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ERIC Projects Completed

EDITORIAL

Writing a research article, research paper or research notes is not merely a dissemination of work, but is actually a forum to open a dialogue between the work and the scholar. Research writing opens a scope for reflection, discussion and undertaking further research leading to dynamism and development. It explores new ideas, creates new knowledge and leads to personal as well as collective professional development. Research writing is more than any other writing as it is a communication channel between the researcher and the outside world making the work lively. With this vision and mission, Indian Educational Review – a prestigious international research journal of NCERT strives to provide effective communication between the researchers and the professionals exchanging the research experiences.

The present issue of the journal contains research papers, research notes and abstracts of the researches funded by ERIC. Researchers in their papers have probed lot of issues that may be of interest to the literary world. These include constructivism, academic competence of school adolescents, nutritional and health status, science contents in books, excessive use of internet, resources in primary schools, teacher education and factors influencing carrier choice etc. The ERIC studies include self regulatory strategies and use of ICT facilities in the schools.

We wish a happy and prosperous new year to all our contributors, readers and the subscribers. We intend to offer a window to our readers through which their ideas, views, suggestions and comments could be obtained on a regular basis. This will not only increase interaction but also provide us feedback for further improvement of the journal. Any specific opinion or experience on significant issues is always welcomed. We seek your cooperation and views on improvement of the journal and research initiatives.

POONAM AGRAWAL
Academic Editor

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Research Papers

Promoting Academic Competence in School Adolescents: Results of 15-day Life Style Intervention Programme

ARUN PRATAP SINGH* AND GIRISHWAR MISRA**

ABSTRACT

There has been paucity of theory-based life style interventions to improve academic competence among school adolescents. Therefore, present study examined the effect of Life Style Intervention Programme (LSIP) introduced through a psycho-education programme on academic competence in a sample (N = 100) of students in a residential school located at Mankapur, Gonda in Uttar Pradesh, India. Academic competence (AC) was evaluated through a self-report measure. The results indicated that adolescents who participated in a 15-day LSIP reported of increased AC. Also, some of the aspects significant for academic performance (i.e., self-esteem, anxiety, depression, optimism) as secondary outcomes were also assessed. The findings have implications for life style education efforts in schools, which could have a major impact on the academic performance of students.

Introduction

In India, the main documented concern for many ailments among school adolescents is for academic achievement (Deb, 2001). Each year, failures and lesser scores in exams than expected, consummates the lives of many students (National Crime Records Bureau, Ministry of Home Affairs, Government of India, 2000). For majority of school adolescents, anxiety, depression and lack of optimism become hallmark of periods after examination (Deb, Chatterjee & Walsh, 2010). In order to enhance academic competence and alleviate negative effects in academic process, existing approaches in the stream of psychology and other related disciplines remain preoccupied with

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changing pedagogy, refining process of examination and cultivating psychological skills among students. While educational reforms do have some roles to play, psychological assistance requires a great deal of expertise, resources and infrastructure in schools (Ponnuswami, 2000). Further, addressing concerns related to AC through individual counselling to larger segment of school adolescent is an arduous task. In view of limitations of traditional approaches, proactive efforts are often recognised of robust importance to deal with multiple concerns related to academic performance (Deb, et al., 2010). Especially, due to evidences of deterioration of life style in adolescents and consequent constraints imposed in daily functioning, capacities, abilities and competence (Leventhal, Prohaska & Hirschman, 1985); it has become emergent to address it (Hans & Mahajan, 1994).

Previous studies indicate that life style practices related to Yoga (Kauts & Sharma, 2010), intake of positive food items (i.e., fruits, vegetables) (Maclellan, Taylor, Wood, 2008), appropriate sleep (Dahl & Lewin, 2002), and religious involvement (Milot & Ludden, 2008; Sharma & Sharma, 2006) may be effective in promoting competence among school adolescents in several areas. Several instances in religious texts suggest that ancient school system of education (*Gurukul)* in India, imbibed many of life style practices in its' educational programme (Koller, 2006). A close observation of Ayurveda by Indian and western scholars reveals that it emphasised life style practices related to nutrition (*ahar*), sleep (*shayan*) and use of leisure hours (*vihar*) for holistic development of individual (Dwivedi, 2005; Fields, 2002; Mishra, 2005; Parashar, 2000; Sastri & Chaturvedi, 1989; Vidyalankar, 1968). Yet, although the idea that competence is associated with life style practices and functioning is a not new, empirical study linking these phenomena are exceedingly limited in both the eastern and western context.

Against this backdrop, the purpose of present study was to assess the effectiveness of life style changes in improving AC and other significant variables pertaining to academic performance. Because AC in this study was assessed primarily within the school setting, it was defined as adolescent's ability to memorise, concentrate, interest in studies and learning capacity required for educational performance. The componential structure of LSIP was based on *Ayurvedic* and *Yogic* notions of life style (Parashar, 2000; Dwivedi, 2005). It was hypothesised that LSIP would promote AC in the intervention group among boys and girls both. Besides, it also would

enhance self-esteem and optimism while reducing the degree of depression and anxiety.

Module of Life Style Intervention Programme (LSIP)

The development of intervention programme (LSIP) consisted of multiple phases of insightful thought through literature review and also negotiations and discussion with several concerned persons. Firstly, prominent adolescent health concerns in recent literature and themes related to life style in Ayurvedic and Yogic texts (*Charaka Samhita, Sushruta Samhita, Gita, Taitryopanisha, Chandogyopanishad, Yoga Darsan etc.*) were explored. In light of this review, the researcher himself went through self-revelations about own experiences related to effect of life style changes during adolescence. After that a focus group discussion with teachers (n = 5) and students (n = 5) in a residential school was conducted to understand their experiences in life. Conclusively, the detailed components of LSIP were identified on the basis of expert advice about their feasibility and relevance to adolescent's health concerns. It was planned to include dietary and sleep regimen based on *Ayurveda* and also certain postures *(Asanas)*, deep breathing practices (*Pranayama*), meditation (*Dhyan*), and chanting of mantras as recommended in the system of Yoga in the framework of LSIP. Many of the theoretical and practical issues related to capability of the participants to adhere with LSIP, school routine, and availability of adolescents for Yoga training programme were also taken under consideration during the rigorous process of its' development.

The operationalistion of LSIP was carried out through some insights derived from theoretical models of behavioural change. Based on these insights, LSIP was introduced to adolescents through an improved form of *psycho education*. It intended to inform, persuade and assist the adolescents to adopt healthy dietary habit, sleep routine, Yoga and religious practices. The processes of LSIP included establishment of personal rapport, increasing awareness, persuasion, orientation, assessment, training and persistence for the change. It was undertaken in three stages (i.e., preparation, introduction and implementation). In the first stage, firstly rapport was established with adolescents. Latter on guided by cognitive dissonance theory, participants were provided informational inputs about the risks of practising unhealthy habits and benefits of practicing positive life style behaviours interactive session. In subsequent stage of introduction, based on social learning theory (Bandura, 1977), a power

point presentation and a film about practising of some components of LSIP by some of the popular role models (film, sports and public life) were shown. Deriving ideas from theory of reasoned action (Ajzen & Fishbein, 1980), in the second step of same stage participants in small group were made to engage in addressing the pros and cons of changing life style with the investigator. In the next stage i.e., implementation, Yoga training programme was run for about two weeks besides assuring the compliance for change in dietary habits, avoidance of unhealthy items and sleep. Giving personal regards for changing their life style each day after Yoga training programme reinforced the participants. During the end-up session of intervention, their participation and performance were recognised through video-recording and positive approval by principal and the staff of school.

Each day of LSIP began with a Yoga session of 45 minutes specially designed for this study on the basis of expert advice, feasibility and relevance to concerns related to academic competence. It included practices related to Yoga i.e., *Asanas, Pranayama*, *Shavasana* and chanting of Mantras (i.e., Om, Allahoo, and O Christ) included from different religious traditions. The details of Yoga training programme are given Appendix-2. In summary, intervention group participants were engaged in positive change of their dietary habits, avoid unhealthy food items, and follow proper sleep habits and perform Yoga for two weeks (as given in Appendix - 1).

Method

Participants

The sample consisted of 100 school-going adolescents (50 boys and 50 girls) enrolled in junior and senior secondary classes in a residential school participated in the study. There was equal number of adolescents in intervention (n = 50) and control (n = 50) groups. The two groups were matched for gender, age and grade. The age of participants ranged from 12-18 (M = 14.4 years; SD = 1.89). The selection in the study was based on two criteria: (1) participants should not have been exposed to the contents of LSIP during the last three months, and (2) they should not be suffering from any disease (e.g., physical disability, chronic diseases, fever etc.) which may impair adherence to the LSIP.

Measures

Academic competence: The assessment of AC included rating on items measuring the student's ability to learn, memorise, concentrate and

interest in studies on five-point scale ranging from never (1) to always (5). The cronbach alpha of the scale with this sample was = .66.

Anxiety: The items related to anxiety were adapted from 100-item Sinha Anxiety Scale Sinha (1968). The internal consistency in this sample of study was (= .56).

Depression: It was evaluated through 21-item Beck Depression Inventory (Beck et. al, 1996). This scale has satisfactory test-retest reliability (.90) and internal consistency (= .86).

Self-esteem: The 10-item Rosenberg Self Esteem Scale (Rosenberg, 1965) is a well-known valid and reliable measure of self-esteem. The scale generally has high reliability with test-retest correlations typically in the range of .82 to .88, and Cronbach's in the range of .77 to .88.

Optimism: It was measured through Life Orientation Test (Scheier, Carver & Bridges, 1994) consisting of 8 items. Psychometrically, the scale has proved to be reasonably sound. The internal consistency of the scale is adequate (□ = .72), as is its test-retest reliability (r = .77 over a four-week interval).

Life Style Change Inventory: The compliance on aspects of LSIP was assessed through a self-report inventory on 7-point rating scale. The respondents were asked of reporting their adherence to the changes during a usual week in last one year. The researcher for use in the present study developed it.

Design

Participants allocated to intervention and control group of both the gender rated their well-being before and after LSIP, yielding a 2 (type of group) x 2 (type of gender) x 2 (testing occasions) factorial design. Participants of both groups were matched in their gender and age.

Procedure

After seeking formal permission from governing body of the school, the researcher got introduced to the students during prayer session by principal of the school. It was followed by informal interaction with teachers and students of the school. After establishing appropriate rapport, firstly the students were provided with informational inputs about effects of specific life style aspects in an informal discussion in classrooms. In subsequent sessions, they were shown a short film and power-point presentation about the popular acceptance of Yoga among celebrities such as actors, models, players and by the general public. Latter on, the adolescents were asked to indicate their

willingness to join the LSIP. Among consenting students, those who met with the criteria were recruited in the study and got allocated in intervention or control group according to design of the study.

After group allocation, measures were administered among intervention and control participants in a hall for pre-test. At the same time, they were given a self-compliance diary in which they noted down their daily engagements in various life style activities. In subsequent phase, the intervention group participants were engaged in small group discussions to share their concerns and experiences related to health and life style. Then, LSIP sessions were run six days in a week over a 2-week period in a hall in the school premises. One session of LSIP lasted for about one hour. The control group participants were engaged in a dialogue for the same duration. The compliance was assessed through personal monitoring by researcher, self-report and attendance in Yoga training programme. The participants again completed the measures after the intervention. After three months of conduct of LSIP, a follow-up was done. It (n = 46) involved administration of a checklist of life style change inventory.

Results

Table 1 displays the mean scores and Standard Deviations on the scales of academic competence, depression, anxiety, optimism and self-esteem as function of type of goup, gender and testing occasions. It is apparent from that higher mean scores were found for intervention group at the post-test for academic competence, self-esteem, and optimism and lower mean scores for depression and anxiety in comparison to the control group among boys and girls both.

TABLE 1

Means and SDs of Scores on the Measures of Academic Competence, Self-Esteem, Depression, Anxiety and Anxiety by Type of Group, Gender and Testing Occasions

Measures	Intervention Group				Control Group			
	Boys (n = 25)		Girls (n = 25)		Boys (n = 25)		Girls (n = 25)	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Academic Competence	12.72 (*3.33*)	16.04 (*3.11*)	12.48 (*3.04*)	15.68 (*1.86*)	13.72 (*3.87*)	13.76 (*3.41*)	14.24 (*2.55*)	14.84 (*3.19*)
Depression	7.68 (*2.24*)	6.72 (*1.54*)	7.68 (*1.65*)	7.60 (*1.15*)	8.32 (*2.15*)	7.72 (*2.01*)	8.16 (*1.92*)	7.96 (*1.61*)
Anxiety	9.16 (*2.88*)	6.56 (*2.87*)	8.00 (*2.53*)	6.40 (*1.60*)	8.00 (*2.90*)	7.24 (*2.81*)	8.04 (*1.81*)	7.64 (*1.93*)
Optimism	20.56 (*4.23*)	23.48 (*3.70*)	20.00 (*2.67*)	22.92 (*2.37*)	18.92 (*3.74*)	19.72 (*2.99*)	20.04 (*2.83*)	20.52 (*3.24*)
Self-esteem	10.56 (*2.81*)	12.00 (*2.08*)	10.40 (*2.43*)	12.52 (*1.53*)	10.28 (*2.42*)	10.36 (*2.09*)	10.80 (*2.39*)	10.48 (*2.70*)

Note: SDs are in parenthesis

Subsequently, the mean scores on academic competence, self-esteem, optimism, anxiety and depression were subjected to separate 2 2 2 ANOVAs with repeated measure on third factor (testing occasions). The 2 2 2 analysis partitioned variation due to differences between groups into each pair of independent variables as well as the main effects. All analysis were evaluated at alpha levels of $p < .05$, $p < .01$ & $p < .001$. Table 2 shows the main effects of the type of group, gender and testing occasions for academic competence, anxiety, depression, self-esteem and optimism.

TABLE 2

ANOVA Summaries of Main Effects of Type of Group, Gender and Testing Occasions Performed for Academic Competence, Depression, Anxiety, Optimism and Self-esteem

Variables	Type of Group				Gender				Testing occasions			
	INT	CON	MS	*F* (1,99)	Boy	Girl	MS	*F* (1,99)	PRE	POST	MS	F (1,99)
Academic Competence	28.46 (*4.73*)	28.28 (*5.91*)	.40 (*5.96*)	.03	28.12 (*4.66*)	28.62 (*3.26*)	3.12 (*3.04*)	.21	13.29	15.08	160.20	3.49***
Depression	14.84 (*2.89*)	16.08 (*3.33*)	19.22 (*3.54*)	3.90 (*2.74*)	15.22	15.70 (*1.99*)	2.88 (*1.65*)	.58	7.96	7.50	10.58	6.17*
Anxiety	15.06 (*4.15*)	15.46 (*4.25*)	2.00 (*4.92*)	.22	15.48 (*3.33*)	15.04 (*2.58*)	2.42 (*2.39*)	.27	8.30	6.96	89.78	26.91***
Optimism	43.48 (*4.79*)	39.60 (*6.10*)	188.18 (*6.70*)	12.52**	41.34 (*4.77*)	41.7 (*3.43*)	42.0	0.13 (*3.45*)	19.88	21.66	158.42	24.49***
Self-Esteem	22.74 (*3.61*)	20.96 (*4.13*)	39.60	(*3.90*)	5.17* (*4.05*)	21.60 (*2.49*)	22.10 (*2.31*)	3.12.41	10.51	11.34	34.44	10.39**

Note: SDs in parenthesis. *$p < .05$, **$p < .01$, ***$p < .001$

The results showed significant main effects for Type of Group and Testing Occasions both on the scale of optimism but only for Testing occasions on academic competence, depression, anxiety and self-esteem. This indicated that optimism differed significantly between groups as well as across Testing Occasions but variation in academic competence, depression, anxiety and self-esteem was laid out only according to testing occasions.

The results also indicated interactions that qualified the main effects stated above. Figure 1 shows mean scores of academic competence as a function of testing occasions and type of group. It reveals that reported level of academic competence somehow remains stable among control group but increased substantially among intervention group participants ($F_{(1,96)} = 22.58$, $p < .001$).

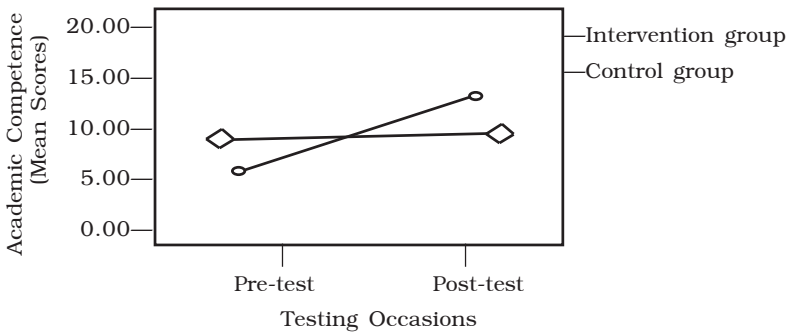

***Fig. 1*:** Mean Scores of Academic Competence as a Function of Testing Occasions and Type of Group

Figure 2 displays mean scores of anxiety as a function of testing occasions and type of group. It suggests that decrement in anxiety among intervention group partcipants was significantly greater than control group participants ($F_{(1, 96)} = 8.65$, $p < .01$).

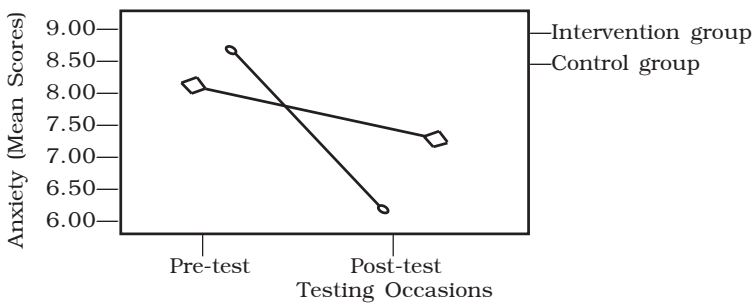

Fig. 2: Mean Scores of Anxiety as a Function of Testing Occasions and Type of Group

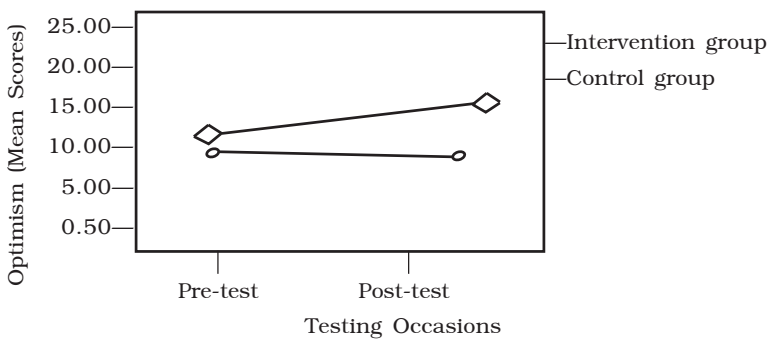

Fig. 3: Mean Scores of Optimism as a Function of Testing Occasions and Type of Group

Figure 3 presents mean scores of optimism as a function of testing occasions and type of group. It indicates that optimism remained relatively stable among control group participants but increased significantly among adolescents exposed to LSIP($F_{(1,96)}$= 10.05, p < .01).

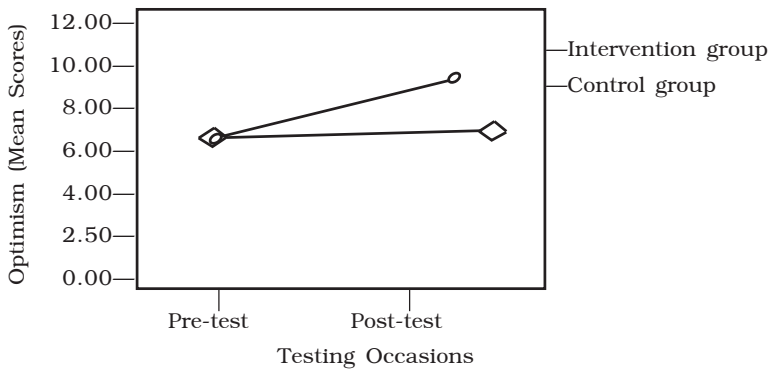

Fig. 4: Mean Scores of Self-Esteem as a Function of Testing Occasions and Type of Group

As seen in Figure 4, the results suggested significant enhancement in self-esteem among intervention participants in comparison to control group participants (F(1, 96) = 13.62, p < .001).

Follow-up

A follow-up of the adolescents who participated in the intervention was undertaken after a period of 3 months. To this end, the participants were asked to report the extent to which they were observing the various aspects of life style change which were introduced during the two weeks of LSIP. The compliance for life style changes was noted substantially during follow-up. Gender was found to be insignificant in terms of compliance for changes in life style after three months of LSIP. The results suggested continuation of life style changes in many of related components (72.7% avoiding water during meals, 100% avoiding fast foods, 93.2% avoiding tea, 78.6% getting up before sun rise, 72.7% sleeping before 10 p.m., 72.7% doing Yoga, 91.9% reciting mantras) for at least once a week.

Discussion

Findings from this study provided an empirical support for efficacy of positive life style changes (i.e., dietary habits, food consumption, sleep habits, yoga and religiosity) for academic competence and other secondary outcomes (i.e., anxiety, optimism and self-esteem)

significant for academic performance among adolescents. The results indicated that LSIP led to enhancement in health and well-being among boys as well as girls. There was no significant gender difference with respect to the impact of LSIP. The results contained in improved scores on measures of academic competence, anxiety, self-esteem and optimism evinced evidence for increased concentration, memory, interest in studies, optimistic view, self-confidence and decrease in embarrassment among adolescents as a result of LSIP. These findings support a few other rudimentary studies that have found positive outcomes in academic performance of students practicing Yoga (Kauts & Sharma, 2010), regular sleep habits (Dahl & Lewin, 2002), intake of positive food items (Maclellan, Taylor, Wood, 2008) and involved in religiosity (Sharma & Sharma, 2006).

In summary, the present study yielded empirical evidence that a holistic intervention with a focus on life style does contribute to academic competence of adolescents and the effect was almost similar for boys and girls. The participants of intervention and control group were matched in age and gender of whom latter group displayed lower level of gains on the different measures. The LSIP was multifaceted in its composition. It had elements of psycho-education, yoga, dietary control and managing daily routine activities in life. The participants of intervention group underwent adherence to avoidance of unhealthy food items (i.e., fast food, cold drink, and tea/coffee) and practicing of positive dietary habits (i.e., eating appropriately, not taking excessive water during meals). The participants followed sleep regime practices (i.e., going to bed for sleep before 10 p.m. and waking before sunrise) during intervention period. They also participated in a Yoga training programme conducted at 5:30 a.m. daily for 45 minutes and practised chanting of mantras from different religious traditions. The compliance for all the changes in life style was strictly monitored by the researcher with the support of teachers and staff of the school. Thus LSIP attended to diverse aspects of life in a concerted fashion.

Another feature of the programme was that it continued for two weeks in a set up where continuous monitoring, guidance and support was available in a residential set up. This promoted a conductive climate for the participants. The entire group was active participant and had access to each other as well as the resource person for the programme. The present researcher acted as the instructor and resource for the intervention. He stayed in the school premises and observed the participants on different occasions during the entire duration of intervention. It was observed by researcher that continuity

in time and space was particularly helpful in achieving the goals of intervention. The activities of the programme were made part and parcel of the routine. The experiences of participants revealed that they liked the programme and enthusiastically invested their energy. The follow-up results suggested that the effect of intervention was not a momentary one. It continued and persisted. A higher proportion of adolescents complied with several life style changes (i.e., avoiding fast foods, avoiding intake of tea and cold drinks, getting up before sunrise and doing Yoga) during the follow-up period of three months.

The study demonstrated effectively the efficacy of a psycho-social intervention in the lives of adolescents in a residential school setting. The study has implications for extension of such intervention on a broader scale with suitable modification as per the requirements of the specific settings. The involvement of peers and teachers in the programme works as a source of motivation and support. Being a collectivistic culture the impact of such intervention increases if the changes take place in-group context. However, a close scrutiny of the programme revealed that its goals might be attained more effectively if the parents and teachers too are addressed and their attitude toward life style is changed. The study also very clearly brought out the argument that academic competence can not be nurtured merely by counseling but also can be enhanced by cultivating some change in life style with support from the social context in which adolescents live.

Conclusion

The results showed that academic competence can be enhanced through positive changes in life style. Given the emphasis on alterations in current adolescent life style, the conduct of LSIP has a potential to make a unique contribution to improvement in academic performance. Since adolescence is very critical for academic development and parents often emphasise enhancement of academic skills, the school curriculum needs to have some scope for promoting positive life style (Hamburg, 1990). A close perusal of the details of the present study indicates that while it has expanded the scope of academic competence by relating it with life style there remain some issues, which deserve attention of researchers and policy makers. There is need for thorough investigation for the role of dietary and sleep habits in academic performance. The role of religious involvement, although little understood and considered, continues its presence in human life. There is need for proper understanding

of religio-spirtual activities at home and its relationship with concomitant aspects of AC. While the study has focused on school context the issue of life style requires the involvement of parents. Therefore, it would be pertinent to extend the scope of inquiry to include the parental perspectives on adolescent life style.

The present study offered new possibilities about emergence of the area of life style counselling to deal with multiple concerns related to academic competence, examination anxiety, lack of self-esteem and pessimism among adolescents. The success of intervention points out the possibility that schools offer an ideal setting for teaching and creating environment for compliance of behavioral practices embedded in cultural context of India to adolescents in large groups. Recently life skills education has been introduced for optimising adolescent development. It may be extended to incorporate life style behaviours significant for their academic achievement and thus for career goal in life at large.

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Nutritional Health Status of Primary School Children

A study in Bareilly District

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ABSTRACT

The future of the society depends on the quality of life of the children. Nutritional needs change throughout life, depending on genetics, rate of growth, activity and many other factors. Nutritional status is the condition of health of the individual as influenced by the utilisation of nutrients. Nutritional needs also vary from individual to individual. The major objective of this research is "to assess the nutritional health status of primary school children of rural and urban areas", by assessing their clinical health status and the quantity and quality of food intake by the children in both the areas of study. Four hundred children of 7-9 years of age were selected from the rural and urban areas of Bareilly district. They were assessed for nutritional health status by applying Clinical Nutrition Survey Chart; 24-hr recall method and Food Frequency Questionnaire. The nutritional deficiency signs and symptoms were observed more in rural children than the urban children. Nutrient intake and consumption frequency of all the 6 food groups was more among the urban children compared to their rural counterparts.

Introduction

Since 1947, India has made substantial progress in human development. Still the manifestations of malnutrition are at

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unacceptable levels. Nineteen per cent of world's children live in India. India is a home to more than one billion people, of which 42 per cent are children. More broadly, malnutrition in India is in a state of silent emergency and thereby demands greater priority than ever before. The nutritional status of population is therefore critical to the development and well being of the nation (National Nutrition Policy, 1993 Government of India). The present status of malnutrition in India is that a devastating half of all the newborns are malnourished and 30 per cent are born underweight making them more vulnerable to further malnutrition and diseases. To evaluate nutritional status, assessors can use measure of body composition and development (anthropometric measurements) or measures of how well the body performs certain tasks (functional tests of nutrition status). Anthropometric measurements and functional tests useful in nutritional assessment indicate that each measurement depends on adequate nutrition. Poor growth in children indicates malnutrition. Malnutrition is an impairment of health resulting from deficiency of calories and/or more essential nutrients, and over nutrition, which is an excess of one or more nutrients and usually of calories.

Under nutrition is a major public health problem worldwide, particularly in developing countries (Onis et. al.). One third of the children under 5 years old worldwide are moderately or severely undernourished. Under nutrition impairs physical, mental and behavioural development of millions of children and is a major cause of child death (World Bank, 1993, Falkner, 1991).

Shrivastava, Rahul (2008) - according to 'National Sample Survey Organisation', twenty per cent people in rural India earn only ₹ 12 a day, of which each person spends just ₹ 7 on food. In Orissa and Chhattisgarh, 44 per cent people suffer from such a devastating situation. Ever wondered why people migrate from villages to cities? The survey says life is a shade better in urban India where 22 per cent people spend ` 19 daily. In urban Bihar, 56 per cent live on this amount.

