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RESEARCH REVIEW ARTICLE

Research Trends in Environmental Education

RESEARCH PAPERS

Ethnopsychological Perspectives on Education for Adivasi Children in India

Creativity Amongst Children with Special Needs (CWSN): Tapping from School Teachers' Experiences

Impact of Storyline on Creativity among Middle School Children

Pre-service Teachers' Beliefs Concerning the Nature of Mathematics and Teaching-Learning of Mathematics

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EDITORIAL

This issue of *Indian Educational Review* carries one research review article on the theme of environmental education, four research papers, and one summary of ERIC projects.

Surveys of research are conducted periodically, in all disciplines at the global as well as national levels. These surveys present a viable and useful picture of the development in the discipline vis-a-vis social changes. The exercise tells us not only where the field has gone, but also gives hints as to where it may be going. In the discipline of education six surveys of research have been conducted so far. The sixth survey of research covered research studies conducted during 1993 to 2000. A need was felt to review the research conducted after 2000. Beginning with this issue, it is proposed to bring out surveys of research on one theme in the forthcoming issues of the Journal. The present issue contains a research article "Research Trends in Environmental Education" by Kavita Sharma. She has reviewed researches under six broad themes, namely awareness and attitude of students and teachers, curricular framework and material, such as syllabi, textbooks and teaching-learning material (TLM), teaching-learning process, teacher development including teacher education curriculum and training and policy and systemic issues. An attempt has been made to identify gaps and offer suggestions for future research.

Four research papers have also been included in this issue. The first paper by Girishwar Misra and Rishabh Kumar Mishra, entitled, "Ethnopsychological Perspectives on Education for Adivasi Children in India", is concerned with the education of tribal children and their social representation and emerging identities. The paper titled, "Creativity amongst children with special needs (CWSN): Tapping from school teachers' experiences" by Archana Kumari and Yukti Sharma explores teachers' perception about creativity among CWSN. Kusum Mary George and Basavarajappa in their paper "Impact of storyline on creativity among middle school children" have examined the impact of an intervention on enhancing creativity. The last paper titled "Pre-service teachers' beliefs concerning the nature of mathematics and teaching-learning of mathematics" by Charu Gupta and Jawaid Hussain is concerned with examining the pre-service teachers' beliefs about the nature of mathematics and its pedagogy.

The summary of an ERIC project titled, "Education of Girls: A Study of the National Programme for Education of Girls at Elementary Level (NPEGEL) in Manipur, Mizoram and Tripura" by Anita Nuna has also been included in this issue.

The *Indian Educational Review* focuses on enriching the discipline of education by disseminating findings of educational research, providing opportunities for exchanging research experience among fellow researchers, motivating academicians and providing inputs to all those involved in policy making and planning. Contributions of academicians, researchers, and freelance writers are cordially invited for the next issue. We seek your suggestions and views on improvement of the journal and research initiatives.

Academic Editor

INDIAN EDUCATIONAL REVIEW

The *Indian Educational Review* is a bi-annual journal, brought out by the National Council of Educational Research and Training (NCERT), New Delhi. The journal publishes articles and researches on educational policies and practices and values material that is useful to practitioners in the contemporary times. The journal also provides a forum for teachers to share their experiences and concerns about schooling processes, curriculum, textbooks, teaching-learning and assessment practices.

The views expressed by individual authors are their own and do not necessarily reflect the policies of the NCERT, or the views of the editor.

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Research Review Article

Research Trends in Environmental Education

KAVITA SHARMA*

ABSTRACT

With a global concern on education for sustainable development, during last few decades, different policy documents have highlighted the need to address it through education from time to time. In India, an important milestone in this direction is the judgment of the Honourable Supreme Court in 2003, which made environmental education mandatory at all levels. Following this, various educational bodies at the national and state levels took measures in this direction; be it development of curriculum, resource material, undertaking researches, extension, training or any other activities. This report is a systematic review of the researches conducted during 2000–2016 in India related to environmental education. It includes M.Ed. and doctoral theses, research articles, conference reports and research projects by different institutions and agencies. Divided into six broad themes, namely awareness and attitude of students and teachers, curricular framework and material such as syllabi, textbooks and teaching-learning materials (TLM), teaching-learning process, teacher development including teacher education curriculum and training, policy and systemic issues; each theme explores the trends of research in the area over the last one and a half decade. The research survey also highlights the gaps in studies under each theme and provides suggestions for future research on environmental education.

Introduction

Environmental consciousness has been a major theme of global discussions and deliberations. It is accepted that consciousness about the environment should prevail as a crucial imperative. In India, the first key step towards integrating environment and development was the establishment of National Council of

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Environmental Planning and Coordination, after the historic 'Conference on Human Environment', held at Stockholm in 1972. Subsequently, the Department of Environment was set up which was converted to a full-fledged Ministry. Various laws and regulations made from 1972 onwards provided the legal framework for environment protection. Later, the landmark National Forest Policy of 1988 was developed.

The five basic gross elements or the *panch mahabhoota* of nature: *akash* or firmament, *vayu* or air, *agni* or fire, *apah* or water, and *prithvi* or earth are considered auspicious since the ancient times in India. People were careful to refrain from activities that could cause harm to nature and its bounties. It was understood that the well-being of the Mother Earth depended on the preservation and sustenance of the environment. Mahatma Gandhi's Basic Education Scheme incorporated the elements of environmental consciousness and protection. Further initiatives included recommendations by the Education Commission (1964–66), the *National Policy on Education*, 1986 and POA 1992, emphasising on the need of addressing and including environmental concerns at all levels of schooling. The *National Policy on Education* (1986) states, *"There is a paramount need to create a consciousness of the environment. It must permeate all ages and sections of society, beginning with the child. Environmental consciousness should inform teaching in schools and colleges. This aspect will be integrated in the entire educational process"*. Consequently, Environmental Education (EE) has been one of the priority areas of concern in all the school curriculum development programmes at the NCERT (1975, 1988, 2000, and 2005). The Honourable Supreme Court of India, in its historic judgment of 18 December 2003, also directed that Environmental Education (EE) should be an integral and compulsory part of the school curriculum from Classes I to XII. The *National Curriculum Framework 2005* endorsed the infused and integrated approach to (EE) laying great emphasis on habitat of students and its relation with learning. It states *"…today formal education has largely become alienated from the habitat of the students. But the environmental degradation proceeds at an unprecedented pace. We are beginning to realise the importance of taking good care of our habitat. Humankind must therefore make an attempt to comprehend its roots, to re-establish links with its habitat, and to understand and take good care of it. In substance and spirit, then the theme, 'Habitat and Learning' is equivalent to EE"*.

International Scenario

In 1992 the Rio Earth Summit took cognizance of the need to take action in 'every area in which human impacts on the environment'. Efforts to bring about a shift in 'educating about the environment' to 'educating for sustainability' were reflected in the World Summit on Sustainable Development (WSSD) in Johannesburg in 2002. This brought a shift in the international climate of thinking about Sustainable Development as *'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'*. It led the urgent need for everyone to be sensitised about continuous and over exploitation of our natural resources in the name of development that brought the future of humanity and of this planet at stake. Ensuring environmental sustainability was also one of the eight international development goals that 191 nations and 22 international organisations committed to help achieve by 2015.

Recognising education as a critical means to achieve sustainability, the United Nations launched the 'Decade of Education for Sustainable Development (DESD)' in 2005. The goal of the decade (2005–2014) was to integrate the principles, values and practices of Sustainable Development into all aspects of education and learning in order to encourage behaviour that will create a more sustainable future in terms of environmental integrity, economic viability and a just society for present and future generations (UNESCO, 2005). A key objective of the UNDESD was to foster better quality teaching and learning for Education for Sustainable Development (ESD). This calls for a reorientation of thinking and practice of formal education—including curriculum's teaching-learning approaches and assessment.

The end of the decade was marked by the UNESCO World Conference on Education for Sustainable Development (ESD) in 2014 which proposed Aichi-Nagoya Declaration on Education for Sustainable Development, inviting governments *'to reinforce the integration of ESD into education, training, and sustainable development policies'* with UNESCO as the lead agency. As official follow-up to the DESD, UNESCO launched the Global Action Programme (GAP) for ESD to scale up action on ESD worldwide. It was intended to reorient education and learning so that everyone has the opportunity to acquire the values, skills and knowledge that empower them to contribute to sustainable development; and emphasise it in all relevant agendas, programmes and activities

that promote sustainable development. Thus, accomplishing the objectives through empowerment and mobilisation of the youth, public awareness initiatives for people of all ages and building capacities of educators and trainers by transforming learning and training environments with policy reforms, GAP aims to help individuals understand, devise and implement sustainable solutions for solving the complex problems presented by climate change solutions at local levels.

In August 2015, 193 countries agreed on 17 Sustainable Development Goals (SDGs) in which ESD is explicitly recognised in the Sustainable Development Goals as part of Target 4.7 which states *"By 2030, ensure that all learners acquire knowledge and skills needed to promote sustainable development, including, among others"*. Thus, ESD is an essential tool to develop sustainability competencies in learners as specific cognitive, socio-emotional and behavioural learning outcomes to enable them contribute to sustainable development through societal, economic and political change as well as by transforming their own behaviour and thus accomplish the SDGs. Such an education goes beyond the formal curriculum to provide holistic experiences that are not confined to the classroom but are part of the learning in the school and the community of the students. The learning is linked to real life, and activities require application of knowledge and skills in real situations. Such an education requires leadership that places sustainability at the heart of policy planning and practice, and that engenders democratic and participatory decision-making process.

The Present Review

The six educational research surveys conducted in the past did not focus much on this area except the fifth survey, which too concluded that researches conducted on Environmental Education (EE) are inadequate and recommended their promotion across all levels and regions. It suggested apportionment of content at all levels in education and implementation of a well-planned national programme in this direction.

The present report is based on researches from 2000–2016, predominantly relating to the Indian context. It includes doctoral theses, research articles, conference reports, and research projects undertaken by different institutions and agencies besides M.Ed. dissertations submitted to universities. Data collection process included web surfing, correspondence to all the central and some state

universities through letters, fax messages and emails. The list and addresses of the universities were procured from the UGC website. Field visits to the libraries of different institutions, universities in Delhi and outside were made during October-November 2016. These were NCERT, NEUPA, Delhi University, Jamia Millia Islamia, Jawaharlal Nehru University, B.R. Ambedkar University, Centre of Science and Environment, Teri University and Indraprastha University in Delhi. Besides this, visits to CEE, Ahmedabad, MS University of Baroda, Central University of Gujarat and Gujarat University were also made. Collection of articles, research papers, conference proceedings, M.Phil. Dissertations, Ph.D. theses, etc., was carried out during these visits. Correspondence through letters and emails also enabled to gather details from the universities and other research institutes. A detailed survey of literature, primarily Indian studies, through internet using search engines/sites, *viz.* Sodhganga, Economic and Political Weekly, Google Scholar, JStor, Mendley, Sage Journals, Academic.edu, Elsevier, Scrib, Taylor and Francis, Research Gate, books and journals was conducted and a number of articles, research papers on Environmental Education conducted during 2000 to 2016 were collected. Key words such as environment, environmental education, curriculum, awareness and attitude, policy and programmes, education for sustainable development, learning of/for/through environment projects, classroom processes, India, etc., were used. Articles were selected as per the following criteria: (a) the articles related to the environmental education; (b) the articles addressing issues related to environmental challenges and promoting environmental education; (c) the curriculum and policy and programmes on environmental education used in India; and (d) the articles on studies of environmental education at the school level. The material collected was systematically listed.

Data analysis began in the month of December 2016 and six broad themes; (1) Environmental Awareness, Attitude and Sensitivity among Students; (2) Curriculum Framework, Curricular Material and School Environment; (3) Teaching Learning in EE; (4) Awareness and Attitude of Teachers and Teacher Educators; (5) Teacher Development and (6) Policy and Systemic issues were identified. These were further classified into sub-themes and the data collected was segregated and classified into these categories.

The research articles, reports and M.Phil. and Ph.D. theses were carefully examined and a gist was prepared. Relevant sections

were highlighted using colour coding for segregation of qualitative data into these categories. Finally the report was compiled so that the succeeding sections deal with the trends of researches on EE and its related areas from 2000–2016. There are six broad themes, which were categorised into sub-themes. The sections have been organised in a bottom-up approach, i.e., starting with the Awareness and Attitude of students, moving on to Curriculum/Curricular Framework and Curricular Material such as Syllabus, Textbooks and Teaching-Learning Materials (TLM), then assessing the transactional aspect of the curriculum, i.e., the Teaching-Learning Process, further moving on to the Awareness and Attitude of the Teacher, then looking at Teacher Development which includes Teacher Training and Teacher Education Curriculum and lastly evaluating the top-level perspectives —Policy and Systemic Issues. Each thematic sub-section explored the trends of the EE researches, which have been analysed with regard to how they are connected or related to one another in terms of being similar or different. Further, an attempt was made to look at the recommendations of the researches under each sub-theme and also to point out the gaps therein. The research review concludes by pointing out the overall gaps in the studies and giving suggestions for future research on Environmental Education.

Environmental Awareness, Attitude and Sensitivity among Students

One of the fundamental goals of Environmental Education (EE) is to equip students with the skills to enable them to make more thoughtful decisions on environmental issues (Arvai et al., 2004). Children display sensitivity to protection of the living beings besides participating in their conservation and protection activities. Being tomorrow's leaders, they not only constitute an important audience for environmental education but can influence parents and community too. Sensitivity, knowledge, behaviour and action are crucial to establishing sound basis for Environmental Education in schools (Jeronen and Kaikkonen, 2002). Transformation of awareness and knowledge into right attitudes, values and behaviour is a long-term process that requires sustained interventions for a long time (Sampath and Sundaramoorthy, 2014). There is a positive relationship between environmental awareness and environmental attitude. Abraham and Arjunan, (2005) observed a highly positive and significant correlation between environmental interest and

environmental attitude whereas Schmidt's (2007) experimental study found a positive correlation between attitude and behaviour. Negev et al. (2008) conducted a national survey on 6th and 12th grade students in Israel for environmental knowledge, attitudes, and behaviour, and found no significant correlation between knowledge and behaviour. The researchers also found that the presence of an adult who mediated children's relation to nature was strongly related to environmental attitude and behaviour formation.

Most of the studies reflect a good level of environmental awareness among the students, except Chaudhary (2004) who found that the factual and conceptual environmental knowledge among the secondary school students of Vadodara was average. Sudhir (2013) found that the students in Tamil Nadu were aware of the environmental issues and participated in environmental programmes. Sahaya and Paul (2005) observed that students, in general, had an above average level of environmental awareness. Shair and Akhter (2012) found that in the state of Jammu and Kashmir, environmental awareness was far below in adolescents as compared to the students enrolled in higher education, who exhibited satisfactory environmental knowledge and skills. Shobeiri and Prahallada's (2006) comparative study on environmental awareness among secondary school students in India and Iran found significant difference in the levels of environmental awareness of the students of the two countries. The study concluded that the number of students with average level of environmental awareness in India (44%) is more than their counterparts in Iran (14.9%), whereas the number of Iranian students with high level of environmental awareness (85.10%) is more than that of Indian students (56%). Raina (2015) revealed that senior secondary level students were environmentally more aware than high school level students, whereas Kaur and Kaur (2009) found no difference in the level of awareness among secondary and senior secondary students.

Studies reveal significant correlation between the effect of socio-economic factors and environmental awareness, attitude and behaviour. Negev et al. (2008) study on 6th and 12th grade students in Israel observed associations with demographic and experiential data, and concluded that ethnic and socio-economic characteristics were moderately associated with environmental literacy. Khan (2013) found that socio-economic factors such as demographic change, social change, gender and divisions of labour, health, education, knowledge and information, poverty,

economic change, technological change have a positive impact on environmental management. Sahaya and Paul (2005) also reported that factors like locality of school, caste of the students within the group influenced the environmental awareness among the students. Chethana (2003), however, found that different levels of socio-economic status and locality of school did not account for significant difference in the environmental awareness and attitude of secondary school students. Indupalli et al. (2015) reported significant linkage between literacy status of mother and students' environmental awareness. Although Bharambe (2013) observed that parents' qualification did not affect the level of awareness but found children of farmers were environmentally more aware than others. Sahaya and Paul (2005) found no impact of religion, family and its size and observed that these factors have no effect on the environmental awareness among students. Most studies found urban students and those studying in private schools having better awareness as compared to the rural children and those studying in government schools (Abraham and Arjunan, 2005; Rout and Agarwal, 2006; Raina, 2015). Rathore (2000) compared the achievement of urban and rural children at the primary level from non-formal education centres and formal primary centres of Khandwa district in the subject Environmental Studies, and found that boys and urban students outperformed girls and their rural counterparts.

There are contradictory findings with respect to the influence of gender on environmental awareness. While a set of studies (Abraham and Arjunan, 2005; Tripathi, 2000; Rathore, 2000) found boys in schools having more environmental awareness as compared to their female counterparts, Raina (2015) reported that girls at the high school demonstrate better environmental awareness than boys at the same level, which is in consonance with Shobeiri's (2005) study in the context of Iran and India. A few studies (Bharambe, 2013; Kaur and Kaur, 2009; Larson, 2010; Rout and Agarwal, 2006; Sahaya and Paul, 2005), however, revealed no effect of gender on environmental awareness.

With regard to the subject background, there were contrary findings. Rout and Agarwal (2006) reported that science stream students have better environmental awareness and environmental attitude in comparison to the students of non-science stream. Another study (Kumar and Patil, 2007) on postgraduate students also revealed the same results, thereby showing that subject

stream influences the awareness and attitude of the students towards environmental issues. However, a study by Tripathi (2000) gave contradictory findings as it revealed arts students had higher environmental awareness than science students. There was no difference in environmental awareness of students between central schools and other schools. Sahaya and Paul (2005) observed that medium of instruction also influenced the environmental awareness among the students, and the domination of English medium over Urdu and Kannada medium was observed by Indupalli et al. (2015) for enhancing environmental awareness of students from Gulbarga in Karnataka state.

Shobeiri (2005) and Chaudhary (2004) found that environmental attitude of secondary school students of Vadodara were average. A year later, a comparative study between India and Iran by Shobeiri (2005) concluded that in both India and Iran students studying in Class X exhibited more favourable environmental attitude than Class IX students wherein girls showed better environmental attitude than boys in both the countries. Also secondary students of Iranian government school exhibited enhanced environmental attitude than private school students, whereas Indian private school students were better as compared to those from the government schools. Regarding type of school management and its effect on environmental attitude of school students, Shobeiri (2005) revealed that it affects Environmental Attitude of students, which was opposite to the findings of Chethana (2003) study that found no significant effect of type of school management on the environmental attitude of secondary school students.

Several quantitative studies across disciplines have investigated children's knowledge and attitudes (Strife, 2012) about environmental problems and few examined children's feelings and even fewer focused on children's point of view. Sinha and Taneja (2012) revealed that primary school students with internal locus of control exhibited better environmental sensitivity than those with external locus of control. Exploring children's feelings, Strife (2012) found that majority of children expressed fear, sadness and anger on environmental problems. Majority of them shared apocalyptic and pessimistic feelings about the future state of the planet. The eco phobia among children may have serious implications for their participation in environmental stewardship and conservation efforts.

Sudhir (2013) found that the students in Tamil Nadu were aware of the environmental issues. However, there is a huge gap between

awareness and action for environment protection and conservation in schools. With respect to gender, Sinha and Taneja (2012) found girls exhibiting better environmental sensitivity and responsible behaviour than the boys. Except Rathore (2000) and Kumar and Patil (2007), all the studies were conducted on students from high school to those at the higher secondary stage.

In summary, largely the studies have examined the students' environmental awareness and attitude at the secondary level. Little attempt has been made to study the environmental awareness among children at the primary stage. Quite a good number of the researchers studied the impact of socio-economic and demographic variables on environmental awareness and attitude of students whereas only one study analysed the correlation between environmental awareness, attitude and behavioural aspects among students. Hardly any efforts to understand the development of environmental skills among children at various stages are made. More studies involving children at the early grades and primary stage can help understand the young minds to address the issue at the foundation level.

Curriculum Framework, Curricular Material and School Environment

The knowledge, skills and dispositions that students acquire are largely picked up from the milieu, which includes their home, school and society. A huge onus is on school education and therefore, the curriculum needs to be such that it provides scope and capacity to transform children into responsible global citizens. This section evaluates and analyses the studies centered on curriculum and curricular materials such as syllabi, textbooks and other teaching-learning materials (TLM), school infrastructure and school environment in the area of environmental education.

Curriculum

A sizeable number of studies have analysed the curriculum (Dutta, 2013; Iyengar and Bajaj, 2011). Some studies compared the curriculum of different states in India with the one at the national level, whereas others compared the Indian curriculum with those from other countries. Highlighting the curricular burden on young children at the primary stage, Kaur and Sharma (2016) noticed that environmental studies (EVS) was perceived as science whereas social science was being taught as a separate subject in Delhi

state government schools. The approach was against the *National Curriculum Framework 2005*, which envisages Environmental Studies, a separate subject integrating science and social science. However, Thakur (2007) disagreed with the integrated or infused approach to EE and states that contents of EE get diluted when these are infused with the rigid concepts of science and social science in textbooks and curricular materials. Pynae (2006) states that in the light of the fact that individuals, teachers, researchers and schools actively construct and give meaning to human–environment interactions and relations, a humanly constructive approach (by bringing real authentic life into the process of learning) to reflexive inquiries is a creative, practical, enabling and non idealistic solution that curriculum theorists now need to consider for education for the environment.

