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CONTENTS

EDITOR'S NOTE

Science is a dynamic and expanding body of knowledge covering wide domain of experience. It plays a true liberating role, helping people escape from the vicious cycle of poverty, ignorance and superstition. National Curriculum Framework-2005 also emphasises on the importance of Science Education. The Framework states "Good Science Education is true to the child, true to life and true to Science". A lecture by C. Vijayan on "Strategies for Effective Science Education in the Present Century" emphasises on shifting towards learning Science and discovering new ideas. Science Education involves inspiring and motivating the students' community in general. It is because of fast growing demand of economy that space for computers has been created in our life. In school education learning computers has become essential to cope with the expectations of growing competitions in the world of work. Scope of subjects such as Commerce has been enhanced with the beginning of computer-based accounting. However, the attitude and interest of teachers who are expected to deal with ICT for many reasons in schools, many a time have become a road block towards utilizing this technology for enhancing student's learning. In this issue, Shipra Vaidya's article throws light on this aspect. Further, Smitha V.P and Manjula P. Rao in their articles point out that teachers need to be efficient in communication and interaction with students to effectively implement Guided Discovery Learning and Inquiry Training Model to develop critical thinking. Constructivism is also an approach which promotes child-centred pedagogy viewing learning as knowledge and experiences interacting in the mind of the learner. Seema S.Ojha in her article "Constructivism and History Textbooks" expresses that constructivists consider child as an active learner and the teacher as a facilitator in the learning process of history.

Teachers are the most important element in fostering student achievement. Madhu Sahni explains that teachers' quality plays a critical role in affecting student's performance. Students need effective teaching for better performance. Bijoy Kumar Panda in his comparative study of Madhya Pradesh and Karnataka finds out that teacher management remained crucial for the development of education. Another case study by Sambit K. Padhi and Sandeep Kumar highlights the need for improvement of Secondary Teacher Education Programme in Chhattisgarh.

Fostering pupil's motivation towards learning is an essential feature of the teaching skills which helps in establishing a positive classroom environment. Sarita Saini in her article expresses that role of parental encouragement is crucial in influencing the level of pupil's academic achievement. Monitoring pupils' progress closely with quick and supportive

feedback towards pupil's learning enhances child's interest in learning. Emerging curricular vision emphasises providing stress-free environment to children for learning. Even in Mathematics, now the focus is on mathematisation of child's thinking abilities. Children need to be provided constructive and conducive environment for mathematics learning to discard fear and phobia attached with Mathematics. In this context, Madhu Kushwaha and Shubhra Srivastava and Sushmita Chakraborty present their views in their articles.

In addition to teaching-learning, managing class for discipline is another area which requires our attention. In the past years, teachers and parents often view corporal punishment as an effective technique to discipline the class. What is the present scenario? Naba K Mondal and Sohini Das in their article "Corporal Punishment in Higher Secondary School: A Case Study in Birbhum District, West Bengal, India" presents a study on the corporal punishment between the rural and urban students. They observe the mixed opinions between the rural and urban teachers towards corporal punishment.

The issue also includes Right of Children to Free and Compulsory Education Act 2009, for its readers. Now, the whole education community is expected to join hands towards providing each child his/her right to education.

It is our sincere hope that readers will get enriched by the ideas, opinions, studies, etc. presented in this issue. We also expect reflections of our readers on the present issue for continuing this dialogue on education.

Academic Editor
JIE

Strategies for Effective Science Education in the Present Century*

C. Vijayan**

Abstract

The present century continues to witness several emerging technologies often beyond the wildest of our imaginations. An unlimited content of information is available easily from resources all over the globe, packaged in a variety of extremely effective and unconventional styles of presentation. The shift of emphasis from the textbooks and the blackboard to the internet, virtual classrooms and multimedia is happening at a tremendous pace. The magnitude and speed of the information explosion of the present times re-emphasises the urgent need for building bridges across the huge gaps between information, knowledge and wisdom. This shifts our attention to the very basic purpose of education as an enabling, enriching and empowering technology, demanding focused efforts to evolve innovative strategies addressing the perspectives of the content and the style, the teacher and the taught, the enabling agencies and the public — all stakeholders. The emphasis is shifting towards learning to learn and uncovering and discovering the syllabus. Science education involves inspiring and motivating the student community at large, imparting theoretical as well as practical skills and highlighting the need for creative thinking and innovation. The proclaimed role of the educator, of opening up the students' eyes ('chakshurunmeelitam yena') towards glimpses of the ultimate reality, is particularly significant for science education. It is important to address the fundamental issue of the recent migration of excellent brains from science and science education towards greener pastures. Obviously, these pastures also are to be made sufficiently green! While waiting for this, we have also to evolve strategies within our reach to save the situation. The treasury of experience and wisdom of original thinkers on education and great teachers of the past and the present provides us specific examples, tested ideas and adaptable techniques to start with. We may have to struggle a bit, shaping bricks and polishing stones, which is an integral part of building up a monument. The fruits may be rewarding; but the charm and thrill of the adventure itself are worth the effort!

* This article was presented during the First Golden Jubilee Lecture Series-2011 at CIET, NCERT on 27 April 2011 delivered by Professor C. Vijayan, published by NCERT, New Delhi.

**Professor*, Department of Physics, IIT Madras

The NCERT means much more than a mere government office to me and several thousands of others from all over the country who have been supported and inspired through the prestigious National Science Talent Search Scholarship to pursue science for their education and career. Thus, I stand here in reverence and gratitude as I speak at the portals of the NCERT. Over the past several decades, this institution has been designing and developing appropriate methods for improving education and training in India as it has become a role model for the other developing nations in this noble endeavour.

The scenario has been ever-changing and the efforts have to continue to design specific strategies for education in general and science education in particular, adaptable to the perspective of the present century. The spirit of science education has perhaps been brought out in the most appropriate manner in the popular story of the legendary student of ancient India, *Shvetaketu*[1]. He returned home after completing his *Gurukula* education over a period of twelve years and stood before his father, *Uddalaka Aaruni*, declaring proudly that he had learned everything. His father asks him: "*Have you obtained that knowledge, which makes you understand all that has not been understood? Has your learning empowered you to think about all that has not yet been thought about?*" This question continues to be relevant to help us to retain our focus and perspective clear and sharp when we plan strategies for effective science education, even in the present century.

The Philosophy of Education — The Text as a *Pretext*

Education is actually the process of helping to learn — a process that enables, enriches and empowers. Learning is important while *learning to learn* is even more important. The teacher actually trains and encourages the students to learn by themselves. The aim of the teacher is to *uncover and discover* true scope and potential of the syllabus and then to transcend it. That is why it is often said that *a great teacher inspires.*

Our tradition has defined the teacher as *the one who removes the cataract of ignorance and reopens the eyes of the student* towards the light of knowledge, *enabling him to perceive a few glimpses of the ultimate reality that encompass everything*. The ultimate knowledge is stated to be *that, knowing which everything becomes understood*. This has special significance and meaning in the context of science education. Science is based on mathematical logic. A clear, straightforward and no-nonsense approach to learning and life at large can be inculcated by proper science education and training. Removing the cataract of ignorance and misconceptions is of crucial importance in science teaching. The universe we find ourselves in is pretty complicated as *Mother Nature likes to hold her pet secrets close to her heart.*[2] Science can unravel only some fraction of it all (though the fraction is expected to be a bit larger after the famous LHC experiments!). Yet, science is the only powerful enough tool for the survival of the species. This highlights the need for going beyond the text and inspiring the students to

transcend their limitations with a universal view with a larger perspective.

To give some specific examples from physics, the purpose of working out a particular numerical problem in a class on kinematics is not just to calculate when a particular car reaches its mundane destination under the given conditions, but to master the methods of dynamics at large. In fact it does not even stop there as most students are anyway not going to take up automobile engineering or even physics. It has the larger agenda of sharpening the students' intellect so as to develop their skill set for success in all human endeavours in their future.

The simple pendulum is a topic we learn in physics quite early. Then we complicate it by adding damped and driven motion. Now this becomes a very powerful paradigm to analyze extremely complex phenomena of oscillatory systems, regular and chaotic, in various branches of science, engineering, technology, medicine, finances and what not! A mastery of the study of partial differential equations, for example, enables one to model a great many dynamical systems that makes up our world – natural and manmade. Teachers and leaders of education will benefit by keeping such a balanced perspective — humble, factually correct, clear and logical — at the back of their minds if they wish to do their jobs properly.

Science Education in the Rapidly Unfolding Scenario

Several distinct features mark the horizon of science education of the present and the immediate future, most of which could not even be dreamt about before the turn of the century. For example, it is clear by now that a great amount of the process of education going to be out of the class room. The class room itself is going to be remarkably different. The ease of obtaining large amounts of authentic information in convenient formats such as multimedia[3] and simulation revolutionises the learning processes and prompts us to think beyond the textbooks and the blackboard have to take note of the rapid technological advances and make efficient and effective use of these in science education.

Today the student can enjoy high quality content in virtual classrooms provided by a choice of excellent institutions worldwide. This has made education truly 'global' as we are not limited to the wisdom of a single board or university at any remote geographical location. It has now become very easy to obtain the latest results of international research on education, to consult experts worldwide and to browse through the curricula of several universities over the globe. Free and easy access to several high quality e-books and other resources, obtaining information about and even purchasing books from sources all over the world and other similar facilities have changed the very outlook of education methodology[4]. The old adage of *learning only one fourth of the content from the teacher*[5] is going to attain its fullest significance in the years to come.

Churning the Milky Way of Information for the Nectar of Wisdom

However, the information explosion is a *genie released out of the bottle* and has to

be handled properly. Information *per se* is not knowledge, and knowledge *per se* is not wisdom. Bridges need to be built and better, chasms are to be filled thoroughly. As J. D. Everett had observed,[6] *"There is a great danger in the present day lest science-teaching should degenerate into the accumulation of disconnected facts and unexplained formulae, which burden the memory without cultivating the understanding."* It is the age-old fear of *loosing sight of the forest while examining the trees* in detail with all technical formalities. Here the question raised by T.S. Eliot becomes important[7]

"Where is the wisdom we have lost in knowledge?
Where is the knowledge we have lost in information?"

Our attention should now focus on the very basic purpose of education as an enabling, enriching and empowering technology, and we have to plan focused efforts to evolve innovative strategies addressing the perspectives of the content and the style, the teacher and the taught, the enabling agencies and the public — all *stakeholders*.

Several initiatives are being taken up and strategies are being adopted in countries all over the world on improving the effectiveness of science education in the present times. The *American Association of the Physics Teachers*[8] and the *American Journal of Physics*[9] are just two examples from USA. The Organization for Economic Cooperation and Development (OECD) has been working on a project aimed to study innovation and change in Science Mathematics and Technology Education (SMTE). The Innovation Technologies Move Europe series of meetings[10] have come up with excellent level of student motivation and participation. Science education has taken up the format of a festival in Germany, judging from the 'science-on-stage' programmes going on in Berlin in recent years. Universities such as the National University of Singapore give a lot of importance to science outreach programmes for schools and colleges, aimed at inspiring young minds to pursue science with passion.[11] Back home in India we have the NCERT[12] and the DST[13] who have been active enthusiastically in this matter, pursuing several initiatives in an exemplary manner. The Government of India has established institutes such as HBCSE, Mumbai and IISERs at several places in the country, which are changing remarkably the perspective of science education in the country.

Need for Serious Initiatives with Innovation and Thrust

Several strategies have evolved over the years and many of these have been tried out successfully. The first and foremost point is to motivate the students to develop an interest in science. Many of them may become engineers or doctors or industrialists later, but learning basic science at the appropriate levels will enable them to perform well in all these pursuits. This requires a multilevel approach. The past one or two decades have witnessed new science books appearing and newer editions of old text books undergoing thorough modifications in content and style — good examples from physics being the books

by Halliday, Resnick and Jearl Walker, Harvey, Arthur Beiser, etc. to name a few.[14–16] They present the content in a charming way, with excellent photographs and appropriate discussions of physics in everyday life that the students can relate to very easily. Attractively designed questions and problems, internet links (to multimedia and other resources), companion volumes and CDs with simulations, etc. provide excellent value addition to such books.

There are many colleges and even Universities where students end up referring to only books written by their own professors. Of course many of them may be excellent; but the point is that students might miss out the experience of referring to the best books acclaimed globally. This is a situation which can be remedied easily in the internet era. At least, obtaining information about the global scenario and resources is no more difficult. We now have virtual classrooms being designed by world's best institutions where students can derive the benefit of almost being present in such classrooms.[17,18] The NPTEL programme funded by the Government of India[18] has been doing an excellent job and several high quality technical courses (which have gone through a thorough quality assessment and screening) have already been uploaded and are available free of cost to anyone with an internet connection in any remote corner of the world.

Practical training is something that has to be specially highlighted in the context of science education. Over the years, even the leading institutions in our country have been slowly drifting away from providing due importance and thrust to this aspect. Establishing some *standard laboratories* in the schools and colleges is not sufficient, though necessary. Specifically designated centres have to be designed and developed to conduct laboratory training programmes and inculcate the right philosophy perspective *and hands-on training* among the educators at all levels. As stated by Stowe, *common sense is the knack of seeing things as they are and doing things as they ought to be done.*[19]

A wealth of resources is available for those who look for it. Of special mention in this context is the excellent work has been done by Shri Arvind Gupta on popularising science and inspiring thousands of children through highly innovative and economic experiments.[20] Prof. Yash Pal's various excellent contributions towards inspiring students towards the wonders of science are worth special mention here.[21] Contributions by several others such as Prof. Babulal Saraf (at CDPE, University of Rajasthan)[22] and Prof. T. S. Natarajan (IIT Madras)[23] towards effective science education have made a remarkable impact. The training programmes in experimental physics by the noted physics researcher and teacher Prof. R. Srinivasan under the auspices of the Indian Academy of Sciences are relevant in this context.[24] There are several other such initiatives in the country, by dedicated people, institutions and organisations such as people's science movement (also using the media of regional languages for more effective outreach) which also should have found

mention here, but many of these are not known widely or listed readily in any single source.

The Technology of Education — Mastering the Model

The role of the teacher indeed appears to be very complex in the present scenario. Of course, the new devices are of much utility to the teacher, but there is no replacement for the central figure of teacher as such. So it is up to the teacher to get familiar with the new technologies and to make optimal use of them. The present model of a comprehensive educational system appears to be quite, complicated, but careful analysis helps one to master it and go beyond.

On the face of it, the dynamics of riding an ordinary bicycle appears to be a really complicated process; balancing the whole weight spread over the entire geometry at just two points and maneuvering it across curves, slopes and potholes. Looks almost impossible if you think logically! We all would have had a lot of struggle learning cycling. However, once we master the techniques, we seldom think about the involved processes and ride on smoothly, peacefully and happily. Teaching is also a complicated process to learn with a lot of skills to be developed through a lot of worries and struggles. Courses on education teach all these thoroughly. However, the teacher has to integrate all this into his system without bothering too much about the technicalities and specific details, just as an experienced motor driver drives smoothly without getting confused over the positions of the gears and the clutch. Young teachers often begin their career by learning to imbibe the methods of their own favorite teacher to start with; eventually they become thorough with the whole model of education. As is often described in educational circles, it is a journey from '*modeling the master*' to '*mastering the model*'.

The actual content covered in a class is just like the *tip of an iceberg*, and it is the preparation which is like the huge, deep buried part of the iceberg that keeps the tip up. It is the mastery of the subject matter and the style of presentation that leads to confidence, conviction, thoroughness, clarity and eventually, success. A teacher should be enthusiastic and sincere. Enthusiasm is contagious; it can catch attention, overcome barriers, create interest and thus make a difference. A successful teacher tries to keep the students alert, interested and inspired all the time. Each class should convey something and make a specific contribution, a value addition, towards enhancing the understanding as well as the vision of the student. Techniques such as good management of the audiovisual and electronic media, a simple and direct style, eye contact, use of proper voice modulation etc. should come naturally to an efficient the teacher.

From here to Eternity — *What Next?*

Strategies are to be evolved in areas such as student motivation. This has several facets such as attracting the brilliant student to the lure of science (irrespective of whatever profession he pursues later). This also includes

maintaining the interest generated among the students so that the interest continues to grow. Let us look at some of the possible strategies in some detail, with appropriate examples. Some of the important aspects are listed below, *without any claim at all, of being exclusive*!

- Timely and periodic revision of the content of the curriculum and incorporation of new methodologies after careful and continuous review and quality assessment.
- Teacher training with emphasis on presentation of the subject matter in an attractive manner making use of multimedia and internet resources such as simulation and animation wherever relevant.
- Focus on encouraging the students to go beyond any *local* textbook and to develop an international outlook well beyond the limited syllabus of any given University, creation of awareness of the availability of virtual classrooms of tested quality and other web resources.
- Exposure to and training on the techniques of creative thinking and problem solving in science. Apart from incorporating these in curricula, special regional centers may be set up to concentrate on this aspect, which can undertake to provide short term training to teachers and students.
- Design of mini, micro and/or full-fledged projects (at the appropriate levels) for individuals or groups of students so as to encourage their innovative and investigative skills.
- Incorporation of healthy debates among students on topics related to the tough concepts, possible misconceptions, relevance of the content learned to the world around, possible applications, social relevance, etc.
- Urgent and definitive action to bring practical training with hands-on experimentation to its rightful place in science education, encouraging (through competition, awards and prizes) innovative design of novel and preferably low-cost devices, experiments, equipment, demonstration kits, etc.
- Steps to reduce the large scale flow of brilliant minds to *greener pastures* down the gradient of societal pressures and to ensure that pursuits of science and/or science education are also made *sufficiently green!*

Though education is to be considered in a holistic manner, especially at school level, certain specific aspects need to be emphasised in the context of science education. The content and methodology of the curriculum have to provide due importance to actual experimental work in the form of laboratory work, field study and project work. Innovation is to be recognized and encouraged. The role of mathematics as the language of science and engineering and the need for a proper understanding of the logical and mathematical method to master modern science are to be highlighted. The student must be taught to distinguish between the core and the clutter, to develop a sincere, childlike curiosity and to practice the art of raising the right questions without fear, inhibition or meek acceptance. Creative thought and

problem solving skills form the cornerstones of science education.

Emphasis must be given in the content of science education to the new challenges such as harnessing solar energy and other feasible sources of alternate energy, protecting and sustaining our environment (air, soil and water, above all) and attaining one hundred percent self self-reliance in food production. Exposure to and an awareness of these really urgent topics of immediate concern to humanity at an early and proper age appear to be crucial for our very survival on this planet.

Albert Einstein has expressed his view that "Education is that which remains, if one has forgotten everything one has learned in school". It is important to develop among students, "... general ability, independent thinking and judgment and preparedness to adapt to progress and changes". According to him, the school should always have its aim that the student leaves it as a harmonious personality, not as a mere specialist.[25] Sir C. V. Raman has stated emphatically: "The essence of scientific spirit is to look behind and beyond to realize what a wonderful world it is that we live in. Everything that we see presents to us not a subject for curiosity, but a challenge to the spirit of man to try to understand something of this vast mystery that surrounds us".[26]

The treasury of experience and wisdom of original thinkers on science education provides us with an abundant measure of resources such as specific examples, tested ideas and adaptable techniques to take forward. We may have to struggle a bit, shaping bricks and polishing stones, which is an integral part of *building up a monument*. Sri Aurobindo had envisioned : *"...man may very well be a laboratory in which Nature wills to work out superman..."* .[27] It is to Mother Nature that we, the science educators, have to get enrolled as assistants. The fruits may be rewarding in the long run; but the charm and thrill of the adventure itself are worth the effort!

REFERENCES

Reference and Links to Resources:

1. A story from Chandogya Upanishad, verse 6.1.2
2. http://www.wenatcheeworld.com/news/2011/feb/19/retired-wsu-professor-accepts- agricultures-wolf/
3. http://www.vega.org.uk/video; http://amasci.com/amateur/physvids.html
4. Dan MacIsaac, The Physics Teacher, Vol. 48, October 2010 p494
5. http://www.speaksanskrit.org/forum/viewtopic.php?t=237
6. http://www.crewtonramoneshouseofmath.com/math-quotes.html
7. http://www.wisdomportal.com/Technology/TSEliot-TheRock.html
8. http://www.aapt.org/
9. http://ajp.aapt.org/
10. http://www.science-on-stage.eu
11. http://physics.nus.edu.sg/~phyoutreach/demolab.htm
12. http://www.ncert.nic.in/index.html

13. http://www.dst.gov.in/
14. *Fundamentals of Physics,* Sixth Edition by David Halliday, Robert Resnick and Jearl Walker 7th edition, Wiely, 2004
15. *Physics for Scientists and Engineers*, Raymond A. Serway, John W. Jewett Brooks Cole; 6th edition, 2003
16. Study Guide for The Physical Universe [Paperback] Konrad Krauskopf, Arthur Beiser McGraw-Hill Science/Engineering/ Math; 14th edition, 2011.
17. http://ocw.mit.edu/index.htm
18. http://nptel.iitm.ac.in/courses.php
19. http:// www. lotofquotes.com/common_sense_quotes_sayings_about _common_sense/
20. http://www.arvindguptatoys.com
21. http://en.wikipedia.org/wiki/Yash_Pal; http://www.youtube.com/ watch?v=FNDFyNJbH3M
22. http://video.google.com/videoplay?docid=611895857380356270#; Current Science, Vol. 96, No. 9, p 1270, May 2009
23. http://www.physics.iitm.ac.in/~tsn/
24. http://www.ias.ac.in/
25. From Einstein's lecture on 'Education' at Albany, USA, 1936, *quoted in Literary Reader, Functional English, CBSE Class XII*
26. From "Why the sky is blue", a radio lecture given by Sir. C. V. Raman to school children. Available free at http://www.vigyanprasar.gov.in/digilib/
27. The Essential Aurobindo: Writings of Sri Aurobindo, Robert A. Mc Dermott, *Sri Aurobindo.*

The Fear of ICT among Commerce Teachers – How to Overcome Teachers' Resistance

SHIPRA VAIDYA*

Abstract

Computer technology and its usage have registered a significant development during the last three decades. Historically, computers have been used effectively in science and technology to solve the complex conceptual and logical problems. They have also been used for carrying out economic planning and forecasting processes. Recently, modern day computers have made their presence felt in business and industry. An important impact of computers has been on data storage and data processing within the organisation. The advent of computers has also fast replaced the traditional methods of accounting by dispensing with the manually handled book of accounts and associated paper work. The development of database technology has brought about a revolution in the accounting department of a small to large sized organisations. This revolution has opened new vistas of growth in the practice of accounting profession. And there is no stopping to this avalanche of change. Our commerce teachers cannot keep themselves away from these changes and happenings. But, the electronic frontier is not something that commerce education has embraced with open arms. The fear of ICT among post graduate teachers of commerce is responsible for the slow acceptance of modern technology in the educational environment. This paper explores the trepidations of post graduate teachers of commerce in the implementation of ICT and submits suggestions to integrate technology in the classrooms. The study is confined to the commerce post graduate teachers of Kendriya Vidyalaya Sangathan, but the findings may be relevant to the entire commerce teaching community.

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Introduction

The world of business is witnessing developments and changes coming too fast and thereby demanding our attention for commerce curriculum at the higher secondary stage. These would not wait for the normal five-year curricular cycle in order to be included in the school curriculum. Every learner in a dynamic learning society has to be familiarised with such areas of knowledge in the global setting. The past three decades have witnessed rapid advances in information technology that in turn has affected the business activities to a great extent. The role of computers has also brought a big revolution in accounting theory and practices. The accounting principles, practices, procedures and techniques have to be tuned with the economic and social development of a country so that the primary objective of accounting, that is the decision worthy reporting, is achieved.

How can we make teaching and learning of accounting curriculum effective at the school level? The National Curriculum Framework-2005 (NCERT) has proposed the epistemic shift that the textbook should not be perceived as a closed box and the only source of information. It should be one of the ways of understanding issues and be seen as a dynamic document. Therefore, for upgrading the accounting curriculum at the higher secondary stage, commerce educators have expressed significant interest and are pursuing the integration of ICT into the accounting curriculum. ICT in the school system has resulted to look beyond the traditional teaching-learning processes. The use of computers is now to be seen in a broader context than merely seen as a separate subject of study. It should become an integral part of literacy, computer aided learning and finally computer based learning throughout the country.

Simultaneously, the urge within the accounting profession has shown a shift for acquiring the skills needed by students after entering the workforce. It has been largely felt that an opportunity need be given to the learner to dwell into the changing role of accounting and understand the shift from just *reading numbers to reading beyond the numbers.* The arrival of computers has fast replaced the traditional methods of accounting by dispensing with manually handled book of accounts and associated paper work. The development of database technology with Database Management System (DBMS) has brought out a revolution in accounting of small to large sized organisations. This revolution has opened new vistas of growth in the practice of accounting profession. Usage of computers and IT enables a business for quickly, accurately and timely access the information that helps in decision making. This sharpens the competitive edge and enhances profitability.

Computerised Accounting System refers to the processing of accounting transactions through the use of hardware and software to produce accounting reports. Against this background, as a follow up of National Curriculum Framework-2005, a new course (optional) on 'Computerised Accounting System' is designed by NCERT for the higher secondary commerce education programme.

About the Course

The newly brought out course on 'Computerised Accounting System' develops a basic understanding about the nature and purpose of accounting information and its use in the conduct of business operations. The course is optional to the existing course on 'Analysis of Financial Statements' at the Class XII level and carries the total weightage of 40 marks, divided as 20 marks theory and 20 marks practical. The course lays emphasis on the process of accounting data as a part of Accounting Information System (AIS) using the two application softwares Excel and Access. Using these softwares, the learners of accounting are exposed to design need based small accounting projects and are facilitated towards the concept of data flow, information generating and data representation through charts and graphs. The exemplar projects given in the textbook relates to Bank reconciliation statement, Petty cash book, Purchase and sales book, Ratio analysis, Pay roll, Asset accounting, etc. The course on Computerised Accounting System is a skill-based course and prepare students for the world of work. With the business operations moving towards automation, the component of ICT in the teaching-learning of accounting is gaining importance. The course has employment potential too.

But unfortunately, in its sixth year of implementation, the course is quite unpopular among commerce teachers and is yet to take off. The very apparent reason for this dismal situation is the 'fear of ICT' among commerce teachers *who think mouse is something they do not want to find in their kitchen* (Mayya, 2007). Though, the pressure for schools to reform and change the method in which teachers instruct is over-emphasised, but until teachers become comfortable and confident in using the computer, it remains an isolated tool with either the potential to increase student learning or the amount of dust it accumulates (Deborah, 2000). When teachers do not use computers, the likelihood of students using it and becoming computer literate is greatly affected. Providing computers in schools is not adequate. What is required is to motivate teachers to recognise the potential of ICT to enable school education.

Reporting the Survey

Realising the resistance of commerce teachers towards the newly designed course on Computerised Accounting System, a survey was conducted on the post graduate teachers of commerce of Kendriya Vidyalaya Sangathan to ascertain the actual and perceived difficulties in using ICT in the commerce classroom. The study was conducted in two phases:

Phase I: Conduct of survey on the teaching of a newly designed course on Computerised Accounting System.

Phase II: Organising series of teacher education programmes on 'Computerised Accounting System' as a mode to overcome teacher's resistance.

Phase I: Conduct of Survey

Kendriya Vidyalaya Sangathan (KVS), New Delhi was approached to depute post graduate teachers of commerce to participate in this academic exercise in

January 2009. As many as eighty-five (N=85) deputations were received covering all the regions of Kendriya Vidyalaya Sangathan. The female commerce teachers constituted at least 40% of the sample. This helped us to analyse the gender-wise motivation to use ICT in accounting classroom. A questionnaire was prepared to gather the information from the deputed teachers on the integration of computerised accounting system in the accountancy curriculum at the higher secondary stage.

The survey was conducted with the following objectives:

1. To congregate the opinion of commerce teachers on the new course Computerised Accounting System for the upgradation of accounting curriculum at the higher secondary stage.
2. To ascertain the needs and apparent difficulties in handling this course effectively in the classroom.

The survey asked questions about the familiarity of the commerce teachers on the use of computers, capability of teachers to handle the topics of computerised accounting independently in classes XI and XII and finally an open ended question to express their viewpoint on the necessity of integrating ICT for the upgradation of commerce curriculum at the higher secondary stage. This enabled us to answer the following questions:

1. What are the factors that motivate a commerce teacher to teach the Computerised Accounting System course in classes XI and XII?
2. What are the factors that restrict a commerce teacher to teach the Computerised Accounting System course?
3. Is there any significant difference between male and female commerce teachers on the use of computers in the accounting class?
4. Does any significant difference exist between the age and length of experience with the use of computers in the accounting class?

The findings of the survey revealed that all the teachers were well familiarised with the use of computers. This is because of the initiatives of Kendriya Vidyalaya Sangathan (KVS) such as computer literacy programmes extended to all Kendriya Vidyalaya teachers and all other administrative and support personnel for upgrading their skills in ICT operations. Also, the KVS has specifically carved a special component for computer education and applications in all the in-service teacher training programmes which are conducted every year for different subject areas across all stages of school education.

Despite this, the commerce teachers have less acquaintance with regard to the use of spreadsheet and Database Management system. This analysis formed the foremost basis for the unpopularity of the course amongst teachers which requires the knowledge of these two application software's, viz., Excel and Access for generating accounting information. Secondly, the information received from the survey clearly showed that the commerce teachers were not able to handle the chapters' relating to computerised accounting independently in the

classroom. It is worth noting here that these topics are included in the in Class XI as an 'entry gate' to the course of Computerised Accounting System in Class XII. They either take the help of the computer teacher to cover these lessons or simply desired not to teach these lessons given an opportunity to do so.

Lastly, while responding to the open ended question, nearly all commerce teachers agreed to the need for the integration of ICT leading to the upgradation of the commerce curriculum at the higher secondary stage. The findings of the survey revealed the following:

1. The commerce teachers felt the need for continuous training and support especially and exclusively for this new area. Similar to the science stream, they wished to have a separate computer lab and a separate slot in the school timetable for the commerce stream students for the effective teaching of this subject.
2. The conventional 'chalk and talk' method of teaching accounting emerged as a strong factor restricting the use of ICT in accounting. Respondents had a view that drawing up accounts on the black board helps the learner grasp the concepts of accounting easily. They felt that there is a possibility that students may get lost in using the application software alone leaving the accounting task at the back burner. However, as many as half of the respondents preferred a middle way, i.e., strengthening the accounting concepts using a black board and enabling students to design accounting reports for generating accounting information in the form of small projects and classroom activities.
3. The male and female commerce teachers did not differ in their responses on the teaching of Computerised Accounting System course. Similarly, the assumption that commerce teachers in the older age bracket and with the more years of experience have loathing for ICT did not hold true. In fact, such senior commerce teachers desired to participate in the training programme on Computerised Accounting System and wished to learn more about this new and emerging area of study under commerce education at the higher secondary stage.

Phase II: Teacher Education Programmes on CAS

Teachers are the key agent for the success of any exercise for curricular reform in school education. Although the creative ideas for reforming education come from many sources, only the teachers can provide insights that emerge from intensive, direct experiences in the classroom *per se*. The revision in curriculum cannot be imposed on teachers from top to bottom or outside–in. If teachers are not sufficiently well prepared to introduce new contents and ways of teaching, they are unlikely to implement them energetically. This is equally true for Computerised Accounting System course because it is relatively a new concept which demands teachers to go beyond the boundaries of their subject specialisation.

It is not only the teaching style but also the learning style that is influenced by ICT. A shift is now seen from aiming at the mastery of discrete units of some fixed knowledge towards exploration, problem solving, decision making, i.e., from prescriptive classroom teaching to interactive group learning. The findings of the survey, reported in Phase I, generated the need for in-service teacher education programmes in computerised accounting system. In collaboration with Kendriya Vidyalaya Sangathan, the Department of Education in Social Sciences and Humanities (NCERT) conducted three programmes at KVS, NEHU Shillong, Zonal Institute of Education and Training (ZIET-KVS) located at Gwalior and Mysore respectively in the year 2009-10. The duration for the programme was for six days. Sixty five commerce teachers of Kendriya Vidyalaya Sangathan attended these programmes.

The objectives for organising these programmes were:

1. To acquaint teachers with recent trends and emerging practices in accounting discipline at the higher secondary stage.
2. To enable commerce teachers appreciate accounting as an information system and helping them move beyond the traditional boundaries of the discipline towards data representation and information generation.
3. To upgrade the skills of commerce teachers for using ICT in accounting.
4. To develop scientific approach towards the subject.

To support learning, the focus of these programmes was on data flow and generation of accounting information using application softwares: MS Access and MS Excel-2007. The content presentation was devised as 30% theory and 70% practicals. Throughout the course, the commerce PGTs were given hands-on training to use specified application softwares for generating required accounting information. The commerce teachers were encouraged to choose the topics from their syllabus as a part of small projects. Initially, the group had an inhibition on using the computer but gradually, as they built up confidence, they were able to develop small projects and activities like bank reconciliation statement, sales book and purchases book, calculating the amount of depreciation and preparation of an asset account, petty cash book, subscription account, loan repayment schedule, etc.

As the programme progressed, the teacher trainees were able to think of many other accounting tasks from Class XI and XII accountancy syllabus and were actively involved in developing student-friendly activities. The indications were quite clear. What is required is to enable commerce teachers recognise how technology can serve commerce education programme at the higher secondary stage and then provide access to training to them.

Discussion and Suggestions

The findings of the survey reflected the '5 A barriers' underlying the resistance of commerce teachers taking up this course effectively in the classroom. These are Attitude, Awareness, Application,

Access and Accomplishment (Mayya 2007). There is a natural tendency to resist new ways of doing things. 'Resistance to change' also denotes an important barrier which prevents the use of technology in accounting classroom. It is the attitude of our commerce teachers which is responsible to a great extent for the slow acceptance of ICT in educational setting. Such resistance is apparent in terms of teacher's unwillingness to change their teaching style and practice. They feel that it calls for fewer efforts to continue doing things the way they have always been done rather than to acquaint themselves to the new way of doing things. Most of the respondents held a view that textbook teaching should be the focus of instruction and a primary teaching learning tool for teaching accounting.

Secondly, the commerce teachers are aware to the terminology like e-mail, internet, word processing, file attaching and are also familiarised with the routine functioning of different computer applications. Still, they are unable and unaware that using electronic media as a tool in the classroom can be motivational and beneficial to commerce students.

Thirdly, the need for continuous training in the subject area emerged significantly for the effective implementation of this course at the higher secondary stage. Simply, focusing on the basic computer skills is not preparing the commerce PGTs to handle the Computerised Accounting System course independently. Differentiated mode of training may be devised to meet the variety of needs and skill-level of teachers.

By varying delivery method, say from lecture to group activity to individual presentation, teachers can motivate the interest of students in accounting discipline to realise their full potential and at the same time maintaining academic standards.

Lastly, the advent of globalisation offers rethinking about the selection and delivery of instructional content and new sources of information in order to keep competence with knowledge. Such arguments require students to take active role in the learning process that consequently results in better student retention and performance. The teachers will now have to be co-learners with students as the areas of the frontline curriculum will generally be new as much for them as for their students.

Conclusion

Accountancy being a skill subject to higher secondary students, a better achievement and well adjusted personality is essential for learning to be pleasurable (Babu and Kaliamoorthy, 2007). Rather, it lays more emphasis on memorisation, reliance on textbooks and regurgitates the 'trained monkey' approach. The teaching-learning practice is not effective to cater to the needs of business world. Data processing and information generation for the purpose of useful and timely decision making has to be an important part of accounting curriculum, can now is easily managed by anyone using technology. The students of accounting

are not exposed enough to the impact of technology on accounting practices and ways in which technology can be leverage to make business decisions easily.

Hence, it is explicit to renovate the accounting education to become conversant with the current practices, which is the panorama of the skill development.

REFERENCES

Babu, R. and K. Kaliamoorthy. 2007."Achievement in Accountancy and Educational Adjustment of Higher Secondary Students", *Journal of All India Association for Educational Research* (JAIAER), ISSN - 0970-9827

Beegle, J. and D. Coffee. 1991. "Accounting Instructors: Perceptions of How They Teach *versus* How They were Taught". *Journal of Education for Business,* 67 (2):90-99.

Chang Chee Fei 2006. "Teaching Accounting to Learners with Diverse Intelligence", Taylor's College, Malaysia. Paper presented at Asia Pacific Educational Research Association International Conference, Hong Kong Institute of Education.

Deborah Y and R. Meyers. 2000. "The Factors that Motivate and Impede Computer Use by Teachers", Doctoral Dissertation. ISBN:0-493-00359-2

Deleo, W.I. and C.A. Letourneau. 1994. "Use of Problem Solving Model in Teaching Specific Accounting Concept", *Journal of Education for Business,* May /June 94, 69;5, pp 263.

Mayya, S. 2007. "Integrating New Technology to Commerce Curriculum: Overcoming Teacher's Resistance", *The Turkish Online Journal of Educational Technology-* TOJRT, ISSN: 1303-6521, Volume 6, Issue 1.

National Focus Group Paper of Teaching of Social Sciences. *National Curriculum Framework, 2005.* NCERT. Also refer Accountancy Textbooks for Class XI and XII published by NCERT.

Vaidya S. 2008. "Creating Thinking Accountants – Focus on the Approaches in Teaching-learning of Accounting Practices", *Journal of Indian Education,* Volume XXXIV, Number 3.

Relative Effectiveness of Inquiry Training Model and Guided Discovery Learning on Critical Thinking of Secondary School Students

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Abstract

Inquiry Training Model and Guided Discovery Learning are two teaching approaches which are known to hold potential in development of critical thinking in students. This study investigated the relative effectiveness of these two approaches. A pre-test post-test quasi-experimental design with a 3 2 factorial matrix was adopted. 126 students belonging to three different sections of the eighth standard of a school were selected as the sample. Two classrooms, consisting of 42 students each, were taken as experimental groups in which the Inquiry Training Model and Guided Discovery Learning were applied and the third classroom was the control group which received conventional lecture-demonstration method. The study revealed that both Inquiry Training Model and Guided Discovery Learning were equally effective in developing critical thinking in students and that both these approaches were better than the conventional lecture demonstration method.

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INTRODUCTION

The quality of learning is enhanced if students are taught to think critically. Deep learning involves examining new facts and ideas critically, and tying them into existing cognitive structures and making numerous links between ideas as against surface learning, which involves new facts and ideas are accepted uncritically and attempts are made to store them as isolated, unconnected, items [Compiled from Biggs (1999), Entwistle (1988) and Ramsden (1992)]. Development of critical thinking ability is essential for the students of science as it helps them in their future career in engineering, medicine, research and such other fields that have applications of science. Not only that, critical thinking enables individuals to resist superstitious beliefs, extremist views and narrow mindedness that are the root causes of unrest, miseries and violence in the society and develop positive attitudes essential for building up a progressive minded society.

Clement and Lockhead (1980) observes that "We should be teaching students how to think. Instead, we are teaching them what to think." Development of critical thinking through curricular intervention has, therefore, gained interest in the recent times.

Schafersman (1991) observes that many secondary school students do not possess the 'higher-order' intellectual skills we should expect of them. According to him, nearly seventy per cent cannot solve a problem which is not directly given in the textbook. People could be influenced through effective science education to think critically on issues related to their personal and professional areas and on issues related to social, political and economic aspects.

Traditional teaching methods give emphasis more on providing content than on developing thinking skills of students. Education must help not merely to increase the knowledge of the pupils but go beyond that by developing their skills of understanding, analysis, interpretation, higher order thinking skills and application abilities. Science education, in particular, must help in developing scientific attitude and critical thinking in students.

At the school level, science education can be improved by adopting suitable teaching methods that promotes scientific attitude, knowledge cognitive processes and critical thinking. Constructivist approaches to learning focus on learning environments in which students have the opportunity to construct knowledge themselves, and negotiate this knowledge with others. Guided Discovery Learning and the Inquiry Training Model are the examples of learning contexts that cater for knowledge construction processes.

