Journal of
Indian
Education

Volume XLV Number 4 February 2020

विद्यया ऽ मृतमश्नुते

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NCERT

राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

About the Journal

The *Journal of Indian Education* is a reviewed periodical published in May, August, November and February by the National Council of Educational Research and Training, New Delhi.

NCERT encourages original and critical thinking in education. JIE provides a forum for teachers, teacher educators, educational administrators and researchers through presentation of novel ideas, critical appraisals of contemporary educational problems and views and experiences on improved educational practices. Its aim include thought-provoking articles, challenging discussions, analysis challenges of educational issues, book reviews and other related features.

The Journal reviews educational publications other than textbooks. Publishers are invited to send two copies of their latest publications for review.

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JOURNAL OF
INDIAN
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CONTENTS

Editor's Note

The increased role of Information and Communication Technology (ICT) in the realm of education, especially school education has been a matter of discussion and deliberations worldwide. The Government of India, through various initiatives such as *Diksha*, *Shagun*, National Repository on Open Educational Resources (NROER), E-pathshala, etc., uses ICT platform and made an effort to ensure quality of school education to all. It is an agreeable fact, that ICT has developed very rapidly and has influenced every aspect of life, positively as well as negatively. First three articles or research papers in the present issue discuss the influence of ICT in academic and other related areas of one's life. Apart from this, the present issue includes broad spectrum of papers covering different themes such as Learning Outcome, Yoga Education, Vocational Education, Empirical Research findings related with pedagogical activities, etc. Some of the papers provide solutions to the challenges faced by the system based on empirical evidences collected from different stakeholders.

Educationists and researchers have been regularly studying the effects of media and technologies such as the internet, on the psycho-social behaviour of adolescents. The paper titled 'Internet Usage by Adolescents: Implication on their Studies and Academic Performance', by Arati Mukhia, Saileela K and Donatus Kujur, tries to look at the effects of internet usage on higher secondary school students' academic performance. Results revealed that the time exhausted online was found to be linked with academic performance, while internet usage did not associate very well to academic scores. The broad use of social sites or social media networking has been on the rise among the new generation youths. The paper titled 'A Study of Social Media Addiction among Students from Higher Education Institutions' by Shahida Parveen, Kundan Singh and Pratibha Sagar is an endeavour to scrutinise the pattern of social networking handling and unconstructive impact of social media on youths. Now-a-days, development of quality e-content and its effect on the learning level of students has become one of the most ideal subject matters for researchers. Shipra Rana and Nain Singh, in their paper, 'A Study of e-content through e-learning: Viewpoints of Researchers' aims to find out it's basis by underlining the studied steps to glance into the origin of e-learning in India, and evaluated different researchers' works on e-contents through e-learning to envision the span for more research to be conducted in this field of inquiry.

The paper by Shilpi Banerjee and Aanchal Chomal titled, 'Towards Actionable Learning Outcomes' endeavours to develop a profound understanding about how Learning Outcomes are consequent from means

of school education and their distinctiveness. The paper ends with a set of proposals to institutionalise Learning Outcomes at the general level for stakeholders together with teachers, schools, government and the private sector to facilitate them to work towards building integrated and holistic solutions.

The initiation of yoga education in school curriculum has been emphasised as a follow-up of the International Yoga Day, announced by the UN General Assembly in 2015. Saroj Yadav, Sweta Singh, Shruti Sharma presents the report of the study on the implementation of yoga in schools by analysing the status of diverse yogic activities conducted in schools of KVS, NVS, CBSE and other schools of Delhi. The findings of the research reveals that, a bulk of Indian schools have accredited and included yoga and yogic practices as a component of their core curriculum, and devoted a separate period where student can practice yoga and its similar practices.

Rajni Thakur and Kalpana Thakur carried out a study to evaluate the result of the cooperative learning techniques (JIGSAW IV and STAD) on science self-efficacy of 240 VIII graders with different cognitive styles. Their paper titled, 'Boosting Science Self-efficacy of Eight Graders through Cooperative Learning' reveals among the two cooperative learning strategies students belonging to JIGSAW IV yielded better science self-efficacy scores than students belonging to STAD and control group.

The paper by Mudita Sharma and Nikhat Yasmin Shafeeq titled, 'Assessment of the Implementation of RTE Act, 2009 in Context of Curriculum in Government and Private Elementary Schools of Western Uttar Pradesh' seeks to find out the status of the implementation of RTE Act-2009 in the elementary schools of western Uttar Pradesh, in the light of the rules given in the RTE Act in context of curriculum. It was found that some of the provisions of the RTE Act in context of curriculum are pursued in the elementary schools of western U.P.

It's been more than 100 years now since the term 'Nature of Science (NoS)' is being accentuated in the field of science education. The paper titled, 'Research Trends in Nature of Science: Analysis and Implications' by Mamta Singhal presents an outline of numerous promising research developments on Nature of Science.

Dropping out of school halfway is a severe educational and social problem. The study by Jeebanlata Salam titled, 'Vocational Skill Interventions: Dropout Reduction and Employability' is mainly based on analysis of literature on vocational education, dropout reduction or prevention and its consequence on employability. Based on the study, the author finds that, when dropout programmes are planned, vocational education strategy in

school appears as a useful means in developing dropout prevention, training of trained workforce — geared towards sustainable livelihood and productivity in society.

After the inauguration of Right of Children to Free and Compulsory Education Act (RTE) 2009, the value of School Management Committee (SMC) was sincerely taken into consideration, though the community participation had previously existed with different categorisation. The paper by Prakash Bhue and Tattwamasi Paltasingh titled, 'Decentralised School System through Community Participation: From Expectation to Implementation' crafts an attempt to observe the nature of challenges faced by the SMC members from the viewpoints of external and internal issues.

Higher education institutions are the hubs that present prospects to the youth to empower themselves through advanced knowledge, approach and expertise. In the paper titled 'Growth and Development of Higher Education in Uttarakhand', Pavan Kumar and P.K. Joshi evaluate the condition of higher education system in Uttarakhand.

We hope that our readers would be able to relate their personal experiences with the issues and concerns discussed by the authors of these articles or research papers presented in the current issue. We look forward to your suggestions and comments on the different issues of JIE. We are looking forward to you contributing in the journal by sharing your knowledge in the form of articles, action research reports, theoretical papers, book reviews, etc.

Academic Editor

Internet Usage by Adolescents
Implication on their Studies and Academic Performance

Arati Mukhia* Saileela K.** Donatus Kujur***

| Abstract |

Educationists and researchers have been constantly investigating the effects of media and technologies such as the Internet, on the psycho-social behaviour of adolescents. Moreover, recent studies conducted suggest that the use of the Internet impact the academic performance of students. This paper aims to explore the effects of Internet usage on higher secondary school students' academic performance. To collect data, a personal information form, and an Internet Usage Scale developed by the authors were applied to 511 students from 11 different schools of Darjeeling district. Results revealed that the time spent online was found to be associated with academic performance while Internet usage did not correlate very well to academic scores. Family demographics did not play any role on Internet Usage.

INTRODUCTION

It is interesting to note that before the Internet and communications technology was made accessible to the general public globally, their use had been limited to only educational institutes and defense establishments. Apparently, the policy makers knew that it would revolutionise research activities and

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later teaching-learning experiences. Historically, it was during the 1980s that computer-based communication was introduced. However, the Internet and various other types of computing technology were accessible to the general public only in 1993 (McMillan and Morrison, 2006). While Internet, on one hand can deliver enriching learning experiences to a student, it also brings forth the possibilities of other potential costs which may result in the degradation of high school students' scholastic performance. Its use for educational purposes include students utilising their online time to improve their knowledge relevant to their academic interests. For example, downloading study materials, watching Powerpoint presentations relevant to the student's academic courses, watching online lectures, etc. Its use for non-educational purposes are usually related to entertainment, viz., watching movies online, listening to music online, online gaming, watching television channels, getting online on social media and instant messaging, etc.

As of today, the Internet has surpassed all other media in terms of deliverance of knowledge with academic content. With the commercial applications like Byjus, online educational organisation like the Kahn Academy and the Government of India's free online portal like the 'Swayam' which imparts educational courses for students, to name a few, the Internet has been tapped in every conceivable

way to better the means of providing the best to the students. In other words, it has become a student's paradise, if put to good use. However, Internet use has both positive and negative aspects (Guan, 2009), be it for academic or non-academic purposes. The positive aspects include increased self-confidence, increased frequency of communication with friends and family, and feelings of empowerment (Clark, 2004). But if used excessively, to the point of addiction, it can also have adverse consequences, which may affect one's personal, occupational, mental and physical well-being (Murali, 2007). An individual may initially use the Internet for purely academic purposes but later get indulged more in non-academic activities. Whatsoever the reason, the individual gradually becomes more and more Internet dependent. This existence of Internet dependency among Internet users of different ages was first investigated by Young (Young, 1996). Scherer narrowed the research by Young by focusing on the existence of Internet dependency among college students (Scherer, 1997). Both Scherer and Young were of the opinion that excessive Internet usage has an impact on scholastic performance among students. Research surveys show that the Internet usage by students are not primarily for gaining learning experiences, but more so on indulgences on entertainment and other activities. There is ample literature to prove that the Internet

can distract students from their study (Young and Rogers, 1998), which could also be explained by the fact that students tend to get indulged so much on online activities that it leaves them with little or no time for studies (Griffith, 2000).

The problem of indiscriminate use of the Internet by the school-going adolescents is a universal one. Over the past decade, India has seen a boom in the Internet and communication technology related Industry. Internet service providers and mobile phone companies have made data and smart phones available at much cheaper rates which has led to the Internet becoming easily available and the devices to access them, affordable to almost everyone. People of all age groups, and more specifically the school-going adolescents are more prone to get addicted to their use as we have started to spend more time in online activities. High school students are at the middle of the adolescence period and hence more vulnerable to addiction since, of late, students have to compulsorily and regularly go online for many educational purposes. Once they start surfing the Internet, they get drawn on to social media platforms and other online activities like, online gaming, chatting, online shopping, etc. This leads, in the long run, to a decline in the academic performance of the students. This has necessitated their parents, teachers and guardians to keep a tab on the extent of Internet usage and the online activities. It is

therefore very imperative to know what the students are using the Internet for, and find answers to some very pertinent questions. Is the use of the Internet amongst students limited to educational purposes? If the Internet is also used for purposes other than academic activities, then does this lead to a decline in the academic performances of the students?

In this study, the researchers have investigated the Internet usage activities of Higher Secondary students belonging to the hill region of Darjeeling District in West Bengal, India. The Internet usage data was then correlated with academic performance data of the students to see whether Internet usage really affected their studies.

OBJECTIVES OF THE STUDY

Since the Internet is available to most of the students, it has become imperative to analyse the relationship between their Internet usage and academic success. Though, numerous studies have been carried out all over the world looking into these aspects, the researcher did not find any literature pertaining to any kind of such research study being carried out in her study area, which comprises the hilly areas of Darjeeling district, in the state of West Bengal. As with all adolescents, the teenagers of the study area are no different when it comes to being tech-savy or Internet-savy. Therefore, it is extremely relevant to expect high Internet usage levels of secondary

school students, and even more pertinent to examine the relationship between students' Internet usage and their academic performances taking into account their gender, school type, kind of families they belong to, and more importantly the time they spend on the Internet. Therefore, the more specific objectives of the study were put forth as follows:

1. To find out the level of Internet usage of adolescents studying in higher secondary school students.
2. To find out the percentage of Internet usage by students for academic purposes.
3. To find out whether there was any significant difference among boys and girls studying in higher secondary schools in terms of the level of Internet usage.
4. To find out if there is any significant difference in the level of Internet usage of the adolescents studying in the higher secondary schools with respect to certain demographic variables.
5. To find out if there is any significant relationship between Internet usage and the academic achievement of the adolescents studying in higher secondary school.

RESEARCH METHODOLOGY

A survey method using a structured questionnaire, and an Internet Usage Scale was used to gather the information required for the study using a random sampling approach. Sample of the study consists of 511 higher secondary students from 11 different Schools of Darjeeling district.

The questionnaire was divided into two sections: (i) Demographics and (ii) the Internet Usage Pattern. The first section of the questionnaire consisted of questions related to the demographic details like gender, type of school, parent's education, their occupation, type of family, etc. The second section included questions pertaining to their generic internet usage activities and internet usage pattern. Questions like preferred activity online, time spent online daily, purposes, etc., were included in this section. The Class X results of West Bengal Board of Secondary Examinations were taken from the school records to calculate academic scores and taken as academic performance of the students.

Internet Usage Scale (IUS)

The IUS was developed by the researchers. It was constructed to understand the effect of Internet usage among the adolescents. The scale measures the easeness of use, the purpose and overall feelings of detachment in individuals through a self-report Likert-type scale comprised of 19 items rated on a five point scale with options ranging from 1 "Strongly disagree" to 5 "Strongly agree". 17 of these items are positive statements and the rest are negative statements. The maximum score was 95 and minimum score was 19. The high scores on the scale indicate an individual's high Internet activity as well as the level of detachment, which may increase the tendency to addiction.

Reliability and Validity of the Scale

The IUS was initially constructed with 23 items. To test the reliability of the scale, a pilot study was carried out, wherein, the scale was administered on a randomly selected sample from four higher secondary school students and their responses were scored on a 5 point scale. A Cronbach Alpha for the total instrument was conducted in order to test for reliability of the 23 items in the questionnaire taken as a whole. The Cronbach coefficient alpha for raw score variables for the total instrument was found to be 0.59. To choose internally consistent items, four items were deleted from the Internet Usage Scale to achieve the reliability close to 0.630 (Mukhia and Saileela, 2019). Therefore, the IUS which was finally presented to the students for this study had 19 items. The initial draft of the scale was also presented to the experts, among who were psychologists, sociologists and educationalists, for their opinions. The scale has high face validity since all the items have been included in the scale only after seeking the opinions and approval of the experts. The scale also possesses content validity because only those items which significantly discriminated between high scores and low scores were retained in the scale. According to the validity and reliability studies, the IUS is a valid and reliable instrument.

Data Analysis

The datas obtained from the questionnaires were analysed with the help of IBM's statistical package for social sciences, the SPSS 16.0 program. Frequency, percentage, mean and standard deviation were used in a descriptive analysis of the data. For correlational analysis, two groups were compared by independent samples t-tests and for determining Pearson's correlation coefficient, a Bivariate Correlation was carried out. The significance level was taken as .05 from the analysis of data.

RESULTS

Internet Usage Pattern: Time spent, preferred online activity and the medium of use

In general, 26.8 per cent of the students were found to spend less than 1 hour for Internet daily, about 48.6 per cent spend 1–3 hours, 15.4 per cent spend an average of 3–6 hours daily and almost 9.1 per cent of the students were found to spend more than 6 hours for Internet daily. But the majority of students were found to spend a moderate 1–3 hours on online activities. The percentage of Internet usage among the students in terms of gender and the locality of school were also estimated. It is apparent from Table 1, that, girls preferred to use the Internet for a limited period of time while the boys seem to be uncontrollable and tend to use it for a prolonged period of time. While students from rural schools spent less time online (82 per cent spent 1–3 hours against only 18 per cent spending more than

3 hours) their counterparts from urban schools were found to spend more time on online activities (68.9 per cent spent 1–3 hours against 31.1 per cent spending more than 3 hours).

In general, it is interesting to note that girl students accessing the Internet purely for academic purposes was about 24.6 per cent while the percentage of the boys was only about 9.8 per cent. It was also found that an almost equal percentage (25.2 per cent) of girl students went online only for social media while boys (11.1 per cent) were found to be less interested in social media. This study reveals that the boys usually prefer to go online looking for entertainment (20.0 per cent) rather than spend time on the Internet for educational purposes or on social media. It is also

evident that girl students prefer to keep a balanced approach on their online activities (Entertainment 15.3 per cent, Social media 25.2 per cent, Educational 24.6 per cent).

With the advent of 4G, smart phones and data made available at cheaper rates, access to the Internet nowadays has become very easy, even in rural areas. Mobile phones have become cheaper and almost everybody is able to afford one. The students are no exception. It was evident from the data collected; 90.1 per cent of students use the mobile phone preferentially to surf the Internet, the rest 9.9 per cent use all three media for surfing the Internet, viz., mobile phones, laptops or tablets and cybercafes. None of the adolescents prefer to go online through a desktop nowadays.

Table 1
Time spent per day in Internet Usage Activities (in percentage)
Frequency of Internet Usage

Time spent on the Internet	Rural		Urban	
	Male (%)	Female (%)	Male (%)	Female (%)
Less than 1 hour	29	44	13	21
1–3 hours	47	44	45	59
3–6 hours	17	8	21	16
More than 6 hours	7	4	21	4

Internet for Education Purpose

On an average only 17.2 per cent of the adolescents were found to use the Internet purely for educational purposes. The bulk of the students (47.4 per cent) used it solely for getting project ideas and materials, 14.6 per

cent used it for getting online study materials, 3.6 per cent went online to download maps and pictures and only 2 per cent used it for references. The rest 32.4 per cent of the students used it for any of the two, three or all four purposes. Here too, it was found

that the girl students (58.3 per cent) were eager to avail internet facilities to help them in getting ideas and materials for their project work than the boys (36.5 per cent). Girls were also found to spend more time than the boys for online tutorials (Girls 3.4 per cent, Boys 1.7 per cent).

Internet for Non-educational Purposes

It was found from the study that 17.7 per cent and 18.2 per cent of the students use the Internet purely for entertainment and for social contacts. Amongst the non-academic use, social networking media was the most preferred activity online for most of the students. On an average 68.6 per cent of high school students spend their data purely on social media, four times the amount spent for educational purposes. Here too, girl students (79.6 per cent) tend to spend more time and data on social media than the boys (57.7 per cent). Moreover, girls are found to spend more time and use more data than the boys for online shopping (Girls 12 per cent, Boys 5.1 per cent), watching music videos or movies (Girls 58.9 per cent, Boys 36.5 per cent) and online storage (Girls 8.4 per cent, Boys 6.1 per cent). Boys on the other hand spend more time and data on the Internet for e-mails (Boys 6.8 per cent, Girls 3.8 per cent), Wikipedia (Boys 6.7 per cent, Girls 5.6 per cent) and online games (Boys 17.0 per cent, Girls 7.9 per cent).

Internet Usage Levels

The mean and S.D. of the entire sample for the Internet Usage Scale were calculated and presented in Table 2. The mean and standard deviation of the total group are 63.05 and 6.871 respectively. A student's maximum score is 95. The mean value is greater than the mid score of 47.5. The mean value of girls 63.91 for Internet usage is slightly greater than the mean value of boys 62.05. Therefore, it is apparent that Internet usage of adolescents studying in higher secondary students is high.

Table 2
Mean and Standard Deviation of Internet Usage of Higher Secondary students

Internet Usage	N	Mean	Standard Deviation	M+1D	M-1D	Level
Entire Sample	511	63.05	6.871	69.92	56.18	High
Boys	236	62.05	6.564	68.61	55.49	High
Girls	275	63.91	7.023	70.93	56.89	High

An independent samples t-test performed on the above variables (Internet usage and Gender) show that there is significant difference (p<.01) between boys and girls studying in higher secondary schools with respect to Internet usage as is evident from Table 3.