Iyengar and Bajaj (2011) observed a large gap between the environmental education in Madhya Pradesh State curriculum and that recommended by the NCERT at the national level across all grades in terms of contextual linkages and interdisciplinary aspects. Dutta (2013) too noticed gaps in Assam State school curriculum for Environmental Studies in Barak Valley and found that environmental studies at national level includes more social science dimensions but the state curriculum does not give sufficient attention towards this. Studies by Jerath (2005) and Tapasya (2014) looked at the curriculum from a comparative perspective. Tapasya (2014) compared the environmental education curriculum at primary level in India against the Finland curriculum (considered of high quality as per the OECD) and found that India's EVS curriculum is not at par with it. It considered the Finland EVS curriculum to be superior in terms of making students both aware and responsible towards environment, whereas the Indian curriculum lacked clarity in aims, content, pedagogy and assessment. Jerath (2005) examined the general framework of EE in Technical Vocational Education (TVE) system at the secondary school level in five countries – China, India, Indonesia, Malaysia, and the Philippines and found that EE had not been adequately addressed and there were gaps in the current structure.

Some studies put forward an international perspective for countries ranging from Singapore (Kwan and Stimpson, 2003), Poland (Domka, 2004) and New Zealand (Chapman, 2011). Kwan and Stimpson (2003) found three underlying themes: a pragmatic utilitarian concern for the urban environment of Singapore; a

school and examination system that is still largely focused towards traditional disciplinary knowledge; and the overriding influence of government and the balance that it priorities between environment, economic development, social stability, nation building and external image as the context variables that helped shape the environmental curriculum in the schools of Singapore. Both Domka (2004) and Chapman (2011) presented unsatisfactory state of EE curriculum in Poland and New Zealand respectively. On emergence of EE in the curriculum discourse in New Zealand, Chapman (2011) observed that the curriculum, by itself, provides little concrete guidance for teachers.

As per the NCERT studies (2011–12, 2012–13 and 2013–14) on monitoring the EE implementation, three-fourth of the stakeholders agree that the school curriculum addresses the environmental concerns. Vishvasrao (2005) suggests that to bridge the gaps in environmental awareness and environmental education, the science education curriculum needs to focus on naturalistic view than creationism; help students develop a holistic understanding of environment with eco-friendly habit inculcation right from the early stages of school.

Textbooks

A number of studies (Banerjee, 2005; Gopal and Anand, 2005; Kaur and Sharma, 2016; Prakash, 2008; Rani, 2016; Saini, 2012; Shrivastava, 2007; Varghese, 2008) analysed the NCERT textbooks for EE at different stages. Almost all the studies found NCERT textbooks in consonance with the ethos of EE. Varghese (2008) found that the content of NCERT EVS textbooks for Classes III–V incorporates the objectives of EVS curriculum under NCF 2005, identified by a good EVS programme. Saini (2012) too observed them in accordance with the Piaget and Vygotsky theories for which contextual teaching-learning can realise the intended curricular objectives. Kaur and Sharma (2016) mentions that in spite of the EVS textbooks being in tune with the EE principles, as per the textbook writers' opinion, the teachers teaching EVS are unable to locate the social sensitivities embedded in NCERT EVS textbooks at the primary stage. Teachers also felt the EVS syllabus to be bulky with lengthy chapters that lack relevant content. However, for the NCERT science textbooks of Class IX and Class X, Rani (2016) did not give a satisfactory picture and observed that scientific concepts linked with environmental issues and concerns have been dealt with in a very limited way.

Some studies gave the perspective of textbooks from different States whereas others provided their comparative view with that of the textbooks of NCERT at the national level. Gopal and Anand (2005) concluded that national level and school textbooks of different states treated EE as secondary to other scholastic areas, which is against the recommendations of the *National Curriculum Framework 2005*. A comparative analysis of the EVS textbooks on Classes III–V of NCERT and SCERT, Delhi for the consistency of content and its organisation by Shrivastava (2007) found that both are based on Vygotsky's assumptions of learning. The textbooks of Rajasthan (EVS textbooks) although included environmental concepts but lacked on several important themes both at the primary and the upper primary levels (Science textbooks) (Prakash, 2008). However, Singh (2011) did not notice gaps in the content of Class VII, General Science textbooks of Rajasthan Board of Education and found it to be environment oriented, thus, aiming to develop basic awareness and understanding of the environment among learners. Additionally, Jaiswal (2006) found that the content of the textbook of environmental science of Class IV Gujarat State Education Board textbooks was not in accordance with the abilities and interest of the students. The study by Banerjee (2005) specifically looked at the inclusion of disaster education in Indian school curriculum and found that it was introduced as part of the educational reforms in 2000, before India's experience with Tsunami. However, greater impetus to disaster education in school curriculum was given post tsunami experience.

TLM and School Infrastructure

A number of studies have examined Teaching Learning Materials (TLM), which varies from cartoon and comics based multimedia package (Kaptan, 2001), instructional package (Pillai, 2012; Sharma, 2005) computer assisted instruction (Aivazidis et al., 2006) and folk music (Dey, 2014). These materials were effective in enhancing achievement (Kaptan, 2001; Pillai, 2012) of students as well as promotion of understanding and sensitivity towards environment among children at upper primary stage (Sharma, 2005). Aivazidis et al. (2006) found that students who received computer assisted instruction outscored their peers who were taught traditionally on knowledge and attitude of environmental issues.

Assessing the status of school environment and sanitation in rural Indian schools for appropriateness and adequacy of various

attributes, Majra and Gur (2010), indicated that one fourth of the schools were sited at inappropriate places and only half of the schools had appropriate and adequate structure. On drinking water availability (90%) and cleanliness (80%) of the school compound the schools were good, whereas for natural light (70%), ventilation (60%) and separate toilets for boys and girls (60%), the performance was satisfactory and performed badly on Liquid (30%) and solid waste disposal (40%) and hand-washing with soap (10%). There were no separate rooms for serving the midday meals in any of the schools under study and many (90%) of the schools were overcrowded.

Several studies made recommendations with regard to curriculum framework, curriculum materials and TLMs. Some of these are general in nature while some others are very specific. A couple of studies made recommendations with regard to state level curricula and related materials. Gopal and Anand (2005) advocates redesigning the curriculum and the curricular material so as to address the anomaly of EE being treated secondary to other scholastic areas. Domka (2004) proposes redesigning the curriculum and provision and usage of appropriate TLM to improve EE. Rani (2016) suggests that the science curriculum be transformed to include the emerging issues of the environment. Ranganathan (2005) proposes that indigenous knowledge should be placed at the heart of the process of education for sustainable development (ESD) and the same may be facilitated through Information and Communication Technologies.

Some state specific studies recommend inclusion of more concepts, Dutta (2013) advocated for relating human relationships with environment in the Assam State curriculum, and Prakash (2008) sought improvement in environmental concepts in the existing EVS textbooks at primary stage in Rajasthan. Redesigning of curriculum of EE at the international level has been suggested (Jerath, 2005). Jerath (2005) further seeks UNESCO like organisations to take lead to develop policy guidelines and standardised core curriculum, to ensure uniformity internationally.

A good number of studies examined the curricula, textbooks and other Teaching Learning Material (TLM) for the EE component. Some of them compared the State curricular material with that at the national level and others compared it across different countries. There are mixed observations on the EE curricula and material, some showing consonance and others depicting deviations from

the ethos of EE. Overall, the studies recommended a pragmatic, rational and utilitarian approach to EE in school curriculum, which is guided by EE principles at its core and rooted in the contexts.

Teaching-learning in Environmental Education

Curricular intentions can only be realised if its transaction occurs in a desired manner, which depends largely on teachers' understanding of the curriculum and its objectives, the processes of teaching-learning employed by them including the availability and usage of appropriate resources through meaningful strategies or practices in an apt school and the classroom environment. There is a need for stressing the importance of environmental awareness in an educational setting in order to benefit both student knowledge and future welfare of the greater population (Schdmit, 2007). Covitt et al. (2009) established that interconnections between different domains of the environment (e.g., between physical and the natural environment) need to be built in order to achieve the curricular goals of EE. This section covers the studies on teachers' perceptions and their understanding of EE curriculum, diverse pedagogical approaches on transaction of EE curriculum, role of physical setting and school architecture.

Teacher's Perceptions and Understanding of the EE Curriculum

In order to ensure implementation of EE Curriculum it is important that the teachers understand the curricular intentions as envisaged in the curriculum framework. The teachers' perceptions on environmental education also play a key role on how students learn, retain and apply the knowledge, attitudes and skills in changing their perceptions of their environment. However, Sharma (2016) reported a limited understanding of EE with regard to curriculum transaction among different stakeholders implementing EE. Paul (2008) too observed the same in a public school in Texas, USA. Sharma and Devi (2012) found teachers teaching early grades lack an understanding of integrated approach to teaching-learning of EVS as suggested by the *National Curriculum Framework 2005,* although all of them believed that integrated approach will address the curriculum load and help children in learning. Thakur (2007) mentioned that subject specialisation of the teachers influenced their views to a great extent in the teaching of EE. Primary school teachers with science as subject background are more competent in

teaching EVS in primary grades than the teachers having language or other subjects as their subject background. It has been reported that primary teachers across schools lacked in their understanding of EVS curriculum (Kaur and Sharma, 2016; Sharma and Devi, 2012). However, the factors affecting the pedagogic practices of teachers are rooted in the understanding they possess for the subject of EVS.

Teaching-learning Approaches and Physical Settings

Strife (2010) considers it necessary to reflect on the pedagogical practices, and mentions that EE pedagogies are not 'one size fits for all', thereby calls for humanisation of environmental education discourse and pedagogical practices. Kopnina (2014) explores a number of questions about visions of the future and their implications for EE. It discusses EE/ESD approaches for three future scenarios; the limits of growth, sustainable development and ecological modernisation and advocates education for deep ecology in order to address the ethical implications. Joy (2005) recommends scientific education about techniques and skills needed to protect the environment rather than merely creating environmental awareness and providing information about the same. In general, the studies reflect dominance of teacher centric classrooms and subject specialisation of the teacher influenced their views to a great extent in the teaching of EE (Kaur and Sharma, 2016; Sharma, 2011; Thakur, 2007). Most teachers from both government and private secondary schools use lecture and discussion methods for teaching environmental topics with very less or no inclusion of activity or project based methods. Sharma (2011) and Kaur and Sharma (2016) observed poor pedagogic practices, as classroom teaching-learning was restricted to reading out the text either by the teacher or by students with teachers explaining its literal meaning. They further mentioned that no planning and preparation for the transaction of the textbook chapters as per the curricular objectives is ever made. A similar trend across the pre-schools of Poland by Domka (2004) was observed, where unsatisfactory state of the form of environmental education taking into account children's achievements was witnessed. Sharma (2011) found that most teachers do not use innovative and activity based pedagogical methods for teaching environmental education in class; lecture cum discussion methods for teaching environmental topics is used with very less or no inclusion of activity or project based

methods. Researchers attribute this to the inability of the teachers to understand and use contextual methodologies. It has also been pointed out that the ineffective transaction is due to transfer of concepts and methodologies of EE from the developed countries.

a. Whole School Approach

Judicious use of all school resources both physical and natural (school building and energy resources), adopting collaborative means to involve the entire human resource (staff, students, their parents/guardians and community) and directing the teaching-learning practices for environmental sustainability are envisaged under whole school approach. Nemati (2008) discusses ways through which environmental education could enter schools, and school curriculum in Iran using whole school approach in organisational principles, operational principles and physical surroundings of school. Sharma (2016) suggests the same in the Indian context through a case study of two green schools. However, she observed that green practices lack a holistic vision and hence reflect a poor understanding of the Education for Sustainable Development (ESD) among different stakeholders in school education. A case study by Schelley et al. (2012) of a US public high school illustrates that charismatic and role model leaders, and effective communication among multiple aspects of modeling helps to create synergistic relationship between conservation efforts and EE.

b. Integrated Approach

A few studies have examined the effectiveness of integrated approach in implementing EE in schools. Sharma (2009) highlights the scope and issues of Environmental Education for the approaches of infusion, integration and a separate subject against the nature of EE for the multidisciplinary and interdisciplinary aspects. Sharma (2013) through examples in language and mathematics demonstrated how integrated approach to EVS in early grades can help address the curriculum load without compromising with environmental concerns as mandated under NCF, 2005. Sharma and Devi (2012) observed that Kendriya Vidyalaya primary teachers teaching early grades believe that integrated approach can address the curriculum load and help children learn EE better. Studies (Beth, 2008; Wammer et al., 2010) also observed that by integrating environmental focus to chemistry course the students gained knowledge of general chemistry and exhibited greater

concern for the environment. Schdmit's (2007) experimental study found that a separate introductory environmental course increased pro-environmental attitudes and behaviour of university students enrolled for it as compared to the students who were not enrolled.

c. Field Based Approach

A number of studies (Carrier, 2009; Paul, 2008; Farmer et al., 2007; Larson, 2010; Mehra and Kaur, 2012; Vaske and Katherine, 2001) support the idea that EE teaching-learning is effective in outdoor, natural and field-based open settings as compared to that in the conventional classroom situations. Mehra and Kaur (2012) found that teaching environmental education by outdoor programme enhanced responsible environmental behaviour of Class V students as compared to students taught by traditional method. Carrier (2009) observed significant gain in scores of primary students provided with outdoor EE lessons in schoolyard as compared to those in traditional classroom settings. Farmer et al. (2007) established that school field trips help children retain environmental knowledge gained and also build pro-environmental attitudes, behaviour and values among elementary students. The environmental education programmes conducted in local natural settings built an individual's emotional connect to a natural environment and helped them realise that their actions can make a positive difference in their own community which facilitates the development of environmentally responsible behaviour (Vaske and Ketherine, 2001). Mehrotra (2015) seeks involvement of community and creating public awareness to understand the local environmental problems and devise solutions accordingly.

d. Inquiry Approach

Joy (2005) states that scientific education about techniques and skills needed to protect the environment is crucial rather than merely creating environmental awareness and providing information about the same. The use of questioning in environmental science classrooms was effective in enhancing thinking skills among primary students (Dutta, 2002). Further, the inquiry based constructivist approach facilitates students better for developing understanding of environmental concepts, issues and concerns (Rajendran, 2012).

e. Settings and School Architecture

The studies establish that the school building and its architectural aspects play a significant role in EE teaching-learning, where students not only prefer an open plan setting but also enjoy their time in comparison to those who attended conventional classrooms. Gislason (2009) observes that a school with open plan architecture facilitates collaborative, multidisciplinary teaching practices suited to the environmental studies curriculum, and positively contribute to the social climate as it enables better peer interaction than would be possible in a more enclosed environment. Findings of Vaske and Katherine (2001) also support the same. Riordan and Klein (2010) established that professional development; immersion into real world tasks, inquiry based learning, ongoing support at school and connection to a broader world through authentic action are key aspects of Expeditionary Learning (EL) under environmentally sustainable school practices. However, lack of awareness and obstacles prevent teachers from employing outdoor field exploration methods (Paul, 2008). Eilam and Trop (2011) found that the EE/ESD programmes implemented in Israel school education elicited pro-environmental behavioural changes regardless of the differences in programmes of the four pedagogical essentials, namely 1) traditional academic style of teaching and learning: non natural learning 2) multidisciplinary learning (inter and/or cross disciplinary) 3) multidimensional learning and 4) emotional learning, were co implemented.

f. Going Beyond the Textbooks

In addition to field based experiences and organising teaching-learning in open settings, studies also advocate to go beyond the textbooks to help children connect and learn through their experiences in daily lives (Sharma, 2013). Using innovative approaches with focus on environment action within educational institutions deepens the understanding of environment and opens the minds of students that no bookish knowledge could do (Gopal et al., 2008). Lalam's (2008) experimental study on Class VII students in Andhra Pradesh endorses inculcation of environmental values through co-curricular activities. However, Kaur and Sharma (2016) hardly witnessed any efforts by the teachers in the classrooms to go beyond the textbook and observed that any activities beyond reading and writing were barely encouraged.

g. TLM and its Use

In their study, Kaur and Sharma (2016) found that the teachers felt that the textbooks lacked content, and opined that they contained only social messages. However, when asked, they could not even locate the social sensitivities embedded in the textbooks. Saini (2012) and Bokolia (2012) analysed the NCERT EVS books and found the teacher's role to be that of a facilitator, who needs to focus on the processes of learning to enable children to think, compare, classify, estimate, observe, hypothesise, debate, discuss, explore and engage in hands on activities and interact and communicate with the environment.

A variety of teaching-learning material besides textbooks has been found to be effective. Folk music and folk songs helped students to acquaint with their own culture and be sensitised for the environmental issues (Dey, 2014). Cartoon based learning material enhanced achievement of the students in environmental science in comparison to the traditional method of teaching (Aivazidis et al., 2006; Kaptan, 2001; Pillai, 2012). A similar trend was observed for student teachers (Shamsha, 2011), and the use of cartoon analysis task enabled them to think beyond the textual information that led them to think, discuss, question and observe during the entire session enabling their active participation in class.

Studies (Ramkumar, 2003; Sharma, 2005; Suneetha, 2000) that looked into the effectiveness of instructional packages in environmental studies found the packages to be effective in facilitating the teacher in enhancing teacher-pupil interactions for the acquisition of process skills and promoting better awareness and attitude towards environment besides increasing sensitivity among primary and upper primary students. Sandraanne (2007) established participation in the activities conducted during the environmental education programme led to development of connection, caring and concern for other species. Interventions lead to knowledge enhancement and have a desirable impact on students but that should be of short duration and must be accompanied with appropriate training (Sampath and Sundaramoorthy, 2014). However, Kaur and Sharma (2016) did not find usage of any material except blackboard and chalk for teaching-learning of EVS in the primary classrooms. Bharucha (2005) recommended that materials other than the textbook be used for teaching-learning about the environment. Mehra and Kaur (2012) recommend using outdoor programmes for environmental education especially

during primary stage as young children are active learners and they learn best using hands-on and through interactive play and self-discovery. Dogra (2013) recommended that science teachers across the country should use observation, analysis, interpretation, explanation and finally making broader generalisations in their classroom pedagogy to provide every student with optimal learning environment. Domka (2004) sought improvement in pedagogical approaches in EE in Poland.

Overall, the studies advocate adoption of a variety of pedagogical approaches that encourage students to use different resources beyond classroom that are located in their real life situations. However, for the school settings and architecture, more studies are required in the Indian context. Further, more studies on teacher perceptions and understandings of the EE curriculum and pedagogies can provide better insights for innovations in teaching-learning.

Awareness and Attitude of Teachers and Teacher Educators

Environmental awareness and attitude of teachers have a direct bearing on their teaching-learning practices thus influencing the development of awareness and attitude among the students. Pro-active teachers with good awareness and a positive environmental attitude can guide and motivate their students into the right direction with regard to protection and conservation of the environment.

Studies, however, show low environmental awareness and understanding of the related issues among majority of teachers and teacher educators in India and abroad (Bhumika, 2013; Rosaline, 2008; Sharma, 2011). Dola (2008) found that although pre-service teacher trainees were highly aware of the environmental problems they lacked a clear understanding of the related issues. Barthwal and Mathur (2012) reported average to moderate level of awareness among Ladakh school teachers about local biodiversity, wildlife and conservation. Khalid (2001) found that majority of pre-service elementary teachers had an array of incorrect notions about the nature, causes and effects of ozone depletion, acid rain and greenhouse effect. In spite of the lack of necessary subject knowledge, the pre-service teachers enrolled for a course in Turkey were not only willing to integrate environmental issues into their teaching practice but also exhibited high sensitivity for environmental protection. However, Kumar (2015) observed

a good understanding of environmental awareness amongst the pre-service graduate teachers.

In contrast to awareness, the environmental attitude exhibited was observed quite favorable as indicated by different studies for both the teachers (both pre-service and in-service) and the teacher educators (Barthwal and Mathur, 2012; Indu and Suryalatha, 2008; Radha, 2005). Shobeiri (2005) even mentioned that Indian teachers were having higher environmental attitude than Iranian teachers.

Large number of studies (Kumar, 2015; Sharma, 2014; Rosaline, 2008) reported gender based variation in environmental awareness among pre-service teachers (Bhumika, 2013; Dhillon and Sandhu, 2005). Sharma (2014) showed that the environmental awareness of pre-service teachers was moderately positive in case of males and slightly positive for females. On the contrary, Kumar (2015) supported female teachers having more environmental awareness than the male counterparts in all the four domains (knowledge, attitude, skill and behaviour) of environment. Regarding environmental attitude, two studies reported contrasting results. While Shobeiri (2005) observed female teachers showing better environmental attitude than male teachers in both India and Iran, Shaila (2003) found no significant difference in the environmental attitude of male and female secondary school teachers in Bangalore.