"Nations where the human resource is undervalued and material resources are overvalued always remain poor." India stands 25th on the Global hunger Index with 46 per cent of underweight children below 5 years of age. (State of World Children, 2008).

This perhaps holds good especially for a State like Uttar Pradesh which, with a population of about 18 crore, is home to about one-sixth of country's population. Every sixth malnourished child in India lives in U. P. Fifty Seven per cent children born to malnourished mothers are underweight. In Uttar Pradesh the under- nutrition figure is as high as 72 per cent.

Therefore, the major objective of the present study is to assess the nutritional health status of the primary School Children in the rural and urban areas of Bareilly district.

Methodology

The study was undertaken with the objective "to assess the nutritional health status of children in Bareilly district". Assessment of nutritional status is the first step in the formulation of any public health strategy to combat malnutrition. The children with in 7-9 years of age were selected randomly from the identified schools. Two hundred children from rural and urban areas each constituted the total sample of 400. Three tools were used in the study to assess the nutritional health status- Clinical Nutrition Survey Chart, 24-hr recall method, Food frequency questionnaire.

Clinical examination is commonly used in survey, since it is relatively simple and do not call for sophisticated equipment. It reveals the anatomical changes due to malnutrition that can be diagnosed by the naked eyes.

24-hr recall method is generally used by dietician to obtain a general picture of person's food intake. It is used to elicit an accurate picture of the diet history. In 24-hr recall method, the actual food and drink consumed in the immediate past 24 hours is recorded. Sometimes, a longer period may be used. The recorded food consumed in the last 24 hours is then converted to the nutrients available in each food item used in preparing it and then compared with the Recommended Dietary Allowances.

Food Frequency Questionnaire is either interviewer administered or self-completed. A detailed questionnaire includes the list of foods and the subject answers as to how often and in what quantity each food is eaten per day, per week and per month. The collected information of the food consumed is then checked with the Recommended Dietary Allowances (RDA by ICMR, 1990). It gives an estimate of the amount and frequency of the various nutrients consumed by the individual.

Results and Discussion

The results of the present study conducted on the primary school children are discussed below:

TABLE 1

Clinical Nutritional Survey Chart of Rural and Urban Children

Clinical Signs	Category	Rural	Urban
General Appearance	Good	6%	97%
	Fair	45%	3%
	Poor	45%	-
	Very Poor	4%	-
Hair	Normal	37.5%	99.5%
	Loss of Luster	51%	0.5%
	Discolored & Dry	13.5%	-
	Sparse & Brittle	21.5%	-
Eye Discharge	Absent	99%	100%
	Watery	1%	-
	Mucopurulent	-	-
Lips	Normal	6.5%	98%
	Angular Stomatitis, Mild	65%	2%
	Angular Stomatitis, Marked	17.5%	-
Gums	Normal	94.5%	98.5%
	Bleeding	4.5%	1.5%
	Pyorrhoea	-	-
	Retracted	1%	-
Teeth	Absent	21%	98%
	Chalky Teeth	44%	2%
	Pitting of Teeth	8.5%	-
	Discoloured	26.5%	-
Skin	Normal	46.5%	99.5%
	Loss of Luster	49.5%	-
	Dry & Rough	4%	0.5%
	Hyperkeratosis	-	-
Bones	Normal	100%	100%
	Rickets		

Source: FAO/ WHO Expert Committee on Medical Assessment of Nutritional Status, WHO Tech. Rep. Ser. 258.

Interpretation

Table 1, shows the percentage distribution of the nutritional deficiency signs amongst rural and urban respondents. The description of the rural children is as follows- **General Appearance:** A majority of the rural respondents (90%) were classified as fair, (45%) and poor (45%). **Eyes:**

99 per cent of rural respondents had normal eyes with no presence of discharge, only 1 per cent having watery eyes. **Lips:** 65 per cent of the children were observed to suffer mild Angular Stomatitis and close to 17.5 per cent had marked Angular Stomatitis. **Gums:** were observed normal in 94.5 per cent of the rural respondents, while 4.5 per cent of them had bleeding gums. **Teeth:** 44 per cent of the rural children had chalky teeth confirming the deficiency of Calcium, 26.5 per cent had discolored teeth which could be a result of poor dental care. **Hair:** 37.5 per cent of rural children had normal hair. However, 51 per cent had dull hair or hair without luster. 13.5 per cent of the respondents had discolored and dry hair and 21.5 per cent had sparse and brittle hair. A not so encouraging hair condition of the respondents indicates a significant deficiency of protein amongst the rural respondents. **Bones:** were found normal. None of the children had Rickets or any other visible orthopedic problem. **Skin appearance:** was normal in 46.5 per cent, dull in luster in 49.5 per cent. The balance 4 per cent of the respondents had dry and rough skin. Hyperkeratosis was not observed in any respondent.

Table 1, also exhibits the status of urban respondents on clinical signs and symptoms. **General Appearance:** 97 per cent of the respondents appeared good while 3 per cent were fair. **Eyes:** All the respondents had healthy eyes with no discharge. **Lips:** 98 per cent of the respondents exhibited normal condition of lips and only 2 per cent of them had mild angular stomatitis. **Gums:** 98.5 per cent of the urban respondents had normal gums while a minor fraction, 1.5 per cent, had bleeding gums indicating lack of dental care awareness. **Teeth:** Flurosis was absent in all the children while only 2 per cent had discolored teeth. **Hair & Bones:** Almost all the respondents had normal hair and bones. **Skin Appearance:** The skin appearance of urban respondents was normal. Only 0.5 per cent of the respondents had dry and rough skin which could be a result of the stringent climatic consideration/s.

TABLE 2

Percentage distribution of children according to deficient nutrient intake within last 24 hours

S.No.	Nutrient	RDA*	Rural		Urban	
			% Deficient	Average Intake (g/day)	% Deficient	Average Intake(g/day)
1.	Protein (g/day)	41	20.0%	27	6%	34
2.	Fat (g/day)	25	15.3%	18	-	-
3.	Carbohydrates (kcal/day)	390	96.0%	249	53.3%	296

4.	Energy (kcal/day)	1,950	54.0%	1,418	11.3%	1,650
5.	Calcium (mg/day)	400	76.0%	229	1.3%	186
6.	Iron (mg/day)	26	42.0%	16	70%	16

* Recommended Dietary Allowance/sby ICMR 1990.

Interpretation

The 24-hr recall method was used to find out the amount of essential nutrients intake by the respondents. The percentage of the rural and urban children deficient in the six major nutrients is given in Table 2. The table illustrates that 20.0 per cent rural children were deficient in **Protein** intake than the recommended amount (41g/day). The average intake by the deficient respondents was 27g/day. 15.3 per cent of the respondents did not consume the recommended amount of **Fat** (25g/day). The average consumption of fat by these respondents was 18g/day. A majority of the respondents (96.0%) had deficient **Carbohydrate** consumption, average of 249 kcal/day compared to 390 kcal/day recommended. **Energy** deficiency was exhibited by 54.0 per cent of rural respondents. **Calcium** is an important nutrient for the children of this age as they are growing children and calcium is required for the building and growth of stature. However, 76.0 per cent of rural respondents exhibited calcium deficiency. The average intake of calcium was 229 mg/day inspite the recommended amount of 400mg/day. Also, 42.0 per cent of the rural respondents did not consume the daily recommended **Iron** (26 mg/day). Their consumption was limited to 16mg/day.

Among the urban children 6 per cent of the respondents exhibited deficient consumption i.e. only 34 g/day of their daily requirement of **Protein** (41 g/day). All urban respondents were well fed with **Fats**. **Carbohydrate** was one nutrient on which both rural as well as urban respondents were found deficient with about 53.3 per cent urban respondents missing the recommended daily carbohydrate consumption of 390 kcal/day. The average consumption of carbohydrates was 296 kcal/day by them. 11.3 per cent of the urban respondents did not consume the recommended daily **Energy** requirement, as over half of the children were lacking carbohydrate intake. Proteins, fats and carbohydrates together make up for the daily requirement of energy. 1.3 per cent of the respondents were **Calcium** deficient and 70 per cent were not consuming the daily recommended amount of **Iron** (26mg/day). The average calcium and iron intake by the deficient urban respondents was 186mg/day and 16mg/day respectively.

The findings of the researcher in this particular study about the deficiency of nutrient intake amongst rural and urban children are well supported by a research article published in the **Mint, June 1, 2007**. The article states that the consumption of protein came down to 57.0 g/day in 2004-05 from 59.0 g/day during 1999-2000. There has always been a deficiency in the consumption of calories in rural and urban population since 1972. In urban India, protein consumption fell from 58.5 g/day to 57.0 g/day during the above stated period. Fat intake in rural areas fell from 36.0 g/day to 35.5 g/day and in urban areas it declined from 50.0 g/day to 47.5 g/day. A study conducted by Awasthi and Kumar in the year 1999 on 110 primary school children of Kumaon Hills, Uttaranchal reveals that the energy intake of more than half of the sample size was 50-75 per cent of the RDA standards.

TABLE 3 (A)

Percentage Distribution of Rural Children based on Frequency of Food groups' intake

S.No.	*Food Groups*	*Daily*	*Weekly*	*Twice a month*	*Monthly*
1.	Pulses and Legumes	64%	22%	12%	2%
2.	Cereals	100%	-	-	-
3.	Milk & Milk products	44%	39%	-	-
4.	Green Leafy Vegetables	68%	26%	6%	0%
5.	Fats & Oils	56%	12%	-	-
6.	Meat, Fish & Poultry	19%	27%	5%	-

Interpretation

Table 3 (a) details the frequency at which rural respondents consume various food groups constituents- 64 per cent of the rural respondents consume pulses and legumes daily, 22 per cent of the respondents consume it weekly, 12 per cent consume it twice a month and the balance 2 per cent of the respondents consumed pulses and legumes on a monthly basis. All the children consume cereals on a daily basis. These children may not be consuming all the cereals as a part of their daily diet, however, wheat and rice constitute staple food. Less than 50 per cent of the total rural respondents consume milk and milk products on a daily basis, about 44 per cent of them consume milk daily, 39 per cent consume it weekly, and the rest do not recall consuming milk and milk products. Though many of the respondents consume milk as a constituent of tea everyday, however, that is not considered as a source of rich lact-protein. Green leafy vegetables

are consumed by a fairly large number of rural respondents on a daily basis (68%), 26 per cent consume these weekly, and the balance 6 per cent consume them twice a month. Green leafy vegetables are grown and, therefore, readily available in rural destinations at economical prices than other vegetables and, therefore this could be one of the reasons of its higher consumption by rural respondents. 56 per cent rural children recalled consuming foods containing fat and oils like samosa, paratha, puri or any other fried food in their daily diet while 12 per cent consume it weekly. Fat is used for cooking food, however, the researcher wanted to know if respondents consume fat and oil from foods other than cooking oils as a part of their diet. 19 per cent of the rural respondents consumed non-vegetarian foods constituting either or a mix of meat, fish, poultry on a daily basis. 27 per cent of the respondents consume non-vegetarian foods weekly, while 5 per cent consume it only twice a month. All respondents didn't respond to this query, implying they could be vegetarians.

TABLE 3 (B)

Percentage Distribution of Urban Children based on Frequency of Food groups' intake

S.No.	*Food Groups*	*Daily*	*Weekly*	*Twice a month*	*Monthly*
1.	Pulses and Legumes	92%	8%	-	-
2.	Cereals	100%	-	-	-
3.	Milk & Milk products	96%	4%	-	-
4.	Green Leafy Vegetables	60%	3%	-	-
5.	Fats & Oils	92%	6%	2%	-
6.	Meat, Fish & Poultry	38%	16%	4%	-

Interpretation

Table 3(b) shows the percentage frequency of consuming various food groups for urban child respondents. The diet intake of the urban children was found to be good and better than their rural counterparts. Pulses and legumes were consumed by 92 per cent children on a daily basis while the rest consumed it weekly. Cereals were consumed by all the respondents on a daily basis, possibly in the form of chapatti/s. Milk was also consumed by a majority of respondents on a daily basis with only 4 per cent consuming it weekly. Green leafy vegetables were not found to be preferred by urban respondents as much as their rural counterparts. Only 63 per cent of the urban respondents recall consuming green leafy vegetables of which 60 per cent consumed it daily and 3 per cent consumed it weekly. Consumption of fats was high amongst urban respondents.

In addition to cooking oil/s they consume fats in the form of butter or ghee with chapatti, dal and also fried and junk food/s. 92 per cent of the respondents consumed visible fats daily. Only 58 per cent urban children recalled consuming non- vegetarian foods. 38 per cent consumed it daily (primarily eggs for breakfast), 16 per cent consumed these weekly and 4 per cent consumed these fortnightly. A research study is conducted.

Findings of the Study

To meet the objective of the present study "To assess the Nutritional Health Status of Primary School Children in rural and urban areas" the nutritional health analysis tools were used and the status of nutritional health was assessed. On observing the rural children for any nutritional deficiency signs and symptoms, mild angular stomatitis, loss of luster of hair and skin indicates protein and energy deficiencies, chalky teeth shows calcium deficiency among them. They were also short of carbohydrates requirements. The urban children's nutritional analysis shows a normal appearance; no prominent nutritional deficiency signs were seen. The urban children were also not meeting the RDA of carbohydrates and iron but the consumption was not poor enough to create deficiency in the body. The deficiency signs indicate the poor diet intake, inappropriate amount of food and non- nutritious food. They might tend to eat whatever is locally or cheaply available, a complete meal is lacking in their diet schedule. The urban children were lacking in iron, which indicates that the children might be reluctant in consuming iron rich food like green leafy vegetables, jaggery etc. whereas these are locally available and constitute the major proportion of the rural diet.

A research work is said to be successful if it can make a difference to the society or can bring a change in the ongoing practices. During the research the researcher realised that certain improvements by the Government of India, administrators and policy makers should be made in the ongoing welfare programme and new comprehensive programmes should be developed to improve the overall health of the children of India and elevate the position of India in the Human Development Index.

Implications

The nutritional health analysis shows signs of deficiencies among the rural children. The frequency of essential food intake like milk and complex carbohydrates is also poor among the rural children

studied. Therefore, their energy requirement is not met by their daily diet. After doing this detailed study it is recommended that the supplementary meal provided by the Government under the mid-day meal scheme should be enough in portion and nutrition to support the daily Recommended Dietary Allowances given by ICMR, for the growing children of this age. The investigations indicate that the porridge, khichadi and rice puffs, generally given under the mid-day meal scheme do not suffice for the nutritional needs of the children, therefore the food with a mixture of highly nutritive or fortified by essential nutrients like Iron, Calcium and Carbohydrates should be distributed in schools or should be made readily available at subsidised rates.

It is not only the rural children but a nutritional gap is also seen among the urban children, hence imparting nutrition knowledge and follow-up of the running nutritional programme should be done. In the urban schools where children bring their own lunch boxes to schools, parents should be counseled about nutrition and a monthly diet plan should be advised to the parents according to the requirement of the child. This can keep a check as well as will help in modifying the diet of the child and the family as well. The government should have a budget to run a comprehensive nutrition education programme in all the schools.

The researcher recommends that the food provided to the children under Mid-day Meal programme should be a mixture of all the essential nutrients. It should be cooked by a trained cook in a separate cooking area, so that the students are not involved in cooking and the nutrients of the food are restored by applying appropriate cooking methods. The cooking utensils and the cooking area should be clean and well ventilated to maintain the hygiene.

Regular weight and height measurements should be taken in the school so that a regular check can be kept on the development of the children. Based on the need of the children of a particular school intervention programmes should be developed and implemented. The need of the date is to keep children free from all diseases and provide them a healthy and hygienic environment, so that the future of the country is secured.

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A Critical Appraisal of General Science Content of Class VII Textbooks

SWATI SINGH*

ABSTRACT

General Science is being taught as an integral part of general education, as it equips the learner with the basic awareness of his physical and biological environment. In this Endeavour, the 'Content' aspect of General Science plays a crucial role as it provides a theme or keynote for the instructional process. Thus the effectiveness of any instructional process is largely determined by the content and it presentation. Content of General Science with special emphasis on the term 'General' is a finest essence of those scientific facts, concepts and principles that are of general importance to a learner, providing general awareness of his environment. In order to remain realistic it needs to accommodate the ongoing changes in the environment to let the learner be conscious of recent evolution occurring as a result of scientific and technological progress. It is its auto accelerating nature and the fact that nothing is absolute in science that makes an urgent and recurring demand for periodical updating of its content. Thus to remain relevant and meaningful, content needs to be critically evaluated, updated and restructured on the regular basis. Textbooks being an effective tool to present the content, researcher felt the need to critically appraise the General Science content of Class VII textbooks prescribed by Rajasthan Board of Education in terms of its relevance and adequacy. Content was found to be environment oriented making an attempt to develop a basic awareness and understanding of the environment in the learner.

Introduction

General Science is now being treated as one of the curricular areas that are indispensable for any school curriculum. It provides the learner with the ability to identify various phenomena (biological as well as physical) operating in his environment and understand their

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casual relationships, classify, interpret and make reasonable conclusions. In this endeavour, the 'content' aspect of General Science plays a crucial role as it forms the pivot around which teaching learning process facilitates. It provides a **theme** or **keynote** for the instructional process. It is a medium through which a teacher interacts and communicates subject knowledge to a learner. So the effectiveness of the instructional process largely depends on the worthwhileness of the content in any discipline in context of objectives to be fulfilled through its transaction. Thus, Content in order to remain realistic and meaningful needs to be restructured on the regular basis. Such restructuring should be done on the basis of the outcomes of critical evaluation of the content.

Important considerations for critical appraisal of General Science 'content' at Upper Primary Stage (Class VII) are as follows:

(a) Nature of content in General Science at upper primary stage

The understanding of nature and structural arrangement of scientific knowledge can become a framework for planning, evaluation and consequent, restructuring of the content. Content of General Science is an ordered knowledge of natural phenomena and relations between the concepts and conceptual schemes that have developed as a result of experimentation and observation and thus explains the objects and events with in our natural environment. Looking deeply into the structure of general science content, its components can be visualised in a hierarchical arrangement where the smallest unit but largest in number are **facts.** Innumerable facts when organised have led to the forming of various **concepts** which are abstract idea about complex phenomena. In trying to understand the behaviour or occurrences of these concepts in various interrelationships, certain **constructs** are created. On the basis of experimentation, with empirical proof, **principle** and **laws** governing phenomena have been identified. When these stated in a complete universally applicable and proven explanation these are called **theory.**

Theory
Principles
Constructs
Concepts
Facts

Hierarchical arrangement of knowledge in Science

Content of General science is an accumulated systematised body of knowledge including facts, concepts, principles, formulae, figure and diagrams etc. All these form the **product of science** which has developed as a result of experimentations observations and measurements called **process of science** in the course of explaining events within our natural environment. Products of science are never final, but in fact they are fluid in nature and tentative. Theories and laws which are proved wrong in the course of time are discarded or replaced by new ones. Science is not only a product but also a process by which this product of science is obtained. Science as a process involves classification, experimentation and measurement etc.

Thus, an ideal General Science content should have a close link between the conclusions of science (**science product**) and inquiry that produced them (**science process**).This can be achieved if the content have along with adequate amount of conceptual input, lot of picture illustrations and variety of activities and experimentations.

(b) Learner's characteristic at upper primary stage

The learner's maturity level (psychomotor ability and stage of cognitive development) make a very important point of consideration for planning and evaluating the content. Learners learning ability, his limitations and strength determine the expected learning outcomes. What to expect say from a child of 3 or 5 can only be determined, keeping in mind the level of development of child. The objectives of teaching the content, difficulty level of the elements of content and the content presentation should be determined on the basis of learner's maturity level. How relevant and appropriate is the content in the context of stage of development it is meant for, forms the important criterion for the evaluation of the content. In the present paper researcher is dealing with the upper primary stage(11 to 14 years of age). As per the Piagetian theory of intellectual development, in Class VII (upper primary stage) child is in formal operational stage. He is no longer tied to concrete situation and capable of developing conceptual understanding of the general science content. Student at this age has an ability to conceptualise the way in which the component parts of the General Science content are interlinked, so as to draw a meaningful idea about it. This should be an ultimate aim of General Science teaching at upper primary stage.

Thus, an ideal science contents should have appropriate and adequate conceptual input to enable the child to conceptualise and draw a meaningful idea about it.

(c) Objectives of General Science teaching at Upper Primary Stage

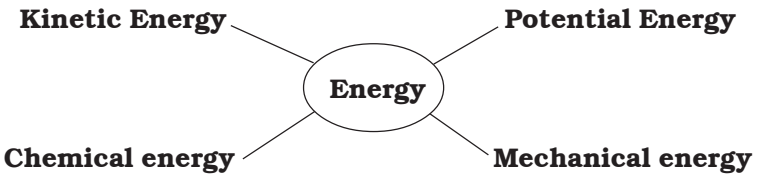
Critical evaluation of content should be done in the light of objectives of teaching it, which in turn need to be appropriate in context of National development goals, pedagogical goals and educational priorities. Therefore researcher made a comprehensive survey of literature to find out the objectives of Science teaching at upper primary level. Education commission (1964-66) in its report mentioned the objective of teaching science at upper primary stage as to develop among children a proper understanding of main facts, concepts, principles and process in the environment. Objective mentioned in the guidelines and syllabi for upper primary stage prepared by NCERT in 1988 was to acquaint students with some basic concepts, principles, laws of science relevant for understanding and interacting with the environment. According to Narendra Vaidya (1971), to develop functional understanding of scientific facts, concepts, conceptual schemes and their application to new phenomena is an important objective of teaching science at this level. Having studied the reports of various other committees and commissions as well as suggestion by eminent scientist, researcher concluded that '**Attainment of science concepts'** should be an objective of science teaching at this level.

Thus, Ideal General Science content at upper primary stage should enable a child not only to recall, recognise and define concepts but also to understand, interpret, explain and apply his conceptual understanding in new situations**.**

Having studied the philosophical and psychological basis of General Science content, researcher decided to critically appraise the General Science content in respect of following:

(a) Is Content Relevant?

Content is relevant if it makes sense to a learner at this stage. It should be **complete in itself** and should be capable of forming logically a properly organised **'Whole**' or a meaningful **'Gestalt'** in the mind of a child. Relevance can be assessed in terms of the amount of interrelatedness with in the content. Inter linking with in the content should be such that learning of one concept leads to the development of second, second into third and so on, until the main idea of that unit is eventually attained. For e.g. a conceptual statement like 'energy can change from one form to another' summarises a great number of concepts



Conceptual statement (idea) Ÿ # Energy can change from one form to another

(b) Is content Adequate?

Content is adequate if it is provided with broad and variety of learning experiences. To develop and understanding of any idea it is required to provide adequate learning experiences so that one can recognise and apply the concept being used. Along with the adequate the conceptual input it should be supplied with adequate number of picture and verbal illustrations. Figures and diagrams, presents the content in the concrete form, performing activities would provide first hand experience and increase students participation, thus help in developing and idea about the concept. Ideal science content has an adequate amount of conceptual input along with adequate number of picture illustrations (figures and diagrams), verbal illustrations (activities) and thought provoking questions. Conceptual learning of the content can only occur if it is adequate in terms of the above. Researcher would judge the adequacy of the content in terms of amount of conceptual inputs, amount of its being activity oriented and number of figure and diagram been presented.

RATIONALE

If the content is evaluated and restructured on the above parameters, there are maximum possibilities that learner having studied General Science for 10 years of General education will come out with full scientific understanding of the environment. But in order to have developed such strong understanding of science, one needs to have strong scientific base. Thus one of the basic priorities is to review the science status at lower levels of academic set up like 'upper primary level' where the foundations for the scientific understanding can be strengthened. This is why this stage was chosen for study by the researcher.

STATEMENT OF THE PROBLEM

A critical appraisal of General Science content of Class VII textbooks

OBJECTIVE OF THE STUDY

To critically appraise the Class VII General Science content in respect of its relevance and adequacy.

HYPOTHESIS

Content of General Science of Class VII is relevant and adequate.

POPULATION

Textbooks of Class VII of all boards of education in India.

SAMPLE

Textbook of Class VII prescribed by Rajasthan Board of Education published by Rajasthan Rajya Pathyapustak Mandal, Jaipur.

DELIMITATION OF THE STUDY

The researcher was fully conscious of the wide scope of subject area as well as various constraints and so the study was delimited in terms of follows:

1. The study was conducted only on Class VII content of General Science.
2. The study was conducted only on General Science textbook of Rajasthan Board of Education.

SOURCE OF DATA

In the present study, researcher analysed the substantive dimension of the General Science curriculum at upper primary stage. Thus the source of data was the content of General Science textbook of Class VII of Rajasthan Board of Education.

TOOL FOR THE DATA COLLECTION

As the objective of the study was to critically appraise the content of general science at upper primary level, it was essential to analyse it, for which the content analysis was done. Thus the tool used for the collection of the data was the **content analysis Performa** and the technique used was **qualitative content analysis.**

(a) Qualitative Content Analysis

It is a qualitative research technique in which researcher analyses the presence, meanings and relationships of concepts. To conduct a content analysis on any textbook content, it is broken down, into manageable categories on a variety of levels to identify the concepts and then relationships are examined among concepts. In structural terms, content refers to organised set of statements or proposition and in General science content these statements are about interrelated scientific facts, concepts and principals that are of general importance to a child. Thus, in order to make a qualitative General science content analysis, General Science textbook of Class VII was examined and distilled (analysed) thoroughly for facts, concepts, laws/principles, process (cyclic and linear processes), relationships (direct, inverse, concurrent and cause-effect relationships) and categorisations with the help of Content Analysis Proforma. Data thus obtained as a result of such exhaustive content analysis was too massive. Therefore, compilation of data was done where all the concepts as well as ideas were sorted out from the above Proforma and tabulated. From the above tabulated data concept clusters were identified where each concept cluster comprised of a 'central' concept and various related concepts and ideas clustered around it. There were total 14 concept clusters identified where each concept cluster seemed to be complete in itself and conveying some meaningful ideas. Interrelationship among various concept clusters was identified to judge the interrelatedness within the content and how far it is successful in forming a meaningful 'Gestaltic' view of the environment in the mind of the child. This enabled researcher to assess the relevance of the content with respect to learner at upper primary stage. Below each concept cluster a table was formed which depicted the concepts and ideas involved in the cluster and nature of details been provided for each one of them in the textbook. This enabled researcher to assess the adequacy of the conceptual input. Figure and diagram analysis was done to assess the adequacy of the picture and verbal illustration.

(b) Content Analysis Proforma

This was the tool used for data collection. It was a tabular presentation of the content. It was divided into six columns namely Facts, Concepts, and Laws, process, Relationships and categorisation. Relationships column was further divided into concurrent, inverse and cause effect relationships columns while process column was further divided into

cyclic and linear process. All the facts found were listed under the columns of facts, all concepts found were listed under concept column and so forth in the content analysis Performa as shown in the Table No.1:

TABLE 1
Content Analysis Proforma

Facts	Concepts	Laws	Process		Relationships				Categorisation
			Cyclic	Linear	Direct	Inverse	Concurrent	Cause-effect	

NATURE OF DATA

Data obtained after the systematic and detailed examination and analysis of the content of General Science textbooks of Class VII of above mentioned Board was found to be purely **qualitative** in nature.

PROCEDURAL DETAILS

Procedural details have been elaborated in what follows:

(a) Content Analysis

Content of General Science textbook was found to have been presented in a topical fashion. There were 20 chapters in the textbook. Content analysis was done chapter wise. Each chapter was analysed thoroughly for facts, concepts, laws/principles, process (cyclic and linear processes), relationships (direct, inverse, concurrent and cause-effect relationships) and categorisations. All the facts found were listed under the columns of facts, all concepts found were listed under concept column and so forth in the content analysis Proforma. Data thus obtained as a result of such exhaustive content analysis reflected each and every aspect of the content of textbook but at the same time it was too massive. Researcher found it impractical to present it in its original form, thus compilation of data was done.