To be a skilful thinker, one needs to learn meaningfully, think flexibly and be able to make reasoned judgments. It is crucial to ensure that the young generation is able to think independently, generate creative initiatives and solve unexpected problems, while remaining intellectually proficient. We cannot assume that students will spontaneously pick up these skills without being taught explicitly (Kong, 2006).

Lecture demonstration method,

which is the most widespread and traditional, has certain drawbacks as it tends to make students passive listeners, rather than critical thinkers.

Development of critical thinking is essential to equip students to meet the challenges of the modern times. With expanding contents in science with addition of new research findings, inventions and discoveries, it is practically impossible to attempt to deliver all science knowledge through the school curriculum. Students who possess inquiry skills, discovery skills and critical thinking skills are capable of seeking out knowledge they need and apply it effectively for their use. Teacher's role would shift from content delivering to that of a facilitator in learning. Many researchers have observed that learning takes place better when students construct knowledge themselves. Learning takes place when the student acquires knowledge, and also skills for interpretation, analysis, synthesis, evaluation and application. Critical thinking is essential for deeper learning.

Educational psychologists advocate constructivist approaches for development of critical thinking. Inquiry Training Model and Guided Discovery Learning are two such approaches to teaching, with former focussing on learning through inquiry and the latter on discovery. In the Inquiry Training Model classroom students learn the skills of inquiry and use it to solve problems. In Guided Discovery Learning the teacher minimally intervenes in the learning process and provides guidance to the students, who are provided with facilities to find solutions to the problems themselves by performing experiments in the classroom.

The Delphi report (1990), which is a consensus report developed by forty-six experts from various disciplines, including science and education, presents a number of characteristics of a critical thinker. It defines a critical thinker as follows:

"The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit."

The six cognitive skill components of critical thinking, as per Delphi report are: analysis, interpretation, inference, evaluation, explanation and self regulation.

The present study could provide a great deal of insights on various practical aspects of their implementation in the classrooms.

Not many studies seen conducted that evaluate the effectiveness of Inquiry Training Model and Guided Discovery Learning in promoting critical thinking and to compare their effectiveness. This study investigates the relative effectiveness of Inquiry Training Model and Guided Discovery Learning. Further, this study has helped to get an understanding of the classroom processes that occur in development of thinking.

Inquiry Training Model

Inquiry Training Model was developed by Suchman (1961), which was intended to engage students in causal reasoning, become precise in asking questions, building hypothesis and testing them. It was also intended to teach students a process to investigate and explain unusual phenomenon and help develop their thinking abilities. The Suchman Inquiry Training Model is most commonly used in science and social studies.

In Inquiry Training Model the students engage in open-ended, student-centred, hands-on activities like data gathering, verification, experimentation, explanation, and analysing in order to solve the problem presented to them. These learning activities are expected to help development of cognitive skills for searching, data processing, logic and scientific inquiry.

Inquiry training begins by presenting students with a puzzling event. When faced with such a situation the students are naturally motivated to solve the puzzle. They are then prompted to ask questions to the teacher in order to find the solutions. The teacher must not answer the questions directly. She may just say 'yes' or 'no' to each question. The students are required to ask only such questions that contain an idea or guess which the teacher either confirms or rejects. Whenever the question cannot be answered by a 'yes' or 'no', the teacher asks the students to re-phrase the question so that it can be answered by a 'yes' or 'no'. The students eliminate irrelevant variables and discover the relationships that exist between the relevant variables. Next, the teacher asks students to organise the data and formulate an explanation for the puzzle. Finally, students analyse their pattern of inquiry and propose improvements. In this way the students are trained to think and inquire for a solution to a puzzling event with the assistance of the teacher.

Phases of Inquiry Training Model

There are five phases under this model as listed below:

- **Phase I:** Confrontation with the problem; explain inquiry procedures; present the problem.
- **Phase II:** Data gathering, verification; verify the nature of objects and conditions; verify the occurrence of the problem situation.
- **Phase III:** Data gathering, experimentation; isolate relevant variables; hypothesis and test casual relationships.(Students organise the information obtained so that they can derive an explanation for the puzzling event).
- **Phase IV:** Formulating and explaining—formulate rules or explanation
- **Phase V:** Analysis of the inquiry process—analyse inquiry strategy and develop more effective ones. The students are asked to analyse the problem-solving strategies they used. This operation helps students to establish a focus in their inquiry and to facilitate discussion of the problem situation.

These phases were used in the designing of lesson plans for Experimental Group I.

As opposed to passive learning, that

suppresses student inquiry, classrooms based on Inquiry Training Model encourage inquiry by training them in inquiry skills.

This teaching model has various attributes in it that stimulate autonomous learning through inquiry and questioning skills to various degrees. It has been observed from relevant literature that very few studies have been conducted to assess how far teaching based on Inquiry Training Model is effective in improving science achievement in secondary school students. Moreover the existing studies give inconsistent results. Understanding about the effectiveness of Inquiry Training Model in improving achievement in students and the conditions that facilitate its effective application in science classrooms will help improve science education.

Guided Discovery Learning

In guided discovery, the teacher devises a series of statements or questions that guide the learner, step by logical step, making a series of discoveries that leads to a single predetermined goal. In other words the teacher initiates a stimulus and the learner reacts by engaging in active inquiry thereby discovering the appropriate response. Guided discovery seems to offer a happy medium between the pure discovery and expositional learning as some of the efficiency of expositional learning is maintained along with the benefits of the pure discovery process which can be well adapted to most situations (Bibergall, 1966). Kersh and Wittrock (1962) stated that guided discovery is the most motivating of the three types. The reason appears to be that the reinforcement given by a teacher in the form of encouragement and support (even if the pupil does not discover the correct answer) motivates the child to continue working and she in turn becomes more motivated.

Guided discovery helps students personalise the concepts under study, creating an understanding that cannot be matched using any other method of instruction. In guided discovery learning the teacher should guide the students toward the discovery. This can be accomplished by providing appropriate materials, a conducive environment, and allotting time for students to discover.

Martin (1997) in his book has proposed a lesson plan format for guided discovery learning. Carin and Arthur (1970) also gave lesson plan format for discovery learning. From these books and various literatures related to discovery learning and guided discovery learning, five phases were identified, which are as follows:

Phases of Guided Discovery Learning

(i) *Motivation and Problem Presentation*

At this phase the teacher creates the learning situation to lead the student to the discovery. The problem may be presented which is motivating and inspiring through various methods like demonstration, narration, questioning, etc.

(ii) *Selection of Learning Activities*

At this phase, the students with the help of the teacher select the learning

activities to solve the problem presented before them.

(iii) *Data Collection*

During the data collection phase of the lesson, the students work within groups. In the groups, students negotiate ideas and learn from one another. The students involved in the activity record their observations in their data collection sheet. When the students engage themselves in setting apparatus and doing experiments the teacher walk around the room to assess them and answer their questions. The teacher provides all necessary directions to them at all stages.

(iv) *Data Processing*

In the data processing phase, the students get involved in interpretation and analysis of the data collected. They discuss about the observations they have made. The teacher asks questions about the topics and indirectly guides them to discover learning contents. The students work with the data recorded in the data collection sheets and get involved in drawing graphs, analyse, and interpret. Based on these analyses the students make predictions.

(v) *Closure*

In the closure phase of a lesson, the students review the learnt contents in order to recollect prior knowledge

These phases have been used in the designing of lesson plans for Experimental Group II.

The responsibilities and the role of a teacher in a guided discovery learning environment become multifold when compared to conventional classroom teacher. The teacher has to create an intellectual climate; plan and sequence learning activities; prepare instructional materials; assist students in selecting proper activities and so on.

In such a context, understanding about the relative effectiveness Inquiry Training Model and Guided Discovery Learning on developing critical thinking in students and the conditions that facilitate their effective application of these in science classrooms will help improve science education. This approach to teaching has various attributes in it that stimulate the critical thinking skills to various degrees. A study of the present nature is expected to throw light into unexplored areas of development of the said skill.

The present study can provide a great deal of information on the nature of teacher behaviour in classroom aimed at promotion of critical thinking. Moreover, the present study will be helpful for future researches in identifying teacher behaviour aspects. It could also bring up various problems in actually implementing this in the classroom.

Objectives

1. To determine the relative effectiveness o f Inquiry Training Model or Guided Discovery Learning approaches in teaching in developing critical thinking of secondary school students.
2. To determine whether Inquiry Training Model is better than the conventional teaching method (lecture demonstration) in developing critical thinking.

3. To determine whether Guided Discovery Learning approach is better than the conventional teaching method (lecture demonstration) in developing critical thinking.

Research Questions

Based on information gathered from review of related literature the following research questions were formulated for the present study:

1. Which is the better model of teaching in developing critical thinking—Inquiry Training Model or Guided Discovery Learning?
2. Is Inquiry Training Model better than the conventional teaching method (lecture demonstration) in developing critical thinking?
3. Is Guided Discovery Learning approach better than the conventional teaching method (lecture demonstration) in developing critical thinking?

Methodology

In order to answer the said research questions, a quasi experimental design was adopted with a 3 2 factorial matrix consisting of a pre-test at the beginning of the experiment and post-test at the end.

The Sample

Purposive sampling technique was used, wherein the sample was drawn from three intact divisions of Class VIII students of a government run vocational higher secondary school in Meppayur village of Kozhikode District, Kerala State. Each classroom had 42 students. In all, there were 126 students, 66 boys and 60 girls, belonging to the age group of 13-14 years.

Two of the divisions were chosen as the experimental groups and the third was the control group. One of the experimental groups was taught through Inquiry Training Model and the other through Guided Discovery Learning. The control group received conventional lecture demonstration method.

Instrumentation

The Standard Progressive Matrices Test (Raven, 1958) was used to measure intelligence. A Critical Thinking Test was developed and standardised as part of the study for measuring the critical thinking of the students.

The cognitive skills given in the Delphi Report (1990) were used for constructing the critical thinking test. There were 44 multiple choice test items in the test, related to seven cognitive skills, namely, interpretation (seven items), analysis (eight items), evaluation (seven items), inference (eleven items), explanation (six items) and self regulation (five items). The duration of the test was one hour. The test was standardised and its reliability was established by Test-retest method (0.76) and by Split half method (0.85). To establish the face validity, the items of the test were subjected to experts' evaluation.

In order to get a better understanding of the whole process a semi structured interview was also used. It helped to gather the students' reaction on the instructional method used, the classroom environment, the role of the teacher and the role of the students.

Procedure

At the start of the experimental treatment, a preliminary test to measure intelligence was administered to all the groups, with a view to partial out the effect of intelligence on the treatment results. Pre-tests on critical thinking was then administered to all the three groups to measure their entry level critical thinking abilities.

The experimental treatment lasted for five months. During this time, 50 school periods, each with 40-45 minutes duration, were used for the study.

The students were taught from the science topics given in the eighth standard science textbook published by the Government of Kerala. The three units in chemistry taught were (a) water, (b) solutions and (c) acids and bases and the four units taught in physics were (a) sound, (b) static electricity, (c) electric current and (d) heat. The same units were taught in both the experimental groups and in the control group using different methods mentioned above. At the end of the treatment period, post-tests in critical thinking were administered to all the three groups.

Analysis and Interpretation

The three null hypotheses tested in this study were:

$H_0$1: There is no significant difference in critical thinking between the Experimental Group I and the Experimental Group II.

$H_0$2: There is no significant difference in critical thinking between the Experimental Group I and the control group.

$H_0$3: There is no significant difference in critical thinking between the Experimental Group II and the Control Group.

To test the null hypotheses, a unvaried analysis of covariance (32 ANCOVA) was performed on the post test scores. Before ANCOVA analysis, the mean scores were analysed.

Table I shows the means scores of the total sample, boys and girls (maximum score was 44) in the critical thinking tests (post and pre) in the Experimental Group-1, Experimental Group-1I and the control group.

Table I

Mean scores in critical thinking of experimental group-I and the control group

Group	Gender	N	Mean Score			
			Pre-test	Post test	Gain	% Gain
Experimental Group-I	Boys	22	15.91	24.86	8.95	56%
(Inquiry Training Model)	Girls	20	15.00	23.25	8.25	55%
	Total	**42**	**15.48**	**24.10**	**8.62**	**56%**
	Boys	22	13.68	17.41	3.73	27%
Control Group	Girls	20	12.25	15.95	3.70	30%
	Total	**42**	**13.00**	**16.71**	**3.71**	**29%**
Experimental Group-II	Boys	22	15.32	22.64	7.32	48%
(Guided Discovery Learning)	Girls	20	13.55	21.40	7.85	58%
	Total	**42**	**14.48**	**22.05**	**8.47**	**52%**

Table I reveals that there was a positive gain in the scores for critical thinking in all the three groups. For the Experimental Group-I the gain was +8.62 or +56% and for the Experimental Group-II it was +8.47 or +52%. The gain was moderate (+3.71 or +29%) for the control group.

The mean scores displayed in the table suggest that there is very little difference in the mean scores of boys and girls of the Experimental Group-I (+8.95 and +8.25 respectively), Experimental Group-II (+7.32 and +7.85) as well as the control group (+3.73 and +3.70).

In order to test whether there is any statistically significant gain in the scores from pre-test to post-test, 32 ANCOVA analysis was carried out on critical thinking post-test scores, with pre-test scores and intelligence as covariates. The results are tabulated in Table II.

Table II shows that difference in the mean scores of experimental group-I, experimental group-II and the control group is statistically significant, as indicated by the F value, F=47.665, p<0.001. The results of 32 ANCOVA procedures do not indicate which of these group means is statistically different from one another. To evaluate where the difference among the groups occurred, the post-hoc test was carried out, the results of which are shown in Table III.

Table II

32 Analysis of covariance associated with critical thinking of Experimental Group-I, Experimental Group-II and the Control Group

Test of Between Subjects Effects

Dependent variable: Critical thinking

Source of variation	Sum of squares	df	Mean square	F	Sig
Pre-critical thinking	806.815	1	806.815	148.426	0.000
Intelligence	20.657	1	20.657	3.800	0.054
Group	518.191	2	259.096	**47.665**	**0.000**
Gender	0.923	1	0.923	0.170	0.681
Group* Gender	5.019	2	2.510	0.462	0.631
Error	641.423	118	5.436		
Total	58802.000	126			
Corrected Total	3487.714	125			

Table III

Scheffe Post-hoc test result for critical thinking (total sample) of Experimental Group-I, Experimental Group-II and Control Group

Dependent variable: Critical thinking post-test

(I) Group	(J) Group	Mean Difference (I–J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Experimental Group–I	Control Group	7.3810*	0.935	0.000	5.0637	9.6982
	Experimental Group–II	2.0476	0.935	0.095	-0.2696	4.3648

Control Group	Experimental Group–I	-7.3810*	0.935	0.000	-9.6982	-5.0637
	Experimental Group–II	-5.3333*	0.935	0.000	-7.6506	-3.0161
Experimental Group–II	Experimental Group–I	-2.0476	0.935	0.095	-4.3648	0.2696
	Control Group	5.3333*	0.935	0.000	3.0161	7.6506

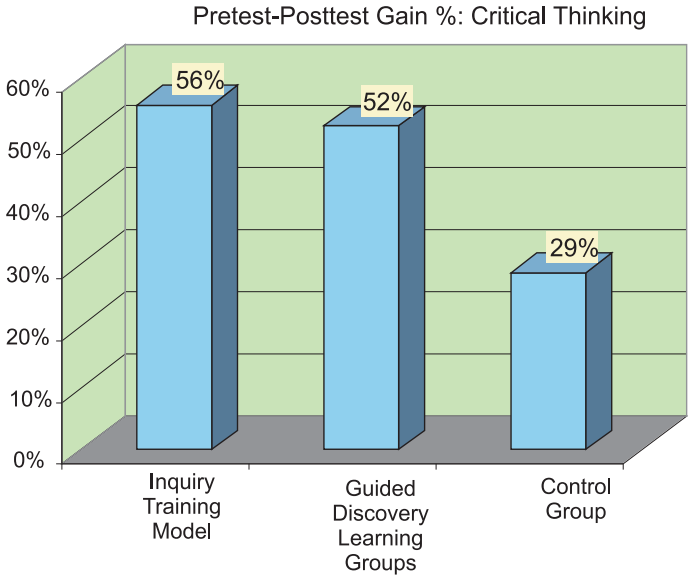
* The mean difference is significant at the .05 level.

The difference in the mean scores of Experimental Group-I and Experimental Group-II is not statistically significant, as indicated by the sig value, which is greater than 0.05. This reveals that both the experimental interventions are equally effective in developing critical thinking in students. Hence, the first null hypothesis [$H_0$1] stating that there is no significant difference between the Inquiry Training Model and the Guided Discovery Learning in developing critical thinking of secondary school students is accepted.

Table III reveals that the difference in the mean of the Experimental Group-I and the Control Group is statistically significant, as indicated by the sig value, which is less than 0.05. The mean difference between the Experimental Group-I and the Control Group is 7.3810. The positive difference shows that the mean of the pre-test scores in critical thinking of Experimental Group-I is higher than the Control Group. Also, 22 ANCOVA analysis shows that the difference in the mean post-test scores in critical thinking of the experimental group-I and the control group is significant with F=70.654, p<0.001. Hence, second null hypothesis [$H_0$2] stating that there is no significant difference in critical thinking between the Experimental Group-I and the Control Group is rejected. This indicates that the experimental treatment through Inquiry Training Model (mean= 24.10) is more effective than the Control Group (mean=16.71) in developing critical thinking.

The mean difference in scores between the Experimental Group II and Control Group is 5.3333. The positive difference shows that the mean pre-test scores in critical thinking of Experimental Group II is higher than the Control Group. Further more 22 ANCOVA analysis shows that the difference in the mean post-test scores in critical thinking of the Experimental Group-II (Guided Discovery Learning) and the control group is significant with F value, F=102.943, p<0.01. Hence, the null hypothesis [$H_0$3] stating that there is no significant difference in critical thinking between the Experimental Group II and control group is rejected. This indicates that there has been a significant increase in critical thinking due to the experimental treatment through Guided Discovery Learning (mean=22.95) as compared to the Control Group (mean=16.71). This result is in tune with Gurumurthy (1990) who has found that cognitive skills are increased due to intervention through Guided Discovery.

Graph I : Percentage pre-test to post-test gain in critical thinking of the Experimental Group-I, Experimental Group-II and the Control Group



The percentage gain (gain/pre-test score 100) in critical thinking is represented in Graph I.

It reveals that there has been increase in critical thinking in all the three groups. But there is relatively more gain in mean critical thinking scores of Inquiry Training Model and Guided Discovery Learning groups as compared to the control group. While in the control group the gain is only 29%, in Inquiry Training Model and Guided Discovery Learning it is 56% and 52% respectively.

Even though there is a small difference in the mean critical thinking scores of Experimental Group-I and Experimental Group-II, this difference is not statistically significant as revealed from the ANCOVA and post-hoc analysis. This indicates that both Inquiry Training Model and Guided Discovery Learning are effective in developing critical thinking in students.

From the Graph-I it is clear that there exist a difference in the mean score of critical thinking of Experimental Group I and the Control Group. The difference in the mean scores of Experimental Group-I and Control Group in critical thinking, is statistically significant as revealed from the ANCOVA and post-hoc analysis. This result indicates that the Experimental Group I is more effective than the Control Group in developing critical thinking.

From the Graph I it can also be clearly seen that there exist a difference in the mean score of critical thinking of Experimental Group II and the Control Group. ANCOVA analysis and post-hoc analysis reveal that the difference in the mean scores of Experimental Group-II

and Control Group in critical thinking is statistically significant. This result indicates that the Experimental Group II is more effective than the Control Group in developing critical thinking.

Insights from semi-structured interview

The following collections of comments from students were received in response to the interview on Inquiry Training Model classes:

"We enjoyed learning in the Inquiry Training Model classes"

"I realised that my friends think not like me when given a problem."

"In regular classes there is no need to think"

Similarly, students' responses were positive on Guided Discovery Learning classes also, as revealed from the following comments to open ended questions:

"My interest in the science subject has increased due to the Guided Discovery Learning science classes."

"We were all the time discussing various topics; so how can we get bored?"

"In Guided Discovery Learning we learnt to handle apparatus and do experiments ourselves."

These student reactions show that they like the new teaching approaches they were administered in the experimental classrooms. Some students believed that their ability to think has increased.

Findings of the Study

No statistically significant difference was found between the Experimental Group-I and the Experimental Group-II with respect to the development of critical thinking, indicating that both Inquiry Training Model and Guided Discovery Learning are equally effective in fostering critical thinking of students. The study also revealed that both these approaches were more effective in developing critical thinking than the conventional lecture-demonstration method. It was also observed that the classrooms tailored for developing critical thinking do not create boredom in students as students' active participation in learning is encouraged.

It was also observed that the teachers need to be efficient in communication and interaction with students to effectively implement Guided Discovery Learning and Inquiry Training Model to develop critical thinking. Besides, teacher needs to be proficient in the subjects taught and a critical thinker herself to effectively stimulate the students to think critically on subjects.

Discussion

Inquiry Training Model and Guided Discovery Learning require a different social climate in the classrooms than the conventional classroom in which the students are passive learners and have different teacher-student relationship and teacher behaviour. As against the teacher-centred classrooms, these approaches require a continuous two-way communication between the teacher and the students and student-centred, inquiry/activity oriented classes that are focussed on thinking development of students. This corresponds to the findings of Terenzini, et al. (1995) that high level of classroom interaction promotes thinking.

The study confirms the findings of (Swartz and Parks, 1994) that the more explicit the teaching of thinking, the more

students will learn the processes of thinking and their applications and that of Gokhale (1995) that collaborative learning fosters critical thinking. Both approaches in the present study involve collaborative learning which could have contributed to the critical thinking development. Furthermore, classroom culture that promoted free thinking might have contributed to the results.

Conclusion

Depending on the nature of contents taught, application of either Inquiry Training Model or Guided Discovery Learning or both could be adopted even in combination with other methods of instruction. Teacher training needs to be tailored to equip the teachers with skills in conducting classes using these teaching methods.

REFERENCES

Bibergall, Jo Anne. 1966. "Learning by discovery: Its relation to science teaching", *Educational Review*, 18(3), 222 – 231.

Bruner, J. 1996. Toward a Theory of Instruction. NY: Norton. Clement and Lochhead. (1980). Cognitive Process Instruction. Cited in Schafersman.

Carin, ArthurA. and et al. 1970. *Teaching science through discovery,* Columbus, Ohio: Charles E Merril Publishing Company.

Compiled from Biggs (1999), Entwistle (1988) and Ramsden (1992). Retrieved from < http://www.engsc.ac.uk/learning-and-teaching-theory-guide/deep-and-surface-approaches-learning.

Delphi Report. 1990. Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction Millbrae, CA: The California Academic Press.

Gokhale, Anuradha. 1995. "Collaborative learning enhances critical thinking", *Journal of Technology Education*, 7, 1045-1064.

Gurumurthy, C. 1990. A comparative study of the effectiveness of guided discovery approach of doing physics experiments vs. instructed performance approach at pre-university level. Ph.D., Edn., University of Mysore, Mysore.

Kersh, Bert Y., and Merl C. Wittrock. 1962. "Learning by Discovery: An Interpretation of Recent Research", *The Journal of Teacher Education*, 13(4), 461-468.

Kong, Siew Lang. 2006. Effects of a Cognitive-Infusion Intervention on Critical Thinking Skills and Dispositions of Pre-service Teachers. Ph.D., National Institute of Education, Nanyang Technological University, Singapore.

Martin, D. (1984). "Teaching thinking skills: Infusing cognitive strategies into teacher preparation programs", *Educational Leadership*, 42, 68-72.

Passi, B.K., Singh, L.C. and Sansanwal., D.N. 1987. *Inquiry Training Model of Teaching*. Agra: National Psychological Corporation.

Schafersman, Steven D. 1991. An Introduction to Critical Thinking. Retrieved from http://www.freeinquiry.com/critical-thinking.html

Swartz, R.J. & Parks, S. (1994). Infusing Critical and Creative Thinking into Content Instruction: A Lesson Design Handbook for the Elementary Grades .Pacific Grove, CA: Critical Thinking Press & Software.

Suchman J.R. 1961. Inquiry Training: Building skills for autonomous discovery. Merrill-Palmer *Quarterly of Behaviour and Development*, 7, 147-169.

Terenzini, P. T., Springer and etal. 1995. "Influences affecting the development of students' critical thinking skills", *Research in Higher Education*, 36, 23-39.

Constructivism and History Textbooks

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Abstract

History is often viewed as something we read from books or are told through lectures rather than perceived as an active process of inquiry and discovery. The result of such presentation is that through this passive involvement, students accept the facts presented to them, not realizing the true engaging qualities of the historical process. How then can history transform the students experience into one that encourages students to become active participants in exploring history? The answer lies in presenting history in such a way that invite students to become involved in the interpretation of the past by allowing them to utilize analytical and interpretative skills just as a historian would. Among current approaches to teaching, constructivism most closely resembles the model of learning in which children actively construct things and learn from their own experiences. Applying constructivist concepts to the teaching of history can revolutionize the learning environment, and perhaps recapture the joy of learning as envisaged in the report 'learning without burden'. After a brief exploration into the meaning of constructivism and the theories of the educators who elaborated on it, the article moves on to the examples of constructivist learning from new NCERT history textbooks based on NCF-2005.The article tries to put emphasis on making use of different approaches to serve the needs of student's best and providing greater variety of information.

History is often accused of being loaded with facts and dates. When students are asked to list their favourite subjects, history invariably comes in last. Students consider history 'the most irrelevant' of subjects taught in schools. Bor-r-ing is the adjective they apply to it.

I do not need to convince that history is important. More than any other topic, it is about us. Whether one finds our present society wonderful or awful or both, history reveals how we arrived at this point. Understanding our past is central to our ability to understand

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ourselves and the world around us. We need to know our history. Then arises a question if history has such an important role then what has gone wrong that students find this as a boring subject. I think the problem is less with the students lack of interest than how we teach history. We see that the teaching of history, more than any other discipline, is dominated by textbooks. And students are sometimes right: the books are boring. The stories that history textbooks tell are predictable; every problem has already been solved or is about to be solved. Textbooks exclude conflict or real suspense. Textbooks almost never use the present to illuminate the past. In most classrooms students are expected to learn the 'right' answers to questions defined by others. Memorisation of 'objective' data is the primary focus of most classroom activities. Even supposedly fun and interesting activities usually aim to transmit a narrow range of information to the students' memories. That's why none of the facts is remembered because they are simply presented as one thing after another. Textbooks tend to cover all the important themes of particular periods of history but they rarely give a chance to students to act like real historians, sifting contradictory information and making active interpretations. As a result students exit history textbooks without having developed the ability to look at things historically.

Psychology has furnished ample evidence to the world–evidence that stands today unquestioned—that the child is not merely a passive receiver, but is, by his very nature, an active agent and likes 'doing' or 'constructing' things, and that it is the rottenness of the methods that are employed in teaching him that makes him a passive inert clog on the educational wheel. It is, therefore, a fact at the present day that the child learns a thing very much better if there is a leaven of his own effort mixed up with it. This effort can either be mental or manual: so there is psychological sanction, if not always of current practice, for giving the child opportunities for making the knowledge he receives truly his own by active exercises, whether they are mainly intellectual, aesthetic or manual.

Among the current approaches to teaching, constructivism most closely resembles the model of learning in which children actively construct things and learn from their own experiences. Applying constructivist concepts to the teaching of history can revolutionise the learning environment, and perhaps recapture the joy of learning that is central to human nature.

What is Constructivism?

Constructivism is a view of learning based on the belief that knowledge is not a thing that can be simply transmitted by the teacher to students. Constructivists consider the student as an active learner and the teacher as a facilitator in the learning process. The theory of constructivism is based on the idea that children learn better by actively constructing knowledge and by reconciling new information with prior knowledge. There are many schools of thought within constructivism, but all generally agree on the basic characteristics of constructivist teaching:

- Learner-centred instruction in a democratic environment;
- Active learners who build and create meaning and knowledge;
- Learners who hypothesize, question, investigate, imagine and invent;
- Learners who reflect and make associations with prior knowledge to reach new understandings.

Adopting a constructivist viewpoint has tremendous consequences for educators. It not only changes the nature of knowledge but also the roles of teachers and students. The constructivist perspective emphasises on providing students with opportunities to develop skills and knowledge, which they can relate to their prior knowledge and future utility. In the constructivist curriculum the individual learner has an important role in determining what will be learned. Answers are less clearly right or wrong. Teachers become facilitators or guides instead of the class authority. Lectures give way to student research. The classroom becomes a much more active place.

There are many versions of constructivism. The second version, in particular, has had a considerable impact on educational theory. The first and older is generally known as radical constructivism. It comes directly from Piaget. Its focus is on the individual, where all learning is centred. Piaget saw real learning as happening when an individual came into contact with a new idea that was in conflict with previously held ideas. The 'dissonance' between the two ideas forces the individual to actively examine their world-view and construct a new one. The key role of the teacher in radical constructivism is to promote analytical thinking by creating situations where students have to solve problems that challenges their current ways of thinking.

Another version of constructivism is generally known as social constructivism. It comes from the ideas of Lev Vygotsky, but has a lot in common with the ideas of John Dewey and many others. Social constructivists hold that the social context of learning is at least as important as what happens in the mind of an individual. By interacting with others we come to a public understanding and shared sense of what information is right and what is wrong. The construction of knowledge is a social act, leading to cultural variations in world-views. With social constructivism, group interaction is key. The teacher interacts with the students to come to new understandings. Group work and class discussions are the critical activities in a classroom. It has generally been seen as more suitable than radical constructivism.

History Textbooks and Constructivism

The new NCERT history textbooks are an attempt in this process of construction of knowledge. The most important thing about these new history textbooks is the way they actively engage the student in a dialogic process of constructing possible historical insights. We have already seen that the active engagement of students is the first and foremost concern of constructivism. This important thing is accomplished in the new textbooks through new and innovative ways of guiding interpretations of source extracts. These source extracts have been used to give

students an idea of the evidence on which the arguments of historians are based and more importantly to enable them to evaluate and interpret the sources. For example, on page 45 of Class VI history textbook there is a box on Vishwamitra and the river. This is a dialogue between a sage and two rivers. After this dialogue the historical deduction that sage lived in a society where horses and cows were valued animals is stated. Right after this there are questions for students as to whether chariots were also important and find out the modes of transport mentioned there. Here students are not forced to accept the historian's secondary narration but are given an opportunity to work out bits and pieces of historical reality from the primary source themselves. There are a number of other sources used in the new textbooks. These include photographs of Mohenjodaro, Ashokan inscriptions, beautiful reproductions of early Indian art and craftsmanship, political paintings at the time of the French revolution with exercises inviting students to analyse them, oral accounts of *adivasi* struggles in early twentieth-century Bastar, a seventeenth-century map of a medieval European town, a sketch of a woman operating a treadmill in a cotton-press, a reproduction from a nineteenth-century vellum manuscript of the Quran. This is a random sample, but it conveys some of the excitement of historical evidence, some of the sheer richness of range in the 'sources' used to reconstruct the past that the textbooks communicate. So the obvious dimension of history as a 'discipline'—the skill of making plausible, coherent inferences from limited evidences—is clearly pushed to its limits in these new books and in this way the process of learning history almost becomes, at points, a way of *constructing* it.

These books try to actively engage students not only through sources but also by calling on student's capacity to imagine the past. This is less obvious but perhaps even more basic dimension—that of history as a discipline of the *imagination*, the capacity to visualise the texture of the past in ways circumscribed, but also authorized by available sources. Very few people, after all, would take to history without a certain fascination with how the past looked, felt, sounded, smelt. The fact that our investigation of the past can never be accurate to its original paradigm does not disable this fascination; it provokes and intrigues it.

One of the challenges and pleasures offered by the new books is *de-familiarisation*. The deployment of the literary and methodological device of 'making strange', is central to the historians craft. In a sense all critical thought has this function—to render unfamiliar what may appear to be a matter of 'common sense', to ask questions about things we take for granted. The particular variant of this device that the historian has recourse to is to reveal that things have a past, and that they came to be what they were (or are) through complex processes and entanglements. This is a concern that resonates through the new NCERT history books. It is a concern that is perhaps most explicit in the textbook *Our Pasts*-I for Class VI. All the chapters of this book begin with a child encountering something that makes him/her think

afresh, wonder about an everyday, taken-for-granted reality. The very first lines of the book are these:

Rasheeda sat reading the newspaper. Suddenly, her eyes fell on a small headline: 'One Hundred Years Ago'. How, she wondered, could anyone know what had happened so many years ago?

This becomes the starting point for a brief, simple, but extremely skilful exploration of how we know what we know about the past—an introduction to historical evidence that avoids being either banal or prescriptive, but instead presents historical knowing in the most accessible of ways, as an adventure.

From the point of view of constructivism another important component of these textbooks to consider is the connection between what is learned and the student's wider life. Information learned purely in isolation is not very useful, and usually soon forgotten. No objective test can really establish connections for a student that make the material an integral part of their life. This is especially important for taking history beyond the level of trivia, and helps answer the annoying question: 'Why do I need to know this?' Wherever possible the new books strive to find connections between what is studied and the student's lives. This is explicitly built into the lesson as a discussion or as a part of the evaluation at the end. In Chapter 1 of Class XII *Themes in Indian History, Part I* there is a source box on how artefacts are identified. This source is an excerpt from one of the earliest reports by Earnest Mackay on excavations at Mohenjodaro. In this excerpt he talked about saddle querns —how they were found, the material used to make them and how they looked besides many other things. Then he tried to make connection between those saddle querns with modern day querns. Through this excerpt students have been given an idea how archaeologists use present day analogies to try and understand what ancient artefacts were used for. But they are not compelled to accept this as fact rather they have been given a chance to explore and think whether this correlation is a useful strategy or not? These kinds of exercises take students beyond the textbook and instigate them to see things around them more critically. Similarly an exercise at the end of Chapter 4 of Class VI *Our Pasts*, which deals with Harappan civilization, asks students to identify old buildings in their locality, and to find out how old they are and who looks after them—thereby making connection with the student's lives. So the textbooks not only try to connect the content with student's life outside the school but also try to inculcate in the children a desire to explore and understand things on their own. These examples run throughout the book.

It is true that these textbooks have made an attempt in the process of construction of knowledge. But like other approaches constructivism too has its limitations, particularly in typical school settings. So an honest appraisal of the limitations of constructivism is important here if teachers are to effectively implement new ideas without wasting time and effort.

The first problem with the adoption of this approach is that it might not be the most appropriate theory of how people learn. The basic principles of

constructivism were laid down a century ago and new studies of brain functions are producing a more scientific view of how learning takes place. In both constructivism and objectivism, it is believed that the brain is a learning machine, learning all types of things with the same mechanisms. But new brain studies show that different types of knowledge are learned by different parts of the brain in different ways. Some things seem to be 'hardwired' into the brain, which dictates how that information is learned. The way children learn grammar seems to fit this model. This means that some types of learning more closely follow the objectivist pattern than the constructivist. Other more complex types of knowledge are more likely to involve multiple parts of the brain, and more closely fit the constructivist model. So the nature of the information that we are trying to teach may decide the type of the approach we take.

A more immediate concern for the teacher is that constructivism does not fit the current educational environment in most schools. Most schools focus on standardised exams. Teachers concerned about their students' future cannot afford to ignore these exams. These exams are highly marks focussed. And marking constructivist products in such a situation is not always easy because student's understanding of the material will be personal. Answers will vary from student to student. The general push to memorize and review commonly tested information tends to greatly limit constructivism's use. Sometimes school structures also create problems to constructivism. Short class periods make it difficult to go deep into a subject in a day. Fragmented class schedules fragment students thinking in the course of a day. Another obstacle to the use of constructivism comes from the paucity of material support for this approach. Textbooks are increasingly using primary sources, but in a small amount. A teacher will have to collect more materials to carry out constructivist instruction. In a country like ours students may or may not have access to the materials required to do the kinds of comparison and deep analysis that is the essence of constructivism.

There is continuous debate going on between objectivism and constructivism and sometimes this debate itself poses a problem. The classroom teacher, who wants to know the best way to teach, hears arguments for both these approaches and gets confused. As a result many teachers simply decide to follow a method with which he or she is comfortable. It does not have to be objectivism or constructivism.

Conclusion

In reality, both objectivist and constructivist approaches are useful in the classroom, depending on the nature of the information students need to learn. Before exploring a subject in depth it is usually good to familiarize students with important basic information such as chronology, vocabulary and geography. Objectivist approaches such as lecture can be an effective way of teaching this information before students do research or work in a more constructivist manner. Combining approaches is probably going to serve the needs of not only of students but also of

teachers and provides greater variety of information. Classroom teachers need to avoid getting caught up in the debate between the two approaches, and instead make use of any technique that suits their needs. But in a subject as complex and open to interpretation as history, it is important that we make greater use of constructivism if we are to remain a relevant and vital part of the curriculum.

REFERENCES

HOAGLAND, A. MATHEW. 2000. *Utilizing Constructivism in the History Classroom*, ERIC.
GLASERFELD, E.V. 1989. *Constructivism in Education*, Oxford: Pergamm Press.
GHOSE, K.D. 1951. *Creative Teaching of History*, Bombay: Oxford University Press.
DAMON, LINDA AND ETAL, 1997. *Preparing Teachers for Tomorrow: A Constructivist Approach*, ERIC.
NCERT. 2005. *National Curriculum Framework*, 2005. NCERT, New Delhi.
NCERT. 2006. *Our Pasts*, History textbook for Class VI, New Delhi.
SARKAR, ADITYA. 2006. *Contemporary Education Dialogue*, (Reviewed book), Volume 4(1) Monsoon.
SHARMA, SANTOSH (ed.). 2006. *Constructivist Approaches to Teaching and Learning*, Handbook for Teachers of Secondary Stage, NCERT.

Improving Quality of Teachers: Why and How?

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Abstract

Teacher quality plays a critical role in affecting student's performance. Not only do policy makers hold students to high standards, but they have elevated their expectations for teacher standards also. Emphasising teacher educators have much to contribute to the development of quality amongst the teachers; the author offers suggestions for improving quality of teachers.

Introduction

The most important contribution academe can make to supporting learning in our country is if colleges and universities would commit their substantial resources to better preparing those who become elementary and secondary school teachers. Although colleges and universities may genuinely strive to prepare education students effective teachers, the beginning teacher typically enters the world of full time teaching fairly naive. Critics of teacher training programmes lament the intellectual emptiness of the curriculum and the lack of connections between what is taught and the realities teachers find when they walk into the classroom. Frequently, there is a disparity between the academic practices that colleges and universities teach their students and the experiences students actually encounter as beginning teachers.

Schools today face enormous pressure to educate an increasingly diverse and complex student body. Croker (1999) maintained that to be successful, education students have to balance notions of teaching based on their preparation at the institution with the reality they face in the classroom. High expectations of what children

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should know and be able to do, an increasingly diverse student population and breakthrough in research about how children learn, increase the pressure on teachers to possess the skills and knowledge necessary to educate children in the 21st century (Shankar, 1996). To improve student learning, there is no need to change the structure, rather change the instructional practices of teachers. The schools that seem to do best are those that have a clear idea of what kind of instructional practice they wish to produce, and then design a structure to go with it (Wong and Wong, 2009).

Better teachers are the key to improving public education and that colleges of education have a responsibility to prepare teachers accordingly. Studies do show a positive connection between the level of teacher preparation and the degree of impact and performance in the classroom (George Lucas Educational Foundation, 2002). It is felt that pre-service training focuses almost exclusively on knowledge acquisition, with little attention to pedagogy, instructional practices and classroom management skills is not preparing teacher for the 21st century (NCTE, 1998).