A careful analysis of the studies shows that teachers are at different levels of awareness, which vary according to their educational and socio-economic background. The following paras show the differences in the level of awareness.

a. Government versus Private Schools

Few studies have made attempts to identify the extent of environmental awareness among the government and private school teachers. Sharma (2011) found that majority of both government and private secondary school teachers had a limited understanding of environmental education with little clarity on the significance and role of environmental education. In contrast, Dinakara (2000) reported that the private elementary school teachers of Mysuru district were significantly better than government school teachers in their environmental awareness. In another study (Katoch and Kumari, 2010), it was found that private school teachers have better environmental attitude than government school teachers.

Sharma (2014) reported that gender had an effect on environmental awareness and emotional intelligence. It showed

that the environmental awareness of male and female pre-service teachers was found to be slightly positive but not significantly correlated with emotional intelligence. The environmental awareness of male in-service teachers was found to be moderately positive and significantly correlated with their emotional intelligence. On the other hand, the environmental awareness of in-service female teachers was found to be slightly positive but not significantly correlated with their emotional intelligence.

b. Educational Qualification and Locality

Indu and Suryalatha (2008) observed that background or the educational qualification did not contribute significantly towards the knowledge scores on environmental awareness of the student teachers. Katoch and Kumari (2010) mentioned that higher education helps in developing awareness of teachers positively towards environment. Studies comparing the environmental awareness of teachers on the basis of their educational qualifications, such as B.Ed. students with D.T.Ed. students (Lalitha, 2008) and postgraduate teachers against graduate teachers (Kumar, 2015) confirm that teachers with higher education show better environmental awareness. Similar results have been reported with respect to the environmental attitude of teachers in India and Iran (Katoch and Kumari, 2010; Shobeiri, 2005).

Teachers from science stream have higher levels of environmental awareness and attitude and are more competent to teach EE in comparison to social science, arts, commerce and language teachers (Bhumika, 2013; Dhillon and Sandhu, 2005; Kumar, 2015; Lalitha, 2008; Paul, 2008; Radha, 2005; Rosaline, 2008; Shobeiri, 2005). The trend was valid for both pre-service and in service teachers. Paul (2008) and Shobeiri (2005) reflected the international scenario in the contexts of America and Iran respectively. Studies by Bhumika, (2013) and Kumar (2015) observed the environmental awareness of pre-service teachers from science, commerce and arts streams in declining order with those from arts stream at the minimum level. Shaila (2003) found no significant difference in the environmental attitude of science and arts school teachers at secondary level. Indu and Suryalatha (2008) observed the physical science student teachers to have a favorable attitude towards environmental protection in comparison to their life science counterparts.

c. Urban/Rural Background

Highlighting that residential background affects the environmental education awareness of the school teachers, the research studies (Dinakara, 2000; Dhillon and Sandhu, 2005; Katoch and Kumari, 2010; Rosaline, 2008) reported that the urban teachers were more environmentally aware than their rural counterparts. Katoch and Kumari (2010) concluded that the performance of teachers in private schools was better due to greater accountability, monitoring and adopting measures for discipline and reward. In the context of the US, Desjean-Perrotta et al. (2008) revealed that the pre-service teachers did not possess the knowledge required to be environmentally literate. However, the ethnicity and their residential background did not have a significant effect on their environmental perceptions.

As regards environmental attitude, the findings are inconclusive. While a few studies (Dinakara, 2000; Shaila, 2003) found no significant difference in the environmental attitude of rural and urban secondary school teachers, Katoch and Kumari (2010) not only found that urban school teachers have better environmental attitude than rural school teachers but also appeared to be more concerned about the protection and conservation of environment. The marital status (Shaila, 2003) and type of school management (Shobeiri, 2005) had no influence on environmental attitude of teachers. It has been further reported that age and length of experience had no influence on environmental attitude of teachers of Iran and India (Shobeiri, 2005). Dola (2008) found that participation of pre-service teacher trainees to solve environmental problems was very low.

Teacher Development

In order to understand the lack of environmental awareness and understanding of related issues predominantly among teachers, it is crucial to look into different aspects of teacher education. In this context, the curriculum and training assume greater significance. The gaps in any of these two are responsible for ineffective implementation of EE in schools.

i. Teacher Education Curriculum

Only a few studies focused on teacher education curriculum but these provided some valuable insights that can have significant implications for the policy, planning and implementation of EE.

Poor understanding of teachers about EE confirm Jaiswal's (2006) observation that very few primary teachers teaching environmental science had studied environmental education in their pre-service education of B.Ed. This draws attention towards addressing the issue of EE in teacher education curriculum. Nemati (2008) also highlights the dearth of quality curriculum in EE and also mentions that nature of EE curriculum may vary at different levels as per the contexts, nature of subject and available resources.

Prachi (2011) substantiates the integrated approach to EE by showing the enhanced awareness of pre-service science teachers on environmental issues when they were trained on a programme on teaching of chemistry integrated with EE. Tali (2010) observed similar trend when pre-service teachers' from Israel were trained on EE through a separate programme and not through an integrated or infused approach. It also observed substantial improvement in environmental awareness with mild change towards pro-environmental behaviour after the teachers underwent a three-year course in environment. Mehrotra (2015) states that EE requires creative teachers who can go across disciplines and specialised courses while teaching sustainability. Gupta (2005) concludes that transformational educators can make the concept of ESD become a reality. Such educators can see beyond, think beyond and act beyond and are not mere preachers but true followers and promoters of ESD. They imbibe ESD in their daily lives and reflect it in their teaching approach.

ii. Teacher Qualification and Experience

Besides curriculum, teacher qualification, subject background and in-service professional development are very important. According to Jaiswal (2006) most of the primary teachers of environmental science had minimum academic qualification or professional training to be a teacher and only very few teachers studied environmental education in their pre-service education at B.Ed. Majority of the teachers had undergone in-service education in environmental science and most of them had their training in the methodologies of curriculum transaction of environmental science. A similar trend was reported in the NCERT reports (2011–12, 2012–13 and 2013–14) on monitoring the EE implementation in States and UTs in India. As per these reports, 60% of teachers reported that they were well versed with skills required to transact environment related activities and about 48% agreed that they have received

training. However, many teachers from different States and UTs expressed the need for special training on EE. Most of the primary teachers taught other subjects, in addition to environmental science (Jaiswal, 2006). The teachers with science background were more competent in teaching EVS at primary grades than the teachers from language or other subject backgrounds.

iii. Curricular Materials and Classroom Transaction on EE in Teacher Education

In a study, Kaur and Sharma (2016) focused in depth on classroom teaching-learning of EVS at the primary level. They reported that classroom teaching-learning was restricted to reading out the text by the teacher or students and teachers explaining its literal meaning. There were hardly any efforts to go beyond the textbook and activities beyond reading and writing. The classroom environment was primarily teacher-centric and children had rare opportunities to ask questions. Further, no usage of any material except blackboard and chalk was witnessed. It also found that teachers hardly carried out planning and preparation for the transaction of the textbook chapters and lack of motivation for the same was apparent among them. Pedagogic practices of primary school teachers are affected by their knowledge of EVS subject. Jaiswal (2006) highlighted that large number of primary teachers referred to newspapers, books, and encyclopedia of school library, magazines, and television to update their knowledge of environmental science.

The study on curricular intentions, classroom transaction of contemporary EVS textbooks of the NCERT by Kaur and Sharma (2016) gathered the opinion of experts and textbook writers who highlighted that the textbooks included finely nuanced understandings for building sensitivities for various social and environmental issues, development of the scientific temper among learners and contextualising the learning opportunities. However, when asked, the teachers were unable to locate the social sensitivities embedded in the textbooks. They felt that the textbooks lacked content and contained only social messages. The teachers across schools were not found working on building sensitivities for various social and environmental issues, and the development of the scientific temper. In another study (Jaiswal, 2006) on Gujarat State Education Board (GSEB) environmental science textbooks, it was observed that most of the teachers were satisfied and with the textbooks. However, few teachers opined that

the content of the textbook of environmental science of Class IV was not meaningful and relevant to the present context and it lacked sufficient information, explanation, illustration. According to Kaur and Sharma (2016) almost all teachers expressed a concern for the large syllabus and lengthy chapters in NCERT EVS textbooks, which needs to be carefully considered and appropriately addressed.

iv. Teacher Training

Patel (2007) found that teachers have clarity about the objectives and accordingly they prepared themselves in advance for attending in-service training programmes. Teachers felt that time and duration for in-service training programmes was adequate for the attainment of objectives of the programmes and in-service training programmes were able to cope with emerging trends of education. Rajendran (2012) found that pre-service teachers trained through constructivist approach were found to facilitate their students better for developing understanding of environmental concepts, issues and concerns. Another study (Sampath and Sundaramoorthy, 2014) reported desirable impact of interventions on elementary teachers and recorded their knowledge enhancement. Parasnis and Bahulikar (2005) found the teaching material (modules, CDs and transparencies) were effective in generating interest and interaction among student teachers. A few EE teacher educators integrate learning technologies into their instructional ventures to enhance cognition and learning. Concern has also been raised that technology might have negative consequences on student connection to the natural environment (Peffer, Bodzin and Smith, 2013). Riordan and Klein (2010) observed that environmentally sustainable school practices through Expeditionary Learning (EL) provide teachers' professional development to promote environmental education aiming to impact student experience and work.

A number of factors facilitate teachers to adopt pro-environmental behaviours (Pruneau, 2006). Included among the factors are participation in a community of change, construction of knowledge of climate change, a solo activity in nature, and a continuum of values. Organisational skills, personal advantages, and ease of chosen actions were also noted as facilitating factors. Limiting factors included lack of time and lack of awareness of people around them and the difficulty of affirming one's differences. Shamsha (2011) found that the use of cartoons to evaluate the

environmental concepts enabled active participation of student teachers by making them think beyond the textual information, discuss, question and observe during the entire session. About 95 per cent of the student teachers opined that the cartoon analysis task helped them to think creatively about the situations and begin the process of restructuring their understanding. Bharucha (2005) suggests that initiatives may be adopted in India to enable teachers to use materials other than the textbooks for teaching-learning of the environmental aspects.

There is a need for undertaking intensive pre-service and in-service environmental education programmes to spread conservation awareness (Barthwal and Mathur, 2012), and thus strengthening the teacher education programmes. Studies (Kaur and Sharma, 2016; Rosaline, 2008) call for reorienting the pre-service and in-service programmes with scope for knowledge updation of teachers, encourage them to undertake planning, preparation and sharing of knowledge for teaching-learning. They further state that mechanisms need to be evolved that could encourage and empower teachers to transact the EVS textbooks meaningfully which requires building their understanding on learner centric pedagogy, besides addressing their concerns carefully and appropriately for the curriculum, syllabus and textbooks. Sharma and Devi (2012) recommended steps to build capacity of teachers to understand integrated approach and design appropriate learning tasks through appropriate pre-service and in-service teacher education curriculum, teaching-learning material and training. Besides introduction of EVS as an additional subject to science and social science at the primary level, Kaur and Sharma (2016) mention it as a major systemic issue that needs to be addressed.

According to Sampath and Sundaramoorthy (2014), knowledge enhancement of EE among teachers can be achieved in short durations with appropriate training, but transformation of knowledge into right attitudes, values and behaviour is a long process and requires sustained interventions. It is in consonance with Tali (2010), who recommends prolonged and sustained efforts towards EE to bring the desirable changes in environmental behaviour of pre-service teachers' of Israel.

Policy and Systemic Issues

In order to understand all aspects of planning and implementation, it is crucial to look into the policies that help shape ideas and also

give direction. The studies on policy dimensions provide evidences to concertise these ideas that help to introduce, replicate or scale up the micro level curricular reforms to macro level and design or reframe the policies. This section includes studies that look into the implementation aspects of EE.

i. Policy Issues

The preceding sections indicate a limited understanding of EE with regard to teaching-learning approach, teacher development and curriculum transaction. Sharma's (2015–16) study points towards scattered efforts being done under Education for Sustainable Development which lack a cohesive and holistic vision and coordination among different agencies and stakeholders, and thus being ineffective at the ground level. It demands adopting appropriate measures at the policy level, planning and implementation levels and also ensuring better coordination among different agencies that deal with ESD. Singh (2008) emphasises on proper communication amongst the policy makers especially between the Centre and the State, and coordination among their agencies to enhance community participation in the decision-making process with regard to EE. Strife (2010) concludes that given the proliferating sustainability movement with emphasis on relocalising individual and community behaviour, EE may have a special place in localising education by teaching for local environments and people, and accordingly, we need to rethink the way EE discourse frames education and the approach we use to achieve a more environmentally engaged and active citizenry. Jerath (2005) recommends that better understanding of environmental issues needs to be promoted through appropriate curriculum modifications and also that UNESCO like organisations develop policy guidelines and standardised core curriculum, to ensure uniformity internationally. Examining the role of ESD, Pant (2005) points out that while EE can be envisaged as formal and informal education, the latter is more relevant to ESD. Batra (2005) seeks to locate the agency of the school teacher in the process of curriculum design and development, policy perspectives and teacher education practices and envisions transformation of teacher education in India. It cautions that radical change in the school curriculum under NCF–2005 can do little to alter educational processes and outcomes in Indian classrooms without changing the central reality of teachers.

A few studies have focused towards the policy issues on introduction of EE, especially in the early stages. Emphasising the approaches of infusion, integration or as a separate subject at different levels for EE in school education. Sharma (2009) highlights the scope, issues and policy dimensions of environmental education for multidisciplinary and interdisciplinary aspects. The multidisciplinary aspect and integrated approach to EE is further validated through examples of integration of environmental component with language and mathematics (Sharma, 2013), where it shows how the issue of curriculum load can be addressed without compromising environmental concerns as mandated under NCF–2005 and the *National Policy on Education.* As per the NCERT studies (2011–12, 2012–13 and 2013–14) on monitoring of EE implementation, the State representatives on EE reported that EE is implemented in an infused model across India and a maximum of two periods (30–35 minutes each) are allotted per week to environmental activities in schools all over India. Overall the studies recommend synchronous, comprehensive and holistic efforts for involvement and coordination amongst multiple agencies and stakeholders in school education for policy framing and its implementation. However, studies in this area are lacking.

ii. Role of Agencies

a. Non-governmental Sector and Community

Spreading awareness about the environment and making efforts to improve the same requires multi-pronged efforts by multiple stakeholders wherein public participation through non-governmental sector and other initiatives are equally important. However, this requires effective coordination and networking with different agencies such as motivated and dedicated voluntary organisations (Agarwal, 2008). Volunteers and educators who work in or with schools and other educational institutions can have a tremendous impact from increasing awareness and knowledge, to helping them form attitudes and facilitate action projects on environment.

Many studies advocate for adoption of effective measures at policy, planning and implementation levels and also ensuring better coordination among different agencies that deal with ESD (Agarwal, 2008; Batra, 2005; Sharma, 2015–16; Singh, 2008). Attempts (Preetna, 2000; Shukla, 2005; Srivastava and Paliwal,

2013) have been made to document good practices by some agencies, especially the NGOs, for their proactive role towards raising awareness, spreading environmental education and work for environment protection by involving the public at large in various EE activities. Considering non-governmental organisations as influential tool for accomplishment of the goals of ESD, Agarwal (2008) highlights the increase in size and number of NGOs and discusses their role in promoting EE especially in the areas where the state has not reached or its presence is inadequate. Srivastava and Paliwal (2013) observed that the NGOs help to build a symbiotic relationship between the environment and the society through a holistic approach. Singh (2008) examined the evolution of the symbiotic relationship between the indigenous community and conservation of the environment and suggests creating awareness through environment education for enhancing community participation. However, Joy (2005) recommends going beyond creating awareness and giving information and offering scientific education for inculcating techniques and skills which are needed to protect the environment. Shukla (2005) suggests that socially critical EE will be more useful as approaches like biodiversity contests, and community-based plant diversity register, as implemented by environmental NGOs and local communities do help to create a platform to remove constraints in establishing effective communication with the underprivileged and disadvantaged groups of children, women and tribal communities.

Analysing the goals and broad objectives of seven non-governmental organisations in the field of environmental education, Preetna (2000) found that improvement of the prevailing environment in the city through initiatives focused on school children was a common element among all. Citing the success of Eco-club partnership programmes of schools with non-governmental organisations, Roberts (2009) recommends directing different agencies to work cohesively towards programme success, clarifying the future vision of National Green Corps (NGC) programme and addressing existing operational shortcomings.

b. Government and Corporate Sector

Envisaging the role of the institutions of higher education for EE, Singh (2005) suggests universities to take a lead to frame suitable initiatives in the area of EE. Khan (2013) assessed the functioning of various organisations associated with preservation

and restoration of environment and found that socio-economic factors such as demographic change, social change, gender and divisions of labour, health, education, knowledge and information, poverty, economic change and technological change have a positive impact on environmental management. Ardoin and Bowers (2012) investigated the role of US based foundations, which are one of the largest sources of support for environmental efforts. It found reasons behind the paucity of EE funding and concluded that despite public support, environmental education (EE) is rarely a priority for funders. Causes for the low level of EE support included definitional complexity, uncertainty about efficacy, and inclusion of EE funding within issue-specific grants, such as those focused on climate change. Hannam (2010) examined the role of a government agency, i.e., the Indian Forest Service in environmental management in India, and found that it has responded well to the key challenges, namely economic liberalisation; political manipulation and corruption; social changes and their impact on recruitment on the Indian Forest Service in the last 20 years. It concluded that in spite of these challenges, the Indian Forest Service is remarkably resilient and remains the most powerful agent in rural India.

Environmental Education thus requires coordinated and cooperative efforts amongst various agencies such as the government and its institutions, NGOs, Corporate Sector Organisations (CSOs), donors and foundations, schools and the community. It also indicates overlapping and intersection of various variables like those of social, cultural, demographic, economic, and political factors. Undoubtedly, NGOs are playing a positive role in terms of EE and ESD but more surveys and studies of critical nature are needed to arrive at a holistic view.

Epilogue

The preceding discussion clearly indicates that a large number of quantitative studies across disciplines, not just in India but across the globe, have investigated only children's knowledge and attitudes towards environmental problems. Only a few studies examined children's feelings and even fewer focused on children's point of view. Many studies investigated environmental awareness and attitude of students and teachers. Most of them focused on students from high school onwards. There is a correlation between environmental awareness and attitude, and further the environmental attitude has been found to correlate with behaviour. However, a direct

correlation between environmental knowledge and behaviour has not been observed. It may be concluded that environmental awareness enhances with age as children mature developmentally from high to higher secondary stages in schools and later towards the stage of higher education. Children from private schools were found to be better aware than those from the government schools. Although, with regard to gender there were mixed findings as more studies were in favour of boys showing better awareness than girls. One study mentions that adult interaction greatly influences environmental attitude and behavioural formation. There are studies that attempted to find the effect of factors such as religion, parents' qualification, family size, background, etc., and found no significant impact of these variables on environmental awareness among the students. There were contrary findings with respect to the subject background (science versus non-science). However, there was no difference in awareness of students from central schools and other schools. Students from India and Iran did not differ as regards their environmental attitude. At the international level, children expressed apocalyptic and pessimistic feelings about the future state of the planet. The ecophobia prevalent among children may have serious implications for their participation in environmental stewardship and conservation efforts.

The EE is implemented as an infused model across India and a maximum of one hour per week is allotted to environmental activities in schools. There were mixed opinions towards integrated approach to EE curriculum with some in favour and others against it. Gaps in EE curriculum of some states and their deviation from that given by NCERT at the national level have been pointed out. An unsatisfactory state of EE curriculum was also witnessed by some studies in Poland and New Zealand besides EE curriculum of technical vocational education of many other countries like China, Malaysia, Indonesia, and Philippians including India. Indian curriculum was found to be inferior to that of Finland regarding EE component. A pragmatic utilitarian concern for environment, focus on traditional disciplinary knowledge and the government influence on prioritisation of economic development over environment are the key themes to shape the environmental curriculum. Many studies analysed the NCERT textbooks at different levels for EE and found them in consonance with the EE principles. In spite of the textbooks reflecting EE, the teachers are unable to transact them in the desired manner. Except Delhi and

Rajasthan, the studies analysing the state textbooks observed gaps for environmental component in the textbooks. Schools performed well on the indicators of drinking water availability and cleanliness of compound, performed average on light and ventilation and availability of toilets, and poorly on waste disposal and hand wash. Majority of schools were overcrowded.

Teachers had a limited understanding of EE and similar trends are visible in US schools although many of them admitted to have studied EE. Some studies show that subject specialisation affects teacher competency on EE and teachers with science background are better at it. Most of the teachers across government and private schools use conventional teacher centric modes in their classroom with hardly any attempt to use activity, project or any other innovative ways of teaching-learning. Transformational educators, who think beyond and act beyond and who are not mere preachers but true followers and promoters of ESD, who imbibed ESD into their daily lives, which is reflected in their teaching approach and style can make the concept of ESD become a reality. Teachers who go across disciplines and teach in an interdisciplinary manner are role models of ESD practices. Few EE teacher educators integrate learning technologies into their instructional venues to enhance cognition and learning as there was concern that technology might have negative consequences on student connection to the natural environment. Participation in a community of change, construction of knowledge of climate change, activity in nature, and a continuum of values are factors that facilitate teachers to adopt environmental behaviours.