(b) Compilation of Data

In order to make the data obtained, more refined and presentable, all the concepts as well as ideas were sorted out from the above Proforma and tabulated. Two tables exhibiting all the concepts and ideas along with their way of presentation in the book were prepared (**Appendix II-A & II-B**). Framework of the table is as follows:

TABLE 2

Concepts	Definitions	Descriptions	Differentiation/ Categorisations	Process	Relationship

TABLE 3

Ideas	Mode of Presentation		
	Illustrative	Descriptive	Explanatory

(c) Identification of Concept Clusters

On the basis of tabulated data obtained from the preceding step, researcher tried to represent the content in more meaningful pictorial format i.e. in the form of **concept clusters.** Each concept cluster comprised of a 'central' concept and various related concepts and ideas clustered around it. Each concept cluster seemed to be complete in itself and conveying some meaningful ideas. The assumptions behind the clustering of concepts and ideas were that various concepts and ideas in the content are interrelated.

(d) Tabulation of Nature of Details in Each Concept Cluster

Below each concept cluster a table was formed which depicted the concepts and ideas involved in the cluster and nature of details been provided for each one of them in the textbook.

Concepts/Ideas	Nature of Details

(e) Interlinking of Concept Cluster

An attempt was made to identify interrelationship among various concept clusters. This was done to judge the interrelatedness within the content and how far it is successful in forming a meaningful 'Gestaltic' view of the environment in the mind of the child.

(f) Figure and Diagram Analysis

This was done in order to determine adequacy of the content in respect of figurative component. Each figure and diagram was analysed and assigned to one or more of the following categories:

(i) Figures used strictly for illustrative purpose.

(ii) Figures requiring students to perform some activity or to use data.

(iii) Figures illustrating setting up the apparatus for an activity.

Data obtained on figures and diagram analysis has been presented in **Appendix III**.

DATA ANALYSIS

General Science textbook of Class VII, fourteen concept clusters were identified. Each concept cluster could be characterised distinctly and found to be conveying a meaningful idea.

Identification of Concept Cluster

Concept cluster no. 1 (Life Processes) was 'process' centered conveying an idea, that various life processes allow life to continue. **Concept cluster no. 2 (Heat)** is 'relational' type conveying an idea of cause and effect relationship among various phenomena operating in the environment. This cluster showed Melting, boiling, expansion and change of state as the effect of heating .**Concept cluster no. 3 (Electric Current)** was 'categorisation' based conveying an idea that materials can be categorised into good or bad conductor as per their ability to conduct electric charge. **Concept Cluster no. 4 (Living Organism)** was found to be 'organisation' based projecting an idea that our body is an organised structure where cell as a structural unit is organised into tissues, tissues into organs and organs into organ system. Finally proper organisation of organ systems makes an individual. **Concept cluster no. 5 (Matter)** was 'classification' type depicting an idea that matter can be classified into elements, compound and mixture all of which are made of atoms and molecules. **Concept Cluster no. 6 (Chemical Representation)** was based on 'symbolic representation' giving an idea that chemical can be represented by symbols and chemical equation is nothing but symbolic representation of chemical reaction. **Concept Cluster no. 7 (Cell)** was 'function' based giving an idea that cell is a functional unit of organism. A cell functions through its different organelles like mitochondria, ribosome, centrosome etc. in such a way that whole organism continues living and reproduce through mitotic and meiotic cellular division. **Concept Cluster no. 8 (Constituents of Air)** was 'composition' based giving an idea that air is a mixture of gases. **Concept Cluster no. 09 (Chemical Reaction)** was 'Reaction' based depicting various reactions occurring naturally like nitrogen fixation, photosynthesis, oxidation etc. **Concept Cluster no. 10 (Diseases)** was 'relational' type giving an idea of disease, its causes, symptoms

and precautions. **Concept Cluster no. 11 (Imbalance in Nature)** was again 'relational' conveying an idea of interdependence of living and nonliving components of nature thus emphasising on environmental consciousness. **Concept Cluster no. 12 and 13 (Sound and Light)** gave an idea that light as well as sound travels in all direction from their source where sound needs medium while light can propagate without medium. **Concept Cluster no. 14 (Machines)** generated an idea that machine makes our work easier.

Below each concept cluster a table was presented that mentioned whether the concepts in the cluster had been presented in content as description, definitions, relationships, process, and categorisation. With the help of the table, researcher could make out whether the details been provided regarding concept cluster (all concepts within the cluster) were adequate and appropriate to develop the idea that each cluster seemed to be conveying.

Interrelationship among Concept Clusters

All the fourteen concept clusters were identified to be interrelated generating one major idea of **'unity of biological, physical and chemical phenomena operating in the environment'.** The interrelationship among these concept cluster have been presented in the Figure-1

This figure depicted the conceptual interlinkage with in the content. These relationships were identified in the following manner. As shown in **Concept Cluster no. 1(Life Processes)** all living organisms perform various life processes like respiration, nutrition, excretion etc. to keep themselves alive. They require energy to perform these life processes which is obtained from food through chemical reactions. In order to get chemical energy from food, it has to be broken into smaller and soluble molecules through the process of digestion. These smaller molecules as described in **Concept Cluster no. 09 (chemical reactions)** then take part in chemical reaction called oxidation that take place in mitochondria of the cell as described in **Concept Cluster no. 7 (Cell)**. Food molecules are oxidised with oxygen taken up by the organism through aerobic respiration from air. The oxygen percentage in the air maintained through another chemical reaction called photosynthesis as described in **Concept Cluster no. 09 (Chemical reactions)**. During this process green plants synthesise an organic compound called carbohydrate using carbon dioxide and water from the environment and heat energy from sunlight, as described in **Concept cluster no. 2 (Heat)** facilitate these

chemical reactions**.** Oxygen is released in this process. Chemical representation as described in **Concept Cluster no. 6 (Chemical representation**) of this process can be done as following chemical equation.

$$6CO_2 + 6H_2O \xrightarrow{\text{Sun Light}} C_6H_{12}O_6 + 6O_2 + \text{Energy}$$

Oxygen thus released causes food molecules to oxide and release energy which is used for various life processes to carry on among which are mitosis and meiosis. Mitosis helps in growth and development from cell to organ system while meiosis causes organism to reproduce its own kind leading to population growth as described in **Concept Cluster no. 7 (Cell)**. The uncontrolled exploitation of natural resources by human population has led to environmental pollution as described in **Concept Cluster no. 11 (Imbalance in nature)**. Although machines make our work easier as described in **Concept Cluster no. 14 (Machines)** but indiscriminate use of machines leads to enormous sound ,water and air pollution .Consequently, the natural composition of air as described in **Concept Cluster no. 8 (Constituents in air)** has been disturbed due to mixing of various harmful gases and compounds .This in turn are affecting all living organism, various life process and causing various diseases among human population .

Figure and Diagram Analysis

Overall ninety five figures and diagram were found in the content that was covered in 17 chapters as shown in **Appendix III**. Not even a single chapter was without figure. There were 7 chapters which had large number of figures and four chapters which had very less number of figures. Sixty five figures were presented for only illustrative purpose. There were twenty one figures which required students to perform activity while fifteen figures illustrated the way of setting up apparatus for activity. Ratio of figures for illustrative purpose only to the figures calling for performing some kind of activity was (65:36). In some chapters figures were lacking in clarity for eg. Figure exhibiting human respiratory system in chapter 7, figure for human heart etc.

DATA INTERPRETATION

Thus, overall it was found that content of General Science textbook rendered itself for meaningful representation in the form of fourteen 'consistent wholes' which were referred to as 'concept clusters'. Each one of these conveyed some meaningful idea about the content. This

proves the relevance of the content to an extent. When seen in totality, all the above fourteen concepts clusters were found to be interrelated forming a 'Gestaltic' view of the content in general science textbook of Class VII. One major idea found to be emerging out was environment being an integrated whole comprising physical, biological, and chemical phenomena.

RESULTS

Overall content was found to be **relevant**. It was complete in itself forming logically a properly organised 'Whole' or a meaningful 'Gestalt' in the mind of a learner. Interrelatedness with in the content was such that learning of one concept leads to the development of second, the second into a third and so on eventually emerging into one major idea i.e. **"There is oneness and unity in all nature".** Content was **adequate** except few concepts like atoms, load, fulcrum, work etc. found to be lacking adequate description. Content was adequate in its figurative component but proportion of illustrative figures was higher than activity based figures. Content was appropriate except few concepts like machines, kinds of asexual reproduction whose description seemed to be too heavy and vast for the upper primary stage. But still textbook was found to be bit authoritative and less investigative offering few challenges to students

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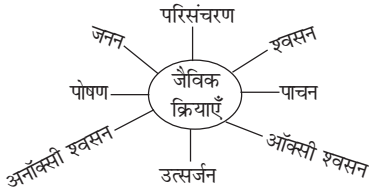
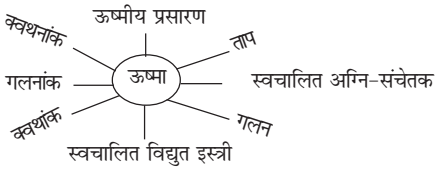
Concept Cluster No. 1



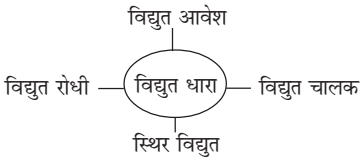
S. No.	*Concepts/Ideas*	*Nature of Details*
1.	जैविक क्रियाएँ	Descriptions
2.	पाचन	Process
3.	ऑक्सी श्वसन	Process
4.	जनन	Process,Categorisation
5.	पोषण	Process,Categorisation
6.	अनॉक्सी श्वसन	Process
7.	उत्सर्जन	Process
8.	श्वसन	Process
9.	परिसंचरण	Process

Concept Cluster No. 2



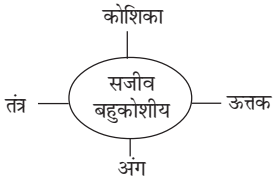
S. No.	*Concepts/Ideas*	*Nature of Details*
1.	उष्मा	Descriptions
2.	क्वथन	Descriptions,Definition
3.	गलन	Descriptions,Definition
4.	गलनांक	Descriptions,Definition
5.	ताप	Definition
6.	स्वचालित विद्युत इस्त्री	Description
7.	स्वचालित अग्नि-संचेतक	Description
8.	ऊष्मीय प्रसरण	Description

Concept Cluster No. 3



S. No.	*Concepts/Ideas*	*Nature of Details*
1.	विद्युत आवेश	Definition,Descriptions, Categorisation
2.	विद्युतरोधी	Definition
3.	स्थिर विद्युत	Description definition
4.	विद्युत प्रवाह	Definition
5.	विद्युत चालक	Definition

Concept Cluster No. 4

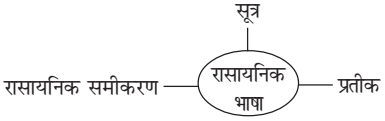


S. No.	*Concepts/Ideas*	*Nature of Details*
1.	सजीव बहुकोशीय	Descriptions,Definition,Categorisation
2.	कोशिका	Descriptions,Definition,
3.	ऊत्तक	Descriptions,Definition,
4.	अंग	Descriptions,Definition,
5.	तंत्र	Descriptions,Definition,

Concept Cluster No. 5

S. No.	*Concepts/Ideas*	*Nature of Details*
1.	पदार्थ	Descriptions, Categorisation Definition,
2.	तत्व	Descriptions,Definition, Categorisation
3.	मिश्रण	Descriptions,Definition, Categorisation
4.	यौगिक	Descriptions,Definition, Categorisation
5.	परमाणु	Definition,
6.	अणु	Definition,

Concept Cluster No. 6



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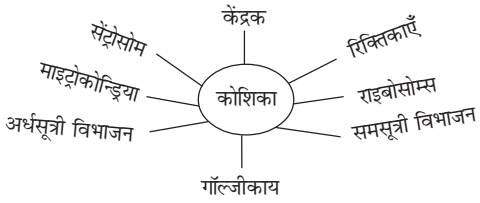
2.	सूत्र	Descriptions, Definition,
3.	प्रतीक	Descriptions, Definition,
4.	रासायनिक समीकरण	Descriptions, Definition,

Concept Cluster No. 7



S. No.	Concepts/Ideas	Nature of Details
1.	कोशिका	Descriptions, Definition,
2.	माइट्रोकोन्ड्रिया	Descriptions, Definition,
3.	सेंट्रोसोम	Descriptions, Definition,
4.	अर्धसूत्री विभाजन	Descriptions, Definition,Process
5.	समसूत्री विभाजन	Descriptions, Definition,Process
6.	गॉल्जीकाय	Definition
7.	राइबोसोम्स	Descriptions, Definition,
8.	रिक्तिका	Descriptions, Definition,

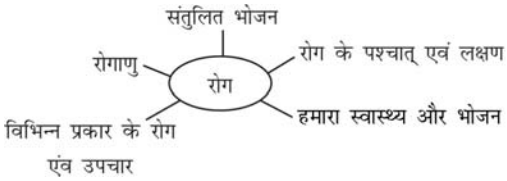
Concept Cluster No. 8

S. No.	Concepts/Ideas Nature of Details	
1.	वायु के अवयव	Descriptions,
2.	वायु के सक्रिय भाग ऑक्सीजन है	Descriptions,
3.	वायु में जलवाष्प और निष्क्रिय गैसें	Descriptions,
4.	वायु में जलवाष्प और कार्बन डाईऑक्साईड है	Descriptions,
5	नाइट्रोजन वायु का सर्वाधिक भाग	Descriptions,

Concept Cluster No. 9

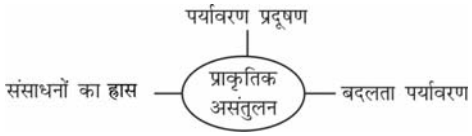
S. No.	*Concepts/Ideas*	*Nature of Details*
1.	रासायनिक क्रियाएँ	Descriptions
2.	नाइट्रोजन यौगिकीकरण	Descriptions , Definition
3.	उदासीनीकरण	Description, Definition
4.	खाद्य संश्लेषण	Description, Definition
5.	आक्सीकरण	Description

Concept Cluster No. 10



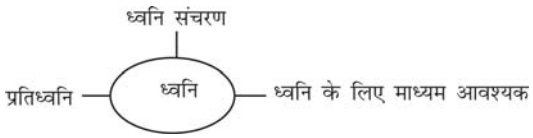
S. No.	*Concepts/Ideas*	*Nature of Details*
1.	रोग	Descriptions
2.	रोगाणु	Descriptions
3.	संतुलित भोजन	Description
4.	हमारा स्वास्थ्य और भोजन	Description
5.	विभिन्न प्रकार के रोग एवं उपचार	Description
6.	रोग के पश्चात् एवं लक्षण	Description

Concept Cluster No. 11



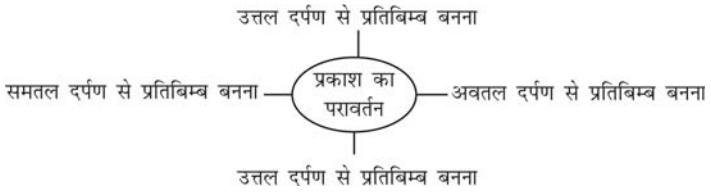
S. No.	*Concepts/Ideas*	*Nature of Details*
1.	प्राकृतिक असंतुलन	Descriptions
2.	पर्यावरण प्रदूषण	Descriptions, Example
3.	संसाधनों का ह्रास	Description
4.	बदलता पर्यावरण	Description

Concept Cluster No. 12



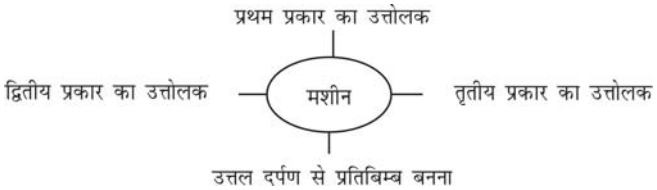
S. No.	*Concepts/Ideas*	*Nature of Details*
1.	ध्वनि	Descriptions, Categorisation
2.	प्रतिध्वनि	Descriptions
3.	ध्वनि के लिये माध्यम आवश्यक	Description, Example
4.	ध्वनि संचरण	Description

Concept Cluster No. 13



S. No.	*Concepts/Ideas*	*Nature of Details*
1.	प्रकाश का परावर्तन	Descriptions,Definition, Categoration
2.	पार्श्व परिवर्तन	Descriptions,
3.	समतल दर्पण से प्रतिबिम्ब बनना	Description
4.	अवतल दर्पण से प्रतिबिम्ब बनना	Description
5.	उत्तल दर्पण से प्रतिबिम्ब बनना	Description

Concept Cluster No. 14



S. No.	*Concepts/Ideas*	*Nature of Details*
1.	मशीन	Descriptions, Example
2.	प्रथम प्रकार का उत्तोलक	Descriptions, Example
3.	द्वितीय प्रकार का उत्तोलक	Description, Example
4.	तृतीय प्रकार का उत्तोलक	Description, Example

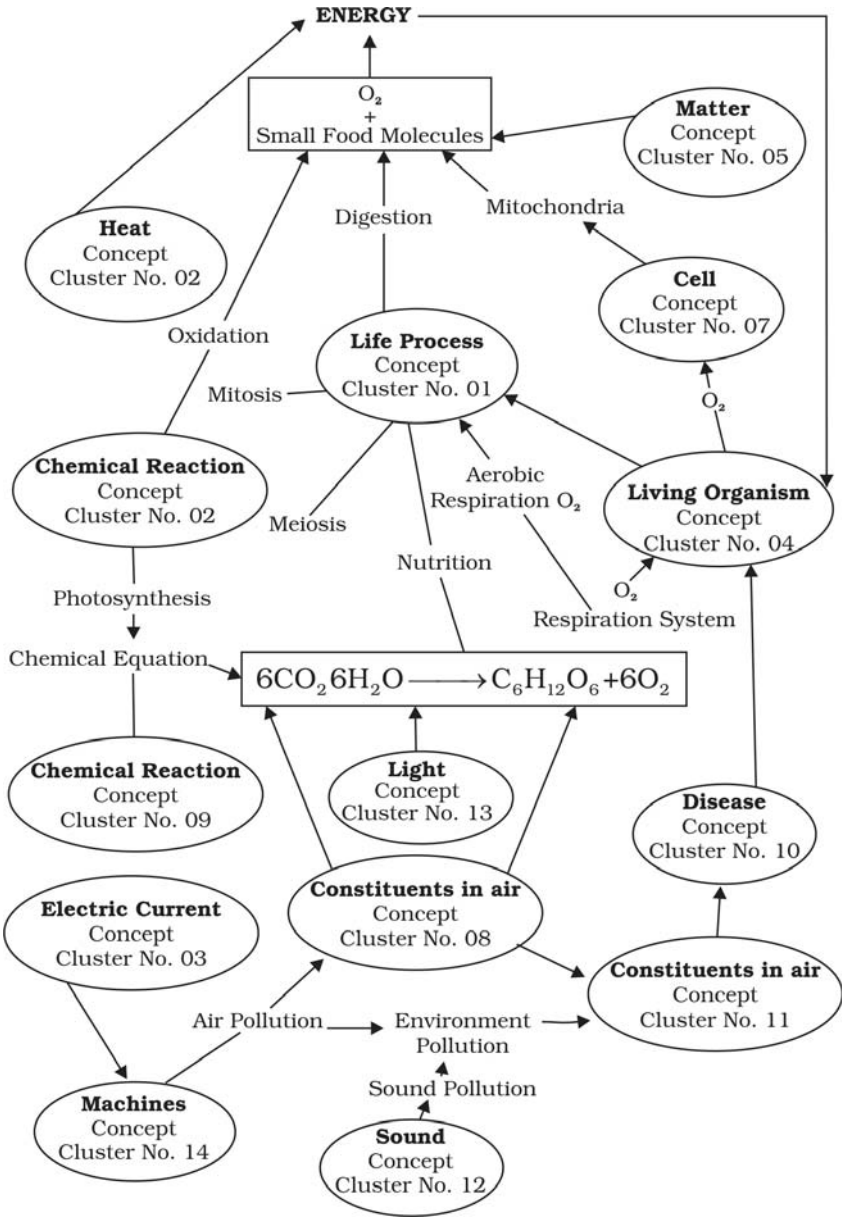


FIGURE 1
Interrelationship among concept cluster of Class VII content of General Science

APPENDIX-I

TEXTBOOK DETAILS

In the present study, content analysis of General Science textbook of Class VII prescribed by Rajasthan Rajya Pathypustak Mandal, Jaipur was made. Details of the above mentioned books are as follows:

विषय सूची

APPENDIX-II-A

Concept in Class VII General Science Textbook and their description

S.No.	*Concepts*	*Definitions*	*Description*	*Differentiation/Categorisation*	*Process*	*Relationship*
1.	पदार्थ	√	Examples	पदार्थ in terms of their state शुद्ध पदार्थ और अशुद्ध पदार्थ Composition शुद्ध पदार्थ in terms of their Composition अशुद्ध पदार्थ in terms of their Composition		
2.	तत्व	√	Examples	तत्व in terms of physical and chemical Characteristic		
3.	मिश्रण	√	Examples	समांग मिश्रण और असमांग मिश्रण : Constitution		
4.	यौगिक	√	Examples, Illustration		√	
5.	रासायनिक क्रिया	√	Examples		√	
6.	प्रतीक	√	Examples			
7.	अणु सूत्र	√	Examples			

8.	रासायनिक समीकरण	√	Examples		√	
9.	उदासीनीकरण अभिक्रिया	√	Examples, Illustration		√	
10.	लवण	√	Examples			
11.	नाइट्रोजन यौगिकीकरण	√	Examples		√	
12.	कोशिका	√	Structure, Function			
13.	समसूत्री विभाजन	√			√	
14.	अर्धसूत्री विभाजन	√			√	
15.	राइबोसोम्स	√	Structure, Function			
16.	गाल्जीकाय	√	Structure, Function			
17.	रिक्तिकाएँ	√	Structure, Function			
18.	माइट्रोकोन्ड्रिया	√	Structure, Function			
19.	केंद्रक	√	Structure,			
			Function			
20.	सेंट्रोसोम	√	Structure,			
			Function			
21.	ऊतक	√	Structure, Function	जन्तु ऊतक और पादक ऊतक :Structure, जन्तु ऊतक in terms of their structure and function, पादक ऊतक in terms of their structure Location and function, जन्तु विभाज्योतक ऊतक और स्थायी ऊतक in terms of structure		
22.	श्वसन	√	Structure, Function			
23.	ऑक्सीश्वसन	√				
24.	अनॉक्सी श्वसन	√			√	
25.	पोषण	√	Examples, Illustration	सजीवों में पोषण एवं पादप में पोषण	√	
26.	खाद्य संश्लेषण	√			√	
27.	परिसंचरण	√	Structure, Function		√	
28.	उत्सर्जन	√	Structure, Function		√	
29.	जनन	√	Structure, Function	अलैगिंक जनन और लैगिंक जनन जंतुओं में लैगिंक जनन और पादपों में लैगिंक जनन मादा जनन और नर जनन	√	

30.	संतुलित भोजन	√	Definition, Example			
31.	रोग	√	Definition, Example			
32.	रोगाणु	√				
33.	ऊष्मा	√	Example			
34.	ताप	√				जब वस्तु को ऊष्मा देते है तो उसका ताप बढ़ जाता हैं।
35.	गलंन	√	Example, Illustration		√	
36.	गलंनाक	√				
37.	क्वथन	√	Example,		√	
			Illustration			
38.	क्वथनांक	√			√	
39.	उष्मीय प्रसारण	√		ठोस, द्रव अंर गैसीय उष्मीय प्रसारण	√	
40.	स्वचालित	√	Structure,			
	अग्नि संयतक		Function			
41.	स्वचालित	√	Structure,			
	विद्युत इस्त्री		Function			
42.	प्रकाश परावर्तन	√		नियमित परावर्तन और विसरित परावर्तन	√	
43.	पार्श्व परिवर्तन	√				
44.	प्रतिबिम्ब	√				
45.	ध्वनि			क्षीण एवं प्रबल ध्वनि मंद एव तीक्ष्ण ध्वनि	√	
46.	ध्वनि संचरण	√	Illustration		√	
47.	प्रतिध्वनि	√				
48.	प्राकृतिक असंतुंलन	√	Example			मनुष्य की अनियोजित आर्थिक गति-विधि से प्राकृतिक असतुंष्ट
49.	पर्यावरण प्रदूषण	√		पर्यावरण प्रदूषण in terms of component of environment		
50.	प्राकृतिक संसाधन	√	Example, Illustration			
51.	स्थिर विद्युत	√	Example, Illustration			
52.	विद्युत आवेश	√	Example, Illustration	घन आवेश और ऋण आवेश		
53.	विद्युत चालक	√				

54.	विद्युत-रोधी	√				
55.	मशीन	√	Example, Illustration	साधारण मशीन और जटिल मशीन	√	
56.	उत्तोलक	√		प्रथम प्रकार उत्तोलक द्वितीय प्रकार उत्तोलक और तृतीय प्रकार उत्तोलक	√	
57.	जैविक क्रियाएँ	√	Example, Illustration		√	

APPENDIX-II-B

Other ideas in Class VII General Science textbook and their description

S.No.	Ideas	Descriptive	Illustrative	Explanatory
1.	पदार्थ अत्यन्त सूक्ष्म कणों से मिलकर बनते है।		√	
2.	ऊष्मा परिवर्तन से पदार्थ की अवस्था बदल जाती है।		√	
3.	वायु के अवयव वायु का सक्रिय भाग ऑक्सीजन नाइट्रोजन वायु का सर्वाधिक भाग वायु में जलवाष्प और कार्बन डाइऑक्साइड एवं धूल के ठोस कण निष्क्रिय गैसें	 √ √ √	 √ √	
4.	जैविक क्रियाओं के लिये ऊर्जा जरूरी	√		√
5.	अंग एवं तंत्र का निर्माण	√		
6.	बदलता पर्यावरण	√		
7.	संसाधानों का ह्रांस	√		
8.	विभिन्न प्रकार के रोग एवं उपचार	√	√	
9.	व्यक्तिगत एवं सामुदायिक स्वास्थ्य	√		√
10.	रोग की पहचान एवं लक्षण	√		
11.	हमारा स्वाास्थ्य और भोजन	√		
12.	महान विज्ञानी चन्द्रशेखर वेंकटरमन के जीवन का वर्णन	√		
13.	व्यक्तिगत एवं सामुदायिक स्वास्थ्य एवं पर्यावरण स्वच्छता	√		

APPENDIX-III

Figure and diagram analysis of Class VII General Science textbook

Chapter No.	Figure & Diagram Analysed	Figures that illustrate only	Figures Requiring students to perform activity	Figures illustrating way of setting up apparatus for activity
1.	1 विभिन्न वस्तुएं 2 ऊष्मा से पदार्थ को विभिन्न अवस्थाओं में परिवर्तन 3 प्रकृति में विभिन्न तत्वों की प्रतिशत मात्रा	√ √ √		
2.	1 सोडियम व क्लोरिन परमाणु की संरचना 2 नमक बनने की प्रक्रिया	√ √		
3.	1 ऑक्साइड बनाने की विधि	√	√	√
4.	1 वायु का प्रतिशत संघठन आयतन के अनुसार	√		√

	2 प्रयोगशाला में ऑक्सीजन बनाना 3 ऑक्सीजन के उपयोग	√		√
5.	1 जन्तु कोशिका (साधारण सूक्ष्मदर्शी द्वारा देखा गया) 2 जन्तु कोशिका (इलेक्ट्रान सूक्ष्मदर्शी द्वारा देखा गया) 3 अंत: प्रदव्यी जालिका 4 माइट्रोकोन्ड्रिया 5 गॉल्जीकाय 6 केंद्रक 7 पादप कोशिका 8 विभिन्न आकृति की कोशिकाएँ 9 समसूत्री विभाजन 10 अर्द्धसूत्री विभाजन	√ √ √ √ √ √ √ √ √ √		
6.	1 उपकला ऊतक कोशिकाएँ 2 अस्थि ऊत्तक 3 रूधिर ऊत्तक 4 पेशीय ऊत्तक 5 तंत्रिका कोशिका 6 तने की अनुप्रस्थ काट 7 विभाज्योतक ऊत्तक 8 मृदुतक 9 स्थूलकोणोत्तक 10 दृढ़ोतक 11 दारू जायलम ऊत्तक 12 पोथवाह ऊत्तक 13 आमाशय में उपस्थित ऊत्तक 14 ऊत्तक अंग तंत्र	√ √ √ √ √ √ √ √ √ √ √ √ √ √		

Figures & Diagrams from chapter No. 7 to chapter No. 17 of Class VII General Science textbook were also analysed in the above manner.