Although understanding the subject content is important, to be successful in the classroom, teachers should also be able to do in the domains like student development, diverse learners, multiple instructional strategies, motivation and management, communication and technology, assessment, professional growth, etc. Therefore, the key issue for teacher educators should be to develop effective teaching skills in those who have the potential to become good teachers (Andrews, 2000). They should provide teacher trainees with challenging instruction or educating them deeply, either in the content they will teach or in the knowledge and skills of their profession like encouraging students to persevere, strategies for explaining difficult material, methods of managing a productive and respectful classroom, etc.

Strategies for Improving the Quality of Teachers

The following strategies in this regard may prove useful:

Modeling by Teacher Educators

Teacher educators should model the strategies and theories they teach and promote. Learning the theories of intelligence, personality learning and motivation is important but teacher trainees need to understand how to apply them in the classroom. In other words teacher trainees should be taught how to use the information aspect for solving problems in general and teaching in particular. Therefore teacher educators should create 'Environment in the classroom'. Pose a problem before the teacher trainees and help them find solutions to these problems. Provide them with materials so that they can do the experiment in the class. Assign them with projects, take them on field trips. This way they will experience the educators actually teaching the manner that they want them to teach. This will lead to a deeper understanding of the concept in question, which in turn help the trainees successfully apply and incorporate it in to their own classroom. Hence the need arises for the teacher

educators to delve on specialised skills that add quality to the professional functioning.

Current Classroom Experience

Teacher educators should visit the classroom sites to see how students and the process of teaching have changed. How there is a shift in the emphasis in learning environments from teacher-centred to learner-centred; where teachers move from being the key source of information and transmitter of knowledge to becoming guides for sufficient learning; and where the role of students changes from one of passively receiving information to being actively involved in their own learning. Observing the new trends and processes that are found in many classrooms and then incorporating this knowledge in to the course work would be a useful tool for teacher educators to use in order to prepare pupil teachers for the reality of the teaching world.

Restructuring Field Experience

Field experience remains an integral part of teacher education programme. It affords pupil teachers the chance to visit school sites. Sound field experience should provide opportunities to pupil teachers to visit school sites for observing experienced teachers at work while learning how students learn, how to assess learning, and other effective teaching strategies; and then actually teaching a group of children. Further, field experience can be provided in a variety of settings.

Continuous Professional Development

Research affirms that the single most important determinant of what students learn is what their teacher knows. One of the most important factors in a high quality education is the knowledge, experience, and capability of the classroom teacher. There is strong evidence that having a high-quality teacher affects learning and is an important factor in explaining student test score gains (Clotfelter, Ladd, and etal., 2007; Darling-Hammond, 2000; Darling-Hammond and Youngs, 2002; King, 2003; Loeb, 2000; Wayne and Youngs, 2003). One widely cited study by economist Eric Hanushek (1992) suggests that the estimated difference in annual achievement growth between having a good and bad teacher can be more than one grade-level equivalent in test performance. Therefore, to improve student learning, it is imperative that teacher learning be improved. With the changing needs of the society, teacher educators and in-service teachers have to be up-to-date with the knowledge aspect and the use of ICTs. In this regard orientation programmes foster desirable competencies in them which is helpful in achieving required quality. Refresher courses, seminars, conferences, workshops, extension lectures, etc. and other training programmes can facilitate them with new approaches and methods of teaching, skill inculcation techniques communicative as well as analytical skills.

Education systems around the world are increasing pressure to use the ICTs to teach students the knowledge and skills they need in the 21st century. Three Rs for the ICT based 21st century are:

- *Reading*: Finding information by

searching in written sources, observing, collecting and recording.
- *Writing*: Communication in hypermedia involving all types of information and all media; and
- *Arithmetic*: Designing objects and actions (UNESCO, 2005).

For education to reap the full benefits of ICTs in learning, it is essential that pre- and in-service teachers are able to effectively use these skills for learning. Teacher education institutions must provide the leadership for pre- and in-service teachers and model new pedagogies and tools for learning. Unless teacher educators model effective use of technology in their own classes, it will not be possible to prepare a new generation of teachers capable of employing a variety of technology tools into all phases of academic, administrative and research and extension functions.

Therefore it is imperative for the teacher educators and in-service teachers to get trained with the ICTs to enhance their skills to compete with the quality standards of education. They cannot be expected to learn these skills in their teaching after a one-time workshop. They need in-depth, sustained assistance in the use of the technology. Also, they must have sufficient access to digital technologies and the internet in their institutions also.

Redrafting Teacher Education Courses

There is need to draft teacher education courses that have totally specialised knowledge and specialised skills. More getting theoretical knowledge of philosophy, psychology or such other subjects is not sufficient. The present situation demands our future teachers start philosophising or thinking psychologically to find solution to their classroom problems.
- Integrate action research projects into curriculum.
- Classroom management course must be added. More instruction in classroom management techniques and parent communication strategies should be provided.
- Integrate ICT into curriculum. The aim of teacher education is to develop skills and appropriate knowledge among teacher trainees for using and integrating right technology in an appropriate manner. So there has to be change in terms of curriculum at pre-service level. Focus should be shifted from learning from technology to learning with technology in order to facilitate learning for children having different learning styles and making learning more effective involving more senses in a multimedia context.

Making Provision for Induction Programmes for Beginning Teachers

Teacher induction programmes provide new teachers with the needed support during the frequently difficult transition from college student to the actual classroom teaching experience. Induction programmes may also aid in forming a professional base on which the beginning teacher can build his or her teaching career. Successful induction programme can be based upon four elements:
- Using orientation as a means to familiarise new teachers with school

procedures and to introduce them to existing faculty, culture and resources of the school.
- Training to assist teachers with classroom management and organisational strategies.
- Support from a mentor. Mentors can provide novice teachers with invaluable help by sharing teaching strategies, classroom management tips, and offering encouragement and support during stressful moments.
- Assessing new teacher's teaching performance.

Conclusion

Teacher educators of today have to shoulder dual responsibilities. They have not only to nurture present day teachers but have also to prepare teachers for the future. It is the teacher alone who can do justice to the profession, to the students, to the academic community and to the nation as a whole. So he has to acquire professional competencies, commitment and empowerment to perform multiple tasks inside and outside the classroom. These and other similar steps would help improve quality and performance of teacher educators, teachers and their students, on the one hand, and development of better human resources in the society, on the other. Let us hope for the best in the days to come, to get a bunch of quality teachers in future who will look after the well-being of the cause of education.

REFERENCES

ANDREWS, R. 2000. "A Prescription for Improving Teacher Preparation", *Education Week,* 20 (13), 37.

CLOTFELTER, C. T., LADD, H. F. AND ET AL., 2007. *How and Why do Teacher Credentials Matter for Student Achievement?* Washington, DC: Urban Institute.

CROKER, D. (1999). How can we better train our student teachers?, *English Journal,* 87, 17-18.

DARLING-HAMMOND, L. 2000. "Teacher Quality and Student Achievement: A Review of State Policy Evidence". *Education Policy Analysis Archives,* 8(1).

DARLING-HAMMOND, L., YOUNGS, P. 2002. "Defining highly qualified teachers: What does scientifically-based research actually tell us?", *Educational Researcher,* 31(9), 13-25.

HANUSHEK, E. A. 1992. "The trade-off between child quantity and quality", *Journal of Political Economy, 100,* 84-117.

GEORGE LUCAS EDUCATIONAL FOUNDATION. 2002. "Teacher preparation research: Taking a closer look." (online) Available: http://www.glef.org

KING, R. J. 2003. "Teacher Quality: Understanding the Effectiveness of Teacher Attributes", Washington, DC: Economic Policy Institute.

LOEB, S. NOVEMBER. 2000. "Teacher quality: Its enhancement and potential for improving pupil achievement". Paper presented at the National Invitational Conference, Improving Educational Productivity: Lessons from Economics, Washington, D.C.

NCTE (1998). *Curriculum Framework for Quality Teacher Education,* New Delhi: NCTE.

SHANKER, A. 1996. "Quality assurance: What must be done to strengthen the teaching profession?", *Phi Delta Kappan*,78(3), 220-224.

UNESCO. 2005. "Information and communication technologies in schools, A Hand book for teachers," Division of Higher Education, UNESCO.

WAYNE, A. J., AND YOUNGS, P. 2003. "Teacher characteristics and student achievements gains: A review", *Review of Educational Research,* 73, 89-122.

WONG, R AND WONG, R. 2009. "Teachers are the greatest assets", *Teachers.net Gazette,* 5(6).

Management of Teachers — A Comparative Study of Madhya Pradesh and Karnataka

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Abstract

Teacher management has remained very crucial for the development of education and schooling in developing countries. The dwindling resources in managing the quantum of teachers in the countries also have remained a mammoth task, as it consumed the entire chunk of resources available for the development of education. The other inputs such as school infrastructure, learning material, teaching material and qualitative improvement necessary for teaching learning and training the teachers could not be materialised. Although access to education for all has been an important input in the development of the society the necessary inputs to make it successful has remained a major challenge. To meet the manifold expansion of schooling a variety of teachers such as contract teachers, community teachers, temporary teachers, para-teachers and many cadres of teachers have entered the arena of education system. However, these quick remedies were able to meet the demand of schools by bringing more and more children into the ambit of education. A big question that still remains unanswered is that by mere provision of teachers in the schools will it be able to improve the effectiveness of schools and increase their efficiency? As there is a vast ground work needs to be done to enable the teachers to perform efficiently, issues such as qualified teachers, training and retraining and service condition of teachers, promotion, facilities of housing and remuneration —all play a great role in motivating the teachers and to perform effectively. Although the governments have been developing policies for teachers but the implementation of such practices are seldom followed which has resulted in poor performance as well as unrest among teachers. The present comparative study was undertaken to understand some of the issues relating to the management of teachers which can have direct bearing on effective functioning of schooling and education system. The study was conducted in the states of Madhya Pradesh and Karnataka and focused on support being extended by the administration to primary teachers in order to facilitate them to perform efficiently.

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Introduction

Management of teachers refers to the process of enabling the pool of teachers into a composite group of performers. Creating mere educational infrastructure has no meaning unless it is accompanied by an intensity to provide quality education through participation and management of community, both the teaching as well as that of village community. This approach towards development in general and educational development in particular has given rise to a lot of community centric educational programmes, some of which have been dealt with in this paper. Of late international organisations, non-governmental organisations and private foundations have played remarkable role in realizing the goal of universalization of education through mission mode and participatory model. However, despite all efforts the goal has somehow remained as an illusion.

The study attempts to understand some of the issues relating to the teachers which can have direct bearing on effective functioning of the education system. The study was conducted in the states of Madhya Pradesh and Karnataka and was restricted to management issues related to the primary teachers. The study deals with two major aspects: Teacher management and teacher empowerment as well as teacher professionalism in the classroom. The study includes various empirical and qualitative research evidences from the country and abroad. Both the aspects have been dealt in the light of wide literature available on these two aspects.

Teacher Management: Some Empirical Evidence

Though Indians were the first to realise the importance of teachers in education and created a divine aura around the teachers. Its caste system further bolstered the image of teachers, as it was the preferred profession of hallowed Brahmins. Classical Indian society and its education system has accorded primacy to teachers and even made kings subservient to them albeit theoretically. But later little was done to carry forward the tradition. The nobility and hallowed precincts of teaching profession remained buried in the morass of poverty, partisanship, plagiarism and sycophancy despite flashes of brilliance hither and there. So was the situation in the West as well in general. But in the late eighties, attempts were made to look at the problems of teachers with fresh perspective. Some of these efforts are well documented by Gaziel (2002), which has been enumerated here, lends credence to the research.

The Carnegie Task Force on Teaching as a Profession in the United States (1986), and the Etzioni Commission on Teacher Status in Israel (1979), and the Educational Planning Commission in France (1991), all stressed in their reports the need to improve schools by improving the status and power of classroom teachers, and by decentralising school decision making. The assumption behind these reports is that school decentralisation would give more power to teachers to make school decisions and would strengthen their professionalism in the classroom and improve student achievement. Since the

early eighties, the literature has been flooded with calls for the empowerment of teachers to participate in a more central way in the determination of school goals and policies, and to exercise their professional judgement about the content of the curriculum and the means of instruction (Hill & Bonan, 1991; Kreisberg, 1992). Along with these calls for empowerment of teachers, (Lieberman, 1989), the strengthening of the teacher's position should also be supported for its contribution to reversing the patriarchal relations that have dominated schools for many years. These calls (the restructuring views) for empowering teachers raise the question of its benefit to teacher's instruction and student learning (Zeichner, 1991; Weiss, Cambone and et al., 1992). On the one hand we need to recognise the positive aspects of teacher empowerment and school restructuring, such as the role they can play in providing teachers with more stimulating and humane environments in which to carry out their work and in tapping the tremendous amount of expertise possessed by teachers. We cannot have good schools unless classroom teachers are enabled to play central roles in the running of those schools and in the development of solutions to the numerous problems that the schools face. On the other hand empowerment has proved elusive, both as a theoretical and empirical construct (Malen et al., 1990). We do not know yet if the concept simply affirms teachers' long standing classroom autonomy, or does it recognise the potential of teachers as professionals to reform education from the ground up. If the arenas of school decision-making in which teachers may claim influence are distinct, does participation in different domains have differential consequences for the caliber of instruction and therefore student academic performance? (Newman and Gamoran, 1996). In other words the question is, whether those efforts to professionalise teaching, such as the potential for intensification of teachers' work and the diversion of teachers' energies from the school's primary academic mission, to making decisions about personnel or even taking part in school public relations are not contradictory to the teachers' main task of putting their energies into instruction? Or perhaps the new tasks teachers are required to assume are complementary and are needed for their main professional self image, and this may have an indirect effect upon their main task, which is instruction (Panda, 2006).

Teacher management is an important issue as there have been very few studies which have touched upon these issues. Teachers spend their working days in the classrooms yet times do many kinds of jobs which are invisible to the administrators as well as the community. The support they are expected to get and the rewards for their good work, etc. remain invisible. Hidden behind are the major problems which are not tackled properly by the planners as well as the administrators. Numerous issues, such as selection of right kind of persons, training, deployment, support and guidance, remunerations and rewards, training and promotion and motivation, etc. play an important role in improving teacher efficiency (Panda, 2001).

The management of teachers in terms of recruitment, posting and deployment as well as training is in a state of transition. The policy makers and planners of late have realized the importance of proper process in the country not only in terms of providing training, which not only tends to be different from the past methods of training but also can have everlasting and continuous impact on the teachers as well as proper transparent methods of managing the teacher issues (Govinda, 2002). The professionalism among teachers have found to have increased due to proper management of the teachers, majority of the studies have also shown, in addition to the proper selection of the teachers, the training which have been obtained by the teachers have shown better professional attitudes and relationships; with more positive effects on pupil achievement than untrained teachers; and continuous training improves their teaching skills (Dove, 1986). Besides, there is a need for developing receptivity to induction of modern educational aids and skills to operate educational hardware.

Over the decades there is definitely a quantitative expansion of the schools and the teachers in order to achieve the target of providing universal access. There is a quantum increase in the teacher training institutions all over the world but the question of quality teacher education in order to produce quality teachers did not receive the desired attention. Whereas, the teacher is required to play a multidimensional role, that is, teaching, research, development of learning material, extension and managing the institutions. To help a teacher play such multidimensional roles effectively, it is essential that they should be equipped with certain specific skills such as linguistic skills, self-study skills, in addition to their professional growth in order to meet changing needs and demands of their profession and general skills for handling pupils of varied cultural settings (Ottaway,1962).

A review of studies from Chile, the Congo, India, Iran, Kenya, Malaysia, Puerto Rico, Thailand and Tunisia, concluded that the educational and professional qualifications of teachers are not important for pupil achievement at primary and lower secondary levels, though they are somewhat important at upper secondary level in certain subjects such as science. The findings show that the teacher's age, sex, and socio-economic status do not have any consistent effects; qualifications, length of experience of teachers do have a positive effect on pupil achievement; and teacher attitudes prove important to improve pupil motivation and achievement (Simmons and Alexander, 1980).

In many developing countries, especially in primary schools, teachers represent almost the only source of knowledge as prescribed in the school curriculum. In more developed contexts, in contrast, there are alternative and supplementary sources of knowledge. In developing countries home-study facilities may be limited, libraries, books, radio and television may not be available. Learners are more dependent on the school and teacher. One implication of this line of reasoning is that

complementary investment in social infrastructure and communications, and adult education may well have indirect positive effects on the quality of schooling (Fitzsimmons and Freedman, 1981). The life-long learning centres of Japan and industrialised nations are best sources for enhancing such learning activities in the community.

Another issue highlighted by studies was the fact that teacher effectiveness cannot sensibly be separated from school effectiveness. One aspect of this which is beginning to receive the attention of researchers and policy-makers in developing countries is the level of school resources and the way the teachers are managed with clear guidelines enabling perform better. Commonsense suggests that teachers, however well educated and trained, are rendered less effective if schools do not take into account management-related issues in addition to the provision of basic facilities, equipment and materials necessary for teaching.

Heyneman (1983) points out that in industrialised countries 14 per cent of the recurrent costs of primary schools are allocated to classroom resources—books, maps, visual aids, furniture—and 86 per cent to salaries. In contrast, in the developing world, schools are grossly under-resourced. In Asia the average is 9 per cent on material resources and 91 per cent on salaries and in Africa, 4 per cent on material resources and 96 per cent on teacher salaries. This shows that better quality teaching and teaching tools – particularly more and better textbooks – have definitely a substantial effect' on pupils' achievement.

Another problem is with the issue of teacher absence in the schools due to various factors. A study conducted by Kremer et al. (2004) had revealed that 25 per cent of teachers in India at the primary levels in the government schools are found to be absent, which was highest among the countries such as Peru, Ecuador, Papua New Guinea, Bangladesh, Zambia, and Indonesia. While within India, the states of Jharkhand, Bihar, Punjab, Assam, Uttarakhand, Chhatisgarh, Uttar Pradesh, Andhra Pradesh, West Bengal, Rajasthan, Odisha, Karnataka, Haryana, Tamil Nadu, Himachal Pradesh and Kerala had more than 21.2 per cent to 41.9 per cent teacher absence. The reasons for their absence have been attributed to lax in the management of teachers, lack of proper infrastructure, community support and over burden of teaching etc.

Teacher Empowerment and Teacher Professionalism in the Classroom

The literature on school-based management and school effectiveness suggests giving more control to teachers over their work and the schools in which they work. The results which stem from the bulk of research is that education must be decentralised arid professional. Decisions must reflect teachers' and principals' best professional judgments on behalf of students rather than adhering blindly to rules and procedures that emanate from higher bureaucratic offices and governmental agencies (Shanker, 1991). Although there have been some challenges to recent efforts to give classroom teachers a voice in running schools, the current consensus

in mainstream educational literature is to restructure schools, diffusing authority both to individual schools and to staff within schools. In addition to the positive impact this strategy is likely to have on the recruitment and retention of teachers, the strengthening of the teacher's position should also be supported for its contribution to reversing the patriarchal relations that have dominated schools for many years. These call (the restructuring views) for empowering teachers raise the questions of its benefits to teacher's instruction and student learning (Zeichner, 1991; Weiss, Combone and et al., 1992).

There is the danger in the involvement of teachers in school decision-making about programmes, budgets and staffing, will make excessive demands on their time, energy and expertise, diverting their work beyond the bounds of reasonableness, and making it more difficult for them to accomplish their primary mission. Witnesses throughout the United States are experiencing the effects of increasing demands on their empowerment. Another argument of this view is that teacher empowerment may, under certain circumstances, undercut important connections between schools and their communities leading to greater conflict within the school to the legitimate interests of parents and other community members in school affairs, for example, teachers may use their empowerment as a weapon to further distance parents and communities from attaining a meaningful voice in school affairs. It is well known from other studies that school and community connection is a critical element in the success of schools especially for at-risk students (Gaziel, 2001). If teachers dislike the community connection because of parents' involvement, then we may say teachers' empowerment could impede their instruction and student learning. Instead they suggest strengthening the control upon teachers work, and imposing instructional mandates such as standardised curricula textbooks and assessment.

The loose-coupling perspective suggests that empowerment is largely irrelevant to teacher professionalism and instruction. Gamoran et al. (1994), tested the relationship between teacher empowerment and school achievements in order to discover which view (bureaucratic, loose-coupling) are the most accurate. That is to say, does teacher empowerment strengthen teacher professionalism in the classroom and the school and by these means improve student learning and achievement, or does it impede instruction and student achievement as the bureaucratic view contends; or is there no effect from teacher empowerment on teacher's instruction and student learning and achievement as the loose-coupling contends. Their results reveal that teacher control over curricular content may be detrimental to achievement, but control over teaching method may be beneficial. Teacher's involvement in school policies yielded some unclear effect. Their conclusion is as follows: the effect of empowerment upon teacher professional self image and teacher instruction depends on which aspect of teaching is

empowered and the domain in which empowerment occurs. Newman and Marks (1996) found that teacher empowerment which works must focus on instructional vision and professional collaboration. Further, Newman (1993) argues from the research reports that there is a positive relationship between teacher empowerment 'and improvement in instruction. Site-based councils have explicitly concentrated on issues of curriculum and instruction. Louis and Marks (1996) contend that for teachers to function professionally in a collaborative intellectual enterprise focused on student learning, they must be able to influence policies and practice pertaining to the instructional mission, while if teachers directed energy toward other school organisations, the quality of their instruction would be somewhat affected. Louis and Marks (1996) argue that teacher empowerment that does not concentrate on instruction and collective work to improve classroom practice would not be associated with higher levels of student performance.

The Contrasting Situations in the States of Madhya Pradesh and Karnataka

Madhya Pradesh has among the lowest levels of economic and human development in India, but 2001 Census data show sharp increases in literacy rates for males and females aged seven and above since 1991, from 58.5 to 76.8 per cent and 29.4 to 50.3 per cent respectively. At 64.1 per cent, average literacy has almost caught up on the national average of 65.4 per cent, and the very large gender gap has somewhat decreased, at 26.5 percentage points vs 29.3 percentage points in 1991 (Census of India, 2001). The government of Madhya Pradesh, has widely advertised these results in magazines and journals and presented them as the outcome of reforms, it has undertaken since the mid-1990s (Rajiv Gandhi Shiksha Mission 2001).

Indeed, government educational policies have been more clearly defined in Madhya Pradesh than in other north Indian states. They include the creation of primary schools through the District Primary Education Programme (DPEP), the Alternative Schools (AS) programme and, especially, the implementation of the Educational Guarantee Scheme (EGS); the decentralization of school management through the recruitment of local residents as teachers, the creation of new administrative units, and the empowerment of gram panchayats and institutions like Village Education Committees (VEC). The Madhya Pradesh government has supplemented these measures promoting primary education with the creation of middle schools and the *Padhna Padhana Andolan*, and adult literacy programme.

While expanding the supply of primary schools to rural areas of Madhya Pradesh has been an undeniable necessity, the specific reforms implemented by the Madhya Pradesh government have sparked much controversy about the features of the resulting school system and the role of the State in the field of education in the long run—not to mention the uncertainty on future cooperation between the Madhya Pradesh government and NGOs resulting from the closure of the Hoshangabad Science Teaching

Programme in July 2002. Unfortunately, independent research on the implementation and impact of these reforms is hardly available as yet, and the literature circulated by the Madhya Pradesh government tends to mix information with promotion.

While the State of Karnataka is making sincere efforts to bring all children of 6-14 to school, to retain them at least for 8 years and to make them to learn and achieve the minimum level, the State is also trying to build the capacity of primary school teachers by giving training and providing the resources at school level. About 98 per cent of villages and habitations are provided with schooling facilities. The small habitations where the population is very small and very few children are available efforts are made to provide EGS under the SSA programme.

The State has approximately 2,34,100 teachers working in 49,640 primary schools of the State (2005-06). All these teachers are trained and recruited. The government has made sincere efforts to make the teacher recruitment policy transparent with efforts of reserving 50 per cent of the posts for lady teachers based on merit and roaster system as well as qualifying through a common entrance test. This method of recruitment through competitive tests has been implemented from the year 2001 onwards and efforts are made to refrain from the political as well as other corrupt practices in the recruitment and selection of the teachers. Transfers are also made from time to time on method of counselling and the teachers can also be transferred at Taluk level as well as District level depending upon the deployment policy of the state at a given point of time. The teachers have ample opportunities for career mobility as well subject to their possession of qualifications of training etc.

Unlike the State of Madhya Pradesh, the State of Karnataka has teachers in majority recruited by the government through a proper governmental procedure and all the teachers are eligible for the benefits of the government services. The state has kept low on the recruitment of contractual teachers, however, in case of demand some contractual teachers are appointed under the SSA provisions.

The Block Resource Centres and the Cluster Resource Centres are providing academic inputs to the teachers to a great extent in the form of supervising the schools, helping the teachers in their problems of teaching and also enabling them to develop learning material for use in the classes.

The study presents results of the fieldwork conducted in teacher training institutions as well as some of the schools in the Bhopal district of Madhya Pradesh and Mysore district of Karnataka and the responses of the teachers were analysed. The fieldwork aimed to document the functioning of schools belonging to the government (whether created under EGS or not), to describe the structure of their management, and to understand the consequences of the reforms on the links between education and rural society, notable attitudes towards education and the development of private schools. The results are not representative of rural

Madhya Pradesh or Karnataka as a whole, but they should give an accurate picture of the current situation in two areas typical of the settings targeted by EGS, namely Adivasi villages and Dalit hamlets. A general assessment of the current situation of primary education in Madhya Pradesh and Karnataka would need to address the issues highlighted in the present study, which is arguably the first independent study of the reforms undertaken in this state since 2000.

Literacy Rates of Madhya Pradesh and Karnataka

The literacy rates during 2001 in the two states reveal that both the states were almost had more and the less similar status literacy rates in rural areas of Madhya Pradesh having 57.80 per cent while Karnataka having 59.33 per cent. In the urban areas the literacy rate for Madhya Pradesh was 79.39 per cent and Karnataka 80.58 per cent, respectively. There is very little difference between the total literacy rates in both the states with 63.74 per cent for Madhya Pradesh and 66.64 per cent in Karnataka—a gap of roughly 2 per cent in the literacy rates. This was the prevalent situation during the early 2001 at the time of census enumerations. Both the states have thereafter put up lots of efforts to improve schooling in the respective states and have made access possible in all the habitations and improved the educational levels.

However, if one looks at the other indicators of availability of teachers, trained teachers, teacher pupil ratio and female teachers serving in the schools, it will be observed that there is great variation existing in these two states with Madhya Pradesh lagging behind in terms of most of these indicators while Karnataka is ahead in terms of such provisions. Karnataka has reported to have all the teachers trained and only recruited the teachers having training with 100 per cent trained teachers at all levels of pre-primary, primary, middle and high school levels, while the state of Madhya Pradesh has yet to achieve the target of 100 per cent trained teachers in all the levels of education with only 53 per cent at pre-primary and primary levels, 56 per cent at middle level and 77 per cent at high school level. Similarly the teacher-pupil ratio is higher at pre-primary and primary levels in Madhya Pradesh with 45 pupil per teacher and the state of Karnataka is successful in reducing the teacher-pupil ratios considerably with 25 teachers per pupil for pre-primary and primary levels 35 at

Literacy rates in the states of Madhya Pradesh and Karnataka

States	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Madhya Pradesh	71.70	42.76	57.80	87.39	70.47	79.39	76.06	50.29	63.74
Karnataka	70.45	48.01	59.33	86.66	74.12	80.58	76.10	56.87	66.64

Source: Selected Educational Statistics, 2006-07

middle and 23 at high school level. One of the remarkable achievements made by Karnataka is that of appointing greater number of women teachers in the schools with 90 female teachers per 100 male teachers at pre-primary and primary levels, 123 female teachers per 100 male teachers at the middle stage and 71 female teachers per 100 male teaches at the high school level. However, the state of Madhya Pradesh has lagged behind in this indicator of providing larger number of female teachers at all the stages of schooling compared to the state of Karnataka.

Status of Management of Primary Teachers in Madhya Pradesh and Karnataka

The provision of access as well as quantum increase in the primary education system has, however, resulted in a tremendous pressure on the primary teachers and on the education system on the whole. Many of the states have responded to such challenges and were in a position to provide a variety of schools in the states with a variety of teachers in order to provide schooling and education irrespective of habitations. The community involvement in the functioning of the primary schools and particularly the Education Guarantee Scheme schools in the state of Madhya Pradesh has been found to be very successful. In other states also additional teachers were deployed from the community in the schools where the enrolments have increased. The untrained community teachers have been provided with necessary in-service training though it varied from state to state with 17 days to 21 days of training.

The states of Andhra Pradesh and Karnataka have attempted in making the teacher recruitment/placement/ transfer transparent with computerisation of the entire teacher data and the criteria for posting and transfers. Computerisation has made the process of posting and transfers faster and its accessibility has enabled teachers to know exactly where they stand in the posting and transfers. This also has reduced political interference in recruitment/posting and transfers to certain extent. Contrast to the technologically modern methods adopted in the recruitment, transfers and posting of teachers, the state of Madhya Pradesh is still following the age old method of posting and transfers, while recruitment of teachers have been temporarily suspended in the state after 1990s, only a variety of the *Gurujis* (the para teachers) are appointed in the schools.

The teachers recruited in the states of Andhra Pradesh and Karnataka have to qualify a competitive written test and should possess basic qualifications of secondary education with a diploma in teaching at the primary level and the qualification is higher at the secondary levels. The remunerations are higher for primary school teachers in the pay scale of ₹ 3000-75-3450-100-4450-125-5700-150-6300 with festival advance, medical advance, leave salary benefit, house building, vehicle purchase advance, etc.

Madhya Pradesh, which perhaps has problems of limited resources, has adapted altogether a new kind of approach. The state has not recruited new teachers in the regular vacancies of the teaching posts, and instead a new

category of teachers called "Shiksha Karmi", and now of "Samvida Shikshaks" (teachers recruited on fixed-term contracts), and EGS teachers known as "*Gurujis*" are recruited locally. These teachers cannot be transferred from one school to another, they should have certain minimum qualifications, i.e., completed higher secondary schooling but will be paid a consolidated amount ranging between ₹1,000 and ₹ 2,500. On the other hand the existing regular cadre teachers serving in the schools get much higher amounts than these categories of teachers. There is job insecurity and constant pressure on the government from these temporary teachers for regularisation and provision of more salaries (Panda, B. K. 2001).

Although the issues of managing the teachers varied from state to state, one thing which is common in both these states is that of providing sufficient number of teachers in the schools especially in the inaccessible areas enabling the schools to function regularly without any disruption. These states have created structures in the form of Block Resource Centres and Cluster Resource Centres with coordinators who on continuous basis provide academic support to all the teachers. These structures in addition to the provision of monetary resources to the teachers in terms of making their own teaching-learning material have benefited the learners and were found to improve the teaching in the schools. Training and academic support have highly benefited the teachers which were not available in the past. The teachers were also found to become more accountable as there was continuous support and monitoring. The states which are better off in the sense in terms of their economic resources are able to provide good facilities of schooling compared to the state of Madhya Pradesh which is doing its best despite the resource constraints in achieving its objectives. However, there are certain apprehensions in terms of the quality of

Trained teachers, female teachers for every 100 male teachers, PTR in the states of Madhya Pradesh and Karnataka

Stages of Education	Madhya Pradesh			Karnataka		
	Trained Teachers	Female Teachers	Pupil Teacher Ratio	Trained Teachers	Female Teachers	Pupil Teacher Ratio
Pre-Primary/ Primary/ Junior Basic	53%	45	42	100%	90	25
Middle/Sr. Basic	56%	27	33	100%	123	35
High/Post Basic Schools	77%	59	32	100%	71	23

Source: Selected Educational Statistics, 2006-07

learning and achievement as well as sustaining and improving the socio-economic status of the community by providing education at the door steps.

The indicator of GER expresses the number of students enrolled in various levels of education regardless of age, as a percentage of population. The GER at primary level in the state of Madhya Pradesh is found to be 130.07 which is higher than the GER of Karnataka which has 99.94, which indicates that more children have been enrolled in the schools of Madhya Pradesh. Although sometimes it is also found that the chances of over-aged children existing in the schools which had higher gross enrolment ratios.

GER in the states of Madhya Pradesh and Karnataka

States	I-V (6-11 years)			VI-VIII (11-14 years)			I-VIII (6-14 years)		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Madhya Pradesh	153.71	146.90	150.90	101.60	89.98	96.03	134.10	125.76	130.07
Karnataka	108.45	105.48	106.99	90.62	86.82	88.76	101.53	98.28	99.94

Source: Selected Educational Statistics, 2006-07

The dropout rates are another significant indicator indicating the wastage in the schooling system. The higher drop out rate indicates the inability of the schools to retain the children in the school till they complete their schooling. The drop out rate of the children in Madhya Pradesh is higher compared to that of Karnataka, the drop out among boys is 48.71 per cent which is higher than the drop out rate of the girls which is 48.06, while the drop out rate of girls is 38.83 per cent and boys is 38.75 per cent in Karnataka which is lower than the dropout rate of Madhya Pradesh. The drop out rate for Classes I-X is higher and it is more than 50 per cent in both the states for both boys and girls. The drop out rate of girls, i.e. 74.58 per cent, is the highest in the state of Madhya Pradesh while the drop out rate of boys is highest in the state of Karnataka with 54.83 per cent compared to that of girls which is at 53.24 per cent. The overall dropout rate for Classes I-X for Madhya Pradesh stands at 70.51 per cent and for Karnataka 54.09 per cent which has roughly 15 per cent lower

Drop outs in the states of Madhya Pradesh and Karnataka

States	I-V (6-11 years)			VI-VIII (11-14 years)			I-VIII (6-14 years)		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Madhya Pradesh	0.0	0.0	0.0	48.71	48.06	48.42	67.36	74.58	70.51
Karnataka	12.09	11.64	11.87	38.75	38.83	38.79	54.83	53.24	54.09

Source: Selected Educational Statistics, 2006-07

drop outs than Madhya Pradesh. Thus it will be observed that there is contrasting differences in terms of drop outs that exist in the two states. Although the literacy rates indicated small gaps between the two states, there is astounding gaps in the drop out rates at various levels of education as well as gender in these two states.

The Observations of the Teachers Regarding Management

Information was gathered from 100 primary teachers each from the two districts of Bhopal and Mysore regarding various issues relating to teacher management which has been analyzed in this article. The question of support received from the higher authorities remained to be the priority among the teachers, as they depended upon the higher authorities for every action to take place in the schools. The teachers stated that the support received from the higher authorities is not much in Madhya Pradesh (32.5 per cent), while in Karnataka it was 54.0 per cent, however, the responses indicate that the higher authorities are not approachable or not available to provide the support the teachers are looking for in terms of managing the schools.

The timely disbursement of salary to the teachers is another major important factor in facilitating the teachers to meet their household expenses. Both the states have certain percentage of teachers who stated that they do not receive the salaries on time (MP 35 per cent and Karnataka 15 per cent), however, majority of the teachers stated that they received salaries on time.

To keep the motivation levels high among the teachers it is also necessary to have a career path and regular upward mobility in their careers. If the management is not able to provide such promotion opportunities, it is very difficult to have good motivated teachers to teach in the schools. Majority of the teachers from Madhya Pradesh stated that they do not get opportunity on time for career mobility (87.5 per cent). The teachers are stagnating in their existing posts for a long time as there is no recruitment or promotions given in the state and teachers on contract basis have been appointed from time to time to cater to the demands of the schools. Although the teachers from Karnataka have stated that majority of them were able to get promotions, around 20 per cent of the teachers were not satisfied with the promotion process due to long delays in getting promotions which acts as demotivating factor.

Training has been considered most important method of building capacity of the teachers from time to time, the

Support received from higher authorities

States	Yes	No
Madhya Pradesh	32.5%	67.5%
Karnataka	54.0%	46.0%

Timely receipt of salaries

States	Yes	No
Madhya Pradesh	65%	35%
Karnataka	85%	15%

Career mobility (promotions) of Teachers

States	Yes	No
Madhya Pradesh	12.5%	87.5%
Karnataka	70.0%	30.0%

teachers expect regular trainings to take place wherein they can learn the new methods of teaching as well as clarify their doubts in terms of various contents and subject matter. The teachers felt that the training they received were not very regular and was more of a routine kind of activity and felt the need for appropriate and regular trainings which can build their capacity in teaching. Teachers from both the states have mentioned that they have received training but its suitability and regularity are not ensured.

Opportunity for receiving training

States	Yes	No
Madhya Pradesh	97.5%	2.5%
Karnataka	100%	0%

The teachers felt that the management is not able to provide them adequate facilities in terms of teaching-learning material, library and other such aids which has affected their teaching. The concern of the education department was more on enrolment, retention and regularity of the teachers and students and their focus on equipping the schools with teaching-learning material, etc. was very low. Teachers from both the states have stated that the education department, to a large extent, was not able to provide all the necessary facilities to undertake teaching effectively. 82.5 per cent of the teachers in Madhya Pradesh and 25 per cent of teachers from Karnataka stated that the facilities in the schools are either inadequate or not available which hampers in carrying out teaching in classes. The lack of books and library is another major problem to make the children to supplement their knowledge base.

Availability of adequate facilities for organising the classes

States	Yes	No
Madhya Pradesh	17.5%	82.5%
Karnataka	75.0%	25..0%

The teachers in both the states stated that the block level education officers and immediate supervisors never find time to provide any kind of support to the teachers at times of difficulties in managing the schools. They have to manage the schools on their own or either depend upon their fellow teachers to solve the problems. Even the CRCs are not able to provide any support to the schools except for collecting the school information from time to time. 97.5 per cent of teachers from Madhya Pradesh and 70 per cent of the teachers from Karnataka were not very much satisfied with the support obtained from their immediate education officers.

The teachers sometimes approach the local parents and the community

Support received from the inspectors/ education officers

States	Yes	No
Madhya Pradesh	2.5%	97.5%
Karnataka	30.0%	70.0%

members for support when they face problems in obtaining certain facilities and urgent school requirements but very rarely they get any support from them. However, the schools which are located in the rural areas, the rural youth sometimes come forward to help them but in the case of urban areas it is very difficult to locate the parents and community members. It was found that 70 per cent of the parents/community members had an indifferent attitude towards teachers/schools in the state of Madhya Pradesh, while 65 per cent of the teachers from Karnataka felt the same.

Attitude of community members towards the schools

States	Supportive	Indifferent
Madhya Pradesh	30%	70%
Karnataka	35%	65%

The teachers stated that the schools had proper village education committees in place and the meetings of these committees are held from time to time. The committees are elected by the parents and are held responsible for many of the school decisions.

The education departments have made no efforts in both the states to enable the teachers to be aware of the rules, regulations and acts of the government formulated for the benefit of the teachers. The teachers either could not utilize the benefits due to ignorance of the rules and regulations or faced problems in their services. Some of the teachers have stated that they managed to learn about the rules and regulations through their peer groups and tried to utilize their knowledge in understanding and utilizing the rules. It is observed that 67.5 per cent and 70 per cent of the teachers in the states of Madhya Pradesh and Karnataka were not aware of the government rules regulations and acts.

Support received from village education committees

States	Yes	No
Madhya Pradesh	32.5%	67.5%
Karnataka	45.0%	55.0%

Knowledge of the various state acts and rules by teachers

States	Yes	No
Madhya Pradesh	32.5	67.5
Karnataka	30	70

Another major problem the teachers in both the states reported is that of timely transfers and promotions. Although there seems to be certain norms of transfers after a fixed period of posting, it is not practised in real terms. The teachers who are highly influential tend to remain and continue in their native places or urban areas where the facilities are better while the teachers posted in the rural and disadvantaged areas continue to serve for long periods without any benefit of transfers. Similarly the teachers also are not promoted from time to time which blocked their career advancement. The irregularity in transfers and promotions is a great cause of demotivation among the teachers. The problem is very acute in the state of Madhya Pradesh with teachers not getting timely transfers as well as promotions (57.5 per cent) while

in the state of Karnataka the position is better to some extent with 72.5 per cent of the teachers stating that they get timely transfers and to some extent the promotion is also done timely.