The studies support holistic approach when teaching-learning goes beyond the textbooks and occurs in open and in real life settings using integrated or multidisciplinary approach to EE curriculum. It enhances pro-environmental attitude and behaviour as it helps build emotional connect with environment, besides facilitating knowledge retention. In addition, the inquiry approach facilitates development of skills especially thinking skills. A variety of TLM other than textbooks such as cartoon based package comics, multimedia packages, etc., were found to be effective for enhancing environmental understanding and sensitivity. However, the teachers are found to be using only traditional modes of teaching-learning. A study highlighted a link between understanding of the subject and pedagogic practices adopted by teacher.

A large number of studies mapped the awareness and attitude of teachers but very few studies focused on teacher educators. Largely the studies report a lack of environmental awareness and related issues among majority of teachers and teacher educators. The studies also mention the misconceptions about the environment and related issues and problems. The environmental attitude, however, has been found quite favourable in a number of studies, which include both pre-service and in-service teachers. Studies also depict gender-based variation in environmental awareness and attitude of the teachers. There is a trend of higher environmental awareness among teachers with increasing level of education, which has also been observed for teachers in countries other than India. Some studies comparing the awareness in EE, based on the residential background, age, length of experience and type of school management observed that there was no variation based on any of these variable except that the teachers from urban background reported to be better placed as compared to those from rural areas. The studies show that it takes prolonged and sustained efforts for changing the environmental behaviour in contrast to environmental awareness and attitude.

The studies indicate lack of quality teacher education curriculum with regard to EE and call attention to its adaptation as per the context, nature of subject and available resources and implementation. Very few primary teachers teaching EVS studied environmental education in their pre-service education at B.Ed. Most of the studies demand reorientation of both pre-service and in-service teacher education programmes in the country. Some seek active involvement of teachers in teacher education curriculum design. The studies indicate that poor teacher preparation for EE both at the pre-service and in-service trainings needs to be addressed. The lack of experience and training of teachers for EE are some of the major reasons for its ineffective implementation.

Further, teachers trained through constructivist approach were found to facilitate their students better for developing understanding of environmental concepts, issues and concerns. The classroom teaching-learning is highly teacher-centered as conventional approaches of reading out the text or using chalk and blackboard are witnessed. Although teachers expressed their interest there is lack of planning and preparation by teachers for teaching-learning under EE. Teachers did not have the pedagogical understanding of EE. The teachers from some states even had

concerns with the load of syllabus and text. The studies reflected contrasting findings for the availability and use of resources for EE. The studies reported a positive impact of TLM other than textbooks on knowledge enhancement under EE, and suggested strengthening the teacher education programmes at the national and state level to build the capacity of teachers for development and use of TLM.

Studies point out the lack of vision and seek adoption of effective measures at policy, planning and implementation levels for better coordination among different agencies and stakeholders that deal with ESD. Emphasis on EE is needed right from the early stages at both national and international levels, and the studies demand transforming the teacher education while executing any radical reforms in school education. Some studies attribute ineffective EE implementation to adopting methodologies used in other countries without giving a careful thought to contextualisation. Almost all the studies either recommend for adopting the whole school approach to EE or adopting the approach of infusion or integration thus highlighting the multidisciplinary and the interdisciplinary approach. Overall, the studies recommend synchronous, comprehensive and holistic efforts for involvement and coordination amongst multiple agencies and stakeholders in school education for policy framing and its implementation. However, studies are lacking in this area.

The research is mainly focused on mapping environmental awareness and attitude of teachers and students. Although there are studies that analysed the school education and teacher education curricula in India and even compared it with the curricula of other countries, more work needs to be done to arrive at precise conclusions. The systemic issues and role of other agencies also need to be studied besides understanding the classroom practices and processes qualitatively in order to suggest policy reform measures. Though suggestions for a teacher education reform are witnessed, however, systematic and empirical studies in this direction can suggest some concrete and workable solutions. Overall, environmental education is such a crucial component and needs immediate attention of the research fraternity to come up with tangible suggestions for the policy planners, implementers and the beneficiaries for accomplishment of the Sustainable Development Goals.

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Research Papers

Ethnopsychological Perspectives on Education for Adivasi Children in India

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ABSTRACT

Acknowledgement of heterogeneity of cultural identities figures prominently on the agenda of sustainable development. In this context, Adivasi (tribal) communities in India assume the status of marginalised communities owing to disadvantages accruing from their societal positioning. Living in diverse ecological settings and pursuing lives with cultural uniqueness exhibited in the patterns of livelihood, settlement, language use and religion, they are differentiated from the 'mainstream'. Following the norms of equity and equality the official provisions of affirmative action have offered a set of measures including introduction of (modern) education. Education of this sort was conceived to be a source of modernisation and social change to bring them closer to the mainstream. Against this backdrop, the paper examines the progress of education of the Adivasi children and their social representation, emerging identity concerns and explores the possible choices. To this end, educational policy and practices of formal education are analysed from ethno-psychological perspective and some relevant pedagogical interventions are outlined for the educational development of Adivasi children.

Introduction

Tribes certainly show features characteristic of a society. Interestingly enough it is neither a sociological category nor an anthropological one. It is a product of a 'history of exploitation of some people by some others, usually within the boundaries of a nation state, (see Channa-Mitra, 2008). It is also a contested

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category used for classifying identity of a group in relation to other groups. It also indicates inadequacy to accommodate the changes taking place in other communities. But the most crucial fact is that there is mismatch about the reality of these groups and the ways they are construed, represented and understood. Historically 'tribe' evolved to connote a set of negative traits under colonial regime (Radhakrishna, 2006). In recent years there is revival of interest in studying various tribes in their own right (see Bird-David, 2008; Das, 2004; Dube, 2003; Shangkham, 2006).

The discourse about tribes is often undertaken within the framework of development. The technological civilisation is becoming universal criterion of development (see Aseniero, 1985). This position delegitimises other cultures, especially the cultures of indigenous people (Banuri, 1990) and results in devaluing them. Thus the western science and knowledge is given priority over local, particularly non-western systems of knowledge. It is often held that western world view, culture and modernity stand for development and a singular culture is promoted at the cost of diversity. Therefore it is urged that culture be added as the fourth pillar of the sustainable development along with ecology, society and economy as three other pillars.

Acknowledgement of heterogeneity of cultural identities importantly informs the agenda for sustainable development. This, however, is incommensurate with increasing homogenisation and shrinking space for cultural diversities which is emerging in the wake of globalisation. Though there is agreement about the threats of ecological imbalance a viable approach to development is still out of sight. The imbalanced development leads to uneven distribution of benefits, contributes to ecological costs and devaluation of the cultural and indigenous knowledge and practices (Gottileb, 1996). It is realised that the vision of sustainable societies must respect diverse cultural identities, self-reliance and social justice along with ecological balance. There is an urgency to acknowledge cultural arena of identities, practices, knowledge, arts as an asset for sustainable society cherished with the values of universal human rights and social justice.

Tribal People in India: A Case of Delegitimised Cultural Identities and Marginalisation

Living in diverse ecological settings and pursuing lives with cultural uniqueness exhibited in the patterns of livelihood, settlement,

language use and religion the tribes of India comprise 8.2 per cent of the total population, identified with 461 ethnic groups (see Table 1).

Table 1

Trends in the Proportion of Scheduled Tribe Population

Census Year	Total Population (in millions)	Scheduled Tribes (Population in millions)	Proporation of STs Population
1961	439.2	30.1	6.9
1971	547.9	38.0	6.9
1981	665.3	51.6	7.8
1991	838.6	67.8	8.1
2001	1028.6	84.3	8.2
2011	1210.8	104.3	8.6

Source: Statistical Profile of Scheduled Tribes in India, 2013, Ministry of Tribal Affairs, GoI.

The Adivasi (tribal) communities in India assume the status of culturally devalued and marginalised communities owing to disadvantages accruing from their societal positioning. They are part of the nation's development agenda. However they are paying the cost of nation's development. Their sustainable network with nature, co-existence and self-reliance has been broken. These groups occupy very low position on the list of indicators of development. They are characterised by geographical and social isolation from the mainstream society. Their survival is often tied to the land and forest resources. As Xaxa (2011) observed though the state led policies prioritised tribal development and it had significant impact there is a progress-regress relationship disguised under the agenda of *national development*. The integration oriented policies aimed at breaking the isolation between the tribal and non-tribal communities through land, labor and credit market have created an exploitative relationship between the two where tribals stand at the receiving end as a marginalised group. If the isolation and integration debate is further peeped in, it can be observed that protection and mobilisation approaches are held as keys to developmental plans. The tribals have been given constitutional and legislative rights aimed at ensuring their social representation in politics, government jobs and education. Such provisions have significantly mobilised them towards the Indian middle class but only a small segment of the tribal population could benefit. It has been observed by some scholars that tribal communities were in

a better situation in their natural habitat (Bhowmik, 1998; Preet, 1994). As noted by Xaxa (2011) the standard of life of tribes who lived within their traditional social and ecological system may have been low on quality indicators of the state but poverty in the form of hunger and deaths were generally absent. Maharatna (2005) observed mortality advantage in the case of tribes and held that due to a 'healthy life style pattern and practices such as child care and use of indigenous herbal/natural medicines, tribes could be expected to experience a (relative) mortality advantage' (p. 134).

The developmental programmes were aimed at removing and fulfilling the 'deficits' of tribes in terms of their socio-cultural practices, economic activities and relationship with nature. The underlying assumption was deficit impedes the smooth transition from forest to non-forest settlement. Such interpretation does not take cognisance of environmental degradation caused by developmental project and completely ignores the exploitative relationship between tribal and non-tribal groups. Their socio-cultural assets that unfolds a sustainable life is neither acknowledged nor researched, rather their social structure, occupational practices, quantitative aspects like-mortality rate, fertility rate, literacy rate were used as evidence to describe them as uncivilised and underdeveloped community. The onus of failure of developmental programs is again located among tribes. Assessment report of such projects frequently cite evidences, i.e., isolation, mostly geographical isolation, lack of rigour in plan implementation and traditional world view and lifestyle of tribal communities. It does not acknowledge harmonious and sustainable relationship between man-environment where land, forest, water and other natural resources are deployed with ethics of care.

Education of and for Tribes: A Contested Territory

Following the norms of equity and equality the official provisions of affirmative action have offered a set of measures including introduction of (modern) education. Education of this sort was conceived to be a source of modernisation and social change to bring them closer to the mainstream. However, it is questionable as to how education has impacted the tribes. Most of the studies of tribal students report problems of access, retention and achievement. Glimpse of explanations given by these studies affirm two reasons: the lack of institutional infrastructure and resources for education, and inability of the tribes to pursue the formal education (Sedwal and Kamat, 2008; Bagai and Nundy, 2009). Both the explanations

locate the root of problem in tribal communities. The first explanation carries an implicit assumption of tribal community being low in cultural capital necessary for education. The second explanation shows unwillingness of tribes for formal education. Historically, the overt and covert practices of education were considered the arrangements of a colonial system, legitimising western knowledge aimed at preparing human resources to be deployed in industries and services as required by the colonisers. The structure, institutions and processes of formal education gradually assimilated the elite and urban and maintained a distance from local knowledge, language and other cultural practices. Thus people from the margins didn't find genuine space for themselves in the structure of formal education. The tribes had to face double disadvantage: geographical isolation and cultural alienation. Both the issues were identified as impediments to tribal development and strong recommendations were made to improve the status of education among tribes (Table 2).

Table 2

Major Policy Recommendations about Tribal Education

The National Policy on Education (NPE), 1986

- Priority will be accorded to opening primary schools in tribal areas.
- Develop curricula and devise instructional material in tribal language at the initial stages with arrangements to switch over to regional languages.
- ST youth be encouraged to take up teaching in tribal areas.
- Ashram/residential schools will be established.
- Incentive schemes for the STs in view of the special needs and life style.

National Curriculum Framework (2005)

1. Emphasis on multilingual education as a 'holistic approach.'
2. Textbook production, publication in tribal languages.
3. Curriculum must acknowledge and depict tribal life.
4. Inclusion of Tribal/Dalit folklore and languages.

Right to Education Act (2009)

1. Local authority be responsible for providing education.
2. Steps to enroll drop-out students in age appropriate classes.
3. Infrastructural support including buildings and learning materials.
4. Necessary teaching support including well trained teachers.
5. Establishment of norms for teacher training and certification.
6. Greater role of School Management Committees in: (a) Monitoring school working, (b) Recommending school development plan, (c) Monitoring grants.
7. Comprehensive Quality Enhancement plans.

The policy recommendations show that 'status of education' is equated with 'education' as whole but measured in terms of gross enrolment ratio (GER), an indicator that shows how many tribal children are attending the schools. The data show that significant achievement has been noted in terms of enrolment and arresting the dropout rates (Tables 3 and 4).

Table 3

Gross Enrolment Ratio (Scheduled Tribes Students)

Level/Years	Elementary (I–VII, 6–13 Years)	Secondary and Senior Secondary (IX–XII, 14–17 Years)	Higher Education (18–23 Years)
1990–91	80.4	NA	NA
1995–96	90.9	NA	NA
2000–01	88.0	25.7	4.2
2005–06	106.7	28.7	6.6
2009–10	117.2	39.3	10.3
2010–11	119.7	41.5	11.2
2011–12	111.8	43.9	11.0
2012–13	114.5	NA	11.1
2013–14	105.5	52.5	11.3
2014–15	104.0	56.5	13.7

Source: Educational Statistics at a Glance 2014–15, MHRD, GoI

Table 4

Drop-out Rates in School Education (Scheduled Tribes Students)

Years	Primary (I–V)		Elementary (I–VIII)		Secondary (I–X)	
	Tribes	All Categories	Tribes	All Categories	Tribes	All Categories
1990–91	62.5	42.6	78.6	60.9	85.0	71.3
1996–97	56.5	NA	75.2	NA	84.2	NA
2001–02	52.3	NA	69.5	NA	81.2	NA
2005–06	39.8	25.7	62.9	48.8	78.5	61.6
2010–11	35.6	27.0	55.6	40.6	70.9	49.3
2011–12	35.3	22.3	57.2	40.8	65.9	50.3
2012–13	32.3	21.3	49.2	39.0	62.7	50.4
2013–14	31.3	19.8	48.2	36.3	65.4	47.4

Source: Educational Statistics at a Glance 2013–14, MHRD, GoI

The presence of tribes in the state sponsored institutions has increased. However, what education means to them and how it has been assimilated by the tribes is a matter of concern. Padel and Gupta (2015) criticised policy recommendations as 'a stolen' agenda from western countries like US and Australia. These policies involve education as a tool for assimilation by the cultures of non-tribes. The social representation of tribes as 'backward' and in need of 'upliftment' made them literate and opened the job opportunities but didn't influence their social position. The milieu of educational institutions as well as work places is often biased towards non-tribes. Tribes still face identity burden and swing between two poles: 'tribal culture and tradition' and 'educated and modern individual'.

The literacy rate for Adivasi Children shows significant improvement (Table 5) but a huge gap continues if we compare with other groups.

Table 5

Comparative Literacy rates of Sts and Total Population (in percentage)

Category/Census Year	1961	1971	1981	1991	2001	2011
Total Population	28.3	34.45	43.57	52.21	64.84	72.99
Scheduled Tribes	8.53	11.30	16.35	29.60	47.10	58.96
Gap	19.77	18.15	19.88	22.61	18.28	14.03

Source: Statistical Profile of Scheduled Tribes in India, 2013, Ministry of Tribal Affairs, GoI

It can be also noted (Table 6) that there is a mismatch between what is said and recommended in policy documents and what is practiced in reality.

Table 6

Problems and Challenges in Tribal Education

Infrastructural Problems (Sujatha, 2011, Preet, 1994)	• Majority of the schools lack basic infrastructural facilities. • Schools do not have teaching-learning materials. • Lack of minimum sanitary provisions. • Irregular supply of mid-day meals. • Lack of communication facility. • Untimely supply of study materials.

Curriculum and Pedagogy (Jose 2016, Brahmanandan and Bosubabu 2016, Sujatha, 2011)	• Medium of teaching, i.e., English being a foreign language for tribal children. • Unable to fully comprehend classroom teaching and activities or understand the texts properly. • Type of content in the textbook not relevant to the tribal community. • The rigid systems of formal schooling emphasising discipline, routine norms, teacher-centred instruction. • Non-contextualised and culturally insensitive pedagogy.
Unequal treatments (Sedwal and Kamat, 2008; Bagai and Nundy, 2009)	• Verbal abuse, physical punishments. • Avoidance by the dominant castes students and teachers. • Tribal children's inability to establish a communication with non-tribes. • Non-tribal teachers having an attitude of indifference to tribal languages, traditions, cultures and life-styles.

Social Representation and Emerging Identity Concerns

At the surface level, the exclusion of tribal children is explained as a case of deficit in terms of cognitive abilities. However, the main cause of exclusion lies in other factors such as coping with divergent social norms, cultural biases, exploitative social relations, hegemonic culture of social and state institutions. For tribal children exclusion is not an event at a given point of time, rather, it comprises of accumulation of experiences over a period of time due to discriminatory events distributed across diverse activities in various contexts such as family, community, school, peer group and other institutional settings where they don't have any entitlement and power for negotiation. They become voiceless without any kind of agency (Govinda and Bandyopadhyay, 2008). In this situation access in formal education is seen as a potential to actualise their capabilities and be at par with the mainstream. But if education itself leads them to exclusion, they are caught in a vicious cycle of disadvantage that reproduces them as a marginalised community. This kind of social representation and emerging identity concerns are adversely influencing the tribes in general and their schooling in particular. The presence of tribals in the formal centers of learning and work often compels to either accept the imposed identity of being modern and literate at the cost of shrugging off their own practices or moving away from the mainstream society and constantly living in isolation. While entering the mainstream system as students, teachers or in some

other role, they hardly find their cultural context, practices, knowledge, language as a part of experience in these institutions. Meanwhile, their social representations are stereotypical in depicting them as a primitive community living in isolation. The educational discourses treat primitiveness as a non-developed stage and work with the assumption that they should be thriving for development with State's assistance.

The Gap between Tribes and Non-tribes

The formal education in modern India, owing its route to the ideal of western modernity, assumes that an educated individual is equipped with certain civic skills, a worldview based on rationality and scientific thinking, a self regulating and disciplined mind equipped with professional capacities and ethics. Any social group which differs from these norms is treated as underdeveloped. The state's programme along with other philanthropic enterprises chart developmental plans to supplement the knowledge, skill and attitude of tribal students. Therefore, tribes inhibiting in isolation and practising their own style of life are treated as 'non-modern' communities and are forced to assimilate modern knowledge and practices. The formal education for tribes is envisioned as a pedagogic tool marching towards the state of modernity. Although formal education has equipped tribes with the assets of literacy but it has also reinforced the negative construal of tribal identity of being inferior, alienated and underdeveloped. Balagopalan (2003) terms this tendency as 'internalisation of innate failure' that validates the proposition that if the tribal children are not able to sustain in the formal institution they and their community are lacking in certain skills, knowledge and attitudes. Therefore, the state wants to inculcate 'schooled identity'. The belief of teachers, parents and students about 'being tribal' means slow, unclean, uncivilised, having low cognitive ability, lack of family support. Therefore, they are assigned to manual jobs. While at home, the parents of tribal students and students themselves find it difficult to pass the exam or to complete any homework. Thus, the disjuncture between tribal culture and school practices remain unaddressed and formal education for them remains an imagined world.

Devaluing Cultural Identity and Indigenous Knowledge

Introduction to a universal education system for masses accepts the norm of universal exposure to learning experiences and

evaluating the same against uniform standards. The process seems feasible, reliable and objective but underneath exclusion of cultures and histories of these communities make them invisible in the mainstream discourses. This is the case for tribes in India. The cultures and histories of tribal communities are missing from mainstream discourses of formal education. The curricula at different levels represent mostly urban middle class societies thriving for industrial development and leading towards global world (Agarwal, 2002; Balagopalan, 2003). If represented, their symbolic meaning is tabooed as primitive community inferior to the mainstream society. They are represented as isolated, strange and backward (Jose, 2017). Their cultural practices and indigenous knowledge are not adequate to teach as it is not compatible with the scientific ways of knowing, doing and learning. Such representations show prominence of the civilising discourse of education over the education as pursuit of vivid intellectual engagement enabling the individual to celebrate the multiplicity of worldviews.