Table 3
Mean Difference between Boys and Girls in Internet Usage

Gender	N	Mean	SD	't' value	dF	Sig (2-tailed) 'p' value
Boys	236	62.05	6.564	-3.067	509	0.002
Girls	275	63.91	7.023			

Several other demographic variables were tested against the dependent Internet usage variable using the independent samples t-test. Since some of the sample sizes under test were unequal, the assumptions for homogeneity was needed to be maintained so that the standard deviations of our dependent variable were equal in both populations. In all cases, the significance level for Levene's test for equality of variances was found to be > 0.05. A cursory glance at Table 4 indicates that there is no significant difference (p>0.05) between any of the demographic variables and Internet usage of higher secondary school students.

Table 4
Mean Scores of students from Internet Usage Scale
by demographic characteristics

Demographic Characteristics		N (%)	Mean	SD	'p' value
Father's Education	Below High School	215 (42)	62.97	7.136	0.750
	High School and Above	296 (58)	63.16	6.683	
Mother's Education	Below High School	388 (76)	62.81	7.017	0.162
	Above High School	123 (24)	63.80	6.815	
Father's Occupation	Government Job	49 (10)	63.43	7.024	0.685
	Private Job/Unemployed	462 (90)	63.01	6.861	
Mother's Occupation	Government Job	8 (2)	60.38	9.303	0.268
	Private Job/Unemployed	503 (98)	63.09	6.829	
School Type	Urban	277 (54)	63.42	7.018	0.186
	Rural	234 (46)	62.61	6.681	
Family Type	Nuclear	317 (62)	63.42	6.888	0.122
	Joint	194 (38)	62.45	6.818	
No. of Family members	>= 5	304 (59)	62.80	6.843	0.327
	< 5	207 (41)	63.41	6.912	

Relationship of average duration of daily Internet Use, Internet Usage Levels and Academic Performance

The descriptive statistics show that the adolescents' average duration of daily Internet usage was found to be 2.07 hours with a standard deviation as *SD* = 0.876. The relationship of the average duration of daily Internet use with the Internet usage levels computed from the Internet Usage Scale was also determined. Pearson correlation analysis results reveal a positive significant relationship at a medium (r = .179, *p* < .01), between these variables (Table 5). The result is significant since it implies that with the increase in the duration of the Internet the Internet usage level also increases. The study also aimed at investigating the relationship between the average duration of daily Internet use, the Internet usage levels and their effect on academic performance of the students. A low-level, significant and positive relationship was found between students' duration of daily Internet use and academic performance (r = .103; *p* < .05). However, no significant relationship was found between the students' Internet usage level derived from IU Scale and academic performance as is evident from the results shown in Table 5, which presents the descriptive and correlation between internet usage and academic performance.

Table 5
Mean, Standard Deviation, and Correlation coefficient among the three variables Daily Internet use, Internet Usage and Academic performance

Usage	Mean	Standard Deviation	Daily Internet Use	Internet Usage
Daily Internet Use	2.07	0.876		–
Internet Usage	63.04	6.876	0.179*	–
Academic Score	45.85	11.665	0.103**	-.026

*p < .01, **p < .05.

DISCUSSION AND CONCLUSION

The results of our study are very similar to the findings of Young (1996), Scherer (1997), Morahan-Martin and Schumacher (2000), Anderson (2001), Kubey et al. (2001), Metzger et al. (2003), and Fortson et al. (2007) that there is an existence of Internet dependency also among higher secondary students, the mean scores on Internet usage being much higher than the mid score. This study also confirms findings by Young (1996), Rumbough (2001), and Metzger et al. (2003) that the most predominant reasons for which students use the Internet is for recreational activities. Internet usage for academic work was in the proportion of 17.2 per cent of our population in contrast to the

arguments by Lubans (1999), Scherer (1997), and Jones (2002) who found that the primary reason for students' online activity was purely academic in nature. Our study furthermore reveals that there is a difference in activities of boys and girls when it comes to the preferential online activity. It was found that while boys were more engaged in recreational activities online, girl students use the Internet more for academic work. It was further seen that there is no linear relationship between Internet usage and academic performance. We however, decided to investigate whether this remained true if the time spent online was correlated to academic performance. A low-level, significant and positive relationship was found between students' duration of daily Internet use and academic performance (r = .103; p < .05). The finding, which has an interesting similarity with the results of Jackson et al (2006) suggest that adolescents who spent more time on the Internet had better academic performance. The research was primarily focused on finding out the extent of Internet usage by adolescents, specifically the students studying in high schools, to determine whether the use could be categorically termed as healthy or unhealthy.

From the present study, it may be concluded that although the Internet usage has not had an effect on the student's academic performance, but still, the addictive-like features of the Internet will sooner or later make them potential victims of its negative effects since they are found to use it excessively. As it has already been mentioned, the main reason for providing the Internet for education was to enhance students' academic performance, more focused studies relating to the influence of the Internet on students needs to be carried out.

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A Study of Social Media Addiction among Students from Higher Education Institutions

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Abstract

The broad use of social sites or social media networking has been on the rise among the new generation students. In modern world, life cannot be imagined without Facebook, YouTube, WhatsApp, Instagram, LinkedIn, Twitter and other social media sites. Social media has made a promise to set up connections among people with its existence. Nowadays, many research studies have been investigated that social media is appearing anti-social, because social activities and engagement of students with society is decreasing day by day. To administer the present study, 200 students have been selected by purposive sampling, studied in Mahatama Jyotiba Fule Rohilkhand University, Bareilly in Uttar Pradesh (India). Data was collected through self-made tool named 'Social Media Scale.' Collected data was analysed with percentage method. This paper was an attempt to analyse the pattern of social networking usage and negative impact of social media on students. Results of the study showed that over use of social media is creating many health, social and learning outcome related issues among students of higher educational institutions.

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INTRODUCTION

The word 'Social Media' means collection of applications such as Facebook, Twitter, WhatsApp, LinkedIn, YouTube, Instagram, Telegram, WeChat, etc., and websites that link people to share information and aware people about any event through social networking. From the beginning of the 21st century social media is in progress. People belonging to different age groups use social media. Social media influence adolescent's lives. It has many negative impacts on all age groups of human beings.

Living in 21st century, where technology has become a universal safety blanket, it becomes really important for us to understand some integral part of this technology. One such part is 'Social Media'. The modern society has become more and more obsessed with technology in shape of PCs, Tablets, I Pads, Smart Phones, etc. Social Media has transformed the way we interact and meet each other. However, it is a very threatening situation to most of the people that due to addiction with the social media, websites and apps such as Facebook, Yahoo, WhatsApp, Tinder, Twitter, Instagram, Telegram, WeChat, YouTube, Google+, LinkedIn and many others, we are losing interactions in real lives with other people who are even closer to us.

Have you ever talked to a person selling newspaper on a street or have you ever conversed with a person working in a restaurant? The answer would be a straight 'NO'—just think! In today's world, mobiles have become more than just machine; it has become our lives, a device that we desperately cling to while waiting for someone, standing in a line or even while sitting at our homes with our loved ones.

Most of us would either be using WhatsApp, and a few would also be using Facebook or Instagram and so on. We just hang onto our electronic devices waiting for someone to be online without realising that our loved ones are waiting for us outside this social-networking world. We have hundreds of friends on our friends list, but a few of them are those whom we have never ever seen or met and a few are those whom we have never ever conversed with. At the end, we realise that we are doing a mistake by hanging onto social media sites.

The moment we pause to check a notification in mid-conversation, we're sending an indirect message that the person on the other end of the phone is more important than the one in front of us. As we become more and more accustomed to interruption, our ability to have meaningful, focused conversations weakens.

Our real life relationships may begin to mimic the shallow relationships of social media if we're unable to dedicate uninterrupted time to deeper connections. So 'it fuels our already broken society.'

Social media has created barriers among people, it causes teenagers, adults and children to develop a

habit of checking their phones, Twitter, WhatsApp, Facebook, etc., instead of having a conversation with the people around them. Yes we may have a million of friends on Facebook or thousand followers on twitter and WhatsApp but how will they ever help us, even if they wish to? Virtual friends will never beat real friends. This is something many people can't perceive as true.

The present world has become fully dependent on the technology, most importantly smart phones and the social media. These technological creatures were developed to serve mankind, but their excessive use really creates a serious issue in our lives, especially in younger generation. Social networking is a double-edged sword and really does make us less social if we are not careful.

Literature Review

Many research studies have been done so far, they show the many types of negative effects on the children and students. Some studies are given below:

A recent global study conducted by Kaspersky lab (2017) reveals that social media users are interacting less face-to-face than in the past because of this new found ability to constantly communicate and stay in touch online. In the study, researchers found that about one-third of people communicate less with their parents (31%), partners (23%), children (33%), and friends (35%) because they can simply follow them on social media.

The extensive use of social media and its impacts on today's society has been widely debated amongst researchers for numerous years. A study conducted by Drago (2015), found that people aged between 8 to 18 years spend more time using social media than any activity, spending an average 7.5 hours on these platforms per day and we have sacrificed conversation for mere connection. Melissa G. Hunt (2018) made a study in the department of psychology in the university of Pennsylvania. It found that Facebook, Snap chat, WhatsApp, Telegram and Instagram may not be great for personal well-being. Kaveri Subhramanyam and Patricia Greenfield (2008) states that using online communication has both negative and positive effects, because they are harmful ways in which the internet could be used. They also stated that now-a-days, schools are trying their best to control how students use digital media on school grounds. In some schools, leaders have banned the access of social networking sites. Avina Vidyadharan wrote an article on June 19, 2018 in the magazine 'The WEEK' with the title 'Social media mirrors modern India's hypocrisy.' She wrote that bigotry in modern India is endangering the 'fictional' equality in the country. Social media outbursts, fake news and controversies are spread in the blink of an eye nowadays. Study conducted by Sunitha Kuppuswamy and P.B. Shankar Narayan in 2010, clarified that using social media takes

most of the time of students and redirects it towards non-constructive, often non-ethical, deceptive and improper activities, for example, texting and chatting with friends for most of the time of the day, time killing by searching peoples' private life and avoiding their real jobs and studies.

SIGNIFICANCE OF THE STUDY

Social media is interactive computer-mediated technologies that facilitate the creation and sharing of information, ideas, career interests and other forms of expression via virtual communities and networks. The social media was initiated with the promise of socialisation among the socially disconnected individuals and groups. But with the passing of time, it is appearing anti-social view of social media. Now-a-days there appears many negative effects of social media usage among the students from higher educational institutions. Many research studies have been administered, are resulting negative effects as slow down in the academic performance, increasing loneliness, cut down from the real social relations, wasting of time, involvement in anti-social activities, etc. The aim of present study is also to investigate the anti-social and negative effects of social media on students. The results of this study will provide awareness to parents, students, teachers, social reformers and educational institutions.

OBJECTIVES OF THE STUDY

Following are the objectives of the present study:

*   To find out the negative effects of social media on students from higher educational institutions.
*   To find out how the social media is affecting the daily routine of students.
*   To observe the effect of social media on the academic performance of students.
*   To find out the role of social media for boosting up social fanaticism.
*   To find how the social media is increasing loneliness and depression among the students.

METHODOLOGY OF THE RESEARCH

Sampling and sampling procedure

To administer the present study, 200 students were selected by researchers through purposive sampling. The samples included both male and female students. All the students were studying in higher classes. The present study was limited to students studying in Mahatama Jyotiba Fule Rohilkhand University, Bareilly in Uttar Pradesh (India).

Statistical method

To analyse the data percentage, statistics were used. The data was analysed item wise to show the actual status related to social media use and its effects on students.

Tools

The researcher used a self-made tool with the title *"Social Media Scale".*

It includes 25 statements related to social media used by students. Every statements has two options as 'Yes' and 'No'. The validity and reliability was satisfactory of the tool.

ANALYSIS OF DATA

The researcher analysed the data with percentage of every statement. The result of analysis of data are given in Table 1.

Table 1
Percentage Analysis of Data

S. No.	Statements were studied	Percentage of responses	
		Yes %	No %
1.	Even after being connected with my relatives through social media, I feel lonely when I am out of the house.	65%	35%
2.	I don't have a need to meet my relatives because I connect with them through social media.	71%	29%
3.	Since I started using social media, I started talking less with my relatives.	75%	25%
4.	I feel lonely without using social media.	62%	38%
5.	I use the social media on average 5 hours a day.	50%	50%
6.	Business of the social media, hindess the practical knowledge of destiny with society among students.	60%	40%
7.	I believe that due to the busyness on social media, I cannot take time to sit with my parents and receive their affection.	59%	39%
8.	Currently, the entire society is on social media.	52%	48%
9.	Now-a-days, students are unable to participate in social activities due to social media engagement.	69%	31%
10.	Even after using social media, the person is becoming socially lonely.	62%	38%
11.	I prefer to talk with my friends and relatives through social media than sit among them.	80%	20%
12.	Seeing massages on social media is more beneficial than playing and walking with friends.	40%	60%
13.	Students are more likely to see messages on the social media rather than walking, reading, and breakfast after the morning rising.	72%	28%
14.	I do not feel the need to go to my friends' home as we are being connected through social media.	70%	30%
15.	Aggressive behaviour in student is increasing due to overuse of social media.	63%	37%

16.	Students cannot make effective conversation with the people due to overuse of social media.	69%	31%
17.	I have become lazy due to use of social media.	45%	55%
18.	I am unable to take time for physical activities due to busyness on social media in the morning and evening.	65%	35%
19.	Now-a-days, the students wake up late in the morning because they use the social media late in the night.	73%	27%
20.	Problems related to eyes are increasing due to overuse of social media on mobile.	79%	21%
21.	Problems of migraine and headache may be appearing due to overuse of social media.	58%	42%
22.	Study time of students is decreasing due to use of social media.	90%	10%
23.	It is inhibiting creativity and self-study ability of students due to overuse of social media.	48%	52%
24.	Being busy on social media, we cannot concentrate on our study properly.	63%	37%
25.	I cannot live even a single day without using social media.	74%	26%

RESULTS

After the percentage analysis of collected data, results were found that 65 per cent of students believe that even after being connected by their relatives through the social media, they also feel lonely when they are out of the house. 71 per cent of the students are of the opinion that they don't have to meet their relatives staying for away because they can converse with them through social media. 71 per cent of the students agree with the statement that they talk less with their relatives due to use of social media. They are carrying only with the formality of getting connected with their relations. 62 per cent of the students accept that they cannot live without the use of social media and feel upset and disturbed without using social media. 50 per cent of the students use social media on an average 5 hours a day. They spare their study, sleeping and physical activity time in using social media. 60 per cent of the students believe that practical knowledge dealing with society is decreasing due to more engagement in social media. 59 per cent of the students being busy with social media and not taking time to conversation with their elders, so they not receiving the care and affection of their relatives. 52 per cent of the students believe that virtual society

is a real society and they deal with it as a real society, so they don't have the need to converse and meet face-to-face with their relatives. 69 per cent of students do not participate in social activities actively due to social media engagement. 62 per cent of the students feel lonely socially because they have hundreds of friends in their social media list but they are not in direct touch with them. 80 per cent of the students prefer talk with their friends than sitting among them. 40 per cent of the students believe that reading massages and news is more beneficial for them than playing and walking. 72 per cent of the students from higher educational institutions firstly check the social media messages after getting up in the morning than walking, reading and having breakfast. 70 per cent of the students from higher educational institutions don't go home to their friends because they are interconnected with each other through social media. 63 per cent of the students believe that social media is increasing aggressive behaviour among the people mainly in students. 69 per cent of the students tells that they feel weak in effective conversation due to constant use of social media. 45 per cent of the students believed that they have become lazy due to use of social media. 65 per cent of the students do not take time for physical activities due to social media engagement. 73 per cent of the students believed that they rise after sunrise in the morning because they are engage in social

media late at night. 79 per cent of the students feel that if we use social media on mobiles and computers, it may cause eye problems. 58 per cent of the students have a query of migraine and headache due to overuse of social media. 90 per cent of the students waste their study time with social media. 48 per cent of the students believed that it is effecting creativity and self-study of students due to use of social media. 63 per cent of the students cannot concentrate on their study due to overuse of social media. 74 per cent of the students believe that it is very difficult to pass even a single day without using social media.

Discussion

After analysis of data, it retrieved that there were various reasons to social media addiction among students from higher education institutions. According the opinion of 65 per cent of the students from higher education institutions, they felt loneliness even connected with their relatives on social media, when they were out of the house. Majority of students did not have a need to meet their far relatives because the communicated through social media with them. So, social media was decreasing warmness among social relations. Most of the students were talking less with their family members because they spared most of the time of day on social media and is was reducing face to face contact among family members. Total 62 per cent of students

from higher education intuitions accepted that they feel loneliness and uncomfortable without using social media and they were becoming addicted. An average of 5 hours of their day were passing in engaging social media. If they used these 5 hours for brushing their skills and personality, is can be changed their real world or life. Study also retrieved that majority of students were not passing time with parents and the bond between children and parents were getting weaken day by day. Many of students were using social media as passion not for need. Social engagement was also reducing among students, and anti-social behaviour and activities were increasing, due to this social crime incidents were rising day by day. Physical activities were reducing in daily life of students because they were spending their morning and evening for social media inside the room, so they were facing many life style problems related to their physical and mental health. The students did not like to go to their friends' and relatives' houses. 69 per cent of students marked their opinion that over use of social media was increasing aggressive behaviour among students and society. By lacking of physical and social activities, aggressiveness was rising among students. The laziness has observed also due to over use to social media. In modern perspective, the students were using social media till late night and waking up late in the morning, so their metabolism was disturbing caused life style problems as frustration, aggressiveness, head ache, high blood sugar, baldness, constipation, eye problems, lacking of attention, etc. The light of screen of social media devices were harming eye vision and mental health of students. There wasa little time forself-study due to over engaging on social media, so achievement and I.Q. level was reducing of students from higher education institutions. The concentration of students was decreasing also because they had been addicted of social media and cannot live for a day without using social media.

At last, it may be said in single line that overuse of social media is an addiction among students from higher education institutions and they were sawing their golden time on social media. This may be very harmful for the future of self as well as Notion. So, it may be proper counseling of students for suitable and safe use social media.

Conclusions

From the analysis Table, is revealed that majority of students were crossing the safe and appropriate limit of social media using. Most of the students were engaging on social media for pass and to waste the time. Although, the students were feeling that their continuous engagement with the social media was not fair but they had been addicted of it. They want to quit but failed unfortunately. It can be concluded

from the study that the overuse of social media was increasing many problems for students and they were being addicted of social media. The side effects of overuse of social media such as decline in academic performance, health problems, difficulty in social adjustment, lack of physical activity, separation in social relations, aggressiveness in behaviour, loneliness, etc., also revealed from the study.

RECOMMENDATIONS

To use safe and useful social media, there are some suggestions for students, parents and teachers.

- Social media should be used only for a limited time, whenever required.