Difficulties in getting transfers/ promotions etc.

States	Yes	No
Madhya Pradesh	42.5	57.5
Karnataka	72.5	27.5

The Salary Structures of the Two States

The salary structures followed in the two states are contrastingly different with the designation of the entry level teacher in Madhya Pradesh has evolved from the lower division clerks and upper division clerks nomenclature and have been designated as lower division teachers and upper division teachers with the starting pay scale of Rs.4000-6000 and Rs.5000-8000, while the primary teachers in the state of Karnataka are designated as primary teachers with Rs.3000-6300 scale of pay. While the head master of Madhya Pradesh gets Rs.5500-9000 basic pay and the Karnataka primary school head master gets a basic pay of Rs.4150-7800. There are certain differences in the scale of pay of teachers in both of these states. The promotion avenues and career upward mobility is comparatively faster in the state of Karnataka compared to Madhya Pradesh.

The transfer of the teaching staff and transfer due to promotions are also followed in both the states. However, the provision of in-service training to the teachers on promotion is not available and the chances of attending training are very limited. The short term interactive meetings are the opportunities which the promoted teachers get sometimes and particularly the SSA workshops and training activities are attended by the primary school teachers to a great extent.

Facing the Challenge of Teacher Demand

In order to meet the targets of schooling and making them available in all the habitations, EGS schools were created which made available the schools without a major increase in educational expenditure. Costs have been cut

Teacher scales in Madhya Pradesh and Karnataka

Madhya Pradesh		Karnataka	
Designation	**Pay Scales**	**Designation**	**Pay Scales**
Lower Division Teacher	4000-100-6000	Primary Teacher	3000-75-6300
Upper Division Teacher	5000-150-8000	Primary Head Master	4150-100-7800
Head Master	5500-175-9000	High School Head Master	6000-150-11200
Lecturer	6500-200-9100	Secondary Teacher	8250-200-16000
Principal/BEO	6500-200-10500	Secondary School Principal	

Source: Compiled from State Reports

through the payment of very low salaries to *gurujis* and the absence of systematic funding for buildings, while the BRCs/ CRCs were envisaged to provide pedagogical inputs like training and teaching-learning materials.

Teaching-learning materials are financed by the SSA, earlier it was DPEP through the provision of school and teacher 'contingencies' (₹ 2,000 and ₹ 5000 a year, respectively). Equipment is limited (desk, chairs for gurujis, metal cupboards; at least one blackboard, maps and charts). As usual in rural India, pupils sit on mats and have nothing on which to lean other than their notebooks or slates while writing. Several schools have also reported to not having received the 'contingencies'. The delivery of textbooks was especially important. Making available the textbooks in several schools still remains a great concern. Furthermore, while teachers asserted that all pupils had received free textbooks, many parents said they had to buy them. All pupils had textbooks in their schoolbags, but it is unclear how many had received them from the education department and how many have purchased on their own.

Efficient Teacher Deployment

Teacher deployment is a major problem for the state governments in general and no state is exception to this problem. The influential teachers retain their postings in the urban and good localities where all the facilities are available while the teachers who do not have any influence subjected to the postings in remote and inaccessible habitations and never get an opportunity to serve in the urban areas. Although, the rules and regulations in majority of the states have made it compulsory for the newly recruited teachers to serve for the first three years of their career in a remote area, the teachers on some pretext manage to get their postings in areas of their convenience. The hardship allowances and other allowances are not able to suffice the real hardships they face in serving in these remote areas. The same condition prevails both in the states of Karnataka and Madhya Pradesh as well. The problem is more conspicuous in the state of Karnataka as the teachers are appointed on a regular basis and when the issue of posting is initiated it is sometimes a major problem which the education officers face in fulfilling the demands of the local powerful politicians and deviate from the already laid down rules and regulations. In case of Madhya Pradesh, the teachers mostly serving the primary schools are on temporary service and due to the local level recruitment the teachers of the same locality get their postings in their own village and reside in the school neighbourhood, the question of transfer and teacher placement does not become a major concern of the education officer.

Motivation of Teachers

The problem of teachers lies in the very fact that there is no proper mechanism in place to understand their problems and provide support both in terms of administrative as well as academic and more particularly managing the day-to-day affairs of the schools efficiently. In the absence of such policies the problem of finding ways of understanding and articulating the needs of the teaching community are left undocumented or

obscured by predetermined categories of planning needs. The only way to do this is to encourage shifting the perspective from the government to the community. Looked from the point of view of the teachers, the problems may be re-defined, provoking a review of existing assumptions and norms. Solutions will emerge and planning norms move closer to teacher's needs as the teachers themselves perceive them to be.

Teacher Education

The state governments have created varieties of teaching opportunities to overcome the access situation of the respective states. The creation of parallel teacher positions has not smoothened the functioning of the schools rather it has created additional administrative mechanisms. More particularly the creation of the para-teachers and contract teacher cadres initially went on very smoothly but has stumbled upon problems of their continuance, complacency and obtaining quality teaching inputs, etc. Moreover, the major challenge in teacher management is the question of the basic entitlements strengthening their positions. Unless the government makes necessary reforms in ensuring the provision of basic entitlements in terms of their recruitment, posting and the necessary service conditions requisite to serve the schools while taking into consideration the school facilities in terms of all the basic teaching-learning material and support from the school, the performance of the teachers may not see the improvement. Although there may not be end to the list of the demands made by the teachers from time to time to which the government cannot accede, but the basic requirements of the school and schooling and teacher and teaching in more conducive environments can definitely enhance motivation among teachers to a great extent. The teacher training institutions created at various levels needs to be revitalized and has to be more proactive in providing continuous capacity building programmes to the teachers. The present system of teacher training is not in a position to become proactive and reach the teachers making teachers devoid of an adequate capacity building on continuous basis. The training provided is not able to address the various problems they face while transacting teaching in the schools. On the other hand the variety of teacher cadres posed the following challenges for deployment and training with:

- Although the regular teachers who are to be appointed in the schools are required to have basic pre qualification of either a diploma in teacher training or a B. Ed. for their entry into the system, but this is not ensured with regular in-service teacher training;
- The state governments have no policy of pre-service training as a mandatory pre-requisite for teacher recruitment in case of specially *shiksha karmis*, contract teachers and *gurujis* who do not have any pre-service training. This creates a need for careful perspective planning for developing their capabilities, as only 21 days of a routine kind of training is provided to many of them;
- In addition there are pedagogical challenges created by first generation

learners and heterogeneous multi-age, multi-ability groups which the untrained teachers as well as the teachers who are not receiving regular in-service training struggle to overcome.

The strategy for training, therefore, has been sensitive to these complexities. The training has focused on the primary teachers raising the number of teachers trained from time to time and the records show that all the teachers, irrespective of their cadres, have undergone training at the BRC/CRC levels, while the contents of the training rarely focus on the individual school requirements as well as creating new knowledge and skill among the teachers to take up multi task in the schools.

While the Karnataka state government also initiated major programmes for improvement of education in the state, the issue of managing the teachers of the state has received a major impetus by the creation of a Teacher Transfer Act. This act facilitated in judiciously deploying and posting the teachers according to the necessity of the schools in the state enabling all the schools to perform effectively. By implementing this act, the state has rationalised the deployment of additional teachers existing in some of the schools mostly located in the urban areas and areas having better facilities to the areas which are interior and inaccessible. Moreover, the frequent request of transfers by teachers has been reduced by making five years as the criteria of eligibility of transfer. The teachers who are recruited have to initially serve in rural and tribal areas, thereafter they become eligible to serve in the urban areas. The categories of working places are:

A – Urban area/notified town, municipality area,
B – Semi urban area (schools in the radius of 5 km from urban limits)
C – Rural area (other than A & B)

The calculation of weightage/points:
One year service in rural area – 2 points
One year service in semi-urban area – 1.5 points.
One year service in urban area – 1 point

The total weightage of points is calculated after verifying the total number of years service the teacher has put up and accordingly the points will be given. These points are calculated while making transfers as well as promotions, and the state has also evolved a counselling process for posting of teachers. After the counselling process is carried out the list of the teachers posted and transferred are all displayed in the website of the department as well as the orders are issued on the same day. Thereafter the changes in the orders are avoided to a great extent.

Although attempts have been made to make the recruitment and posting practices of the teachers transparent, still the state governments could not put in place a fool proof system of appointing and posting as per norms prescribed above. There are variety of factors such as influence, political linkages and transaction of money takes place to get a desired posting in a good place and the teachers manage such postings without much problem. Only the teachers who do not have any influence remain in the

rural and inaccessible areas without getting a transfer. Similarly, regarding the knowledge of the rules and regulations by the teachers, it is found that the teachers who are members of teacher unions have access to much of the rules and regulations and consult each other in case of any clarifications. The schools do not receive any circulars, etc. regularly for the benefit of the teachers — thus making them to depend for such information on their peer groups and associations.

Conclusion

There is definitely efforts were made by the various state governments, including the Madhya Pradesh and Karnataka, in improving the entire education system of the respective states. The mission established in the state of Madhya Pradesh has accomplished many of the responsibilities. The Karnataka government has come out with vision documents for education as well as mid term reports envisaging a variety of programmes towards educational development in the state. However, there is a need to look into the socio-economic factors of the state and the need of the community in a larger perspective. In the absence of the developmental programmes for the state as a whole there remains a divide between the haves and have nots leading to failure of the best efforts and programmes of the government. There is a need for creating teachers, who are now large in numbers, but the quality cannot be achieved with such programmes.

The academic support through the BRCs and CRCs is good to those teachers who can be accountable to the system and need not work on an ad-hoc manner with low quality teachers as para teachers. This para-teacher system, although in existence in many of the states, it is only a stop gap arrangement and once the recruitment of regular teachers is done the para-teacher contract ends. But in the case of Madhya Pradesh, the para teachers have become unique kind of teachers who might perhaps become a problem for the state unless certain measures of creating qualified good teachers are brought into the system. The contractual teachers might resist as well for their absorption into the government system for regular jobs, despite the fact that most of them do not possess the requisite qualifications and training which in turn can affect the school education. The fate of the Literacy Programme Missions should be an eye opener, as it could not be sustained in the long run due to such kinds of problems, therefore, the Gurujis of Madhya Pradesh need a relook in this context avoiding the loss of quality and sustainability of the educational achievements in the state. Majority of the southern states have practised regular teacher recruitments without any commitment of regularising the para-teachers. This measure has enabled them to get trained as well as qualified teachers into the system. Only the challenge for them is building capacities of these teachers and improving the school provisions in order to improve the school performance. The BRC/CRC concept which provided academic inputs to the teachers, however, over a period of time, has become saturated and either provided low academic inputs or no inputs of academic importance, this

again raises the question of adequate and continuous teacher training to teachers. The government should plan for accelerated teacher training institutions which should be more vibrant with good teacher trainers and capacity to provide academic support to the teachers in real sense and effectively, as the pre-service training becomes inadequate while facing the real teaching situations by a teacher who has to work with inadequate schooling facilities.

It is not only the question of equipping adequately teachers to take up teaching occupation but there is a need to look into the non-monetary support which can be extended to these teachers in order to take care of the disadvantages they face at times (Panda, B. K. 2006). For instance the teachers serving in the rural and disadvantaged areas have to forego many of the facilities for themselves as well as for their children. The non-availability of suitable accommodation and other hardship allowances are very meagre and do not suffice the hardships they face. There is a need for looking into creation of such facilities and benefits which can retain the best teachers in the schools. These kind of facilities can be either in the form of providing accommodation, benefits to their children for higher studies, medical allowances, hardship allowances and additional increments and counting of their service in disadvantaged areas for promotion and awards, etc. Although such benefits are there, the amount, which they get, is very little and the monetary benefits are very little. Either there is a need to enhance the amount of such allowances or devise some other non-monetary benefits which can attract as well as retain the qualified teachers. Most probably with the implementation of the Right to Education Bill Act, 2009, there will be better opportunities for the teachers in all the states. The RTE Act envisages in ensuring provision of all facilities to teachers adequately and ensures that they teach effectively. The Act also takes care of the basic entitlements of the teachers such as their qualifications, training and capacity building, etc. while ensuring all the entitled benefits which can take care of their service conditions and motivation aspects as well. The schools are adequately equipped with all the necessary teaching-learning material, school functioning, working hours, number of days to function in a year, and timely conduct of the school and all such conducive environment to run the schools efficiently. The RTE Act will make the state governments to ensure that all necessary facilities are extended to the teachers so that the quality of schooling can be improved in the country.

REFERENCES

Census of India. 2001. *Provisional Population Totals*, Series 1, Paper 1, Registrar General, Delhi.

Dove, Linda, A. 1986. *Teachers and Teacher Education in Developing Countries –Issues in Planning and Management and Training,* Croom Helm, London.

Fitzsimmons, S. J., and Freedman, A. J., 1981.*Rural Community Development: A Program Policy and Research Model*, ABT Books, Cambridge.

Gamoran, A., Secada, W.G., Marrett, C. A., 1998. 'The Organizational Context of Teaching and Learning: Changing Theoretical Perspectives in Holliman,' M. T., (Eds.), *Handbook of Sociology of Education.*

Gaziel, H, 2002.Teacher empowerment reform and teacher perceived effectiveness: A Contradictory or Complimentary? *Education and Society,* 20, 79-89.

Gaziel, H. 2009; Teachers' Empowerment and Commitment at School Based Management and Quality, *Comparative Education and Policy Research,* Vol.8, Part-2.

Govinda, R., ed., 2002. *India Education Report: A Profile of Basic Education*, Delhi: Oxford University Press.

Govinda, R., and N.V. Varghese.1993. *Quality of Primary Schooling in India: A Case Study of Madhya Pradesh*, Paris: International Institute for Educational Planning, UNESCO.

Heyneman, S. P. 1983. *Improving the Quality of Education in Developing Countries, Finance and Development*, Croom Helm, London.

Hill, P. T. & Bonan, J. 1991. *Decentralization and Accountability in Public Education*, Santa Monica, Rand.

International Institute for Population Sciences (IIPS) and ORC Macro. (2001), *National Family Health Survey (NFHS-2) India 1998-99: Madhya Pradesh*, Mumbai: IIPS.

Kreisberg, S. 1992. *Transforming Power, Domination, Empowerment and Education*, Albany, NY: State University of New York Press.

Kremer, Michael and et al. 2004. *Teacher Absence in India*, World Bank.

Louis, K.S. and Marks, H. M., 1995. 'Does Professional Community Affect the Classroom?' Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.

Malen, Betty and et al.,1990. 'Unfulfilled Promises, School Administrator,' 47.2, 30-32, *Educational Journal*, 402-409.

Newman, Marks and Gamoram. 1996. 'Authentic pedagogy and student performance,' *American Journal of Education*, 104, 280-312.

Ottaway, A.K. C. 1962. *Education and Society — An Introduction to the Sociology of Education*, Routledge and Kegan Paul, London.

Panda, B. K., 2001. *Nothing but the Schools – The Role and Responsibilities of the School Heads*, Anamika Publications, New Delhi.

Panda, B. K. 2006. Need for Teacher Development – Experiences Abroad, *Journal of Indian Education,* NCERT, Vol. XXXII, No.2.

Rajiv Gandhi Shiksha Mission. 2001. 'Rededicating to the Continuing Challenge: Growth of Literacy in Madhya Pradesh', Rajiv Gandhi Missions Occasional Paper No. 9, Bhopal, Government of Madhya Pradesh.

Simmons, J., and Alexander, S. 1980.'Factors which promote school achievement in developing countries: A Review of the Research', In J. Simmons (Ed.*) The Education Dilemma: Policy Issues for Developing Countries in the 1980s*, Elmsford, NY., Pergamon Press.

Shanker., A. 1991. 'The end of the traditional model of schooling and a proposal for using incentives to restructure for public schools', *Phi Delta Kappan*, 71 (5), 345-357.

Weiss, Carol H., Combone, Joseph and etal., 1992. 'Teacher conflicts in Shared Decision Making', *Education Quarterly*, 28-3, August 1992, 350-67.

Zeichner., K. 1993. 'Traditions of Practices in US pre-service teacher education Programme', *Teaching Teacher Education*, Vol.9 (1), 1-13.

Growth and Status of Secondary Teacher Education Programme in Chhattisgarh: A Study

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Abstract

This study was conducted to find out the growth of secondary teacher education programme (B.Ed.) in Chhattisgarh since 2004 and the status in terms of number and types of institutions and strength of students in these institutions. In addition to these, this study also put an effort to find out the extent to which these institutions have fulfilled norms and standards of NCTE. Perception of pupil teachers and teacher educators towards the ongoing problems and solutions of these problems is another part of discussion. To strengthen the study data were obtained from both primary as well as secondary sources. Three hundred pupil teachers and 70 teacher educators across ten secondary teacher education institutions were the sample of the study. It was found that in Chhattisgarh the number of secondary teacher education institutions and the strength of students have been continuously increased from 2004-05 to 2009-10. So far the growth in types of institutions is concerned, private institutions showed steady growth in comparison to government and aided institutions. Hardly any of the private institutions completely fulfilled the recent norms and standards of NCTE in all aspects. The results of the study also revealed that pupil teachers and teacher educators were not happy with the prevailing situations. Further, many suggestions were made by them to improve the standard of the secondary teacher education programme in Chhattisgarh.

Introduction

The entire educational system of our country is in the process of change. We all know that no educational reform can be successful unless the quality of teacher is improved, but it depends on quality of teacher education. National Policy of Education (NPE, 1986) has rightly observed that the status of the teacher reflects the socio-cultural ethos

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of the society and no people can rise above the level of its teachers. Good teachers can be produced only when we have good and effective teacher education programme. On the other hand, Kothari Commission said: "Of all the different factors which influence the quality of education and its contribution to national development, the quality, competence and character of teachers are undoubtedly the most significant." Therefore, there should be a sufficient supply of intelligent and sincere persons to the teaching profession with the best professional education and satisfactory conditions for their work. The present state of secondary teacher education in the country presents a mixed picture of far-sighted intentions and innovations coupled with alarming distortions and structural shortcomings. Looking back from past to present, it appears that although nomenclature has undergone a change from 'training' to 'education', the system by and large remain unchanged. It has been observed that the existing system of teacher education is rigid and static.

Many researches have been conducted time to time to find out the prevailing situation of secondary teacher education programme: Behera (1989) did an evaluative study of the problems of teacher education programme at the college level undertaken by the private agencies in Odisha; Patted (1992) conducted a critical study of the qualitative improvement of secondary school teacher preparation in Karnataka state; Walia, (1992) found that B.Ed. course was theoretical in nature, no internship was provided to the students and that the one-year duration was quite inadequate; Shukla (1995) conducted a comparative study of state level selection procedure of admission to the B.Ed. courses of Rajasthan and Madhya Pradesh; Kumar (1996) also conducted a comparative study of teacher education programmes at secondary level in south India; Srivastava and Agarwal (1996) studied the existing pattern of secondary pre-service teacher education in the country and analysed its various components and prepared guidelines to restructure the internship programme; Nagpure (1991) did a study on working system of teacher education at secondary level in Maharashtra with reference to physical facilities, academic work and examinations. However, these studies have not found any visible research evidence to understand the system of teacher education in Chhattisgarh. Therefore, it was decided to take up a study on growth and status of secondary teacher education programme in Chhattisgarh.

Teacher Education of Chhattisgarh

By the year 2009, Chhattisgarh has 95 secondary teacher education institutions, which have been running to prepare the teachers for secondary schools. Government, aided as well as private bodies run these institutions. Keeping these statistics in mind it was felt to undertake a study which could examine the growth and status of teacher education programme.

Objectives of the Study

The objectives were:

1. To study the growth of secondary

teacher education programme in Chhattisgarh in terms of number of colleges and strength of students.

2. To study the extent to which the norms and standards of NCTE have been fulfilled.
3. To study the perception of teacher educators and student teachers towards the improvement of secondary teacher education programme in Chhattisgarh.

Delimitation

The study was delimited to only the pre-service secondary teacher education programme in Chhattisgarh. Distance mode secondary education programme was not covered in this study.

Methodology

Descriptive survey method was followed in conducting the present study. The pupil teachers and the teacher educators working in the B.Ed. institutions and the Department of Education under the different universities of Chhattisgarh were considered as the population in the present study. The study was conducted across ten B.Ed. institutions from which a sample of 70 teacher educators and 300 pupil teachers were selected.

The university-wise sample of institutions included in the study is given in Table 1.

Tools

One observation schedule and two self made questionnaires were developed for collection of data.

The observation schedule was filled during the visit to the sample institutions which included available infrastructure, curricular and co-curricular activities in the respective institutions. Data regarding the process of admission, intake, fees, duration of course, nature of questions asked in the entrance examination and pattern of evaluation were collected from admission brochure.

A questionnaire for pupil teachers consisted of 24 items and was developed to seek information pertaining to their interest towards teaching, methods of instruction followed by the teacher educators , technological devices used by the teachers while teaching, number of

Table 1
University-wise sample of secondary teacher education institutions

Sl.No	Name of University	Pre-Service Secondary Teacher Training Institutions		Total
		Govt.	Private/Aided	
1.	Guru Ghasidas University, Bilaspur	2	1	3
2.	Pandit Ravi Shankar Shukla University, Raipur	1	3	4
3.	Dr. C.V. Raman University Kota, Bilaspur	—	1	1
4.	Sarguja University, Ambikapur	—	2	2
	Total	3	7	10

lessons to be completed during micro teaching and internship, facilities of library and internet access. Along with these, they were encouraged to express their opinion for the improvement of ongoing practices.

Another questionnaire comprised 23 items and tried to seek information from teacher educators about their educational and professional qualifications, teaching experience, pay-scale, publication in terms of research papers, weekly workloads and institutional support for their professional growth and development, etc. They were also asked to answer about the important factors responsible in disseminating quality education and opinion regarding the improvement in quality of teacher education programme.

The collected data were tabulated and analysed using frequency and percentage analysis. Graphical representation of the data was also made wherever required.

Findings and Discussions

Growth of Secondary Teacher Training Institutions

The analysis of the growth of teacher training institutions was made for a period of six years (2004-05 to 2009-10).

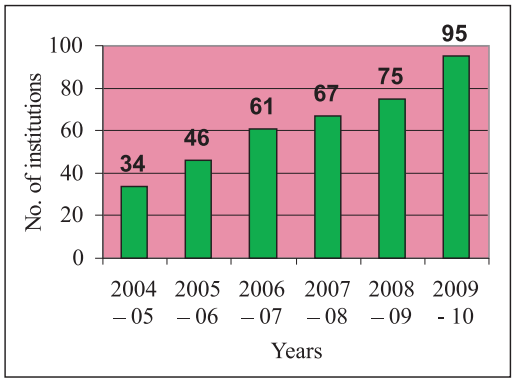

Fig. 1: Growth of Secondary Teacher Education Institutions (2004–05 to 2009–10)

Table 2 and Figure 1 show that there were only 34 secondary teacher education institutions in the year 2004–05 which rose to 95 by 2009-10. It is observed that 61 new institutions were established within a period of six years and on an average 12 institutions were added per year. It is also evident that by the year 2009-10 the number of institutions became approximately three times more in comparison to the year 2004-05.

The growth of B. Ed. colleges may be due to the demand of such courses and the necessity of maximum number of trained teachers in this state.

Table 2
Growth of secondary teacher education institutions (2004-05 to 2009-10)

Year	Number of Colleges
2004 – 05	34
2005 – 06	46
2006 – 07	61
2007 – 08	67
2008 – 09	75
2009 – 10	95

Source: www.scert.cg.gov.in

Table 3
Management-wise distribution and growth of secondary teacher education institutions (2004–05 to 2009–10)

Year	Types of Management			
	Govt.	Aided	Private	Total
2004 – 05	2	1	31	34
	(5.9)*	(2.9)	(91.2)	(100)
2005 – 06	2	1	43	46
	(4.3)	(2.2)	(93.5)	(100)
2006 – 07	2	1	58	61
	(3.3)	(1.6)	(95.1)	(100)
2007 – 08	2	1	64	67
	(3)	(1.5)	(95.5)	(100)
2008 – 09	2	1	72	75
	(2.67)	(1.34)	(96)	(100)
2009 – 10	3	1	91	95
	(3.16)	(1.1)	(95.8)	(100)

* Figures in parentheses show percentage.
Source: www.scert.cg.gov.in

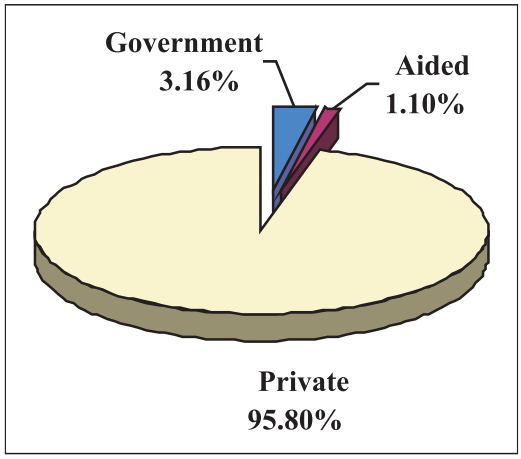

Fig. 2: Management-wise distribution and growth of secondary teacher education institutions 2009–10

Table 3 indicates the management wise trend of growth of B. Ed institutions in Chhattisgarh from 2004–05 to 2009–10. As evident from Table 3, there are three types of B.Ed. institutions in Chhattisgarh— government, aided and private. In 2004–05, 91.2 % of B.Ed. institutions were owned and managed by the private bodies and government and aided institutions were very less — 6% and 3%, respectively. There were only two government colleges and one aided college as compared to 31 private institutions in the year 2004– 05. In the year 2005–06 private managed institutions were 43 and it became 58 in the year 2006 – 07. In the year 2007–08 the number of private colleges were 64 and in 2008–09 it was 91, whereas no such growth was observed in case of government institutions from the year

2004–05 to 2008–09. In the year 2009-10, Guru Ghasidas University started B.Ed. course in its campus. By the year 2009-10, the percentage of government, aided and private B.Ed. colleges were 3.16%, 1.10% and 95.80%, respectively.

The above findings indicate that the interest of government in opening new B.Ed. institutions has not been so prominent as compared to private bodies.

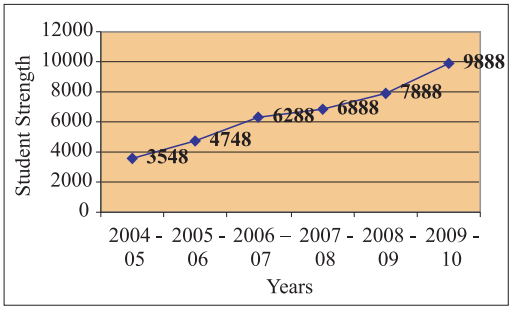

Fig. 3: Growth of Student strength in Secondary Teacher Education Institutions (2004 - 05 to 2009 – 10)

Table 4
Growth of student strength in secondary teacher education institutions (2004–05 to 2009–10)

Year	Student Strength	Percentage Growth
2004 – 05	3548	-
2005 – 06	4748	33.82
2006 – 07	6288	32.43
2007 – 08	6888	9.54
2008 – 09	7888	14.5
2009 – 10	9888	25.35

Source: www.scert.cg.gov.in

Growth of Student Strength

The student strength was 3548 in the academic year 2004–05. During the year 2005–06, the student strength reached to 4748 which was an increase of 1200 seats (33.82%) as compared to the previous year. Again, the strength became 6288 in 2006–07, almost1540 seats (32.43%) increase over the preceding year. In the year 2007–08, th student strength became 6888 which was an increase of 600 seats (9.5%) as compared to 2006–07. The student strength in the year 2008–09 was 7888, an increase of 1000 seats (14.5 %) over the preceding year. In the year 2009–10, the student strength became 9888 and it was an increase of 2000 seats (25.35 %) over the preceding year. The data clearly depicts that there was a continuous increase in the student strength in the B. Ed. colleges.

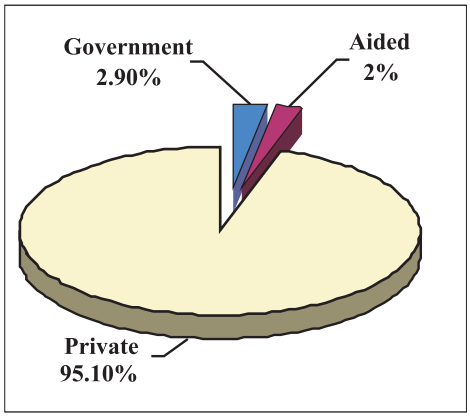

Fig. 4: Management-wise Comparative Growth of Student Strength in B.Ed. Institutions 2009–10

Table 5
Management wise comparative growth of students strength in B.Ed. institutions (2004–05 to 2009–10)

	Types of Management			
Year	**Govt.**	**Aided**	**Private**	**Total**
2004 – 05	188 (5.3)	200 (5.6)	3160 (89.1)	3548 (100)
2005 – 06	188 (4)	200 (4.2)	4360 (91.8)	4748 (100)
2006 – 07	188 (3)	200 (3.2)	5900 (93.8)	6288 (100)
2007 – 08	188 (2.7)	200 (2.9)	6500 (94.4)	6888 (100)
2008 – 09	188 (2.38)	200 (2.5)	7500 (95)	7888 (100)
2009 – 10	288 (2.9)	200 (2)	9400 (95.1)	9888 (100)

Source: www.scert.cg.gov.in
(Figures in parentheses indicate percentage)

It is evident from Table 5 that in 2004–05 the strength of students in the government B.Ed. colleges was 188 (which was 5.3% of total strength) whereas in case of aided and private colleges, it was 200 (5.6%) and 3160 (89%), respectively. In government colleges, till the year 2008–09 the strength remained same, therefore, the percentage in total strength was declined subsequently and reached to 2.38 per cent in 2008–09 in comparison to other institutions during these years. In the year 2009–10, 100 seats were added to government Institutions as a result of which strength reached to 288 (2.9%). In the case of aided institutions, the strength remained the same till the year 2009–10 but in comparison with other institutions the per cent of strength declined and reached to 2%. Analysis of the strength of private managed institutions indicates that in the year 2004–05 there were 3160 (89.1%) of total strength and by 2009–10, the strength reached to 9400, which is 95.1 per cent of total strength. It is also observed that 6240 seats were increased in six years. The data clearly depicts that there was a continuous growth of students in the private B.Ed. institutions.

Table 6 shows that the present enrolment per government institutions (on an average) is at 96 whereas it is 200 in the case of aided institution and 103.29 in private institutions.

Table 6
Average strength of students in government, aided and private secondary teacher education institutions in 2009–2010

Types	**Number of B.Ed. Colleges**	**Strength**	**Average strength**
Government	3	288	96
Aided	1	200	200
Private	91	9400	103.29

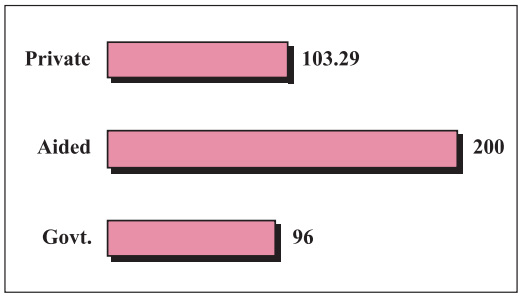

Fig 5: Average Strength of Students in Government, Aided and Private Secondary Teacher Education Institutions in 2009–2010

B.Ed. Institutions and NCTE Norms

This has been analysed on the basis of data collected through the observation schedule from sample teacher training institutions.

Duration and working days: *One academic year or two semesters with at least of 200 working days, exclusive of period of examination, admission, etc. and institution shall work for a minimum of thirty-six hours in a week.*

B.Ed. programmes, in most of the colleges follow annual pattern, i.e. of one year whereas Department of Education, GGV offers it on semester pattern. The working days in the different institutions varies from 180 to 200 days but they work for a minimum of thirty-six hours in a week.

Intake: *There shall be a basic unit of one hundred students divided into two sections of fifty each for general sessions and not more than 25 students per teacher for a school subject for methods course and other practical activities of the programme to facilitate participatory teaching and learning.*

Most of the institutions have intake of 100 students. Raipur and Bilaspur government colleges have intake of 95 and 93 students, respectively. Kalyan College, Sector-7, Bhilainagar-Durg, Bhilai Materi Collage, Bhilai-Durg, Shri Shankracharya Mahavidyalaya, Bhilainagar and Swami Swarupanand Institute of Education, Bhilai and G.H. Raisoni National College, Raipur have intake of 200 students. Care has not been taken by most of the institutions regarding the intake of students per teacher for each school subject and practical activities fixed by NCTE.

Eligibility: *At least fifty per cent marks in Bachelor's degree and/or in the Master's degree or any other qualification equivalent.*

The state government follows the eligibility condition prescribed by NCTE for seeking admission in B.Ed. programme and the minimum age fixed for admission is 20 years.

Reservation :*The reservation in seats and relaxation in the qualifying marks in favour of the reserved categories shall be as per the rules of the concerned government.*

Government and aided institutions follow vertical and horizontal reservation, which is applicable for the candidates of Chhattisgarh only. Vertical reservation is based, on various categories of students, i.e 21%,15%,14% seats are reserved for ST, SC and OBC (non creamy layer) students respectively.

From all the categories again the horizontal reservation is applied as 6% for disadvantage sections, 3% for freedom fighters and 3% for ex-servicemen. Thirty per cent of the seats are reserved for female candidates. But private institutions neither follow vertical nor horizontal reservations. All the seats of government colleges, aided colleges,

institutes of teacher education, and Pandit Ravi Sankar University are reserved for candidates of Chhattisgarh only. Apart from this 80% seats are reserved for candidates of Chhattisgarh and the rest 20% are treated under all India quotas in private colleges. Guru Ghasidas Vishwavidyalaya (GGV) follows the norms fixed by the central government, i.e. 15% for SC, 7.5% for ST and 27% for OBC. As it is a central university no such seats are reserved for candidates of Chhattisgarh.

Admission Procedure: *Admission shall be made on the basis of marks obtained in the qualifying examination and/or in the entrance examination or any other selection process as per the policy of the state government/ UT administration and the university.*

Admission in B.Ed. is made through the process of entrance examination. One common pre-B.Ed. entrance examination is conducted by an agency named VYAPM (Chhattisgarh Professional Examination Board) for all government aided and private institutions (except GGV) usually in the month of May. In pre-B.Ed. examination the weightage of the questions are given in the Table 7.

Table 7
Weightage given to different items in entrance examination

S. No.	Area Covered	No. of Questions	Percentage
1	General Mental Ability	30	30
2	General Knowledge	20	20
3	General Attitude	30	30
4	General English	10	10
5	General Hindi	10	10

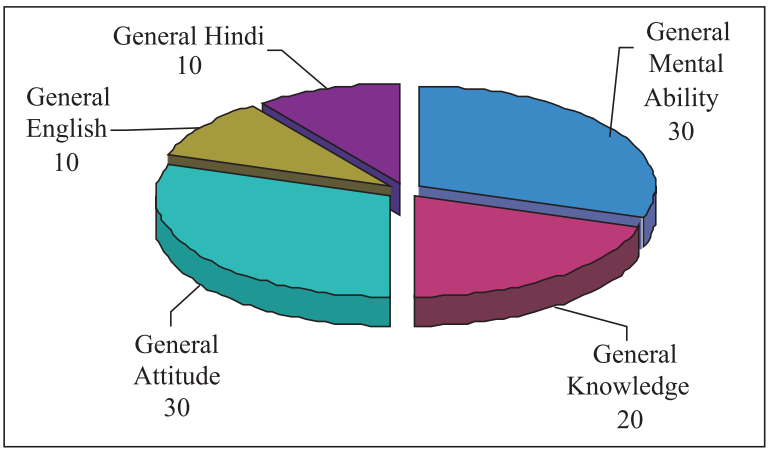

Fig 6: Weightage given to different items in entrance examination (in %)

All the questions are of objective types and there is no negative mark for wrong answers. Two merit lists are prepared on the basis of marks obtained in the entrance examination. One is for candidates of Chhattisgarh and another is for the outside students. If two or more candidates obtained same marks in the entrance examination then preference is given to the candidate who is senior in age. According to their ranks in pre-B.Ed. exam, SCERT, Raipur organises an online counselling for admission in various colleges. A non-refundable amount of ₹ 350 has to be paid by the student for attending counselling.

Department of Education, GGV (a central university) conducts a separate entrance examination for admission in B.Ed. programme. There are 100 multiple choice questions (MCQ), out of which 30 questions are based on teaching aptitude, reasoning, current educational scenario and 70 are based on current awareness, mental ability, numerical ability, comprehension and basic ideas from all other areas.

Fees: *The institution shall charge only such fee as prescribed by the affiliating body/ state government concerned in accordance with the provisions of National Council for Teacher Education.*

The prescribed fees in government institutions are ₹ 3,245 for non hostlers and ₹ 5,145 for hostlers, whereas for aided college, it is ₹ 21,350. There is no fixed amount prescribed for private colleges. In private colleges, the range lies usually from ₹ 20,000 to ₹41,000 for Chhattisgarh students and for candidates outside the state it varies between ₹ 21,500 and ₹ 61,000. In the case of GGV, the prescribed fees is ₹ 35,00 (₹2,000 in 1st semester + ₹1,500 in 2nd semester).

Staff Structure:*One principal and seven teachers for intake of 100 students. In addition to this one art education teacher, one physical and health education teacher, one work experience teacher, one computer (ICT) teacher, one librarian and one technical assistant. For doing administrative functions, one office cum-account-assistant, one office-cum-computer operator, one storekeeper and two lab attendants/helpers/support staff.*

So far the staff pattern is concerned, the optimum number of teaching and non-teaching staff is hardly found in private teacher education institutions. Only three or four non-teaching staff have been handling all the official works. Most of the private colleges do not have lecturers for art education, physical education and work experience . In some private institutions there were scarcity of teachers in science, mathematics and English. Government colleges fulfill the norms of NCTE in terms of teaching and non-teaching staff.

Infrastructure: *Institution must possess 2500 sq mtrs of well demarcated land for the intake of 100 students. It varies if the colleges running other educational programmes. For one unit of B.Ed. the institution must have two classrooms, one multipurpose hall with seating capacity of 200, library-cum-reading room, ICT resource centre, psychology resource centre, art and craft resource centre, health and physical education resource centre, science and mathematics resource centre, two store rooms and multipurpose playfield. There should be principal's*

office, staffroom, administrative office, visitors room, girl's common room, seminar room, canteen, separate toilet facility for boys and girls, parking space, safeguard against fire hazard, etc.

It was observed that 50% institutions had the required land of 2500 sq. metres. These institutions have library-cum-reading rooms, ICT resource centres and psychology resource centres but art and craft resource centre, health and physical education resource centre, science and mathematics resource centre, store rooms and multipurpose playfield, etc. Most of the institutions have staffrooms, girls common rooms, parking spaces, administrative offices, seminar rooms but visitors' room, canteen and safeguard against fire hazard were lacking.

Instructional: *Institutions have easy access to sufficient number of recognized secondary schools within reasonable distance for field work and practice teaching. Library- cum-reading room with seating capacity for at least fifty students equipped with 3000 books including text and reference books journals, etc. internet facility, and resource centre rooms, i.e. teaching-learning resource centre for science and mathematics, psychology resource centre and ICT facilities with computer, TV, camera, satellite interlinking terminal, etc should be available for running B.Ed. college.*

Sufficient number of secondary schools has been arranged by the institutions for the practice teachings within the reasonable distance but sometimes due to non-availability of schools or other problems like examinations or holidays, these institutions face difficulties in allotting the schools within the reasonable distance.

Library-cum-reading rooms were available and sufficient number of books also found available in most of the institutions but journals and magazines of education were insufficient in most of the institutions. Institutions have access of internet facility but its optimum utilisation by students was not found . It was found that out of 10 institutions only four (40%) institutions have psychology resource centre rooms and in the same way the number of ICT resource centres were very few. Even though some of the institutions had ICT resource centres but these were not well equipped with technological devices like computers, TV and satellite interlinking, etc.