Sundar (2010) considers formal education for tribes as a source of alienation from cultural roots. She explains the point with data from central India. She found the tribes interested in formal education perceive it as tool of advancement, upliftment and social mobility. They believe that formal education will enable them to get rid of tribal identities and they will turn into 'Educated Adivasis'. The educated youth communicate with each other in the language learnt at the schools. They want to show themselves different from their uneducated peers. The negligence of their own language is the first step towards denigration of their worldviews and knowledge. The influence is perpetuated further. They start feeling uncomfortable by the idea of being a member of the family engaged in primitive activities, i.e., hunting, gathering, etc. They rely more on their new social networks with other caste people living outside of the tribal areas. Bayly (1999) termed it as entering into 'new epistemic communities'. It should be kept in mind that their membership of these new epistemic communities with an unequal power status have adverse effect on their identities. In the same manner Kumar (1989) elaborated how the schooling exposes tribal children to learn that 'they are backward'. He took an example of classroom teaching where issues of tribes were discussed. He observed that if any tribal student resists to affirm the negative representation of tribal, he/she is considered as

cognitively backward, because her arguments do not conform the textbook knowledge; if he/she accepts that representation, she is supposed to belong to a backward community. In the same way, Sundar (2012) highlights the subtle politics of religious identity taking place through schooling. She elaborated the same point with the help of two schools, one run by a Hindu organisation and other run by a Catholic missionary. The first type of school practiced predominantly Hindu culture where most of the students were tribes. They were supposed to be Hindu. On the other hand the Catholic School practiced the rituals of Christianity where most of the children were supposed to be Christian. Thus both the schools were dominated by the voice of 'powerful' groups and tribal culture as well as identity was devalued. We have developed a kind of thinking where if formal curriculum is practised, indigenous and cultural knowledge have to be dropped.

The data presented in Table 3 show that the issue of access has been addressed to some extent. Infrastructural measures are being strengthened though their pace is slow. The major concern now is to facilitate creating an interpersonal milieu that may integrate the tribes without threatening or devaluing their culture. Neither should we limit their world to the cultural resources of their own nor should they be compelled to surrender to a different culture through schooling. The linguistic, social and cultural diversity of tribes is not just a resource pool that can be churned into schools and educated individual can be mainstreamed. These resources are integral to their being. Any process for the sake of welfare or development should acknowledge it and be empathetic to it.

Educational experiences are pivotal to the construction of knowledge and identity. It should integrate the tribal ways of knowing, doing and being in their local milieu as valid as school knowledge and enable them with a critical understanding of both the tribal and non-tribal worlds. Gandhi's idea of *Nai Talim* may offer an epistemological and pedagogical approach for integration of cultural diversity in the classroom. It was adopted as an approach for *Aashramshala* schools but was misinterpreted as vocational education. Craft and work experience based education brings learners' funds of knowledge into the classroom. It strengthens the relationship between nature, community and individual, nurtures a sense of self-reliance, reinforces the dignity of labor and above all lead the community towards a sustainable life.

There are microcosmic experiments with tribal children under the umbrella of institution called school. Most of these institutes try to alienate themselves from the mainstream schools and embed them in the local milieu. They are part of empowering movement either working with isolated tribal groups or with displaced tribal people. They are different in their functioning, curricula and pedagogy. Most of them intensively work for primary and elementary levels of education. They also engage with adults. Some such efforts are summarised below.

Adharshila Learning Centre, started in 1998, defines education as a tool for liberation. The school has prioritised learning by doing as essential pedagogic approach. It practices democracy in school with active participation from student side. They are identified as Student *Karykartas* and use to participate in decision making and sharing the responsibility. They have right to express their opinions, to disagree with teachers and to negotiate with other stakeholders. The students passing out from *Adharshila* schools have completed their secondary level of schooling and are aspiring for further education. The students have completed many learning projects best suited to their context: listing herbal plants, bio diversity record of school, water and electricity data, etc. The school organises workshops related to theatre, communal harmony, gender and painting. A student led project on famines was published by Eklavya named *'Rukhi Sukhi'*.

Agragamee has engaged with the issues of tribal development for 25 years with the ideology of 'food and voice'. The organisation extensively works in the tribal areas of Odisha. It runs single teacher primary schools in remote tribal areas. The programme has yielded significant achievement in primary education in comparison to other schools. It has also empowered the tribal students with a sense of critical understanding. The students who are enrolled in the primary classes used to check muster rolls of MNREGA and made people aware about wage rate. The schools run by the organisation usually appoint tribal teachers in their school so that language barrier may be overcome. The teachers were trained to teach in a multilingual classroom. The schools have developed their own textbooks compatible with local context.

Aide et Action, an NGO, runs mobile library in government schools where tribal students are enrolled. Mobile library vans reach the schools in morning. There are 20 stacks of books arranged in graded manner with reference to reading skills. A resource person

helps students in selecting and reading the books. The books are in various tribal languages so that they can find culture in the stories and poems. Besides, the mobile library van moves in the community where resource persons organise story telling sessions and facilitate the reading skills among adults.

Puvidham, a government approved nursery and primary school located in Dharmapuri in Tamilnadu, caters to the needs of local tribal community. It also runs a bridge course for school drop-out students. The school has an eco-friendly environment with sufficient play area, organic farm and a little forest for children in a natural environment. The school is organised around the Gandhian philosophy. Work and education are not separate entities. The school tries to inculcate the values of harmony with nature and respecting dignity for farming as one of the significant occupations. Everyday community activities are treated as sources of learning. Language learning takes place through listening the stories and poems and translating them into drawings or other creative forms. Similarly, mathematics is taught by everyday activities such as Rangoli making, measuring the land, etc. Farming is a key activity around which teaching of academic subjects such as science, mathematics, language curricula is interwoven.

Imalle-mahua school is situated at Kondagaon district in the Baster area of Chattisgarh. The website of *Imalle-mahua* school narrates the story of its journey in first person. The school reflects essence of ownership and empowerment. In the initial years school embraced the philosophy *Nai Talim*, but due to teachers' ill-preparedness and students lack of interest, the management has chosen a different path. They put the learners' happiness, that is according to them is 'free will to work and play', on priority and organised the learning experiences accordingly. The learners were categorised into four groups—*Supari*, *Semar*, *Seethaphal* and *Soorajmukhi*. The schools routine is like a routine of family beginning in the morning between 6:00 am to 7:00 am with cleaning and preparing breakfast, and subsequently engages the students in various work experiences, having a robust lunch in afternoon and after lunch activities ended around 5:00 pm.

Kanavu, located in Wayanadu district of Kerala, is a school for tribal children celebrating the culture of collectivity through the local ways of learning and doing. The school begins with the recital of classical ragas and ends up with a folk dance form '*thudi*'. *Kanavu* gives great importance to the learning of music, dance, theatre,

martial arts, painting, etc. The school believes in philosophy of self reliance. It produces 70 per cent of its food requirement. Myths, tales and folklores find a respectable place in the curriculum. The students at *Kanavu* take training in both orthopaedic practices as well as self-defense.

These experiments and interventions aimed at educating tribal children reflect a pedagogic approach where modern school subjects are not taught for the sake of knowledge. These institutions provide interesting examples of innovative learning spaces marked with cultural sensibilities. Opportunity for learning is often constructed and embedded within the eco cultural context. Rather than compelling the learners to assimilate the culture of others these institutions interweave modern knowledge through every day practices. These schools bring out the following realisations:

- Opportunities for students to perform home and community roles.
- Students and their community voices get expressed and valued.
- The language, art forms, and work experiences form integral part of learning.
- Learning is characterised by intrinsic motivation, creativity and freedom to express.

The message is clear that the learning experiences should be designed in such a manner that they lend support and extend cultural and social mediators of tribal milieu. For the same teachers have to come out from the walls of schools and enmesh themselves as ethnographers and should have a fair and deep understanding of cultural practices of the community. It will help them to localise the curriculum. Drawing elements from cultural practices should be integrated within the classroom discourses with sensitivity and empathy. Such practices promote active student involvement and nurture an identity of empowered individual. Integration of learners' funds of knowledge doesn't mean excluding the school knowledge, rather it renders the classroom into a learning space where everyday knowledge and school knowledge both contribute to meaning making. The process also has scope where the myth that the scientific knowledge is only circulated through schools can be broken and indigenous knowledge of learners can be brought to the centre stage. In tandem with this, their communicative and language practices should be mainstreamed. It should not be done as an effort of conservation but as an effort of promotion

so that they don't feel alienated and harassed. The aspirations of parents, community and students should be acknowledged and given the scaffold. The community-school relationship should be strengthened and parents should have stronger voice and agency in decision making. Their social capital can be deployed through the same. Above all, assimilative practices that denigrate the cultural-social-ecological assets of tribes mould them into a conformist individual. We need to promote integrative practices which support sustainable development in everyday culture.

Concluding Comments

In a democratic set up people should be allowed to grow and develop along their genius. The various forms of traditional art and culture should be encouraged. The tribal people are the oldest inhabitants of the country. They were subjugated by more recently arrived groups. The natural habitat of these people was disturbed and their land was taken away. They were pushed further into the hilly gorges and wilds, and forced to work without adequate compensation. They do require special attention from the government. In the past, many tribal groups were forced to assimilate into the dominant culture of the country. But some groups, such as the Bhils, Gonds, Santals, Oraons, Mundas, Khonds, Mizos, Nagas, and Khasis have resisted the processes of imposed change and preferred to maintain their cultural identities. The critical question is whether tribal communities can enter the mainstream while preserving their distinct social and cultural beliefs and practices.

It is widely held that education is indispensable to enable the tribal people to cope with the challenge of national integration. Education, therefore, would determine the likelihood of progress and success in life. The tribes neglecting modern education would have to suffer. However, the reality of schools gives a different picture. Despite considerable expenditure on schools, creation of other facilities such as scholarships and residential arrangements the achievements remain quite limited. Prevalence of cultural taboos, discrimination and low literacy rate are very common among tribal girls (Ghosh, 2007; Khora, 2005; Mishra, 2006; Rani and Nanjunda, 2007; Rani et. al., 2009). It is reflected in non enrolment, substantial degree of drop out and poor attendance (Ghatak 2005; Rana and Das, 2004). Teaching of language and mathematics (Panda, 2006) to the tribal students are problematic as they don't take into account the ethos of tribal pupils. In general

the educational progress is very low (Rao, 2004; Mohanty (2003). The domination and hegemony of dominant groups in terms of orienting knowledge, pedagogic practices, language, curriculum, evaluation, school timings should change so that justice may be done with the histories, socio-cultural contexts, needs and aspirations of these indigenous groups (Gregory and Gregory, 2007; Lauren, 2006).

The tribal youth find the incentives unattractive. The goal to assimilate the tribes remains unfulfilled and questions the implementation of tribal policies and strategies. The barriers in the success of educational programmes include unhealthy relationship between tribal students and their non tribal peers and teachers. They do not understand the psyche of tribal students, hold stereotypes (e.g., primitive, uncultured, not worthy of being learners, slow learners) and display discrimination. Tribal customs, mannerisms, language and cultural heritage are often undermined. The inferiority complex is implanted in them.

In many tribes adult males are often bilingual but the women and children speak tribal dialects only. The tribal child, on entering school, is suddenly expected to understand a different state language. This language barrier interferes with their education. Some attempts are being made to educate Gonds, Bhils, Santals, and other groups in their own tongues. According to recent reports, tribal children are responding well to such programs. The mother tongue based multilingual education has yielded good results.

The content and the method of tribal education need to be critically evaluated. The tribal youth come from a distinct historical and social background. They need special attention and orientation in their attempts to bridge the two cultures. The curricula are either irrelevant to them and/or offer only negative views of tribal societies. While official policies intend to provide several benefits, and extend facilities, few of them effectively reach the intended recipients.

The tribal youth, even while they study at the secondary and college levels, should, be encouraged to remain integrated with their own societies. Once they become culturally and socially alienated, it would be difficult to maintain the connection with their own societies and maintain traditions. Tribal students must develop inner resolve to resist exploitation and to safeguard their own rights.

The tribal cultures do have knowledge and practices which are valuable in many areas including health, agriculture, art

and sports, etc. These positive elements are often absent in the mainstream culture. There should be genuine attempt to learn and acquire this knowledge tradition as they are on decline.

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Creativity amongst Children with Special Needs (CWSN): Tapping from School Teachers' Experiences

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ABSTRACT

The present paper focuses on exploring school teachers' perceptions (N=20) about creative potentialities of CWSN by tapping on their experiences. The paper attempts to deconstruct the concept of creativity so that it can be understood in the context of children with special needs. By quoting experiences of teachers, the paper tries to understand and explore creative manifestations amongst CWSN as perceived by them. The findings indicated that the teachers who have direct interactions with CWSN possess positive inclination towards their creative potentialities as compared to others who do not engage with CWSN on a regular basis. The need of various pre-service and in-service programme which help teachers to equip themselves for nurturing the CWSN in their class was also voiced by the teachers during the discussions. The paper concludes by drawing out implications for school education as well as teacher education specifically focusing on the need for developing an inclusive pedagogy that focuses on needs of children arising by virtue of both their abilities as well as impairments.

Keywords: *CWSN, Pedagogical strategies, Diverse abilities, Creativity, Twice-exceptional children.*

Introduction

Every child is unique, they think differently, have different learning styles; hence they have diverse needs that have to be addressed. In the present dynamic world, education is expected to play a significant role in development and nurturance of hidden abilities and potentialities of all children including Children with Special

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Needs (NPE 2016). Parents and teachers have significant role in providing varied experiences and opportunities which should help children to realise their hidden potentialities and express them accordingly. Creativity is one of the abilities which is an important human attribute that equips individuals to function better in a rapidly changing contemporary environment (Craft, 2002). The National Curriculum Framework (NCF, 2005) refers to it as one of the basic aims of education by stating *'Education must provide the means and opportunities to enhance the child's creative expression....'*. This paper focuses specifically on children with special needs because in the case of CWSN it becomes more challenging as their abilities most of the time gets overshadowed by their impairments (Neihart, 2008). In the education of children, teachers play an important role as they spend more time (after parents) with children (NCFTE, 2009). So, it becomes important to find out how teachers perceive or look at the abilities and potentialities of CWSN which becomes a basis for understanding and planning educational experiences for them. Hence, the present study envisioned to explore school teachers' experiences specifically in relation to CWSN and their perception of creative potentialities amongst them.

Understanding Children with Special Needs

With the enactment of RTE Act, 2009, today the classrooms seem to be even more diverse which in turn signifies the importance of inclusive education. Within the philosophy of inclusion each learner, irrespective of their abilities, socio-economic backgrounds or social conditions/context, has equal rights to participate, have access to resources and opportunities in the society. As one contemplates about the historical evolution in the field of special education, it highlights various milestones like different models of disabilities, change in terminologies, modifications in the educational provisions made for children to impart need-based education. For example, the term "disabled" or "handicapped" were replaced in the middle of 1970s by "people with disabilities" by considering disability as a characteristic of an individual, as compared to the defining variable. After that the phrase "Children With Special Needs" was introduced that had a broader perspective which expected to include all children along with person with disabilities who require special provisioning in educational setting and felt excluded in classrooms by virtue of their socio-economic

background, language of classroom, family conflicts, i.e., children who make bulk of dropouts from school system (NCERT, 2006). All these changes in terminologies reflect the way various prejudices and stereotypes in the society have been influencing the notion of disability in the past.

Theoretically, the conception of disability has changed from mere charity model to empowerment and from the medical model to the psycho-social models (The Disability Manual, 2005). Different models of disability that have evolved with time show paradigm shifts in the understanding of disability (theoretically) and provide basis upon which society and concerned authorities could make provisions for meeting their needs. These models provide multiple frameworks to understand issues and debates around disability, and also throw light on the perspectives held by people who create and follow particular models. Initially, there was a complete isolation and marginalisation of people with disabilities and people used to have an attitude of pity and charity towards them. This was followed by a period where more emphasis was given on their impairment than on their other abilities. The existence of barriers in environment and social reasons for non-functioning of these individuals was not considered. With the advent of the social model, disability was seen as a social construct and impairment was located within the individual that had implications for the society and its institutions to reflect on their structures and processes with a view to make them enabling for all individuals. The human rights perspective too emphasised that every human being irrespective of their impairments has certain rights and differences and it should be seen as diversity within the human race. This implied that various institutions of the society had the responsibility to prepare themselves for the existing diversity so that each individual is able to claim his/her rights, of which education was considered as the most important. Various models and perspectives of disability have shown the ways in which social attitudes towards person with disabilities have changed with time and contexts (Hegarty, 2001). Later perspectives of disability have definitely advocated for their empowerment, provisioning for human rights, equality, social justice and inclusion (Disability Manual, 2005).

After going through the gradual evolution in the field of special education, it can be said that the journey has been full of debates, contentions and issues that gets reflected in the wide gap between the theory and praxis. Moreover, till now the main emphasis as

far as education of Children with Special Needs is concerned, is on providing them support so that they are able to function by getting need based educational service where the 'service provider' mainly focuses on needs that arise due to their disabilities (Neihart, 2008). On the other hand, needs that arise from their abilities and potentialities seldom get recognition or attention. In tandem with this, in literature too, we find a similar scenario as Lederberg et al. (2012) have highlighted that very few researches supported creativity among CWSN.

Deconstructing the Idea of Creativity

Creativity is fundamental to life. The present world we live in has been shaped by human creativity. Creativity is possibly one of the most essential yet least understood constructs. Creativity can be referred to from different perspectives and conceptual frameworks that have different implications. For example, Boden (2004) states it in two ways; historical creativity and psychological creativity. In historical creativity, novelty is relative to an entire society whereas in psychological creativity novelty is relative to an individual. Hence, according to this conception, historical creativity seems to be rare while psychological creativity is widespread, and it involves all individuals under its umbrella. The conception of creativity is constantly evolving and transforming over the course of time. If we trace the etymology of the term it brings us to Greek, Judaic, Christian and Muslim traditions of thought where notion of 'inspiration' or 'getting an idea' was founded and creativity was considered to be a divine prerogative. Major shift in the conception of creativity was noticed during the Romantic era in Europe when human abilities started getting recognised as the source of 'inspiration' (Craft, 2002). But still creativity was seen only in the form of product.

The construct of creativity as process or cognitive skill came in the latter half of nineteenth century with the rise of experimental psychology. This led to the development in the mid-twentieth century of tests to assess the types of thinking claimed to produce or reveal creativity. The interest in creativity as 'process' led to a wider consideration of creative processes in the mid-twentieth century, under the influence of systems theory. The systems theory focuses on the complex events that occur during creative manifestations. According to Csikszentmihalyi (2015), creativity is not just a mental process, but also a cultural and social event. The

modern construct of creativity generally emphasised two aspects– originality and appropriateness. This approach saw creativity as a response to a pre-existing problem, rather than re-imagining or creation of new ideas. In the late modern period, terms 'big C' and 'small c' emerged that broadened it to include everyone as potentially creative. According to Gardner (1993), "*big 'C' creativity entails the integration and reorganisation of cognitive structures while small 'c' entails the extension of existing cognitive structures".* With the further progression in the field, creativity began to be seen as a problem-solving tool, which includes the development of new commercial products and services, so the construct of creativity as innovation became extremely important (Charliele and Jordan, 2012). This idea of innovation led creativity from personal to social sphere; hence creativity as 'social' construct emerged. This construct viewed creativity as a collaborative social phenomenon developed in and through communities and groups, rather than residing within the individual. It was supported by Vygotsky's view (1978) that individual thinking arises from, and is determined by close social interaction. This construct emphasised the importance of social recognition and acknowledgement by the community in determining what is accepted as creative. Thus, different constructs of creativity were influenced by the values and perceptions of the context. Therefore, we may conclude that the contemporary understanding of creativity is complex as it has resulted from the accumulation of earlier constructs as well as recent developments in psychological research. Hence, creativity has many connotations, is multifarious and is a culturally positioned process (Misra and Srivastava, 2006).

Creativity in education specifically in context of school children is looked upon as a human attribute that helps to adapt and respond to the rapidly changing world which implies its application to the everyday life contexts (Craft, 2005). Thus, according to Craft, it is found not only in complex academic settings but also in everyday life. This has widened the conception of creativity from a rare to an everyday phenomenon. In this context, Anna Craft argues that all children are capable of or have potential to possess little 'c' creativity. The discourse emphasises that small 'c'/everyday 'c'/ little 'c' creativity perceives every child to be potentially creative. Narrowing down to the context of formal education to school or in fact to classrooms, the nurturance of creativity must be thought for every child irrespective of his/her disabilities, socio-economic backgrounds, or any other social context.

Rationale

Education plays an important role in every individual's life. And when we talk of children with special needs, role of education to empower and to give proper support according to their specific needs become even more crucial. The contemporary discourses of creativity imply that every child irrespective of his/her strengths, weakness, socio-economic background, disability can be potentially creative which should be nurtured through educational experiences. Children with special needs are often stigmatised and hence encounter many attitudinal and physical barriers (Dixon, 2005). In case of children with special needs Neihart (2008) talked of 'masking effect'. That is the needs arising due to disabilities of CWSN overshadow their abilities, which in turn leave their brighter side unnoticed. Thus, it is important that the teachers understand the specific needs of children in the classroom so that they can provide learning environment which helps the child to develop in a holistic manner and that the needs arising from abilities and disabilities should be met with same enthusiasm. Fortner (1986) on the basis of her study on intermediate-grade students with learning disability proclaimed that after creative productive-thinking training, the students with learning disability group significantly improved in a spontaneous writing task. Hence, if appropriate experiences are planned and provided to children with special needs, their creative potentialities can be unmasked and nurtured. Helen Keller was both deaf and blind. But with an appropriate support from her mentor, she was able to realise her potentialities. Thus, her case reinforces the importance of teachers in a child's life and a teacher's actions as well as initiatives depends on her conviction which in turn is largely influenced by her perception about children. Hence, the study envisages exploring teachers' perception about children with special needs and their creative potentialities.