- Parents and teachers should pay attention to the use of social media by students and sensitise them towards the negative effects of social media.
- We should not use social media late night and early morning.
- We should prefer our daily routine as physical activities, meeting with social relatives, walking and having food on time in place of using social media.
- It should be skipped provoked and aggressive massages on social media.
- We should provide value to our family and social relations in place of virtual relations.
- Safe use and negative effects of social media should be included in school curriculum.

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A Study of e-content through e-learning
Viewpoints of Researchers

Shipra Rana* Nain Singh**

| Abstract |

The meaning and nature of education is getting new shape and perspective due to developments in the field of Information and Communication Technology. The use of Information and Communication Technology for effective learning in a knowledge-based society has travelled a long distance. E-learning has become the most strong and effective tool for twenty first century in the educational system. It has modernised the entire process of teaching and learning through the use of variety of techniques by designing of e-content in new perspectives. Now-a-days, development of quality e-content and its effect on the learning level of students has become one of the most preferred subjects for researchers to research on. The researchers, in this paper, tried to find out its root by emphasising the investigated steps to peep deeply into the origin of e-learning in India, and analysed the various researchers' works on e-contents through e-learning to visualise the scope for further research to be conducted in this field of investigation.

CONCEPT OF E-LEARNING

According to Cambridge Dictionary (2020), e-learning is defined as "learning done by using computers and courses provided on the internet." Education and teaching today are emerging as media loaded systems. The emergence of e-learning has shifted the paradigm of methods of classroom instruction and communication. E-learning is a general term used to refer computer

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enhanced learning. It supplements conventional teaching and learning, and placed the learner at the center position rather than the educator. It ensures a coherent, planned and progressive curriculum and transmission of core information. It provides the students more flexibility and better control over their learning. It takes into account pedagogical perspectives of teaching-learning. Various cognitive processes, emotional aspects (motivation, engagement, fun and sense of fulfillment), skills and behavioural outcomes of learning process are dealt with e-learning. In the teaching-learning process, the teacher is the protagonist. They are the chief organiser of the learning activities. In fact, in that capacity, they should gradually make efforts to give that place to the students. E-learning helps the teacher to go to the background and give guidance to the students electronically, inspire and direct the students to blossom fully according to their own perception, vision and experiences. In India, the concept of e-learning started to spread its wings in late twentieth century, the history of which is described under the following heading.

e-Learning in India

With the introduction of computer and internet in the late twentieth century, e-learning began its digital journey in India with the establishment of a virtual university named as 'Net Varsity' by NIIT. On 26th May, 1993, University Grant Commission established Consortium for Educational Communication (CEC)—an interuniversity center. It is a nodal agency at national level to address the higher educational needs of the country through production of curriculum and educational material at large and its dissemination through various ICT modes. In the year 1998, National Task Force on IT and Software Development was accepted by Government of India with the aim of equipping all educational institutions from high school upwards with internet connect Personal Computer's (PC) on an appropriate scale. After that, Virtual Campus Initiative (VCI) was started by Indira Gandhi National Open University (IGNOU) in 1999 that takes into account Bachelor of Computer Application and Master of Computer Application. Learning materials were made available to the students in downloadable zip files and Hyper Text Markup Language pages. Assignments were provided to the students for their evaluation. Additional support was also provided to the students through IV-2A teleconference. However, the program was withdrawn due to less number of students. Ministry of Human Resource Development, Information and Broadcasting, the Prasar Bharti and IGNOU in the year 2000 jointly launched a set of educational television channels Gyan Darshan I and II. These exclusive educational channels release programs from

various Doordarshan Kendras using satellite transmission in different languages. Another milestone in e-learning came in the year 2001 when India's first social science online program was started by IGNOU. It was named Resettlement and Rehabilitation online Programme, and was supported by World Bank. A platform with course content, discussion forum, chat, assignment submission and online quiz was developed internally for the programme. This programme too met the same fate as that of VCI and was withdrawn from online due to less number of students and other problems (Mishra, 2008).

Realising the potential of online learning to reach out to the unreached, IGNOU in October, 2005 initiated the development of a knowledge repository to store, index, preserve, distribute and share the digital learning resources in the country. This repository is called *e-Gyankosh.* MHRD in the year 2006, designed an education portal named 'Sakshat'. It was a pilot project of the Government of India, which was being spearheaded by IGNOU. It was intended to be a one stop portal for students of all levels, teachers, scholars and life-long learners. National Mission on Education through Information and Communication Technology has been envisaged as a centrally sponsored scheme to leverage the potential of ICT in teaching and learning processes for the benefit of all the learners in higher educational institutions in 'anytime

anywhere mode'. It was launched on 3rd February, 2009. It plans to focus on appropriate pedagogy of e-learning. It has envisaged content and connectivity as the twin pedals for initiating and accelerating ICT enabled higher education. E-PG Pathshala is another landmark initiative of the MHRD under NME-ICT being executed by UGC. Launched in November, 2015, it hosts educational resources for teachers, students, parents, researchers and educators. It is one portal under which, high quality, curriculum based, e-content is being developed in 77 subjects at post-graduate level (Department of Higher Education, MHRD, Government of India).

The e-learning platforms are bringing a measurable difference in students' engagement and performance. It is reducing gaps in the delivery of educational and giving a new dimension to the educational space with the blossoming of e-content, which proves to be helpful for the teaching-learning process.

E-CONTENT

In the current scenario, e-learning platforms are the only way forward. Moreover, the government has adopted a series of measures to bring a technological revolution to accentuate e-learning. In this process e-content came out as a major breakthrough to make a shift in the Indian educational system. e-content is a subset of e-learning. According to Department of School Education

and Literacy, MHRD, Govt. of India (2019), "e-content is any form of learning material available digitally which a learner access or interacts with, so as to achieve related learning outcomes". It is integrated synergy of several type of information such as text, audio, video, animation and graphics that leads to effective learning. It is the latest method of instruction that allows the students to actively engage in the teaching-learning process suited to their needs, pace and convenience. According to mission document NME-ICT. "It shall be the endeavour of the mission to continuously work for enriching the repository of e-content of the nation. For the purpose, it shall encourage the academicians, scholars and institutions to contribute to the world of knowledge in cyber space by creating e-knowledge content. The mission shall also evolve a mechanism to rate the quality of the e-content generated before admitting it to the national repository. The mission shall work on the philosophy of encouraging all the scholars and academicians to generate e-content." At present, Consortium for Educational Commission had initiated the production of e-content under NME-ICT on nearly 90 undergraduate subjects.

NATURE OF E-CONTENT

E-content is interactive and self-directed in nature as it accommodates multiple learning styles to actively engage the learners in the learning process, and allows the learner to choose contents that suits appropriate to their needs, interest, abilities, capabilities and skills. It includes learner-centered approach that enables the learner to learn at his own speed according to their own situations, didactic nature: meaning contents that convey some moral fact or learning. It is based on the pedagogical principles that enable the teacher to act more often as a mentor and less often as a pedagogue. The teacher is expected to perform the role of a facilitator and moderator with different responsibilities in a technology-mediated learning environment. Convenience and flexibility are just other assets of e-content because the learning sessions are available for all 24 hours × 7 days, and the learners are not bound to a specific day or time to physically attend classes.

FORMS OF E-CONTENT

There are two forms of e-content, they are Short Learning Objects and Module.

(a) Short Learning Objects (SLO)

Short Learning Objects (SLO) is a new way of thinking about learning content. They are much smaller units of learning, typically ranging from two to three minutes. It may be a description about an item, equipment, a concept, a process, an activity, etc.

(b) Module

E-learning modules are larger independent structural experiences,

containing objectives, learning activities and assessment. In other words, it is a comprehensive package containing a lesson. It contains lecture modules with inbuilt visuals, text, quiz, FAQs, assignments, glossary, case studies, references, discussions and downloads. The output is deployable on the web or CDs. The following Table 1 differentiates between the e-learning and e-content.

Table 1
Difference between e-learning and e-content

e-learning	e-content
Objectives are general and not specified in behavioural terms.	Objectives are specified in behavioural terms.
Various ranges of technologies can be used for delivering the information.	Any one of the technologies can be used to deliver instruction at a time.
The duration of the programme cannot be fixed.	The duration of the programme can be fixed.
Immediate feedback cannot be collected.	Immediate feedback can be collected.
It is process oriented.	It is product oriented.
There will be no control over the situation.	It is carried out under controlled situation.

SIGNIFICANCE

E-content in education has served as a primer to initiate a new level of learning. Like any other styles in teaching-learning process, e-content has drawn serious attention of researchers in recent past as it has shown marked influence on classroom transactions, students' behavior and learning outcomes. In the light of various government policies discussed above, it can be taken into account that e-content is boosting the impending growth of e-learning in India. Therefore, the investigators thought it worthwhile to go through the viewpoints of various researchers and explore how the e-content is becoming a new e-learning megatrend.

STATEMENT OF THE PROBLEM

A study of e-content through e-learning: viewpoints of researchers

OBJECTIVE OF THE STUDY

To study and review the so far research work conducted by the various researchers on e-learning and e-contents.

VIEWPOINTS OF VARIOUS RESEARCHERS ON e-LEARNING AND e-CONTENT

The enormous growth of e-learning in education in India and its perceived benefits have drawn researchers eye to study the various aspects of e-learning to enhance students' learning experience. Recent trends and researches have shown the acceptance and usage of different

modes of e-learning in India over the last decade. A powerpoint based learning package for eleventh standard students in Botany by Rekha in (2007), had been developed to prove its usefulness and carried out a study to compare the effectiveness of it at pre-test and the post-test level which had resulted in that, the powerpoint presentation was found to be more effective tool for teaching the particular topic as compare to that of the traditional chalk and talk method. It also yielded fruitful results in respect of listening curiously and understands the topic easily. The need of an ICT based learning environment for students as well as teachers was highlighted by Merlene and Devanathan in (2008) and concluded that ICT based teaching-learning environment motivates the student for acquisition of knowledge and skills actively, and helps in the professional development of teachers to keep pace with the changing methods of ICT to support classroom teaching and learning. Likewise, Begum (2008) observed that teacher's role has been changing towards observing, intervening, monitoring and supporting learning and technology in its various forms like e-mail, tele-mentoring, online education, teleconferences, and streaming video have enhanced the quality of teaching-learning process, make advances in textual, graphical and computer literacy and develop depth of inquiry in the learners. The relationship between e-learning and

achievement in Chemistry among higher secondary students in terms of usage of internet and number of concepts viewed was examined by Jayakumar and Krishnakumar 2014 in accordance with the objective to identify the extent of contribution of the background variables to the post-test scores and the gain scores. The significant findings were emerged out of the research carried out as the contribution of the two variables showed that the online materials were used more effectively.

Realising the potential of digital resources for the twenty first century, e-content in Biology and Tamil subjects was developed and validated by Amutha and Karthikeyan in 2007 for higher secondary school students. The researchers concluded that the e-content was the key instrument of making the teaching-learning process more effective, and it defiantly and significantly enhances the academic achievement of the students in the particular subjects. The effectiveness of e-content in teaching at tertiary level was done independently by Felix (2007); Karthick (2007); and Muthaiyan (2010). The study was conducted on nearly 25–30 students using experimental research method to reveal that e-content in the form of SLO (Short Learning Object) increases the performance of the students as the e-content intrinsically motivates learning and enables teachers to provide students with the experiences of variable difficulty, randomness and simulating nature. E-content on the

topic 'concept of micro-teaching' was developed by Rastogi and Parashar in 2009 and was found to be effective in enhancing the level of proficiency of teaching skills in the B.Ed, students. Aravindan and Ramaganesh in 2010 investigated the effectiveness of e-content in concretising the concepts of physics among the heterogeneous teacher educators, and the results revealed that the e-content was effective in concretising the concepts.

e-content on teaching method of Tamil at B.Ed. level, and zoology at higher secondary level was developed by Karthikeyan and Shanmugaraja et al., in 2012 and found out the effectiveness of teaching through e-content in terms of active participation, encouragement of vigilance and learner achievement as a result of the unique combination of tutorial, interactive and visual capabilities. Rekha et al., and Albina et al., in 2013 clearly indicated the usefulness of e-content for learning purpose by students' achievement in biology and mathematics in terms of gain score of experimental group taught by using e-content presentation as compared to control group taught by using lecture method. The readiness and needs of 46 polytechnic students towards the development of e-content for engineering courses explored by Subramaniam et al., in 2013 using questionnaire depicted that 87 per cent of the students agreed that online learning materials (e-content) should be created in their courses,

and 100 per cent of the students agreed that online learning materials (e-content) should be developed for future learning.

In a similar manner Jebraraj et al., and Digambarrao in (2015), Tripathi et al., and Amutha in 2016 confirmed the effectiveness of e-content than conventional method in making the concepts clearer. The experimental group who learned through developed e-content was found at higher level in their academic achievement, than the students in the control group who learned through conventional method. The distance between the teacher and the taught is becoming nil and we are headed towards a state of virtual reality. Realising this, the unique benefits of technology to instructional programs in the current digital era was focused by Muthukumari and Ramakrishnan in 2017 and Albina in 2018 for IX standard students by developing and validating e-content in history and mathematics subjects, and on the basis of learning outcome they recommended the generation of good e-contents that will be accessible to all. Kumari (2019) studied the effectiveness of e-content in nuclear physics on the academic achievement of higher secondary students and reported that the treatment through the e-content resulted in more gain and retention of the content at the knowledge, understanding and application levels of learning than the conventional method. Priya (2019) in her research paper

titled "e-content development tools and delivery platforms" described some basic tools, simple delivery platforms and grading tools for developing interactive e-content. The paper gives brief overview of various software for content generation, animations, audio generators and screen casting tools. In addition, the author proposed that e-content is the best methodology for reaping the great benefits of learning owing to limited opportunities and economic disparities. Singh (2019) investigated the effectiveness of e-content on environmental education in terms of learning outcomes of undergraduate students and concluded that learning materials in multimedia format are effective than print materials because of joint presentation of text, picture, graphics and sound to explain the concepts.

The above studies show that e-learning is playing a major role in Indian educational system over the last decade. E-content as a subset of e-learning is changing the current trends of classroom learning and is sure to stay and make a long lasting impact on all the aspects of education.

Conclusion

By realising the fact that e-learning truly is a methodology, this paper attempts to provide the growth trends of e-learning in India. The government is taking proactive measures on this level to develop its potential fully. The key findings from literature review have highlighted the effectiveness of e-content on students' achievement, need for an ICT based learning environment and generation of good quality e-contents. So, it can be concluded that e-content is slowly becoming new e-learning megatrend, and development of quality e-content in more number of teaching subjects at present is the need of the hour to give learners a better experience and benefits that it has to offer now and in the future.

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Towards Actionable Learning Outcomes

SHILPI BANERJEE* AANCHAL CHOMAL**

| Abstract |

Annual Status of Education Report (ASER), and National Achievement Survey (NAS) routinely reports the crisis of Learning Outcomes in Indian school education.The identified primary reason for this crisis is stakeholders unclarity about the kind of desired learning for each subject and criteria of assessment. Learning Outcomes for elementary stage developed by National Council for Educational Research and Training (NCERT) states important knowledge, skills and dispositions students need to attain at the end of an academic year. This paper attempts to develop a deep understanding about how Learning Outcomes are derived from aims of school education and their characteristics. Furthermore, the paper proposes an approach of designing effective lesson plan by following suitable pedagogy and assessment strategies in classroom. The paper concludes with a set of recommendations to institutionalise Learning Outcomes at the systemic level for stakeholders including teachers, schools, government and the private sector to enable them to work towards building integrated and holistic solutions.

INTRODUCTION

As India's Twelfth Five-Year Plan notes: "The four main priorities for education policy have been access, equity, quality and governance. The Twelfth Plan will continue to prioritise these four areas but will place the greatest emphasis on improving Learning Outcomes at all levels" (ASER, 2012). Driving up

Learning Outcomes is now clearly a key priority for Ministry of Human Resource Development (MHRD). MHRD in India has instituted NAS annually in all States and Union Territories (UTs) of the country. These assessments are based on Learning Outcomes that were published by the NCERT in 2016. With the decision of conducting this exercise on a yearly basis, states have begun to show a deep interest in understanding what Learning Outcomes mean, and how can they be achieved in schools (NCERT, 2017) (ASER, 2019).

Under Right to Education (RTE) Act and *Sarva Shiskha Abhiyan* (SSA), several interventions like Continuous and Comprehensive Evaluation, ICT based teaching, activity based learning, etc., to improve the quality of education have been undertaken. However, within a classroom, seldom these interventions meet its stated objectives, as there is little understanding of their purpose. There is also inadequate awareness that, all classroom-based interventions should ultimately aim at improving student learning. Sole dependence on textbooks for teaching, with improper orientation to the concepts and objectives of the subject, often leads to classroom pedagogy that over-emphasises rote memorisation of content, leaving no space for students to acquire the skills and dispositions (attitudes and values) that is expected of a formal school system (Bhattacharjea, 2015).

It is no surprise therefore, that every year we continue to witness poor students' learning levels in the ASER (ASER, 2019) and NAS (NCERT, 2017) reports. One of the primary reasons as indicated in Learning Outcomes document (MHRD, 2017) is teachers being unclear about what kind of learning are desired in each subject, and the criteria against which it could be assessed. A survey was conducted to understand teachers' and teacher educators understanding of Learning Outcomes. This survey was conducted as part of Learning Outcomes course offered by Azim Premji University to teachers and teacher educators teaching in various schools and teacher education institutes. 110 teachers and 125 teacher educators across various states in India were surveyed to know the extent of their understanding about Learning Outcomes. It was found that close to 80 per cent of the teachers and teacher educators had not heard of Learning Outcomes; for those who may have heard about it saw it, only as the basis for National Achievement Surveys conducted by NCERT. There were hardly 5 per cent teachers and teacher educators who recognised the importance and relevance of Learning Outcomes in setting benchmarks and standards for learning. In order to shift the focus of education from rote learning of textbooks, to outcome-based education that comprehensively addresses the knowledge, skills and dispositions that school education

aims to inculcate, a thorough engagement with the meaning, purpose, characteristics of Learning Outcomes becomes indispensable (NCERT, 2017).

Learning Outcomes defines the knowledge, skills and dispositions which the students need to acquire through a subject. Therefore, they are very critical for determining the teaching methodologies, learning activities and assessment schemes for the successful transaction of the concepts in each subject. Therefore, an in-depth understanding of the characteristics, benefits and challenges in transacting Learning Outcomes becomes crucial for teachers. This paper will help in developing a deeper understanding of what should be the outcomes of education, across stages and subjects, how are they derived, and how they could be achieved through a coherent and well-aligned pedagogy and assessment process.

Need of Learning Outcomes

The National Policy of Education (NPE) (Aggarwal, 1989) recommended articulation of competencies and values that should be nurtured through various stages of schooling. To address quality issues in education class-wise and subject-wise, Minimum levels of Learning (MLLs) were developed for primary stage in 1992 by the NCERT. The MLLs laid down Learning Outcomes in the form of competencies as the minimum required educational standards

to be acquired by all children irrespective of their class, caste, gender, religion and region. MLLs were soon criticised for being highly product oriented and focusing only on cognitive domain of development (MHRD, 2017). Examinations based on the MLL have continued to focus on rote learnt information. In 1993, Yashpal Committee Report (Yashpal, 1993) advocated the concept of learning without burden to relieve the students of unnecessary stress and burden of examination. The report clearly states that, learning should focus on application of knowledge and skills instead of being memory-based and short-term information accumulation.