Curriculum transaction: *Practical work is to be performed by each student separately. Students are required to teach thirty lessons (15 in each teaching subject). During practice teaching they are also required to teach ten lessons (five lessons in each teaching subject). In simulated situation, they have to make observation of ten lessons taught by fellow students (five in each teaching subject) during internship in an academic session. The students have to conduct an action research project and five days of community experience in an academic session.*

Observation and responses of the students indicate that lecture method is mostly followed and Hindi is a medium of instruction followed in almost all subjects. So far practice teaching is concerned, students are instructed to teach 40 lessons (20 lessons in each teaching subject). Before that during micro teaching they get experience and exposure in simulated situation where

they have to master over different skills and to prepare and present five lessons in both teaching subjects. Apart from this during internship five lessons are observed in both the subjects by their peers. In responding to the action research project, 30% of students expressed that they have conducted this project. Every institution organised field-specific community experience programme, but it was of hardly one or two days.

In addition to the above discussions, some of the points on teacher indicators were also taken into account.

Qualification of Teachers

Qualifications of a good number of teacher educators were M.A./M.Sc. in school subjects with M.Ed. Very few teachers were having NET/JRF in education. 97% of teacher educators working in these institutions were fulfilling the basic educational qualifications as per NCTE norms whereas only 3% were working with M.A/M.Sc. with B.Ed.

Teaching Experience and Workload

There are a good number of teacher educators in government colleges having rich experience of teaching but it is not true in the case of private colleges. 30% of teacher educators have more than 10 years experience, whereas 20% of teachers have 5–0 years experience and 50% have more than one year but less than 5 years experience.

The average workload of a teacher educator is approximately 20 periods per week. But it usually ranges from 15-30 periods per week.

Publication, Refresher and Orientation Programmes

So far as the publication of articles/ research papers is concerned, 60% of teacher educators had their publication of papers whereas 40% teacher educators said that no paper has been published so far.

Only 45% teacher educators attended orientation/refresher programmes because most of them did not get permission from their management.

Perception towards Improvement in Secondary Teacher Education Programme

This objective has been analysed on the basis of data collected with the help of the questionnaire of teacher educators and student teachers.

Perception of Teacher Educators

Perception of the teacher educators were discussed in the following headings.

Constraints

Expressing the opinion towards the factors responsible in disseminating quality in teacher education programme, 20% of teacher educators have emphasised on the defect in the process of admission, 40% on poor qualities of

Table 8
Opinion of teacher educators towards various constraints

S. No.	Determinants of Constraint	Percentage Teacher Educators
1.	Poor quality of students	40
2.	Large size classes	10
3.	Load of other academic work	30
4.	Defect in admission process	20

students whereas 10% have put their opinion that a large size class is a constraint which don't allow teacher to work properly and to give individual attention on the students. 30% have expressed their view that load of other non-academic work is a great constraint which always make teachers busy and do not allow to put full attention on teaching.

Opinion for Improvement

Expressing the opinion on improvement of the programme, 40% of the teacher educators emphasised on increase in duration of course from one year to two years. Approximately 20% told that there is a need of modification in the admission process. It is also advised by some of them that eligibility criteria of admission should also be modified. They had their opinion that both marks of entrance examination and their previous academic performance should be taken into account instead of considering only entrance examination. 20% teacher educators have also emphasised on appointment of well qualified and competent teachers to train the prospective teachers. 10% teacher educators expressed that it is needed to make a balance between theory and practical papers to make the programme more effective. 40% have emphasised on regular conduction of conferences, group discussions in the institutions for the quality improvement in the programme.

Teacher educators also told that some remedial classes need to be arranged for slow and disadvantaged sections. Emphasising on the importance of in-service training, 15% of teacher educators said it is really essential for a teacher, which will make them competent and provide information regarding the recent changes taken place in the field of education. 10% of teacher educators emphasised on practical approach of teaching inspite of theory-ridden. 20%

Table 9

Opinion of teacher educators on improvement of the programme

S. No.	Suggestions	% Teacher Educators
1.	Increase in duration of course	40
2.	Modification in admission process	20
3.	Appointment of qualified teachers	20
4.	Balance between theory and practical paper	10
5.	Regular organisation of seminar, group discussion	40
6.	Emphasis on in-service proving	10
7.	Practical approach of teaching	10
8.	Increase in duration of practice teaching	30
9.	Reform in syllabus	10
10.	Closing of the poor quality institutes	7

have made emphasis on using of new technological devices which will make the classroom teaching more effective and innovative. 30% of them told that the duration of teaching practice in real situation is not sufficient. Therefore, it is also an urgent need to increase the duration of practice teaching. 10% have also put their opinion that there is a need to reform in the syllabus. 7% of teacher educators said that the institutions whose status is not up to the mark should be closed as soon as possible and regular monitoring and supervision of these intuitions should be made through competent agencies. Other suggestions such as cent per cent attendance, use of teaching learning material, reduction of workload of teachers, were also received from the teacher educators.

Views and Perceptions of Students

The performa developed for obtaining opinion of students was administered to about 300 student teachers across 10 institutions. About 45% of the student teachers who responded were boys and the rest were girls. An average of 30 student teachers from each college participated in the study. The opinions expressed by the student teachers are summarised below:

About 70% of student teachers responded that they have chosen teaching profession by choice, whereas 30% have viewed that by chance they came to this profession. Most of the student teachers expressed the view that they enjoyed teaching. 55% of student teachers said that if they get good and more salaried job than teaching they will surely quit the teaching job and join some other profession, whereas 45% were not in favour of the said statement.

Regarding the development of programme, 90% student teachers told that the course should be of two years duration to develop the proper training ability in the students. They made the suggestion that the duration of practice teaching and internship be increased from one month to at least six months. 50% of student teachers responded that teachers with adequate qualification and

Table 10

Opinion of student teachers towards improvement of the programme

S. No.	Suggestions	% Student Teachers
1.	Increase in duration of course	90
2.	Increase in the duration of practice teaching	90
3.	Appointment of qualified Teachers	50
4.	Regular organize of seminar, group discussion	30
5.	Increase the no. of College and minimization of fees	50
6.	Practical approach of teaching	30

experience should be appointed and the load of other non-academic works on teachers minimised in order to put their full attention on students. 30% of students emphasised on adopting practical approach of teaching in place of theoretical approach. 50% students expressed the view that the number of B. Ed. colleges should be increased, fees must be minimised and proper scholarship facility for poor students must be made available. Few students have also expressed that proper and modern technological devices should be used to make the classroom teaching more interesting and effective. Some students made their opinion regarding opening of residential training colleges. 30% students wanted that seminars and conferences should be organised within a regular interval to develop the capacities of students. Very few have emphasised on teaching of subjects through English medium.

Looking at the above results of the study, it can be concluded that a lot need to be done in secondary teacher education institutions. The teacher educators, head of the institutions, monitoring and supervising agencies and the managers have to play a significant role so that the secondary training institutions can generate the real masters who can shape the future destiny of the society.

REFERENCES

Adval, S. B. 1979. *Quality of Teachers*. Allahabad: Amitabh Publications.

Agarwal, J. C. 1996. *Teacher and education in a developing society*. New Delhi: Vikas Publishing House Pvt. Ltd.

Agarwal, J. C. 2006. *Modern Indian Education (4th ed.)*. Delhi: Shipra Publications.

Ahmed, S. 2010. An assessment of growth and grants of higher education in India. *University News,* 48(12), 1-5.

Chandta, S. S., Beri, A., & Beri, N. 2008. Re-equipping teacher education. *University News*, 46(16), 6-9.

Harish, B. 2007. *Encyclopedia of teacher education: Teacher training concepts.* Vol. II, New Delhi: A.P.H. Publishing Corporation.

Kothari, R. G., & Shelat . 2009. Teacher education programme at secondary level: some issues. *University News,* 47(25), 1-7.

Madhavi, R. L. 2009. Preparation of Teacher Educator: A scenario. *Edutracks, 9*(1), 11-15.

Pandey, S., Yadav, D. D., and Rani, R. 2007. *Appraisal of the functioning and performance of colleges of teacher education.* New Delhi: NCERT.

Pradhan, G. C. 2009. A study on growth and present status of elementary education in Goa. *Journal of Indian Education*, 34(4), 90-119.

Roy, R. 2005. Rethinking teacher education: need of the day. *University News*, 43(51), 12-15.

Srivastava, G. N.P., and Agarwal, I.P. 1999. Restructuring secondary teacher training: A prospective model. *Journal of Indian Education*, XXV (1), 22-36.

Vidyapati, T. J., and Pareek, R. B. 2009. Status of science education in rural secondary schools. *Journal of Indian Education*, 34(4), 121-136.

Yadav, S. K. 2003. Quality improvement of teacher education programme. *University News,* 41(40), 1-5

Motivation and Teaching-learning Process

SARITA SAINI*

Abstract

Presently, it is frequently heard that students are under stress and demoralised, because of one reason or another. Some of the students even do not feel like to attend the school. The author has the opinion that the major key factor of distress among today's youth is lack of proper motivation and positive feedback from teachers as well as parents. This write-up focus on the role of motivation during teaching-learning process in school, and role of parents in motivating their children at home. In this article an attempt has been made to suggest some very useful and practical strategies to motivate the students. It will not only make the teaching interesting but also improve the achievement of students.

Introduction

Motivation is typically defined as the force that account for the arousal, selection, direction, and continuation of behaviour. Nevertheless, many teachers have at least two major misconceptions about motivation that prevent them from using this concept with maximum effectiveness. One misconception is that some students are unmotivated. Strictly speaking, that is not an accurate statement. As long as a student chooses goals and expends a certain amount of effort to achieve them, he is, by definition, motivated. What teachers really mean is that students are not motivated to behave in the way teachers would like them to behave. The second misconception is that one person can directly motivate another. This view is inaccurate because motivation comes from within a person.

Definition of Motivation

Motivation is defined as "some kind of internal drive which pushes someone to

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do things in order to achieve something" (Harmer, 2001). As stated by Brown (1994), motivation is a term that is used to define the success or the failure of any complex task. Steers and Porter (1991) deal with three matters while discussing motivation:

- what energizes human behaviour,
- what directs or channels such behaviour, and
- how this behaviour is maintained or sustained.

Motivation is thought to be responsible for "why people decide to do something, how long they are willing to sustain the activity and how hard they are going to pursue it" (Dörnyei, 2001). Ryan and Deci (2000) state that "to be motivated means to be moved to do something". Unlike unmotivated people who have lost impetus and inspiration to act, motivated people are energised and activated to the end of a task. "Interest, curiosity, or a desire to achieve" (Williams and Burden, 1997) are the key factors that compose motivated people. However, they believe that arousing interest is not enough to be motivated. This interest should be sustained. In addition to this, time and energy should be invested and the effect which is required needs to be sustained so as to reach the aim. According to Steers and Porter (1991), motivation can be characterised as follows:

- needs or expectations,
- behaviour,
- goals, and
- some form of feedback.

Motivation and Classroom Dynamics

The signs of positive motivation are many and varied, but it is fairly easy to recognise when a group of students is well motivated. For example:

- They participate actively and willingly with one another in learning activities.
- They are attentive to what the teacher and other students say and the questions they ask.
- They do their homework regularly and prepare the next day's activities.
- They find input material interesting.
- They are willing to cooperate with one another or with the teacher when practical difficulties arise.
- They come to class with well-organised notes.
- They are willing to "have a go" even if they find an activity difficult or unfamiliar.

The signs of poor motivation are equally varied and are, to a large degree, the mirror image of those mentioned above. They include the following:

- Students tend not to arrive on time for class or enter the classroom with evident reluctance.
- They are listless during and become restless towards the end of the lesson. (They can't wait to get away.)
- They are unwilling to cooperate with one another on learning activities.
- They find study materials and learning activities boring or complain about them not being useful.
- Disagreements or tensions arise among group members for no apparent reason and are difficult to resolve.
- Students are unwilling to depart from habitual routines or familiar activities, even if the teacher explains their relevance in learning terms.
- They seem not to retain what they have done in previous lessons.

Various Strategies for Motivating the Students

Some students seem naturally enthusiastic about learning, but many need–or expect–their teachers to inspire, and stimulate them: "Effective learning in the classroom depends on the teacher's ability to maintain the interest" (Erickson, 1978).

Unfortunately, there is no single magical formula for motivating students. Many factors affect a given student's motivation to work and to learn (Bligh, 1971; Sass, 1989) interest in the subject matter, perception of its usefulness, general desire to achieve, self-confidence and self-esteem, as well as patience and persistence. And, of course, not all students are motivated by the same values, needs, desires, or wants. Some of your students will be motivated by the approval of others, some by overcoming challenges.

Researchers have begun to identify those aspects of the teaching situation that enhance students' self-motivation (Lowman, 1984; Lucas, 1990; Weinert and Kluwe, 1987; Bligh, 1971). To motivate the students, teachers can do the following:

- Show a deep seated interest for the students.
- Give frequent, early, positive feedback that supports students' beliefs that they can do well.
- Ensure students' success by assigning tasks that are neither too easy nor too difficult.
- Create an atmosphere that is open and positive.
- Help students feel that they are valued members of a learning community.
- Provide immediate reward to those who put in extra efforts in the class activities like drawing a star on the wrist or giving them beautiful flower from the garden.
- Always reinforce the positive response of the students, say: good! very good, excellent, etc. to ensure that it matters a lot to you.

Some characteristics that emerge as major contributors to student motivation

- Instructor's enthusiasm
- Relevance of the material
- Knowledge of subject matter
- Skill to communicate that knowledge
- Organisation of the course
- Appropriate difficulty level of the material
- Active involvement of students
- Variety
- Rapport between teacher and students
- Use of appropriate, concrete, and understandable examples
- Involving the students in different class activities.

I: Combining Instructional Objectives and Behaviours

1. Set high but realistic objectives for your students: Research has shown that a teacher's expectations have a powerful effect on a student's performance. Set realistic objectives for students when you make assignments, give presentations, conduct discussions, and grade examinations. "Realistic" in this context means that your standards are high enough to motivate students to do their best work but not so high that students will inevitably be frustrated in trying to meet those objectives. To develop the

drive to achieve students need to believe that achievement is possible which means that you need to provide early opportunities for success (American Psychological Association 1992; Bligh 1971; Forsyth and McMillan 1991; Lowman 1984).

2. Help students for self evaluation: Failure to attain unrealistic goals can disappoint and frustrate students. Encourage students to focus on their continued improvement. Help them to evaluate their progress by encouraging them to critique their own work, analyze their strengths, and work on their weaknesses. For example, consider asking students to submit self-evaluation forms with one or two assignments (Cashin, 1979; Forsyth and McMillan, 1991)

3. Suggest students how to succeed: Reassure students that they can do well in and tell them exactly what they must do to succeed. Say something to the effect that "If you can handle the examples on these problem sheets, you can pass the exam. People who have trouble with these examples can ask me for extra help." Or instead of saying, "You're way behind," tell the student, "Here is one way you could go about learning the material. How can I help you?" (Cashin 1979; Tiberius 1990).

4. Strengthen students' self-motivation: Avoid messages that reinforce your power as an instructor or that emphasises extrinsic rewards. Instead of saying, "I require," "you must," or "you should," stress "I think you will find." or "I will be interested in your reaction."(Lowman, 1990).

5. Avoid creating intense competition among students: Competition produces anxiety, which can interfere with learning. Reduce students' tendencies to compare themselves to one another. Bligh (1971) reports that students are more attentive, display better comprehension, produce more work, and are more favourable to the teaching method when they work cooperatively in groups rather than compete as individuals. Refrain from public criticisms of students' performance and from comments or activities that pit students against each other (Eble, 1988; Forsyth and McMillan, 1991).

II: Framing and presenting the matter to motivate the students

1. Be enthusiastic about your subject: A teacher's enthusiasm is a crucial factor in student motivation. If you become bored or apathetic, students will too. Teacher's enthusiasm comes from confidence, excitement about the content and genuine pleasure in teaching. If you find yourself uninterested in the material, think back to what attracted you to the field and bring those aspects of the subject matter to life for your students. Or challenge yourself to devise the most exciting way to present the material, however dull the material itself may seem to you.

2. Work from students' strengths and interests: Think from the student's point of view how they feel about the subject matter, and what their expectations are. Then try to devise examples, case studies, or assignments that relate the course content to students' interests and experiences. For instance, a chemistry

professor might devote some lecture time to examining the contributions of chemistry to resolving environmental problems. Explain how the content and objectives of your course will help students achieve their educational, professional, or personal goals (Brock 1976; Cashin 1979; Lucas 1990).

3. Follow the maxims of teaching: Try to follow the different maxims of teaching like simple to complex, general to specific, concrete to abstract, analysis to synthesis and particular to general, etc. If teacher use these maxims not only students feel interested in the subject matter rather teacher will enjoy it and feel satisfied.

4. Increase the difficulty of the material with passage of time: Give students opportunities to succeed at the beginning of the year. Once students feel they can succeed, you can gradually increase the difficulty level. If assignments and exams include easier and harder questions, every student will have a chance to experience success as well as challenge (Cashin 1979).

5. Vary your teaching methods: Variety reawakens students' involvement in the course and their motivation. Break the routine by incorporating a variety of teaching activities and methods in your course: role playing, debates, brainstorming, discussion, demonstrations, case studies, audiovisual presentations, guest speakers, or small group projects (Forsyth and McMillan 1991)

III: Discourage grades/marks

1. Emphasize mastery and learning rather than marks/grades: Ames and Ames (1990) report on two secondary school mathematics teachers. One teacher graded every homework assignment and counted homework as 30 per cent of a student's final grade. The second teacher told students to spend a fixed amount of time on their homework (thirty minutes a night) and to bring questions to class about problems they could not complete. This teacher graded homework as satisfactory or unsatisfactory, gave students the opportunity to redo their assignments, and counted homework as 10 per cent of the final grade. Although homework was a smaller part of the course grade, this second teacher was more successful in motivating students to turn in their homework. In the first class, some students gave up rather than risk low evaluations of their abilities. In the second class, students were not risking their self-worth each time they did their homework but rather were attempting to learn. Mistakes were viewed as acceptable and something to learn from.

2. De-Emphasising the marks system Researchers: Recommend de-emphasising grading by eliminating complex systems of credit points; they also advise against trying to use grades to control nonacademic behaviour (for example, lowering grades for missed classes) (Forsyth and McMillan, 1991; Lowman 1990). Instead, assign ungraded written work; stress the personal satisfaction of doing assignments, and help students measure their progress.

3. Frame exam/test paper that encourage the kind of learning you want students to achieve: Many students will learn whatever is necessary to get the marks they desire. If you base your tests on memorising details,

students will focus on memorising facts. If your tests stress the synthesis and evaluation of information, students will be motivated to practise those skills when they study (McKeachie, 1986).

4. Avoid using marks as threats: As McKeachie (1986) points out, the threat of low achievement may prompt some students to work hard, but other students may resort to academic dishonesty, excuses for late work, and other counterproductive behaviour. Moreover this will create stress in their mind and they will feel burdened.

IV : Reinforcement –A key factor to motivate the students

1. Give feedback as quickly as possible: Return tests and papers promptly, and announce the reward publicly and immediately. Give students some indication of how well they have done and how to improve. Rewards can be as simple as saying a student's response was good or giving him a candy or star, etc. or mentioning the names of contributors. "Reena has given very good example of a periodic change around us, very good Reena, well done."

2. Reward the achievement of students: Both positive and negative comments influence motivation, but research consistently indicates that students are more affected by positive feedback and success. Praise builds students' self-confidence, competence, and self-esteem. Recognize sincere efforts of each student. If a student's performance is weak, let the student know that you believe he or she can improve and succeed over time (Cashin, 1979; Lucas, 1990).

3. Show them the good work of their peers: Share the ideas, knowledge, and accomplishments of individual students with the class as a whole. There must be a one good quality in every student. Announce that good quality of a student in the class.

- Make available copies of the best papers and essay exams.
- Provide class time for students to read papers or assignments submitted by classmates.
- Have students write a brief critique of a classmate's paper.

4. Giving negative feedback with a difference: Negative feedback is very powerful and can lead to a negative class atmosphere. Whenever you identify a student's weakness, make it clear that your comments relate to a particular task or performance, not to the student as a person. Do not announce the weakness of students in front of a whole class. Try to cushion negative comments with a compliment of some good work done and in a separate room.

5. Avoid demeaning comments: Many students in your class may be anxious about their performance and abilities. Be sensitive to how you phrase your comments and avoid off hand remarks that might prick their feelings of inadequacy.

6. Avoid comparison. Never compare the performance of two students. Simply give individual feedback whenever required. Comparison creates jealousy among the peer groups and hurt the feelings of students when compared with bright students. Moreover, it will de-motivate the students to work harder and lead to lost of interest in the subject.

V: Guidelines for parents to motivate their children

Teacher can arrange parent teacher meeting (PTA) twice a month and guide the parents and suggest different ways to motivate their children. Teacher should always start the PTA with positive outlook. Discuss all the good work of a child then tell them the weakness and the way to overcome those limitations. Teacher can give the following guidelines to the parents.

1. Inspire their thirst for knowledge: If you want your child to be a stellar student, don't limit learning to the walls of his classroom. Your child needs your help to really "open up the world of ideas," joy in discovery will transfer to his/her schoolwork, so you'll boost his/her academic achievement, too!

2. Fill your child's world with reading: Take turns reading with your older child, or establish a family reading time when everyone reads her own book. It's important to show her that "it's not only a school task." Demonstrate how important reading is to you by filling your home with printed materials—novels, newspapers, even posters and place-mats with words on them. Children can learn to read by living in an environment that's rich in words.

3. Encourage self expression: Encourage your child to express his opinion, talk about his feelings, and make choices. He can pick out a side dish to go with dinner and select his own extracurricular activities. Ask for his input on family decisions, and show that you value it. "One of the things valued in school is class participation practice at home expressing his feelings" is good for self-esteem and self-confidence.

4. Show enthusiasm for your child's interests: Encourage him to explore subjects that fascinate him. If he's a horse nut, offer him stories about riding or challenge him to find five facts about horses in the encyclopaedia. Make sure he has the tools he needs if your child love looking for sea life at the beach during family vacations, bought her little nets so that she could catch crabs and minnows. Now she's a marine biologist.

5. Provide play opportunities: Provide your child different opportunities that support different kinds of learning styles — from listening and visual learning to sorting and sequencing. Your child will develop his creative expression and problem-solving skills as he builds. He'll need lots of unstructured play time to explore them. Although sports activities and language clubs are valuable experiences, too many scheduled activities can add "too much stress" to your child's life, and distract him/her from exploring the pleasures of learning at his own pace.

6. Be a role model: Point out the new things you learn with enthusiasm. Let them see you in action: choose an activity that's unfamiliar to you both, such as playing tennis or speaking English, and schedule a lesson or pick up a couple of instructional tapes. "Parents are the single most important modeling agent in a child's life" and if you "demonstrate that learning is a lifetime adventure," your kids will get the message.

7. Talk to him/her about his/her school: Ask about what she/he is learning in school, not about his/her grades or test scores. "Even if he/she doesn't do well grade-wise, never

compare them with the other students, he/she might still be learning and improving and you don't want to discourage that. Have him/her teach you what he/she learned in school today — putting the lesson into his/her own words will help him/her retain what he/she learned.

8. Celebrate achievements: No matter how small or big it is you should celebrate each and every achievement of your child. Completing a book report calls for a special treat; finishing a book allows your child an hour of video games. You'll offer positive reinforcement that will inspire him to keep learning and challenging himself. "If a child feels as if he is successful regardless of what it is, it builds him up and makes the next challenge easier."

REFERENCES

American Psychological Association. 1992. *Learner-Centered Psychological Principles: Guidelines for School Redesign and Reform.* Washington, D.C.

Ames, R., and Ames, C. 1990. "Motivation and Effective Teaching." In B. F. Jones and L. Idol (eds.), *Dimensions of Thinking and Cognitive Instruction.* Hillsdale, N. J.: ErIbaum.

Bligh, D. A. 1971. *What's the Use of Lecturing?* Devon, Teaching Services Centre, University of Exeter, England.

Brock, S. C.1976. *Practitioners' Views on Teaching the Large Introductory College Course.* Center for Faculty Evaluation and Development, Kansas State University, Manhattan.

Brown, H. Douglas. 1994. *Principles of Language Learning and Teaching.* Prentice Hall Regents, New Jersey.

Cashin, W. E. 1979. "Motivating Students." *Idea Paper,* No. 1. Center for Faculty Evaluation and Development in Higher Education, Kansas State University, Manhattan.

Dorniei, Zoltan. 2001. *Motivational Strategies in the Language Classroom.* Cambridge University Press, Cambridge.

Eble, K. E.1988. *The Craft of Teaching.* (2nd ed.) Jossey-Bass, San Francisco.

Ericksen, S. C.1978, "The Lecture." *Memo to the Faculty,* No. 60. Ann Arbor: Center for Research on Teaching and Learning, University of Michigan.

Forsyth, D. R., and McMillan, J. H. 1991, "Practical Proposals for Motivating Students." In R. J. Menges and M. D. Svinicki (eds.), *College Teaching: From Theory to Practice.* New Directions in Teaching and Learning, no. 45. Jossey-Bass, San Francisco.

Harmer, Jeremy. 2001. *The Practice of English Language Teaching.* Essex: Longman Press.

Lowman, J.1984. *Mastering the Techniques of Teaching,* Jossey-Bass, San Francisco.

Lowman, J.1990. "Promoting Motivation and Learning." *College Teaching,* 38(4), 136-39.

Lucas, A. F.1990. "Using Psychological Models to Understand Student Motivation. " In M. D. Svinicki (ed.), *The Changing Face of College Teaching.* New Directions for Teaching and Learning, no. 42. Jossey-Bass, San Francisco.

McKeachie, W. J.1986. *Teaching Tips.* (8th ed.) Mass.: Health, Lexington.

McMillan, J. H., and Forsyth, D. R.1991. "What Theories of Motivation Say About Why Learners Learn." In R. J. Menges and M. D. Svinicki (eds.), *College Teaching: From Theory to Practice.* New Directions for Teaching and Learning, No. 45. Jossey-Bass, San Francisco.

Ryan R. M and Deci, E.L. 2000. "Self-determination theory and the facilitation of instrinsic motivation, social development and well-being", *American Psychologist*, 55:68-78.

SASS, E. J.1989. "Motivation in the College Classroom: What Students Tell Us." *Teaching of Psychology,* 16(2), 86-88.

STEERS, RICHARD, M. AND LYMAN W. PORTER. 1991. *Motivation and work Behaviour*. McGraw-Hill. Inc. Lincoln, New York.

TIBERIUS, R. G.1990. *Small Group Teaching: A Trouble-Shooting Guide.* Ontario Institute for Studies in Education Press, Toronto.

WEINERT, F. E. AND KLUWE, R. H.1987. *Metacognition, Motivation and Understanding,* Hillsdale: Erlbaum.

N.J.: ERLBAUM. 1989."When They Don't Do the Reading." *Teaching Professor,* 3(10), 3-4.

WILLIAMS, MARON AND ROBERT L. BURDEN. 1997. Psychology for Language Teachers: a Social Constructivist Approach. Cambridge University Press, Cambridge.

Internet sites

http://www.wpi.edu/~isg_501/motivation.html.
www.hltmag.co.uk/jan04/
www.scholastic.com

Mathematisation of Thought: Right or Wrong Answer in Mathematics Classroom

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Abstract

According to the National Curriculum Framework, 2005, the aim of mathematics teaching is 'mathematisation' of thought, which means to be able to understand the world in the language of mathematics. Research suggests that stereotyped classroom teaching inwolves a mechanical or procedural approach to problem solving, with emphasis on getting a right answer. The children are hence socialized to approach a problem in procedural manner to get a legitimate correct answer without giving consideration to the realistic context of the problem. This paper studies the approaches of children studying in Class V of a reputed government CBSE school, to realistic mathematics word problems and how these approaches are related to their classroom achievement. The analysis of the responses reveals that the children approach the problems in a procedural manner and their school grades are not related to their realistic understanding of the problem.

Introduction

"The main goal of mathematics in school is the 'mathematisation' of the child's thinking." — National Curriculum Framework, 2005.

'Mathematisation' of thought implies that the child learns to think about the world in the language of mathematics. That is, she becomes capable of mathematical modelling and applying mathematics to solve problems in real life situations.

The major emphasis of NCF, 2005, is on linking a child's everyday life experience to school mathematics. An attempt is made to add contextual details to mathematics in order to link it to the child's everyday knowledge in the form of word problems which form an important part of mathematics curriculum.

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Vision for School Mathematics

- Children learn to enjoy mathematics rather than fear it.
- Children learn important mathematics; Mathematics is more than formulas and mechanical procedures.
- Children see mathematics as something to talk about, to communicate through, to discuss among themselves, to work together on.
- Children pose and solve meaningful problems.
- Children use abstractions to perceive relationships, to see structures, to reason out things to argue the truth or falsify of statements.
- Children understand the basic structures of mathematics: arithmetic, algebra, geometry and trigonometry, the basic content areas of school mathematics. All offer a methodology for abstraction, structuration and generalisation.
- Teachers engage every child in class with the conviction that everyone can learn mathematics (NCF 2005:43)

Word problems are verbal descriptions of a problem situation wherein one or more questions are posed and the answers to which can be obtained by application of mathematical operations to information (usually numerical data) available in the text. The types of word problems used in classroom consist of a text embedded in a real life situation and the answers derived would work in the given situation.

The problems are intended to help the children to develop problem solving abilities and to use the mathematics learnt in classroom in solving problems in real life situations. Thereby showing that the mathematics they learn in classroom will be useful in everyday life, that is; leading to their 'mathematisation' of thought. In contrast, the current practice of word problem solving in classroom does not foster the ability of mathematical modelling in students.

Need of the Study

In classroom situation word problem solving involves learning specific tricks like identifying keywords (e.g. altogether, remaining), applying procedural memory and doing mechanical exercises of applying the four mathematical operations without giving any considerations to realistic problem context and reality constraint. Researchers have shown that children across variety of societies frequently fail to bring realistic considerations in finding solution to word problems (Greer, 1997; Reusser, 1988; Silver et al., 1993; Verschaffel and De Corte, 1997).

De Corte and Verschaffel (2000), in their paper Connecting Mathematics Problem Solving to the Real World state "practice surrounding word problems is controlled by a set of (largely implicit) rules that constitute "word problem game". These rules include the following assumptions:

1. Every problem presented by the teacher or in the textbook is solvable and makes sense.
2. There is only one exact numerical correct answer to every word problem.
3. The answer must be obtained by performing basic arithmetical operations on all numbers stated in the problem.

These largely implicit rules are learnt by a child through her socialisation in the mathematics classroom. The teaching practices socialise a child's approach to word problem solving wherein the implicit rules learnt by them guide their approaches and they solve problems with neither realistic considerations nor the use of their common sense. The teaching practice involves the teacher first presenting what is to be acquired and then the students practising on a set of tasks given to them. This stereotyped approach thus focuses on the procedure of getting the correct answer rather than the concept of the problem; that is the argumentation involved (Saljo and Wyndhamn, 1997; Silver et al., 1993; Verschaffel et al., 1994).

Despite NCF, 2005 recommendations of linking a child's everyday experience to classroom mathematics and the aim of 'mathematisation' of thought, the current mathematics teaching practice remains highly procedural and the aim remains defeated. Children's approach to realistic mathematics word problems is a less researched area in Indian context. This study tries to answer the following questions:

- How do children approach realistic mathematics word problems?
- Are realistic approaches of children to the word problems related to their classroom achievement?

Objectives of the Study

- To study the approaches of children to realistic mathematics word problems.
- To study the relationship between the students' school grades and their realistic understanding of the problem.

Research Procedure: The study is an exploratory field study, based on data obtained from 80 students of Class V of a CBSE school in Varanasi, selected purposively. The chosen school is a reputed one catering to children of government employees of all classes. An arithmetic test consisting of ten word problems was used, of which three were simple problems while remaining seven required realistic considerations therefore called realistic mathematics word problems. The problems were based on the four mathematical operations and were in both English and Hindi.

The test was administered to 80 students of two sections of Class V. Class V-A was told that they were free to answer creatively and give whatever solution they thought was appropriate for solving the problems and there was no right or wrong answer. The second group V-B was not given any such instructions and was simply asked to solve the given problems. Both the groups were further asked to give reasons for not solving a particular problem. No further hint or help was given to the students while they solved the problems. There was no time limit and most of the students took approximately an hour to do the test.

Evaluation of Achievement in School: The school follows a detailed plan to measure and assess students' achievement in arithmetic. It provides grades separately along the following dimensions:

1. Formation and recognition of numbers (FNC)

2. Understanding basic concepts (UBC)
3. Ability to compute (AC)
4. Problem solving ability (PSA)
5. Project
6. Assignment
7. Oral

The overall grade comprised the grades in above seven dimensions. Here the researcher used the grades obtained by the students in problem solving ability.

The conversion of the grades into percentage as used in school is as follows:

A+	—	90%- 100%
A	—	75% - 89.99%
B	—	56% - 74.99%
C	—	35% - 55.99%
D	—	0% - 34.99%

Data Analysis and Interpretations

Out of 80 answer sheets one was found incomplete therefore only 79 answer sheets were used for analysis. The responses for the problems were coded as follows:

EA – Expected Answer (when the answer is obtained through procedural approach to the problem).

OA – Other Answer (these are unclassifiable answers, when the child attempts to obtain the answer by using any mathematical operation mechanically without understanding the problem, also a procedural approach. These are wrong answers according to classroom evaluation).

NA – No Answer (when the child has not attempted to solve the problem).

RA – Realistic Answer (when the child has solved a problem by considering the realistic context given in the problem, that is; the approach is contextual).

TE – Technical Error (when the child committed a calculation mistake in solving the problem to get expected answer).

Out of ten problems three were simple, referred to as S1, S2, S3 and the remaining seven referred to as P1, P2, P3, P4, P5, P6, P7; required realistic considerations to solve them (realistic word problems). The analysis of the answer sheets revealed that there was not much effect of the differences in instructions given on the approaches of the students to solve the problems. The type of responses given by the two groups combined to the ten problems is given in percentage as follows:

Table 1
Percentage of different types of responses to the ten problems given by both groups

	S1	S2	S3	P1	P2	P3	P4	P5	P6	P7
EA	100%	46.8%	55.7%	84.8%	17.7%	68.4%	31.6%	8.9%	50.6%	43%
OA	-	46.8%	41.8%	5.1%	55.7%	21.5%	35.4%	87.3%	40.5%	43%
NA	-	6.3%	2.5%	2.5%	19%	2.5%	3.8%	2.5%	5.1%	10.1%
RA	-	-	-	6.3%	3.8%	2.5%	6.3%	0%	0%	0%
TE	-	-	-	1.3%	3.8%	5.1%	22.8%	1.3%	3.8%	3.8%

It is evident from Table 1 that the maximum percentage of students gave an expected answer or some other answers to the simple as well as realistic word problems. The other answers usually involved children applying any mathematical operation on the numbers given in the problem in order to solve it. To simple problem S1, 100% responses were expected answers. To problems S2 and S3, 46.8 % and 55.7% children gave an expected response, respectively and 46.8% and 41.8% gave other answers respectively. To the realistic problems also, the maximum percentage of students either gave an expected answer or gave other answers. A very small percentage of students gave realistic responses to problems P1, P2, P3 and P4 while no student gave any realistic answer to problems P5, P6 and P7.

The percentage of children from different grade groups giving realistic answers to the problems P1 to P7 from two different groups is given as follows:

From the Table 2 and 3 it is clear that the percentage of realistic responses in both the groups is very less. In Group 1 just 20% children from grade group C and 3.7% children from grade group D gave realistic responses to problem 1. Apart from P1 none of the children in Group 1 gave realistic response to the remaining problems P2 to P7. Similarly in Group 2 children gave no realistic response to problems P5, P6 and P7. It can be seen from the table that realistic responses do not depend on the grades achieved. That is, very small percentage of high achievers (A+ and A), the average achievers (B) and the low achievers (C and D) took a realistic approach to the problems in group 2 while in group 1 all children from all grade groups (except grade group C and grade group D to P1) did not make any realistic considerations to solve any of the realistic word problems, showing that even those who are good at problem solving don't see the realistic aspect of a problem.

Table 2
Percentage of Realistic Responses of Group 1 (with instruction)

	P1	P2	P3	P4	P5	P6	P7
A+	0%	0%	0%	0%	0%	0%	0%
A	0%	0%	0%	0%	0%	0%	0%
B	0%	0%	0%	0%	0%	0%	0%
C	20%	0%	0%	0%	0%	0%	0%
D	3.7%	0%	0%	0%	0%	0%	0%

Table 3
Percentage of Realistic Responses of Group 2 (without instructions)

	P1	P2	P3	P4	P5	P6	P7
A+	16.7%	16.7%	16.7%	33.3%	0%	0%	0%
A	0%	33.3%	0%	0%	0%	0%	0%
B	0%	0%	25%	0%	0%	0%	0%
C	25%	25%	0%	25%	0%	0%	0%
D	4.2%	0%	0%	8.3%	0%	0%	0%

Table 4
Percentage of Expected Answers and Other Answers on Realistic Problem (Both groups)

	P1		P2		P3		P4		P5		P6		P7	
	EA	OA	EA	OA	EA	OA	EA	OA	EA	OA	EA	OA	EA	OA
A+	87.5	0	12.5	62.5	87.5	0	50	25	25	75	50	25	87.5	12.5
A	100	0	33.3	33.3	66.7	0	100	0	33.3	66.7	100	0	66.7	33.3
B	100	0	25	37.5	75	0	62.5	12.5	12.5	87.5	100	0	62.5	25
C	66.7	11.1	11.1	66.7	66.7	22.2	44.4	22.2	11.1	77.7	33.3	66.7	44.4	44.4
D	84.3	5.9	17.6	56.9	64.7	29.4	17.6	45.1	3.9	92.2	43.1	47.1	31.4	51

Analysis of all the realistic problems reveals that maximum number of children from all grade groups gave an expected answer or other answers by mechanical applications of arithmetic algorithms without understanding the problem. Where the children had problems dealing with fractions (P2), division of big numbers (P4) and conversions (P5) the number of children giving other answers increased for all grade groups. The analysis reveals that all the children approach a problem in a procedural manner with an aim of getting a numerically correct answer required in the classroom.

P2 was a simple fraction problem stated as: Ankur has bought 4 planks of 2□ m each. How many planks of 1m each can he cut out of these planks? 10 planks was the most often given answer in response to the above problem. Maximum students from all grade groups gave other answers in which children attempted to obtain the answer by using any mathematical operation mechanically without understanding the problem. Apparently, it involved some sort of calculation with numbers given in the problem in order to get an answer.

The way the questions have been solved clearly shows that the child who is good at problem solving is actually good at the procedural aspect of problem solving. The other children who are not good at problem solving struggled with the conversion of mixed fraction to improper and doing some multiplication to get an answer showing that even the procedural aspect of such children is weak. Analysis of the answer sheets revealed that the students had problem dealing with fractions and 21.6% children of grade group D giving no answer may be attributed to it. A student in his reason for not responding to the problem stated "I do not understand 2□." A common reason given by children for not giving a response to the problems was that they did not understand the question or they did not know which mathematical operation was to be applied in the given problem.

Children from all grade groups tried to get an expected answer by some or the other mathematical calculation without understanding the problem contextually. From the analysis it can be said that higher percentage of low achievers (grade C and D) as compared to high achievers

(grade A+ and A) give other answers which are wrong answers according to classroom assessment. High achievers (grade A+ and A) give more expected answers (right answer required in the classroom) than low achievers. This clearly shows that low achievers try and solve problems by mechanical application of mathematical operations trying to '*do something*' with numbers given in the problem without understanding it while the high achievers know which mathematical operation to apply to solve the problem and get a legitimate correct answer without considering it contextually. It is clear that students' approach, that is, being procedural or contextual is not related to whether they are good at problem solving or not.