Research Notes

Quest over Courses of Study: *Deciding for Teacher Rating Scale*

SUDESHNA LAHIRI*

Abstract

The focus is now shifting from improvement in the quantity of schools to improvement in the quality of teachers. Hence, reaffirming the role and performance of facilitators become significant in the pursuit of quality education. In this regard, policy makers and administrators have suggested that student evaluation of teachers (SET) should be integral part of the Teacher appraisal. Reviewing the recommendations by different committees for improvement in educational system in India, the question arises — whether questionnaires for rating teachers used to evaluate the teachers should be course specific? What is the status of teachers when they are rated on a uniform questionnaire used in spite of having different streams? Thus, the present study is conducted with a framed objective — to find out the effect of course on student evaluation of teachers. A sample of 1711 higher secondary school students is made to rate 93 teachers. It is found that course has an effect on student evaluation of teachers on more than one dimension of "teacher effectiveness".

Because, teacher plays a key role in carrying out the structuring of the society and nation, Education Commission (1966) has rightly said, "Of all different factors which influence the quality of education and its contribution to national development, the quality, competence and character of teachers are undoubtedly the most significant". Thus, the importance of a teacher in the educational processes is unquestionable as he/she is architect and designer of all classroom interaction. Further, UNESCO (1972) has also reported that new roles are expected from the teacher in Asian Schools. He has to become a democratic leader, a friend and guide to his pupils and their parents

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in community. In view of the significance of the role in education played by teachers, due to the rapid and drastic developments in technology, economy, and politics, teachers would face more challenges and uncertainties in performing a wider range of duties and taking up more responsibilities in 21st Century. The plea is that let the teachers accept responsibility and be accountable for their part in the declining standards of education and cooperate to contribute positively in a constructive manner, as there has been a considerable increase in the amount of effort put into improving the teaching-learning process in schools in India and different parts of the world. To ensure quality education, policy makers have recommended implementation of regular evaluation of teacher performance and ensuring their accountability, with the introduction of pay scale revision. In 1971, S.R. Sen Committee while recommending the higher pay scales had added the need for code of conducts (Professional ethics) to be made part of it. Recommendation from National Policy of Education (NPE) (1986) has suggested "Annual Performance Appraisal" for the teachers of colleges and Universities observing a comprehensive open participatory database system of teacher evaluation with the inputs from self, peers, heads of institutions/departments, students and others. However, it has been realised that performance evaluation of teachers is an extremely delicate and solemn task, which requires a high degree of uprightness and integrity on the part of assessor. As in most academic institutions, the Principals/Heads always evaluate the teachers at the end of the academic year when the confidential report is prepared. A major flaw in the system is that the principal is so engaged in administration that he or she cannot devote time in monitoring, assessing and taking remedial measures for improving the quality of education being imparted. Moreover, the permanent staff in the institution finds it offensive that the all powerful Principal would intrude into their classroom without invitation. In this regard, policy makers and administrators suggest that students would not be the silent partners as students have front row seat to observe classroom processes and are the best judges of what they have learnt (Scriven, 1995). For the last three decades, committees appointed, in India, to discuss effective measures for the accountability of teachers recommend to implement 'Student Evaluation of Teachers' to ensure quality teaching. The Rastogi Pay Committee (1997) instituted by the University Grants Commission (UGC) has stressed that student appraisal of teachers should be an integral part of the package of recommendation on pay scale and service conditions. Mehrotra committee (1987) also agrees,

with NPE (1986), the need for compulsory annual submission of 'Performance Appraisal' and students should evaluate their performance. The National Assessment and Accreditation Council (NAAC) of India, established by the University Grants Commission in 1994 to initiate quality management procedure, has made the institution of higher education to introduce student evaluation of teachers as one of the criteria for assessing teaching quality. The guidelines given by NAAC for Internal Quality Assurance Cell (IQAC) consist of various questionnaires for collecting feedback from students in structured way. Similarly, Technical Education Quality Improvement Programme (TEQIP) of Government of India consequent to implementation of reforms derived from National Policy of Education (NPE-1986 as revised in 1992) by institutions. The reforms to be carried out, among others, may include establishing the practices of student evaluation of teachers' performance and teaching counseling. The committees that also recommend student evaluation of teachers (SET) as an integral part of appraisal system are Professor Amrik Singh Committee, Ashok Mitra Education commission during early 1990s and the current 'Perspective Plan' by Higher Education Commission of West Bengal. In recent decision, the Kendriya Vidyalaya Sangathan has decided to adopt a system of evaluation of teachers by the students. According to the new rule (i.e., 81-E), children from class V to XII would be given printed assessment forms in the month of October and they would have to put tick mark against the appropriate grading. Tracing the origin of the concept, Student Evaluation of Teachers (SET), the process is first used in 1920's in University of Washington for deciding tenure for teachers, although it is started as a measure in US campuses for administrative decisions since 1960's. A recommendation for SET tops the list among the six suggestions for improvement of teaching made by the Carnegie Commission (1972) for US campuses. The area, i.e., SET, has been the frequently visited by Educational Researchers in Euro-American academe since 1960; however, it is still unexplored in Indian scenario. Therefore, before making the process an integral part of Teacher Appraisal System, a deep probe research should be conducted in Indian campus to constitute it's layout. The first step towards it is to develop the instrument, which could suitably match the objectives, purposes and needs of the system (i.e., SET). Development of the format of Teacher Rating Form is an essential task for quality assurance as quality is the most important agenda in the eve of most awaited sixth pay commission because the appeal

is to make teaching job more attractive in terms of pay packages and service conditions. Although, the process (SET) is struggling for its existence in Indian educational system, premier Institutions along with those managed by private bodies have enforced this system of teacher appraisal without evolving scientifically developed 'Rating Form' for teachers. This, in return, leads to the pertinent question: whether uniform format should be used for evaluating the teachers from different courses of study? Because, policy makers have not made any clarity in instruction for differential process\format for rating of teachers for different courses. Thus, the evaluation of teachers is carried out in campuses blindly following the hypothesis that there is no significant effect of courses on Student Evaluation of Teachers. Review of related literature gives a sharp edge for testing the hypothesis statistically. Because 'SET' has been frequently visited area for Euro-American researchers, the studies conducted suggest varied results over the effect of course on student ratings. Exploring the course variables, it is required/elective, day or evening, course level, academic major versus minor, prior subject interest are seen affecting students' ratings (Papalewis, 1990; Scherr & Scherr, 1990). Branes and Branes (1991) address in their study that although student evaluation data provide a reasonable basic for making decisions about instructors when generalisability across course and students. When the course is the object of measurement (OM), data are less generalising. Conclude that this finding may be due to the type of evaluation items used for academic discipline differences in the type of courses selected for the study. Marsh (1982c) points that weak tendency for higher ratings in humanities and lower ratings in science but too fewer studies to be clear. Researchers also suggest that humanities courses tend to be rated higher than those in science and engineering; upper level courses tend to be rated higher than lower level courses (Feldman, 1983; Marsh & Dunkin, 1992). Because each discipline may vary with respect to the type of teaching style used (Hudak & Anderson, 1984), students with engineering majors may evaluate humanities, social sciences and natural science professors more negatively because they may be less accustomed to their teaching styles or have less interest in those courses than other students (Basow & Silberg, 1987). Study conducted by Basow and Distenfeld (1985) finds that student major also has an effect on the evaluations of professors. Engineering majors give the least positive ratings on each factor, perhaps because no engineering professors are evaluated. Similarly, professors of humanities courses are always

rated more than professors of social science, natural science courses, and engineering, a common pattern (Adams, 1997; Cashin, 1988; Marsh & Dunkin, 1992; McKeachie, 1996). Again, Schenkler and McKinnon (1994) suggest that course level appears to be a consistent variable that displays the greatest effect on student evaluation with students in more advanced courses indicating greater satisfaction with the instructor performance. Haskell (1997) points that required courses hold less interest and receive lower evaluations than elective courses. Ratings are generally higher for senior than for junior courses and for optional than for required courses (Feldman, 1978; Marsh, 1980, 1983; Murray et al., 1990). Cahn (1987) suggests that student evaluation of teachers measure attitudes toward instructor's course. Similarly, Evans (2004) finds that a link between a students' least popular teacher and the student's worst subject. Their favourite teacher is also the teacher of their best subject. Researchers also find effect of course taught on student ratings in interaction with gender. When the interaction of student gender is considered, Lucek, Endres and Caplan (1993) in Mass Communication show that male students rate male instructors higher and that female students rate female instructors higher. Similarly, because female faculty are most represent in the humanities, they are not viewed as very nontraditional by their students, although students may have same-gender preferences in terms of teaching styles when teacher gender is also considered. In social sciences, however, which are composed primarily of business and economics and government and law-faculty, female professors are underrepresented and likely to be viewed as non-traditional (Sidanius & Crane, 1989; Tieman & Rankin-Ullock, 1985). Contradictory to the researches revealing the effect of course, Marsh and overall (1981) demonstrate that the instructor is the primary determinant of student ratings rather than the course he or she teaches. Gilmore et. al. (1978), applying generalisability theory to student ratings, also find that the influence of the instructor who teaches the course is much larger than that of course that is being taught. The conducted study suggests that ratings for a given instructor should be arranged across different courses to enhance generalisability. Reviewing the related literature, it has been observed there is a scarcity of research in India on the area "Student Evaluation of Teachers". The reported study on SET in Indian setup conducted by Balachandran (2000) in Madras University, finds that Economics teachers have improved slightly more than English language teachers as a result of feedback by student evaluation. English being foreign

language, teachers may need more feedback of 'student evaluation' sessions before improvements can result in English Language teachers at par with teachers of other subjects. However, it does not study the effect of course/stream of studies on student evaluation of teachers. The review of literature left the question unanswered that whether course specific questionnaires should be used to evaluate the teachers. The present paper attempts to investigate the status of teachers having different streams when students are ratings teachers on same format of Rating Scale.

OBJECTIVE

1. To find out the status of Higher Secondary School Teachers of different courses of study in relation to student evaluation of teachers.
2. To find out the effect of courses of study on student evaluation of teachers.

METHODOLOGY

Sample: From randomly selected 17 schools from urban area of Varanasi (India), 1750 Higher Secondary level students are made to rate 105 teachers. Because 39 rating forms are eliminated due to incomplete responses, final sample consists of 889 male and 822 female students evaluating 57 male and 48 female teachers.

Tool: A Teacher Rating Form (modified and adapted from Basow & Silberg, 1987) is used to measure student evaluation of teachers. The Rating Form is composed of 30 items responded over 5-point Likert-scale ranging from *Very Poor* (1) to *Excellent* (5). The items are equally divided among six dimensions of teacher effectiveness: Scholarship, Organisation/Clarity, Teacher-Group Interaction, Teacher-Individual Student Interaction, Enthusiasm/Dynamism and Personal Qualities. Internal reliability is established through Cronbach alpha, which is 0.7518.

Procedure: All 17 schools are managed by private bodies and follow CBSE syllabus. Each of the 105 teachers are having Post-graduate degrees and teaching in Higher Secondary Classes. To investigate the effect of course, students evaluate 41 teachers from Science, 33 from Humanities and 31 from Commerce stream. Overall, each teacher is rated by an average of 16.29 students. For analysing the effect of courses, F-tests are computed among mean ratings of teachers

grouped according to streams (i.e., Science, Arts and Commerce). Post-hoc test is carried out to investigate the significance of difference among mean ratings of teachers using Student –Newman-Keuls test.

RESULT

Because the developmental problem of teacher evaluation programmes begins with the fundamental consideration: evaluation of what? If a student evaluation of teacher is the measure of "teacher effectiveness", then it should provide the measures of separate dimensions. By using the responses of 1711 students, inter-correlation among the dimensions is calculated. Inter-correlated matrix is given in Table 1.

TABLE 1
Inter-correlation matrix among various dimensions

	D1	*D2*	*D3*	*D4*	*D5*	*D6*
D1	1	0.879*	0.894*	0.758*	0.843*	0.688*
D2		1	0.904*	0.796*	0.845*	0.810*
D3			1	0.822*	0.837*	0.793*
D4				1	0.805*	0.731*
D5					1	0.741*
D6						1

*Significant at 0.01 level of confidence

D1 = Scholarship
D2 = Organisation/Clarity
D3 = Teacher-Group Interaction
D4 = Teacher-Individual student Interaction
D5 = Enthusiasm/Dynamism
D6 = Personal Qualities

Correlation as given in Table 1 shows that six dimensions included in test are highly interrelated. The inter-correlation among the dimensions is established to show that although they are separate dimensions but overlaps to capture a common abstract that is 'teacher effectiveness'.

1. Status of Higher Secondary School Teachers of different courses of study in relation to student evaluation of teachers.

To find out the status of teachers of different courses of study when students rating the teachers, mean, S.D. and S.E. are computed.

Table 2 shows descriptive statistics giving the status of the teachers across six dimensions for each of three courses e.g., Science, Humanities and Commerce.

TABLE 2
Status of Student Evaluation of Teachers on Different Courses of Study.

	VARIABLES	*MEAN*	*S.D.*	*S.E.*
1.	**Scholarship**			
	Science	15.9781	2.9017	0.4278
	Humanities	17.8267	2.5099	0.5477
	Commerce	17.9008	2.8409	0.5682
2.	**Organisation/Clarity**			
	Science	17.0188	3.2842	04842
	Humanities	17.8895	3.2196	0.7026
	Commerce	18.7590	2.9196	0.5839
3.	**Teacher-Group Interaction**			
	Science	15.1458	3.0799	0.4541
	Humanities	17.0990	2.8229	0.6160
	Commerce	17.32	3.1076	0.6215
4.	**Teacher-Individual Student Interaction**			
	Science	16.1276	3.3878	0.4995
	Humanities	16.5662	2.3157	0.5053
	Commerce	17.3546	2.8381	0.5676
5.	**Enthusiasm/Dynamism**			
	Science	17.2672	3.4950	0.5153
	Humanities	17.7505	2.6567	0.5773
	Commerce	18.7752	3.1377	0.5313
6.	**Personal Qualities**			
	Science	17.6030	2.9932	0.4462
	Humanities	17.8130	3.2430	0.7077
	Commerce	19.0456	2.5651	0.5130

Status of the teachers in relation to student evaluation of teachers can be determined and compared on the basis of mean rating (Table 2) obtained. It can be concluded from Table 2 that teachers from Commerce stream have been rated highest across each of six dimensions, i.e., Scholarship, Organisation/Clarity, Teacher-Group Interaction, Teacher-Individual Student Interaction, Enthusiasm/Dynamism and Personal Qualities. Similarly, Teachers from Science stream have received lowest rating across every dimension on administered Rating Form. The table 2 further suggests that when compared for six dimensions within each courses of study, Teachers from Commerce and Science stream are highly rated in 'Personal Qualities' whereas teachers from Humanities scored high in 'Organisation/Clarity'.

2. To find out the effect of courses of study on student evaluation of teachers.

To find out the effect of course, individual student ratings across the six dimensions are subjected to F-tests are given in Table 3.

TABLE 3
Effect of Courses of Study on Student Evaluation of Teachers

	VARIABLES	*MEAN*	*S.D*	*S.E*	*F*	*SIG*
1.	**Scholarship**					
	Science	15.9781	2.9017	0.4278	5.23*	0.007
	Humanities	17.8267	2.5099	0.5477		
	Commerce	17.9008	2.8409	0.5682		
2.	**Organisation/Clarity**					
	Science	17.0188	3.2842	0.4842		
	Humanities	17.8895	3.2196	0.7026	2.486	0.089
	Commerce	18.7590	2.9196	0.5839		
3.	**Teacher-group Interaction**					
	Science	15.1458	3.0799	0.4541		
	Humanities	17.0990	2.8229	0.6160	5.409*	0.006
	Commerce	17.32	3.1076	06215		
4.	**Teacher-individual**					
	Science	16.1276	3.3875	0.4995		
	Humanities	16.5662	2.3157	0.5053	1.328	0.270
	Commerce	17.3546	2.8381	0.5676		
5.	**Enthusiasm/Dynamism**					
	Science	17.2672	3.4950	0.5153		
	Humanities	17.7505	2.6567	0.5773	1.910	0.154
	Commerce	18.7752	3.1377	0.5313		
6.	**Personal Qualities**					
	Science	17.6030	2.9932	04462		
	Humanities	17.8130	3.2430	0.7077	2.013	0.140
	Commerce	19.0456	2.5651	0.5130		

* Significant at 0.01 level.

From Table 3, it can be concluded that there is a significant effect of courses on student evaluation of teachers over dimensions, namely, Scholarship and Teacher-Group Interaction at 0.01 level of confidence. Comparing the means obtained for three courses of studies over six dimensions, it has been found that teachers from science stream received lowest mean ratings. Teachers from Commerce stream received highest mean ratings among three courses on each of the six dimensions of 'teacher effectiveness'. Post-hoc tests have been carried out to find out the significant differences among mean ratings of teachers belonging to three courses, i.e., science, arts and commerce, across six dimensions. Thus, data are

subjected to Student- Newman- Keuls tests to investigate the further significant differences. Results are shown in Table 4.

TABLE 4
Results of student-newman-keuls test for difference in mean ratings in relation to course.

	Variables	*Subset for Alpha = 0.01*	
1.	**Scholarship**		
	Science	15.9781	17.8267
	Humanities		17.9008
	Commerce		
2.	**Organisation/Clarity**		
	Science	17.0188	
	Humanities	17.8895	
	Commerce	18.7590	
3.	**Teacher-group Interaction**		
	Science	15.1458	17.0990
	Humanities		17.3200
	Commerce		
4.	**Teacher-individual Student Interaction**		
	Science	16.1276	
	Humanities	16.5662	
	Commerce	17.3546	
5.	**Enthusiasm/Dynamism**		
	Science	17.2672	
	Humanities	17.7505	
	Commerce	18.7752	
6.	**Personal Qualities**		
	Science	17.6030	
	Humanities	17.8193	
	Commerce	19.0456	

Results from Table 4 confirm that mean rating of teachers from science stream is significantly different from mean ratings of teachers belonging to arts and commerce streams. For Organisation/clarity, Teacher-Individual Student Interaction, Enthusiasm/Dynamism and Personal Qualities, there are no significant differences in the mean ratings of the teachers belonging to Science, Arts and Commerce.

DISCUSSION

Gradually, a kind of critical but constructive observation by students is becoming the part of most teacher appraisal system in India. Before making the process (i.e., SET) mandatory in every educational institution, a pertinent question has to be addressed that whether it is required to develop a uniform format for the teachers of all courses available. It has been observed in many appraisal system,

it is not the students' opinion that have necessarily been solicited rather they are answering administrators' questions without giving the matter any thought when they are supposed to 'evaluate' teacher. Methodologically poor "evaluation" not only fail to measure professional competency of the teachers, but also practically result in alienating the relationship between teacher and the administrators, hardly leaving any scope for improvement of performance. Wherever an unscientifically developed Teacher Appraisal process is conducted, it gives hardly any scope for two-way dialogue and objective of giving opportunity to a teacher for self-improvement remains unfulfilled. Thus, the process has been imposed and fate of the teachers has been decided without realising the consequences. However, an effective administration one which gets results that does not criticise teachers but assumes supportive roles to teachers. Because the reported study attempts to find out the status of the teachers when the same format for Rating Form is administered over the teachers having different stream of studies, it has been found that students rate their teachers differentially with courses. Teachers belonging to Science stream are poorly rated than their counterparts. This amply raises a quest whether teachers from science stream fail to show their "effectiveness" or it is the differential expectation related to the stream that pulls their ratings down. Thus, the objective 2 of this study investigates upon the effect of courses on student evaluation of teachers (SET). The present study reveals that there is a significant effect of course on student evaluation of teachers on more than one dimension of "teacher effectiveness". When Post-hoc tests are applied, it has been found that mean ratings of Science teachers are significantly different from mean ratings of teachers from Commerce and Humanities for the dimensions: Scholarship and Teacher- Group Interaction. The result is supported by previous researches where Marsh (1981 b) argues that students' ratings primarily reflect the effectiveness of the instructors may be uniquely suited to teaching some specific courses. Marsh (1994) assumes that every teaching method is effective for every course objective and suggests that there is a single (correct) way to teach. Similarly, Instructional Development and Effective Assessment (IDEA) is based on the assumption, which is supported by IDEA's empirical data (Cashin & Perrin, 1978; Cashin & Sixbury, 1992; Hoyt & Cashin, 1977). The assumption is that different courses have different instructional objectives and therefore, various teaching methods will be differently related to achievement per cent or at least to student's reports of progress — one different

course objectives. Researchers also suggest that the classroom also provides the stage for interaction between students and teachers, its characteristics limits the choices of teaching strategies and mode of exchange between the two (Ting, 2000). Thus, student ratings may partly reflect the class-specific experience. Because class characteristics vary from one course to another, sometimes the same teacher may not get consistent ratings across different types of courses. Chang (2000) also finds that course difficulty is negatively correlated with all evaluation scores. Reviewing these studies and considering Indian socio-economic scenario, low ratings acquired by science teachers in present study (Table 3) may be due to the differential expectations with the course. Students belonging to science stream, face a threat of throat cut competitive examination in India just after the completion of their Higher secondary school. This may result for a quench of knowledge, more often, up to the level where they can meet the requirement of competitive examinations. Thus, a teacher from science stream has to regularly update its knowledge and should be equipped with skills and techniques to disseminate the knowledge effectively. Moreover, most of the study materials and content in science stream are available in English. Thus, a dual competency is required for being well versed with the language and conceptualising the course content, before disseminating the subject knowledge. The expectation is to have knowledge of a broad range of content in sufficient depth to convey the information in meaningful ways to the students. The low ratings for science teachers, especially for "Scholarship", may also be accounted by differences in method for teaching science. Similarly, science teaching may involve and require different method than Humanities and Commerce. The question arises— how legitimate it is to put the teachers forcibly into same frame of questionnaire when the method of teaching is course specific? When review of literature (1984 to 1991) has been undertaken by Finely and Crawely (1993) to examine the instrument available for use of science educators, very few instrument are found to evaluate science educators. In India, the UGC involving representatives of All India Federation of College and University Teacher's Association has prepared two different formats of performance appraisal, for assessing the teachers, one for the teachers of Arts and Science colleges and other for teachers of professional colleges. However, the committee does not suggest the specificity of the format of the questionnaire used for collecting student ratings of teachers. Thus, it is in practice to administer same

questionnaire over the teachers belonging to different courses whenever the process (i.e., SET) is employed. This makes the entire process of SET a convenient matter of picking and choosing what serves to comply with the original hypothesis of the SET designer/ administrator rather than engaging in an honest evaluation. This means the evaluation is like a shopping list of potentially conforming characteristics. For remedial measure, researchers reveal about the use of SET (Braskamp & Ory, 1994; Cashin, 1995): 1. To increase comparability across faculty and departments, evaluations should be administered with a standard set of institution-wide procedures 2. Due to differences in student ratings by discipline, administrators comparing ratings for personal decisions or awards across such discipline should be very cautious.

In sum, student evaluation of teachers should be used to help teachers for career development by securing feedback for reflection and self-scrutiny. It should also serve as a touchstone to effective teachers. Therefore, course specific format should be designed to evaluate teachers. It is necessary to identify and select items related to the nature of the course. An effective Teacher Rating Form will enable teachers to know when he performs well and when he does not and how he needs to develop to become more valuable to him, the school and the students. If a single format is used for all courses, rating obtained by teachers should only be compared within the stream to which they belong. Because teachers may feel inept and confused when they receive lower ratings affected by the course of studies, they may be forced to keep changing their styles, ultimately loosing interest from their profession. Thus, it is important not only to develop performance appraisal system but also imbibe a positive attitude towards it.

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The Effect of Excessive Use of Internet upon Adolescents

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Abstract

The present study was conducted to find out the effect of excessive use of internet upon adolescents, mental health. The major findings of the study were : (i) Internet usage negatively affects the mental health of adolescents. (ii) Internet usage affects more to the mental health of rural adolescents than that of urban adolescent. (iii) Internet usage affects the mental health of adolescent boys and girls of different SES same way. (iv) Internet usage and area differences are interacting significantly for the adolescents mental health and no variable are interacting significantly with one another for the mental health of adolescents.

The 21st century is telemetric (Computers connected to networks). It denotes the emergence of new technologies of communication and most significantly, the telemetric revaluation. Both globalisation and communication technologies have caused and resulted in the growth of each other and have influenced one another in complex and multiple ways. People have become compulsive information consumer. Technology, particularly, internet is widely influenced all spheres of human beings and specially the adolescent. No doubt, the technology is revitalising antidote for stagnating education system. But, also true that excess use of internet is creating problems regarding mental health of people, especially of adolescents as they are widely using internet. Hyper use of internet produces impulsive-control disorders (*ICD*) with the development unlimited access to sex, gambling, shopping, stock trading etc. These all increase a subsequent rise in

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impulsive behaviour. Addictive behaviour are classified into four categories. Intermittent explosive disorder fails to receive aggressive impulses. Kleptomania, failure to resist urges to steal items. Pyromania and Pathological gambling fails to resist urges to set fire, and gambling. Trichotillomania fails to resist urges to pull ones hair.

Patients afflicted with these disorders engage in the behaviour to increase arousal. When these behaviours occur frequently, they interfere with a person's normal functioning or sometimes may distort personality.

Bonebrake, K. (2002) estimated that 85 million Americans are on line and about 15 millions of those suffer from internet addiction; also identified specific risk factors such as loneliness, thrill seeking behaviour and sexual compulsivity. Many research studies have supported this view (Beaved, K.W. (2002), Meral Kelleci and S. Inal (2009), Hardie, E. & Tee, M.Y. (2007), Cooper, N.S. (2003). Some studies revealed that hyper use of internet contributes to increase job stress and strain. (Lakshminarayanan T.R. and Prabhakaran P. 1993). Information overload and multitasking both associated with ICT and may create stress by work overload.

Excess use of internet may lead to increase levels of depression and reduction in social support. The excess online interaction of isolated adolescents sometimes encourages self–injurious behaviour. Hamburger, Y. & Ben Artizi, E. (2003) supported this view and identified that time spent online was not associated with dispositional or daily well being. As per intimacy theory the closeness of instant messages communication partner was associated with daily social anxiety. However results indicated that teenagers may be the population most vulnerable to those negative effects. Sometimes they are often quite knowledgeable about unwanted things like drugs and have made access to information extremely simple (BBC New – Oct. 28, 2009). Contrary to above studies S. Netherlands (2009) found that over-media use acted as protective factor for boys, who spent relatively more time playing video games and watching movies. He found lowest level of anxiety in them. The opposite pattern emerged for girls. Similarly surfing the net can slow dementia progression (caregmoor.news, Oct. 20, 2009). The Study of G. Small, supported the view and also indicated that people the little experience of web, performing the internet searches for even a short period of time can enhance brain function.

Research Question

On the basis of above discussion the question arises as does excessive internet usage affects the mental health of adolescents? Whether it effect positively or negatively? Is these any relationship between excessive internet usage and rural/urban adolescent? Is there any relationship exists between excessive use of internet and boys and girls of different socio-economic status? The present research is designed to answer the above questions.

Objective

The specific objective of the study is

- To study the effect of excessive internet usage on mental health of adolescents.

Hypotheses

In order to achieve the objectives the following null hypotheses were formulated for presented study.

$\mathbf{H_{01}}$ • The scores of mental health of adolescent are not significantly different on experimental group and control group regarding ***area, sex*** and **SES**.

$\mathbf{H_{02}}$ • *Internet usage, area differences, sex* and *SES* do not interact significantly for the adolescents' mental health in their two ways three way and four way interaction.

Sample: In this study adolescents between age group of 17-18 years were selected from Class XI of senior secondary school of Banda city.