With the coming of the National Curriculum Framework (NCF) 2005 (NCERT, 2005), there was a paradigm shift in the approach to learning. Constructivist approaches to learning with the child being at the center of the learning process as an active constructor of knowledge was emphasised. It was also deliberated that the purpose of education is to develop knowledge, skills and dispositions that would enable children to become reflective, rational and empathetic citizens in a multi-cultural and plural country. Quite obviously, the assessments in such a system would also need to significantly transform from one-time summative tests that overtly focus on textbook learning, to formative assessments that are integral to teaching-learning and assess all aspects of learning. It

is with this intent that Continuous and Comprehensive Evaluation (CCE) was proposed in NCF 2005, and it was mandated till elementary level of education in Right to Education (RTE) Act proposed in 2009 (Jain, 2009).

The NCERT published Source Books on Assessment of different school subjects, and along with that a document called LINDICS (NCERT, 2014). Despite the development of detailed assessment procedures and concepts, there was a felt gap between the policy documents and the LINDICS. The 'Learning Outcomes' for Elementary Stage developed by the NCERT in 2016, subsequently led to addressing this gap. These 'Learning Outcomes' for Classes 1 to 8 synthesised all available policy recommendations on 'quality' and made concrete suggestions of 'what should be taught' and 'how should it be taught'. These were developed in consultation with academicians, practitioners, researchers and various civil society organisations across India. In the current context of outcome-based education, Learning Outcomes clearly serves the following purposes:

OBJECTIVITY

Due to diversity in geographical and cultural setting, building an education system which ensures uniformity and comparability in education received by all Indian children is a major concern (Eksath, 2011). Learning Outcomes acts as common benchmarks for learning—class-wise

and subject-wise outcomes helps educating children across India for achieving common core standards of education. In many ways, they could be compared to the common core standards developed in United States (CCSC, 2009). While the Learning Outcomes remains the same, the teaching-learning environment should be contextualised based on the social, political and economic environment of that location which in turn gives students meaning, relevance and usefulness of learning. Contextualisation allows teacher to adapt the content in order to make students relate the content to local environment. This in turn makes teaching-learning more effective and enjoyable.

ACCOUNTABILITY

Accountability in education system is the collective responsibility of all stakeholders to implement the policies and practices used for raising students learning levels. All stakeholders including students, teachers, parents, community members, administrators and the policy makers are expected to be accountable and ensure that goals of education are achieved.

Accountability can be established by measurable indicators of quality. One of the measurable indicators of education quality is Learning Outcomes. They are assessment standards indicating the expecting level of learning that children should achieve for that class (MHRD,

2017). These outcomes can be used as checkpoints to assess learning at different point of time. Such assessment processes help policy makers, teachers, parents and students identify progress toward meeting the outcomes.

Conducting large scale assessment such as NAS to provide comprehensive picture of students learning levels across the country has helped in institutionalising Learning Outcomes. The NAS gives useful information to policy makers to devise strategies and allocate resources to strengthen poor performance of states/districts/schools/teachers, etc. In NAS, students learning levels are measured against the Learning Outcomes stated by NCERT, and action plans are devised for all areas of concerns including national level fund allocation, policy changes and teacher training (NCERT, 2017–18).

Accountability is also expected at the systemic level. National level indices have been designed to measure the effectiveness of the system in achieving quality. Two such indices are the School Education Quality Index (SEQI) (Niti Aayog, 2019), which was developed to evaluate the performance of States and UTs in the school education sector and the Performance Grading Index (PGI) (MHRD, 2017–18) which is a tool to grade states and UTs. Both these indices provide States and UTs with a platform to identify their strengths and weaknesses and undertake requisite course corrections or policy

interventions. The SEQI consists of 30 critical indicators that assess the overall effectiveness, quality and efficiency of the Indian school education system. Of the total score of 965 that a state can get, 360 points are allocated to Learning Outcomes. On the other hand, PGI has a total of 1000 points, of which 180 points are allocated to Learning Outcome and quality indicators. Both the indices refer to NAS results that are based on the Learning Outcomes to ascertain the score for the Learning Outcome indicator.

IMPACT ON TEACHING LEARNING PROCESSES

Attainment of Learning Outcomes should be a key goal of school education. Since Learning Outcomes indicate what knowledge, skills and dispositions a student will achieve at the end of the course, it is important that the major stakeholders of education that is, parents, teachers and students understand the Learning Outcomes. While these provide guidance for teachers to choose and direct their instructional methodology and plan for appropriate assessment strategies, and students to organise their learning, these would also help parents to know what their children are learning and achieving at the end of every class.

To ensure there is impact, teachers no longer have to focus on 'completing the syllabus' or 'finishing up the portions of the textbook', instead they should focus on whether

the students in the class can demonstrate the Learning Outcomes. An assessment of that would help the teacher in evaluating the efficacy of her teaching methods.

LINKAGES BETWEEN AIMS OF EDUCATION AND LEARNING OUTCOMES

The school curriculum (NCERT, 2005) is a broad plan for facilitating certain capabilities such as knowledge, skills and dispositions in children which are guided by the larger aims of school education. These aims are influenced by what the child can do, the existing socio-cultural conditions and the needs of a learning community. The aims of education outlined in the NCF 2005 (NCERT, 2005), is the basis for development of Learning Outcomes. It states that an educational aim is perceived as an end; it sets the trajectory of development that is sought to achieve through education. Various school subjects enable in pursuing these aims through their disciplinary focus and methods. The broad aims of education stated in NCF are:

- Develop in students a commitment to democratic values of equality, justice, freedom respect and dignity, secularism and a concern for other's well-being. This commitment should be based on sound reason and understanding arising out of adequate dialogue and discussion in schools.
- Enable independence of thought and action to take well-considered rational decisions for self and collectively.

- Inculcate sensitivity to other's well-being and feelings.
- Learning to learn, and willingness to unlearn and re-learn.
- Participate in democratic processes and contribute to the society in constructive ways.
- Provide means and opportunities to enhance one's creative expressions and the capacity for aesthetic appreciation.

The realisation of these aims occurs through the teaching-learning of various school subjects such as Languages, Mathematics, Science, Social Science, Art, Music or Theatre. Illustratively, the curriculum and syllabus documents of Social Science, detailed in the National Focus Group Position Paper of Social Science (NCERT, 2006), clearly articulates the relevance of the subject in developing an appreciation for values enshrined in the Indian Constitution such as justice, liberty, equality, fraternity, unity and integrity of the nation and the building of a socialist, secular and democratic society. The document further states that Social Science as a subject must invest in building a child's moral and mental energy to provide them with the ability to think independently and deal with social forces that threaten these values without losing their individuality. It should promote children's ability to take initiative to critically reflect on social issues that have a bearing on the creative coexistence between individual good and collective good. Similarly, all subjects taught in

elementary schools help in addressing the aims of education through their respective curriculum and syllabus for different stages of schooling.

As these aims of education are very broad, they cannot be achieved at one go and needs to be developed gradually. Therefore, curricular expectations are defined for different stages of school education which includes primary, upper primary, secondary and senior secondary. These form the basis for organising the age appropriate content based on their prior knowledge. Learning Outcomes are defined for each class in a stage and are more specific as compared to curricular expectations. Figure 1 shows an example of the relationship between aims of education, curricular expectation and Learning Outcomes.
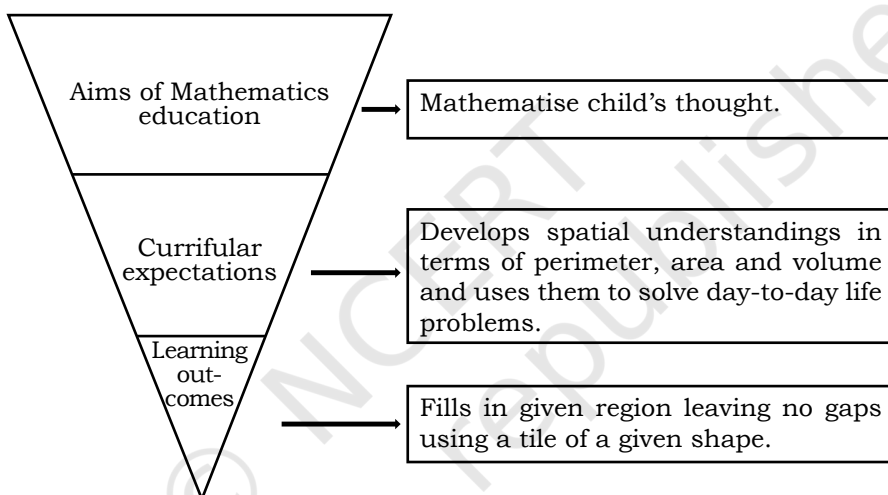
Figure 1: Relationship between aims of education, curricular expectation and Learning Outcomes

Characteristics of Learning Outcomes

A thorough investigation of the elementary level NCERT Learning Outcomes reveals the following common characteristics across subjects:

Alignment of Learning Outcomes with Curricular Expectation

Curricular expectations for a subject areas certained through a range and variety of Learning Outcomes defined for all the classes in a stage. For example, one of the curricular expectations as stated in primary stage of Language teaching is '*Ability to read and interpret critically the texts in different contexts—both verbal and in pictorial mode.*' This is addressed by a series of Learning Outcome as shown in Figure 2. Similarly, one of the curricular expectations as stated in primary stage of Mathematics teaching is '*Develop own methods*

of performing operations on numbers in daily life (addition, subtraction, multiplication and division).' This is addressed by a series of Learning Outcome as shown in Figure 3.

Within all subjects, such an alignment between the curricular expectation and the Learning Outcomes for different classes can be found.

Class I
- E1.1 Distinguishes between print and non-print materials (pictures or graphics).
- E1. 2 Names familiar objects seen in the pictures.
- E1. 3 Associates word with pictures.
- E1. 4 Recognises letters and its sounds.
- E1. 5 Observes subtle and explicit aspects of a picture.
- E1. 6 Understands different events, characters in a picture or a sequence of pictures.
- E1. 7 Attempts reading books available in school or outside.
- E1. 8 Guesses meaning of printed text or familiar text from the given context.

Class II
- E2.1 Selects books to read available at school or outside.
- E2.2 Understands the various units of language, e.g., letter, word and sentence.
- E2.3 Uses multiple strategies to guess the meaning of read material, e.g., estimate meaning of words by seeing the pictures, associates letters and their sounds, identifies letters, etc.
- E2.4 Appreciates different events, characters, in a story or other text.
- E2.5 Shows interest in reading familiar or unfamiliar text.

Class III
- E3.1 Reads various texts (newspaper, children's magazines, hoardings, etc.) and expresses their opinion or discusses with peers and teachers and answers questions.
- E3.2 Reads small text with comprehension (i.e., identifies main ideas, details and sequence and draws conclusions, asks questions).
- E3.3 Reads printed scripts on the classroom walls, posters, charts, etc.
- E3.4 Reads aloud with appropriate pronunciation and pause.
- E3.5 Ascertains meaning of words by reading them in various context or text.

Class IV

- E4.1 Reads subtitles on TV, titles of books, news headlines, pamphlets and advertisements.
- E4.2 Reads printed scripts on the classroom walls, notice board, in posters, advertisements, etc.
- E4.3 Uses punctuation marks appropriately in reading aloud, with intonation and pauses such as question mark, comma and full stop.
- E4.4 Infers the meaning of unfamiliar words by reading them in context.
- E4.5 Connects stories and other texts with personal experiences and expresses ideas that one has inferred through reading and interaction.
- E4.6 Asks questions and gives reason or arguments on content, events, pictures, characters, titles of read texts.
- E4.7 Appreciates vocabulary of other subjects such as mathematics, science, social science, arts, medicine, etc.
- E4.8 Shows excitement towards reading and selects personal favourites from the school library or reading corner.

Class V

- E5.1 Reads storybooks, news bulletin or headlines, advertisements, program reports, children's magazines, hoardings, etc., and discusses about them.
- E5.2 Reads different genres of text (humour, heroic tales, social issues, poems, etc.) with comprehension, asks questions, gives views, draws conclusions.
- E5.3 Uses dictionary to find meaning of unknown words.

Figure 2: Class I to Class V Learning Outcomes for the curricular expectations—Ability to read and interpret critically the texts in different contexts—both verbal and in pictorial mode.

Class I

- M1.1 Constructs addition facts up to 9 by using concrete objects.
- M1.2 Subtracts numbers using 1 to 9.
- M1.3 Solves day to day problems related to addition and subtraction of numbers up to 9.

Class II

- M2.1 Solves simple daily life problems or situations based on addition of two-digit numbers.
- M2.3 Solves daily life situations based on subtraction of two-digit numbers.

Class III
- M3.1 Solves simple daily life problems using addition and subtraction of three-digit numbers with and without regrouping, sums not exceeding 999.
- M3.2 Constructs and uses the multiplication facts (tables) of 2, 3, 4, 5 and 10 in daily life situations.
- M3.3 Analyses and applies an appropriate number operation in the situation or context.
- M3.4 Explains the meaning of division facts by equal grouping or sharing and finds it by repeated subtraction.
- M3.5 Adds and subtracts small amounts of money with or without regrouping.
- M3.6 Makes rate charts and simple bills.

Class IV
- M4.1 Applies operations of numbers in daily life.
- M4.2 Multiplies 2- and 3-digit numbers.
- M4.3 Divides a number by another number using different methods like: pictorially (by drawing dots), equal grouping, repeated subtraction and by using inter-relationship between division and multiplication.
- M4.4 Creates and solves simple real-life situations or problems including money, length, mass and capacity by using the four operations.
- M4.5 Identifies half, one-fourth, three-fourths in a given picture (by paper folding) and also in a collection of objects.
- M4.6 Represents the fractions as half, one-fourth and three-fourths by using symbols respectively.
- M4.7 Shows the equivalence of half and two-fourth and other fractions.

Class V
- M5.1 Performs four basic arithmetic operations on numbers beyond 1000 by understanding of place value of numbers.
- M5.2 Divides a given number by another number using standard algorithms.
- M5.3 Estimates sum, difference, product and quotient of numbers and verifies the same using different strategies like using standard algorithms or breaking a number and then using operation.
- M5.4 Finds the number corresponding to part of a collection.
- M5.5 Identifies and forms equivalent fractions of a given fraction.
- M5.6 Expresses a given fraction, in decimal notation and vice versa.
- M5.7 Converts fractions into decimals and vice versa.

Figure 3: Class I to Class V Learning Outcomes for the curricular expectations—Develop own methods of performing operations on numbers in daily life (addition, subtraction, multiplication and division)

Structure of Learning Outcome statement—Skill and Content

All the Learning Outcomes are expressed in terms of skill to be demonstrated and content to be acquired by the students. Each statement consists of a verb and noun (Tyler, 2013). The verb describes the cognitive skill and the noun.
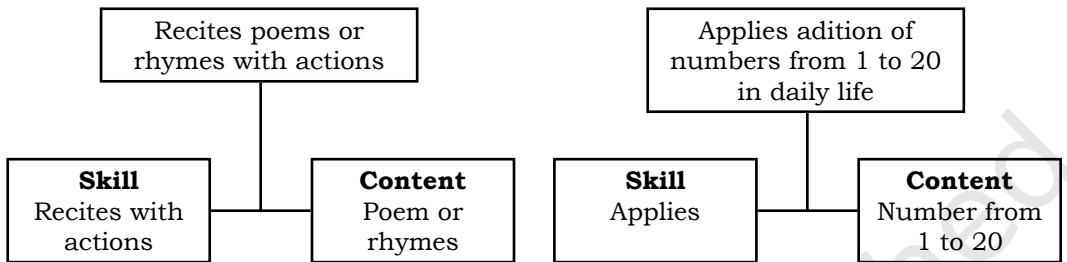
Describe the content as shown in Figure 4.
Figure 4: Structure of Learning Outcome statements

The cognitive skills addressed in the Learning Outcomes may range from lower order cognitive processes like Remember (R) and Understand (U) to more complex cognitive processes such as Apply (Ap), Analysis (An), Evaluate (E) and Create (C) (Krathwohl, 2009).

Progression across difficulty levels and cognitive levels within a class and across stages

The Learning Outcomes are spirally linked in terms of age appropriateness and complexity within and across curricular areas and stages. A clear progression in terms of content domains dealt, difficulty of these content domains and complexity of cognitive processes is observed in Learning Outcomes. Content and cognitive processes for each class are decided based on prerequisite knowledge needed, and are appropriate to the child's age. This progression is found within a class where content and skills are seen progressing from simple to complex, and across a stage (primary and upper primary) where similar progression is observed. This progression is explained through examples given in Fig. 5 to Fig. 10.
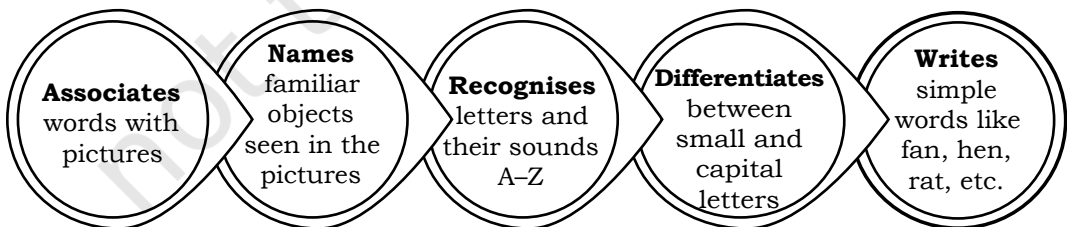
Figure 5: Language — Progression in difficulty of writing skill content domain and complexityof skills within a class

Figure 6: Mathematics — Progression in difficulty of numbers content domain and complexity of skills within a class

Figure 7: Language — Progression in difficulty of content domains from Class I to Class V

Printed scripts	Familiar text	Unfamiliar text
E1.1 Distinguishes (U) E1.2 Names (R) E1.3 Associates (U) E1.4 Recognises (U) E1.5 Observes (U) E1.6 Understands and Sequences (Ap)	E1.7 Attempts (Ap) E1.8 Guesses (Ap)	E2.5 Shows interest (HOTS)
E3.3 Reads (U) E3.4 Reads aloud (Ap) E3.5 Ascertains meaning (E)	E2.1 Selects (U) E2.2 Understands (U) E2.3 Guess the meaning (Ap) E2.4 Appreciates (HOTS) E2.5 Shows interest (HOTS)	E3.1 Reads, Expresses opinions, Answers questions (U) E3.4 Reads aloud (Ap) E3.5 Ascertains meaning (E)
E4.6 Asks questions (Ap)	E3.2 Reads, Identifies main ideas, Draws conclusions, Asks questions (U) E3.4 Reads aloud (Ap) E3.5 Ascertains meaning (E)	E4.1 and E4.2 Reads (U) E4.3 Uses (Ap) E4.4 Infers meaning (An) E4.7 Appreciates (HOTS) E4.8 Shows excitement (HOTS)
	E4.5 Connects, Expresses ideas (An) E4.6 Asks questions (An)	E5.2 Reads, Asks questions, Give views conclusions (An) E5.3 Uses (Ap)
	E5.1 Reads, Discusses (Ap)	