Conclusion

From the above analysis it can be concluded that children's approach to the realistic word problems is highly procedural. The high achievers (grade A+ and A), average achievers (grade B) and the low achievers (grade C and D); all have a procedural approach towards problem solving. The low achievers usually give other answers (wrong answers) due to their lack of competence in carrying out numerical calculations and choosing correct mathematical operations. It is evident that their dilemma is focussed on which arithmetic operation to apply to get a legitimate correct answer rather than on understanding the problem, like a girl was asked how she arrived at the answer she said, *"If the answer is wrong then I don't know whether I have to divide or multiply."* It can be concluded that children who participated in the study followed the implicit rules that there is only one exact numerical correct answer to every word problem and that the answer must be obtained by performing basic arithmetical operations on all numbers stated in the problem. The children who gave no response to the problems stated that they did not understand what to do in the problem, that is, which arithmetic operation to use.

The school teaching, which is highly procedural, socialises a child to learn the implicit rules of problem solving in classroom. Farida Abdulla Khan (1999) studied and compared two groups of vendors and a group of school children for differences on their knowledge of number systems and their competence and understanding of a set of mathematical word problems and found that vendors had a better understanding of the mathematical principles and a better range of strategies than the *schoolchildren, who were constrained by a narrow application of school-learned routines and algorithms.*

Those children who attain high grades are high on the procedural aspects of problem solving and low on the realistic considerations while those who attain low grades are unable to understand even the procedural aspects leave alone the contextual aspect. Both these groups are equally unable to employ their everyday knowledge to solve the problems and show strict adherence to the implicit rules learnt in the classroom. Students' school grades in problem solving in mathematics are not related to their understanding of realistic consideration of the word problem. Thus it is clear that in this context the

stereotyped classroom teaching did not foster 'mathematisation' of thought in children and the gap between classroom mathematics and mathematics outside school still remained.

The Key Issues and Concerns of NCF-2005 for Science and Mathematics Re-emphasised for their Easy Implementation, to the question 'how do you visualise achieving the higher aim of mathematics in our education?', states that it is possible by developing the child's capability for logical and analytical thinking, nurturing a confident attitude to problem solving, and an ability to decide which mathematical tools are appropriate in which context and to apply them accordingly. Thus the responsibility falls on the teachers to nurture an environment that develops these abilities in the children. They should guide knowledge, but allow the students to experiment, manipulate objects, ask questions and try things that don't work, allowing them to integrate new experiences and interpretations to construct their own personal meaning. They should allow multiplicity of approaches to a problem discouraging a single method as the right method and a single answer as the only correct answer, liberating mathematics from the stereotype of getting a right answer found by applying the one taught algorithm. If children's classroom experiences are to be organised in a manner that permits them to construct knowledge, then our teacher training programmes should focus on empowering teachers to use new methods for teaching and learning of mathematics and break away from the set stereotype, so that the goal of 'mathematisation of thought' is realised.

REFERENCES

Greer, B. 1997. Modelling reality in mathematics classrooms: the case of word problems. *Learning and Instruction*, 7, 293-307. Retrieved, April 18, 2010, from http://www.sciencedirect.com/science.

Khan, F. A. 1999. The social context of learning mathematics: Stepping beyond the cognitive framework. *Mind, Culture, and Activity*, 6(4), 304 - 313. Retrieved, August 16, 2010, from http://www.informaworld.com/smpp/content.

National Curriculum Framework. 2005. National Council of Educational Research and Training, New Delhi.

Position Paper National Focus Group on Teaching of Mathematics. 2006. National Council of Educational Research and Training, New Delhi.

Q & A Science and Mathematics in NCF-2005: The Key Issues and Concerns of NCF- 2005 for Science and Mathematics Re-emphasised for their Easy Implementation (2010). National Council of Educational Research and Training, New Delhi. Retrieved, November 18, 2010, from http://www.ncert.nic.in/html/pdf/ncf_qna.pdf.

Reusser, K. 1988. Problem solving beyond the logic of things: Contextual effects on understanding and solving word problems. *Instructional Science*, 17, 309-338. Retrieved, April18, 2010, from http://www.springerlink.com/content/.

SALJO, R., & WYNDHAMN. J. 1997. Word problems and mathematical reasoning—a study of children's mastery of reference and meaning in textual realities. *Learning and Instruction*, 7, 361-382. Retrieved, April 17, 2010, from http://www.sciencedirect.com/science.

SILVER. E. A., SHAPIRO, L. J., AND DEUTSCH. A. 1993. Sense making and the solution of division problems involving remainders: An examination of middle school students' solution processes and their interpretations of solutions. *Journal for Research in Mathematics Education. 24.* 117-l 35. Retrieved, April 13, 2010, from http://www.jstor.org/stable/749216.

VERSCHAFFEL, L., DE CORTE, E., AND LASURE, S. 1994. Realistic considerations in mathematical modeling of school arithmetic word problems. *Learning and Instruction*, 4, 273-292.

VERSCHAFFEL, L. AND DE CORTE, E. 1997. Teaching realistic mathematical model and problem solving in the elementary school. A teaching experiment with fifth graders. *Journal for Research in Mathematics Education*, 28, 577-601.

VERSCHAFFEL, L., GREER, B., AND DE CORTE, E. 2000. Connecting Mathematics Problem Solving to the real world, in proceedings of the International Conference on Mathematics Education into the 21st century: Mathematics for living (pp 66-73). Amman, Jordan: The National Centre for Human Resource Development.

Making Learning of Mathematics Developmentally Appropriate

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Abstract

'Good' performance in mathematics at elementary level has always been a concern for learners, as it indicates the individual's ability of alacrity, accuracy and brevity in thinking and estimation. It, moreover, projects an individual's capacity of reasoning, critical and analytical thinking. Society also places high importance in performing successfully in this subject as it is considered to be the catalyst for children to gain 'good' employment in their adult lives. But for majority of children, learning of mathematics tantamount to 'swallowing' of mathematics and 'memorization of formulas'. Therefore, learning of this subject has been observed to draw considerable amount of fear and anxiety accompanied with a feeling of incompetence, which over and over again estrange children from school and play an important role in their non-participation and disinterest in school activities, irregular attendance and/or drop-out. Besides, RTE-2009 makes it a necessity to provide every child with 'good quality' elementary education and hence it becomes an urgent need to ensure that children learn mathematics in a constructive and conducive environment, wherein learning of mathematics is more meaningful and learner centric (NCF-2005). In this backdrop, attempt was made to explore a few psychological dimensions involved in the learning of mathematics during elementary stage, one of which was delving into the concern of appropriateness of the content in terms of their comprehensibility vis-à-vis learners' cognitive development and age/grades. The exploration involved deliberations with subject experts, mathematics educators and psychologists, focus group discussion with practising teachers and learners to congregate their perspectives, analysing of present mathematics textbooks (Class I to VIII) and reviewing of literature. Findings are discussed with implications for subject teachers, teacher educators and mathematics curriculum framers and textbook writers, in the Indian context.

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Introduction

In the recent years extending of psychological principles in learning of specific school subjects has gathered momentum. Learning of all school subjects at the elementary level is crucial for building the base of any subject, during these years of education. All the same, importance of understanding psychological dimensions in learning of mathematics takes priority, because mastery over this subject manifests an individual's ability of speed, accuracy, neatness, brevity and estimation. It also projects an individual's capacity of critical, logical and analytical thinking and reasoning. These faculties help individuals in analyzing and solving not only day-to-day problems but also problems related to social and economic development of the society. Probably because of this, society also places high importance in performing successfully in mathematics. Learning of this subject is considered as the catalyst for children to gain 'good' employment in their adult lives. The better one's ability in learning and performing in mathematics, the higher her/his chances are of getting into engineering, medicine, public administration and management professions.

However, learning of mathematics besides that of science and languages has been observed to draw considerable amount of fear, anxiety and feeling of incompetence in school children. This fear, anxiety and feeling of incompetence often estrange the children from school and play an important role in their non-participation and disinterest in school activities, that further leads to irregular attendance and/drop-out. One may reason that in a classroom there may be a few children who enjoy learning the subject and 'do mathematics', but for majority it is 'swallowing' of mathematics and 'memorization of formulas'. In order to develop 'mathematisation of thinking' National Curriculum Framework (NCF, 2005) thus geared towards making learning of mathematics more meaningful and learner-centric.

Teaching and learning of mathematics is a complex activity and many factors determine the success of this activity. Mathematics is not only hierarchical in nature but also highly abstract. It is concerned with ideas rather than objects; involves manipulation of symbols rather than manipulation of objects. Nature and quality of instructional material, presentation of content, learning environment, motivation of the students are all important factors involved in learning of the subject. Also teaching of this subject is concerned with the computational know-how of the subject, selection of appropriate mathematical content as well as its appropriate communication, only then it leads to adequate understanding and application of the concepts. Due to the inherent nature of the subject, dependency of learners on teachers for optimum learning is heightened. Thus, factors as mentioned above, probably, accelerate the difficulty in learning and comprehending of the mathematical concepts and continue to remain complicated for children at all levels, be it primary, middle or secondary.

In the context of Indian classrooms this gains further propensity. Large

number of students in classrooms, low teacher student ratio (in fact there are also multigrade classrooms with single or two teachers) and a diverse socio-cultural milieu are to name some of the challenges. Thus, those who wish to make the process of learning mathematics developmentally appropriate, in order to make it an enjoyable experience rather than one to be endured, are often faced with difficulties either due to large classrooms and/or divergent language and other social-cultural background, besides divergent mathematical ability of her/his students.

The apparent disconnect, lack of understanding and relating of the concepts and contents taught in classroom gains propensity with every passing grade and becomes noteworthy as children move from primary classes to completing of elementary stage. It is pertinent to notice that as the children transit from primary to middle school, they also are in zenith of their physical and psychological development. The specific Classes of V, VI, VII and VIII which mark the transition and also completion of elementary schooling, correspond with not just rapid physical and cognitive development but are also marked by several crisis and search for their resolutions (in form of quest of one's identity) which go a long way in the self development of the children as individuals. Therefore, on one hand undergoing the tribulations of transition from childhood to adulthood and on the other the demand of mastery over a subject that is not only critical and complex in nature, but also depend upon factors that are beyond the control of children, probably make learning of this subject difficult, leading to loss of interest and motivation.

Furthermore, the societal norms that point towards optimal mastery on this subject as an indicator of being 'intelligent and good' student, plays overwhelming role in the development of the self. Performing/non-performing in the subject puts a social tag on the individual at home, school and also among peers with regard to an individuals' present ability and future performance in adult life. All these connotations further act as a barrier in opening up to the complex nature of the subject.

However, mathematics has a fundamental role to play in enabling cultural, social and technological advances as well as empowering individuals as critical citizens in contemporary society and for the future. Number, space and measurement, chance and data are common aspects of most peoples' mathematical experience in everyday personal, academic and occupational situations. Equally important are the essential role that mathematical structure and working mathematically play in peoples' understanding of the natural and human worlds.

Mathematics learning, hence as seen, carries with it certain burdens, which act as blocks in children's ability and motivation to learn the subject. These blocks, as mentioned above are firstly the very nature of the subject, which is hierarchical. In other words, it is built layer upon layer of previous learning – thus making mastery of previous layer(s) a necessity to progress

and learn the forthcoming layer of concepts and procedures. Second block is the societal expectations and pressure of 'high' performance in the subject. Since 'successful' performance in the subject projects an individual's capacity of critical, logical and analytical thinking along with the ability of reasoning (faculties considered essential in solving economic and social concerns) and hence increasing ones probability of getting into coveted professions. This demand of the society to perform in this subject (else be labelled as 'good for nothing') coupled with the inherent 'hierarchical' nature of the subject, is probably what causes in a learner fear of performance, fear of ridicule, fear of failure and thus becomes the third and final obstruction in learning of the subject. Unfortunately, failure as well as perceived failure in performing in this subject, is among the frequent causes that compels many students (through elementary years) to give up not just learning of mathematics but also attending school. These factors make it a priority to understand some psychological dimensions that are involved in learning of mathematics, one of them being the concern of appropriateness of the content in terms of their comprehensibility vis-à-vis learners' cognitive development and age/ grades.

Objective of the study: The present study made an attempt to explore the concern of appropriateness of the content in terms of their comprehensibility vis-á-vis learners' cognitive development and age/grades, during elementary stage.

Methodology: In order to accomplish this objective the study adopted strategies of deliberations (both formal and informal) with subject experts, mathematics educators and psychologists, reviewed literature, held focus group discussion with practising teachers and learners and also analysed present mathematics textbooks of the NCERT.

Findings: Attempt was made to understand the issue from theoretical underpinnings and literature survey as well as the viewpoints of learners and teachers on the issue. It is pertinent to mention at this juncture that the analysis is not purely based on empirical data, though as mentioned earlier, learners and teachers were interacted with and their viewpoints were collected through focus group discussions.

A crucial factor influencing learning is the maturational and experiential readiness of children. It is particularly important in the context of learning mathematics which requires mastery of certain pre-requisite concepts, skills and mathematical vocabulary learning. 'Curriculum load' often surfaces as one of the causes that probably make learning of mathematics difficult for most children. 'Curriculum load' can be due to an overload of information (i.e., content) and/or the 'load of noncomprehension' (Kaul et al. 1995). According to Kaul et al (1995) the 'load of non-comprehension' can be attributed to a large extent to the mismatch of developmental and academic priorities in framing of curriculum and also the classroom practice.

Theoretical standpoint and literature review: We take a look at some of the theoretical perspectives of child development and deliberate on them along with relevant research findings.

Piaget's cognitive development theory: According to Piaget, concrete operational period (roughly from 7–11 years) is a period in which children acquire certain logical structures that allow them to perform various mental operations, which are internalized actions that can be revised. In fact, he sometimes combined ages 2–11 years and labelled it as "preparation for and achievement of concrete operations" (Miller, 1993). Piaget believed that during the concrete operational period children developed and mastered various mental operations such as reversibility, compensation, class inclusion, relation, temporal-spatial representation, etc. However, it is important to note that firstly these concepts/operations do not develop at the same time (Miller, 1993). It is well known that comprehending 'conservation of weight', often do not happen until nearing the end of concrete operations (thus approximately around the age of 11–12 years). Secondly, each cognitive acquisition develops over a period of time, it gradually moves from a transitory stage to being strengthened, stabilized and generalised to variety of situations (in other words attain maturity for application of the concept in variety of situations). So the operation of reversibility may begin at approx 7-8 years (when it is in a transitory stage) and then gradually progress over the years to get strengthened and stabilized.

Thus, during concrete operations (roughly corresponding to our primary schooling) children are capable of understanding based on representations that are internalized and organized. Their thoughts get decentralised, dynamic and reversible, all reflecting a capability of a logical system in thought process. However, children still need "concrete" representations of objects/ mental presentations. They can deal with "what is" rather than "what could be" – i.e. they can deal with the 'actual' rather than 'possibilities'. Thus, concepts and skills that require them to shift from hands-on experiences to planning, inferring and deducting is difficult as they are still comfortable with focusing on a single operation/thought only (particularly, in the early primary years of Classes II-III).

It is important to note here that in these classes we wish children to 'guess', 'estimate', calculate multiple digits (addition, subtraction, multiplication, division) and even do reverse calculations, understand problems through stories and solve them; including those that have multiple operations (for example addition followed by subtraction, etc. through a story). Also in Class II we have stories where children are asked to 'guess' why a sack of salt when soaked in water becomes lighter, while a sack of cotton becomes heavier or the example of balancing the 'see-saw'.

Difficulty with word problems: Often it is perceived that word problems create confusion in the young learners as they demand high levels of comprehension ability (thus probably moving the focus

away from numerical to verbal ability). Word problems are also seen as those that require an ability to infer, deduct and also involves multiple operations. Word problems in Indian mathematics textbooks, at present, consist of 50% in the 'combine' category and another 35% in 'change' category (Menon, 2007). It was further observed that there is a need to consider such problems from the perspective of 'mathematisation' of the real world. At present Menon (2007) pointed out that, such problems are not being prepared to model real life situations. She further suggested that there is a need for major restructuring of the mode in which activities (with/ without concrete materials) are proposed in the mathematics classroom, so that children get the opportunity to solve word problems related to all four categories of 'change', 'compare', 'combine' and 'equalise' (Carpenter et al, 1983).

It is necessary to highlight here that, National Assessment of Educational Progress (NAEP) in USA have revealed over the years that majority of students in that country's context have mastered various mathematical operations after roughly a year or two of the content load being covered in the curriculum (Crown, 1990). However, even in such assessments it was found that a large percentage of 4th-5th graders had difficulty with regrouping (borrowing), particularly if it was given in the form of an instruction, such as "subtract 237 from 504" (Crown, 1990, pg. 509).

Neurological development of the brain that support Piaget's stages of cognitive development: Epstein (1986, 1990) had demonstrated that there are 'spurts' and 'plateaux' in brain growth, which tend to match with Piagetian stages of development. Thus the brain growth spurt at the age of 5-6 years is 'genetically' oriented for the development of concrete operations, while 10-11 years for formal operational functioning. Neurologically what occurs at these stages is an increase in inter-neuronal dendritic growth, thus preparing for more complex wiring-up in relation to experiences that are to come in future. This then demands that the child be exposed to 'appropriate' experiences, so as to utilize the new nerve fiber growth and in turn facilitate new neuronal connections. Thus, according to Kaul et al. (1995) these brain growth 'spurts' periods are those during which interventional experiences (in the form of learning new concepts and operations) have maximum effect. Infact, cognitively oriented interventions at pre-school stage have been found to have significant effect on academic achievement all the way through 8th grade (Clement et al, 1987). Kaul et al. (1995) further proved this in mathematical learning in the Indian context.

Information – processing theory of cognitive development: According to this theoretical approach, young children (upto 10 years of age) are capable of using rehearsal to aid memory, but they cannot spontaneously produce the strategy. They also lack in knowing when, where and how to use make use of these strategies, effectively. Information-processing theorists believe that by the time children enter their teenage they become more capable of picking a strategy that fits a particular task and carry out that strategy spontaneously, quickly and efficiently.

Researches in cognitive science also point out that in the first few years of elementary schooling (approximately upto 9 – 10 years) children have difficulty in the "inversion principle' (i.e., the idea that adding and subtracting the same number leaves the original quality unchanged). According to Siegler (2003) not until 11 years of age (i.e., roughly around sixth grade) do most children demonstrate an understanding of inversion principle and solve problems related to it, both quickly and efficiently. Another concept that takes time of children to understand is "mathematical equality". According to cognitive science researches, majority of 3rd and 4th grade children do not understand the meaning of 'equal' sign and thus commit errors (Alibali and Goldin-Meadow, 1993; Goldin-Meadow, Alibali and Church, 1993). Warren (2006) indeed found in a longitudinal study for three years on children from Grade 3 onwards that most children had limited understanding of 'equal' as a symbol of quantitative sameness, as well as had difficulty in comprehending 'more' and 'less'. She continued to reveal that over the three years period this difficulty in understanding 'equal', 'more' and 'less' showed no significant change. Cognitive scientists have also pointed out that multi-digit addition and subtraction is difficult and that children spend 'several years' learning multi-digit arithmetic. It is known that to learn this, children need to first learn the 'carrying procedure' for addition and 'borrowing procedure' for subtraction. To understand these procedures one needs to understand the place value concept (i.e., each position in a multi-digit number represent a successively higher power of ten) and also that multi-digit number can be represented in different ways. Many children, because of their difficulty in understanding the place value, adopt faulty procedures to solve the problems (Fuson and Briars, 1990) and thus create confusion when based on these operations further complex operations are required to be done in the higher levels of elementary mathematics. Fuson et al. (1997) in fact were of the view that teaching of standard algorithm for number operations need to be withheld, till children are capable of constructing such procedures. Researchers have shown that a combination of conceptual understanding of place value system and flexible procedures for operations with teaching standard algorithm helped in enhancing students' understanding (Ma, 1999). That place value is a difficult concept to understand and equally difficult is its procedural knowledge for primary grade children from second to fifth grade has been revealed in several researches (Kouba, Carpenter and Swafford, 1989; Ross, 1986; Fuson and Briars, 1990; Stevenson and Stigler, 1992). There is felt need to reflect upon the difficulty of multi-digit operations and what alternative procedures based upon number concept can be developed.

A look at the present NCERT textbooks reveals many such instances, in Classes II, III and IV where children are asked to do multidigit along with multiple operations, through word problems. For instance, children are required to first do multidigit addition and then decide whether the character in the word problem can carry all the

stuff, thus implying that the child finally has to do a subtraction (multidigit) to get the reply. Similarly calculate the cost of *x* bricks from a range of differently priced bricks per thousand pieces, calculate the distance of *a* from *b,* when information provided is that *a* is 24 kms away and *b* is 46 kms away in opposite direction.

Difficulties with number operations by most children also makes it relevant to look backward to the learners' initial exposure to formal as well as informal learning of numbers. Mukherjee (2001) put forward that inadequacy in taking cognizance of children's intuitive and informally learned preschool mathematics knowledge, is probably a cause of creating confusion and fear in learning of mathematics at later stages of schooling.

Socio-cultural theory of cognitive development: While the above perspective delved into finding developmental appropriateness of learning the contents of the subject, there is another perspective which focuses on the teaching-learning process. According to the Vygotskian principle, children can learn complex operations if facilitated and surrounded by experts (in the form of parents, teachers, elders). There has been innumerable researches which indeed reveal that with a facilitative teacher, children's mathematical learning can be accelerated (Blanton and Kaput 2005; Mousoulides, Pittalis, Christou, 2006; Wilson, 2008; Burton, 1991).

Ma (1999) in her book *Knowing and Teaching Elementary Mathematics* had emphasised that in order to encourage conceptual understanding of mathematics amongst children at their elementary level, it is essential that teachers at this level have a conceptual understanding of mathematics. Interestingly, Soto-Johnson et al. (2007) attempted to implement the learnings of Ma's work in preparing pre-service elementary mathematics teachers and found that those who adopted the strategies were indeed more effective as mathematics teachers.

Researchers (Sheffield, 2009; Wilson, 2008; Burton, 1991) have indeed highlighted that when children are made to understand mathematical concepts and the skills of problem solving accompanied with a 'why', encouraged to verbalise mathematical reasoning through active reading, listening and writing and make effective use of peer group collaboration (particularly in a heterogeneous class) have led to promote effective learning of mathematics at all levels (primary as well as upper primary). Peer collaboration have also proved to be an important appendage to mathematical instruction (Gupta, 2008; Mousoulides et al., 2006; Turnuklu and Yesildere, 2007; Anderson and Kim, 2003).

It is pertinent to note here that primary teachers are required to teach all subjects to their students from Class I– V, including mathematics. Many of these teachers have not studied mathematics beyond secondary level and more importantly they do not have much interest in the subject (their mastery has been other areas like language, social science, etc.). Therefore, for such teachers to build

up conceptual understanding of children in Classes II to V (no matter how simple they are) is not only cumbersome but also a 'burden', because they themselves probably do not have their concepts cleared. A Sarvodaya Vidyalaya (Delhi) teacher expressing her and her colleagues difficulty during the focus group discussion asked: "How much do you want us to do? I am a teacher with chemistry background. For me teaching SST is a nightmare." Similar is the case with someone whose background is in Hindi or SST. For them teaching mathematics is a 'nightmare'.

But for using all these and more such pedagogical skills it is equally important that the teachers have adequate content knowledge as well. As has been seen in researches by Anderson and Kim (2003), Turnuklu and Yesildere (2007) and others, teachers (particularly primary and upper primary) are required to have a sound base of mathematical pedagogical content knowledge to become effective facilitators in learning of mathematics. Blanton and Kaput (2005) in their work proved that when trained appropriately a primary teacher could effectively integrate algebraic reasoning into one's daily classroom instructions in planned and spontaneous ways that led to algebraic reasoning development among her 3rd grade students.

Distinction between performance and competence: It is also relevant to note the distinction between competence and performance. Children of about 4 years and younger have basic competences but may not have, yet, perfected their skills of performing in actual counting and other similar mathematical activities. Hence while arguing about children's ability to learn numbers one has to be careful of two factors, i.e. the awareness of 'how to count' principle and 'number conservation'. While the former may be possible (and actual experiences indeed reveal) that children below 6 years are very much capable, the latter, i.e. conservation of number is not possible until children reach 6 years and beyond.

Learners' viewpoint: We take a look at some of the viewpoints shared by learners during focus group discussion.

Difficulty in subtraction and division at primary level: At primary level most children reported to have faced difficulty in subtraction and division followed by multiplication (including the ones who were high achievers). In subtraction they had difficulty when calculation involved deducting larger digit from a smaller digit (for example: 37–19). The difficulty was heightened when there were multiple digits (like: 617–139). This implies that their 'borrow'/carry over concept was not clear. Similarly, in multiplication of multiple digits by multiple digits, children had difficulty.

Learning of the number tables was a challenge to many of the children. In fact, most average achievers continued to have this difficulty even in their upper primary classes and instead of recollecting the table from memory, they made simple calculations with pen and paper, to solve complex operations (which caused them to take more time!). As for multiplication of multiple digits by multiple digits (such as 3172513) children said they managed to do either

the multiplication but made mistake in addition or made error in multiplication. It was felt that here too the 'carry over' part was leading to confusion and that children could concentrate on only one operation and lost concentration and attention when another operation was demanded to complete the problem sum. As for division, having difficulty in subtraction was itself a cause of difficulty in division, but along with it was the difficulty in dealing with 'putting the decimal' (*Kaha 'bindu' lagaye samajh mein hi nahi ata – a Class VII student's reflection*).

When asked how did the learners' manage to get over with their above, mentioned difficulties their responses varied, such as taking guidance from elder sibling, class teachers explaining them 'how it is to be done', private tutors 'showing' them the process and making them practise, thinking on their own and finding out strategies and then practising accordingly (this being a trend only amongst the high achievers). However, it was also reported that there were some calculations which they continued to find difficult, but did not share it with their maths teacher (for fear of being ridiculed in front of the entire class – "that so simple a thing s/he did not know") and thus worked on the difficulty, silently!

Similarly in upper primary, majority of children (irrespective of their achievement level) had difficulty with integers, learning different types of angles, fractions and decimals and operations related to them, and understanding algebraic operations. Learners also had difficulty in formulating equations out of word problems (related to speed/age/distance problems).

Viewpoint of Teachers: The primary teachers (across government schools, Kendriya Vidyalayas and private schools) were of the view that majority of children had difficulty in addition and subtraction that involved 'borrow and carry', long multiplication and division and solving story problems.

In upper primary level, a teacher from Kendriya Vidyalaya reported that though she spent considerable amount of time introducing and explaining 'variables' to her children in Class VI (as a part of introducing algebra and realized that only a handful were able to understand her), she had to repeat the same exercises and examples to the same group of children when they moved to Class VII (where interestingly most of the students could easily understand them).

Besides it was observed that difficulties that were voiced by the students were same as the ones highlighted by teachers as areas that they found most of their students having difficulty. They had to, often, take help of stories/daily life situations/hands down experience of understanding formulae with paper and cuttings (and other innovative techniques) to introduce as well as clarify the doubts of learners on the concepts of integers, fractions and decimals, algebraic operations, etc. Also they had to spend considerable amount of time in clarifying doubts of children in mathematical operations learnt in their primary classes.

Thus, here again the question arises as to whether the areas (where children

and teachers have voiced difficulty) are appropriately matching to the learners' cognitive development? Why is it that most children have difficulty with the same procedural skills and that too their difficulties are of similar kind?

Expert's Viewpoint: Experts were of the view that mathematical understanding and memory develops in a sequential manner. Furthermore, it was essential that children by the end of primary level have understood and learnt the four fundamental operations along with understanding of shapes, so as to make mathematical learning at secondary stage comfortable. The above opinion came up as it was observed that in majority of cases children did not have the basic understanding of number concept, place value concept and geometrical understanding when they began mathematical learning at upper primary stage. This probably was a contributing factor of feeling the 'big jump' in learning of the subject as children moved from primary to upper primary (middle) schooling.

Discussion and Implications: The above explorations throw light on differing theoretical perspectives and viewpoints of learners, teachers and experts, which are discussed and some implications are made.

Piagetian viewpoint and relevant literature review have revealed that children in the years of primary schooling (i.e., roughly corresponding to the concrete operational period) can deal with the 'actual' rather than 'possibilities', 'with what is' rather than 'what could be'. In other words, those concepts and their relevant skills that require the children in the years of concrete operational phase to shift from 'hands on' experience to planning, inferring and deducting are difficult, as they are still comfortable with focusing on a single operation/thought only. As they progress with age and cognitive development they gradually internalize, comprehend, strengthen and stabilize the 'hands on' experiences and develop the skill of inferring, deducting, etc. Research evidences in the field of neurological development also have supported that there are spurts of growth in the brain during the age of 5-6 years and again around 10-11 years, when inter-neuronal dendritic growth increases manifolds, thus making these phases of developing years very crucial to receiving and learning 'appropriate' experiences.

Furthermore, investigations by cognitive scientists have pointed out that initial years of elementary schooling have proved to be a difficult phase for children to comprehend "inversion principle". It has also been observed that children take time to understand "mathematical equality" and also in understanding 'more' and 'less'. Another revelation, which is of much concern, is that children spend many years in learning multi-digit arithmetic. Researchers in the field of cognitive science have shown that not only children in primary years have difficulty with multi-digit arithmetic; they also adopt faulty procedures to solve problems. Due to this difficulty with 'place value concept' and end up creating more confusions and complications, when based on these operations complex operations are

required to be done in higher levels of elementary mathematics. Several researches (Kouba et al., 1989; Fuson and Briars, 1990; Stevenson and Stigler, 1992) have revealed that place value, indeed, is a difficult concept and equally difficult is comprehension of its procedural knowledge by primary grade children. Learners during interaction with them had also voiced similar concerns of difficulty in subtraction, multiplication and division of 'big' numbers. Teachers of upper primary level had shared that often they had to revise primary level learnings (as most children were not clear) before beginning with more complex operations.

This has implications for not only curriculum planners and textbook writers, but also for researchers, to delve into finding the 'appropriate age' and cognitive development when learning of multi-digit arithmetic is feasible. Also the need is to investigate into alternative approaches of learning and teaching multi-digit operations.

Moving ahead with the learning of the subject, much responsibility has been put on the teachers who communicate and help learners comprehend its various concepts and procedures. The socio-cultural theory of cognitive development emphasizes (with ample research evidences, as already mentioned in the findings) that children's mathematical learning can be much accelerated with the help of a facilitative expert (including a teacher). However, this demands that the teachers are given adequate training and exposure both in the subject as well as in instructive (general as well as subject-specific) skills. Discussions with primary teachers, in the present study, have revealed that the primary teachers often feel themselves inadequate in dealing with students queries (because they have specialization in other subjects like SST or language, refer to box on page 109-110). As a result of their inadequacy, the students depend upon faulty procedures and their concepts remain unclear, even as they move to upper primary classes.

Therefore, another implication for research, development and training is the need of building the capacity of teachers (at all levels, including the primary teachers) in mathematics subject-specific pedagogy, particularly in those areas that are considered as 'hard spots' at primary and upper primary levels.

However, with practising teachers sharing the same examples while introducing and explaining variables to students of 7th grade, were more meaningful for them than a year before when they were in 6th grade, one still wonders about the appropriateness of the content (in terms of comprehensibility) vis-á-vis learners' cognitive development.

It was interesting to observe that there were some gaps in the continuity of contents in the upper primary classes. In geometry there was apparent discontinuity which probably made the learning of it cumbersome for students. For instance, though in Class VIII students were expected to handle construction of angles, triangles, quadrilaterals as well as special quadrilaterals, yet in the previous class (i.e. Class VII) there was very little

exposure in these areas and hence most of the students were not prepared to handle such construction, even to make use of the compass. Another example of discontinuity in content was also observed in the learning of 'congruency of triangles'. Though this is introduced in Class VII it is dealt in much detail in Class IX, where students are expected to apply the concept while working out geometry. With no follow up in the intervening class (i.e Class VIII) students tend to forget the learnings of Class VII (due to lack of practice) by the time they reach Class IX. However, the remedy may not just be in reducing the content load or questioning the age appropriateness of the content, but probably also in creating an empathetic, understanding, motivating environment of mathematical learning. This is because for the young and inquisitive minds, a four walled classroom is too small a canvas and the proceedings of the class, if not meaningful are often felt 'boring'.[1]

For instance, it was observed that with geometrical patterns and shapes the focus was more on ensuring that the learners answered to 'what' and 'which' questions rather than the 'why'. Even in the primary classes where shapes and patterns have been dealt, teachers found it irrelevant and there was not much emphasis on the need to help learners recognize and understand various shapes and their properties. Thus, developing of spatial reasoning abilities in the children, which is the 'main purpose' of school geometry (*Source Book on Assessment* for Classes 1–V, Mathematics, NCERT, 2008) was probably neglected during primary years of mathematical learning. Probably this is the reason why children in their upper primary classes have difficulty in understanding the properties of geometrical shapes and perform relevant operations. Menon (2009) indeed argued that with appropriate instructions and scaffolding children even in primary grades were capable of developing an understanding of angle concept. van Hiele (1984) cited that difficulty and failure of middle school geometry was primarily because of the discrepancy between the teachers' use of language of instruction of a higher level than the students' level of geometrical thinking. According to the van Hiele theory there are 5 levels of geometrical thinking — visualization level, analysis level, ordering/informal deduction level, formal deduction level and rigour level (Menon, 2009), in which transition from one level to another is more (and strongly) dependent on instruction, rather than a spontaneous transition. Researches by Usiskin and Senk (1990), Human and Nel (1997/87), Clements et al. (1999) have further proved the validity of this theory.

Therefore, mathematical learnings need to be planned, so that learners of primary as well as middle school find the learnings relevant to their life and daily living, and not just an academic requirement.Probably, there is not only a need to relook at the developmental yardsticks in the light of learning of mathematical concepts and procedures but also the continuity and transition of the contents from one grade to another and develop strategies to ensure a more active role of the teacher in developing

[1] 'Some boys in the class sit in the last rows and chat. They often find solving of big problems as a 'boring' and 'meaningless', and sometimes in the pretext of games teacher calling, they leave the class, one by one' — Class VII-VIII students sharing of their mathematics class scenario.

and facilitating understanding and learning of mathematics, both at primary and upper primary level.

Cobb (1995) indeed pointed out that interaction between what learners bring with them when entering the classroom and what they encounter there, often control the learning. Teacher-student relationship in learning of mathematics is a crucial one, because more than in any other subject, here the process of learning is dependent on agreement, which is purely based on reasoning. Both the teacher and students are subject to the same mathematical rules. Hence an authoritarian hierarchy of the teacher may not be applicable for imparting learning of the mathematical concepts and relevant procedures. After all, students respect greater knowledge of the teacher and also expect their own understanding to be enlarged, through interaction that is founded on respect of each other's ability.

However, when students (irrespective of the age/grade) encounter such situations in learning of mathematics wherein they are expected to learn rules that seem 'meaningless' to them and also are anticipated to solve equations based on these 'meaningless' rules, they lose interest and find no motivation. To the students, rules probably become meaningless, because firstly they are unable to find a reason and secondly, when others too cannot provide a reason. Over the years when such experiences gather together, it leads to gradual acquiring of lack of enthusiasm for the subject and sometimes a feeling of repulsion. This is of particular concern at elementary level, as lack of adequate stimulation in the years of rapid cognitive development may prove to be detrimental for their future development in the areas of numerical, spatial reasoning, estimation, brevity of thought, etc. all of which are expected to be nurtured and expanded through the process of mathematical learning.

Mathematical learning and performance involves cultural, social and cognitive phenomena which cannot be separated, and hence need to be understood in relation with each other. Subramanian (2003) opined that in case of children developing the concept of number (as well as in other domains) constructing knowledge may involve coordinating an artificial, culturally developed symbolic system with an intuitive or innate base of basic concepts. Several social theorists (Zeverbergen, 2001; Dowling, 1998) have also proposed that learning of mathematics demands establishing links between the performance of students to their social and cultural backgrounds, besides extending the views of socio-cultural theorists which is based on the work of Vygotsky (1978). Besides, Dodge and Bichart (2001) rightfully pointed that children in early grades of schooling need appropriate challenges so that they can feel successful (as this age group corresponds to the stage of industry vs. inferiority of Erikson's psychosocial developmental stage). This has also been shared by learners "like mathematics because I can solve the problems. This gives satisfaction and also willingness to solve more problems (*maths is liye achha lagta hai kyunki jab problem solve kar lete hai toh bahut maaja aata hai, maan karta*

hai ki aur problems solve kare)[2]." Children during this stage are actively involved in the learning process and are full of energy to get hands-on (concrete) experience. Therefore, an apt environment in the school is required that encourages numerical and spatial reasoning through use of concrete examples and hands-on experiences, even during the primary years. Having discussion on solving certain equation(s)/problems in the classroom/school may be given as an activity. This however, demands the subject teachers to be prepared in the skill of conducting a good group discussion based on mathematical knowledge.

In a classroom, two kinds of authority play a significant role – one that of a disciplinarian and the other is resultant of 'superior knowledge'. While the former may be a necessity to establish and maintain certain amount of order in the class, so as to bring all learners on a common platform of 'readiness' for learning, the other (i.e. authority through superior knowledge) is required to ensure a dynamic mathematical classroom environment of reasoning, debate and agreement, at all levels. This is of utmost importance to deal with the concern of anxiety as an impediment in mathematical learning. When a learner does not comprehend the proceedings of mathematics discourse, they feel over-anxious at the apparent failure to understand what their peers have (presumably) understood. In such a state, one tends to make greater efforts to comprehend – which actually diminishes the effectiveness of their efforts, thereby further increasing their anxiety. In the long term, repeated experiencing of such anxiety-ridden situations in mathematical learning, there probably comes a time when the learner begins each lesson with anxiety, fear of failure and ridicule (this was also put forth as a feeling by learners)[3]

This implies that the mathematics teacher (at all levels) instead of encouraging anxiety and fear for the subject, probably need to make strategies to reduce the already existing baggage of anxiety before commencing a new learning and continue doing so through the entire process of learning. S/he also needs to have in-depth knowledge and conceptual clarity on the subject, so as to not only control her/his class but also generate curiosity, interest and motivation to learn. In such an environment learners will not endure the learning of mathematics, but enjoy it. Also, keeping in mind that mathematics is a hierarchical subject, wherein mastery of learning at each level ensures the learning of a concept/skill at the next level, subject teachers (at all levels, including primary) have to be assisted in implementing appropriate content specific pedagogical knowledge. This is to ensure that the teachers make their learners' learning of various operations and procedures a meaningful experience, based on reasoning.

Children as they progress through the elementary years of schooling are also undergoing various developments within themselves as well as in their social interactions. If these experiences are brought into their learning of school subjects, particularly mathematics, it may make the learning not only

[2] 'Like to do mathematics because we feel a thrill when we are able to solve a problem and then we wish to solve more problems'

[3] A boy of Class VIII shared that he (and many of his friends) do not share their difficulty with their mathematics teacher for the fear of being ridiculed in front of the entire class – which happens to be a co-ed one, and so they continue with their difficulties silently.

interesting and motivating, but also will be perceived as relevant and useful by the learners. Examples and activities related to their daily activities, situations at home, neighbourhood, including school, etc. where the mathematical procedures and operations can be applied, may be included in the teaching learning process.

Finally, learning and performance in this subject, as mentioned earlier, is laden with social expectations. Each and every learner brings with her/him a part of their society's understanding and relevance of learning the subject. Besides they also bring with them the informal learnings of number, shape and representation through signs and symbols. Be it in the primary or upper primary level, the focus of classroom transaction probably need always to be in connecting with such informal learnings of their culture and community, so that learners are able to consolidate and assimilate and thus expand their own schema and in the process internalize and develop the underlying ability of mathematical reasoning. For this mathematics teachers have to be equipped with the know-how of connecting the formal mathematical learnings with her/his learners' informal learnings. Particularly, where classrooms predominantly have large number of students from diverse language and cultural backgrounds, the above is a challenge for teachers, for which they have to be prepared during their pre-service training and continued also at regular intervals as sessions during in-service training.