Sample Design

Different Stratas	*Urban*						*Rural*						*Total*
	Boys			*Girls*			*Boys*			*Girls*			
	High (SES)	Middle (SES)	Low (SES)	High (SES)	Middle (SES)	Low (SES)	High (SES)	Middle (SES)	Low (SES)	High (SES)	Middle (SES)	Low (SES)	
Experimental Group	5	5	5	5	5	5	5	5	5	5	5	5	60
Control Group	5	5	5	5	5	5	5	5	5	5	5	5	60
Total	10	10	10	10	10	10	10	10	10	10	10	10	120

Tools: The following tools were used in this study –

- Mental Health Battery, constructed by *Dr. Arun Kumar Singh* and *Dr. Alpana Sen Gupta.*
- Socio-Economic Status Scale (SESS) constructed by *Dr. R.L. Bharadwaj.*

Research Design – The *Pre-test - Post-test equivalent groups design* was used as follows: -

R	O_1		O_2	O_1	O_3	Pre-tests
R	O_3	C	CO_4	O_2	O_4	Post-tests

On the basis of the design an experiment was conducted to examine the effect of excessive internet usage on mental health of adolescents.

Procedure

Phase I *Administration of MHB & SESS* upon the students of Class XI of senior secondary schools of Banda city to select the students having normal mental health. SESS is administered to categories the SES of the students.

Phase II On the basis of the scores of MHB and SESS 1200 students were selected. Out of 1200 students only 120 students were selected randomly as sample.

Phase III Collection of their scores on MHB and *allocation of 120 students* of normal mental health into experimental and control group on the basis of *area, sex* and *SES*.

Phase IV The experimental group was given the facility to use internet in the computer center continuously 04 hours up to 30 days regularly while no such facility was given to control group.

Phase V After 30 days a post-test of MHB was administered to both the groups, i.e., upon experimental group and control group. The differences of pre-test scores and post-test scores were found as a gain scores.

Analysis and Interpretation of Data

The scores of adolescents' mental health were divided into different groups in accordance to their internet usage, area, sex and socio-economic status.

TABLE –I

Showing the sum of scores, sum of squares and mean of scores on the variable of adolescent's mental health falling in different stages of internet uses, area, sex and socio-economic status

Factors and its Stages		*Different stages of factor B (Area)*												Σ
		B_1 (Urban Area)						*B_2 (Rural Area)*						
		Different Stages of Factor C (Sex)						*Different Stages of Factor C (Sex)*						
		C_1 (Boys)			*C_2 (Girls)*			*C_1 (Boys)*			*C_2 (Girls)*			
		Different Stages of Factor D			*Different Stages of Factor D*			*Different Stages of Factor D*			*Different Stages of Factor D*			
		(Socio-Economic Status)			*(Socio-Economic Status)*			*(Socio-Economic Status)*			*(Socio-Economic Status)*			
		D_1 *High* (SES)	D_2*Middle* (SES)	D_3 *Low* (SES)	D_1 *High* (SES)	D_2*Middle* (SES)	D_3 *Low* (SES)	D_1 *High* (SES)	D_2*Middle* (SES)	D_3 *Low* (SES)	D_1 *High* (SES)	D_2*Middle* (SES)	D_3 *Low* (SES)	
1		2	3	4	5	6	7	8	9	10	11	12	13	14
Different Stages of factor A (Internet uses)	A_1 *(Experimental Group)*	N=5	N=5	N=5	N=5	N=5	N=5	N=5	N=5	N=5	N=5	N=5	N=5	N=60
		Σx=–22	Σx=–31	Σx=–38	Σx=–35	Σx=–21	Σx=–31	Σx=–62	Σx=–69	Σx=–84	Σx=–84	Σx=–52	Σx=–83	Σx=–578
		Σx^2=234	Σx^2=261	Σx^2=412	Σx^2=351	Σx^2=99	Σx^2=297	Σx^2=900	Σx^2=1233	Σx^2=1678	Σx^2=804	Σx^2=680	Σx^2=1891	Σx^2=8840
		M=4.4	M=6.2	M=7.6	M=.7	M=4.2	M=6.2	M=12.4	M=13.8	M=16.8	M=.10	M=10.4	M=16.6	M=9.633
	A_2 *(Control Group)*	N=5	N=5	N=5	N=5	N=5	N=5	N=5	N=5	N=5	N=5	N=5	N=5	N=60
		Σx=9	Σx=1	Σx=8	Σx=21	x=13	Σx=8	Σx=2	Σx=–5	Σx=–2	Σx=10	Σx=12	Σx=8	Σx=+85
		Σx^2=89	Σx^2=89	Σx^2=58	x^2=297	Σx^2=97	Σx^2=34	Σx^2=44	Σx^2=41	Σx^2=220	Σx^2=76	Σx^2=104	Σx^2=152	Σx^2=1301
		M=1.8	M=0.2	M=1.6	M=4.2	M=2.6	M=1.6	M=0.4	M=1.0	M=0.4	M=2	M=2.4	M=1.6	M=1.4116
		N=10	N=10	N=10	N=10	N=10	N=10	N=10	N=10	N=10	N=10	N=10	N=10	N=120
		Σx=–13	Σx=–30	Σx=–30	Σx=–14	Σx=–8	Σx=–23	Σx=–60	Σx=–74	Σx=–86	Σx=–40	Σx=–40	Σx=–75	Σx=–493
		Σx^2=323	Σx^2=350	Σx^2=470	Σx^2=648	Σx^2=196	Σx^2=331	Σx^2=944	Σx^2=1274	Σx^2=1898	Σx^2=880	Σx^2=784	Σx^2=2043	Σx^2=10141
		M=–1.3	M=–3.0	M=–3.0	M=–1.4	M=–0.8	M=–2.3	M=–6.0	M=–7.4	M=–8.6	M=–4.0	M=–4.0	M=–7.5	M=–4.10833

Table I denotes that four way analysis of variance was applied to the scores of adolescents mental health at different stages of internet uses, Area, Sex, and Socio-economic status. The scores of adolescents mental health were divided into different groups in accordance to their internet uses, area, sex and socio-economic status. The results of the analysis are depicted in Table 2 given below.

TABLE 2

Summary table of four way analysis of variance on adolescent's mental health scores at different stages of internet usage, area, sex and socio-economic status.

Source	*df*	*SS*	*MS*	*F*	*Level of Significance*
Main effect					
Factor A	1	3363.08	3363.08	124.68	0.1
Factor B	1	3363.08	3363.08	124.68	0.1
Factor C	1	72.06	72.06	2.45	Non - Significant
Factor D	1	100.32	50.16	1.70	Non - Significant
Two Way Interaction					
A B	1	291.39	291.39	9.92	0.1
B C	1	11.41	11.41	0.39	Non - Significant
C D	2	23.46	11.73	0.40	Non - Significant
D A	2	54.94	27.47	0.93	Non - Significant
A C	1	5.21	5.21	0.18	Non - Significant
B D	2	18.81	9.41	0.32	Non - Significant
Three way Interaction					
A B C	1	1.91	1.91	0.06	Non - Significant
B C D	2	3.62	1.81	0.06	Non - Significant
A B C	2	6.02	3.01	0.10	Non - Significant
D A B	2	32.54	16.27	0.55	Non - Significant
Four way Interaction					
A B C D	2	25.71	12.86	0.44	Non - Significant
Error	96	2820.7	29.38		
Total	19	7681.59			

Table value of F-ratio is F. 05 = 3.94 and F. 01 = 6.90 for df (1,96)
Table value of F-ratio is $F_{.05}$ 3.09, and $F_{.01}$ 4.82 for df = (2,96)

The summary table of four way analysis of variance on the scores of adolescent's mental health at different stages of internet uses, area, sex and socio- economic status shows that:

- The calculated value of F (1.96) = 124.68 (P <.01) for the main effect of Factor A (Internet usage) exceeds the critical value (F.01 = 6.90), therefore F-ratio is significant at .01 level. Therefore

null hypothesis is rejected and research hypothesis that *the mental health of adolescents of experimental group is significantly different from that of control group* is accepted at .01 level.

- The calculated value of F (1.96) = 18.73 (P < .01) for the main effect of Factor B (Area), exceeds the critical value (P(.01) = 6.90) therefore F-ratio is significant at .01 level. Therefore null hypothesis is rejected and research hypothesis that is *the mental health of adolescents of urban group is significantly different from that of rural group* is accepted at .01 levels.
- The calculated value of F (1.96) 2.45 (P <.01) for the main effect of Factor C (sex) very less than the critical value (F(.05) = 3.94) therefore F-ratio is non significant at both level. Therefore null hypothesis *'the mental health of adolescents of boys group is not significantly different from that of rural group'* is accepted and research hypothesis is rejected at both level
- The calculated value of F (2.96) = 1.70 (P <.01) for the main effect of Factor D (Socio-economic status) is very less than the critical value ($F._{05}$ = 3.09), therefore F-ratio is non significant at both level. The null hypothesis that *'the mental of adolescents is not significantly different in high, middle and low socio-economic status groups'* is accepted and research hypothesis is rejected at both levels.
- The calculated value of F (1.96) = 9.92 (P <.01) for the interaction effect of Factor A and Factor B is exceeds the critical value ($F._{01}$ = 6.90), therefore F-ratio is significant at .01 level. So null hypothesis is rejected and research hypothesis that *'Is internet uses and area differences interact significantly for mental health of adolescents'* is accepted.
- The calculated value of F (1.96) 0.39 (P <.01) for the interaction effect of Factor B and Factor C is very less than the critical value ($F._{05}$ = 3.94), therefore F-ratio is non significant at both level. That is why null hypothesis *'Area and sex differences are not interacting significantly for the mental health of adolescents'* is accepted and the research hypothesis is rejected at both level.
- The calculated value of F (2.96) = 0.40 (P<.01) for the interaction effect of Factor C and Factor D is very less than the critical value (F(.05) = 3.09) therefore F-ratio is non significant at both level. That is why, null hypothesis *'Sex and SES differences are not interacting significantly for the mental health of adolescents'* is accepted and the research hypothesis is rejected at both level.

- The calculated value of F (2.96) = 0-93 (P <.0l) for the interaction effect of factor D and Factor A is very less than the critical value ($F._{05}$= 3.09) therefore F-ratio is non significant at both level. That is why, the null hypothesis *'Is the differences of SES and internet usage are not interacting significantly for the mental health of adolescents'* is accepted and research hypothesis is rejected at both level.
- The calculated value of F (1.96) = 0.18 (P < 0.1) for the interaction effect of Factor A and Faceted C is very less than the critical value (F.0.5 = 3.94), therefore F-ratio is non-significant at both level. That is why the null hypothesis *'Internet usage and sex differences are not interacting significantly for the mental health of adolescents'* is accepted and research hypothesis is rejected at both level.
- The calculated value of F (2.96) = 0.32 (P <.01) for the interaction effect of Factor B and Factor D is very less than the critical value ($F._{05}$ = 3.09), therefore F-ratio is non significant at both level. That is why, the null-hypothesis *'Area and socioeconomic status differences are not interacting significantly for the mental health of adolescents'* is accepted and research hypothesis is rejected at both level.
- The calculated value of F (1.96) = 0.06 (P <.01) for the interaction effect of Factor A, Factor B and Factor C is very less than the critical value (F.05 3.94), therefore F-ratio is non significant at both level. That is why the null hypothesis *'Internet usage, area and sex differences are not interacting significantly for the mental health of adolescents'* is accepted and research hypothesis is rejected at both level.
- The calculated value of F (2.96) 0.06 (P <.01) for the interaction effect of Factor B, Factor C and Factor D is very less than the critical value (F.05 = 3.09), therefore F-ratio is non significant at both level. That is why the null hypothesis *'Area, sex and socio-economic status differences are not interacting significantly for the mental health of adolescents'* is accepted and research hypothesis is rejected at both level.
- The calculated value of F (2.96) = 0.10 9 P <.01) for the interaction effect of Factor C, Factor D and Factor A is very less than the critical value (F.05 = 3.09), therefore F-ratio is non significant at both level. That is why the null hypothesis that *'The differences of sex, socio-economic status and internet usage are not interacting significantly for the mental health of adolescents'* is accepted and research hypothesis is rejected at both level.

- The calculated value of F (2.96) = 0.55 (P <.01) for the interaction effect of Factor D, Factor A, and Factor B is very less than the critical value (F.05 = 3.09), therefore F-ratio is non significant at both level. That is why, the null hypothesis *'Socio-economic status, area, and sex differences are not interacting significantly for the mental health of adolescents'* is accepted and research hypothesis is rejected at both level.
- The calculated value of F (2.96) = 0.44 (P <.01) for the interaction effect of Factor A, Factor B, Factor C, and Factor D is very less than the critical value (F.05 = 3.09) Therefore, F-ratio is non significant at both level. That is why the null hypothesis that *'The internet usage, area, sex and socio economic status differences are not interacting significantly for the mental health of adolescents'* is accepted and research hypothesis is rejected at both level.

Table 3 indicates that mean scores on adolescents mental health (a) in experimental group are less than that of control group which shows that internet uses negatively affects the mental health of adolescents, (b) in rural area group are less than that of urban area group which shows that internet uses more affected negatively to the rural area groups than that of urban area groups (c) There is no significant difference between the mean scores of boys group and girls group which shows that the effect of internet uses or boys group in not significantly different from girls group and (d) the same case with high, middle and low socio-economic status groups.

FINDINGS

The findings of the present study are as follows:

- Internet usage negatively affects the mental health of adolescents.
- Internet usage affects more to the mental health of rural adolescents than that of urban adolescent.
- Internet usage affects the mental health of boys and girls in the same way.
- Internet usage affects the mental health of the adolescents of high middle and low SES in the same way.
- Internet usage and area differences are interacting significantly with one another for the mental health of adolescents.
- It is found that area and sex differences are not interacting significantly with one another for the mental health of adolescents.

TABLE 3

Mean value of adolescent's mental health scores at different stages of internet uses, Area, Sex and Socio-Economic Status.

Factors and its Stages	*Different stages of factor B (Area)*														
	B_1 (Urban Area)						*B_2 (Rural Area)*								
	Different Stages of Factor C (Sex)						*Different Stages of Factor C (Sex)*								
	C_1 (Boys)			*C_2 (Girls)*			*C_1 (Boys)*			*C_2 (Girls)*					
	Different Stages of Factor D			*Different Stages of Factor D*			*Different Stages of Factor D*			*Different Stages of Factor D*					
	(Socio-Economic Status)			*(Socio-Economic Status)*			*(Socio-Economic Status)*			*(Socio-Economic Status)*					
	D_1 *High (SES)*	D_2*Middle (SES)*	D_3 *Low (SES)*	D_1 *High (SES)*	D_2*Middle (SES)*	D_3 *Low (SES)*	D_1 *High (SES)*	D_2*Middle (SES)*	D_3 *Low (SES)*	D_1 *High (SES)*	D_2*Middle (SES)*	D_3 *Low (SES)*			
1	2	3	4	5	6	7	8	9	10	11	12	13			
Different Stages of A_1 *(Experimental Group)*	– 4.4	–6.2	–7.6	–7.0	–4.2	-6.2	-12.4	-13.8	-16.8	-10.4	-10.4	-16.6			
Different Stages of A_2 *(Control Group)*	+1.8	+.02	+1.6	+4.2	+2.6	+1.6	+0.4	–1.0	–0.4	+2.0	+2.40	+1.60			

- It is found that sex and SES differences are not interacting significantly with one another for the mental health of adolescents.
- It is found that internet usage and SES differences are not interacting significantly with one another for the mental health of adolescents.
- It is found that internet usage and sex differences are not interacting significantly with one another for the mental health of adolescents.
- It is found that area and SES differences are not interacting significantly with one another for the mental health of adolescents.
- It is found that internet usage, area, and sex differences are not interacting significantly with one anther for the mental health of adolescents.
- It is found that area; sex and SES differences are no interacting significantly with one another for the mental health of adolescents.
- It is found that internet usage, sex, and SES differences are not interacting significantly with one another for the mental health of adolescents.
- It is found that SES, internet usage and area differences are not interacting significantly with one another for the mental health of adolescents.
- It is found that internet usage, area, sex and SES differences are not interacting significantly with one another for the mental health of adolescents.

DISCUSSION

Recent reports are indicating that 97 per cent urban youth are using internet out of them there is a large number of adolescents using it regularly.While circumstance are quite different for rural adolescents. Consequently internet usage affects too negatively to the mental health of rural adolescents than that of urban adolescents.

Presently Internet use is emerging as one of the negative aspect among youth too. Interactive communication application such as chat rooms, instant messaging, e-mail, and on-line games have been more commonly associated with internet addiction among youth. Internet addiction has a negative effect upon academics (a drop in grades), family relations (having to hide the excessive use of internet from parents), physical health (sleep deprivation) and mental health

(depression). These all creates poor concentration, poor memory management, social impairment, impaired problem solving memory, disorganised behaviour, depressed mood, indifferent to others, shyness, lack of self confidence etc.

Often these negative symptoms steadily become more prominent. The same results were supported by Campbell, A.J. Cumming, C.R. and Hughes, I. (2006) as they found negative relationship between web-surfing frequency and life satisfaction.

Adolescents with internet addiction were noticed with deficiencies in the ability to read, express and elicit desired emotions. The co-relation of emotional intelligence and internet addiction disorder was especially high for young adolescents.

Meral Kellei (2009) found that internet use in adolescent was associated with more severe psychiatric symptoms like schizophrenia. But on the contrary G.small (2009) found that among the older people with little experience of the web performing the internet searches for even a relatively short period of time can enhance brain function. It seems that while moderate use of the internet can have positive effects but excessive usage of internet has negative effects upon mental health of adolescent. Attention should be devoted to adolescents with internet use for design of preventive strategies.

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Resources in Primary Schools: A Challenge for India

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Context

Education of children is the primary concern of all countries. In the last two decades, there has been a movement called 'Education for All' to provide access to all children to school. As a result the enrolment of primary schools which was 78 per cent in the year 1990 increased to 86 per cent in the year 2004 around the world. India was no exception and about 123 million children were enrolled in primary classes according to the 7th All India School Education Survey (7th AISES), 2007, conducted by the National Council of Educational Research and Training (NCERT), New Delhi. This has been possible due to the governmental efforts to provide quality education and in schooling facilities to all children in the age group of 6–14 years.

In 1987, Government of India launched a scheme known as 'Operation Blackboard' to provide certain minimum facilities in schools. These included (a) at least two teachers in all primary schools; (b) essential teaching learning material in every school; and (c) at least a two roomed all weather building for each school (Department of Education, 2008). Another scheme, 'District Primary Education Programme (DPEP)', was launched as a centrally sponsored scheme in 1994 in educationally backward districts of 18 states of the country to provide access to all children to primary education, to reduce dropout rates and to raise the average achievement level (IGNOU, 2003).

Government of India launched another scheme Sarva Shiksha Abhiyan (SSA) in 2001-02 to attain universal elementary education covering the entire country in a mission mode with a focus on quality.

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The Government of India took initiative to build schools in rural habitats as 70 per cent of Indian population lives in rural areas. As a consequence, today 78 per cent of the rural population have primary schools within habitations (148 thousand habitations) and 94 per cent of the rural population have primary schools within a walking distance of 1km (7th AISES). As a result of the government initiatives, today 93 per cent of primary schools have a brick building, 80 per cent schools have drinking water facility, 47 per cent have urinals and 40 per cent have toilets (7th AISES).

It is evident that there is a phenomenal improvement in the access to primary education but there is need to ensure quality and equip the schools with adequate resources. A number of studies have shown that achievement level of students is highly correlated with facilities available in schools. The study "Factors Influencing Effectiveness of Secondary Schools of Delhi" found the physical facilities to be the most important factor for effectiveness of a school as availability of good facilities provides a conducive environment for learning. (Agrawal et. al, 2004). The baseline achievement survey conducted on Class V students by the NCERT also indicated that teaching aids, physical and ancillary facilities were positively correlated with learning achievement (NCERT, 2006). In a study conducted in Namibia, the condition of school building was found to have a high correlation with school achievement. (Makuwa, D, 2005). Thus, physical facilities and other resources play an important role in ensuring the quality of education. Equipping the primary schools with adequate facilities still remains a challenge for India.

The study, World Education Indicators-Survey of Primary Schools, conducted by UNESCO Institute of Statistics (UIS) in collaboration with Organisation for Economic Cooperation and Development (OECD) in 11 different countries looked at how primary education was provided in different national settings. For this data was collected on different variables from each participating country. For India resources in schools is an important issue. Hence, this paper explores the availability of different resources and the condition for school buildings in Indian Schools.

Questions to be explored in this paper

(a) How do Indian primary schools compared to schools in other countries in terms of resource levels?

(b) Within India, how schools compare in resource levels by schools location, school type (management) and states.

(i) Rural, Urban
(ii) Public, Government aided, Independent private schools
(iii) Assam, Rajasthan, MP and Tamil Nadu

Development of Tools

The study of world education indicators required data on how schools function, how teacher teach, the learning conditions pupils and teachers face and the support available for change both from the system and from the communities they serve Accordingly, the OECD and UIS staff along with international experts developed three questionnaires:

- School questionnaire to be filled up by the school heads
- Teacher questionnaire to be filled up by Grade IV teachers

Questionnaire on the 'Opportunity to Learn' that Grade IV pupils had to learn reading and mathematics.

It was through question numbers 18 and 20 of the School Questionnaire that information was collected on the availability of shortage of different items related to school resources and conditions of school buildings respectively.

Sample

The WEI-SPS study employed a stratified systematic sample design. India's sampling design followed a two stage procedure which first involved the selection of districts in participating states followed by the selection of schools from the list of eligible schools. The schools were selected with equal probability using a systematic sampling technique. In each selected school, all teachers teaching language and/or mathematics to grade IV students were included in the teacher sample.

The sample for India in the WEI study covered only four states-Assam, M.P., Rajasthan and Tamil Nadu. These states represented the Eastern, Central, North Western and Southern regions of the country. Altogether 1105 schools from 65 districts were covered in the study. The following table shows the state-wise sample of districts and schools.

TABLE 1

Sample of Districts and Schools in Four States of India

State	*Number of Districts*	*Number of Schools*
Assam	14	279
Madhya Pradesh	20	279
Rajasthan	16	275
Tamil Nadu	15	272
Total	**65**	**1105**

In each state, schools were sampled location wise i.e., rural and urban and also according to the type of schools i.e. government/public schools, Government dependent private schools and independent private schools. The following two tables show the number and percentage of pupils by school location and school type in each state.

TABLE 2

Percentage of Pupils by school location in four states of India

		Location		*Total*
		Rural	*Urban*	
Assam	Count	3267336	233709	3501045
	Percentage	93.3%	6.7%	100.0%
MP	Count	6481780	2656178	9137958
	Percentage	70.9%	29.1%	100.0%
Rajasthan	Count	6289977	1695191	7985168
	Percentage	78.8%	21.2%	100.0%
Tamil Nadu	Count	3091296	3763504	6854800
	Percentage	45.1%	54.9%	100.0%
Total	Count	19130389	8348582	27478971
	Percentage	69.6%	30.4%	100.0%

TABLE 3

Percentage of Pupils by school type in four states of India

		Types of School			
		Public School	*Govt. Dependent Private School*	*Independent Private School*	*Total*
Assam	Count	2715006	675892	57620	3448518
	Percentage	78.7%	19.6%	1.7%	100.0%
MP	Count	6496448	444329	2187576	9128353
	Percentage	71.2%	4.9%	24.0%	100.0%
Rajasthan	Count	5415726	92411	2461321	7969458
	Percentage	68.0%	1.2%	30.9%	100.0%
Tamil Nadu	Count	3346426	1848304	1617917	6812647
	Percentage	49.1%	27.1%	23.7%	100.0%
Total	Count	17973606	3060936	6324434	27358976
	Percentage	65.7%	11.2%	23.1%	100.0%

The tables indicate that about 70 per cent pupils were in valley schools and 30 per cent were in urban schools. Among these 68 per cent studied in public schools, 11 per cent in govt. dependent private schools and 23 per cent in independent private schools.

Results

What was the condition of school buildings

In the WEI study questions were asked from the school heads about their perception of the condition of school buildings. This is an

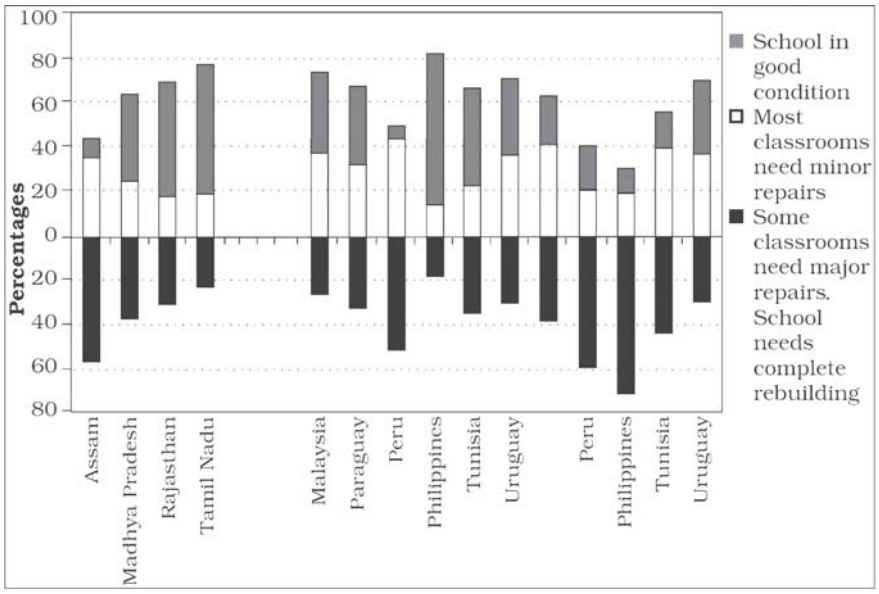
important variable and correlates positively as shown by earlier stated studies, with the school outcomes. The school heads classified their schools as

1. School needs complete rebuilding
2. Some classrooms need major repairs
3. Most classrooms need minor repairs
4. School is in good condition

The first two categories were collapsed into one category (poor condition) and the next two also in one category (good condition). The following figure shows the percentage of primary pupils in schools in the states of India and in other countries by condition of school buildings.

FIGURE 1

The Percentage of Primary Pupils in Schools in the States of India and in other Countries by Condition of School Buildings



As can be seen from figure 1, in India more than 60 per cent of pupils were in schools where the heads seemed to be satisfied that condition of their school buildings was good. About 40 per cent of the pupils were in schools whose condition was deemed as poor. This compared closely with Malaysia and Argentina.

Among the states, it was seen that large number of pupils in the state of Assam were in schools that needed major repairs or complete rebuilding. As opposed to this about 78 per cent students in the state of Tamil Nadu were in schools which were in good condition. The schools in Tamil Nadu compare well with the schools in Chile, Argentina and Malaysia.

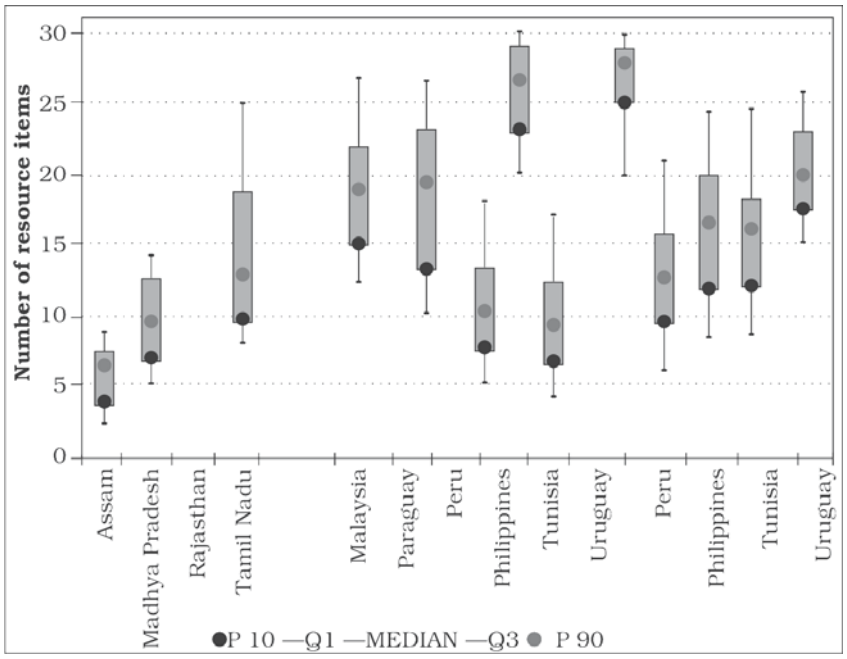
Availability of School Resources

In the school questionnaire, a list of 31 items representing different resources was given and the school heads were asked if they had each one of them in their schools. The list contained such basic items as electricity, water, toilets to computers and internet.