Figure 8: Language — Progression in complexity of skills from
Class I to Class V

Class I	Class II	Class III
• Addition • Subtraction • Arithmetic operation on numbers up to 9	• Addition • Subtraction • Arithmetic operation on numbers up to 99	• Addition • Subtraction • Multiplication • Division • Arithmetic operation on numbers up to 999 • Rate charts, Bills

Class IV
- Addition
- Subtraction
- Multiplication
- Division
- Fraction
- Arithmetic operation on numbers up to 999
- Money, Length, Mass, Capacity

Class V
- Addition
- Subtraction
- Multiplication
- Division
- Fraction
- Decimal
- Arithmetic operation on numbers bigger than 1000

Figure 9: Mathematics — Progression in difficulty of content domains from Class I to Class V

Addition

M1.1 - Constructs (U)
M1.3 - Solves (Ap)

M2.1 - Solves (Ap)

M3.1 Solves (Ap)
M3.3 Analyses and Apply (An)
M3.5 Adds money (U)
M3.6 Makes (Ap)

M4.1 Applies (Ap)
M4.4 Creates and Solves (C)

M5.1 Performs (U)
M5.4 Estimates and Verifies (E)

Subtraction

M1.2 Subtracts (U)
M1.3 Solves (Ap)

M2.2 Solves (Ap)

M3.1 Solves (Ap)
M3.3 Analyses and Apply (An)
M3.5 Subtracts money (U)
M3.6 Makes (Ap)

M4.1 Applies (Ap)
M4.4 Creates and Solves (An)

M5.1 Performs (U)
M5.4 Estimates and Verifies (E)

Multiplication

M3.2 Contructs and Uses (Ap)
M3.3 Analyses and Apply (An)

M4.2 Multiplies (U)
M4.4 Creates and Solves (An)

M5.1 Performs (U)
M5.4 Estimates and Verifies (E)

Division

M3.4 Explains and Finds (U)

M4.3 Divides (U)
M4.4 Creates and Solves (An)

M5.1 Performs (U)
M5.2 Divides (U)
M5.3 Estimates and Verifies (E)

Fraction and Decimal

M4.5 Identifies (R)
M4.6 Represents (U)
M4.7 Shows equivalence (U)

M5.4 Finds (U)
M5.5 Identifies and Forms (Ap)
M5.6 Expresses (U)
M5.8 Converts (U)

Figure 10: Mathematics — Progression in complexity of skills from Class I to Class V

Product and process oriented

Learning Outcomes are articulated by focusing more on the dynamic engagement with the knowledge instead of treating it as static pieces of knowledge. Learning as a product refers to meeting the outcomes with a measurable change in behaviour while learning as a process refers to the internal development caused by acquiring new information and elaborating one's own understanding of using it. When learning is seen as a product, it is assumed that knowledge is transferred from teachers to students and students are the object of teacher's instruction. On the contrary, student's active engagement in their own learning process and making sense of the content is emphasised in learning as process, and here students are subjects of their own learning (Lachman, 1997). Both these types of learning complement each other as product is the outcome of a process, effective processes of learning leads to products of learning which can be used in or relate to real life situation better. The articulation of Learning Outcomes is done in a manner that the process as well as the product of learning has been taken care of.

Measurability and demonstrability

The verb in the Learning Outcome describes an observable behaviour such as explain, summarise, demonstrate, compare, plan, estimate, etc., so that the students' performances are observed and measured to

conclude on how well the outcome is attained. The verbs used in Learning Outcomes have been articulated with great deal of precision and the verbs used for articulation of the outcomes are measurable and observable.

Addresses holistic learning

Holistic learning refers to cognitive, affective and psychomotor development of a child (CBSE, 2102). These are often viewed as exclusive domains of development. However, the Learning Outcomes consider affective qualities and psychomotor development as part of process of development and change in the students' personality rather than treating them stand alone modules with specific set of inputs and expected outputs. For example, within the content domain of Plants and Animals in Environmental Sciences (EVS), the child is expected to identify, classify, describe, and group plants and animals, along with showing sensitivity towards and appreciate diversity of plants and animals. Similar integration is found across the other subjects.

Using Learning Outcomes in classroom teaching and learning

The teaching-learning process should provide overall development (holistic) of children rather than remain textbook centric. However, it is observed widely that textbooks dominate the educational process in Indian schools (MHRD, 2005), and textbooks are often the prime

curriculum resource in schools (Kaul, 1997). It is important that teachers understand the distinction between transmission of knowledge by transacting the concepts in the textbook and facilitation for attainment of certain skills and dispositions using the knowledge of concepts.

For example, in Language, very often the teaching is focused more on familiarising with key characters and events in a given story rather than using the same story as a context for building critical language skills such as interpretation, drawing inferences, arriving at conclusions, etc. Similarly, during teaching poems, the focus is on recitation rather than literary appreciation which includes interpreting; evaluating or making a critical judgement about the poem. This in turn also gets assessed in their formal and informal assessments. In such situation, the Learning Outcomes of language such as the ability to comprehend, interpret, infer and evaluate different genres of text and poems gets side/lined.

Learning Outcomes help in in-depth review and reflection of pedagogical processes used, the focus of these processes should be on both content and skills. All assessments designed by teachers for classroom purposes and central agencies for developing large scale assessments should focus on the attainment of Learning Outcomes rather than content from the textbooks. It is important to internalise the characteristics of Learning Outcomes

Learning Outcomes
Solves simple daily life problems using addition and subtraction of numbers up to 999 with and without regrouping sums not exceeding 999.

Pedagogy

11
378
+267
645

Assessment

456   789
+278   + 297

Figure 10: Misalignment and alignment of Learning Outcomes, pedagogy and assessment

to enable the development of well aligned lesson plans. Lesson plan should be developed in such a manner that the teaching-learning activities and assessment tasks are tightly linked with the Learning Outcomes. This approach is defined as constructive alignment (Biggs, 2003). The constructive part refers to the type of learning and what the student does. The alignment part refers to what the teacher does. Students learn better when the method of teaching, learning activities and assessment strategies are all aligned to each other. In the top box of Figure 10, the pedagogy followed, and assessment used is clearly not

aligned to the Learning Outcome. The Learning Outcome here focuses on application of concepts in real world while the pedagogy and assessment are making merely an attempt to remember and recall the procedure followed for subtraction. The bottom box on Figure 10 shows an example of aligned pedagogical approach and assessment strategy chosen to assess the attainment of Learning Outcome.

DISCUSSION

It is often assumed that Learning Outcomes are relevant for a teacher teaching in a classroom, however, the effective implementation of it depends on what kind of efforts

are undertaken to institutionalise Learning Outcomes at the systemic level. There are at least five critical processes that are needed to enable this.

(i) There is need for a common shared understanding among stakeholders of what is the Learning Outcomes and how are they derived. All education functionaries, teacher educators and teachers should be made aware of this through active dissemination and communication strategies. Workshops, short videos, posters, etc., can be used to enable this. Some governments such as Karnataka have tried innovative ways of doing this; lessons can be drawn from the same (Hindu, 2017).

(ii) Comprehensive training packages should be designed for teachers and teacher educators to help them understand the linkages between their textbooks and the Learning Outcomes. These workshops should be hands on, with ample opportunities for participants to engage with the concept of Learning Outcomes and develop confidence of addressing it in their classrooms. Focus should not only be on understanding the Learning Outcomes but also on developing suitable pedagogical methods

to address those outcomes and assessment strategies to measure if the outcomes have been attained (SCERT, 2019).

(iii) Learning Outcomes is not another document or yet another program of the government. It is very important that it continues to form the basis of all educational programs and policies of the government to improve quality of learning in schools.

(iv) Assessment of student learning through national surveys like NAS and other state surveys should be based on the Learning Outcomes. The questions should measure the same abilities as stated in Learning Outcome statements. Such surveys should not only focus on average performances in different subjects but should offer valuable insights to specific Learning Outcomes that are accomplished or are far from accomplishing. Since Learning Outcomes are articulated as standards of learning, it would also help us evaluate the kind of skills that we need to focus more upon in future.

(v) It is also necessary to recognise that Learning Outcomes are not static. They should be constantly revised and improvised to adapt to changing needs and aspirations of the society.

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A Study of Prevalence of Yoga Education in Schools

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Abstract

Yogic practices are important for every human being, especially for children not only for gaining physical fitness, but also to develop learning, memory and dealing with stress and anxieties in children. The commencing of yoga education in school curriculum has been emphasised as a follow-up of the International Yoga Day, announced by the General Assembly in 2015. Therefore, the aim of the paper is to study the implementation of yoga in schools through a study of the status of different yogic activities conducted in schools of KVS, NVS, CBSE and other schools of Delhi. The findings of the research reveals that, a bulk of Indian schools have acknowledged and incorporated yoga and yogic practices as a part of their core curriculum, and dedicated a separate period where student can practice yoga and its allied practices. Still, in order to make precise scrutiny of the effect of yoga on school going students, a certain degree of standardisation has to be brought about.

INTRODUCTION

Yoga is the ancient Indian science that has attracted the attention and interests of Indians and foreigners alike. Because of the widespread benefits and implications of *yoga* in the physical and mental health of humans, it is being seen as a branch of science. This is evident in the form of increasing scientific literature in the field. The positive effects of *yoga* on physical and mental health are well known and well-researched, and over the past few decades, the

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implication of *yoga* and associated practices on health are being viewed as a form of alternative intervention. *Yoga* has many benefits on the physical, mental and spiritual level, and is believed that yogic influences of the mind on the body are much more powerful than those of body on the mind.

Several reports have established a clear connection between *yoga* (and *yogic* practices) and concentration and problem-solving abilities of students. These studies have reported that school going children in India who practice *yoga* regularly performed better in academics. It was also found that stress was directly related to poor academic performance. In the current academic scenario of our nation, where students are hard-pressed for time and are taught a very detailed curriculum at school, many students find it difficult to cope up studies in the pressure. This shows in the form of poor academic performance and personality changes. Therefore, inclusion of *yogic* practices at school level is necessary so that the students can reap the benefits of *yoga* and associated practices.

About the Initiatives

The National Curriculum Framework, (NCF) 2005, has included *Yoga* as an integral part of Health and Physical Education. As per the NCF, all the three (health, physical and yoga) should be taken together rather than adopting fragmentary approach. Both *yoga* and physical education

contribute to not merely the physical development of the child but have a positive impact on psychosocial and mental development as well. Various studies have shown that yogic practices contribute to the overall development of the child, lead to flexibility and muscular fitness and also correct postural defects among school children (NCERT, 2006). In addition it plays an important role in improving cardio-vascular efficiency and helps to control and reduces excessive body fat while contributing to the overall physical and health related fitness. Apart from contributing to physical fitness, *yoga* also contributes to improving learning, memory and dealing with stress and anxieties in children. Both *yoga* and physical education have not been given the due importance in the school curriculum and neither has their contribution to the health and overall development of the child been adequately acknowledged. The constraints faced in the implementation of *yoga* and physical education are related to a number of factors that affect the quality of school education in general and health and physical education in particular. These constraints include lack of appropriate school environment in terms of physical infrastructure, furniture, lighting, ventilation, water supply, etc., lack of budgetary support, lack of transport services, lack of adequately trained teachers and institutions for their training, lack of proper documentation and

systematic evaluation of the area and lack of coordination between the education and health departments (GOI, 1961). The observations made in the NCF 2005 on Health and Physical Education largely hold true even today, but what we do not have is adequate research in this area, which we feel is indicative of the importance it receives in the policy and research circles.

A study of awareness among teachers of primary and secondary levels in Anna District of Tamilnadu showed a very low level of awareness regarding health promotion measures and was unable to carry out these measures systematically. There was lower awareness among male teachers and those in rural as compared to urban areas (Dhanasekeran, 1990).

Although the number of studies concerned with *yoga* and physical education are very few, the available studies throw some light on the status of this area. As far as physical education is concerned, the available studies show that this area does not get the importance that it should and this gets translated into a negative attitude on the part of the teachers and headmasters of schools. The experience of introducing *yoga* in school curriculum has been quite a mixed experience. There is a tendency for *yoga* to be reduced to mere physical exercise that defeats the very essence of this practice. In the interim period, teachers who are trained in physical education are also getting some training in *yoga*

education. It may be worthwhile to review the syllabus and pedagogy of the teacher's training programme offered by different colleges and deemed universities in this area. Although the number of studies concerned with *yoga* and physical education are very few, the available studies have made it clear that *yoga* is an effective costless therapy to promote health and reduce much physiological and psychological disorder (Michelle, 2012).

OBJECTIVES OF THE STUDY

- To study the implementation of *yoga* in schools.
- To study the status of different *yogic* activities conducted in schools of KVS, NVS, CBSE and other schools of Delhi.

Sample

The total sample of the study consists of 4220 students. Out of these, 481 from KVS, 127 from NVS, 201 from Government school and 3404 from CBSE schools were selected. Table 1 shows the number of schools provided information from various organisations.

Table 1
Number of schools selected as sample

Types of Schools	Total Number of Schools
KVS	481
NVS	127
Government	208
CBSE	3404
Total	4220

Methodology

The questionnaire was prepared and sent to Kendriya Vidyalaya Sangathan, Navodaya Vidyalaya Samiti, Central Board of School Education. These organisations collected the data and sent the data to NCERT. The available data was scrutinised and based on the final data the analyses was done. A simple percentage method was used. Questionnaire was sent to all the KVS and NVS adopting survey method.

Tools

A questionnaire consisting of 16 items was prepared for the school principal. The questionnaire have items related to transaction of *yoga* covering stage, class, timing, types of practices, duration, by whom and teaching aids. Some items were related to NCERT syllabus, training of teachers and assessment.

Data collection details

In this study, data was collected from 4220 schools belonging to KVS, NVS, CBSE and other CBSE affiliated government schools. A detailed questionnaire was drafted in order to gain insights into the various aspects of activities related to *yoga* that were practiced in these schools. This questionnaire was then distributed to KVS, NVS and CBSE affiliated schools, and the filled forms were received and analysed by NCERT.

RESULTS AND DISCUSSION

Distribution of schools with yogic activities

More than 4000 schools all across India were included in this study. Out of these, about 11.5 per cent were KVS; 3 per cent were NVS; about 5 per cent were Government schools and the rest were other schools. For exact numbers, please see the Table below.

Table 1
Distribution of Schools having *Yogic* Activities

	Schools having *Yogic* Activities				
	Yes		No		Total Number of Schools
	N	%	N	%	N
KVS	470	97.7	11	2.3	481
NVS	119	93.7	8	6.3	127
Government	189	90.9	19	9.1	208
CBSE	3322	97.6	82	2.4	3404
Total	4100	97.2	120	2.8	4220
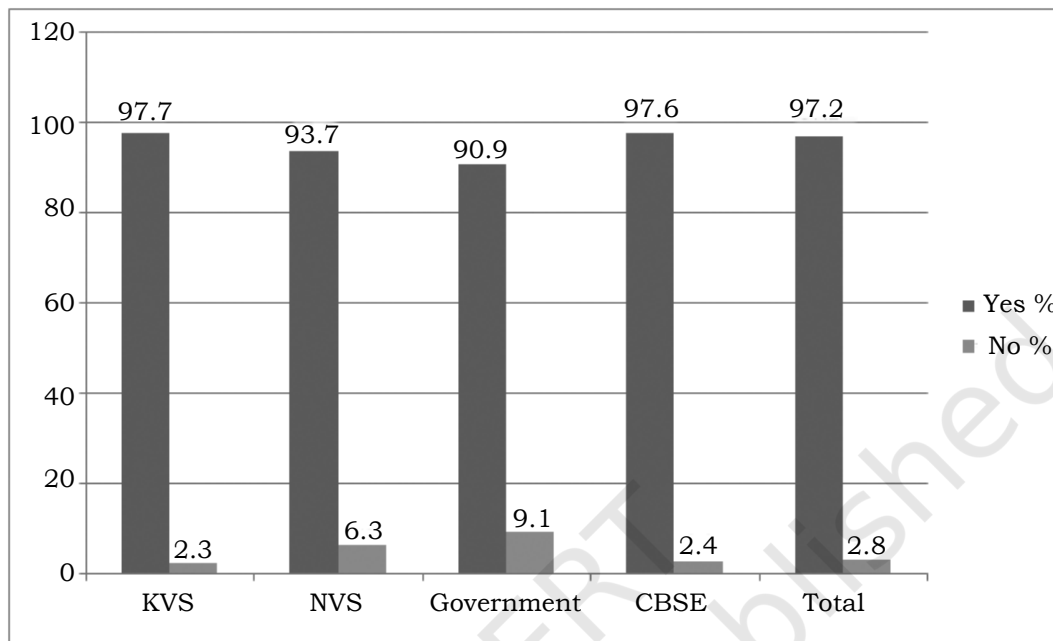
Figure 1: Data showing distribution of Schools Having Yogic Activities

This data clearly shows that a majority of schools have included *yogic* practices in their curriculum. KVS top this list with almost 98 per cent schools having included some form of *yogic* practice for their students. Thus, it is clear that most of the CBSE affiliated schools in India have included *yogic* practices for their students.

Classification of yogic practices in schools

Upon exploring the details of the kind of *yogic* practice that were being practiced in the schools, a classification of yogic practices was made in the questionnaire. Accordingly, responses were collected from schools about inclusion of *Yogasana, Pranayama* (breathing practices), *Dhyana* (meditation), *Shuddhi Kriya* (cleansing processes), relaxation techniques and any other *yogic* practice. The analysis of responses for this part of the study are summarised in the Table 3 below:

According to this data, maximum number of schools included *yogasana* (89 per cent) and *pranayama* (90 per cent) as a part of their curriculum, followed by *dhyana* (about 79 per cent) and other relaxation techniques (about 74 per cent). Very few schools (about 20 per cent) included *shuddhi kriyas*.