Mathematics as a subject carries much importance not only academically but also socially, therefore, mathematics classroom environment during the elementary years probably need to be shaped so as to be stimulating, enriching and rewarding for all learners and wherein mathematical learning is more activity based rather than predominantly a paper-pencil accomplishment.

REFERENCES

Alibali, M.W., and Goldin-Meadow, S. 1993. Gesture-Speech mismatch and mechanisms of learning: What the hands reveal about a child's state of mind, *Cognitive Psychology*, 25, 468–573.

Anderson, H., and Kim, S. 2003. "A missing piece in an elementary school mathematics teacher's knowledge base," *Issues in Teacher Education*, 12, 2, 17–23.

Blanton, M.L. and Kaput, J.J. 2005. "Characterizing a classroom practice that promotes algebraic reasoning," *Journal for Research in Mathematics Education*, 36, 5.

Burton, G.M. 1991. "Using language arts to promote mathematics learning," *The Mathematics*, 3, 2.

Campbell, S.R. 2004. "Theory and practice in Plato's psychology of mathematics education," http:// www. people exerter.ac.uk/PErnest/pome18/5-campbell_theory-and-practice-in-plato.html.

Carpenter, T.P., Hiebert, J., and Moser, J.M. 1983. "The effect of instruction on children's solutions of addition and subtraction word problems," *Educational Studies in Mathematics*, 14, 15–72.

Crown, W.D. 1990. "Assessment of Mathematics Ability." In C.R.Reynolds and R.W.Kamphaus (eds.) *Handbook of Psychological and Educational Assessment of Children: Intelligence and Achievement*, The Guilford Press, New York.

Dowling, P. 1998. "The Sociology of Mathematics Education: Mathematical Myths and Pedagogical Texts," The Falmer Press, London.

English, L.D. (2007). "Cognitive psychology and mathematics education: Reflections on the past and the future," *The Montana Mathematics Enthusiast, Monograph 2,* 119–126, Montana Council of Teachers of Mathematics.

Epstein, H.T. 1986. *Stages in Human Brain Development*, *Development Brain Research*, 30, 114–119.

Epstien, H.T. 1990. "Stages in Human Mental Growth", *Journal of Educational Psychology*, 82, 876–880.

Fuson, K.C. and Briars, D. 1990. "Using a Base-Ten Blocks Learning/Teaching Approach for First and Second Grade Place Value and Multidigit Addition and Subtraction", *Journal for Research in Mathematics Education*, 21, 180–206.

Fuson, K.C. et al. (1997). "Children's conceptual structures for multidigit numbers and methods of multidigit addition and subtraction." *Journal for Research in Mathematics Education*, 28, 2, 130–162.

Gardiner, H.W., Mutter, J.D. and Kosmitzki, C. 1998. *Lives Across Cultures: Cross-Cultural Human Development,* MA: Allyn and Bacon.

Goldin-Meadow, S., Alibali, M.W., and Church, R.B. 1993. "Transitions in Concept Acquisition: Using the Hand to Read the Mind," *Psychological Review,* 100, 279–297.

Gupta, A. 2008. "Constructivism and Peer Collaboration in elementary Mathematics Education: The Connection to Epistemology," *Eurasia Journal of Mathematics, Science and Technology Education,* 4,(4) 381–386.

Human, P.G. and Nel, A.H. 1997. "Alternative Instructional Strategies for Geometry Education: A Theoretical and Empirical Study." Cited in U.Menon's article 'The introduction of angles', Proceedings of epiSTEME 3, HBCSE, TIFR, 2009.

Kaul, V., Dadhich, M. and Soni, R. 1995. "Process based readiness programme for primary level mathematics—A longitudinal study". Paper presented in International Seminar on Research in school effectiveness and learning achievement at Primary stage, NCERT, New Delhi.

Kouba, U.L., Carpenter, T.P. and Swafford, J.O. 1989. "Number and Operations", In M.M. Lindquist (ed.), *Results from the 4th Mathematics Assessment of the National Assessment of Educational Progress* (pg. 64–93). NCTM, Reston, U.A.

Ma, L. 1999. *Knowing and Teaching Elementary School Mathematics*, Mawah, N.J.; Lawrence Erlbaum Associates.

Menon, U. 2007. "Word Problems and Activities: Designing the Curriculum". In C.Natarajan and B.Choksi (ed.) *Proceedings-episteme 20 International Conference to Review Research on Science, Technology and Mathematics Education*, HBCSE, TIFR, Mumbai.

Menon, U. 2009. *The introduction of angles. Proceedings of epiSTEME 3*, HBCSE, TIFR, Mumbai.

Miller, P. 1993. *Theories of Developmental Psychology*, 3rd Edition, W.H. Freeman and Company, N.Y.

Mousoulides, N., Pittalis, M., and Christou, C. 2006. "Improving Mathematical Knowledge Through Modeling in Elementary Schools", In J.Novatna et al (eds.) *Proceedings of 30th Conference of the International Group for the Psychology of Mathematics Education*, Vol. 4, 201–208, Prague: PME.

MUKHERJEE, A. 2001. "Reflections on Experience of the School Mathematics Project. In Mathematics and Science Education in School" (pg. 42–45), Unpublished Seminar Report, ZHCES, JNU, New Delhi.

ROSS, S.H. 1986. "The Development of Childrens Place-Value Numeration Concepts in Grades Two Through Five". In R.S.Siegler, *Implications of Cognitive Science Research for Mathematics Education.*

SHEFFIELD, L.J. 2009. "The Curriculum is More Than Textbooks and Technology: Project M^3 : Mentoring Mathematical Minds", Paper presented in epiSTEME 3, International Conference to Review on Science, Technology and Mathematics Education, HBCSE, TIFR. Mumbai.

SIEGLER, R.S. 2003. "Implications of Cognitive Science Research for Mathematics Education", In J.Kilpatrick, W.B.Nartin and D.E.Schifter (eds.), *A Research Companion to Principles and Standards for School Mathematics* (pg. 219–233). UA:NCTM, Reston.

SKEMP, R. 1986. *The Psychology of Mathematics*, Macmillan, New York.

SOTO-JOHNSON, H., LIAMS, M. AND ET AL., 2007. *Our Voyage with Knowing and Teaching Elementary Mathematics, Teaching Children Mathematics*, 493–497.

STEVENSON, H.W., AND STIGLER, J.W. 1992. *The Learning Gap: Why our Schools are Failing and What we can Learn from Japanese and Chinese Education.* Summit Books, New York.

SUBRAMANIAM, K. 2003. "Elementary Mathematics: A Teaching-learning Perspective", *Economic and Political Weekly.*

TURNUKLU, E.B., AND YESILDERE, S. 2007. "The pedagogical content knowledge in mathematics: Pre-service primary mathematics teachers' perspectives in Turkey", *IUMPST: The Journal* Vol.1, Content Knowledge, http://www.12 prep.math.ttu.edu.

USISKIN, Z. AND SENK, S. 1990. "Evaluating a test of Van Hiele levels: A response to Crowley and Wilson*", Journal for Research in Mathematics Education*, 21, 3, 242–245.

VAN HIELE, P.M. 1984. "The Child's Thought and Geometry". In U.Menon article 'The introduction of angles', Proceedings of epiSTEME 3, HBCSE, TIFR, 2009.

VYGOTSKY, L.S. 1978. *Mind in Society: The Development of Higher Psychological Processes.* MA: Harvard University Press, Cambridge.

WARREN, E. 2006. "Comparative Mathematical Language in the Elementary School: A Longitudinal Study", *Educational Studies in Mathematics*, 62, 169–189.

ZEVENBERGEN, R. 2001. "Mathematics, Social Class and Linguistic Capital: An Analysis of a Mathematics Classroom". In B.Atweh and H.Forgasz (eds.), *Social-Cultural Research on Mathematics Education - An International Perspective,* pp. 201–215, Mahwah, N J. Lawrence Erlbaum Associates.

Corporal Punishment in Higher Secondary Schools: A Case Study

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Abstract

This case study was done in the district of Birbhum, West Bengal to know the status of corporal punishment in higher secondary schools. The study revealed that no teachers, parents or students in rural and urban areas are in favour of corporal punishment. A reverse relationship has been found between the parents' and teachers' attitudes towards the disciplinary actions for students in both rural and urban areas. A positive difference has been found in support of corporal punishment between the rural and urban students' behavioural attitudes; whereas a negative difference has been found against the corporal punishment between the rural and urban students' behavioural attitudes.

The American College Dictionary, 1953 edition, defines corporal punishment as "physical injury inflicted on the body of one convicted of a crime and including the death penalty, flogging, sentence to a term of years, etc." It can be used to refer to a wide spectrum of punishments ranging from forced labor to mutilating torture. It includes a wide variety of methods such as hitting, slapping, punching, kicking, pinching, shaking, choking, use of various objects (wooden paddles, belts, sticks, pins etc.), painful body postures, use of electric shock, use of excessive exercise drills, prevention of urine or stool elimination. Some of these terms are generic, others are specific to the severity of the punishment or the instrument used to inflict it. The psychologists described that corporal punishment is the use of physical force intended to cause some degree of pain or discomfort for discipline, correction and control, changing behaviour etc.

In the ancient world the teachers *(Guru Moshai*) were very strict and they frequently beat the pupils. In the Middle Ages discipline was also severe. Boys were beaten with rods or birch twigs. Discipline in schools was also savage.

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The teacher often had a stick with birch twigs attached to it. Boys were hit with the birch twigs on their bare buttocks. At the beginning of the 19th century two men— Joseph Lancaster and Andrew Bell— independently invented a new method of educating the working class. In the 20th century the cane was used in both primary and secondary schools. Meanwhile the ruler as a punishment tool was commonly used in primary schools in the 20th century. The teacher hit the child on the hand with a wooden ruler. In England in 1987 the cane was banned in state-funded secondary schools. It was banned in private schools in 1999. In the 20th century many parents are still using a wooden spoon to hit children. The school corporal punishment is the intentional infliction of physical pain for breaking school rules. The school students are frequently hit by teachers for minor reasons like forgetting homework, dress code violation or being late for school. Many of them are hit multiple times. There are various types of corporal punishment used in schools. These can be classified as physical punishment and emotional punishment. The physical punishment includes making children stand as a wall chair, keeping the school bag on the head, twisting the ears, holding the ears with hands passed under the legs, making children stand on the bench, making children stand for whole day in the sun, etc., whereas emotional punishment includes slapping by opposite sex, making children stand on the back of the class and to complete the work, suspending children for a couple of days from the school, labelling the child according to his/her misbehaviour and send him/her around the school, pinning paper on the back and labelling 'I am fool', etc. The main justification of school corporal punishment has found from several empirical research work that crowded classrooms with inadequate infrastructure, insufficient learning tools contributes to increased stress among teachers and subsequently to the frequent use of corporal punishment.

The ill effects of corporal punishment include humiliation, loss of self respect, degradation, feeling of helplessness and lowering self-worth lead to aggressive behaviour or withdrawal (Sternberg et al., 1993; Straus, 1994). The regular spanking of children overtime makes them cheats/liers, disobedient, devoid of feelings and bullies (Straus, Sugarman and Giles–Sims, 1997). Children's cognitive development can also be affected by frequent punishment or spanking. This results in their poor academic performance in schools (Straus and Mathur, 1995; Straus and Paschall, 1998). The probability of children assaulting the parents in retaliation especially when they are grown up increases if they are subjected to corporal punishment when young (Brezina, 1998). Many researchers have argued that corporal punishment is harmful for children, as studies of its long term correlates have demonstrated that it predicts higher levels of aggregation and social behaviour in childhood, adolescence and adulthood as well as depression and suicide (Durrant, 2000). A number of studies have supported the notion that corporal punishment contributes to aggressive behaviour of children and subsequent violence in adulthood. Since corporal

punishment tends to produce both fear and anger, its continued use in the schools can hamper the learning process. In the late 20th century public opinion turned against corporal punishment. The most of the countries have banned the school corporal punishment given to its ill-effect. These countries are including Argentina (1817), Australia (1988), Austria (1974), China (1949), France (2008), Germany (1993), Greece (1998), Ireland (1982), Italy (1928), Japan (1947), Netherlands (1920), New Zealand (1990), Spain (1985), Sweden (1958), Thailand (2005), United Kingdom (1987), United States (1867), Uruguay (2008), etc. The Government of India has also made some legal provisions against school corporal punishment but these are usually too broad and are open to individual interpretation. Many of the laws are contradictory and enforcement is half-hearted. With few exceptions, teachers who have been found guilty of using corporal punishment in schools have been convicted. The Supreme Court of India banned corporal punishment in schools in 2002. According to press reports, corporal punishment were banned in Delhi (2002), Andhra Pradesh (2002) and Odisha and West Bengal (2004). Yet, often we get opportunity to read in the newspapers incidents of corporal punishment in schools. How to address this issue of corporal punishment? To address the issues of corporal punishment in schools we need to find out the nature and causes of corporal punishment, its impact on students behaviour and attitude and also to find out the possible ways of corporal punishment resolution mechanism.

Objectives of the Study

The primary objective of the study was to find out the attiudes of parents, teachers and students towards the corporal punishment used in secondary schools and to find out the possible ways to prohibit corporal punishment in schools.

Secondary Objectives

1. To compare the attitudes rural and urban teachers, parents and students towards the corporal punishment used in schools.
2. To find out the relationship between parents' and teachers' attitudes towards the disciplinary actions for the students in the urban and rural areas.
3. To recommend few alternative ways for the teachers to prohibit corporal punishment in schools.

Hypothesis

H_0^1 : There is no difference between rural and urban teachers' attitudes towards the disciplinary actions for the students.

H_0^2 : There is no difference between the rural and urban teachers' attitudes towards the different types of corporal punishment used in schools for the students.

H_0^3 : There is no difference between the rural and urban teachers' attitudes towards the consequences of corporal punishment.

H_0^4 : There is no difference between the rural and urban teachers' attitudes towards the inter-personal relationship techniques for the students.

H_0^5: There is no difference between the rural and urban teachers' attitudes towards the corporal punishment resolution mechanism for the students.

H_0^6: There is no difference between rural and urban parents' attitudes towards the critical view of corporal punishment.

H_0^7: There is no relationship between the attitudes of parents and teachers towards the disciplinary actions for the students in the urban areas.

H_0^8: There is no relationship between the attitudes of parents and teachers towards the disciplinary actions for the students in the rural areas.

H_0^9: There is no difference between the rural and urban students' behavioural attitudes towards the corporal punishment used in schools.

Data Collection and Methodology

The study was based on both primary and secondary data. The primary data had been collected from the rural and urban areas of Birbhum District, West Bengal. The survey was conducted in the months of January–May 2010. For these purpose close-ended questionnaires had been prepared to collect necessary information about the attitudes of the parents, teachers and students towards the corporal punishment used in schools. On the other hand, secondary data relating to literatures of school corporal punishment were collected from the internet, journals, magazines, news papers and books. In this study Stratified Random Sampling Technique was used for the collection of primary data as well as for testing hypothesis. The samples had selected in two stages. The first stage was selection of schools, parents, teachers and students. The study had selected two schools each from urban (Sainthia High School and Sainthia Town High School) and rural (Mahjigram High School and Itagoria Hazi Mumtaz Begam High School) areas. Fifty students each of Class VIII of Sainthia Town High School and Majhigram High School had been selected randomly. The study had selected those parents whose children were studying in Class VIII of Sainthia Town High School and Majhigram High School. Thirty parents were selected from urban areas and 20 parents from rural areas. Similarly, the teachers were selected from two schools each in urban areas (Sainthia High School and Sainthia Town High School) and rural areas (Mahjigram High School and Itagoria Hazi Mumtaz Begam High School). Fifteen teachers of the Sainthia High School and 13 teachers of Sainthia Town High School had been selected randomly. On the other hand, nine teachers of the Mahjigram High School and 13 teachers of Itagoria Hazi Mumtaz Begam High School had been selected randomly.

The attitudes of the teachers and parents towards the different attributes of school corporal punishment (such as, disciplinary action, types of corporal punishment, consequences of corporal punishment, inter-personal relationship techniques, corporal punishment resolution mechanism, critical view of

corporal punishment, etc.) had been measured on the basis of three points scale (Always, Sometimes and Never). Similarly dummy variables (Yes and No) were used to measure the behavioural attitudes of the students towards school corporal punishment. The collected data were summarized in a *Master Sheet,* in such a systematical manner that can fulfill the objectives of the study. However the summarized data had been analysed with the help of few statistical tools like Mean, Standard Deviation (S.D.), Coefficient of Variation (C.V.), Pearson Correlation Coefficient, T-test (Paired Two Samples for Means), etc. by using the software's (SPSS 17.00). Beside these, the alternative ways for the teachers to prohibit corporal punishment have been recommended on the basis of literature survey method.

Results and Discussion

1. *Rural and urban teachers' attitudes towards the disciplinary actions for the students*

The urban teachers' opinion varies highly from the rural teachers in favour of all scales regarding the disciplinary actions for the students (such as, punishment is necessary to improve students academic performance, punishment is only way to rectify students, etc.), since coefficient of variation is high. The positive differences have been found in favour of Always and Sometimes scale between the rural and urban teachers attitudes towards the above disciplinary actions for the students. But negative difference has been found in favour of never scale between the rural and urban teachers

Table 1

Scale	Rural			Urban		
	Mean	S.D.	C.V.	Mean	S.D.	C.V.
Always	20.5	14.15	70.73	17.00	14.67	86.29
Sometimes	38.5	16.86	43.79	35.0	22.32	63.77
Never	41.0	25.55	62.32	48.0	36.14	75.29

Paired Two Samples for Means

Scale	Mean	S.D.	T	Sig. (2-tailed)	Null Hypothesis
Always	3.5	4.43	1.578	0.213	Rejected and Significant
Sometimes	3.5	11.82	.592	0.595	Rejected and Significant
Never	(-) 7.0	12.91	(-) 1.084	0.358	Rejected and Significant

Significance Level: 5 %

attitudes. So the null hypothesis has been rejected in favour of all scales and the significant results have been found at 5% significance level.

From Table 1 it is clear that few rural teachers are always or sometimes in favour of punishment to improve students' academic performance or to rectify the students. On the other hand, few urban teachers did not agree with the opinions of rural teachers. But the major portion of rural and urban teachers are of the opinion that punishment is not only way to improve academic performance of the students or to rectify students. Although there are mixed opinions between the rural and urban teachers about the disciplinary actions for the students but major portion of both rural and urban teachers are not in favour of corporal punishment.

2. *Rural and urban teachers' attitudes towards the different types of corporal punishment used in schools for the students*

A portion of rural and urban teachers are always against different types of corporal punishments used in schools for the students (such as, keeping school bag on the head and stand whole day under the sun, kneel down on the sand, suspend from the school for couple of days, give TC from the school, etc.). On the other side, rural teachers' opinion varies highly from the urban teachers in favour of Sometimes and Never scales regarding the above types of corporal punishment for the students, since coefficient of variation is high.

There is no difference between the rural and urban teachers' attitudes towards the above types of corporal

Table 2

Scale	Rural			Urban		
	Mean	S.D.	C.V.	Mean	S.D.	C.V.
Always	0.00	0.00	-	0.00	0.00	-
Sometimes	11.25	17.04	151.47	7.25	8.85	122.07
Never	88.75	17.04	19.2	92.75	8.85	9.54

Paired Two Samples for Means

Scale	Mean	S.D.	T	Sig. (2-tailed)	Null Hypothesis
Always	-	-	-	-	Accepted and Insignificant
Sometimes	4.0	9.38	0.853	0.456	Rejected and Significant
Never	(-) 4.0	9.38	(-) 0.853	0.456	Rejected and Significant

Significance Level: 5 %

punishments in favour of Always scale. So the null hypothesis has been accepted and insignificant result has been found at 5% significance level. On the other hand, the positive difference has been found in favour of Sometimes scale between the rural and urban teachers' attitudes towards the different types of corporal punishments used in school for the students. But negative difference has been found in favour of Never scale between the rural and urban teachers' attitudes. So the null hypothesis has been rejected in both Sometimes and Never scales and significant results have been found at 5% significance level.

From Table 2, it is clear that the few rural teachers are interested to give sometimes these types of punishments to have control over the indisciplined students, whereas few urban teachers have reverse attitudes to prohibit these types of corporal punishments. However, the major portions of both rural and urban teachers are against using the above types of corporal punishments in schools for the students.

3. *Rural and urban teachers' attitudes towards the consequences of corporal punishment*

The rural teachers' opinions varies highly from the urban teachers regarding the consequences of corporal punishment (such as punishment leads to increase the rate of suicide, punishment leads to increase the rate of depression, punishment incites students to violence, etc.), since coefficient of variation is high.

There is no difference in favour of Always scale between the rural and urban teachers' attitudes towards the

Table 3

Scale	Rural			Urban		
	Mean	**S.D.**	**C.V.**	**Mean**	**S.D.**	**C.V.**
Always	21.5	22.07	102.65	21.5	19.54	90.88
Sometimes	35.25	18.66	52.94	35.75	17.02	47.61
Never	43.25	37.16	85.92	42.75	35.72	83.56

Paired Two Samples for Means

Scale	Mean	S.D.	T	Sig. (2-tailed)	Null Hypothesis
Always	0.00	5.10	0.000	1.000	Accepted and Insignificant
Sometimes	(-) 0.50	4.20	(-) 0.238	0.827	Rejected and Significant
Never	0.50	2.52	0.397	0.718	Rejected and Significant

Significance Level: 5%

consequences of corporal punishment. So the null hypothesis has been accepted in favour of always scale and insignificant result has been found at 5% significant level. On the other side, negative difference has been found in favour of Sometimes scale between the rural and urban teachers' attitudes towards the consequences of corporal punishment. But a positive difference has been found in favour of Never scale between the rural and urban teachers' attitudes. So the null hypothesis has been rejected in favour of both Sometimes and Never scales and significant results have been found at 5% significant level.

From Table 3, it is clear that few portions of both rural and urban teachers are always aware about the consequences of corporal punishment. On the other hand, portions of rural and urban teachers are of opinion that sometimes corporal punishment may lead to increase the rate of suicide/ depression or incites students to violence. But a major portion of rural and urban teachers believe that corporal punishment never leads to increase the rate of suicide/depression or incites students to violence. That means there is mixed opinion between the rural and urban teachers about the consequences of corporal punishment.

4. *Rural and urban teachers' attitudes towards inter-personal relationship techniques for the students*

The urban teachers' opinions highly vary from the rural teachers in favour of Always scale regarding the inter-personal relationship techniques for the students (such as, students feel free to tell their problems, students fear to see those teachers in the classroom who give maximum punishment, other than education students get help from teachers in their social lives, punishment created distance between teachers and students, etc.), since coefficient of variation is high. On the other side, the rural teachers' opinions vary highly from the urban teachers in favour of Sometimes and Never scale regarding the inter-personal relationship techniques, since coefficient of variation is high.

The positive difference has been found in favour of both Always and Never scales between the rural and urban teachers' attitudes towards the inter-personal relationship techniques for the students, whereas, a negative difference has been found in favour of Sometimes scale. So the null hypothesis has been rejected and significant results have been found at 5% significant level.

From Table 4, it is clear that few rural teachers are always interested to make inter-personal relationship with the students or never, but few urban teachers are of opinion that it is sometimes possible. However during the field survey a portion of both rural and urban teachers are of opinion that punishment is sometimes needed to maintain the peaceful academic environment in the schools but inter-personal relationship techniques are one of the ways to minimize the distance between teachers and students. It is not true that students always feel fear to see them inside or outside school campus. They are always tried to help students outside the campus in their social lives. Maximum students feel free to tell their problems. This is the outcome of inter-personal relationship techniques.

Table 4

Scale	Rural			Urban		
	Mean	**S.D.**	**C.V.**	**Mean**	**S.D.**	**C.V.**
Always	50.00	37.69	75.38	47.25	36.62	77.5
Sometimes	19.25	12.01	62.39	23.25	12.58	54.11
Never	30.75	40.90	133.01	29.50	38.45	130.34
Paired Two Samples for Means						

Scale	Mean	S.D.	T	Sig. (2-tailed)	Null Hypothesis
Always	2.75	2.22	2.48	0.089	Rejected and Significant
Sometimes	(-) 4.00	1.41	(-) 5.657	0.011	Rejected and Significant
Never	1.25	2.25	1.00	0.391	Rejected and Significant
Significance Level: 5%					

5. *Rural and urban teachers' attitudes towards the corporal punishment resolution mechanism*

The urban teachers' opinions vary highly from the rural teachers in favour of always scale regarding the corporal punishment resolution mechanism (such as, punishment should be unbiased, punishment should be on the basis of verbal and non-verbal response, teacher being a role model for empathy, kindness, cooperation, patience, etc.), since coefficient of variation is high. On the other side, the rural teachers' opinions vary highly from the urban teachers in favour of Sometimes scale regarding the corporal punishment resolution mechanism, since coefficient of variation is high. Interestingly, no teachers are against of above corporal punishment resolution mechanism. That's why no variation has been found in Never scale between the rural and urban teachers' opinion.

The positive difference have been found in favour of Always scale between the rural and urban teachers' attitudes towards the corporal punishment resolution mechanism, whereas negative difference has been found in favour of Sometimes scale between the rural and urban teachers' attitudes. So the null hypothesis has been rejected in Always and Sometimes scales and the significant results have been found at 5% significance level. There is no difference between the rural and urban

Table 5

Scale	Rural			Urban		
	Mean	S.D.	C.V.	Mean	S.D.	C.V.
Always	88.5	9.61	10.86	87.5	10.28	11.75
Sometimes	11.5	9.61	83.57	12.5	10.28	82.24
Never	0.00	0.00	-	0.00	0.00	-
Paired Two Samples for Means						

Scale	Mean	S.D.	T	Sig. (2-tailed)	Null Hypothesis
Always	1.00	1.15	1.732	0.182	Rejected and Significant
Sometimes	(-) 1.00	1.15	(-) 1.732	0.182	Rejected and Significant
Never	0.00	0.00	-	-	Accepted and Insignificant
Significance Level: 5%					

teachers' attitudes in Never scale. So the null hypothesis has been accepted in Never scale and the insignificant result has been found at 5% significance level.

Although there is mixed opinion between the rural and urban teachers towards the above corporal punishment resolution mechanism but major portion of both rural and urban teachers are always interested to adopt these types mechanism. During the field survey a portion of the rural and urban teachers reported that teacher should be a role model for empathy, kindness, co-operation and patience towards the students. Although they have told that punishment should be unbiased and on the basis of verbal and non-verbal response, but inter-personal relationship among students and teachers is an effective way to avoid punishment.

6. *Rural and urban parents' attitudes towards the critical view of school corporal punishment*

The rural parents' opinions vary highly from the urban parents in favour of always scale towards the critical view of corporal punishment used in school (such as, punishment leads to increase the rate of suicide/depression among the students, corporal punishment is illegal, corporal punishment should not be allowed at school, etc.), since coefficient of variation is high. On the other hand the urban parents' opinions vary highly from the rural parents in favour of Sometimes and Never scale towards the

Table 6

Scale	Rural			Urban		
	Mean	**S.D.**	**C.V.**	**Mean**	**S.D.**	**C.V.**
Always	30.00	38.08	126.93	40.00	39.06	97.65
Sometimes	20.00	10.8	54	22.5	21.06	93.6
Never	50.00	39.16	78.32	37.5	43.02	114.72
Paired Two Samples for Means						

Scale	Mean	S.D.	T	Sig. (2-tailed)	Null Hypothesis
Always	(-) 10.00	13.76	(-) 1.454	0.242	Rejected and Significant
Sometimes	(-) 2.50	16.54	(-) 0.302	0.782	Rejected and Significant
Never	12.5	29.85	0.838	0.464	Rejected and Significant
Significance Level: 5%					

critical view of corporal punishment, since coefficient of variation is high.

The negative differences have been found in favour of Always and Sometimes scales between the rural and urban parents' attitudes towards the critical view of corporal punishment; whereas a positive difference has been found in favour of Never scale. So the null hypothesis has been rejected in favour of all scales and the significant results have been found at 5% significance Level.

From Table 6, it is clear that few urban parents are always or sometimes against of school corporal punishment only because of the ill-effects. They do believe that since corporal punishment is illegal in the school and have many ill-effects on the life of the students, so it should be banned. But still few rural parents are not against of corporal punishment used in school. They do believe that it is not true that corporal punishment increases the rate of suicide/depression among the students. They also believe that corporal punishment is not always illegal. It is sometimes necessary either to have a control over the indisciplined students or to improve the academic performance level of the students.

7. *The relationship between the attitudes of parents and teachers towards the disciplinary actions for the students in urban and rural areas*

High negative (reverse) relationship has been found in all the scales between the parents' and teachers' attitudes towards the disciplinary actions for the students

Table 7

Scale	Urban		Rural		Null Hypothesis
	Correlation Coefficient	Sig.	Correlation Coefficient	Sig.	
Always	(-) .898	0.102	(-) 0.726	0.274	Rejected and Significant
Sometimes	(-) .888	0.112	(-) 0.655	0.345	Rejected and Significant
Never	(-) .990	0.010	(-) 0.979	0.021	Rejected and Significant

in urban areas. Similarly a high negative (reverse) relationship has also been found in all scales between the parents' and teachers' attitudes towards the disciplinary actions for the students in rural areas. So the null hypothesis has been rejected in favour of all scales and the significant results have been found at 5% significance Level.

From Table 7, it is clear that there is a reverse relationship between the parents' and teachers' attitudes towards the disciplinary actions in both urban and rural areas. The parents' and teachers' thoughts are totally different from each other's regarding the students' disciplinary actions. It reflects a tug of water between the parents' and teachers' attitudes towards the disciplinary action. This is due to the lacuna of coordination and communication between parents and teachers. So school authorities are required to arrange more frequent guardian meeting in proper intervals.

8. *Rural and urban students' behavioural attitudes towards the school corporal punishment*

The urban students' opinions vary highly from the rural students regarding the behavioural attitudes towards the school corporal punishments (such as, punishment makes students obedient, punishment is indispensable to maintain discipline in the classroom, punishment is the only way to have a control over the naughty students, etc.), since coefficient of variation is high.

Table 8

Dummy Variables	Rural			Urban		
	Mean	S.D.	C.V.	Mean	S.D.	C.V.
Yes	26.5	39.75	150	26.0	44.03	169.35
No	73.0	39.41	53.99	74	44.03	59.5
Paired Two Samples for Means						

Dummy Variables	Mean	S.D.	T	Sig. (2-tailed)	Null Hypothesis
Yes	0.5	4.43	0.255	0.836	Rejected and Significant
No	(-) 1.00	4.76	(-) 0.420	0.703	Rejected and Significant
Significance Level: 5%					

A positive difference has been found in support of school corporal punishment between the rural and urban students' behavioural attitudes; whereas a negative difference has been found against of school corporal punishment between the rural and urban students' behavioural attitudes. So the null hypothesis has been rejected and significant results have been found at 5% significance level.

During the field survey it was observed that few rural students do believe that punishment makes students obedient and punishment is indispensable to maintain discipline in the classroom. On the other hand few urban students do not believe that punishment is only way to have a control over the naughty students. However, a major portion of both rural and urban students are against corporal punishment used in schools.

However from the above discussion the following results have come out:

1. (a) The urban teachers' opinions vary highly from the rural teachers in favour of all scales regarding the disciplinary actions for the students, since coefficient of variation is high.

   (b) The positive differences have been found in favour of Always and Sometimes scales between the rural and urban teachers' attitudes towards the above disciplinary actions for the students. But negative difference has been found in favour of Never scale between the rural and urban teachers' attitudes.

2. (a) A portion of rural and urban teachers are always against of different types of corporal punishment used in schools for the students. On the other side rural teachers' opinions vary highly from the urban teachers in favour of Sometimes and Never scales regarding the different types of corporal punishment, since coefficient of variation is high.

   (b) There is no difference between the rural and urban teachers' attitudes in favour of Always scale towards the different types of corporal punishment used in schools for the students. On the other hand, the positive difference has been found in favour of Sometimes scale

between the rural and urban teachers' attitudes towards the different types of corporal punishment. But a negative difference has been found in favour of Never scale between the rural and urban teachers' attitudes.

3. (a) The rural teachers' opinions vary highly from the urban teachers regarding the consequences of corporal punishment (such as punishment leads to increase the rate of suicide, punishment leads to increase the rate of depression, punishment incites students to violence, etc.), since coefficient of variation is high.

   (b) There is no difference in favour of Always scale between the rural and urban teachers' attitudes towards the consequences of corporal punishment. On the other side, negative difference has been found in favour of Sometimes scale between the rural and urban teachers' attitudes towards the consequences of corporal punishment. But a positive difference has been found in favour of Never scale between the rural and urban teachers' attitudes.

4. (a) The urban teachers' opinions highly vary from the rural teachers in favour of Always scale regarding the inter-personal relationship techniques for the students, since coefficient of variation is high. On the other side, the rural teachers' opinions vary highly from the urban teachers in favour of Sometimes and Never scales regarding the inter-personal relationship techniques, since coefficient of variation is high.

   (b) The positive difference has been found in favour of both Always and Never scales between the rural and urban teachers' attitudes towards the inter-personal relationship techniques for the students, whereas, a negative difference has been found in favour of Sometimes scale.

5. (a) The urban teachers' opinions vary highly from the rural teachers in favour of always scale regarding the corporal punishment resolution mechanism, since coefficient of variation is high. On the other hand, the rural teachers' opinions vary highly from the urban teachers in favour of Sometimes scale regarding the corporal punishment resolution mechanism, since coefficient of variation is high. No teachers are against of above corporal punishment resolution mechanism. That is why no variation has been found in Never scale between the rural and urban teachers opinion.

   (b) The positive difference have been found in favour of Always scale between the rural and urban teachers attitudes towards the corporal punishment resolution mechanism, whereas, negative

difference has been found in favour of Sometimes scale between the rural and urban teachers' attitudes. There is no difference between the rural and urban teachers' attitudes in Never scale.

6. (a) The rural parents' opinions vary highly from the urban parents in favour of Always scale towards the critical view of corporal punishment used in school, since coefficient of variation is high. On the other hand the urban parents' opinions vary highly from the rural parents in favour of Sometimes and Never scales, since coefficient of variation is high.

   (b) The negative differences have been found in favour of Always and Sometimes scales between the rural and urban parents attitudes towards the critical view of corporal punishment; whereas a positive difference has been found in favour of Never scale.

7. The high negative (reverse) relationship has been found between the parents' and teachers' attitudes towards the disciplinary actions for the students in both urban and rural areas.

8. (a) The urban students' opinions vary highly from the rural students regarding the behavioural attitudes towards the school corporal punishments, since coefficient of variation is high.

   (b) A positive difference has been found in support of school corporal punishment between the rural and urban students' behavioural attitudes; whereas a negative difference has been found against of school corporal punishment between the rural and urban students' behavioural attitudes.

Recommendations to Prohibit Corporal Punishment in Schools

The philosophy of '*spare the rod and spoil the child*' had gone forever. Now students don't need to fear to see the '*Guru Moshai*'. Today the students are very much sentimental. That's why punishment leads to increase the rate of suicide among the students.

The following alternative ways have been recommended for the teachers to prohibit the corporal punishment in schools:

1. An important technique in maintaining classroom control is to develop a milieu of effective communication, in which the teacher displays an attitude of respect for the students. The teachers can exhibit cordiality to students and an attitude that they generally enjoy working with students in the academic setting. Students must be taught in an environment that clearly states they are valued and understood. The emphasis is on positive educational exchanges between teachers and students, not futile, contentious, win-lose contests.
2. Teachers can learn sound blueprints regarding student motivation and

nonviolent techniques of classroom control. It is difficult to present educational material which is stimulating to the students and is aimed at their ability levels. Some students do need alternative academic courses and these should be offered. All students and parents should be carefully involved in decision making process about school issues affecting them, including educational goals and disciplinary rules.

3. Behaviour modification techniques for classroom control can be effectively utilised by school teachers. Inappropriate behaviour can be reduced by using extinction. This technique removes or eliminates inappropriate actions. A variety of nonviolent disciplinary techniques can be taught and utilized, such as soft verbal reproofs or social isolation in addition to the persistent use of rewards (as love, praise and attention by the teacher) for appropriate behaviour. Such methods can be powerful, compelling tools; changing unacceptable behaviour and helping the locus of control become placid within the students in this model.
4. It is difficult that teachers receive as much support and training as possible in their efforts to maintain effective classroom control without resorting to violent techniques. Such training should include instructions on the deleterious short and long-term consequences of corporal punishment. Schools should have an ample supply of counsellors, especially for younger students. Schools need to have in-school suspension facilities while avoiding use of large classroom sizes. Schools' policies need to allow for a wide variety of teaching and disciplinary methods which de-emphasize the necessity for corporal punishment. The input of parents and students into such policies is vital to its overall success. An effective relationship must be developed between school teachers, parents and students to frame sensible rules which have appropriate consequences when infractions inevitably occur.

Conclusion

The present study has observed that no teachers, parents and students in rural and urban areas are in favour of school corporal punishment. But there are mixed opinions between the rural and urban teachers towards the consequences of school corporal punishment. Interestingly a reverse relationship has been found between the parents' and teachers' attitudes towards the disciplinary actions for students in both rural and urban areas. These have been justified by the statistical results as well. During the field survey parents and teachers are told that sometimes punishment is needed to maintain the discipline either in school or at home but given to the ill-effects of corporal punishment, it should be banned. So, no violence against students is justifiable. Even verbal violence should not be permitted in schools. Corporal punishment is not correct and insists the undesirable behaviour of the students. Discipline is necessary but discipline is not equivalent to

punishment. Corporal punishment should be completely wiped out from the academic system and teaching should be made joyful experience for the teachers as well as students. The school authorities may recruit counsellors to understand students' psychology. Deprivation and motivation should be done simultaneously to discipline students. During this process all stakeholders (parents, peers and counsellors) should be involved. The corporal punishment may adversely affect a student's self image and contributes to disruptive and violent behaviour. Besides these, it creates emotional stress and low-self esteem amongst students due to mental and physical injury. If the students are loved and their feelings are respected, the situation of punishment to them will not arise. Teachers who love their students unconditionally would never find any occasion to hit or hurt them. The school authorities may conduct workshops and training programmes on students' behaviour and psychology in frequent intervals. The case studies and real life situations should be incorporated in the course curriculum of the teachers' training institutes so that they can churn out probable teachers who are more caring and understanding towards students. Teachers need to adopt "positive re-enforcement" and "assertive discipline" while dealing with students. A culture has to be developed in the school by the teachers where the word "punishment" is rooted out from the academic settings. The present study has recommended that school authorities should take initiatives for more frequent interaction between parents and teachers by arranging meetings to exchange the views regarding students' disciplinary actions. Last but not least, since the sample size is very small so the present study may not reflect the real attitudes of the teachers, parents and students towards the school corporal punishment. Due to the short period of time the study has not been able to consider all dimensions of school corporal punishment which may have an adverse impact on the students' behaviour and attitudes.

National Curriculum Framework–2005 Perspective on School Discipline and Corporal Punishment

At present, school rules, norms and conventions define permitted 'good' and 'proper' behaviour for individual and groups of students. Maintaining discipline in schools is usually the prerogative of teachers and adults in positions of authority (often the sports master and administrators). Frequently, they also induct children as 'monitors' and 'prefects' and delegate the responsibility of maintaining 'order' and ensuring control. Punishment and reward play an important role in this. Those who implement rarely question the rules or the implications that ensuring compliance may have for children's overall development, self-esteem and also their interest in learning. Forms of disciplining such as corporal punishment and, verbal and non-verbal abuse of children, continue to feature in many schools, and are used to humiliate children in front of their peers. Yet many teachers and even parents still believe

that such punishment is important, unaware of the immediate and long-term detrimental effects of these practices. It is important for teachers to reflect on the rationale that underlies the rules and conventions that govern schools, and whether these are consistent with our aims of education. For instance, rules such as the length of socks and the whiteness of sports shoes are of no educational defensible importance. Rules regarding maintaining silence in classrooms, answering 'one at a time' and answering only if you know the right answer, can undermine the values of equality and equal opportunity. Such rules may also discourage processes that are integral to children's learning, the development of a sense of community among peers, though they may make the class 'easy to manage' for the teacher and facilitate 'covering the syllabus'.