Number of Resource Item: Four Indian States in the International Context

The following figure shows the distribution of pupils population by the number of resource items.

FIGURE 2
Distribution of Pupils Population by the Number of Resource Items



About 50 per cent primary school pupils in India were in schools with 9 or less than 9 items, 25 per cent pupils had 6 less than 6 items and 25 per cent were in schools with 13 or more than 13 items. In the international context, it can be seen that the Indian schools were most poorly resourced. The best situation was in Chile and Malaysia. A large variation was seen across the four states. Schools in Assam were relatively poorly resourced and the schools in Tamil Nadu were relatively better resourced, comparable to Philippines.

In Indian schools, some resource items were the basic items which were available to large percentage of primary pupils (above 60 per cent pupils). These basic items as can be seen from the table 4 are blackboard, maps, drinking water, first aid kit, school library and sports field. In addition to these 6 items, some primary school children have a facility of any one of the three or more resource items which may be separate toilets for boys and girls, electricity, staff room, sitting places and writing places.

The rest of the items are luxury for Indian schools. Electricity was not available to 63 per cent primary pupils. In India, urban schools have electricity connections, whereas in rural areas it is still a distant dream.

Almost 60 per cent students neither have sufficient space for writing nor sufficient places for sitting. Situation was particularly bad regarding safety equipment. Special rooms for teaching like audio visual room and science laboratory, are rate in Indian primary schools. Basic equipment like radio, tape recorder, T.V., overhead projector, microscope etc., are also not available to most primary schools and computers for students' use are very rare.

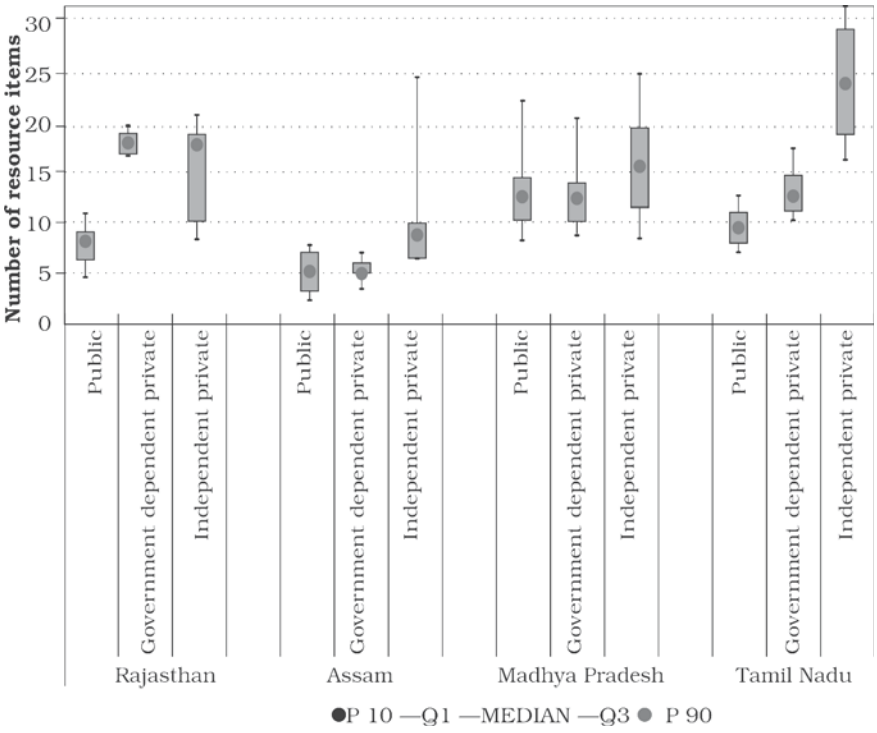
Resource Items by School Type

The percentage of pupils in schools possessing different resource items have been presented in Figure 3 for different types of schools i.e. public/government, Government dependent private and independent private schools in different states of India.

Fifty per cent primary pupils in public schools in different states were in schools with 4 to 9 resource items, whereas 50 per cent primary pupils in independent private schools were in schools with 9 items (Assam) to 23 items (Tamil Nadu). The state of Assam has the most poorly resourced schools. The reasons may be several. It has hilly terrain and rivers like Brahamputra which flood and create devastation every year on a large scale.

FIGURE 3

Distribution of Primary Pupils for all Resource Items by School Type



Resource Items by School Location

For each state of India, the schools were compared by their location. The figure below shows the percentage of pupils possessing different resources items in village schools and urban schools.

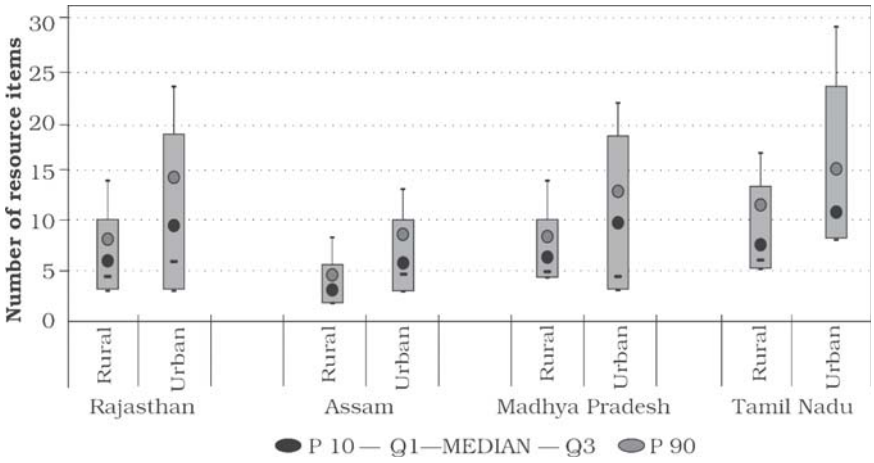
It could be seen that town schools were better equipped than the village schools in all the states of India. Schools in Assam were again found to be poorly resourced. Both village and town schools in Tamil Nadu were better resouced than schools in any other state.

The study of resources in primary schools of India showed interesting results. About 70 per cent primary pupils were in rural schools. Only 65 per cent pupils were in public schools, 11 per cent in Government dependent private schools and 23 per cent were in independent private schools. More than 50 per cent students in

Assam were in schools with buildings in poor condition. More than 50 per cent of pupils were in schools that did not have electricity, sufficient writing places and sufficient sitting places. More than 60 per cent pupils did not have the facility of radio, telephone, T.V., tape recorder, overhead projector etc. Computers are not available in primary schools of India.

FIGURE 4

Distribution of Primary Pupils for all Resource Items by School Location



Variation in Schools Resources in Indian States

To see whether there is variation in school resources among the four Indian states and within the state at district level, analysis of variance was computed. The results are given in the following tables.

TABLE 5

Analysis of Variance for Resources between States

Sources of Variation	*Sum of Squares*	*df*	*Mean Square*	*F*
Between Groups	187512686	3	62504228.7	2049618.2
Within Groups	837986091.5	27478966	30.4955467	
Total	**1025498778**	**27478969**		

FIGURE 5

Variation of Resources between States

Between states 18
Within states 82

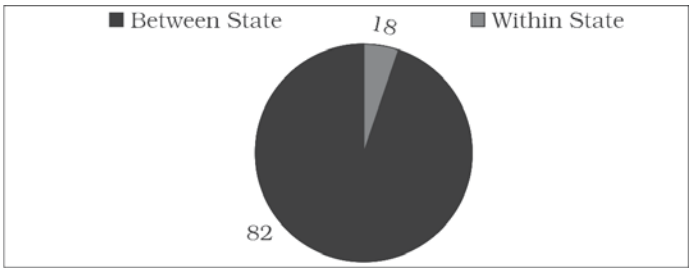


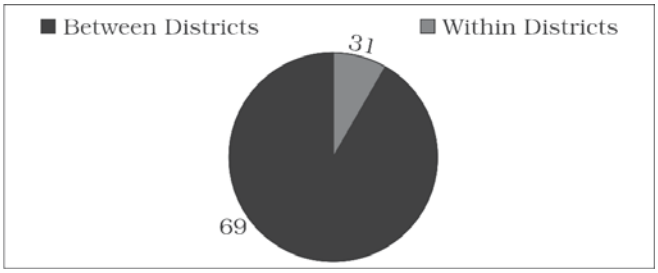
TABLE 6

Analysis of Variance for Resources between Districts

		Sum of Squares	*df*	*Mean Square*	*F*	*Sig.*
Assam	Between Groups	6430762.58	13	494674.04	79123.67	0
	Within Groups	21888122.5	3501030	6.2519094		
	Total	28318885.1	3501043			
MP	Between Groups	25462947.2	19	1340155.1	51467.01	0
	Within Groups	237943792	9137938	26.039112		
	Total	263406739	9137957			
Rajasthan	Between Groups	28941224.7	15	1929415	79997.53	0
	Withing Groups	192589350	7985152	24.118433		
	Total	221530575	7985167			
Tamil Nadu	Between Groups	70133144.3	14	5009510.3	134876.5	0
	Within Groups	254596748	6854784	37.141469		
	Total	324729892	6854798			

FIGURE 6

Variation of Resources between States



It can be seen from the table 5 that there is a variation in school resources from state to state. This may be explained by the fact that education in India is a state subject and each state makes its own policy and allots funds for different levels of education.

The table 6 indicates that there is also variation between districts within each state. This is due to implementation of policies by district level functionaries and the utilisation of funds by them.

School Resources and other Dimesions of School Education

Effective schooling not only depends on school resources but also on other factors too like emphasis on academic achievement, professional satisfaction of teachers, perceived teachers' status, staff's vision of school objectives, teachers' level of education and student motivation. When total school resources were correlated with these variables, the following results were seen.

TABLE 7

Correlation between Total Resources and Selected Variables in India

Item	*Correlation*	*SE*
Emphasis on academic achievement	0.239	0.049
Index of teacher complaints	-0.202	0.039
Professional satisfaction	0.300	0.042
Perceived teacher status	0.138	0.039
Per cent students repeating a grade	-0.076	0.037
Staff's vision of school objectives	0.247	0.036
Teacher's level of education	0.171	0.038
Perceived students motivation	0.205	0.041
School engagement	0.173	0.048
Student behaviour problems	0.206	0.070

The Table 7 indicates that total number of school resources are highly correlated with different dimensions of education. It has been observed that higher the total resources, higher the emphasis on achievement, professional satisfaction of teachers, perceived teacher status, staff's vision of school objectives, teachers' level of education, perceived students' motivation. The schools which are better resourced have lesser problems like repetition of grades by students and teachers' complaints of students behaviours. On the other side poorly equipped schools have low emphasis on achievement, poor students motivation, lesser satisfaction level of teachers and more complaints of behaviour problems.

Implications of the Study

The findings of the study have significant implications for improving the school resources in Indian primary school and can be used to sensitise policy makers and planners about importance of resources in the schools. Administrators and policy makers should try to plan and provide better physical facilities and resource in primary schools of the country. A minimum level of a facilities should be provided to each government and government aided school. There should include

- Complete classroom with usable black boards, chalks, single or duel desks and chairs/benches for students.
- electricity and water.
- sufficient number of clean toilets for students and staff.
- Computer facilities for students.
- Well equipped school libraries.
- Audio-visual room equipped with radio, take recorder, T.V., overhead projector etc. If our schools are better resourced like the schools in Malaysia, we can look forward to higher level of learning outcomes.

Acknowledment: We gratefully acknowledge the help provided by Dr. Yanhong Zhang of UIS in analysing the WEI data for India.

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A Comparative Study of Pre-Service Teacher Education Programme at Secondary Stage in Bangladesh, India, Pakistan and Sri Lanka

S. K. YADAV*

Introduction

The comparative education is an analytical and synthetic approach. In the synthetic approach, it is seen to what extent the social structure, political philosophy and educational philosophy have influenced the educational system of a country. In such study, the totality of all situations and factors involved are kept in view. In other words, in comparative studies of education, now sociological bases are emphasised. Social process, social control, social organisation and social change of a country are carefully studied in comparative education, because it is believed that its educational system cannot be understood from teacher education point of view because it is a sub-system of education.

The purpose of the study is to understand the problems related to teacher education in Bangladesh, India, Pakistan and Sri Lanka with a view to find out their solutions. In the process of understanding Pre-Service Training Education (PSTE) programme at the secondary stage in Bangladesh, India, Pakistan and Sri Lanka, the philosophical background of the country concerned are studied because the education system is always influenced by the philosophical points of view of the people. Another purpose of this study is to understand those causes which make the educational system of one place progressive and that of another backward. In fact educational administration and control is strictly according to prevailing rule in the country.

In India, secondary teachers are prepared through Pre-service Teacher Education Programmes (PSTE). One year Bachelor of Education

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(B.Ed) programme is being run largely in more than ten thousands teacher training institutions and universities in the country. These institutions are managed by Government and private bodies.

The standard of teacher education is regulated by National Council of Teacher Education (NCTE), New Delhi, a statutory body, passed by the Parliamentary Act in 1993. The main objective of the NCTE is to achieve planned and coordinated development of the teacher education system throughout the country, the regulation and proper maintenance of norms and standards in the teacher education system and for matters connected therewith. In Bangladesh, secondary teachers are also prepared through one year B.Ed programme and are being run in more than 189 public and private teacher training institutions, colleges and universities. The standard is maintained by respective national universities. In Pakistan, training of secondary school teachers is for one year B.Ed degree and is being run in 135 institutions and universities. The National Institute of Teacher Education maintains the norms and standards of teacher education. In Sri Lanka, the pre-service education is provided by National Institute of Education, four University Departments, 17 Colleges of Education and four Teacher Education Institutions. These institutions offer three-year pre-service teacher education programme leading to the National Diploma in Teaching. Out of three years, two are at the residential college and the last year is in a school as an intern.

In all the four countries, secondary teachers are prepared through pre-service teacher education programme. But there are variations in the teacher education programmes in terms of duration, curriculum weightage, curricular areas and its implementation at the secondary stage in these four countries. Keeping these in view, this study was undertaken to study the system of teacher education in all the above mentioned countries with following objectives.

Objective of the Study

The major objectives of the study are as follows:

- To identify different issues of pre-service teacher education programme at the secondary level in Bangladesh, India, Pakistan and Sri Lanka.
- To compare different components of pre-service teacher education programme in Bangladesh, India, Pakistan and Sri Lanka.
- To derive implications for overall improvement of pre-service teacher education programme in India.

Design of the Study

The design of the study consisted of sampling procedure, tools used for data collection and techniques for analysis of the data.

Sampling

The sample of the study consisted of 24 Principals (6 males and 16 females), 88 (46 males and 42 females) teacher educators and 157 student-teachers (53 males and 104 females) from all the four countries.

Tools Used

The following three questionnaires were developed to seek the information about the various components of the B.Ed programme from Bangladesh, India, Pakistan and Sri Lanka.

1. The first questionnaire related to Principals of the B.Ed institutions seeks to ascertain perception of Principals about various aspects of B.Ed programme. It consists of 36 items related to general information of the institutions, faculty profile, admission procedure, curriculum development, curriculum transaction and its evaluation.
2. The second questionnaire is meant to ascertain the perceptions of teacher educators on the strengths and weaknesses of the B.Ed programme and its various components. It consists of 32 items, related to structure, duration, components of curriculum, transaction of curriculum, course evaluation, teacher educator professional development, etc.
3. The third questionnaire is related to student teachers. This questionnaire seeks to obtain the perception of student teachers/ teacher trainees of pre-service teacher education programme (B.Ed) at the secondary stage. It consists of 30 items related to the curriculum, methodology for curriculum transaction, use of Information and Communication Technology (ICT) and other facilities available in the institute, organisation of co-curricular activities and evaluation system.

All the three questionnaires were tried out and finalised on the basis of experts opinions.

Data Collection

The data were collected by mailing all the three questionnaires to the B.Ed institutions in Bangladesh, India, Pakistan and Sri Lanka.

The efforts were made to get the filled-in questionnaires from all the four countries. However, less number of questionnaires were received and analysed from Bangladesh, Pakistan and Sri Lanka from principals (7), teacher educators (9) and student teachers (19). Besides these, data from secondary sources were also used for completing the study.

Analysis of Data

The data were scrutinised, classified, compiled and analysed. The descriptive analysis of data was carried out. The syllabus and curriculum of the B.Ed programme from all the four countries were analysed to validate the information provided by the respondents.

Findings and Implications of the Study

The following findings and implications have been derived on the basis of the perceptions of the principals, teacher educators and student teachers on different aspects of B.Ed institutions from India, Sri Lanka, Bangladesh and Pakistan. Major findings of the study are as follows.

Duration

- The duration of the B.Ed programme was one year in India, Bangladesh and Pakistan. However, the duration of the B.Ed programme in Sri Lanka was three years.
- Most of the teacher educators from India, Bangladesh and Pakistan were not satisfied with the one year duration of the B.Ed programme. The student teachers were found weak in content knowledge in all the four countries in general and particularly in India.

Qualifications

- The Principals from all the countries were having Master's degree in Physical Sciences and Social Sciences along with Master's degree in Education. Some Principals were having doctoral degree in education in India.
- In India, Master's degree along with M.Ed was the minimum qualification of Lecturers, Readers and Professors of the B.Ed institutions. In Pakistan, Master's degree along with B.Ed was essential for all the posts. In Bangladesh and Sri Lanka, Master's degree was the minimum qualification required for all the posts. Five to ten years of experience was also required for the posts of Readers, Professors and Principals in all the countries.

Recruitment and Promotion

- In all the countries Lecturers, Readers, Professors and Principals of B.Ed colleges were recruited through open selection by Universities or Public Service Commission. The procedure for promotion for the post of Reader and Professor was based on seniority in Sri Lanka, Bangladesh and Pakistan, where as in India, it is based both on open selection as well as under Career Advancement Scheme.

Admission

- Graduation degree was the minimum qualification for seeking admission in the B.Ed programme, where as in Sri Lanka, it was GCE (Advanced Level). But the teacher educators from Bangladesh and Pakistan expressed that the entry qualification need to be post graduate. The admissions in the B.Ed programme were made on the merit basis. The entrance test was also conducted in some universities in India and Bangladesh. But the teaching aptitude was not considered as a criteria for admission in the entrance examination. The weightage to co-curricular activities should be given in admission to the B.Ed programme.

Management

- The B.Ed institutions were managed by the Government in all the countries. However, some institutions were having private management in India and Bangladesh.
- The B.Ed programme was regulated by the National Council of Teacher Education (NCTE) in India, National Institute of Education in Sri Lanka, National University in Bangladesh and Universities in Pakistan. These regulatory bodies have been entrusted the responsibility to maintain the norms and standards of the B.Ed programme.
- In all the countries, most of the B.Ed institutions were co-educational and some of these were having residential facilities.

Curriculum Development

- In India, National Council of Teacher Education (NCTE), University Grant Commission (UGC) and National Council of Educational Research and Training (NCERT) were responsible for preparing secondary teacher education. National Institute of Education, National University and University of Education were responsible for Sri Lanka, Bangladesh and Pakistan respectively.

- The B.Ed curriculum was revised during 1998, 2002, 2005 and 2009 in India, Sri Lanka, Pakistan and Bangladesh respectively. In all the countries, no definite role was specified for the involvement of the faculty in formulation and revision of B.Ed curriculum and syllabus. However, some of the faculty members were involved in India and Sri Lanka.
- Subjects related to science, social science and languages are taught by teacher educators in all the countries. During 2002-2009, B.Ed curriculum and syllabi of different subjects were revised by all the countries on the basis of feedback collected from student teachers, teacher educators and principals of different institutions.
- Work experience, physical education, art and craft, advanced research method and computer education were the additional papers of B.Ed programme.
- Art and craft and work experience were prescribed as non-scholastic areas in the B.Ed course. The teacher educators from India and Sri Lanka suggested that co-curricular activities related to art and craft and work experience should be organised on regular basis and more weightage should be given to these areas in the B.Ed programme.
- Physical education helped in the development of the personality of student teachers. However, the student teachers from Bangladesh revealed that physical education was suitable and useful, but not much time was given for their involvement.

Theory Papers

- The compulsory theory papers prescribed in the B.Ed programme were almost common in all the four countries. The papers namely Educational Psychology, Sociology of Education, Guidance and Counseling, Educational Measurement and Evaluation, School Organisation, Computer Education and issues related to secondary education were prescribed in the B.Ed programme. In Pakistan, the paper on Islamiat and professional ethics were also prescribed in B.Ed course. The teaching subjects namely physical sciences, life sciences, mathematics, English and social sciences were prescribed by all the countries. Health and physical education, yoga and value education, music, art and craft, computer education were prescribed as additional courses of B.Ed programme in all the countries.

- The teaching of different subjects in the B.Ed programme laid more emphasis on the theory courses than practical work. Besides this, there is no link between the curriculum of the B.Ed course and the school curriculum. Moreover, the curriculum is lengthy and content in many subjects are not required.
- There were many strengths of different subjects prescribed in the B.Ed course. Teaching of philosophy and psychology are helpful in the development of the personality of children. The work experience develops aesthetic sense among the student teachers. The scientific attitude is developed by the teaching of physical sciences and communication skills by teaching of languages among the student teachers.

Practical Work

- Computer application, psychological tests, art and craft, work experience, practice teaching, research projects, assignments and social work were prescribed under practical work. In Bangladesh, only teaching practice was prescribed as practical activity.
- Work experience helped the student teachers to learn by doing different activities. However, the student teachers from Bangladesh revealed that work experience was suitable and useful, but much time was not given for their involvement and participation.
- It was found that the practical activities were very useful for making an effective teacher. It developed confidence among them. The necessary knowledge and skills related to subject matter were inculcated by these activities.
- The student teachers of India expressed that performing and visual arts increased their confidence, brought hidden talent outside and made them tension free. It also helped in developing their personalities. Performing and visual arts made teaching learning interesting. The student teachers from Bangladesh and Pakistan expressed that performing arts was not necessary.

Specific Curricular Inputs

- In India, specific curricular inputs like provision of scholarships and remedial teaching were provided for the disadvantaged students. In Bangladesh, Sri Lanka and Pakistan no specific curricular inputs were provided for disadvantaged students.

Computer and ICT

- The computer labs were established in the institutions. The computer literacy varied between 40 to 75 per cent in all the four countries.
- The computer facilities were utilised for the professional development of teacher educators. Different types of relevant materials related to their own specialisation were downloaded from internet but this facility was availed by only 30 per cent student teachers. However, the ICT facility was not used frequently during teaching learning process in all the four countries. ICT based classrooms were not available.

Practice Teaching

- In India, practice teaching was organised in all types of schools including government, private, aided and own demonstration schools during first and second half of the year. In Bangladesh, the practice teaching was organised only in private schools whereas it was organised in own demonstration schools in Pakistan.
- In India and Bangladesh, subjects like social sciences, physical sciences, languages and mathematics were prescribed under teaching practice of the B.Ed programme.
- The student teachers expressed that two subjects were undertaken for the practice teaching. In India, twenty-four lessons from two subjects were delivered during forty-five days by student teachers. While, forty-five lessons were delivered during ninety days in Bangladesh. In Pakistan, eleven lessons were delivered during thirty days duration.
- The minimum duration of school experience programme was 35-60 days in India, Sri Lanka and Bangladesh, whereas maximum was 90 days in Pakistan. In Sri Lanka, minimum 5-6 lessons were required to be delivered during practice teaching, whereas, maximum 90 lessons were required in Pakistan. In all the four countries, student teachers were prepared for practice teaching before sending them to actual classroom situation. For preparing student teachers, demonstration lessons by faculty members or outside experts were arranged. Simulated and microteaching lessons were organised. About twenty schools were selected by all the four countries for practice teaching. In Sri Lanka, about 2 – 3 lessons were observed by the supervisor, whereas maximum 60 lessons were observed in Bangladesh.

- There were many weaknesses in the system of practice teaching. Teacher educators from India, Bangladesh and Pakistan revealed that the duration of the practice teaching was less. It was not supervised properly. The school authorities also did not cooperate fully in organising the teaching practices in their schools. It was difficult to observe the natural behaviours of student teachers during this programme.

Co-curricular Activities

(i) The co-curricular activities like debate, study tour, social activities, drama, health awareness programme, excursion, science fair, etc. were organised as a part of the B.Ed programme. But in Pakistan, very limited activities like indoor games were organised. The participation of the student teachers in co-curricular activities were lowest in Pakistan and highest in India.

Transactional Strategies

- Lecture method was frequently used by the teacher educators in all the four countries for curriculum transaction in the B.Ed programme. Demonstration methods and group discussions were held on some occasions. Discovery and problem solving methods were used rarely.
- ICT is not used for curriculum transaction. Power-point presentations were made on some occasions in India. It was not at all used in Bangladesh and Pakistan.

Professional Development

- There was no policy for the professional development of the teacher educators. They were only deputed in orientation and refresher courses organised by national institutions like UGC and NCERT in adhoc manner.
- For the professional development of faculty members, national seminars, refresher courses, orientation programmes and other academic programmes on different themes were organised by all the four countries. Lowest 15 faculty members from Pakistan and maximum 100 teacher educators from Sri Lanka attended the professional development programmes during 2004-07. The programmes were organised in the area of educational technology, research design, curriculum development, peace education, human rights, physical sciences, languages, women empowerment and teacher education during 2004-07. Teacher

educators from Sri Lanka attended awareness course on teacher education, whereas in Bangladesh, teacher educators attended the course on teaching quality improvement in secondary education. The teacher educators from Pakistan attended the refresher courses on human rights education, curriculum review and revision and teaching of social studies for elementary B.Ed programme. But, no such programme was attended outside the country during this time period.

- Teacher educators from India had expressed that they were the members of professional organisations like AET, AIATE, AIERA, ATER, IAP, MAF and NATE. In Sri Lanka, teacher educators were the members of SLTEU. In Banladesh, they were the members of NAEM, where as in Pakistan, they were the members of PITE and AIOU.
- The teacher educators from India had published articles/ papers in the field of school and teacher education. The articles were contributed in MERI Journal of Education, Indian Education, University News, Journal of Indian Education, Indian Educational Review, Journal of All India Association for Educational Research, Journal of Education and Psychology, Nav Shiksha and Education in Asia. In Sri Lanka, teacher educators had published articles on educational awareness and role of education in women empowerment in journal of Thinakaran. Teacher educators from Bangladesh published articles on Biological science teaching for the B.Ed syllabus, Right person for the right job, curriculum in the journals named-The Observer, The Star, and The Sangbad. No article was published by the faculty of Pakistan during 2004-07.
- Teacher educators from India had published books in the area of educational technology, computer education, teaching of mathematics, child psychology and total quality management in education during 2004-07. The book on Islamic philosophy was published by the teacher educators of Sri Lanka. In Bangladesh and Pakistan, teacher educators had published books related to teaching subjects on Science, Psychology, English, Languages and Social Science.

Research and Innovation

- Many research projects in the area of school and teacher education were completed during 2004-07 in India and Pakistan. In India, innovations on practice teaching, educational technology, and instructional strategies were carried out, whereas innovations

on ICT and staff development were undertaken by Pakistan. No innovations were reported by Sri Lanka and Bangladesh countries.

Library

- The library facilities were available in the B.Ed institutions and the professional librarians were working in these institutions in all the four countries. There was open access for books and journals in India and Sri Lanka, but open access was not available in Bangladesh and Pakistan. The libraries were kept open on holidays only in India.
- In all the four countries, it was found that books and journals related to the B.Ed course were not available in adequate numbers. Moreover, the libraries were having variety of books related to different fields. The student teachers from all the countries were satisfied with the library services and cooperation extended by the library staff. Seating arrangement in the library was not found proper and adequate in most of the libraries.