This can be attributed to the relative ease of learning and teaching the respective *yogic* practices. Since teaching of *yogasana, pranayama* and *dhyana* are more easily acquired, cleansing processes usually take a lot

Table 2
Distribution of Schools as per the *Yoga* practices they practiced

	Type of School									
	KVS		NVS		Government		CBSE		Total	
	N	%	N	%	N	%	N	%	N	%
Yogasana	429	90.1	121	96.0	186	89.9	2997	88.6	3733	89.0
Pranayama (Breathing Practices)	442	92.9	113	89.7	182	87.9	3036	89.7	3773	90.0
Dhyana (Meditation)	389	81.7	97	77.0	155	74.9	2649	78.3	3290	78.5
Shuddhi Kriya (Cleansing Process)	130	27.3	17	13.5	44	21.3	627	18.5	818	19.5
Relaxation Techniques	374	78.6	80	63.5	151	72.9	2476	73.2	3081	73.5
Any Other	46	9.7	10	7.9	42	20.3	331	9.8	429	10.2
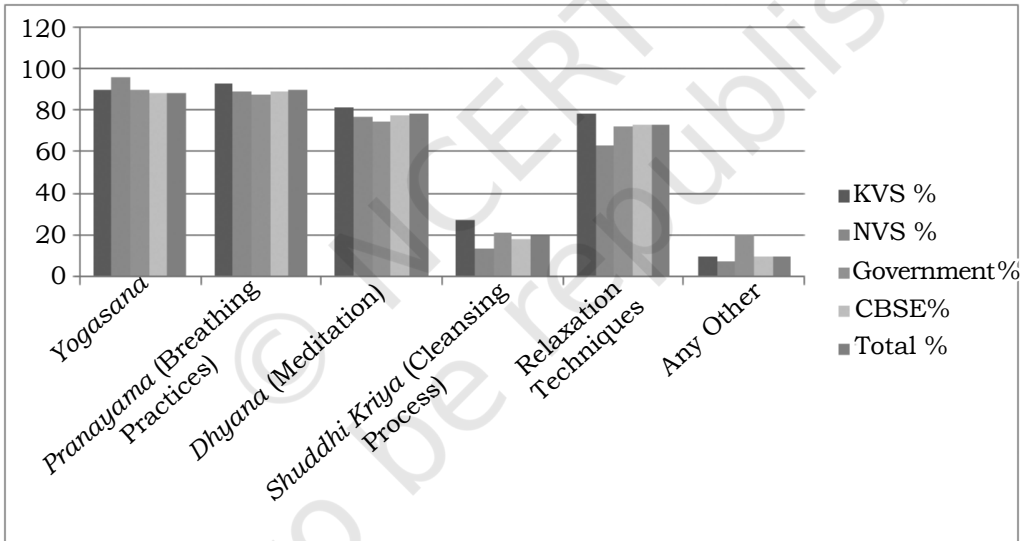
Figure 2: Distribution of Schools as per the Yoga practices they practiced

of time and effort to master the skill. These results could be related to the availability of trained teachers in the respective fields.

Distribution of schools in terms of yoga schedule

In order to probe further about the depth of *yogic* practices followed in the participating schools, the frequency of *yogic* practices was compared among different schools. Schools were classified according to the number of days per week for which *yogic* practices were performed. The results for this part of the study are summarised in the Table 3 below:

Table 3
Distribution of Schools as per their Routine and content of Yoga Classes

	KVS		NVS		Government		CBSE		Total	
	Theory	Practical	Theory	Practical	Theory	Practical	Theory	Practical	Theory	Practical
	%	%	%	%	%	%	%	%	%	%
Daily	34.8	46.1	33.3	32.2	36.4	50.5	17.3	21.1	23.1	25.6
Once a Week	30.4	28.3	16.7	14.9	27.3	29.1	39.5	46.6	35.5	42.8
Twice a Week	26.1	21.1	50.0	45.5	18.2	10.7	28.4	26.1	28.1	25.4
Thrice a Week	.0	.0	.0	.0	.0	.0	14.8	6.1	9.9	5.0
Any Other Schedule	8.7	4.6	.0	7.4	18.2	9.7	.0	.0	3.3	1.2
Total	100	100	100	100	100	100	100	100	100	100
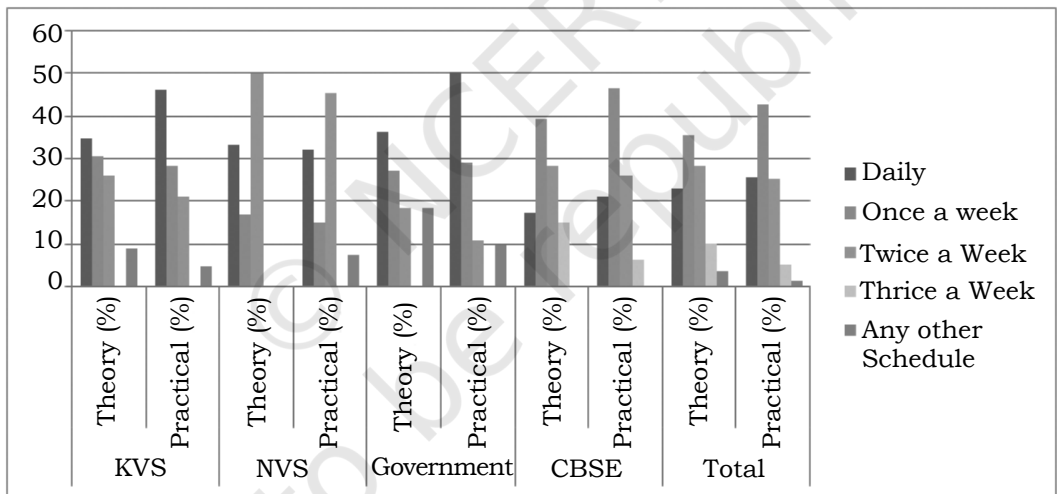
Figure 3: Distribution of Schools as per their Routine a content of yoga Classes.

These results show a high degree of variation among individual categories. For example, although there is a clear dominance of practical *yogic* sessions at schools over theory classes in *yoga* and *yogic* practices, it is evident that there is no uniformity in frequency of *yogic* practices in schools. Even within the same school category, there is no uniformity of frequency of yogic practices. These results highlight a need for uniformity in frequency of *yogic* practices at schools so that the corresponding effects may be realised. In the absence of a uniform *yoga* schedule, it is not

possible to assess and compare the outcome of these practices.

Distribution of schools according to the timing of yogic practices

Within each school category, the timing of *yogic* practices was also identified. While it was clear that majority of the schools (about 66 per cent) included *yogic* practices in the morning, there were considerable variations within each category, except for NVS, where almost 90.6 per cent (65.9 morning and 24.7 in the assembly) of the schools conducted their *yoga* sessions in the morning. For all other categories, the timing of these sessions was varying. The summary of this part of the study is depicted in the Table 5 below.

Table 5
**Distribution of Schools as per the timing of Yoga Classes
in different type of Schools**

	Type of School									
	KVS		NVS		Government		CBSE		Total	
	N	%	N	%	N	%	N	%	N	%
In the Morning	296	61.4	119	93.7	128	61.5	2238	65.8	2781	65.9
Afternoon	14	2.9	0	.0	5	2.4	152	4.4	171	4.0
Evening	7	1.5	5	3.9	11	5.3	83	2.4	106	2.5
In Assembly	76	16.0	0	.0	36	17.3	931	27.3	1043	24.7
Any other time	88	18.3	3	2.4	28	13.5	0	.0	119	2.8
Total	481	100.0	127	100.0	208	100.0	3404	100.0	4220	100.0
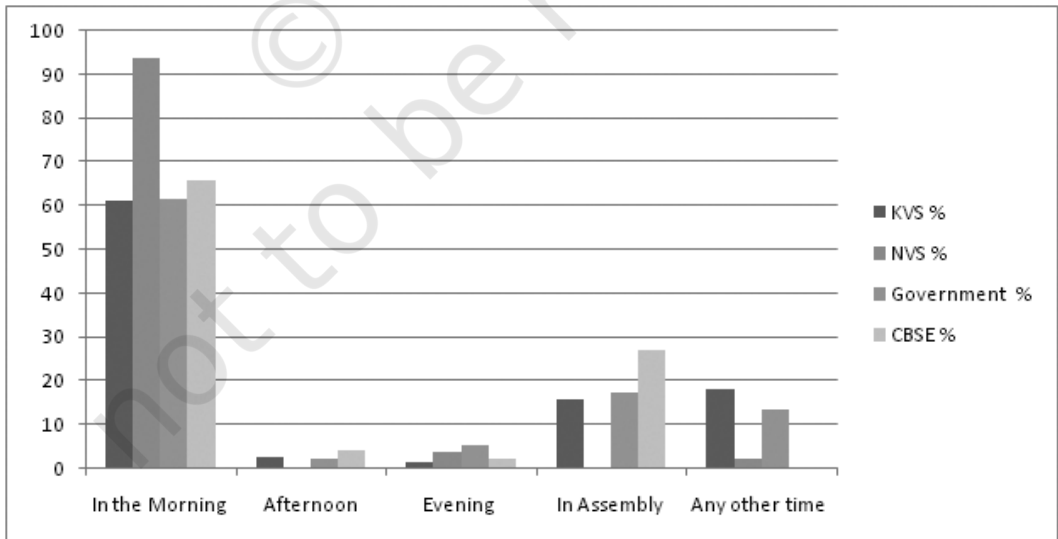
The timing of various *yogic* practices is critical. For *yogasana*, it is vital that students don't have a full stomach and it makes sense to perform these sessions in the morning. However, for the remaining yogic practices like *dhyana* and relaxation, there is minimal impact of empty or full stomach. In order to decipher the effect of various *yogic* practices on students, it is essential to establish guidelines regarding the timing of each kind of *yogic* practice for maximum benefit on students.

Further in line with the timing of *yogic* practices in various schools, it is essential to know the typical duration of each *yogic* practice session. The details regarding this aspect are depicted in the Table 6 below.

Table 6
Distribution of Schools as per the Duration of Yoga Classes in different type of Schools

	Type of School									
	KVS		NVS		Government		CBSE		Total	
	N	%	N	%	N	%	N	%	N	%
30 Minutes	167	34.9	80	63.0	94	45.2	1418	41.6	1759	41.7
40 Minutes	260	53.9	34	26.8	77	37.0	1492	43.8	1863	44.1
One hour	22	4.6	10	7.9	11	5.3	264	7.8	307	7.3
Duration not defined	32	6.6	3	2.3	26	12.5	230	6.8	291	6.9
Total	481	100.0	127	100.0	208	100.0	3404	100.0	4220	100.0
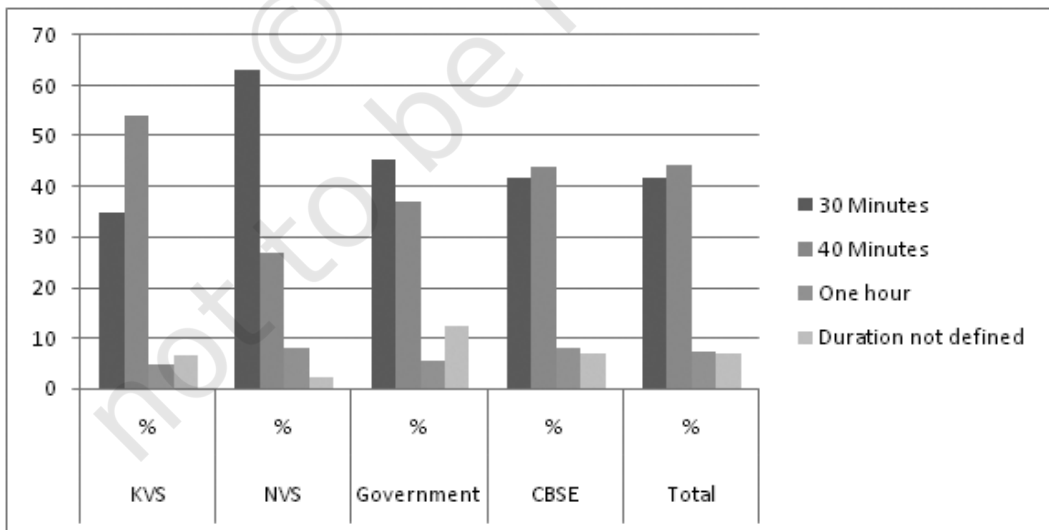
Most of the schools covered in the study included about 30–40 minutes of *yogic* practice per session. NVS showed a majority of schools (63%) where *yogic* practice session lasted for about 30 minutes. Again, a major point to note in this result is the variation within each category regarding the duration of each *yoga* session held.

Distribution of schools based on types of teaching aids

Before making a correlation between the timing, duration and effect of *yogic* practices in schools, it is essential to understand the kind of teaching aids that are available at and used by the schools that participated in this study. For this purpose, the participating schools were asked about the type of teaching aids that were being used for *yogic* practices. The following Table 7 summarises the responses.

As is evident by the results, most of the schools within each category are well equipped with teaching aids that comprises of charts, posters, audio and visual aids pertaining to *yoga* and *yogic* practices.

Table 7
Distribution of schools using teaching aids for yogic activities

| | Type of School | | | | | | | | | |
| | KVS | | NVS | | Government | | CBSE | | Total | |
	N	%	N	%	N	%	N	%	N	%
Yoga Charts and Posters	309	64.2	84	66.1	159	76.4	1949	57.3	2501	59.2
Yoga related Audio-Video	135	28.2	38	29.9	28	13.5	1186	34.8	1387	32.9
No response	37	7.6	5	4.0	21	10.1	269	7.9	332	7.9
Total	481	100	127	100	208	100	3404	100	4220	100
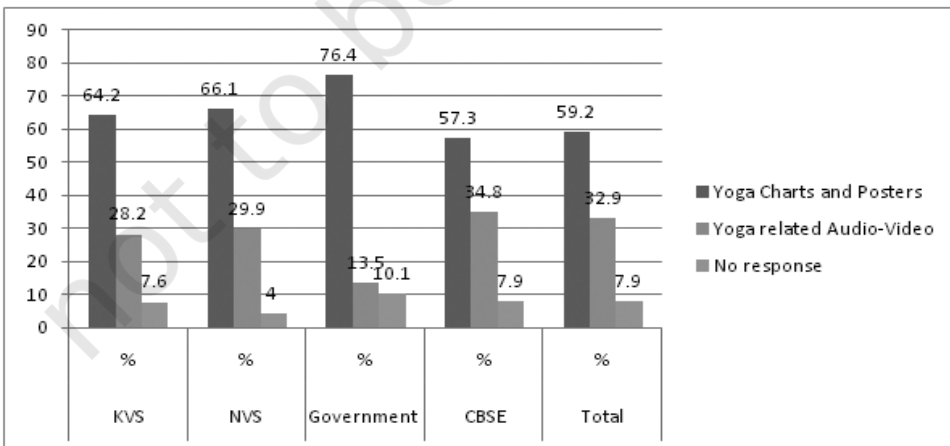
Distribution of schools based on the type of teachers conducting *yogic* practices

Since it is evident that there are ample number of teaching aids available in Indian schools for carrying out *yogic* practices with students, it is essential to know about the teachers who conduct these sessions. For this purpose, the schools were distributed according to the involvement of qualified *yoga* teachers, trained *yoga* teachers, physical education teachers or other teacher to conduct *yogic* practices. The finding related to these aspects is given below in Table 8:

Table 8
Distribution of schools by transaction of yogic practices

	Type of School									
	KVS		NVS		Government		CBSE		Total	
	N	%	N	%	N	%	N	%	N	%
Qualified *Yoga* Teachers	279	58	7	5.5	82	39.4	1237	36.3	1605	38.1
Trained *Yoga* Teachers	81	16.8	2	1.6	23	11.1	650	19.1	756	17.9
Physical Education Teacher	117	24.4	112	88.2	85	40.9	1446	42.5	1760	41.7
Any Other	4	.8	6	4.7	18	8.6	71	2.1	99	2.3
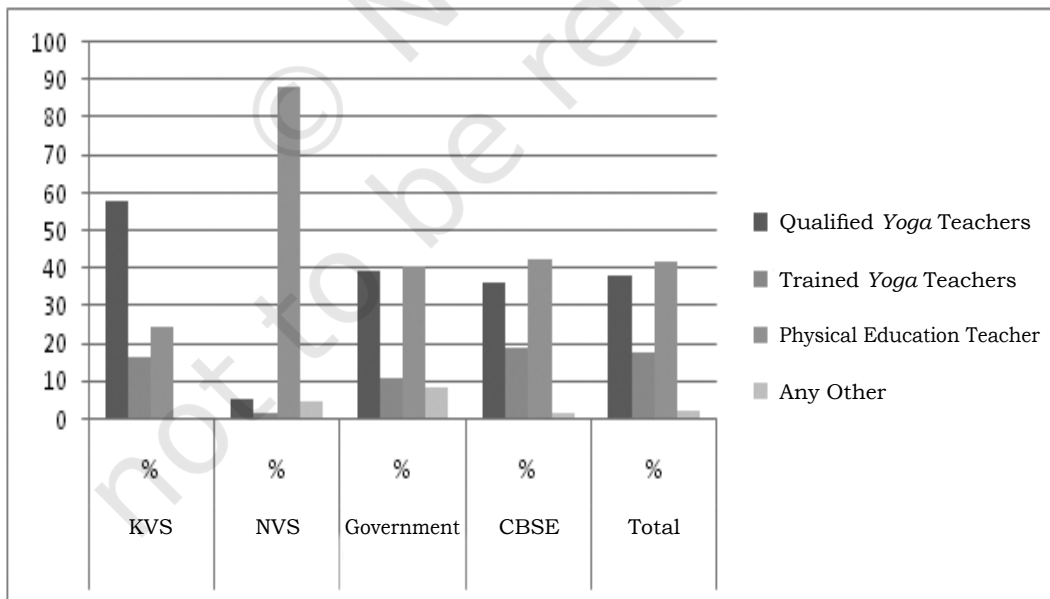
Considerable variation between different categories of schools was seen in this aspect. For example, almost 88 per cent of NVS schools had *yogic* practices conducted by physical education teachers, while the corresponding proportion in KVS schools was just about 25 per cent. In contrast, close to 58 per cent of KVS schools had qualified *yoga* teachers to do the same task. Another aspect that can be observed in this result is that very few schools have *yogic* sessions conducted by trained *yoga* teachers.

Distribution of schools according to special provisions made under *yoga* practices

As the final part of this study, assessment of the type of curriculum being followed by different schools

for *yogic* practices was made. Details were asked about the availability of *yoga* training programs for teachers, assessment and evaluation of students after *yogic* practices, etc. The corresponding results are summarised in the table that follows.

Many interesting outcomes are seen in this section. For example, it is clear that a majority of schools in India have a separate period for conducting *yoga* and *yogic* practices, and the performance of students is regularly assessed in about 85 per cent of the schools that participated in this study. However, less than half of the total school followed a common syllabus for *yoga* and *yogic* practices. Also, only about half of the schools have provision of getting teachers trained in *yoga* and *yogic* practices.