Inculcating the value/habit of self-discipline is important for the systematic pursuit of learning and the development of the child's interests and potential. Discipline must enable the performance of, and be conducive to, the task at hand. It should enable freedom, choice and autonomy for both teacher and child. It is necessary to involve children themselves in evolving rules, and feel a sense of responsibility in ensuring that it is followed. In this way they would also learn the process of setting codes of self-governance and the skills required to participate in decision making and democratic functioning. Similarly, the children themselves could also evolve mechanisms for conflict resolution between teachers and students, and among students. The teacher should ensure that there are as few rules as possible, and that only rules that can be reasonably followed are created. It does no one any good to humiliate children for breaking rules, particularly when there are good reasons for the rule being broken. For instance, 'noisy classrooms' are frowned upon by teachers as well as headmasters, but it is possible that rather the noise being evidence of the teacher not being in control, it may be evidence of a lively and participatory class.

Similarly, headmasters can be unreasonably strict about punctuality. A child who is late for an examination on account of a traffic jam must not be penalised, and yet we find such rules being imposed in the name of higher values. Unreasonableness on the part of authorities in such matters can demoralize children, their parents, and also teachers. It may help to remember to first ask a child why he or she broke a rule, to listen to what the child says, and act accordingly. It is befitting a school head or teacher to exercise authority rather than power. Arbitrariness and unreasonableness are characteristics of power, and are feared, not respected. Systems for the participatory management for the school by children and school teachers and administrators need to be evolved. Children should be encouraged to elect their own representatives to children's councils, and similarly the teachers and administrators of a given school need to be organized themselves, so also the parents.

REFERENCES

KILIMCI, S. 2009. "Teachers perceptions on corporal punishment as a method of discipline in elementary schools", *The Journal of International Social Research*, 2(8).

MUHAMMAD, S.A AND S.R. MUHAMMAD. 2007. Effects of corporal punishment and psychological treatment on students learning and behaviour. *Journal of Theory and Practice in Education*. 3(2): 171-180.

BAUMAN, L.J. AND FRIEDMAN, B. 1998. "Corporal Punishment: Pediatric Clin NoAm". BBC News. (00:22 GMT, April 17, 2007). US University Shooting Kills 33: (http://news.bbc.co.uk/2/hi/americas/6560685.stm).

CLIMINILLO, L.M. 1988. "Discipline: The school's dilemma adolescence."*Daily Times*, (July 4, 2005), Staff Report, Corporal Punishment.

GALLUP ORGANIZATION. 1995. *Discipline children in America: A Gallup Poll Report*, Princeton, NJ: Gallup Organization.

GERSHOFF, E.T. 2002. "Corporal Punishment by Parents and Associated Child Behaviours and Experiences: A Meta-Analytic and Theoretical Review." *Psychological Bulletin*, 14(2): 490-49.

GRAZIANO, A.M. AND LINDA, J. 1992. "Effects of corporal punishment on children." *Violence Update*. 86(3): 368-382.

GRAZIANO, A.M. AND NAMASTE, K.A. 1990. "Parental use of physical force in child Discipline". *Journal of Interpersonal Violence*. 5 (4): 43-50.

HYMAN, I.A. 1988. "Eliminating corporal punishment in schools: Moving from Advocacy Research to Policy Implementation." *Child Legal Rights*. 15(6): 110-115.

HYMAN, I.A., MCDOWELL, E. AND RAINS, B. 1977. "Corporal punishment and alternative in the schools: An overview of theoretical and practical issues in National Institute of Education Preceding." Conference on Corporal Punishment in Schools, A National Debate February 18-20. U.S. Government Printing Office.

LARZELERE, R.E. AND JOHNSON, B. 1999. "Evaluation of the effects of Sweden's Spanking Ban on Physical Child Abuses," *Psychology Rape*. 12 (54): 15-16.

MCCORD, J. 1991. "Questioning the value of punishment," *Social Problems*. 38(2): 190 -200.

ROHNER, R.P., KEAN, K.J. COURNOYER, D. 1991. "Effects of corporal punishment, Perceived Caretaker Warmth and Cultural Beliefs on the psychological adjustment of children in St. Kitts, West Indies," *Journal of Marriage and the Family*. 19 (25):40- 45.

STRAUS, M.A. 1991. "Discipline and Deviance: Physical punishment of children and violence and other crime in adulthood," *Social Problems*. 38 (2): 205-206.

WAUCHOPE, B.A. AND STRAUS M.A. 1990. "Physical punishment and physical abuse of American Children: Incidence rates by age, gender and occupational class," In: Straus MA Gelles RJ (Eds), *Physical Violence in American Families*, New Brunswick, NJ: Transaction.

WRIGHT, B.D. 1999. *Fundamental measurement for psychology a new rules of measurement: What every psychologist and educator should know*, Mahwah, NJ, Lawrence Erlbaum Associate.

GERSHOFF, E.T. 2002. "Corporal punishment by parents and associated child behaviours and experiences: A Meta-Analytic and Theoretical Review." *Psychological Bulletin*. 128(4): 539-579.

MORRELL, R. 2001. "Corporal punishment in South African schools: A neglected explanation for its persistence." *South African Journal of Education*. 21(4): 03.

SLEE, R. 1995. *Changing theories and practices of discipline,* Falmer Press, London.

ROSEN, L. 1997. *School Discipline: Best practices for administrators*, Corwin Press Thousand Oaks, California.

CANTER, L. 2000. *Assertive discipline in Childhood, Edwards Eds., Classroom Discipline and Management,* 3rd Ed, John Wiley & Sons, MA, USA.

KOCHANSKA, G. AND THOMPSON, R.A. 1997. "The emergence and development of conscience in todlerhood and early childhood," in JE Grusec and L Kuczynski, Eds., *Parenting and Children's Internationalisation of Values*, PP: 53-77, Wiley, New York.

CANTER, L. 1989. "Assertive discipline more than names on the board and marbles in a Jar," *Phi Delta Kappan,* 71: 57-61.

STRAUS, M.A. SUGARMAN, D.B. AND GILES-SIMS. 1997. "Corporal Punishment by parents and subsequent antisocial behaviour of children," *The Archives of Pediatrics and Adolescent Medicine*. 155: 761-767.

STERNBERG, K.J., LAMB, M.E., AND ET. AL. 1993. "Effect of domestic violence on children's behaviour problems and depression" *Development Psychology*. 29: 44-52.

STRAUS, M.A. 1994. *Beating the Devil out of Them: Corporal Punishment in American Families,* New Lexington Press, San Francisco.

BHATIA, R. AND MAHAJAN, V. 2008. "Elimination of Corporal Punishment in Schools: Bane or Boon." *Journal of Indian Education*. 34(1):28-38.

STRAUS, M.A. AND MATHUR, A.K. 1995. *Corporal punishment and children's academic achievement,* Paper presented at the annual meeting of the Pacific Sociological Society, San Francisco.

STRAUS, M.A. AND PASCHALL, M.J. 1998. *Corporal Punishment by Mothers and Child's Cognitive Development: A longitudinal Study*. Paper presented at the 14th world conference of sociology, Montreal, Quebec, Canada, Durham, NH: Family Research Laboratory, University of New Hcmpshire.

BREZINA, T. 1998. "Teenage violence towards parents as an adaptation to family strain: Evidence from a National Survey of Male Adolescents." *Youth and Society*.30:416-444.

DURRANT, J.E. 2000. "Trends in Youth Crime and Well-Being since the Abolition of Corporal Punishment in Sweden." *Youth and Society*. 31: 437-455.

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असाधारण

EXTRAORDINARY

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PART II — Section I

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इस भाग में भिन्न पृष्ठ संख्या दी जाती है जिससे कि यह अलग संकलन के रूप में रखा जा सके।

Separate paging is given to this Part in order that it may be filed as a separate compilation.

MINISTRY OF LAW AND JUSTICE
(Legislative Department)

New Delhi, the 27th August, 2009/Bhadra 5, 1931(Saka)

The following Act of Parliament received the assent of the President on the 26th August, 2009, and is hereby published for general information:—

THE RIGHT OF CHILDREN TO FREE AND COMPULSORY EDUCATION ACT, 2009

No. 35 OF 2009

[*26th August*, 2009.]

An Act to provide for free and compulsory education to all children of the age of six to fourteen years.

BE it enacted by Parliament in the Sixtieth Year of the Republic of India as follows:—

CHAPTER I

PRELIMINARY

Short title, extent and commencement.

1. (*1*) This Act may be called the Right of Children to Free and Compulsory Education Act, 2009.

(*2*) It shall extend to the whole of India except the State of Jammu and Kashmir.

(*3*) It shall come into force on such date as the Central Government may, by notification in the Official Gazette, appoint.

Definitions

2. In this Act, unless the context otherwise requires,—

(*a*) "appropriate Government" means—

(*i*) in relation to a school established, owned or controlled by the Central Government, or the administrator of the Union territory, having no legislature, the Central Government;

(*ii*) in relation to a school, other than the school referred to in sub-clause (*i*), established within the territory of—

(*A*) a State, the State Government;

(*B*) a Union territory having legislature, the Government of that Union territory;

(*b*) "capitation fee" means any kind of donation or contribution or payment other than the fee notified by the school;

(*c*) "child" means a male or female child of the age of six to fourteen years;

(*d*) "child belonging to disadvantaged group" means a child belonging to the Scheduled Caste, the Scheduled Tribe, the socially and educationally backward class or such other group having disadvantage owing to social, cultural, economical, geographical, linguistic, gender or such other factor, as may be specified by the appropriate Government, by notification;

(*e*) "child belonging to weaker section" means a child belonging to such parent or guardian whose annual income is lower than the minimum limit specified by the appropriate Government, by notification;

(*f*) "elementary education" means the education from first class to eighth class;

(*g*) "guardian", in relation to a child, means a person having the care and custody of that child and includes a natural guardian or guardian appointed or declared by a court or a statute;

(*h*) "local authority" means a Municipal Corporation or Municipal Council or Zila Parishad or Nagar Panchayat or Panchayat, by whatever name called, and includes such other authority or body having administrative control over the school or empowered by or under any law for the time being in force to function as a local authority in any city, town or village;

(*i*) "National Commission for Protection of Child Rights" means the National Commission for Protection of Child Rights constituted under section 3 of the Commissions for Protection of Child Rights Act, 2005; 4 of 2006

(*j*) "notification" means a notification published in the Official Gazette;

(*k*) "parent" means either the natural or step or adoptive father or mother of a child;

(*l*) "prescribed" means prescribed by rules made under this Act;

(*m*) "Schedule" means the Schedule annexed to this Act;

(*n*) "school" means any recognised school imparting elementary education and includes—

(*i*) a school established, owned or controlled by the appropriate Government or a local authority;

(*ii*) an aided school receiving aid or grants to meet whole or part of its expenses from the appropriate Government or the local authority;

(*iii*) a school belonging to specified category; and

(*iv*) an unaided school not receiving any kind of aid or grants to meet its expenses from the appropriate Government or the local authority;

(*o*) "screening procedure" means the method of selection for admission of a child, in preference over another, other than a random method:

(*p*) "specified category", in relation to a school, means a school known as Kendriya Vidyalaya, Navodaya Vidyalaya, Sainik School or any other school having a distinct character which may be specified, by notification, by the appropriate Government;

(*q*) "State Commission for Protection of Child Rights" means the State Commission for Protection of Child Rights constituted under section 3 of the Commissions for Protection of Child Rights Act, 2005.

4 of 2006

CHAPTER II

RIGHT TO FREE AND COMPULSORY EDUCATION

Right of child to free and compulsory education.

3. (*1*) Every child of the age of six to fourteen years shall have a right to free and compulsory education in a neighbourhood school till completion of elementary education.

(*2*) For the purpose of sub-section (*1*), no child shall be liable to pay any kind of fee or charges or expenses which may prevent him or her from pursuing and completing the elementary education:

Provided that a child suffering from disability, as defined in clause (*i*) of section 2 of the Persons with Disabilities (Equal Opportunities, Protection and Full Participation) Act, 1996, shall have the right to pursue free and compulsory elementary education in accordance with the provisions of Chapter V of the said Act.

1 of 1996

Special provisions for children not admitted to, or who have not completed, elementary education.

4. Where a child above six years of age has not been admitted in any school or though admitted, could not complete his or her elementary education, then, he or she shall be admitted in a class appropriate to his or her age:

Provided that where a child is directly admitted in a class appropriate to his or her age, then, he or she shall, in order to be at par with others, have a right to receive special training, in such manner, and within such time-limits, as may be prescribed:

Provided further that a child so admitted to elementary education shall be entitled to free education till completion of elementary education even after fourteen years.

Right of transfer to other school.

5. (*1*) Where in a school, there is no provision for completion of elementary education, a child shall have a right to seek transfer to any other school, excluding the school specified in sub-clauses (*iii*) and (*iv*) of clause (*n*) of section 2, for completing his or her elementary education.

(*2*) Where a child is required to move from one school to another, either within a State or outside, for any reason whatsoever, such child shall have a right to seek transfer to any other school, excluding the school specified in sub-clauses (*iii*) and (*iv*) of clause (*n*) of section 2, for completing his or her elementary education.

(*3*) For seeking admission in such other school, the Head-teacher or in-charge of the school where such child was last admitted, shall immediately issue the transfer certificate:

Provided that delay in producing transfer certificate shall not be a ground for either delaying or denying admission in such other school:

Provided further that the Head-teacher or in-charge of the school delaying issuance of transfer certificate shall be liable for disciplinary action under the service rules applicable to him or her.

CHAPTER III

DUTIES OF APPROPRIATE GOVERNMENT, LOCAL AUTHORITY AND PARENTS

Duty of appropriate Government and local authority to establish school.

6. For carrying out the provisions of this Act, the appropriate Government and the local authority shall establish, within such area or limits of neighbourhood, as may be prescribed, a school, where it is not so established, within a period of three years from the commencement of this Act.

Sharing of financial and other responsibilities

7. (*1*) The Central Government and the State Governments shall have concurrent responsibility for providing funds for carrying out the provisions of this Act.

(*2*) The Central Government shall prepare the estimates of capital and recurring expenditure for the implementation of the provisions of the Act.

(*3*) The Central Government shall provide to the State Governments, as grants-in-aid of revenues, such percentage of expenditure referred to in sub-section (*2*) as it may determine, from time to time, in consultation with the State Governments.

(*4*) The Central Government may make a request to the President to make a reference to the Finance Commission under sub-clause (*d*) of clause (*3*) of article 280 to examine the need for additional resources to be provided to any State Government so that the said State Government may provide its share of funds for carrying out the provisions of the Act.

(*5*) Notwithstanding anything contained in sub-section (*4*), the State Government shall, taking into consideration the sums provided by the Central Government to a State Government under sub-section (*3*), and its other resources, be responsible to provide funds for implementation of the provisions of the Act.

(*6*) The Central Government shall—

(*a*) develop a framework of national curriculum with the help of academic authority specified under section 29;

(*b*) develop and enforce standards for training of teachers;

(*c*) provide technical support and resources to the State Government for promoting innovations, researches, planning and capacity building.

Duties of appropriate Government

8. The appropriate Government shall—

(*a*) provide free and compulsory elementary education to every child:

Provided that where a child is admitted by his or her parents or guardian, as the case may be, in a school other than a school established, owned, controlled or substantially financed by funds provided directly or indirectly by the appropriate Government or a local authority, such child or his or her parents or guardian, as the case may be, shall not be entitled to make a claim for reimbursement of expenditure incurred on elementary education of the child in such other school.

Explanation.—The term "compulsory education" means obligation of the appropriate Government to—

(*i*) provide free elementary education to every child of the age of six to fourteen years; and

(*ii*) ensure compulsory admission, attendance and completion of elementary education by every child of the age of six to fourteen years;

(*b*) ensure availability of a neighbourhood school as specified in section 6;

(*c*) ensure that the child belonging to weaker section and the child belonging to disadvantaged group are not discriminated against and prevented from pursuing and completing elementary education on any grounds;

(*d*) provide infrastructure including school building, teaching staff and learning equipment;

(*e*) provide special training facility specified in section 4;

(*f*) ensure and monitor admission, attendance and completion of elementary education by every child;

(*g*) ensure good quality elementary education conforming to the standards and norms specified in the Schedule;

(*h*) ensure timely prescribing of curriculum and courses of study for elementary education; and

(*i*) provide training facility for teachers.

Duties of local authority

9. Every local authority shall—

(*a*) provide free and compulsory elementary education to every child:

Provided that where a child is admitted by his or her parents or guardian, as the case may be, in a school other than a school established, owned, controlled or substantially financed by funds provided directly or indirectly by the appropriate Government or a local authority, such child or his or her parents or guardian, as the case may be, shall not be entitled to make a claim for reimbursement of expenditure incurred on elementary education of the child in such other school;

(*b*) ensure availability of a neighbourhood school as specified in section 6;

(*c*) ensure that the child belonging to weaker section and the child belonging to disadvantaged group are not discriminated against and prevented from pursuing and completing elementary education on any grounds;

(*d*) maintain records of children up to the age of fourteen years residing within its jurisdiction, in such manner as may be prescribed;

(*e*) ensure and monitor admission, attendance and completion of elementary education by every child residing within its jurisdiction;

(*f*) provide infrastructure including school building, teaching staff and learning material;

(*g*) provide special training facility specified in section 4;

(*h*) ensure good quality elementary education conforming to the standards and norms specified in the Schedule;

(*i*) ensure timely prescribing of curriculum and courses of study for elementary education;

(*j*) provide training facility for teachers;

(*k*) ensure admission of children of migrant families;

(*l*) monitor functioning of schools within its jurisdiction; and

(*m*) decide the academic calendar.

Duty of parents and guardian

10. It shall be the duty of every parent or guardian to admit or cause to be admitted his or her child or ward, as the case may be, to an elementary education in the neighbourhood school.

Appropriate Government to provide for pre-school education

11. With a view to prepare children above the age of three years for elementary education and to provide early childhood care and education for all children until they complete the age of six years, the appropriate Government may make necessary arrangement for providing free pre-school education for such children.

CHAPTER IV

RESPONSIBILITIES OF SCHOOLS AND TEACHERS

Extent of school's responsibility for free and compulsory education

12. (*1*) For the purposes of this Act, a school,—

(*a*) specified in sub-clause (*i*) of clause (*n*) of section 2 shall provide free and compulsory elementary education to all children admitted therein;

(*b*) specified in sub-clause (*ii*) of clause (*n*) of section 2 shall provide free and compulsory elementary education to such proportion of children admitted therein as its annual recurring aid or grants so received bears to its annual recurring expenses, subject to a minimum of twenty-five per cent.;

(*c*) specified in sub-clauses (*iii*) and (*iv*) of clause (*n*) of section 2 shall admit in class I, to the extent of at least twenty-five per cent. of the strength of that class, children belonging to weaker section and disadvantaged group in the

neighbourhood and provide free and compulsory elementary education till its completion:

Provided further that where a school specified in clause (*n*) of section 2 imparts pre-school education, the provisions of clauses (*a*) to (*c*) shall apply for admission to such pre-school education.

(*2*) The school specified in sub-clause (*iv*) of clause (*n*) of section 2 providing free and compulsory elementary education as specified in clause (*c*) of sub-section (*1*) shall be reimbursed expenditure so incurred by it to the extent of per-child-expenditure incurred by the State, or the actual amount charged from the child, whichever is less, in such manner as may be prescribed:

Provided that such reimbursement shall not exceed per-child-expenditure incurred by a school specified in sub-clause (*i*) of clause (*n*) of section 2:

Provided further that where such school is already under obligation to provide free education to a specified number of children on account of it having received any land, building, equipment or other facilities, either free of cost or at a concessional rate, such school shall not be entitled for reimbursement to the extent of such obligation.

(*3*) Every school shall provide such information as may be required by the appropriate Government or the local authority, as the case may be.

No capitation fee and screening procedure for admission

13. (*1*) No school or person shall, while admitting a child, collect any capitation fee and subject the child or his or her parents or guardian to any screening procedure.

(*2*) Any school or person, if in contravention of the provisions of sub-section (*1*),—

(*a*) receives capitation fee, shall be punishable with fine which may extend to ten times the capitation fee charged;

(*b*) subjects a child to screening procedure, shall be punishable with fine which may extend to twenty-five thousand rupees for the first contravention and fifty thousand rupees for each subsequent contraventions.

Proof of age for admission.

14. (*1*) For the purposes of admission to elementary education, the age of a child shall be determined on the basis of the birth certificate issued in accordance with the provisions of the Births, Deaths and Marriages Registration Act, 1886 or on the basis of such other document, as may be prescribed.

(*2*) No child shall be denied admission in a school for lack of age proof. 6 of 1886

No denial of admission

15. A child shall be admitted in a school at the commencement of the academic year or within such extended period as may be prescribed:

Provided that no child shall be denied admission if such admission is sought subsequent to the extended period:

Provided further that any child admitted after the extended period shall complete his studies in such manner as may be prescribed by the appropriate Government.

Prohibition of holding back and expulsion.

16. No child admitted in a school shall be held back in any class or expelled from school till the completion of elementary education.

Prohibition of physical punishment and mental harassment to child.

17. (*1*) No child shall be subjected to physical punishment or mental harassment.

(*2*) Whoever contravenes the provisions of sub-section (*1*) shall be liable to disciplinary action under the service rules applicable to such person.

No School to be established without obtaining certificate of recognition

18. (*1*) No school, other than a school established, owned or controlled by the appropriate Government or the local authority, shall, after the commencement of this Act, be established or function, without obtaining a certificate of recognition from such authority, by making an application in such form and manner, as may be prescribed.

(*2*) The authority prescribed under sub-section (*1*) shall issue the certificate of recognition in such form, within such period, in such manner, and subject to such conditions, as may be prescribed:

Provided that no such recognition shall be granted to a school unless it fulfils norms and standards specified under section 19.

(3) On the contravention of the conditions of recognition, the prescribed authority shall, by an order in writing, withdraw recognition:

Provided that such order shall contain a direction as to which of the neighbourhood school, the children studying in the derecognised school, shall be admitted:

Provided further that no recognition shall be so withdrawn without giving an opportunity of being heard to such school, in such manner, as may be prescribed.

(4) With effect from the date of withdrawal of the recognition under sub-section (3), no such school shall continue to function.

(5) Any person who establishes or runs a school without obtaining certificate of recognition, or continues to run a school after withdrawal of recognition, shall be liable to fine which may extend to one lakh rupees and in case of continuing contraventions, to a fine of ten thousand rupees for each day during which such contravention continues.

Norms and standards for school.

19. (1) No school shall be established, or recognised, under section 18, unless it fulfils the norms and standards specified in the Schedule.

(2) Where a school established before the commencement of this Act does not fulfil the norms and standards specified in the Schedule, it shall take steps to fulfil such norms and standards at its own expenses, within a period of three years from the date of such commencement.

(3) Where a school fails to fulfil the norms and standards within the period specified under sub-section (2), the authority prescribed under sub-section (1) of section 18 shall withdraw recognition granted to such school in the manner specified under sub-section (3) thereof.

(4) With effect from the date of withdrawal of recognition under sub-section (3), no school shall continue to function.

(5) Any person who continues to run a school after the recognition is withdrawn, shall be liable to fine which may extend to one lakh rupees and in case of continuing contraventions, to a fine of ten thousand rupees for each day during which such contravention continues.

Power to amend Schedule.

20. The Central Government may, by notification, amend the Schedule by adding to, or omitting therefrom, any norms and standards.

School Management Committee

21. (1) A school, other than a school specified in sub-clause (*iv*) of clause (*n*) of section 2, shall constitute a School Management Committee consisting of the elected representatives of the local authority, parents or guardians of children admitted in such school and teachers:

Provided that atleast three-fourth of members of such Committee shall be parents or guardians:

Provided further that proportionate representation shall be given to the parents or guardians of children belonging to disadvantaged group and weaker section:

Provided also that fifty per cent. of Members of such Committee shall be women.

(2) The School Management Committee shall perform the following functions, namely:—

(*a*) monitor the working of the school;

(*b*) prepare and recommend school development plan;

(*c*) monitor the utilisation of the grants received from the appropriate Government or local authority or any other source; and

(*d*) perform such other functions as may be prescribed.

School Development Plan.

22. (1) Every School Management Committee, constituted under sub-section (1) of section 21, shall prepare a School Development Plan, in such manner as may be prescribed.

(2) The School Development Plan so prepared under sub-section (1) shall be the basis for the plans and grants to be made by the appropriate Government or local authority, as the case may be.

Qualifications for appointment and terms and conditions of service of teachers

23. *(1)* Any person possessing such minimum qualifications, as laid down by an academic authority, authorised by the Central Government, by notification, shall be eligible for appointment as a teacher.

(2) Where a State does not have adequate institutions offering courses or training in teacher education, or teachers possessing minimum qualifications as laid down under sub-section *(1)* are not available in sufficient numbers, the Central Government may, if it deems necessary, by notification, relax the minimum qualifications required for appointment as a teacher, for such period, not exceeding five years, as may be specified in that notification:

Provided that a teacher who, at the commencement of this Act, does not possess minimum qualifications as laid down under sub-section *(1)*, shall acquire such minimum qualifications within a period of five years.

(3) The salary and allowances payable to, and the terms and conditions of service of, teachers shall be such as may be prescribed.

Duties of teachers and redressal of grievances

24. *(1)* A teacher appointed under sub-section *(1)* of section 23 shall perform the following duties, namely:—

(a) maintain regularity and punctuality in attending school;

(b) conduct and complete the curriculum in accordance with the provisions of sub-section *(2)* of section 29;

(c) complete entire curriculum within the specified time;

(d) assess the learning ability of each child and accordingly supplement additional instructions, if any, as required;

(e) hold regular meetings with parents and guardians and apprise them about the regularity in attendance, ability to learn, progress made in learning and any other relevant information about the child; and

(f) perform such other duties as may be prescribed.

(2) A teacher committing default in performance of duties specified in sub-section *(1)*, shall be liable to disciplinary action under the service rules applicable to him or her:

Provided that before taking such disciplinary action, reasonable opportunity of being heard shall be afforded to such teacher.

(3) The grievances, if any, of the teacher shall be redressed in such manner as may be prescribed.

Pupil-Teacher Ratio

25. *(1)* Within six months from the date of commencement of this Act, the appropriate Government and the local authority shall ensure that the Pupil-Teacher Ratio, as specified in the Schedule, is maintained in each school.

(2) For the purpose of maintaining the Pupil-Teacher Ratio under sub-section *(1)*, no teacher posted in a school shall be made to serve in any other school or office or deployed for any non-educational purpose, other than those specified in section 27.

Filling up vacancies of teachers

26. The appointing authority, in relation to a school established, owned, controlled or substantially financed by funds provided directly or indirectly by the appropriate Government or by a local authority, shall ensure that vacancy of teacher in a school under its control shall not exceed ten per cent. of the total sanctioned strength.

Prohibition of deployment of teachers for non-educational purposes

27. No teacher shall be deployed for any non-educational purposes other than the decennial population census, disaster relief duties or duties relating to elections to the local authority or the State Legislatures or Parliament, as the case may be.

Prohibition of private tuition by teacher

28. No teacher shall engage himself or herself in private tuition or private teaching activity.

CHAPTER V

CURRICULUM AND COMPLETION OF ELEMENTARY EDUCATION

Curriculum and evaluation procedure

29. *(1)* The curriculum and the evaluation procedure for elementary education shall be laid down by an academic authority to be specified by the appropriate Government, by notification.

(2) The academic authority, while laying down the curriculum and the evaluation procedure under sub-section *(1)*, shall take into consideration the following, namely:—

(a) conformity with the values enshrined in the Constitution;

(b) all round development of the child;

(c) building up child's knowledge, potentiality and talent;

(d) development of physical and mental abilities to the fullest extent;

(e) learning through activities, discovery and exploration in a child friendly and child-centered manner;

(f) medium of instructions shall, as far as practicable, be in child's mother tongue;

(g) making the child free of fear, trauma and anxiety and helping the child to express views freely;

(h) comprehensive and continuous evaluation of child's understanding of knowledge and his or her ability to apply the same.

Examination and completion certificate.

30. *(1)* No child shall be required to pass any Board examination till completion of elementary education.

(2) Every child completing his elementary education shall be awarded a certificate, in such form and in such manner, as may be prescribed.

CHAPTER VI

PROTECTION OF RIGHT OF CHILDREN

Monitoring of child's right to education.

31. *(1)* The National Commission for Protection of Child Rights constituted under section 3, or, as the case may be, the State Commission for Protection of Child Rights constituted under section 17, of the Commissions for Protection of Child Rights Act, 2005, shall, in addition to the functions assigned to them under that Act, also perform the following functions, namely:— 006

(a) examine and review the safeguards for rights provided by or under this Act and recommend measures for their effective implementation;

(b) inquire into complaints relating to child's right to free and compulsory education; and

(c) take necessary steps as provided under sections 15 and 24 of the said Commissions for Protection of Child Rights Act.

(2) The said Commissions shall, while inquiring into any matters relating to child's right to free and compulsory education under clause *(c)* of sub-section *(1)*, have the same powers as assigned to them respectively under sections 14 and 24 of the said Commissions for Protection of Child Rights Act.

(3) Where the State Commission for Protection of Child Rights has not been constituted in a State, the appropriate Government may, for the purpose of performing the functions specified in clauses *(a)* to *(c)* of sub-section *(1)*, constitute such authority, in such manner and subject to such terms and conditions, as may be prescribed.

Redressal of grievances.

32. *(1)* Notwithstanding anything contained in section 31, any person having any grievance relating to the right of a child under this Act may make a written complaint to the local authority having jurisdiction.

(2) After receiving the complaint under sub-section *(1)*, the local authority shall decide the matter within a period of three months after affording a reasonable opportunity of being heard to the parties concerned.

(3) Any person aggrieved by the decision of the local authority may prefer an appeal to the State Commission for Protection of Child Rights or the authority prescribed under sub-section *(3)* of section 31, as the case may be.

(4) The appeal preferred under sub-section *(3)* shall be decided by State Commission for Protection of Child Rights or the authority prescribed under sub-section *(3)* of section 31, as the case may be, as provided under clause *(c)* of sub-section *(1)* of section 31

Constitution of National Advisory Council.

33. *(1)* The Central Government shall constitute, by notification, a National Advisory Council, consisting of such number of Members, not exceeding fifteen, as the Central Government may deem necessary, to be appointed from amongst persons having knowldge and practical experience in the field of elementary education and child development.

(2) The functions of the National Advisory Council shall be to advise the Central Government on implementation of the provisions of the Act in an effective manner.

(3) The allowances and other terms and conditions of the appointment of Members of the National Advisory Council shall be such as may be prescribed.

Constitution of State Advisory Council.

34. *(1)* The State Government shall constitute, by notification, a State Advisory Council consisting of such number of Members, not exceeding fifteen, as the State Government may deem necessary, to be appointed from amongst persons having knowledge and practical experience in the field of elementary education and child development.

(2) The functions of the State Advisory council shall be to advise the State Government on implementation of the provisions of the Act in an effective manner.

(3) The allowances and other terms and conditions of appointment of Members of the State Advisory Council shall be such as may be prescribed.

CHAPTER VII

MISCELLANEOUS

Power to issue directions.

35. *(1)* The Central Government may issue such guidelines to the appropriate Government or, as the case may be, the local authority, as it deems fit for the purposes of implementation of the provisions of this Act.

(2) The appropriate Government may issue guidelines and give such directions, as it deems fit, to the local authority or the School Management Committee regarding implementation of the provisions of this Act.

(3) The local authority may issue guidelines and give such directions, as it deems fit, to the School Management Committee regarding implementation of the provisions of this Act.

Previous sanction for prosecution.

36. No prosecution for offences punishable under sub-section *(2)* of section 13, sub-section *(5)* of section 18 and sub-section *(5)* of section 19 shall be instituted except with the previous sanction of an officer authorised in this behalf, by the appropriate Government, by notification.

Protection of action taken in good faith.

37. No suit or other legal proceeding shall lie against the Central Government, the State Government, the National Commission for Protection of Child Rights, the State Commission for Protection of Child Rights, the local authority, the School Management Committee or any person, in respect of anything which is in good faith done or intended to be done, in pursuance of this Act, or any rules or order made thereunder.

Power of appropriate Government to make rules.

38. *(1)* The appropriate Government may, by notification, make rules, for carrying out the provisions of this Act.

(2) In particular, and without prejudice to the generality of the foregoing powers, such rules may provide for all or any of the following matters, namely: —

(a) the manner of giving special training and the time-limit thereof, under first proviso to section 4;

(b) the area or limits for establishment of a neighbourhood school, under section 6;

(c) the manner of maintenance of records of children up to the age of fourteen years, under clause *(d)* of section 9;

(d) the manner and extent of reimbursement of expenditure, under sub-section *(2)* of section 12;

(e) any other document for determining the age of child under sub-section *(1)* of section 14;

(f) the extended period for admission and the manner of completing study if admitted after the extended period, under section 15;

(g) the authority, the form and manner of making application for certificate of recognition, under sub-section *(1)* of section 18;

(h) the form, the period, the manner and the conditions for issuing certificate of recognition, under sub-section *(2)* of section 18;

(i) the manner of giving opportunity of hearing under second proviso to sub-section *(3)* of section 18;

(j) the other functions to be performed by School Management Committee under clause *(d)* of sub-section *(2)* of section 21;

(k) the manner of preparing School Development Plan under sub-section *(1)* of section 22;

(l) the salary and allowances payable to, and the terms and conditions of service of, teacher, under sub-section *(3)* of section 23;

(m) the duties to be performed by the teacher under clause *(f)* of sub-section *(1)* of section 24;

(n) the manner of redressing grievances of teachers under sub-section *(3)* of section 24;

(o) the form and manner of awarding certificate for completion of elementary education under sub-section *(2)* of section 30;

(p) the authority, the manner of its constitution and the terms and conditions therefor, under sub-section *(3)* of section 31;

(q) the allowances and other terms and conditions of appointment of Members of the National Advisory Council under sub-section *(3)* of section 33;

(r) the allowances and other terms and conditions of appointment of Members of the State Advisory Council under sub-section *(3)* of section 34

(3) Every rule made under this Act and every notification issued under sections 20 and 23 by the Central Government shall be laid, as soon as may be after it is made, before each House of Parliament, while it is in session, for a total period of thirty days which may be comprised in one session or in two or more successive sessions, and if, before the expiry of the session immediately following the session or the successive sessions aforesaid, both Houses agree in making any modification in the rule or notification or both Houses agree that the rule or notification should not be made, the rule or notification shall thereafter have effect only in such modified form or be of no effect, as the case may be; so, however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule or notification.

(4) Every rule or notification made by the State Government under this Act shall be laid, as soon as may be after it is made, before the State Legislatures.

THE SCHEDULE

(*See* sections 19 and 25)

NORMS AND STANDARDS FOR A SCHOOL

Sl. No.	Item	Norms and Standards	
1.	Number of teachers:		
	(*a*) For first class to fifth class	Admitted children	Number of teachers
		Up to Sixty	Two
		Between sixty-one to ninety	Three
		Between Ninety-one to one hundred and twenty	Four
		Between One hundred and twenty-one to two hundred	Five
		Above One hundred and fifty children	Five plus one Head-teacher
		Above Two hundred children	Pupil-Teacher Ratio (excluding Head-teacher) shall not exceed forty
	(*b*) For sixth class to eighth class	(1) At least one teacher per class so that there shall be at least one teacher each for—	
		(*i*) Science and Mathematics;	
		(*ii*) Social Studies;	
		(*iii*) Languages.	
		(2) At least one teacher for every thirty-five children.	
		(3) Where admission of children is above one hundred—	
		(*i*) a full time head-teacher;	
		(*ii*) part time instructors for—	
		(A) Art Education;	
		(B) Health and Physical Education;	
		(C) Work Education.	
2.	Building	All-weather building consisting of—	
		(*i*) at least one class-room for every teacher and an office-cum-store-cum-Head teacher's room;	
		(*ii*) barrier-free access;	
		(*iii*) separate toilets for boys and girls;	
		(*iv*) safe and adequate drinking water facility to all children;	
		(*v*) a kitchen where mid-day meal is cooked in the school;	
		(*vi*) Playground;	

Sl. No.	Item	Norms and Standards
		(*vii*) arrangements for securing the school building by boundary wall or fencing.
3.	Minimum number of working days/instructional hours in an academic year	(*i*) two hundred working days for first class to fifth class; (*ii*) two hundred and twenty working days for sixth class to eighth class; (*iii*) eight hundred instructional hours per academic year for first class to fifth class; (*iv*) one thousand instructional hours per academic year for sixth class to eighth class.
4.	Minimum number of working hours per week for the teacher	forty-five teaching including preparation hours.
5.	Teaching learning equipment	Shall be provided to each class as required.
6.	Library	There shall be a library in each school providing newspaper, magazines and books on all subjects, including story-books.
7.	Play material, games and sports equipment	Shall be provided to each class as required.

T.K. VISWANATHAN,
Secretary to the Govt. of India

विद्यया ऽ मृतमश्नुते

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NCERT

NORTH EAST REGIONAL INSTITUTE OF EDUCATION

(National Council of Educational Research and Training)
Umiam, Shillong-793103, Meghalaya

NATIONAL SEMINAR
ON
'NEW PERSPECTIVES OF HEALTH AND PHYSICAL EDUCATION IN SCHOOL'

CALL FOR PAPERS FOR PARTICIPATION

A national seminar on **'New Perspectives of Health and Physical Education in School'** is being organised by North East Regional Institute of Education, National Council of Educational Research and Training, Umiam-793103, Meghalaya for two days from 19-20 February 2014. Interested participants are requested to send their abstracts (500 words) and full papers (5000 words) to the Coordinator. The abstracts and full papers, that are to be sent in both hard and soft copies, should be related to the subthemes and will be published as books of seminar proceedings. On request from the presenting author, local free hospitality with TA will be provided. No registration fee is required. Last dates for —

- **Abstract submission: 15 November 2013**
- **Full paper submission: 24 December 2013**
- **Participation confirmation: 31 December 2013.**

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Other Exemplar Problems by NCERT

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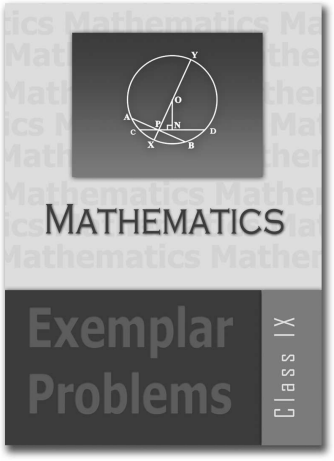
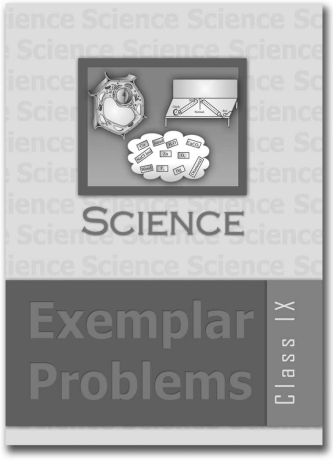
- Exemplar Problems in Physics for Class XI
- Exemplar Problems in Biology for Class XI
- Exemplar Problems in Mathematics for Class XI
- Exemplar Problems in Mathematics for Class XII
- Exemplar Problems in Chemistry for Class XI





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