Objectives

The objectives of the present study are as follows:

- To study the teachers' perception about role of educational background in their preparedness to engage with CWSN.
- To study the teachers' perception about the role of higher authorities and fellow teachers in engaging them to teach CWSN.
- To study teachers' perception about inclusion of CWSN.

- To explore the teachers' perception about creative potentialities amongst CWSN.

Method

A total of 20 teachers, working in different schools of Delhi were selected to participate in the study as the study required a continuous engagement with the same group of teachers for a period of time that included three rounds of focus group discussion. For the present study purposive and convenient sampling techniques were used. Purposive sampling helped the researcher to make the sample better representative of population keeping in minds the objectives of study by including teachers from different types of schools in Delhi. Table 1 shows the distribution of teachers from different schools of Delhi. The methodology of the research study was mainly qualitative and descriptive in nature as it involved descriptions of teachers' experiences and anecdotes related to CWSN in the class.

Table 1

Sample Distribution

Type of School	Number of Teachers
MCD School of Delhi	5
Private School	4
Inclusive School	4
Special School	4
Sarvodaya School (Government)	3

The data were collected using five-point Likert scale (developed by Evangeline Kern (2006), adopted and modified by researcher for data collection according to the needs of present study) followed by focus group discussion with the participant teachers. By using the five-point Likert type questionnaire, the researchers tried to know the teachers' attitude and opinion related to children with special needs and their creative potentialities as well as their preparedness to plan learning experiences for CWSN both in terms of their educational background and the in-service learning opportunities that they got. This was followed by focus group discussions that further probed teachers to share their detailed experiences specifically with reference to CWSN. It helped researcher to develop deeper understanding about the various themes that emerged from the analysis of responses to the Likert scale. On the basis of responses obtained from Likert scale and in the light of various research studies some points of discussion were prepared. All the

teachers were involved in three rounds of focus group discussion. First round of FGD involved orienting the teachers about the issues of inclusion and their interaction with CWSN. Second round involved deeper engagement of teachers with issues related to inclusion and creativity amongst CWSN. Third round was mainly about consolidating the ideas.

Analysis

The responses of teachers that were gathered using the Likert scale were organised by adding the responses in respective categories followed by calculating the mean for each item. The various items in the Likert scale as well as the teachers' responses during FGD were then categorised into four themes. The qualitative responses of teachers gathered during FGD have been quoted along with the interpretation of each table under each theme.

Theme 1: *Educational Background of Teachers*

The item related to this theme were: 1, 3, 19, 21, 25. These items are summarised below in tabular form.

Table 2

Theme 1

S.No.	Items		SD	D	N	A	SA	M
1	My educational background has prepared me to effectively teach children with special needs.	*f*	0	8	4	7	1	3.05
		%	0	40	20	35	5	
3	I need more training in order to appropriately teach CWSN.	*f*	0	0	0	12	8	4.4
		%	0	0	0	60	40	
19	My educational background has prepared me to teach students with special needs.	*f*	0	9	3	7	1	3
		%	0	45	15	35	5	
21	My educational background acquaints me well to identify creative potentialities in CWSN.	*f*	0	3	11	6	0	3.15
		%	9	15	55	30	0	
25	I am provided with sufficient in-service training through my school/state which allows me the ability to identify and nurture creative potentialities in children with special needs.	*f*	0	12	7	1	0	2.45
		%	0	60	35	5	0	
SA–Strongly Agree, A–Agree, N–Neutral, D–Disagree, SD–Strongly Disagree, M–Mean, f = frequency								

Analysis of responses to Likert scale indicated that most of the teachers (45%) think that their educational background does not prepare them to teach children with special needs. Forty per cent of teachers strongly agreed to the fact that they require more training in order to teach CWSN. Needs of in-service programme were also voiced out by the teachers to identify and the teacher from government school "....*blind ladki bahut accha gaati hai, is tarah ki creativity to hum easily identify kar lete hain, but hamare pass koi tools to hote ni aur na hi humne B.Ed. me kuch aisa pada....*". The responses show that the teacher education programmes need to have curricular spaces that addresses the issue of diversity amongst learners specifically with respect to CWSN and empower teachers to understand their learners without depending merely on the external tools. Instead the teacher education courses should help them understand the role of resources in their environment and collaborative models of teaching that involves the role of special educators, counselors, other school personnel as well as parents.

One of the teachers from regular school also mentioned that they get filtered information from the higher authorities regarding various beneficial schemes for CWSN provided by the government and other organisations, and when they encountered a child with creative potentialities in their classrooms they usually don't feel enough aware about tools, study materials, pedagogical modifications which may better equip them to nurture creativity that they could observe amongst their CWSN.

Theme 2: *Role of Higher Authorities and Fellow Teachers*

The items related to this theme were – 4, 5, 6, 11, 14, 15, 18.

Table 3

Theme 2

S.No.	Items		SD	D	N	A	SA	M
4	I am encouraged by my administrators to attend conferences/workshops on teaching students with special needs.	*f*	0	11	5	4	0	2.65
		%	0	55	25	20	0	
5	My colleagues are willing to help me with issues which may arise when I dealing with CWSN in my classroom.	*f*	0	1	9	9	1	3.5
		%	0	5	45	45	5	

6	I feel comfortable in working collaboratively with special education teachers when students with an IEP are in my classroom.	*f*	0	0	10	8	2	3.6
		%	0	0	50	40	10	
11	Collaborative teaching of children with special needs can be effective particularly when students with an IEP are placed in a regular classroom.	*f*	0	0	8	10	2	3.7
		%	0	0	40	50	10	
14	I can approach my administrators with concerns I hold regarding teaching CWSN.	*f*	0	4	12	2	2	3.6
		%	0	20	60	10	10	
15	I feel supported by my administrators when faced with challenges presented by CWSN in my classroom.	*f*	0	6	11	2	1	2.9
		%	0	30	55	10	5	
18	My school provides me with sufficient training opportunities in order for me to appropriately teach students with special needs.	*f*	1	9	7	3	0	2.6
		%	5	45	35	15	0	
SA–Strongly Agree, A–Agree, N–Neutral, D–Disagree, SD–Strongly Disagree, M–Mean								

As evident from Table 3, majority of the teachers reported that (M4 = 2.65) higher authorities did not motivate them to participate in in-service programme for CWSN. Very few teachers (15%) agreed that their school provided them with sufficient training opportunities to teach CWSN. The reason being that these teachers belonged to inclusive schools. From this it can be inferred that teachers who are working in inclusive setups have different experiences, and hence have different opinion. Quoting one of the teachers from inclusive school "*in collaboration with special educator, I modify my LPs according to his needs. During narration of a story he is in the class with other kids, but for writing work he goes to learning centre. Oral work is done with him in the class mostly*" (here the teacher is referring about a child who has cerebral palsy and learning disability). The teacher's response shows that in inclusive schools, teachers get an experience of working in collaboration with special educators. Also, they engage in planning for the child as per the child's needs, such as sending him to the learning centre for writing work. Thus, they develop an understanding that the responsibility of child's learning lies on them as a regular teacher, but it is a

process that involves collaboration with special educators, other school personnel and the parents. Hence, the idea of being trained to teach the CWSN, as also discussed in the above theme, would trivialise the issue. Instead the teachers have to be oriented and engaged with the idea of inclusion and inclusive pedagogy through teacher education programmes. Also, in most of the items, under this theme, teachers took neutral stand, which shows that they were not openly putting forward their views regarding the roles of concerned authorities in preparing them for nurturing specifically CWSN and the creative potentialities in them.

Theme 3: *About Inclusive Practices*

The item related to this theme were – 7, 8, 9, 10.

Table 4

Theme 3

S.No.	Items		SD	D	N	A	SA	M
7	Students who are diagnosed as autistic need to be in special education classrooms.	*f*	0	8	4	6	2	2.9
		%	0	40	20	30	10	
8	All efforts should be made to educate CWSN in the regular education classroom.	*f*	0	0	3	14	3	4
		%	0	0	15	70	15	
9	Students who are diagnosed as mentally retarded should be in special education classes.	*f*	0	3	9	6	2	2.65
		%	0	15	45	30	10	
10	Students who are verbally aggressive towards others can be maintained in regular education classrooms.	*f*	0	0	3	16	1	3.9
		%	0	0	15	80	5	
SA–Strongly Agree, A–Agree, N–Neutral, D–Disagree, SD–Strongly Disagree, M–Mean								

Table 4 shows that almost all the teachers felt that all children with special needs should be included in the regular classroom (M8 = 4). Some teachers (30%) agreed and very few (10%) teachers strongly agreed that students diagnosed with autism and mental retardation should be placed in special classes and others were neutral. But none of the teachers disagreed to the placement of children with autism and mental retardation in special schools. This shows that generally they agree that all children should be placed in regular classrooms, but in context of children with specific disabilities their opinions varied. Hence, it can be said that,

though the teachers agreed with the idea of inclusive educational practices, they also found inclusion to be case specific, that is whether the child should be placed in regular or special school would depend on the severity and type of disability. During the focus group discussion, a similar observation was recorded that although teachers appreciated the philosophy of inclusion but they argued that it was a theoretical concept which was difficult to be implemented in schools.

The teachers from one of the inclusive schools shared that the provisions in their school are adequately planned. The school had regular meetings and workshops for teachers and parents of CWSN. There were also counselors and special educators for each grade and the teachers have freedom to work according to the child's needs. This shows that teachers from inclusive schools were better prepared and had better understanding about CWSN due to the provisioning that was done in their schools. Thus, it can be said that including CWSN to the school could be done when the whole school is involved in the process along with the teachers.

Theme 4: *Creativity in Children with Special Needs (CWSN)*

The item related to this theme were – 2, 12, 13, 16, 17, 20, 21, 22, 23, 24, 25.

Table 5

Theme 4

S.No.	Items		SD	D	N	A	SA	M
2	Children with special needs can also be called differently-abled as they also possess different abilities in them.	*f*	3	0	1	13	3	3.65
		%	15	0	5	65	15	
12	I observed creative manifestations in my classroom while dealing with CWSN.	*f*	0	1	2	16	1	3.85
		%	0	5	10	80	5	
13	Every child has creative potentialities, as a teacher we can nurture that further.	*f*	0	0	0	13	7	4.35
		%	0	0	0	65	35	
16	According to me, exploring creative potentialities among CWSN is a very challenging task.	*f*	0	0	0	14	6	4.3
		%	0	0	0	70	30	

17	There are various factors in school that helps in fostering creative abilities of CWSN.	*f*	0	0	6	14	0	3.7
		%	0	0	30	70	0	
20	I can design activities to explore creative potentialities among CWSN.	*f*	0	3	7	10	0	3.35
		%	0	15	35	50	0	
21	My educational background acquaints me well to identify creative potentialities in CWSN.	*f*	0	3	11	6	0	3.15
		%	9	15	55	30	0	
22	I am able to use various teaching strategies to deal with CWESN while focusing on their creative potentialities.	*f*	0	3	12	5	0	3.1
		%	0	15	60	25	0	
23	Being a teacher, I can design activities which can help to nurture creative potentialities in CWSN.	*f*	0	2	9	9	0	3.35
		%	0	10	45	45	0	
24	In/out of my class CWSN often expressed creative potentialities in one or another way.	*f*	0	2	2	16	0	3.7
		%	0	10	10	80	0	
25	I am provided with sufficient in-service training through my school/state which allows me the ability to identify and nurture creative potentialities in children with special needs.	*f*	0	12	7	1	0	2.45
		%	0	60	35	5	0	
SA–Strongly Agree, A–Agree, N–Neutral, D–Disagree, SD–Strongly Disagree, M–Mean								

About 65 per cent of teachers agreed that as CWSN possessed different abilities, they can be called differently-abled. Thus, it can be inferred that most teachers believed that other than impairments, the CWSN also had other abilities that need to be nurtured. However, few teachers (15%) disagreed to this proposition. During the focus group discussion, researchers tried to understand the reasons for difference in opinion amongst teachers. It was found that teachers who didn't have any experience with CWSN, and were not able to interact or engage with them, it was difficult for them to discuss or acknowledge the abilities present in these children. Also, they had very little understanding about their role with respect to

nurturance of creativity among CWSN. Low mean value (M16 = 1.7, Negative Statement) showed that significant numbers of teachers agreed that exploring creative potentialities amongst CWSN was a challenging task.

Responses of the teachers were analysed school wise, which showed that teachers from special schools and inclusive schools had positive attitude towards CWSN and hence has positive outlook for their creative manifestations as well. As quoted by one of the teachers "……*is diagnosed with cerebral palsy…..he is very good at creative activities. He shows his interest in stories and dramas.*" On the other hand, teachers from regular schools (whether private or government) were neutral or indifferent towards CWSN. One of the government school teacher said "…*till now I did not encounter a child with special needs in my classroom, I do not have any experience in this regard"*. One of teachers from inclusive school shared her experience with a child with hyperactivity. She shared that this child had creative language skills and was way ahead in comparison to rest of the class. The teacher thus realised that while his hyperactivity can be seen as leading to special need, he also had creative abilities. Another teacher from private school shared about a girl with low vision who was very good at dancing and singing. The teacher shared that this girl lacked peer acceptance and thus she felt that her dancing and singing was one of the ways of expressing herself. This shows that teachers who have direct experience with CWSN and engaged with them on a regular basis along with support from special educators were found to observe creative aspects of children also.

Discussion and Conclusion

In the present study, most of the teachers shared about the heterogeneity that existed in their classrooms by virtue of child's culture, developmental differences, varied abilities and diverse backgrounds that showed that the teachers were cognizant about the learners in their classrooms and their contexts. This showed their close engagement with their learners and re-emphasises the fact that the teachers' perception is one of the most important ways for understanding children's abilities. A study done by Fortner (1986), on students with learning disability, showed that on providing training on creative productive-thinking, writing skills of students were found to have significantly increased. Thus the intervention by the teachers and their role in understanding the

learners is very essential. Through analysis of the data collected and teachers' responses during FGD, it was observed that the teachers from inclusive set up got sufficient opportunities to interact effectively with CWSN and hence had positive attitude towards them. They could discuss and share significant instances where they had observed creative potentialities among CWSN as compared to other teachers. Similarly, teachers who are working in inclusive schools had experience of working collaboratively with special educators who through appropriate interventions, helped regular teachers to engage with CWSN in the classroom. Girl and Lim (1998) shared the same understanding in their research where they investigated the social perceptions and connotations of the terms 'creativity' and 'disability'. They collected the data from two groups of teachers; one who worked with people with disabilities and another group comprised of teachers who didn't work with or were not directly involved with people with disabilities on regular basis. Findings of the study revealed that teachers who worked with people with disabilities had positive inclination towards them as compared to those teachers who were not exposed to people with disabilities. This implies that teacher education programmes should include curricular experiences that engage the pre-service as well as in-service teachers with collaborative models of teaching where regular school teacher understands how they can work for CWSN by teaming up with special educators and their parents. This would help the teachers to understand that collaborating with others was one of the essential ways in which they can focus and discuss the needs that were arising out of the potentialities amongst the CWSN rather than only addressing their needs due to their respective impairments or disadvantaged positions.

The study also pointed out that the school ethos and culture that gets nurtured towards inclusion by the active contribution from the authorities of the school leads to have positive experiences amongst the teachers. Few government school teachers shared that they wanted to put efforts for CWSN in their classrooms, but they did not have resources and guidance to work in that direction. All teachers specifically from regular schools felt the need to upgrade themselves with various teaching strategies and pedagogies which would help them to plan experiences for nurturing all kinds of needs that arise from abilities as well as disabilities in the classroom. Julka (2006) also highlighted some issues in this direction that is

regarding the lack of teacher preparation and training in responding to the needs of children with disabilities, which is a reflection on the inadequate preparation of teachers to address diversity in the classroom. Therefore, it can be said that we need to strengthen our pre-service and in-service teacher education programmes in such a way that empowers the teachers with content, pedagogy, values and technologies so that diverse needs of children could be addressed. The present study also showed that most of the teachers had only the popular idea about creativity and have shared that they had gathered very limited understanding about creativity during their teacher education programme which has also been found in the study conducted by Girl and Lim (1998). Thus, teacher education programmes should include the contemporary ideas of creativity that represent various perspectives of creativity including domain specific creativity and everyday creativity. Teachers also pointed out the need of seminar and workshops on periodic basis for updating themselves and also to put forward issues that they faced during their teaching even after getting help from special educator. During focus group discussion, experiences shared by one of the teacher from an inclusive school showed that inclusion where all children's needs as well as potentialities are equally acknowledged by the teachers required efforts, preparation and involvement from the whole school. That is, along with teachers other school personnel must equally participate in the process. Dever and Hamill (1998) conducted a study on teachers, which mainly focused on teachers' understanding and their roles in the process of inclusion of children with special needs in general school settings. One of the findings showed that there was a lack of administrative support in implementation of inclusionary practices which in turn lead to environment of stress and pressure for teachers in school. Present study puts forward the same issue and has emphasised the need of positive contribution from the whole school in being crucial for inclusion to be achieved. Thus, it can be said that the true inclusion can happen only when we start looking beyond the impairments or disadvantages of the CWSN and start focusing on their other creative potentialities so that they could be appropriately nurtured. This requires that our teacher education programs should bring a change in the attitude of teachers towards inclusion; only then can we expect that the true potential of our children with special needs would get acknowledged.

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Impact of Storyline on Creativity among Middle School Children

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ABSTRACT

Storyline being a relatively new technique, there are very few studies that have assessed its efficacy in enhancing creativity. The present study focused on the impact of story line as an intervention on enhancing creativity levels among middle school children. Further, the impact of storyline on verbal and nonverbal creativity as well as among the components of creativity with regard to gender was also assessed. The study followed a pre-post intervention experimental design with a control group. Using convenience sampling, 75 students from a single school consisting of 41 boys and 34 girls were evaluated using the creativity assessment test (Mehdi, 1989). Then based on the creativity scores, the children were systematically allotted to the experimental and control group in such a way that both the groups had equal representation of students from all levels of creativity. The experimental group was provided with storyline as an intervention whereas the control group received no intervention. The results reveal that there is a significant difference between the experimental and control group with regard to total creativity scores, verbal creativity, verbal elaboration and verbal originality scores. Results also indicate that storyline enhanced creativity equally among boys and girls.

Keywords: *Creativity, Verbal and nonverbal creativity, Components of Creativity, storyline, Middle school children.*

Introduction

The advancement during the twenty first century in science, information and technology have been a boon in many areas but it

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also has led to the complexities of life. These complexities demand solutions to already existing problems as well as to new problems in various areas. The role of creativity becomes relevant as it helps in providing solutions for the problems.

Creativity is an ability to do something new or novel which is valuable (such as an idea, a scientific theory or an object, a painting, a literary work, etc.). In other words, creativity can be viewed as a series of dimensions or attributes of an individual's ability to produce valuable ideas, or novel and workable tasks, or a unique talent, or to use imagination to *create socially useful products* (Amabile, 1996; Boden, 2001; Lubart, 1994; National Advisory Committee on Creative and Cultural Education, UK (NACCCE), 1999; Onda, 1994; Rogers, 1954; Zabelina and Robinson, 2010). Creativity doesn't just contribute to individuals, but it also contributes to society and culture ultimately. Cannatella (2004, p. 121) suggested that "The need for creativity is biologically, physically, and psychologically an essential part of human nature and that it is necessary for human growth and cultural striving". Hence it is imperative that the skill of creativity is enhanced. Many of the previous studies have confirmed the efficacy of various intervention techniques such as play, brainstorming, appreciative inquiry, creative reversal act (CREACT), etc., in enhancing creativity. (Berretta and Privette, 1990; Harkow and Rosa, 1996; Garaigordobil, 2006; Karakelle, 2006; Chavez-Eakle 2009; Eow et. al. 2010; Kangas, 2009; Sak and Oz, 2009; Subbotsky, Hysted and Jones, 2010; Garaigordobil and Berrueco, 2011; George, and Basavarajappa, 2016; Rizi, Yarmohamadiyan, and Gholami, 2011; Smogorzewska, 2011).

The aforementioned studies also show that these interventions were provided to participants who belonged to the age group from five year old to even adults. Erikson et al., (1959) and Piaget (1983) have suggested that the sensitive period of developing higher order thinking skills like creative thinking, critical thinking is around 10 years to 12 years of age. Studies by other researchers have also identified that peak periods of development of creativity falls within 10–12 years of age. Hence, subjecting children to interventions to enhance creative thinking (higher order thinking) at the sensitive period of development (10 years to 12 years) can be more beneficial than subjecting them to interventions at the earlier or later stages of development. Hence the present study focused on middle school children (10–12 years) which is within the sensitive period of development of creativity.