Physical facilities

Most of the physical facilities including Principal's room, Staff room, Classrooms, Student's common room, Office space, Laboratories, and Toilets in the B.Ed institutions were available and adequate in India, Bangladesh and Pakistan. But the physical facilities like playground, computer room and gymnasium were not adequate.

Weaknesses and Suggestions

- Many weaknesses were reported in the B.Ed programme from all the four countries. It was reported that more emphasis was given on the teaching of theory courses. Infrastructure facilities were not adequate. Students were not attending the classes on regular basis. New and innovative methodologies were not used for transacting the curriculum. The problems related to admission procedure, lack of faculty, library books, inter-college migration of students, curriculum and textbooks were also reported by the respondents.
- Many suggestions like use of ICT during teaching learning process, adequate infrastructural facilities, adequate library facilities, appointment of qualified staff, well equipped science laboratories, enhancement of duration of the B.Ed programme from one year to two years, more emphasis on practice teaching than theory, availability of textual material and revision of the

B.Ed curriculum on regular interval of five years, were reported by the principals, teacher educators and student teachers of B.Ed institutions from all the countries for improvement of this course.

- Teacher educators from Bangladesh mentioned that PSTE should be made compulsory.
- The student teachers from Bangladesh expressed that more assignments should be given on the basis of the theory papers. Guidance and counseling paper was suggested to be included in the theory paper of the B.Ed course of Pakistan.

Examination and Evaluation System

- Both annual and semester system for examination were followed in India and Sri Lanka. Whereas, only annual system was followed in India and Bangladesh and semester system in Pakistan were followed. Marking system was prevalent for theory and practice teaching and grading system followed for practical work examination in all the four countries.
- The performance of the student teachers in theory courses was evaluated by conducting external and internal examination. Written tests, viva-voce and assignments were largely used as tools for examination. Practice teaching was evaluated by observing and supervising the delivery of the lesson plans in real classrooms. The evaluation of the practical activities was based on construction of psychological tests, assignments and projects.
- There were many weaknesses in the current evaluation system. Outdated and traditonal techniques were used for the evaluation of performance of student teachers. These tools and techniques were largely related to cognitive aspect of the personality. Teacher educators suggested that methods of evaluation should be revised. Continuous and comprehensive evaluation should be introduced for evaluating the performance of the student teachers and grading system should be introduced in place of marking system.

Implications

The following implications for action have been drawn on the basis of the findings mentioned above.

1. The Principals, Teacher educators and Student teachers from India, Bangladesh and Pakistan stated that one year duration of the B.Ed programme is very less and it should be increased from one year to two years, so that the necessary knowledge and skills

can be inculcated among the student teachers during this programme. Besides this, integrated programme of longer duration like in Sri Lanka should also be introduced in India for preparing better teachers.

2. There should be entrance examination for admission in the B.Ed programme and it should be based on aptitude of the students. Written tests, group discussions and interviews should be the part of admission procedure.
3. Physical facilities including principals' room, staff room, common room, computer room, office space, laboratories and toilets should be provided adequately, so that the quality of teaching can be enhanced.
4. The library services should be provided in all the B.Ed institutions, with latest books and journals in adequate number. Well qualified librarian should be employed. Adequate space for library and reading room should be provided in the institutions. The computer and internet facility should also be available in the library. The library should have networking with other libraries.
5. Well qualified faculty members including principals, teacher educators and technical staff should be appointed according to sanctioned strength prescribed for the institution. In the same way, administrative staff should also be appointed. Promotional policies should be followed on regular basis.
6. The schools and the teacher education institutions are working in isolation. Even, there is no relationship between the PSTE curriculum and the school curriculum. Both the curriculum should have close linkages and coordinations. The frequency for revising PSTE curriculum should be at least five years.
7. During the B.Ed programme, more emphasis was laid on theory part than the practical aspects. All the theory papers prescribed in the B.Ed programme should give space to the practical work including assignments and projects.
8. The duration of the school experience was not found adequate in the B.Ed programme. Ninety days duration were allocated for this programme only in Pakistan. The other countries should also allocate at least ninety days duration of the school experience programme. Student teachers should be prepared well before sending them to actual school situations. Simulation and microteaching lessons should be organised. All the lessons should be supervised and monitered, either by the faculty of the

institution or by the school teachers, where the school experience programme is undergoing.

9. Lecture method was used frequently for transacting the curriculum of the B.Ed programme in all the four countries. Besides this, project method, problem solving method, quiz, discovery method and case studies should be used in transacting the curriculum of the B.Ed programme. ICT should be integrated during teaching learning process.
10. The activities related to work experience, projects and assignments were undertaken as a part of B.Ed programme. These activities were not undertaken seriously. More activities like debates, social activities, drama, health awareness programmes and science fairs should be organised in more serious and systematic manner, so that student teachers can gain more exposure and experience during this programme.
11. The performances of student teachers in the B.Ed programme were evaluated through annual and semester systems of examination. It is suggested that comprehensive and continuous evaluation should be introduced for evaluating the performance of student teachers. Equal weightage should be given to school based experience and practical work. Grading system should be introduced in place of marking system.
12. There was no regular policy for the professional development of faculty of the B.Ed programme. Only some faculty members are deputed to the seminars and conferences in adhoc manner. Only very few are contributing articles/papers in the journals. There should be a regular policy for the professional development of the faculty members for their growth and development.

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Less Familiar Pathways in Constructivism

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Abstract

Beginning as an art movement in Russia in the early parts of the twentieth century, constructivism has encompassed many domains of knowledge. Accordingly, many varieties of constructivism have appeared in the literature, so much so that some authors have gone on to dub constructivism a 'veritable jungle'. The five major varieties such as philosophical constructivism, sociological constructivism, Piagetian constructivism, radical constructivism, and social constructivism are like well travelled highways, widely talked about and discussed in literature. In the present paper we make an effort to bring into focus some of the less discussed varieties of constructivism. Though they are like less travelled streets compared to their major counterparts, they lead to new destinations, and explore new dimensions of knowledge acquisition and cognition.

Introduction

In the current scenario constructivism offers a more realistic approach to the process of knowledge acquisition than behaviourism. However, unlike behaviourism, constructivism appears in a large variety of forms (good et. al. 1993; Phillips 1995; Geelan 1997; Jha 2009), some more prominent than the others, Ernest (1995) goes on to say that there are as many varieties of constructivism as there are researchers. Riegler (2003) finds constructivism a 'veritable jungle'. Some of the different varieties of constructivism are elaborately discussed in the literature whereas others are less pronounced. The latter varieties far outnumber the former in terms of perspective and field of application. Here we shall focus on these 'minor' varieties of constructivism and their significance. If we consider the major

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varieties of constructivism as well travelled highways, the minor varieties may appear like less familiar streets. However, the latter lead to new destinations with distinctive ambience.

To appreciate these less discussed forms of constructivism a brief account of the historical development of constructivism and its major varieties is in order.

Constructivism: A Historical Perspective

The term 'constructivism' appears to be Russian in origin (konstruktivizm). According to *The Oxford Dictionary of Difficult Words* (2002, p. 95): "Constructivism is a style or movement in art in which assorted mechanical objects are combined into abstract mobile structural forms. The movement originated in Russia in the 1920s and has influenced many aspects of modern architecture and design". *The New Encyclopaedia Britannica* (1985) elaborates: "Constructivism, Russian artistic and architectural movement that was first influenced by Cubism and Futurism and is generally considered to have been initiated in 1913 with the "painting reliefs" – abstract geometric constructions – of Vladimir Tatlin. Antoine Pevsner and Naum Gabo joined Tatlin and his followers in Moscow, and upon publication of their jointly written Realist Manifesto in 1920 – they became the spokesmen of the movement. It is from the meanifest that the name Constructivism was derived: one of the directives was "to construct" art. Because of their admiration for machines and technology, functionalism, and modern industrial materials such as plastic, steel, and glass, they were also called artist-engineers."

Thus the term 'constructivism' seems to have originated in the field of art and architecture. But it has exerted a lot of influence in many fields of knowledge and learning. However, the basic connotation of the term across the fields remains– "to construct".

Historically, the tenets of constructivism, as used in the field of knowledge, are said to have emerged as early as the sixteenth century in the writings of Giambattista Vico or Giovanni Battista Vigo (1668-1744), an Italian philosopher. Her proposition of 1710, *verum esse ipsum factum* ("true itself is fact" or "the true itself is made") is taken as an early instance of constructivism epistemology. The proposition states that truth is verified through creation or invention and not through observation as taught by Descartes. It is also translated as: "The human mind can know only what the human mind has made" (von Glasersfeld 1995, p. 21). von Glasersfeld (2000) also quotes Giambattsta Vico thus: "God knows

the world, because He created it, human beings can know only what they themselves have made", and then adds: "The treatise form which this statement is taken, is the first constructivist manifesto." According to Noddings (1990) constructivism also emerged from the works of Ulric Neisser (act psychology), and Noam Chomsky (innate linguistic structures of mind).

Major Pathways in Constructivism

The major traditions have been identified in constructivism. These are (i) philosophical constructivism, (ii) sociological constructivism, and (iii) educational constructivism.

Philosophical constructivism probably originated in the ancient Greek philosophy with Socrates' (469-399 BC) 'dialogue' in which he asked directed questions leading his pupils to realise for themselves the weakness in their thinking. More recent origins of constructivism may be seen in George Berkeley's (1685-1753) philosophy of science, the philosophy of lmmanuel Kant (1724-1804), Thomas Kuhn's (1922-1996) *Structure of Scientific Revolutions* (1962), and Richard Rorty's (1931-2007) *Philosophy and the Mirror of Nature* (1979). The philosophical view of constructivism revolves around the concept of materialism vs. idealism and the debate concerning whether the world is *knowable or unknowable* (Afanasyev 1980). According to philosophical view of constructivism our beliefs and perceptions of the world are actively constructed (not discovered) by us on the basis of our experiences and active processes of developing knowledge rather than through a passive reception of sense data. This basic principal of philosophical constructivism in fact governs all other kinds of constructivism.

Experts in the history of science, philosophy of science, sociology, anthropology and computer science often indulge in the debate concerning the role of social factors in scientific advancement relative to retaional, empirical and other scientific factors. This has led to the notion of *sociological constructivism*. According to sociological constructivism the progress of science and technology, and the generation of the public body of knowledge are due to changing social conditions and interests. It argues that all knowledge is constructed and interpreted socially in the frame of science and technology studies. Though the physical world is not socially constructed, our knowledge of the physical world is socially constructed in the sense that interpretation of the sensations coming through our sense organs is socially negotiated, constructed and accepted by people

interacting with each other. The changes in theories and philosophical commitments of science are not directly linked to the explanatory power of cognitive content and rational reasoning. The sociologists treat the individual mind as a 'black box' whose inputs are sociological concerns and outputs are in the form of statements of belief which may be true or false. Three varieties of sociological constructivism have resulted from different schools of thought (Boudourides 1998): *strong* form, *mild* form, and *actor-network theory* (ANT).

Educational constructivism is concerned with knowledge construction in teaching-learning situations including classrooms. It is also known as *psychological constructivism* (Phillips 1995) and has two categories: (a) *personal constructivism*, and (b) social *constructivism*, depending upon whether an individual or a group is involved in the process of construction. Personal constructivism in turn is supposed to have two version: (i) *Piagetian constructivism* or *cognitive constructivism* due to Piaget and (ii) radical constructivism due to von Glasersfeld. Social constructivism is ascribed to Vygotsky.

Piagetian constructivism, ascribed to Jean Piaget (1896-1980), simply means that knowledge is not passively passed on by the teacher to the learner, but is actively constructed by the learner. In this connection Piaget (1970, pp. 57-58) says, "What remains is construction as such, and one sees no ground why it should be unreasonable to think it is ultimate nature of reality to be in continual construction instead of consisting of an accumulation of readymade structures". Piaget's stages of cognitive development support constructivism.

Ernst von Glasersfeld proposed radical constructivism both as a theory of knowledge and as a guide for science and mathematics education (von Glasersfeld 1984, 1987, 1993, 1995). In radical constructivism the traditional philosophical view of realism according to which knowledge has to be a representation of the objective world that is independent of human experience is abandoned. The stand taken by the radical constructivists is that knowledge is something which is *personally* constructed by an individual in an active way, as she tries to comprehend and organise her experiential world. Knowledge construction is an evolving and self-regulatory process, and it is impossible to know the extent to which knowledge reflects an *ontological reality*. The term 'ontology' refers to 'the science that deals with the principles of pure being' or 'that part of metaphysics which deals with the nature and essence of things', von Glasersfeld justifies the name *radical constructivism*

in the following lines: "Radical constructivism, thus, is *radical* because it breaks with convention and develops a theory of knowledge in which knowledge does not reflect an 'objective' ontological reality, but exclusively an ordering and organisation of a world constituted by our experience. The radical constructivist has relinquished 'metaphysical realism' once and for all." (von Glasersfeld 1987, p. 199)

Lev Vygotsky (1896-1934), a leading Russian developmental psychologist, is the propounder of social constructivism. In it he brings to focus the role of the society in the process of knowledge acquisition by a learner. According to him *collaboration* is the key in knowledge construction. Vygtosky introduced the notion of the '*Zone of Proximal Development*' (ZPD) (Vygotsky 1978) which is defined as the intellectual potential a child acquires when assisted by a knowledgeable adult or a more advanced peer. ZPD is to be distinguished from the actual domain of development of the child and can be a true measure of the child's achievement. Interactive communication needs to involve guided interaction that should enable the child to reflect critically on their conceptions and go for necessary changes. Social constructivism views individual knowledge and social knowledge to be one and the same. It suggests that construction of knowledge is facilitated by the vast cultural repertoire of artefacts, ideas, assumptions, concepts and practices which an individual inherits or born into. Thus, learning is a form of *cultural apprenticeship*.

Less Familiar Types of Constructivism

While the above five categories namely philosophical constructivism, sociological constructivism, Piagetian constructivism, radical constructivism, and social constructivism are considered the major types of constructivism, with their numerous followers, there are many other types of constructivism mentioned in the literature though to a lesser extent. Each of them has its own significance and utility, gleaned from the literature. The list, however, may not be exhaustive, *(i) Communal constructivism, (ii) Computational constructivism, (iii) Constructionism, (iv) Contextual constructivism, (v) Critical constructivism, (vi) Cultural constructivism, (vii) Cybernetic constructivism, (viii) Dialectical constructivism, (ix) Didactic constructivism, (x) Empirical constructivism, (xi) Human constructivism, (xii) Information-processing constructivism, (xiii) Mathematical constructivism, (xiv) Methodological constructivism (xv) Moderate constructivism, (xvi) Physical constructivism (xvii) Pragmatic social*

constructivism (xviii) Psychiatric/Therapeutic constructivism, (xix) Rational constructivism, (xx) Realist constructivism, (xxi) Sociocultural constructivism, (xxii) Socio-historical constructivism, (xxiii) Sociotransformative constructivism, (xxiv) Trivial constructivism, (xxv) Weak constructivism.

A perusal of literature suggests that some of the above forms of constructivism are not readily accessible. In view of this we now briefly introduce 19 of the above list of 25 forms of constructivism.

Communal Constructivism

B. Holmes et. al. introduced the term *communal constructivism* in 2001 in view of the increasing influence of Information and Communication Technology (ICT) and networked learning on knowledge construction and sharing. In this model, apart from developing their own knowledge base, students and teachers involved may be thought of as members of a kind of community who help one another in generation and sharing of knowledge making use of ICT. Communal constructivism thus suggests a way of converting the principles of social constructivism into practice in teaching-learning situations. In the words of Holmes et. al. (2001), "What we argue for is a communal constructivism where students and teachers are not simply engaged in developing their own information but actively involved in creating knowledge that will benefit other students. In this model students will not simply pass through a course like water through a sieve but instead leave their own imprint in the development of the course, their school or university, and ideally the discipline."

Computational Constructivism

Computational constructivism is based on neural basis of cognitive development. Its proponents are Quartz, and Sejnowski (1997) and Westermann (2000).

Constructionism

As a variant of constructivism, constructionism (Papert 1991, 1993) emphasises that in order to learn about abstract concepts it is necessary for a learner to create and experiment with 'artifacts'. A link between this view and that of the original Russian connotation of constructivism may be seen. Today constructionism may be facilitated by computers. Thus, besides being an active constructor of knowledge, a learner needs to go for particular constructions of the subject that are external and shared, thereby bringing understanding and experience together.

Contextual Constructivism

An individual constructs her knowledge *upon a foundation or in a context*. Contextual constructivism recognises the significance of context in learning. Contextual constructivism is about understanding the fundamental, culturally based beliefs that both students and teachers bring to the classroom, and how these beliefs are supported by culture. According to Cobern (1993) contextual constructivism is nothing but the impact of culture on the teaching and learning of science. In contextual constructivism the student, the content, and the context are intimately connected. The student builds an understanding of content in context and the context mediates student understanding of content. Context shapes student learning and is in turn shaped by both content and the student.

Critical Constructivism

The roots of *critical constructivism* are said to lie in a series of articles which appeared in the journal *Critical Inquiry* (1991). It argue that besides 'truth' and 'reality', other research tools like 'evidence', 'document', 'experience', 'fact', 'proof', etc. are also important in a social and ideological construction, and these are also subject to criticism. It applies to many disciplines including natural science such as physics and biology, statistics, history, law, etc. According to Kincheloe (1993): "Critical constructivism concerns the attempt to move beyond the formal style of thinking which emerges from empiricism and rationalism, a form of cognition that solves problems framed by the dominant paradigm, the conventional way of seeing."

Watts and Jofili (1998) raise an interesting debate on 'constructivist teaching' claiming that the term is an oxymoron as it combines two contradictory actions: 'construction' and 'instruction' (teaching). They argue that "...constructivist teaching itself should be superseded in favour of 'critical constructivism', and approach which undertakes a broader critique of the relationships between teacher and taught, between learner and subject matter, and between schooling and society." According to them, "To be critical constructivists, teeachers must possess critical awareness: an understanding of themselves, their perspectives, their approaches to the construction of knowledge, and ways in which their own consciousness has been shaped by society (and schools)." They further observe that "Inside a critical constructivist classroom, learners reflect on the lives they lead, ask questions to discover meanings and values. Their learning experiences now include a self-

reflective dimension around themes from daily life. .....This aims to push them into becoming active participants in shaping the economic, social and cultural environment in which they live. These learners also become actively and critically involved in controlling their own learning, and teachers need to work towards the 'liberation' of learners, instead of their 'domestication'." They produce empirical evidence of teachers moving from constructivism towards critical constructivism in classroom transactions through in-service professional development course and action research.

In short, under critical constructivism the learner is expected to question the answers, the evidences, and the so called facts.

Cultural Constructivism

According to cultural constructivism, knowldege and reality, as perceived by a community of people, are dependent upon its culture, which may also dictate the methodology and approach. To give an example, for scientific studies, Western cultures use objects whereas Native American culture uses events. Superstitions and blind beliefs are also peculiar to cultures. Under cultural constructivism knowledge construction is perceived as a process of enculturation. Cultural constructivism appears to be a subset of the broader social constructivism.

Cybernetic Constructivism

Cybernetics is the study of self-organising systems. Cybernetic constructivism owes its origin to cybernetic developments in biology, neurophysiology, and cognition, in particular, cybernetics of self-organisation or second order– mode 2 - cybernetics (von Foerster 1984). It is based on the concept of autopoiesis (self-formation) originally developed to study cell biology. Autopoietic systems are self-contained and self-referential units. Besides biology the concept has been applied to physical, cognitive and psychic systems (Mingers 1995) and social, communication, and legal systems (Luhmann 1989, 1990, 1995). Cybernetic constructivism supports the basic notion of philosophical constructivism as a self-referential process of maintaining identity. Autopoiesis is said to manifest its constructivist character at the level of 'closure' of the nervous system in the sense that action and cognition depend on each other and not on any outside system. Von Foerster has argued that this happens when human brain interprets signals received from different sensory organs. Thus living beings are autopoietic systems. Accordingly,

Maturana and Varela (1980) have claimed that cognitive apparatus is an organisationally closed system. Riegler (2003) terms this *biological constructivism*. In this connection von Glasersfeld claims that "contemporary neurophysiological models may be compatible with a constructivist theory of knowing but can in no way be integrated with the notion of transduction of 'information' from the environment that any realist epistemology demands" (von Glasersfeld 1989).

Dialectical Constructivism

Dialectical constructivism is concerned with the interaction between a learner and her environment. It recognises that traditional views of cognition are not sufficient and both psychological and sociological factors are important for learning. The blending of psychology and sociology helps one to understand how individuals orient and learn from their surrounding and, further, how these interactive influences shape their mental processes. Dialectical constructivism is also called blended constructivism as it brings out the importance of the blending of psychology and sociology in the context of learning. It is linked to the joint efforts of psychologists and sociologists to understand learning from the perspective of 'contextualism' (Brunning,Schraw, and Ronning 1999).

Didactic Constructivism

Didactic constructivism is linked to the problem of operationalising radical constructivism in teaching (Brink 1991). Here the term 'didactic' has the connotation 'to realise'. The verb 'to realise' in turn has two components: 'to construct', and 'to confront'. In this process the learner constructs a conceptual representation and then confronts it with the ideas of the others. It enables one to discover mistakes which could not be perceived earlier. Similarity between this and the Socrates' 'dialogue' discussed earlier in the context of philosophical constructivism may be seen.

Human Constructivism

Human constructivism (Sharma 2006), due to J. D. Novak (Novak 1993), basically proposes that the process of meaningful learning, as understood through assimilation theory, is fundamental to both the psychological process of cognitive development of individuals and the epistemological process of new knowledge construction. It avers that learning and research are nothing but meaning making mechanisms. A researcher as well as a new learner constructs meaning out of a

new experience by connecting it to their existing knowledge framework. This means that a scientist and a learner use the same cognitive processes in the construction of new knowledge. The consequent conceptual change may occur in small incremental steps resulting in a 'weak' from of knowledge reconstruction or in a rapid and abrupt manner resulting in a 'strong form of knowledge reconstruction. This is valid for both a scientist and a learner. According to human constructivism, knowledge is an idiosyncratic, dynamic construction of human beings and in identical situations two human beings may construct two different meanings. This brings out the 'human' aspect of a scientist's work, which is often ignored in teaching-learning situations.

Information-Processing Constructivism

According to *information-processing constructivism* (Melnerney and Melnerney 2002) ability of an individual in information processing is crucial in the process of learning. It suggests that a learner has an independent capacity to self-actualise, i.e. the learner can actively organise his/her own learning experiences with clear ideas of means and ends.

Mathematical Constructivism

Mathematical constructivism (Riegler 2003) is a reaction to Platonism in mathematics. Its proponents, such as I.E.J. Brouwer, Arend Heyting, and Jean Paul van Bendegem claim that mathematical objects exist only if they can be constructed by a method. For this reason they oppose, for example, the notion of infinity.

Physical Constructivism

There exists a 'physical' approach to cognition (Riegler 2003). The proponent and physicist O. Diettrich (2001) argues that the perceived patterns and regularities are just invariants of inborn cognitive (sensory) operators. Different sets of cognitive operators generate different cognitive phenotypes. Laws of nature are, therefore, human specific. According to the physicist G. Grossing (2001) the perceived non-classical structure of space and time in relativistic class are human-specific artefacts based on neurophysiological processes.

Pragmatic Constructivism

According to Rieber (1993), *pragmatists* are those teachers and researchers who have developed a braod and general constructivist

perspective through their disposition, reading and professional development programmes, but have a narrower view of the same in classrooms.

Psychiatric/Therapeutic Constructivism

This constructivism is used as a family therapy to solve interpersonal problems (Watziawiek et al 1974). It aims at disrupting the pattern of symptomatic interpretation of a habitual situation by 'reframing' the situation. The procedure is to "place a conceptual and/or emotional setting or viewpoint in another frame which fits the 'facts' of the same concrete situation equally well or even better and thereby change its entire meaning". This way the patients are enabled to find alternative constructions of their world-view.

Socio-Historical Constructivism

This form of constructivism basically suggests that humans are social beings, situated within the culture and history of a society, which shape their thinking process.

Sociotransformative Constructivism

The sociotransformative constructivism (Rodriguez 1998) originated to help teachers in making their science and mathematics classes more gender-inclusive, socially relevant, and student-centred. It attempts to unite social constructivism as a theory of learning and multiculturalism as a theory of social justice.

Trivial Constructivism

This advocates the thesis that all knowledge is human construction (von Glasersfeld, 1993). It, however, has 'discovery of ontology' as its purpose (Osborne, 1996). It also means that the worldviews, which are differently constructed, gradually converge towards a knowledge system that represents the world objectively.

Weak Constructivism

Paul Ernest (1995) describes weak constructivism as one in which individuals construct their own knowledge (a local notion), while accepting the existence of objective knowledge (*a global notion*).

In Table 1 we give a summary of the main tenets of the different forms of constructivism discussed above. The table enables us to recognise the distinctions between them at a glance.

TABLE 1

Form of constructivism	*Main tenets*
Communal constructivism	Students and teachers as a community; Members help one another in knowledge acquisition; Each member creates knowledge for other; Use of ICT and networked learning
Computational constructivism	Cognitive development of learner; Neural dimension of cognition
Constructionism	Knowledge construction facilitated by construction of and experimentation with artifacts
Contexual constructivism	Significance of context in learning; Impact of culture on learning
Critical constructivism	Construction has a critical dimension; Construction has a self reflective dimension
Cultural constructivism	Knowledge and reality depend upon culture; Knowledge construction is a process of enculturation
Cybernetic constructivism	Concept of autopoiesis; Cognitive apparatus is an organisationally closed system
Dialectical constructivism	Interaction between learner and environment; Blending of psychological and sociological factors for learning; Contextualism
Didactic constructivism	Operationalising radical constructivism in teaching; Construction and confrontation; Discovering mistakes
Human constructivism	Knowledge as idiosyncratic and dynamic human construction; Learning and research use similar meaning making mechanisms; Weak and strong forms of knowledge reconstruction
Information-processing constructivism	Information-processing; Self-actualisation
Mathematical constructivism	Mathematical objects exist if they can be constructed by a method
Physical constructivism	Inborn cognitive operators; Cognitive phenotypes; Neurophysiological processes
Pragmatic constructivism	Broad constructivist perspective gained through reading, disposition and professional development but narrower view of constructivism in classrooms
Psychiatric/ Therapeutic constructivism	Solving interpersonal problems; Reframing a habitual situation; Alternative worldviews
Socio-historical constructivism	Humans as social beings situated within culture and history; Thinking process shaped by culture and history
Sociotransfor-mative Const.	Uniting social constructivism as a theory of learning and multiculturalism as a theory of social justice
Trivial constructivism	Knowledge is human construction; Discovery of ontology
Weak	Own knowledge as local notion; Objective knowledge as
constructivism	global notion

Conclusion

Recognising the fact that the five major varieties of constructivism namely *philosophical constructivism, sociological constructivism, Piagetian constructivism, radical constructivism,* and *social constructivism* (which belong to the three major constructivist traditions) are generally widely discussed and disseminated in the literature, in this paper we have tried to highlight some of the less prominent varieties of constructivism whose significance can be judged on their merit. It must be pointed out that these varieties are not less important; rather they attempt bring to the fore subtle but significant issues in constructivism. They are only limited in their domains of operation. They appear to be less global and more local in their scope. Some of them may be directly traced to the major varieties whereas some others appear to have an independent stance. They appear less widely in the literature. This is one reason why we have given here a brief account of only 19 of the list of 25 less known forms of constructivism cited above. However, it may not be far from truth if we conclude that these minor varieties constitute some 'fine structures' of the major varieties of constructivism. In view of their individual significance it may be important to bring the implications of these less known varieties of constructivism into teaching–learning situations.

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Socio-Psychological Factors Influencing the Choice of Teaching as a Career: A Study of Post Graduate Students in Delhi

VINEETA SIROHI*

ABSTRACT

This study responds to the current challenge of inadequate supply of teachers in Indian higher education. The present study is an attempt to ascertain the choice of post graduate students for teaching and explore the factors influencing the choice of teaching as a career in higher education. A survey was carried out on a sample of 303 post graduate final year students selected through a multistage stratified sampling technique. Results revealed that approximately one-third of the students were inclined towards teaching profession. A significant difference was found between academic stream and inclination towards teaching. Further, significant differences were also found across professions in terms of job preference, economic benefit, freedom of work and job security. While, career choice of teaching was found to be influenced by various socio-psychological factors, no evidence was adduced to support gender influence. The findings have implications for policy makers and educationists for attracting and retaining talent in teaching profession.