Table 9
Distribution of Schools as per the provisions made under Yoga practices

	Type of School									
	KVS		NVS		Government		CBSE		Total	
	N	%	N	%	N	%	N	%	N	%
Do you follow NCERT Syllabus and Textbook on *Yoga*	257	57.0	51	43.2	94	53.4	1316	41.4	1718	43.8
Do you have any provision of training other teachers in *Yoga*	231	51.2	52	44.1	67	38.1	1853	58.3	2203	56.1
Do you conduct *Yoga* Competition in your School	291	64.5	99	83.9	125	71.0	1579	49.7	2094	53.4
Do you assess the performance in *Yoga*	391	86.7	108	91.5	154	87.5	2684	84.4	3337	85.0
Separate period for conducting *Yoga* Classes	403	89.4	52	44.1	129	73.3	2557	80.4	3141	80.0
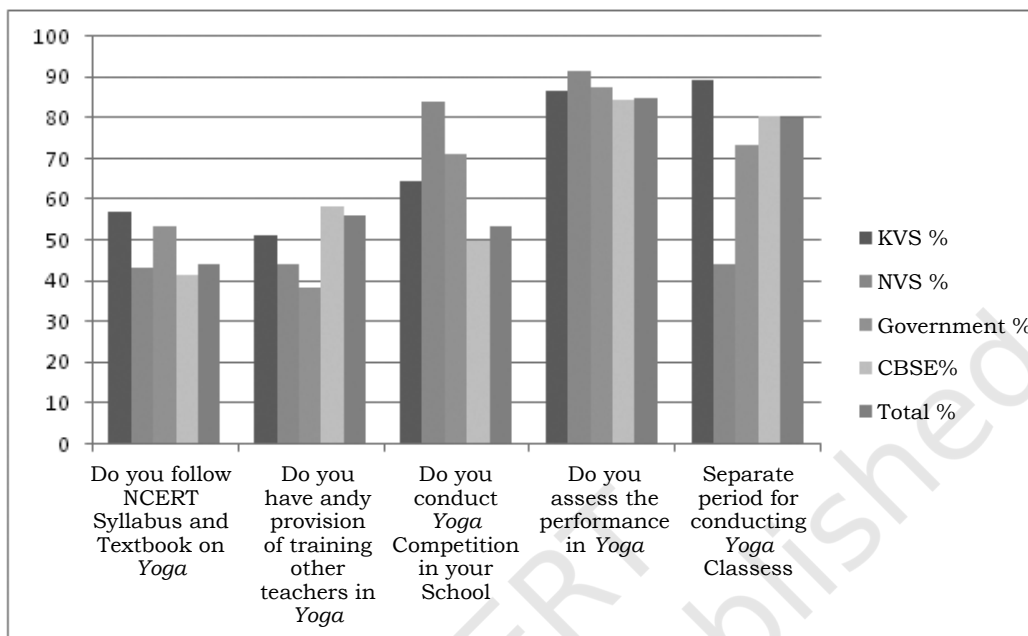
CONCLUSION

As a result of this study, it has become clear that a majority of Indian schools have recognised and included *yoga* and *yogic* practices as a part of their curriculum, and dedicated a separate period where student can practice *yoga* and its associated practices. However, there is a huge variation when it comes to the training of teachers who conduct these sessions, the syllabus that is followed for these sessions, and timing or duration of these sessions. In order to make accurate analysis of the effect of *yoga* on school going students, a certain degree of uniformity in these aspects has to be brought about. For example, specific guidelines regarding the timing and duration of *yoga* sessions, special sessions for students who deal with more stress (higher classes, for example), and a congruent line of teaching. Also, it needs to be checked if these *yogic* sessions can be conducted by trained *yoga* instructors or teachers who can be trained in *yoga*. Once these few parameters are addressed, it would be possible to understand the effects of *yoga* in academic performance and positive personality changes in Indian students.

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Boosting Science Self-efficacy of Eighth Graders through Cooperative Learning

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Abstract

The present study was conducted to compare the effect of the cooperative learning techniques (JIGSAW IV and STAD) on science self-efficacy of VIII graders with different cognitive styles. The data was collected from a set of 240 students of VIII graders randomly chosen from three government schools of Chandigarh. Pre-test, post-test with one control group design was used and the data obtained was subjected to 2-way Analysis of Variance.

The major findings of the study were: 1) The field-independent and field-dependent group of students yielded a significant difference in the mean difference on science self-efficacy scores. Field-dependent students exhibited better science self-efficacy than field-independent students. 2) Students exposed to cooperative learning strategies JIGSAW IV and STAD exhibited better science self-efficacy than the students belonging to conventional group. Among the two cooperative learning strategies, students belonging to JIGSAW IV yielded better science self-efficacy scores than students belonging to STAD and control group. 3) Interaction between treatments and cognitive styles was found to be significant.

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Introduction

Self-belief is a guiding facet that may affect the performance of the students academically. A learner's belief about the capability to perform is the key to her competence in academics. Pajares (2009) identified three critical issues related to individual self-beliefs—"that students difficulties in basic academic skills are often directly related to their beliefs that they cannot read, write, handle numbers, or think well that they cannot learn, even when such things are not objectively true; That many students have difficulty in school not because they are incapable of performing successfully, but because they are incapable of believing that they can perform successfully—they have learned to see themselves as incapable of handling academic work or to see in the work as irrelevant to their perceptual world; and that many if not most academic crises are crises of confidence."

Two main factors responsible for academic success are cognitive styles and self-efficacy (Sankar and Raju, 2011). The construct of cognitive styles was originally proposed by Allport (1937), as a common method of perceiving, remembering, thinking, and problem solving. Since then, there has been considerable research in this area. Tennant (1988) defined cognitive styles as "an individual's characteristic and consistent approach to organising and processing information." Riding, Glass, and Douglas (1993)

termed cognitive styles as static and relatively in-built features of the individual. The field-independence or dependence theory has become one of the most extensively researched cognitive styles today. According to Witkin and Goodenough (1981) when it comes to numbers, science, and problem-solving tasks, field-independent people are more likely to do well. They tend to analytically approach problem and perceive a particular and relevant item in a field of distracting items. On the other hand, field-dependent people tend to be better at recalling such social information as conversations and relationships. They prefer to approach a problem in a more global way and are capable of perceiving the total picture in a situation. Many studies on field-independent and field-dependent cognitive style for education have indicated that the individuals 'different cognitive styles have direct impact upon their achievement performance (Tinajero and Paramo, 1997; Wieseman, Portis, and Simpson, 1992). In a study conducted by Paramo and Tinajero's (1990) study field-independent people tend to out perform field-dependent people in overall school performance. Dillon and Gabbard (1998), Tinajero and Paramo (1998) found "strong evidence of a relationship between field-dependence or independence and achievement in school." Smith (2002) investigated that field independent students favour areas of study that are impersonal and

require cognitive skills (such as the physical and biological sciences and mathematics) while field-dependent students make study choices that require interpersonal skills, such as social sciences. Using varied instructions based on their cognitive styles, every student can be given opportunity to study through their own cognitive styles. It allows for all students to be engaged and active in their learning. To create such positive learning environment, it is vital to understand how to incorporate student cognitive styles in the classroom and enhance the efficacy of students (Graham, 2015). DeTure (2004) reported that field-independent students tended to have higher online technologies self-efficacy than field-dependent students, whereas, Valncia-Vallejo, Lopez-Vargas and Sanebria-Rodriguez (2018) found that field-independent and field-dependent students achieve comparable learning and academic self-efficacy perception when provided motivational scaffolding in an e-learning environment.

Efficacy of an individual in a field can only be judged when he communicates the notion. The feedback in response to the performance ultimately turns out to be contributing towards his high or low confidence to perform. In this situation, the schools and teachers have a crucial role to play. Being the facilitators for learning, what they can best do to improve upon the efficacy of students is to

provide them a practical learning environment including student's participation that may enhance their conceptualisation of ideas. Self-efficacy is a foundation of human agency (Bandura, 1999). "Percieved self-efficacy concerns people's beliefs in their capabilities to mobilise the motivation, cognitive resources and courses of action needed to exercise control over events in their lives" (Wood and Bandura, 1989). Student academic success can largely be attributed to the use of cognitive styles and attention to self-efficacy (Graham, 2015). Arslan (2013) found that majority of students' self-efficacy benefited from the use of cognitive styles in the classroom. Sankar and Raju (2011) also discovered that the instructional style when aligned with their personal cognitive style enhanced the self-efficacy of the students. When focusing on creating the best learning environment to promote academic success, schools should keep cognitive styles and self-efficacy in mind.

Self-efficacy shouldn't be confused with confidence. It isn't merely a general belief in one's ability. As mentioned, it is much larger in scope as assessment of one's capabilities in three complex and crucial areas: motivation, resources, and action. In addition, self-efficacy is not a generalised trait (Bandura, 1982, 1986), it is a person belief in his or her ability to perform a specific task. At a given point of time, it determines the

initial decision to perform a task, the amount of effort to be expended, and the level of persistence (Gardner and Pierce, 1998). As suggested by Gist and Mitchell (1992), self-efficacy has three dimensions: magnitude, strength, and generality. Magnitude involves the level of task difficulty; strength describes whether the conviction regarding magnitude is strong or weak and generality conveys the degree to which the expectation is generalised across situations. Another principle of self-efficacy is that it changes over time with new information and experience, i.e., it is dynamic (Gardner and Pierce, 1998).

Bandura (1994) tells that human functioning is affected by self-efficacy through four psychological processes: cognitive, motivational, and affective and selection processes.

- Self-efficacy impacts the *cognitive process* by influencing the anticipatory scenarios humans construct, analytical thinking and rehearse. It means that individuals with high self-efficacy beliefs tend to anticipate success scenarios, while those with low self-efficacy beliefs tend to dwell on pitfalls and anticipate failure.

- It impacts *motivation* by determining goal level, perseverance and resilience to failures. Those with high sense of self-efficacy set higher goals than those with low self-efficacy.

- *Affective processes* which regulate emotional states and elicitation of emotional

or physiological reactions are influenced by self-efficacy at several fronts. Those with a greater sense of efficacy tend to be more successful in reducing health-promoting habits into their lifestyle.

Self-efficacy also influences the type of *activities and environments people choose*. Bandura (1999) asserts that people avoid situations that they believe are beyond their capabilities, but readily undertake challenges that they think themselves capable of handling. Higher self-efficacy beliefs will lead to more challenging undertakings. In cooperative learning the students in group get an opportunity to share and make each other understand the content of the syllabus. The element of social acceptance, social criticism and validation of the formed perceptions by the group members, solidifies the belief of the students in them. Followed by the re-enforcements they get in the form of appreciation for augmentation of individual as well as group scores sums up towards their insight of self-efficacy about the subject. Cooperative learning Strategies are based on the idea that cooperation among peers is the most important way of influencing their conditions, posing individual and group challenges at the same time. In the strategy, a pupil is not only responsible for their own learning but others as well. The sense of competition within group and with other groups—both act as a motivation to perform.

Although Slavin (1990) proposed a two-element theory of cooperative learning comprising positive interdependence and individual accountability, the five-component theory of Johnson, Johnson and Holubec (1991); Johnson, Johnson and Smith (1991a); Johnson, Johnson and Smith (1991b) is used mostly. According to this conceptualisation, the following five elements are essential for increasing the likelihood of success of the cooperative learning endeavor; (a) positive interdependence, (b) face-to-face promotive interaction, (c) individual accountability, (d) social skills, and (e) group processing.

Positive interdependence: refers to each student recognising that he or she is linked with others in such a way that one cannot be successful unless all the remaining group members are successful.

Face-to-face promotive interaction: involves students' enhancing each other's goals by using such techniques as supporting, praising, encouraging and scaffolding.

Individual accountability: involves being responsible for completing one's share of the work or to master the task assigned within the group. In doing so, social loafing (i.e., disproportionately benefiting from another's work) are assumed to be minimised.

Social skills: requires a positive interaction among all group members. Skills such as effective communication, building and

maintaining trust, and constructively resolving conflicts are emphasised.

Group processing: refers to students being able to assess how well their group is working towards achieving its goals (Johnson and Johnson, 1991).

A rigorous literature survey reveals that there exists a significant relationship between cooperative learning strategies and self-efficacy among students (Yoruk, 2016; Darnon, Buchs and Desbar, 2012; Torchia, 2012). Adding to it, some researches in support of JIGSAW IV a cooperative learning strategy discovered that it can bring about a change in the level of self-efficacy (Darnon, Buchs and Desbar, 2012), liking of school, self-esteem, reduction of prejudices (Aronson and Patnoe, 1997); awareness about environment, self-confidence and helps to socialise (Yoruk, 2016) and is responsible for enhancement of achievement and intrinsic motivation (Torchia, 2012). It has been found that teaching methodologies like collaborative mobile learning activities (Sung, Hwang and Chang, 2016), Collaborative group skills (Mattson, 2011), Participatory approaches (Määttä and Järvelä, 2013), Concept Mapping (Wilson and Kim, 2016), Online learning (Ashford, 2014) and Problem based learning (Boren, 2012) also have a positive effect on self-efficacy of students. Suggesting that, a change in the teaching methodologies that are child-centric can certainly enhance

their self-efficacy in academics. However, in a study conducted by Hevedanli (2015) it was observed that no significant difference in self-efficacy beliefs about biology among pre-service teachers was observed under application of Web-based cooperative learning environment. Even Robertson (2012) using collaborative learning and Wilson and Kim (2016) employing concept mapping technique discovered that there was no significant relationship between the teaching strategies and self-efficacy of students. In contrary, when Santosh (2012) compared the effect of STAD and JIGSAW methods on achievement and self-concept in mathematics, observed no significant difference in the self-concept attainment of the two groups but the achievement of students was found to be significantly higher in JIGSAW group.

As the mentioned studies, reflect a contradiction upon whether the use of cooperative learning strategies and those involving group processing in classroom environment can really bring about a change in self-efficacy among students. So, there arises a need to study whether cooperative learning is a better option to work upon the enhancement of self-efficacy among students or not.

To reach upon the answers to all these, science self-efficacy among the students has been examined under treatments of cooperative learning strategies in the present study.

OBJECTIVES OF THE STUDY

Following are the objectives of the study

1. To compare the mean difference scores on science self-efficacy of field-independent and field-dependent group of students.

2. To compare the mean difference scores on science self-efficacy of the students when taught through three different instructional treatments (two cooperative learning techniques, viz., JIGSAW IV and STAD and conventional group learning).

3. To compare the mean difference scores on four domains of science self-efficacy, viz., self-confidence, physiological arousal, performance outcome expectation and social persuasion.

4. To evaluate the interaction effect between instructional treatments and cognitive styles with respect to science self-efficacy.

Delimitations of the study

1. The study was delimited and conducted in three Govt. Senior Secondary Schools of the Union Territory Chandigarh.

2. Only two types of cognitive styles, viz., field-independence and field-dependence were studied.

3. The experiment was restricted to 50 working days of the academic session.

4. Five topics of science were selected from the syllabi prescribed by NCERT.

Hypotheses

H1 Field-independent and field-dependent group of students yield comparable mean difference scores on science self-efficacy.

Further hypotheses were framed to analyse mean difference scores on science self-efficacy with respect to four domains.

Field-independent and field-dependent group of students yield comparable mean difference scores on

H1.01   Self-confidence

H1.02   Physiological arousal (Positive attitude towards science)

H1.03   Performance outcome expectation (Expecting Specific results)

H1.04   Social persuasion (To influence others deliberately)

H2 The three instructional treatments yield comparable mean gain scores on science self-efficacy. Students taught through the three instructional treatments yield comparable mean difference scores on.

H2.01   Self-confidence

H2.02   Physiological arousal (Positive attitude towards science)

H2.03   Performance outcome expectation (Expecting Specific results)

H2.04   Social persuasion (To influence others deliberately)

H3 There exist no significant interaction between instructional treatments and cognitive styles with respect to science self-efficacy.

When exposed to different instructional treatments field-independent and field-dependent group of students yield comparable mean difference scores.

H3.01   Self-confidence

H3.02   Physiological arousal (Positive attitude towards science)

H3.03   Performance outcome expectation (Expecting Specific results)

H3.04   Social persuasion (To influence others deliberately)

METHODOLOGY

Sample

The research was carried out on a sample of 240 grade VIII students from three government schools of Chandigarh. For classification, Group Embedded Figures Test (GEFT) was administered to a sample of 300. After scoring, students scoring 13 or above were kept in field independent group while those who scored 8 or below were kept in field-dependent group. Those students who scored between 9 and 12 were dropped. Thus, on the basis of the scores obtained by the students in GEFT, they were divided into field-independent and field-dependent group of students. The students belonging to two groups were randomly allocated to experimental and control group. There were 80 students in each group (two experimental and a control group).

Table 1
Bifurcation of sample in the study

Treatments	Field Independent	Field Dependent	Total
Experimental Group 1 (Cooperative Learning – JIGSAW IV settings)	40	40	80
Experimental Group 2 (Cooperative Learning – STAD settings)	40	40	80
Control Group (Traditional Instruction Settings)	40	40	80
Total			240

DESIGN OF THE STUDY

Pre-test and post-test with one control group design was employed. A 2x3 ANOVA was employed for the analysis of mean difference scores on science self-efficacy. The dependent variable was the mean difference scores of Science Self-efficacy and the independent variable of instructional treatment was studied at three levels namely, experimental group (T1) which was taught through cooperative learning settings JIGSAW IV, experimental group (T2) taught through teacher-directed instruction followed by cooperative learning settings STAD and control group (T3) which was taught by conventional method. The variable of cognitive style was studied at two levels, viz., field-independence (C1) and field-dependence (C2). The schematic layout of the design has been presented in Figure 1 below:

T1–Experimental group 1
T2–Experimental group 2
T3–Control group
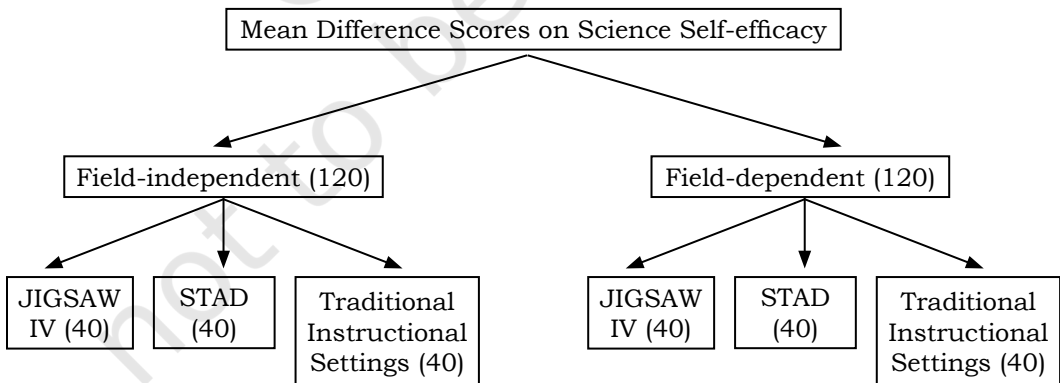
Figure 1: Schematic Layout of design of the study

Tools Used

Following tools were used:

1. Group Embedded Figures Test (Witkin, Oltman, Raskin and Karp, 1971)

2. Science Self-Efficacy Scale (SSES) developed by the investigator comprised of 37 items in four domains, viz., Self-confidence, Physiological arousal (Positive attitude towards science), Performance outcome expectation, Social persuasion.

   Reliability of the scale

   (i) By Test-Retest was 0.93

   (ii) By Split-Half method was 0.81 (Spearman Brown's) and 0.86 (Guttman's formula)

3. Instructional material for STAD and JIGSAW IV and worksheets

PROCEDURE

After the selection of the sample from three different government schools of Chandigarh, the experiment was conducted following three stages.

Stage 1: Administration of the pre-test

This phase involved the administration of the science self-efficacy scale to the students of both the experimental groups and the control group.

Stage 2: Conducting the instructional program

The instructional treatment was manipulated in the form of teacher directed instruction followed by cooperative learning settings (JIGSAW IV and STAD) to the experimental group, whereas the control group was taught through conventional method. All the groups were taught 5 chapters of science syllabus prescribed by NCERT. The instructional treatment was carried out for 50 days.