Among many creativity enhancement techniques, storyline is a relatively new technique (Bell and Harkness, 2006). The findings from the earlier studies (Bell and Harkness, 2006; McBlain, 2007; Smogorzewska, 2011) have shown that storyline helps in enhancing originality and provides the opportunity to elaborate, and encourages the use of visualisation, imagination, transformation and synthesis. However, the number of empirical studies to check its effectiveness in enhancing creativity is few. Hence, the present study has made an attempt to verify the effectiveness of storyline in enhancing creativity and its components among middle school children.

Objectives

- To find out the impact of storyline on creativity and its components, and
- To find out if any significant gender difference exists with regard to the impact of storyline on creativity and its components.

Based on the objectives the following null hypothesis were proposed for the study.

Hypotheses

- There is no significant impact of storyline on creativity and its components, and
- There is no significant gender difference with regard to the impact of storyline on creativity and its components.

Method

Design of the Study

The present study adopted a pre-post intervention experimental design with a control group.

Sample

For the present study, the researcher chose a single school and students from a single grade (V grade) to control the environmental factors. Thus, 75 middle school children (41 boys and 34 girls) between the ages of 10.6 to 12.6 years (V grade) from a state board school (co-educational) of Tamil Nadu, India were selected. Those children who were physically or mentally challenged and those who were exposed to similar interventions earlier were excluded.

Research Tool

Creativity was assessed using Mehdi's (1989) test of creative thinking. The test consists of verbal and nonverbal test for creative thinking. The verbal test of creative thinking includes four sub tests with stipulated time limits namely — consequence test (15 minutes), unusual uses test (12 minutes), similarity test (15 minutes), and production improvement test (6 minutes).

The nonverbal test of creative thinking includes three sub-tests with fixed time limits, namely picture construction activity (10 minutes), incomplete figures activity (15 minutes) and triangles and ellipses activity (10 minutes). The total time required to administer the test is 1 hour 23 minutes.

Further, as directed by the author the sub-tests were scored for fluency, flexibility, elaboration and originality. The author reported test-retest reliability ranges from 0.896 to 0.959 for verbal creativity and 0.932 to 0.947, for nonverbal creativity. The validity coefficients for factor scores and the total creative thinking scores are high enough (sig. beyond 0.01 level) for both verbal and nonverbal tests of creative thinking.

Procedure

The study included three phases: pre-intervention phase, intervention phase and the post-intervention phase.

Pre-intervention phase

The selected students (n=75) were administered the research tool and then percentiles were computed separately for boys and girls. Thereafter, the students were categorised into low (0–33 percentile), moderate (34–66 percentile) and high (67 and above) levels of creativity. Further, the students were sequentially allotted to the experimental (n=39) and control groups (n=36) in such a way that both the groups have students from all the three levels (low, moderate, high) of creativity scores. Further to check if the groups are randomised/matched, independent sample *t* test was applied to the total creativity scores (composite score of all the components of creativity) of both experimental and control group. The results (t (73)=0.64, p=0.67), indicate that there was non-significant difference between the groups with regard to the total creativity score. In other words, both the groups are matched with regard to total creativity and any change in the post test could be attributed to the effect of intervention.

Intervention phase

The intervention module for the present study included ten activities, and was prepared by referring to the previous studies (Bell and Harkness, 2006) and the life skills training package published by RIE (NCERT), Mysuru (George, 2005). All the activities in the intervention module were *group* activities and were given to the experimental group (n=39), whereas the control group (n=36) was not subjected to any intervention and were attending their regular classes wherein their respective teachers engaged them with academic sessions. Each activity of the intervention was carried out within a span of 80 minutes. Thus, the *ten sessions* of intervention for the experimental group were completed in 800 minutes. However, before starting the intervention sessions (ten sessions) the researcher conducted two sessions of ice breaking to enable the group members to become familiar with each other and to the researcher. The activities were conducted within the school premises (inside the computer lab, which was spacious enough and free from other disturbances and distractions maintaining a uniform intervention situation) during the school timings.

For every activity, the experimental group was further categorised (using different methods) in sub-groups so that the activities could be carried out in a more meaningful way. Subgroups consisted of 5/6 members. Care was taken to see that the members within the subgroups were not the same as in the previous activities. The common instructions given to the students were that; *they had to develop a story from the fragments they received. They had to plan a title for their story. Their stories should have a moral message and every participant in the group should take part in the discussions of framing the story. The stories should not be copied from any book or from movies.* After every activity, the researcher asked the groups to identify and appreciate all the creative ideas of each group.

Post intervention phase

After 10 sessions of intervention, post-test was done by administering the verbal and nonverbal test of creative thinking (Mehdi, 1989) on both the experimental and control groups and scored.

Statistical techniques used

For the purpose of data analysis, appropriate statistics like descriptive statistics, and *t* tests were calculated using SPSS for windows (version 16.0).

Results

The pretest data reveals that 32% of the selected sample possessed low levels of creativity, 33.3% of them had moderate levels of creativity and 34.7% of them expressed high levels of creativity. Among the girls 38.2% expressed low levels of creativity, 29.4% expressed moderate levels of creativity and 32.4% expressed high levels of creativity. However, among the boys 26.8% expressed low levels of creativity, 36.6% expressed moderate and high levels of creativity respectively.

Table 1

The results of independent *t* test from the gain scores of Creativity and its components

Components of creativity		Groups	Mean	SD	Mean differences	*t* values	Sig
Elaboration	nonverbal	Experimental	21.33	11.37	2.86	1.12	0.24
		Control	18.47	9.12			
	verbal	Experimental	17.67	11.65	6.42	2.31*	0.02
		Control	11.25	12.39			
Originality	nonverbal	Experimental	1.97	4.96	1.71	1.71	0.09
		Control	0.28	3.42			
	verbal	Experimental	19.87	16.68	8.98	2.60*	0.01
		Control	10.89	12.73			
Fluency (verbal)		Experimental	15.87	13.39	4.07	1.29	0.20
		Control	11.81	14.01			
Flexibility (verbal)		Experimental	19.33	13.49	3.14	1.08	0.28
		Control	16.19	11.42			
Nonverbal creativity		Experimental	23.31	12.91	4.56	1.63	0.11
		Control	18.75	10.99			
Verbal creativity		Experimental	72.74	43.40	22.61	2.40*	0.01
		Control	50.14	37.53			
Total creativity		Experimental	96.05	46.93	27.16	2.59*	0.01
		Control	68.89	43.55			

*Significant at $p < 0.05$

To find out if there was significant enhancement of creativity levels in comparison to the control group; first, the differences between pre-test and post intervention scores for the total creativity scores and its components were computed for both the experimental and control group. Thereafter, to know if these differences obtained

were significant, *independent t test* was computed on the *pre-post test differences (gain scores) of the total creativity scores and its components between the experimental and control groups*. Table 1 shows significant difference between the experimental and control group with regard to the gain scores on total creativity, verbal creativity, verbal elaboration and verbal originality. No significant differences were observed between the experimental and control group with regard to the scores of fluency, flexibility, nonverbal creativity, nonverbal elaboration and originality.

The mean values from the gain scores show that experimental groups have a higher mean compared to the control group, indicating that the intervention has created enhancement in the creativity levels of the experimental group. The slight improvement in the creativity levels of the control group could be attributed to the practice effect on the questionnaire, and probably the students in the control group would have discussed with their friends in the experimental group after their regular school hours about the activities being given to them, which in turn would have given them insights.

Since, significant differences were obtained between the experimental and control groups with regards to the total creativity and some of its components (verbal creativity, verbal elaboration and verbal originality), the hypothesis is partially rejected.

Table 2

Results of independent *t* test from the gain scores of Creativity and its components between both genders

Components of creativity		Groups	Mean	SD	Mean differences	*t* values	Sig
Elaboration	nonverbal	Girls	24.39	13.38	5.68	1.58	0.12
		Boys	18.71	8.83			
	verbal	Girls	19.67	11.14	3.72	0.99	0.33
		Boys	15.95	12.07			
Originality	nonverbal	Girls	1.06	2.60	1.7	1.07	0.29
		Boys	2.76	6.28			
	verbal	Girls	22.89	15.06	5.6	1.05	0.30
		Boys	17.29	17.91			
Fluency (verbal)		Girls	19.94	15.20	7.56	1.81	0.08
		Boys	12.38	10.80			
Flexibility (verbal)		Girls	21.61	16.4	4.23	0.98	0.34
		Boys	17.38	10.40			

Nonverbal creativity	Girls	25.44	13.86	3.96	0.96	0.35
	Boys	21.48	12.08			
Verbal creativity	Girls	84.11	42.37	21.11	1.54	0.13
	Boys	63	42.87			
Total creativity	Girls	109.56	42.71	25.08	1.70	0.09
	Boys	84.48	48.26			

Note: None of the values are significant at 0.05 levels

Further, to find out the impact of storyline between the genders of the experimental group, the pre-post intervention differences (gain scores) of the total creativity and its components were computed for the girls and boys of the experimental group. Later, to know if the differences obtained are significant, independent *t* test was applied on the gain scores obtained for the total creativity and its components between boys and girls. The results (Table 2) revealed that boys and girls in the experimental group did not differ significantly. Hence, the hypothesis is accepted.

Discussion

The results from Table 1 show that there is significant difference between the experimental and control groups with respect of total creativity, verbal creativity, verbal elaboration and verbal originality. In other words, the intervention storyline has been effective in enhancing creativity and some of the verbal components. Thus, the result of the present study confirms the results of earlier studies, which affirm that creativity can be enhanced through interventions (Antonietti, 2000; Fleith et al., 2002; George, K.M. and Basavarajappa, 2016; Komarik and Brutenicova, 2003; Saxon et al., 2003). Further the results of the present study are also in line with the findings of the earlier studies, which have shown the positive effects of storyline on creativity. (Bell and Harkness, 2006; McBlain, 2007; and Smogorzewska, 2011).

The result also shows that storyline was found to be more effective in enhancing verbal creativity and its components compared to nonverbal creativity. Storyline as an intervention involves more of verbal responses through the discussions of framing the stories focusing on the episodes, setting and dialogues from the fragments provided. These verbal responses which are stimulated would have helped in enhancing verbal creativity. In addition, though the present education system focuses on learning by doing, the assessments and evaluation gives more weightage

to the verbal skills. Hence the children would be attuned to express their creativity more through verbal responses. The above mentioned reasons could have led to the enhancement in verbal creativity scores.

The present study has also made an attempt to know whether there are any significant differences between the genders with regard to the impact of storyline in enhancing creativity. The results from table 2 reveal that there is no significant difference between the genders with regard to the impact of storyline. In other words, storyline has been effective in enhancing creativity equally among boys and girls. An intervention of this nature would have been interesting for the children as it was different from their routine class activities which in turn would have led to the enhancement of creativity for both the gender.

Conclusion

- Storyline has led to a significant enhancement with regard to the total creativity scores, verbal creativity, verbal originality, verbal elaboration, fluency and flexibility scores.
- Though there has been enhancement, no significant enhancement was observed with regard to nonverbal creativity, fluency and flexibility, nonverbal elaboration and nonverbal originality.
- The intervention of storyline has been effective in enhancing creativity equally among boys and girls.

Limitations and Suggestions

The major limitation of the study was that no attempt was made to check the efficacy of the intervention specifically on children who have scored low, moderate and high levels of creativity. Since the present study has focused only on the impact of one intervention, future researches can focus on conducting and comparing the efficacy of more number of interventions on enhancing both verbal and nonverbal creativity. Studies can also focus on giving combinations of interventions to check if that works better than giving interventions individually.

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Pre-service Teachers' Beliefs Concerning the Nature of Mathematics and Teaching-learning of Mathematics

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ABSTRACT

The National Curriculum Framework—2005 calls for an epistemological shift in school mathematics, advocating a shift from 'narrow' goals to 'higher' goals of mathematising. However, to translate this vision into reality, one needs to recognise the significance of the agency of teacher. This necessitates a fundamental reconceptualisation of teacher preparation and professional development programmes, wherein investigating and challenging the teachers' beliefs have a crucial role. This study explores pre-service teachers' beliefs about nature of mathematics and its pedagogy. The paper also attempts at discussing probable consequences of the beliefs held by them for teaching and learning of mathematics. Results show that structural spaces need to be created to engage prospective teachers in the process of reflection, which in turn can help critically inform practice.

Introduction

Philosophical Perspectives on Nature of Mathematics

Mathematics is generally viewed as 'a body of knowledge', and the aims of teaching-learning mathematics are generally thought of as 'to acquire the basic mathematical skills and numeracy and to solve practical problems with mathematics'. However, there are controversies over what mathematics is and what the aims of teaching-learning mathematics are (Ernest, 2014, p. 3). The academic philosophy of mathematics addresses technical philosophical issues in relation to the epistemology of mathematics,

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and the values and beliefs inherent to the development and validation of mathematical knowledge. This body of literature documents a number of different academic philosophies of mathematics: realism, Platonism, empiricism, logicism, intuitionism, formalism, conventionalism, and social constructivism.

The diverse philosophical stances about nature of mathematics hold different positions about mathematical knowledge. Some of these (realism, Platonism, formalism, and logicism) can be loosely grouped together and described as 'traditional' philosophies of mathematics because they share an absolutist view of mathematics. In such a view, mathematics is seen as a body of infallible and objective truth, super-human, free from social, cultural and political influences and thus absolute (Ernest, 2014) and mathematical activity is seen as highly abstract, formalised and decontextualised. Such a view assumes a separation between cognitive processes and the settings and activities of which they are a part and treats knowledge as a factual commodity or compendium of facts. At school level, this conception of mathematics gets manifested in the form of cultural discontinuity between 'academic' mathematics and everyday mathematics; resulting in the exclusion of some particular groups.

However, these absolutist conceptions have been challenged, and in the past sixty years a new philosophy of mathematics has been emerging which proposes a humanistic alternative, that is, fallibilism (Ernest, 2014). The fallibilist or 'new' philosophies of mathematics include philosophical stances about nature of mathematics such as fallibilism, quasi-empiricism, humanism, and social constructivism. The fallibilist position views mathematics as socially and culturally constructed; and politically situated (Ernest, 2014). This position redefines mathematics as a fallible social construction; a coming to know, continually expanding field of human creation and invention; and provides a rationale as well as a foundation for 'inclusive' approaches to mathematics; wherein the social contexts of the uses and practices of mathematics can no longer be legitimately pushed aside. Mathematics, then, needs to be studied in living contexts which are meaningful and relevant to its learners, including their languages, cultures and everyday lives, as well as their school based experiences.

Although the link between philosophy of mathematics and its teaching-learning is often invisible, some well-known

mathematicians (for example, Reuben Hersh, 1979) have indicated that there exists a direct link between the two. However, the 'new' (fallibilist) view of mathematics remains a controversial philosophy of mathematics and has fewer supporters than those of absolutism Ernest, 2014). As mathematics educators, we feel that mathematics teachers need to be aware of the philosophical debates and disputes regarding the nature of mathematics. They need to be aware of and acknowledge the legitimacy of both the fallibilist and absolutist views of the nature of mathematics.

The Indian Context

Keeping in tune with the theoretical advancements in the understanding of philosophy, history and sociology of mathematics there has been a review of the purposes of mathematics education at the national level. The *National Curriculum Framework-2005* advocates a shift from achieving 'narrow' goals to 'higher' goals of 'mathematising'; a shift in focus from mathematical content to mathematical learning environments, offering multiplicity of approaches, procedures and solutions (NCERT, 2006). The shift from the conventional noun 'mathematics' to the verb 'mathematising' poses a challenge to the conventional epistemology of mathematics.

Teachers' Beliefs about Mathematics and its Teaching-learning

The prospective teachers' limited knowledge of a particular teaching subject is often discussed in the academic discourse, but discussions about beliefs that prospective teachers carry about the nature of discipline are seldom thought about (Sullivan, 2003). A teachers' way of teaching and changing her/his practice of teaching, in fact, is affected by several factors—teachers' beliefs, expectations, experience, pedagogical and content knowledge, certification and licensure, and educational attainment that constitute a *teacher's background* (Goe, *et al., 2008*). Of all these *inputs* that a teacher brings to her/his position, belief is a major one as it also influences teachers' planning, decision-making and subsequent classroom behaviour.

Researches also attest to the fact that teaching practices in a particular subject are affected by the beliefs teachers hold about teaching-learning of and the nature of that discipline. Teachers' beliefs about the nature of mathematics and its teaching-

learning have been found to influence their teaching practices in mathematics (Ernest, 1989; Emenaker, 1996; Beswick, 2007; Dede and Uysal, 2012). Thus, it is critical to address the beliefs pre-service teachers hold toward mathematics since these beliefs can have a strong influence on their approaches to teach mathematics (Emenaker, 1996) and 'in turn (those teacher actions) have a tremendous impact on students' belief systems' (Raymond, Santos, and Mansingila, as cited in Emenaker, 1996).

Beliefs are basic knowledge and general understandings which a person holds. Although researches on teachers' beliefs have increased in the recent decades the theoretical construct of belief lacks a commonly agreed definition (Dede and Uysal, 2012; Leder *et al.*, 2002). The term 'belief' has been considered equal to 'personal judgments', concepts, meanings, propositions, rules, preferences, 'mental constructs', and 'psychologically held understandings, premises, or propositions about the world' (Dede and Uysal, 2012). In general terms, beliefs have been defined as the lenses through which an individual makes sense of the world around and as such influence the way one interacts with the world (Philipp, as cited in Swars, 2007a). This implies that teachers' beliefs are central to what occurs in classrooms. Visible teaching practices that occur in the classroom are partly a result of the hidden interpretive lenses a teacher holds (Aydin *et al.,* 2010).

Given the multiplicity of definitions of 'beliefs', we have chosen the one given by Raymond (1997), for the purposes of the present study, which defines mathematics beliefs as 'personal judgments about mathematics formulated from experiences in mathematics, including beliefs about the nature of mathematics, learning mathematics, and teaching mathematics' (*ibid.* p. 552).

Attempts have also been made to categorise mathematics beliefs, and frameworks for studying the mathematical beliefs have been proposed. For example, Dionne, 1984 (as cited in Torner and Pehkonen, 1999) has proposed the following perspectives of a mathematical belief system:

- Mathematics is seen as a set of skills (*traditional perspective*): Doing mathematics is doing calculations, using rules, procedures and formulas.
- Mathematics is seen as logic and rigor (*formalist perspective*): Doing mathematics is writing rigorous proofs, using a precise and rigorous language and using unifying concepts.

- Mathematics is seen as a constructive process (*constructivist perspective*): Doing mathematics is developing thought processes, building rules and formulas from reality experience and finding relations between different notions.

Ernest (1989) has also proposed similar views of mathematics:

- *The Instrumentalist View:* The view that mathematics is a useful but unrelated collection of facts, rules and skills.
- *The Platonist View:* The view of mathematics as a static but unified body of knowledge, consisting of interconnecting structures and truths. Mathematics is a monolith, a static immutable product, which is discovered, not created.
- *The Problem Solving View:* The dynamic, problem-driven view of mathematics as a continually expanding field of human inquiry. Mathematics is not a finished product, and its results remain open to revision.

The above mentioned views correspond more or less to Dionne's three perspectives of a mathematical belief system (Torner and Pehkonen, 1999).

Taking into cognisance new epistemology of mathematics, NCF-2005 acknowledges the 'cultural grounding of mathematics' when it notes that "mathematical competence is situated and shaped by the social situations and the activities in which learning occurs. Hence, school mathematics has to be in close relation to the social worlds of children where they are engaged in mathematical activities as a part of daily life" (NCERT, 2006, p. 11). Such a conception of mathematics necessitates a fundamental reconstruction of school mathematics at all levels — curricular choices, pedagogy, assessment, etc. The shift envisaged, poses fundamental changes in teacher preparation and professional development. As the NCF (2005) also points out, "more so than any other content discipline, mathematics education relies very heavily on the preparation that the teacher has, in her own understanding of mathematics, of the nature of mathematics, and in her bag of pedagogic techniques" (p. 6), it becomes pertinent to examine teachers' beliefs about mathematics.

The present study, therefore, aimed at investigating the beliefs of pre-service teachers about the nature of mathematics, and teaching-learning of mathematics, in the light of *National Curriculum Framework-2005*.

Method

Participants

The sample consisted of 50 pre-service elementary teachers enrolled in a four year undergraduate teacher education programme offered by the University of Delhi. All the participants were in the first year of their course.

Procedure

A mathematics belief inventory consisting of 4-point Likert type items was used. Items were taken from Evans (2003) and Hart (2002), as adapted by Zakaria and Musiran (2010). The inventory consisted of 23 items covering three dimensions: *beliefs about the nature of mathematics*, *beliefs about teaching mathematics* and *beliefs about learning mathematics*.

The second phase of the study involved focused group discussion with the prospective teachers to further probe reasons for agreements and disagreements to the given statements, and to understand inconsistencies in their responses.

Results and Discussion

Beliefs about Nature of Mathematics

Conception of the nature of mathematics pertains to 'a teacher's belief system concerning the nature of mathematics as a whole' (Ernest, 1989). The pre-service teachers' views regarding the nature of mathematics were studied with the help of seven statements included in the rating scale which asked them to indicate the extent to which they agree/disagree with the statements. Table 1 summarises their responses.