Key words: Socio-psychological factors, career choice, teaching profession, higher education, academic stream

Introduction

In confronting the many challenges that the future holds in store, humankind sees in education an indispensable asset in its attempt to attain the ideals of peace, freedom and social justice. The tireless quest for knowledge in all fields of thought and human endeavour

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is quite evident in the Indian Education system. In the quest for development, higher education assumes great importance, for it provides the cutting edge and there is no doubt that higher education has a significant contribution to economic development, social progress and transformation of the Indian economy into a knowledge economy. The massive expansion of higher education to 1500 universities nationwide to increase the gross enrolment ratio of at least 15 per cent by 2015 as envisaged by National Knowledge Commission (2006) makes qualified and competent teacher a prerequisite for its efficacious expansion and calls for a serious attention. The new dimension of education, which makes it an integral part of the national development, cast great responsibility on the teacher. At the core of the learning enterprise, a teacher if enabled and empowered, would lead and shape the reinvention of the organisation into a genuine learning organisation. Therefore, there must be a conscious effort to attract and retain talented teachers by providing attractive salaries along with incentives and rewards for performance. This is also essential as talented students have far more lucrative choices in other professions in India and abroad.

The social and economic aspirations of the general population continue to grow apace with the fast changing scenario. Though the salaries undoubtedly are an element of the profession's attractiveness, non-pecuniary conditions and rewards are crucial, too. These include both realisation of personal potentials and the services rendered to the society at large. Likewise, the process of career choice is the result of interaction among various forces. In India, career choice is influenced by various social and psychological factors comprising of influence of significant others, prestige, gender, socioeconomic status, and educational background.

Perusal of the extant literature revealed the influence of various factors on career choice. Arulmani, Van and Eastan (2003) indicated that career belief and socio-economic status influence the career decision of high school students in India. Another study by See (2004) pointed out that those with less educated parents are more likely to choose teaching as a career. In another study, Chan, Chan and Sang (2002) found significant relationships between students' interest in teaching and demographic characteristics. Recently, Kumar and Sharma (2008) indicated nominal pay packages as one of the important reasons behind the shortage of faculty in universities. The determinants have been explored repeatedly with

similar results. Within the framework of Social Cognitive and Social Learning theory, the present study aims to ascertain the choice of post graduate students for teaching across academic streams and explore the socio-psychological factors influencing the choice of teaching as a career in higher education.

Methodology

The sample was drawn from three central universities in Delhi i.e. Jawaharlal Nehru University, Jamia Millia Islamia University and Delhi University. The sample was selected through multistage stratified sampling technique, according to the various academic streams, disciplines and gender. Since the population of students in various disciplines is too large, initially the sample was fixed at 10 per cent of the population enrolled in various academic streams. But the researcher could succeed in collecting data from a slightly larger sample; therefore the actual size of the sample i.e. 13 per cent is slightly larger than the size envisaged. Thus, a total sample of 303 PG final year students represented 13 per cent of the population enrolled in three Universities in Arts, Science and Commerce Stream in the session 2007-08. The sample of arts stream was selected from Delhi University and Jawaharlal University whereas the sample of science and commerce stream was selected from Delhi University and Jamia Millia Islamia University (Table No. 1).

TABLE 1

Percentage of total sample to Population enrolled (2007-08) in three Universities by Academic Stream

Academic Stream		*University*	*Population*	*Sample*	*Percentage*
Arts	Languages	DU + JNU	647	64	10
	Social Sc.	DU + JNU	918	123	13
Science		DU + JMI	612	92	15
Commerce		DU + JMI	216	24	11
Total			2393	303	13

10 per cent and 13 per cent of the sample constituted from the Languages and Social Sciences respectively in Delhi University and Jawaharlal Nehru University. From the Science and Commerce stream a sample of 15 per cent and 11 per cent respectively was taken from Delhi University and Jamia Millia Islamia University (Table No. 1). The academic stream of Social Science included Political Science,

History, Sociology, Geography, Economics and Psychology, under languages-English, Hindi and Sanskrit were covered and Physics, Chemistry, Biology and Mathematics constituted the Science stream.

TABLE 2

Showing no. of respondents by gender and academic stream

Gender	*Academic Stream*				
	Arts		*Science*	*Commerce*	*Total*
	Language	*S. Sc.*			
Male	37	67	43	14	161
Female	27	56	49	10	142
Total	64	123	92	24	303

With regards to gender, a total of 161 (53%) males and 142 (47%) females constituted the total sample of 303 students (Table No.2). A self-developed questionnaire comprising 57 questions was administered to identify the important factors influencing the decision to choose the teaching profession and perceptions about teaching as a career in relation to other careers. The questionnaire comprised of both closed and open ended questions covering eight broad areas relating to teaching profession- personal information, socio-economic status, job preference, status of teaching profession, fostering dynamism in the profession, attracting and retaining talent, qualities essential for good teachers and factors viewed necessary to improve the status of teachers. The data were analysed quantitatively by computing percentage and employing chi square tests and other salient trends were highlighted through qualitative analysis.

Results

The analysis of the data revealed that out of a total sample of 303 students only 31 per cent were inclined towards teaching, representing 30 per cent males and 32 per cent females. A Chi Square test revealed no significant difference between *gender* and inclination towards teaching. Further, an analysis of data across *academic streams*, indicate that a larger number of students from the Arts Stream were inclined towards teaching (37%) followed by the students from the Science stream (23%) and Commerce stream (17%). Chi square tests showed a significant difference between academic streams and inclination towards teaching at .05 level (Table No.3)

TABLE 3

χ^2 Value for inclination towards teaching across gender and academic stream

Variables		*Inclined*	*Not Inclined*	*Total*	χ^2
Gender	Male	48 (29.81)	113(70.18)	161 (53%)	0.23
	Female	46 (32.39)	96 (67.60)	142 (47%)	
	Total	94 (31.02)	209 (68.97)	303 (100)	
Academic Stream	Arts	69 (36.89)	118 (63.10)	187 (61.71)	8.16*
	Science	21 (22.82)	71 (77.17)	92(30.36)	
	Commerce	4 (16.66)	20 (83.33)	24 (7.92)	
	Total	94 (31.02)	209 (68.97)	3 0 3 (100)	

*p < 0.05, **p < 0.01

Job Preference, in terms of order of priority on a list of ten professions reveal that Civil Services was the most popular career across various academic streams and Teaching occupied the second position. A Chi Square test showed a significant difference at 0.01 level for job preference among the professions (Table No.4).

TABLE 4

χ^2 Value across professions in terms of job preference, economics benefits, freedom of work and job security

Variables	Professions					χ^2
	Civil Services	Teaching	Management	Self Employment	Others	
Job Preference	127 (41.91)	94 (31.02)	5 (7.26)	55 (1.65)	55 (18.15)	167.25**
Economic Benefits	128 (42.24)	9 (2.97)	69 (22.72)	20 (6.60)	77 (25.41)	151.68**
Freedom of Work	77 (25.41)	84 (27.72)	7 (2.31)	104 (34.32)	31 (10.23)	106.39**
Job Security	142 (46.86)	91 (30.03)	11 (3.63)	12 (3.96)	47 (15.51)	207.19**

*p < 0.05, **p < 0.01

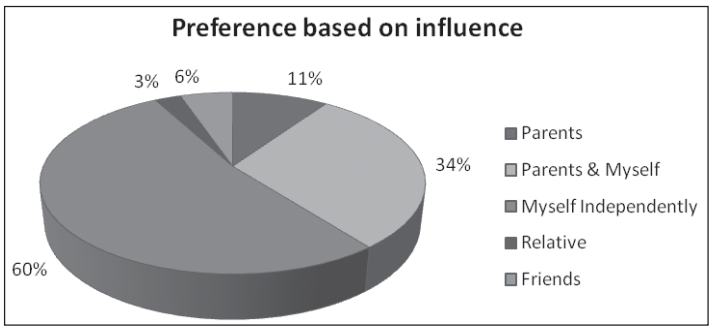
Further relative ranking of various professions in terms of *economic benefits*, placed teaching much lower compared to other professions, as hardly 3 per cent of students rate it at first rank, whereas Civil Services occupied the first place as rated by 42 per cent of respondents. With regards to *freedom of work,* Self Employment was occupied the top position as rated at first rank by 34 per cent respondents, whereas the position of teaching is enhanced (second

position) in comparison to Civil Services which was placed at third position. With regards to *job security***,** teaching again lagged behind Civil Services and was placed at the second position. Further, Chi Square test indicated a significant difference across professions in terms of first ratings for job preference, economic benefits, freedom of work and job security at .01 level (Table No.4).

The *Socio-economic status* of respondents was examined on the basis of the levels of income and educational background of the parents. The major proportion of the students inclined towards teaching fell in the category of low level of income (63%), while in contrast few students came from high-income parents. Further, *Educational background of the parents* of those inclined towards teaching seems to be low, as only 22 per cent of their parents have acquired the qualification of post graduation. *Self efficacy* also seems to be a pertinent factor in the choice of teaching as a career which is evident from the responses of almost half of the students who are inclined towards teaching seems to have strong beliefs about their ability to teach well. Since career choice is a very crucial turn or threshold in the life of an individual, the significant others in one's life, like parents, friends and relatives, play a significant role in influencing the decisions of one's career. With respect to *influence of significant others* on career choice of students, a large segment i.e. 60 per cent of the students indicate that they made the decision about their career independently, whereas 34 per cent of the students state that their decision is based on a joint consensus with their parents, whereas influence of parents accounted to only 11 per cent. On the other hand, influence of relatives and friends seems to be negligible i.e. only 3 per cent and 6 per cent respectively (Fig.1).

FIGURE 1

Preference based on influence of significant others



Prestige factor is also considered important in Indian society while choosing a career. About 73 per cent of the students affirm that teaching profession receive *adequate respect and recognition* in society today. However, a five point rating scale, indicate an average rating and none rated it very low. A little less than one fourth placed it at a high echelon. Hence, it may be inferred that status of teaching is not perceived as low since it is rated at that level by a negligible number of students, whereas in contrast 18 per cent rate it very high. On inquiring about *why teaching is not chosen as a career?* Almost 75 per cent of those not inclined towards teaching stated low salary as the main reason for not choosing teaching as their career. The qualitative information may be gathered from Table No.5.

TABLE 5

Excerpts from narratives of students from academic streams on the theme *"Why did you not choose Teaching as your Career?"*

- Low salary is the main reason of not choosing Teaching.
- It is a low paid job.
- It is because, teaching is something like repeating the same syllabus again and again, there is nothing new to learn. It is not practical enough.
- In teaching, we do not get lucrative salaries, which could be available in other professions. Moreover, in teaching profession, I can never get opportunity to spend holidays abroad.
- Because of low salary.
- There are many factors which stop me to choose teaching as a career such as work load, low status in society, low recognition, seems static, negative perception from society, less respect by students etc.
- It is the last option for me, since salary package is not good enough.

The salient trends that emerged from the narratives in Table No. 5 are that besides *low salary,* the availability of other options offering lucrative salaries was also important reason for not choosing teaching as a career. Other deterring factors were work load, low status in society, low recognition, static profession, negative perception from society, less respect by students and the monotonous and mechanical nature of the job. Almost half of the students are of the opinion that

one of the most imperative factors accountable for deterioration of status of teaching is 'Salary and Service conditions'.

Discussion

A range of forces work together to facilitate or thwart career choice. It is against the backdrop of this tightly interwoven fabric of various socio-psychological factors that career choices seem to be expressed in the Indian context.

Positive and negative values could be attributed to career within the social-cognitive environment, created by prevailing ideologies and experiences of the community. Further, prestige and respectability are factors which have marked influence on career choice. It has been reported in the literature that beliefs about the prestige attributes of a career significantly influence career choice behaviour (Akhilesh, 1991; Desai & Whiteside, 2000), which has been confirmed by the present study. It seems that careers which are accorded lower prestige are also accorded lower dignity. Hence, in order to win the respect of their parents and peer, students may choose to enter a particular occupation, not because they would enjoy the work, but because they want to be deemed worthy of respect by virtue of their future occupational membership (Arulmani, 2005). The findings of the present study seem to align with prestige perceptions.

An interesting finding is related to the socio-economic background of the students, as the results confirm a trend that has been revealed by past research, which suggests that those opting for teaching tend to come from a low socioeconomic background. The present study replicated the findings of Arulmani, Van and Eastan (2003) which highlighted the influence of career belief and socio-economic status on the career decision. The beliefs held by young people from economically and socially disadvantaged backgrounds seem to predispose them to lower levels of occupational aspirations as compared to their more privileged counterparts. Further, our findings are also consistent with the findings of See (2004) which indicate that those with less educated parents are more likely to choose teaching as a career.

The findings of the present study pertaining to gender disparity with respect to inclination towards teaching appears to be in conflict with the findings of Singh, (2006) indicating that higher proportion of women students preferred academic career as compared to men students, as well as Chan et. al. (2002) who found significant

difference between students gender and interest in teaching. This discrepancy may be explained in the past by the notion that teaching is, by tradition, a feminine profession and over the years the mindsets of people have gone through a sea change, in response to evolving social ideologies.

The Indian child rearing practices family structure, hierarchical social organisation and value systems promote social support and interdependence. But, with the advent of industrialisation and urbanisation there has been an enormous change from the past, in the values, child rearing practices, family structure etc. which is evident from findings of the present and past research. Findings of Arulmani (1995), indicate that 46 per cent career choices were based on parental influence as against 12 per cent influence indicated in our study. And individual's decision making with the help of parental inputs had occurred amongst 24 per cent of the individuals, whereas it is about 33 per cent in our study. There is striking divergence in respect of independent decision making, which is fifteen times more now, than what it was in 1995. So, we may infer that in a time gap of about thirteen years, young persons have become more independent in taking career decisions and the spectrum of a combined decision of parents and children has increased. This seems to illustrate a blending of the influence of significant others with the young person's emerging individuality.

As reported by Bereiter and Freedman, (1962) that ability is the major determinant of occupation choice is confirmed by our study indicating beliefs of high self efficacy having more probability of inclination towards teaching. The study concurs with the findings of Chan, et. al. (2002) with respect to relative ranking of teaching to other professions occupying one of the first three positions among top three careers, most wanted by students and a significant difference between academic streams and interest in teaching. In a similar study, students' decision to teach or not was found to be related to their subject of study at the university. Social sciences students were two and a half times more likely than those doing science and maths to choose teaching as a career (See, 2004).

Deterioration of status in teaching profession has been indicated in the present study which is also acknowledged by a recent government report indicating a perceptible decline in the popularity and status of the teaching profession (GOI 2006). It also indicates that salary, service conditions and allowances are responsible for the decline of teachers' status similar to our study.

Conclusion

Compared to other industries, teaching does not offer lucrative career in terms of monetary benefits, as a result only few talented people get attracted towards teaching. Further, there is a general feeling among members of the society that a teacher is not receiving due recognition. The very fact that, compared to many other professions, teaching is not getting equivalent material benefits is an index of comparative neglect of the teacher. There is a need to identify the factors these students believe are the most important and then demonstrate that teaching meets these factors. This sets the stage to focus on recruitment and induction process, assessment of training needs and supportive working conditions to substantially enhance the status of the teaching profession. The task of the policy formulators in any country will be ensuring that the country rises to this challenge to compete in the global knowledge economy.

In this present study, an attempt is made to provide an insight into the perceptions of post graduate students of central universities regarding teaching as a career choice in higher education, to assist policy makers and planners in making informed decisions regarding improvement in the status of teaching profession. Thus, clear directions emerge from this research that policy makers must address effective ways to provide an attractive salary package and lift the status of teaching profession at par with other professions, in order to attract talented persons to this profession. It is found that broader professional concerns about pay, prestige and career opportunities continue to figure into individual teachers' choices. Therefore, policymakers must take seriously the long-range challenges of increasing teachers' salary and developing differentiated careers that reward expertise and encourage advancement. Without some changes, talented students and committed teachers will continue to turn away from teaching. Academics must receive sufficient remuneration according to the global standards. In many, perhaps most, countries salary levels have not kept up with inflation and the academic profession has lost ground to other professional occupations. Today, prospective teachers have access to occupations offering high pay and status; comfortable and well-equipped work setting; continuous training; and opportunities for rapid career advancement. Thus there is no guarantee that they will choose teaching over other options. Nor do they necessarily expect to teach for the long term; serial careers are the norm, and short-term employment is common.

Therefore, the challenge of recruiting teachers to meet the shortage is unprecedented, in both nature and scope.

In the current scenario of globalised world Teaching profession needs a revamping of the policies of personnel management in terms of recruitment, salary and service conditions, promotional avenues, grades and cumulative economic benefits in the career span and performance appraisal.

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ERIC Projects Completed

Effect of Self Regulatory Strategies on Enhancing Teaching Competence among B.Ed Students

Project Investigator
BEGUM, A. J. (2009)

Objectives: (i) To identify the important components and principles of Self Regulation (SR). (ii) To identify the important Self Regulatory Strategies (SRS) which can enhance the teaching competencies (TC). (iii) To identify the specific teaching competencies which are very essential for successful effective teaching. (iv) To find out the relationship between SRS and specific teaching competencies. (v) To evolve a model to enhance to the TC of B.Ed trainees. (vi) To assess the level of SR and application SRS of B.Ed teacher trainees. (vii) To implement the model evolve in order to enhance the TC of B.Ed teacher trainees through the application of SRS. (viii) To assess the application of SRS among the B.Ed teacher trainees after intervention. (ix) To assess TC after intervention. (x) To find out the relationship between application of SRS and TC. (xi) To identify the specific SRS, which enhance specific TC.

Methodology: A sample of 40 teacher trainees of eight subjects (English, Tamil, Science, Biological science, History, Economics, Mathematics and Commerce) from KEVI college of teacher education, Salem Tamil Nadu were selected under quota sampling method (Kothatri, 2005). The independent variables, selected for the present study were teachers' age, gender, education qualification, major subject, years of teaching experience, type of school and locality of school while dependent variable was teaching competence of teacher trainees.

Tools used: A Questionnaire and Attitude Scale for B.Ed teacher trainees and Teaching Competency Assessing Tool developed and standardised by the investigator. Tools used in the study had content validity.

Findings: (i) The B.Ed teacher trainees improved in all the dimensions namely planning, monitoring and evaluation of self regulatory strategies in the post assessment then the pre assessment. (ii) The teaching competency of the teacher trainees improved significantly in post assessment of teaching competency than the Pre assessment. All the components of teaching competency shown significant improvement. (iii) Teacher trainees of Physical Science subject scored highest in the evaluation aspect of self regulation. Teacher trainees of History subject scored highest in the monitoring aspect of self regulation. Teacher trainees of Mathematics subject scored highest in the planning aspect of self regulation. (iv) Teacher trainees of Tamil subject scored highest in the four dimensions of teaching competency, such as mobilisations of resources, planning curriculum, developing leardership quality and motivating pupils. (v) Teacher trainees of English subject significantly improved in the four dimensions of teaching competence such as motivating colleagues, evaluation and remedial skills and planning curriculum. (vi) Teacher trainees of Mathematics subject has shown considerable improvement in four dimensions of teaching competence such as mobilisation of resources, planning curriculum, identification of pupils' talents and needs and classroom management. (vii) Teacher trainees of Physical Science subject have improved in the four dimensions of teaching competence such as mobilisation of resources, planning curriculum, motivating pupil and initialisation of curriculum. (viii) Teacher trainees of Biological Science subject have significantly improved in the four dimensions of teaching competence such as developing leadership quality, planning curriculum, motivating colleagues and initialisation curriculum. (ix) Teacher trainees of History subject has shown considerable improvement in the three dimensions of teaching competence such as identification of pupils' talents, classroom management and motivating pupils. (x) Teacher trainees of Commerce subject has shown considerable enhancement in the three dimensions of teaching competence such as developing leadership quality, motivating colleagues and interschool relations. (xi) Teacher trainees of Economics subject have shown considerable enhancement in the three dimensions of teaching competence such as, mobilisation of resources, identification of pupils' talents and evaluation and remedial skills. (xii) In the overall performance of teacher trainees of Mathematics subject has shown highest performance in the teaching competence from all the other teacher trainees of different subjects and age groups.

Availability and Use of ICT in Schools in Delhi

Project Investigators

SIDDIQUE, M. A. AND ABRAHAM, J. (2010)

Objectives: (i) To study the availability of hardware and software facility in schools in Delhi. (ii) To study the extent of use of technologies in different type of schools as evident from competencies in students. (iii) To study the impact of ICT on students. (iv) To study the extent of training in computers received by the teachers of Delhi.

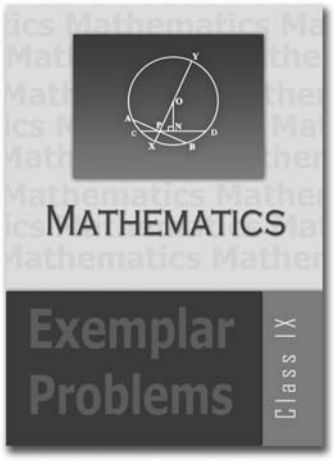
Methodology: The study was conducted on a sample of 309 schools- 157 Government, 52 Government aided, 93 Public, 5 KVS and 2 Zamia schools. The sample were selected by using random sampling method taking 822 primary school students, 970 students of class VII/VIII and 196 teachers of above five different types of schools. Tools used in the study were: (a) Questionnaire for Heads of the schools (b) Questionnaire for the class IV/V students, (c) Questionnaire for class VII/VIII students, and (d) Questionnaire for teachers. Data were interpreted by using statistical techniques like; Mean, Standard Deviation, percentage, etc. The reliability of the studetns' competencies tests were established through test-retest method.

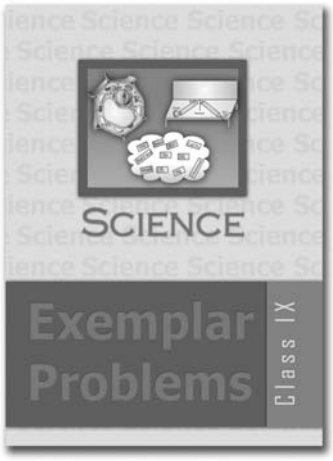
Findings: (i) 94 per cent of the total schools in Delhi had computers, whereas 100 per cent of KVS and Zamia schools had computers, 97 per cent of Public schools and 87 per cent of Government aided schools had computers. (ii) There was computer lab in 84 per cent of the total schools, 79.62 per cent Government schools, 80.77 per cent Govt. aided schools, 93.55 per cent Private schools, 80 per cent KVS and 100 per cent Zamia schools. (iii) Scanner was present in 29 per cent of the schools. (iv) The availability of laptop in percentage was nil in Government schools, 5.77 per cent in Govt. aided schools, 19.35 per cent in Private schools and 20 per cent in KVS. (v) The availability of data lodger was poor as in only 1.94 per cent of total schools studied 13 per cent of total schools had an LCD projector. (vi) The availability of internet facility in the schools were excellent as 74.52 per cent of Government schools, 75 per cent of Government aided, 63 per cent of Public, 80 per cent of KVS and 100 per cent of Zamia schools had

internet facility. (vi) Internet, LAN A and Interactive white board were the technologies that the teacher equipped to handle classes of the 21st century providing learning environments which could make the learner construct knowledge and be active learners rather than passive listeners in the class. (vii) Findings suggested that the schools were ready to take up e-learning environments as 71.5 per cent of the schools studied had internet connection. (vii) Availability of software was 20.38 per cent of govt. schools, 3.08 per cent of Government aided schools, 23.66 per cent private schools, 60 per cent KVS, 0 per cent zamia schools and 22.33 per cent of total schools had publishing software, 3.18 per cent of govt. schools, 7.69 per cent of govt. aided schools, 21.51 per cent private schools, 20 per cent KVS, per cent 0 Zamia schools and 9.71 per cent of total schools had software for web design. (viii) General knowledge CDs were available only in 1.91 per cent govt., 9.62 per cent govt. aided, 44 per cent KVS and per cent0 Zamia and 60 per cent of the total schools. (viii) Online library facility was available in 1.91 per cent govt. school, 7.69 per cent govt. aided schools, 9.68 per cent private schools, 20 per cent KVS and 0 per cent Zamia schools and 5.5 per cent total schools covered in this study. (ix) Only 12 per cent of total schools covered in this study used computers for examination purpose. (x) 81 per cent of the schools covered under this study had computer as a teaching subject. (xi) The effect on ICT on students made a difference in dropout rate in the schools. 7.5 per cent decreased in dropout rate in the schools under ICT compared with schools without ICT (5.7%). (xii) The enrolment of students in schools with ICT facility increased at 13.97 per cent when compared with 11.93 per cent in Non-ICT schools. (xiii) ICT has helped in improving the results of the students in the terminal examination. (xiv) The effect of ICT on the students was found in the field of achievement, time spent on study and interest shown in the classrooms, (xv) The study found that 35.25 per cent of the total teachers had no training in computer, while only 32 per cent teachers had received departmental training in computer education. (xvi) Teachers without training computers were willing to undergo training and use computers in classroom teaching. The study has cited 121 references in the end.

Other Exemplar Problems by NCERT

- Exemplar Problems in Mathematics for Class X
- Exemplar Problems in Physics for Class XI
- Exemplar Problems in Biology for Class XI
- Exemplar Problems in Mathematics for Class XI
- Exemplar Problems in Mathematics for Class XII
- Exemplar Problems in Chemistry for Class XI





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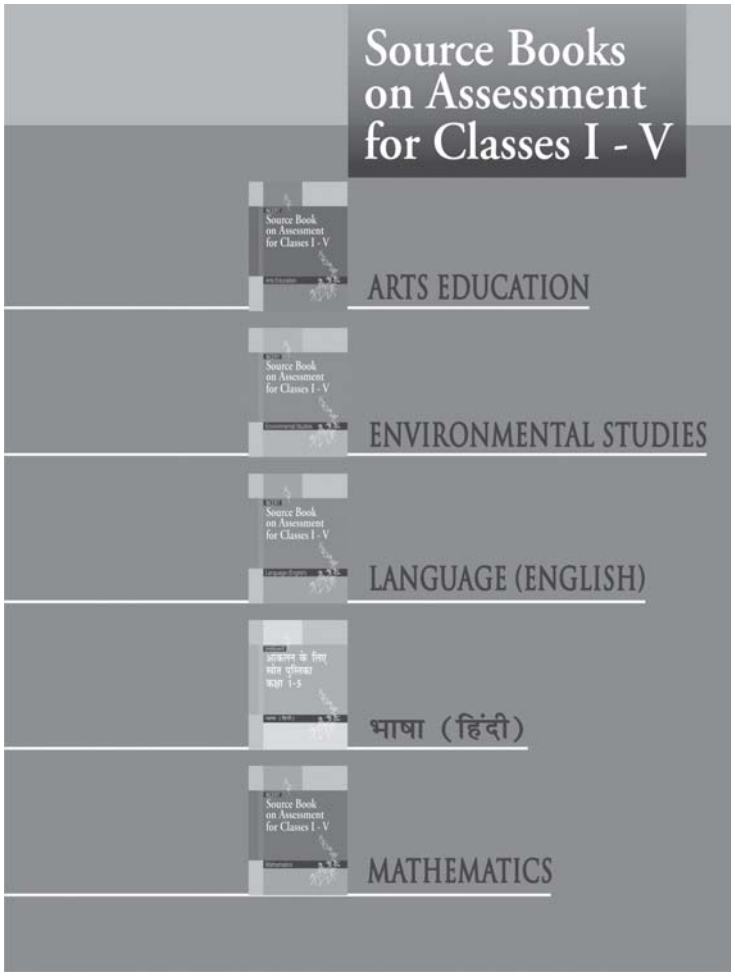

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Form IV *(See Rule 8)*

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I, Neerja Shukla, hereby declare that the particulars given above are true to the best of my knowledge and belief.

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