Table 1

Beliefs about Nature of Mathematics

Item No.	Items	Strongly Disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)
#3	Mathematics problems can be done correctly in only one way.	50.0	43.0	7.0	0.0
#7	Males are better at math than females.	66.0	17.0	10.0	7.0
#10	Some students have a natural talent for math and others do not.	7.0	35.0	47.0	11.0

#12	Mathematical knowledge is fixed and absolute.	12.0	11.0	49.0	28.0
#14	Mathematics is about reasoning, posing and solving problems.	2.0	22.0	49.0	27.0
#19	In mathematics something is either right or it is wrong.	4.0	18.0	58.0	20.0
#20	Some people are good at mathematics and some are not.	5.0	12.0	53.0	30.0

As shown in Table 1, majority (93%) of the respondents believed that there can be multiple ways of doing mathematical problems correctly, as against the common notion of one 'right' way to obtain one 'right' solution. This is further corroborated by a huge agreement (76%) to the statement that 'mathematics is about reasoning, and posing and solving problems', as against the popular perception of the discipline being dry and dull. However, majority (78%) of them also believed that 'in mathematics something is either right or it is wrong'— there cannot be any partial solution to a mathematical problem— either you know it or not; thus leading to anxiety (NCF, 2005). Also, most of the prospective teachers (78%) view mathematical truths as fixed and absolute, and thus fail to challenge the infallibility of mathematics and do not take into cognisance the new philosophy and epistemology of mathematics.

A large proportion of prospective teachers did disapprove that 'males are better at math than females' (83%). This shows a positive attitude towards girls' capabilities of doing mathematics and hold that mathematical abilities are not the monopoly of any one particular group. Still, most of them believed that some students have a 'natural talent' for mathematics (58%) and 'some people are good at mathematics than others' (83%). Such statements majorly focus on socio-political dimensions of mathematics education. Many of the teachers' assumptions come from the attitudes and beliefs prevailing in wider social contexts. Teachers need to challenge erroneous assumptions that link success in mathematics to some special talent/innate ability that only a few possess, and thus deconstruct what mathematical 'ability' and 'achievement' constitutes *(not asked in the listed data)*. This is essential for equitable mathematics instruction for all, as also envisaged by NCF-2005.

Beliefs about Teaching Mathematics

Beliefs about teaching mathematics pertain to the 'teacher's conception of the type and range of teaching actions and classroom

activities contributing to her/his personal approaches to the teaching of mathematics. It includes mental imagery of prototypical classroom teaching and learning activities, as well as the principles underlying teaching orientations' (Ernest, 1989).

Table 2

Beliefs about Teaching Mathematics

Item No.	Items	Strongly Disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)
#2	Mathematics should be taught as a collection of skills and algorithms.	0.0	5.0	81.0	14.0
#4	In mathematics, increased emphasis should be given to use of key words to determine which operation to use in problem solving.	5.0	20.0	56.0	19.0
#5	A major goal of mathematics instruction is to help student develop the belief that they have the power to control their own success in mathematics.	0.0	21.0	45.0	34.0
#8	More than one representation (picture, concrete material, and symbol set, etc.) should be used in teaching a math concept.	0.0	5.0	51.0	44.0
#11	Good math teachers show you the exact way to answer the question you will be tested on.	12.0	30.0	49.0	9.0
#13	In mathematics, skill in computation should precede word problems.	2.0	17.0	56.0	25.0
#15	Students should be encouraged to justify their solution, thinking and conjectures.	3.0	3.0	51.0	43.0
#17	Basic computational skills on the part of the teacher are sufficient for teaching mathematics.	10.0	54.0	32.0	4.0

To study the pre-service teachers' views regarding the teaching of mathematics, 8 statements were given in the rating scale which asked them to indicate the extent to which they agree/disagree with the statements. Table 2 presents a summary of their responses.

As shown in Table 2, majority (95%) of the respondents agreed on the desirability of using multiple representations (picture, concrete material, and symbol set, etc.) in teaching a math concept. These multiple modes of representation also correspond with Bruner's three modes of learning: *enactive, iconic,* and *symbolic*.

Majority of the prospective teachers also believed that 'students should be encouraged to justify their solution, thinking and conjectures' (94%) and 'mathematics instruction should aim at helping students develop the belief that they have the power to control their own success in mathematics' (79%), indicating trust in students' ability to construct mathematical knowledge and take control of their own learning.

Although the majority of respondents (64%) believed that only 'basic computational skills' on the part of the teacher are not sufficient for teaching mathematics, most of them (58%) felt that good math teachers should show their students the exact way to answer the question they will be tested on. On one hand they believed that computational skills constitute one aspect, not the only aspect of mathematics teaching, yet they are placing invariable emphasis on the procedural knowledge (that a teacher needs to impart) for being successful in mathematics. This kind of response contradicts with their earlier response that the students should be active enough in their learning and be given opportunities to hone their cognitive capacities of reasoning and thinking so that they may be in control of their own success in mathematics, as it continues to see the teacher as the epistemic authority who needs to show the 'exact way' of doing mathematics. Such a response also leaves unacknowledged the varied ways of thinking and solving that students bring to the classroom.

Also, computational fluency becomes a central concern of mathematics for the prospective teachers since majority of them (95%) believed that 'mathematics should be taught as a collection of skills and algorithms'. Such a belief will further mystify mathematics to the students and become a central cause of anxiety for them as when conceptual understanding, construction of knowledge are replaced by procedural fluency, and symbols are manipulated without understanding, dissociation from the discipline takes place (NCF-2005).

Beliefs about Learning Mathematics

Beliefs about learning mathematics pertain to 'the teacher's view of the process of learning mathematics, what behaviours and mental activities are involved on the part of the learner, and what constitute appropriate and prototypical learning activities. Thus, these involve aims, expectations, conceptions and images of learning activities and of the process of learning mathematics in general' (Ernest, 1989).

The pre-service teachers' views regarding the learning of mathematics were studied with the help of 5 statements included in the rating scale, which asked them to indicate the extent to which they agree/disagree with the statements. Table 3 summarises their responses.

Table 3

Beliefs about Learning Mathematics

Item No.	Items	Strongly Disagree (%)	Disagree (%)	Agree (%)	Strongly Agree (%)
#1	Mathematics should be learnt as sets of algorithms/rules that cover all possibilities.	5.0	21.0	65.0	9.0
#6	A demonstration of good reasoning should be regarded even more than student's ability to find correct answers.	5.0	32.0	39.0	24.0
#9	In mathematics, you can be creative and discover things by yourself.	7.0	12.0	61.0	20.0
#16	Learning mathematics must be an active process.	3.0	3.0	63.0	31.0
#18	To solve most math problems you have to be taught the correct procedure.	0.0	10.0	65.0	25.0

As shown in Table 3, most of the respondents (94%) agreed that mathematics learning must be an active process, and considered mathematics to be a creative endeavor where students can engage in discovering things on their own (81%). This belief is consistent with the aim of 'mathematisation of the child's thought processes'—the higher aim of mathematics teaching envisaged by the NCF-2005.

Although 63% agreed that more than student's ability to find correct answers, a demonstration of good reasoning should be regarded important; 90% respondents still believed that the correct procedure has to be taught to help students solve most math problems. Thus, again a contradiction is seen in the prospective teachers' beliefs: limiting their own belief about engaging the students' meta-cognitive abilities to the emphasis on being taught the procedural fluency.

Also most of the respondents (74%) agreed that 'mathematics should be learnt as sets of algorithms/rules that cover all possibilities'. Thus, the role of problem solving and active learning in mathematics was underplayed and the emphasis on gaining fluency in procedural knowledge overplayed. This belief again gets corroborated when 100% respondents agree that memorising formulas and procedures is important for the students to be good at school mathematics (Table 4).

Table 4

Teachers Belief about Students' Understanding of Mathematics

Item No.	Items	Not Important (%)	Important (%)	Very Important (%)
To be good at mathematics at school, how important do you think it is for students to:				
#21	Remember formulas and procedures?	0.0	44.0	56.0
#22	Think in a sequential manner?	23.0	64.0	13.0
#23	Be able to provide reasons to support their solutions?	12.0	30.0	58.0

Focus Group Discussion: Probing Further

The results showed that in their first year of the programme, prospective teachers' understanding related to constructivist and socio-constructivist theories was in the process of emerging. They became familiar with the notions of child-centered learning, modes of representations, discovery learning, etc. This was reflected in some of their responses. However, what needs attention are the myriad interpretations that prospective teachers have of many of these ideas. For instance, most of them agreed that mathematics is about solving problems. Varied interpretations for problem solving in mathematics classrooms were revealed during the discussion,

such as solving arithmetic, integration and differentiation problems quickly and accurately; efficiently applying shortcuts and formulae (also considered essential for cracking competitive examinations); solving mathematical puzzles and riddles.

Also, when it comes to translating some of these ideas, such as the role of reasoning, activity, etc., in mathematics classrooms which most of them agreed to, what rules the discussion is 'teaching as they were taught'. In relation to mathematics pedagogy, their own school experiences, which have been instrumental in shaping their perceptions of the discipline, come to the foreground. The statements like: "Practice is must for success of a child in mathematics", "Doing mathematics is about solving more and more similar examples and questions", "Students need to be good at learning formulae and rules, and mental ability to solve problems" – predominated much of the discussion.

The inconsistencies in their responses could possibly be understood in the light of the complex interactions between the emerging understandings of the 'new' ideas (which are discussed as a part of teacher education programme they are enrolled in) as prospective teachers, and their own school experiences as learners of mathematics (caught in the cycle of teaching as they were taught).

Teacher education institutions, thus, need to create spaces where the student teachers can bring to fore these conflicts and contradictions among their ideas, reflect on the varied interpretations they have and their consequences on teaching and learning, and engage in a continual process of questioning their beliefs and images of the discipline vis-à-vis their past experiences and assumptions prevailing in the wider society regarding the discipline and its learners.

Conclusion

The findings of the study have serious implications for teacher education programmes as well as school education. Since 'change in beliefs is a crucial precursor to real change in teaching' (Swars, *et al.*, 2007b), it is imperative that pre-service teachers align their pedagogical beliefs with current thinking on teaching and learning mathematics in order to increase their efficacy for teaching mathematics. Thus, the teacher education programmes need to give opportunities to the prospective teachers, to reflect on their mathematics belief and practices from the very beginning of teacher preparation and continually do so. Such an early

reflection on one's philosophy of teaching can help a teacher assess her teaching practice more honestly. Thus, the primary goal of mathematics teacher preparation should be to stimulate the examination and development of beliefs about mathematics and mathematics pedagogy. This may be the key to minimising inconsistency between beliefs and practice and improving the quality of mathematics instruction (Raymond, 1997).

Also, the inconsistencies between the vision of teacher education programmes, which is currently based on socio-constructivist principles, and the actual practices of teacher educators, which still follow the teacher centered approaches, do fail to influence the prospective teachers' belief in constructivist lines. Since prospective teachers are expected to use student centered methods, pedagogical practices that support constructivist theory can be nurtured by engaging such teachers in constructivist experiences both in learning mathematics and in teaching mathematics (Hart, 2002). This would, in turn, facilitate nurturing beliefs that are consistent with the current philosophy of learning and teaching as envisaged by the NCF-2005.

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Summary of ERIC Project

Education of Girls: A Study of the National Programme for Education of Girls at the Elementary Level (NPEGEL) in Manipur, Mizoram and Tripura

ANITA NUNA*

Introduction

The present research was to make an assessment of the contribution of the National Programme of Education for Girls at Elementary Level (NPEGEL), in enhancing enrolment and retention of girls in elementary education and to explore the benefits of the programme in overall development of girls. More specifically, the focus was on examining what kind of transformation has been brought in the educational scenario and overall development of girls in educationally backward blocks of the North Eastern States of India.

In India, education was accorded a place of great importance in the Constitution. Article 45 of the Constitution clearly directs the State to provide universal, free and compulsory education to all children upto the age of fourteen year within a period of ten years from the commencement of the Constitution in 1950. In 2009, free and compulsory education has been declared as a fundamental right by an Act of Parliament 'The Right of Children to Free and Compulsory Education Act, 2009', as passed on 26th August, 2009, reads as follows: "Every child of the age of six to fourteen years shall have the right to free and compulsory education in a neighborhood school till completion of elementary education. For the purpose of this, 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."

National policies have been formulated to develop strategies to promote education of all with special focus on girls and children belonging to the socially disadvantaged groups, and also rural and remote areas of the country. Many schemes and programmes

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have been launched to ensure easy availability and accessibility of educational opportunities for children, particularly for girls in general and of girls belonging to socially disadvantaged groups (SCs and STs). Prominent among these are opening of more number of schools in remote rural areas as well as in urban locations, distribution of free uniform, free textbooks, scholarships, free boarding and lodging facilities in *Ashram Shalas/Chatravas* (Hostels), launching of Mid-Day Meal Scheme, waiving tuition fee and coaching classes, etc.

The National Programme for Education of Girls at the Elementary Level

The NPEGEL is one among these programmes that has been launched by the government of India (GOI) in 2003 as a 'gender component plan' with specific budgetary provisions, and has been integrated into the SSA to cater to the specific socio-educational needs of girls for their overall development. Under this programme, provisions were made for additional financial support to states for enhancing girls' education from Class I–VIII and also for providing facilities to promote retention of girls in schools, ensure their greater participation in school activities, improve the quality of their social life, including their educational status, stress upon the relevance of quality education for their empowerment and for ensuring their overall development, particularly of girls belonging to the disadvantaged and underprivileged groups, living in risk prone difficult circumstances. This idea was proposed to be implemented through intensive community mobilisation, development of 'model cluster schools' as the girl-child friendly schools, development of gender sensitive need-based teaching-learning materials and provisions of need-based interventions like escorts, availability of need-based books, uniforms and stationery, gender sensitisation of teachers, etc. (GOI, 2005).

The NPEGEL was basically introduced as the GOI visualised that SSA has limited financial provisions for girls' education in the form of innovations at district level. Thus, the NPEGEL was launched as a gender component plan of SSA with a view to have more funds to cater to the needs of girls in educationally backward areas to achieve the goal of UEE. The major objectives of the programme was to develop and promote facilities to provide access; facilitate retention of girls; ensure greater participation of women and girls in the field of education; improve the quality of

education through various interventions and to stress upon the relevance and quality of girls' education for their empowerment. This programme covered Educationally Backward Blocks (EBBs). EBBs were identified on the basis: firstly, blocks having rural female literacy rate less than the national averages, and the gap between male-female literacy rate for these places higher than the national averages as per 2001 census data; secondly, blocks with at least 5 per cent SC/ST population and female literacy rate among these groups below 10 per cent. The benefits of the NPEGEL programme were also applicable to some selected urban slums.

The development of Model Cluster Schools (MCSs) for girls was one of the specifically proposed measures to achieve the improvement in the educational status of girls for their overall development. The MCSs were developed as the girl-child friendly schools and the financial assistance was given to MCSs under the NPEGEL for purchase of items like teaching-learning materials, equipments, library books, and sports materials, etc., for enhancing quality in learning and also to conduct programmes for empowerment of girls. The MCSs were proposed to be opened in areas having high density of SC/ST/OBC/minority population.

Against this backdrop, a necessity was felt to understand whether the NPEGEL has played a role in the educational and overall development of girls. If yes, in what way? In this light, during 2011–12, a study was conducted to examine the role of the NPEGEL scheme in the educational and overall development of girls in two north-eastern states namely Assam and Arunachal Pradesh. The findings of the study indicate that the scheme has contributed significantly in facilitating access to education of Scheduled Tribe girls in Assam through bridge courses and also mainstreaming them in schools through community mobilisation. In addition to access to schooling facilities, the programme proved beneficial in the overall development of ST girls in the state. Based on earlier experiences, during 2014, this study has been planned for other three North-Eastern states— Manipur, Mizoram and Tripura. The aim of the study was to broadly understand how well the scheme has worked for promotion of education of girls in these three states.

Objectives of the Study

The objectives of the study included the following:

- To assess the contribution of the NPEGEL in enhancing enrolment and retention of girls in elementary education;

- To find out the benefits of the NPEGEL in overall development of girls;
- To examine the role of the NPEGEL in sensitising teachers with regard to issues concerning gender; and
- To understand the role of *Sarva Shiksha Abhiyan* (SSA) in the implementation of the NPEGEL.

Research Questions

The following research questions were framed under the study.

- Whether the NPEGEL has played a role in enhancing enrolment and retention of girls in education? If yes, in what way?
- How the NPEGEL has benefited in girls' overall development?
- Whether the NPEGEL has proved beneficial in gender sensitisation of teachers? If yes, how has it helped girls' education and development?
- What kind of support SSA provide in the implementation of the NPEGEL?

Method

In order to answer the research questions as also to realise the objectives of the study, both quantitative and qualitative data was required. Quantitative data was obtained from published and unpublished records of the concerned departments and also with the help of personally canvassed schedules. Qualitative data was collected through personally canvassed interview schedules, observations, discussions and meetings with the beneficiary girl students, teachers, concerned officials, parents and community people. The impact assessment of the scheme in enhancing girls' enrolment was done by analysing the progress made in mainstreaming of out-of-school girls into schools. Two sets of data were collected for measuring the progress:

- Number of out-of-school girls in the 6–14 age group identified through the efforts initiated under the NPEGEL during the past 5 years;
- Number of girls mainstreamed into schools through the efforts initiated under the NPEGEL during the past 5 years.

The impact assessment of the NPEGEL in the overall development of beneficiary girls was made by measuring the level of awareness of targeted girls about different aspects of three indices, i.e.,

personal health and hygiene, self-esteem and self-confidence, and girl child rights and some social issues associated with it through a social skill rating scale. Face-to-face interaction was carried out with the targeted girls in the model cluster schools under study. Interaction with sample girls lasted for 60–70 minutes, and data collected through interaction was systematised and quantified. Item wise analysis of girls' responses was done in respect of these indicators. Analysis was done manually using a frequency method. The frequency tables were used to quantify the amount of girls' level of awareness and utility of different aspects of three indicators mentioned above. The qualitative data collected through focus group discussions and selected case studies was analysed and presented in the form of statements in the study.

The role of the NPEGEL in sensitising teachers on gender issues was analysed through a structured schedule. Through the schedule, data/information was obtained with regard to the number of programmes organised during the last 5 years; duration of each programme; themes covered and profile of participants and resource persons. Information was also collected on whether the teacher training modules have been developed to carry out gender sensitisation programmes. To cross check the efforts of the implementing agencies with regard to gender sensitisation of teachers, beneficiary teachers were interviewed to enlist their level of understanding about issues concerning gender. Collection of data/information was ascertained from teachers with the help of a personally canvassed schedule. The frequency analysis was done to quantify the amount of teachers' understanding about gender, gender relations and gender sensitivity.

Findings of the Study

In Manipur, the National Programme of Education for Girls at Elementary Level (NPEGEL) was implemented during 2006–07. The programme was implemented by the *Sarva Shiksha Abhiyan* (SSA), Manipur. The NPEGEL in the state was implemented with the objective to attain educational development, capacity building and empowerment of the 'Hardest to Reach' girls, especially those not in school. This is the block which was identified as an Educationally Backward Block (EBB) by the Ministry of Human Resource Development, Government of India. The state prepared a detailed action plan for the target group of girls that include specific strategies with defined and measurable outcomes in every

SSA annual work plan since the implementation of the NPEGEL. A gender coordinator for girls' education appointed under SSA at the state level/district/block/cluster level was given the responsibility to look after the implementation of the programme. At the start of the programme, cluster resource persons (CRPs) owned the responsibility to track out-of-school girls in the clusters of the block.

In Mizoram, the NPEGEL was implemented by the state project office, Mizoram *Sarva Shiksha Abhiyan* Mission during 2005–06. The NPEGEL was implemented with the objective of mainstreaming out-of-school girls in schools and providing them vocational skills along with studies. The programme was implemented only in one block namely Lungsen in Lunglei district. Lungsen is the block which is identified as an Educationally Backward Block (EBB) by the Ministry of Human Resource Development, Government of India in the district. In every clusters of the block, one model cluster school (MCS) was developed under the NPEGEL. The state prepared a detailed action plan that included specific strategies with defined and measurable outcomes, and submitted for approval as a part of SSA annual work plan since the implementation of the NPEGEL.

In Tripura, the NPEGEL was implemented by the *Sarva Shiksha Abhiyan* (SSA), *Rajya* Mission, Tripura during 2005–06. Initially, the programme was implemented in one district namely Dhalai. The district Dhalai is divided into 5 blocks namely Salema, Ambassa, Manu, Chawmanu and Dumburnagar. Out of a total five blocks, two blocks namely Chawmanu and Dumburnagar are declared as educationally backward blocks (EBB) and both these blocks are covered under the NPEGEL programme. Later, in 2006–07, 5 more blocks of another two districts namely North Tripura and South Tripura were covered under the NPEGEL. In all, three districts namely Dhalai, North Tripura, and South Tripura (now Gomati) were covered under the NPEGEL.

The study recommends making of continuous efforts in this direction which need to be taken up seriously as the study felt the need to equip the teachers' understanding of gender and gender issues regularly, to enable them to deal with the ideologies behind gender representation in class rooms situations. The study also highlights the need for the government to support such programmes with zeal and regular release of fund in time.

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