The method of cooperative learning JIGSAW IV was used in the first experimental group. In this method, first of all the learning material was divided into four sections. The students were assigned into the group of four called home groups. Each student in a group of 4 gets a different section to learn. The students having same sections meet in expert group to teach and understand the content from each other. Next, students take group quiz and move towards their home groups to teach them and perform on individual worksheets, which contribute to team scores. The students are given reinforcement as gifts, prizes or display of the names of the winning team and a shining star pupil whose scores have improved gradually.

In the second experimental group, another cooperative learning method used was STAD. The students were divided into a group of four (Slavin, 1997). In team study, students worked on worksheets followed by teacher-directed instruction to master the material which was presented in the skill being taught.

The students were re-assigned to different groups from time to time so that they were able to interact with other members of the class.

For team study all the members were given the following instructions in both the groups:

- You have to finish studying only when you are certain that everyone in the team understands the given question.

- If there is a disagreement among team members then they are to present their arguments and resolve the problem themselves.

- When you have questions, ask your teammates first.

- Encourage and praise your teammates from time to time.

- Listen patiently to the points presented by your teammates.

- Have patience in explaining the concept or skill to weaker student.

Stage III: Administration of the post-test

After the instructional treatment of 50 days, science self-efficacy scale was again administered to both the experimental and control groups to discern the effect of treatment.

Analysis of mean difference scores on science self-efficacy

After scoring the difference between post-test and pre-test scores on science self-efficacy were computed. The obtained mean difference was subjected to 2×3 analysis of variance. The means and SD's of different sub-samples were computed and have been presented in Table 2 and the summary of ANOVA for 2×3 design for mean difference scores on science self-efficacy is presented in Table 3.

Table 2
Means and SD's of sub-samples of 2×3 design for mean difference scores on science self-efficacy

	Groups	T1	T2	T3	Total
Total	**C1**	M=16 n=40 SD=11.44	M=10.37 n=40 SD=9.63	M=5.07 n=40 SD=7.52	M=10.48 n=120 SD=10.58
	C2	M=19.6 n=40 SD=11.01	M=14.27 n=40 SD=9.40	M=7.42 n=40 SD=7.90	M=13.76 n=120 SD=10.68
	Total	M=17.8 n=40 SD=11.30	M=12.32 n=40 SD=9.65	M=6.25 n=40 SD=7.76	
Domain 1: Self confidence	**C1**	M=4.02 n=40 SD=3.33	M=2.40 n=40 SD=2.20	M=0.97 n=40 SD=2.21	M=2.46 n=40 SD=2.90
	C2	M=4.60 n=40 SD=3.75	M=3.30 n=40 SD=2.39	M=2.05 n=40 SD=2.38	M=3.31 n=40 SD=3.07

	Total	M=4.31 n=40 SD=3.54	M=2.85 n=40 SD=2.33	M=1.51 n=40 SD=2.34	
Domain 2: Physiological arousal	**C1**	M=3.92 n=40 SD=4.74	M=3.35 n=40 SD=5.27	M=1.22 n=40 SD=2.57	M=2.83 n=40 SD=4.47
	C2	M=4.62 n=40 SD=4.25	M=3.02 n=40 SD=3.64	M=2.10 n=40 SD=3.33	M=3.25 n=40 SD=3.87
	Total	M=4.27 n=40 SD=4.49	M=3.18 n=40 SD=4.50	M=1.66 n=40 SD=2.99	
Domain 3: Performance Outcome Expectation	**C1**	M=2.72 n=40 SD=3.14	M=2.87 n=40 SD=3.14	M=3.41 n=40 SD=2.39	M=2.72 n=40 SD=3.08
	C2	M=3.57 n=40 SD=4.54	M=3.07 n=40 SD=5.11	M=11.26 n=40 SD=2.95	M=3.57 n=40 SD=4.41
	Total	M=4.35 n=40 SD=3.89	M=3.31 n=40 SD=4.29	M=1.78 n=40 SD=2.68	
Domain 4: Social Persuasion	**C1**	M=3.92 n=40 SD=3.94	M=2.15 n=40 SD=2.30	M=1.32 n=40 SD=2.43	M=2.46 n=40 SD=3.15
	C2	M=5.80 n=40 SD=4.64	M=4.15 n=40 SD=3.83	M=1.25 n=40 SD=2.04	M=3.73 n=40 SD=4.10
	Total	M=4.86 n=40 SD=4.38	M=3.15 n=40 SD=3.29	M=1.28 n=40 SD=2.23	

Table 3
Summary of 2×3 ANOVA of mean differences on total scores and on four domains of Science self-efficacy Scale

Source of Variation	df	Sum of Squares	MSS	F-ratio
Total				
T	2	5340.9	2670.45	29.72**
C	1	646.81	646.81	7.20**
TXC	2	559.30	279.65	3.11*
Within Sets	234	21021.2	89.83	

Domain 1: Self confidence				
T	2	313.80	156.90	20.26**
C	1	43.35	43.35	5.59*
TXC	2	2.57	1.28	0.16(NS)
Within Sets	234	1811.45	7.74	
Domain 2: Physiological arousal				
T	2	275.55	137.77	8.31**
C	1	10.41	10.41	0.62(NS)
TXC	2	16.80	8.40	0.50(NS)
Within Sets	234	3878.8	16.57	
Domain 3: Performance Outcome Expectation				
T	2	265.82	132.91	9.83**
C	1	0.75	0.75	0.05(NS)
TXC	2	60.62	30.31	2.24(NS)
Within Sets	234	3163.4	13.51	
Domain 4: Social Persuasion				
T	2	511.52	255.76	22.81**
C	1	96.26	96.26	8.58**
TXC	2	54.15	27.07	2.41(NS)
Within Sets	234	2623.65	11.21	

NS-Not Significant
*-Significant at 0.05 level of confidence
**- Significant at 0.01 level of confidence

MAIN EFFECTS AND DISCUSSION OF RESULTS

Cognitive Style C

F-ratio (Table 3) for the mean differences on science self-efficacy scores of the two cognitive styles was found to be significant at 0.01 level of confidence. An examination of means indicate that the field-dependent group of students exhibited better science self-efficacy than field-independent group of students. Thus, H1 was rejected. Further evidences of the result are supported by the study of Pintrich and de Groot (1990). The results of the present study contradicted with the findings of DeTure (2004) who found results in favour of field-independent students outperforming field-dependent students whereas Valncia-Vallejo, Lopez-Vargas and Sanebria-Rodriguez (2018) found that

cognitive style do not have significant effect on academic self-efficacy in e-learning environment. These researchers have used web-based environments, whereas the present research incorporates cooperative learning environment.

For all the four domains namely self-confidence, physiological arousal, performance outcome expectation and social persuasion of science self-efficacy the F-ratio (Table 3) was found to be significant for self-confidence and social persuasion. An examination of means indicate that field-dependent group of students exhibited better on the domains of self-confidence and social persuasion. Thus H1.01 and H1.04 were rejected, whereas F-ratio for physiological arousal and performance outcome expectation was found to be not significant. Thus, H1.02 and H1.03 were retained.

Treatment (T)

F-ratio (Table 3) for the variation in mean differences on science self-efficacy scores of the three instructional treatments was found to be significant at 0.01 level of confidence. Thus, H2 was rejected.

For further investigation t-ratios were computed for comparison between the three treatments. Significant difference was found on mean difference scores among the group of students when taught through JIGSAW IV and STAD (t ratio=2.26*), among the group of students when taught through STAD and conventional method (t ratio=3.93**) and the group of students taught through JIGSAW IV and conventional method (t ratio=5.47**). This implies that students when exposed to JIGSAW IV and STAD exhibited better science self-efficacy than the conventional group. Among the cooperative learning strategies, it infers that students who were taught through JIGSAW IV yielded better results than the students exposed to STAD method.

Note: *Significant at 0.05 level of confidence

**Significant at 0.01 level of confidence

F-ratio (Table 3) for the difference in the three instructional treatments on the mean difference scores of science self-efficacy was found to be significant on all the four domains namely- self-confidence, physiological arousal, performance expectation and social persuasion at 0.01 level of confidence. Thus, H2.01, H2.02, H2.03 and H2.04 were rejected.

Cooperative learning strategy JIGSAW IV and STAD were found to be more effective than conventional methods on science self-efficacy. The results were consistent with the findings of Yoruk (2016), Darnon, Buchs and Desbar (2012), Santosh (2012), Torchia (2012), Ames (1984) and Nichols and Miller (1994). Among cooperative learning strategies JIGSAW IV was found to yield better results as compared to STAD method. It might be due to the reason that STAD provides less independent situations

of learning as compared to JIGSAW IV, which has contributed towards better science self-efficacy mean difference scores. This implies that if group learning experiences that incorporate more individual accountability are provided in the classroom, it helps to build the academic self-confidence of the students and later increases students' responsibility for their own learning. There is also pressure for performance as created by cooperative learning techniques enhances the student's science self-efficacy through self-evaluation and the sense of contributing towards the group scores.

INTERACTION EFFECTS

Treatments and Cognitive styles (TXC)

F-ratio (Table 3) for the interaction between the treatments and cognitive styles was found to be significant at 0.05 level of confidence. Leading to the inference that two variables interact with each other. Hence, H3 was rejected.

To investigate further interaction between treatment and cognitive style the t-ratios were computed.

Field-independent and field-dependent group of students yielded comparable mean difference on science self-efficacy scores when taught through cooperative learning strategies JIGSAW IV (t=0.90), STAD (t=1.39) and conventional method (t=1.65).

Field-independent students exhibited comparable mean difference scores for JIGSAW IV and STAD cooperative learning strategies on science self-efficacy (t=1.86). Field-independent students yielded better mean difference scores through cooperative learning strategy JIGSAW IV than the conventional method (t= 4.11**) and better mean difference scores through cooperative learning strategy STAD than the conventional method (t= 2.90**).

Field-dependent students yielded comparable mean difference scores on science self-efficacy for cooperative learning strategies JIGSAW IV and STAD (t=1.38). Field-dependent students yielded better mean difference through cooperative learning strategy JIGSAW IV than conventional method (t=3.67**) and through cooperative learning strategy STAD than conventional method (t=2.69**).

Comparable mean differences on science self-efficacy scores were exhibited by field-independent students when taught through cooperative learning strategy JIGSAW IV and field-dependent students when taught through STAD (t=0.50), and among field-independent students when taught through cooperative learning strategy STAD and field-dependent students when taught through conventional method (t= 1.46).

On science self-efficacy, field-dependent students yielded better mean difference scores through cooperative learning strategy JIGSAW IV than field-independent students in

cooperative learning strategy STAD (t=2.63**), field-dependent students yielded better mean difference scores through cooperative learning strategy JIGSAW IV than field-independent students when taught through conventional method (t=4.53**), field-dependent students yielded better mean difference scores through cooperative learning strategy STAD than field-independent students when taught through conventional method (t= 3.84**), and field-independent students yielded better mean difference scores through cooperative learning strategy JIGSAW IV than the field-dependent students when taught through conventional method (t=3.07**).

Note: *Significant at 0.05 level of confidence
**Significant at 0.01 level of confidence

With respect to four domains of science self-efficacy namely—self-confidence, physiological arousal, performance outcome expectation and social persuasion field-independent and field-dependent groups for different instructional treatments yielded comparable mean difference scores on science self-efficacy as F-ratio (Table 3) was found not to be significant even at 0.05 level of confidence. Hence, H3.01, H3.02, H3.03 and H3.04 were retained.

It is inferred that treatments interact with cognitive style on the whole but not with the rest of the four domains of science self-efficacy.

CONCLUSION

As revealed in the study, cooperative learning strategies have a positive effect on the science self-efficacy of students. Among both the cooperative learning strategies Jigsaw IV yielded better results. Field-dependent students yielded higher mean difference scores on self-efficacy than field-independent students. The interaction results too revealed that both field-independent and field-dependent students exhibited better self-efficacy in the cooperative learning classrooms than their counterparts in the conventional classroom. The results indicate that if classroom learning environment aligns with the student's cognitive style, their self-efficacy is enhanced. Also in context of the Indian school environment whereby a group of students are facilitated with smart classes to learn, while others strife to learn even through the conventional methods of learning. In this scenario, cooperative learning methods can prove to be a help. The behavior of students towards others and the way of interaction should be observed very carefully. Some changes that can be brought about in Indian classrooms to benefit students can be:

• Group learning methods should be adopted to enhance self-confidence of students, providing opportunities to perform in front of others, display one's intelligence and mutual agreements to solutions.

- Students' cognitive styles of learning if identified, can be used as a medium to understand each student's necessity, and the classroom environments and teaching methodologies can be changed accordingly.
- While involved in group processing, the teacher should make sure that the students are discussing the concept in right direction or guidance should be provided wherever need arises.
- Emphasis should be given to create classroom situations that compel the students to involve in discussions, involving eye-contact, accepting others ideas, showing patience with group members and reaching conclusions or solutions collectively.
- If the understanding of the scientific concepts, is approved by the classmates, it gives the child confidence in himself to perform again and again.
- Motivation must be given through certain subject based activities to pupils to arrive at solutions with the help of classmates.
- Teacher should ensure frequent use of reinforcements given to students for performing good in groups and even by the students of the groups to each other for putting in good efforts.
- Constant rewards in the form of prizes, display of names on notice board for improvement in performance should be used to arouse interest in the science of subject.

To conclude, Indian classrooms can be made a better place to learn by introducing cooperative learning strategies through regular activities of evaluation like formative tests to train students in aspiring according to their competence. As much group activities can be planned in classrooms to enhance science self-efficacy of students creating a situation of dependence on the others for success. Students can be taught to take responsibility of others learning by promoting group study. Self-study in groups, project work and assignments should be recommended as a mode of learning. If implemented properly, cooperative learning strategies can certainly bring about a change in the scenario of Indian science classrooms.

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Assessment of the Implementation of RTE Act, 2009, in Context of Curriculum in Government and Private Elementary Schools of western Uttar Pradesh

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Abstract

The present paper seeks to find out the status of the implementation of Right to Education (RTE) Act-2009, in the elementary schools of western Uttar Pradesh in the light of the norms prescribed in the RTE Act in context of curriculum. The Act was passed in 2009 and came into force since 1st April, 2010. About ten years of the implementation of the Act, researchers attempted to find out the status of its implementation according to the provisions of curriculum. A self-made tool was used by the researchers to assess the implementation of the RTE Act. Both quantitative and qualitative analysis was performed. Coding, scoring of the data and analysis was done by using the SPSS software. The statistical techniques used for analysing the data were: percentage, t-test and graphs. It was found that some of the provisions of the RTE Act in context of curriculum are followed in the elementary schools of western U.P.

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Introduction

Right to Education Act-2009 came into force on 1st April 2010 as a fundamental right in India. Chapter V of RTE Act deals with curriculum and completion of elementary education. As it is evident that curriculum is an important aspect of our elementary education system which lays special focus on improving the quality of education. NCF–2005 provides a framework along with the guiding principles for making the curriculum and school environment child-friendly that is, free of stress and fear.

Following are some of the salient features of the Right of Children to Free and Compulsory Education Act, as stated by Bairagya, R. and Bairagya, S. (2011)—

- Free and compulsory education to all children of India between six to fourteen age groups;
- No child shall be held back, expelled or required to pass a board examination until completion of elementary education;
- A child above six years of age has not been admitted in any school or though admitted, could not complete the elementary education, then, they shall be admitted in a class appropriate to their age; provided that where a child is directly admitted in a class appropriate to their age, then, they shall, in order to be at par with others, have a right to receive special training, in such manner, and within such time limits, as

may be prescribed: provided the child so admitted to elementary education shall be entitled to free education till completion of elementary education even after fourteen years;

- For the purpose of admission to elementary education, the age of a child shall be determined on the basis of the birth certificate issued in accordance with the provisions of the Births, Deaths and Marriages Registration Act, 1856 or on the basis of such other document, as may be prescribed. No child shall be denied admission in a school for lack of age proof;
- A child who completes elementary education shall be awarded a certificate;
- Calls for a fixed student-teacher ratio;
- Will apply to all of India except Jammu and Kashmir;
- Provides for 25 per cent reservation for economically disadvantaged communities in admission to Class I in all private schools;
- Mandates improvement in quality of education;
- School teachers will need adequate professional degree within five years or else will lose job;
- School infrastructure (where there is a problem) to be improved in three years, else recognition shall remain cancelled;
- Financial burden will be shared between state and central government.

Rekha, C 2011 analyses access provisions under the RTE Act, 2009 and SSA, and declares that access does not constitute mere physical availability of school; it implied facilitating full, free and joyful participation of children in learning. Interventions for universalising access, therefore, cannot be limited to school infrastructure, residential facilities or transportation, but must encompass curriculum, including 'hidden' curriculum, pedagogy and assessment. Equitable access must amalgamate with equitable quality to institutionalism and sustain universal access.

OBJECTIVE OF THE STUDY

The present study is based on the following objective:

1. To assess the implementation of RTE Act in context of curriculum among the private and secondary elementary schools of Western U.P.

As we know that curriculum is the backbone of any educational institution and is a quite wide area, the researchers therefore have taken only the following criteria of curriculum in this study:

1. NCF (2005) is followed or not.
2. Children are taught in their mother tongue.
3. Curriculum helps to assess the creativity.
4. Curriculum gives importance to rote memorisation.
5. Curriculum helps to assess the intellect of the students.
6. Curriculum gives emphasis to personality development.
7. Curriculum helps in sharpening the communicative skills of the students.
8. Curriculum helps in building the confidence level of the students.
9. Curriculum helps in the psychomotor development of the students.
10. Curriculum helps in developing an aesthetic sense among the students.
11. CCE is undertaken for understanding of child's knowledge.
12. Examination is required to promote the child for the next higher class.
13. Child is awarded a certificate after completing the elementary education.

METHODOLOGY

The population of the study consists of the principals and teachers of all the government and private elementary schools of western Uttar Pradesh. Sample of the study constitute 731 Teachers, 60 Principals and Vice-Principals from 4 districts of western Uttar Pradesh, i.e., Aligarh, Etawah, Hathras and Muzaffar Nagar. The sample was selected by using purposive sampling technique.

For collecting data, the Investigator personally visited Elementary schools and

Analysis and interpretation

Table 1
NCF (2005) is followed or not

Do you follow NCF 2005?	Principal						Teachers					
	Private		Government		Total		Private		Government		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes	25	75.8	20	74.1	45	75.0	371	87.3	253	82.7	624	85.4
No	–	–	5	18.5	5	8.3	9	2.1	34	11.1	43	5.9
No Response	8	24.2	2	7.4	10	16.7	45	10.6	19	6.2	64	8.8
Total	33	100	27	100	60	100	425	100	306	100	731	100

contacted the Principals and Vice-Principals, and Teachers of schools to administer self-made Information Schedules on them. Seven categories were made in the tool according to the guidelines of the Right to Education Act, 2009. The first category consists of 5 items regarding personal information of the respondents which include the name, administrative experience, teaching experience, academic and professional qualifications and employment status of the respondents. In second category 6 items were framed which seek information about level, nature, etc., of the School. To check the awareness level of the respondents about the RTE (2009), third category was framed of 3 items. Fourth category was comprised of 7 items about the management and administrative policies. It tends to elicit the information about the admission process and the provisions that are followed. Fifth category consists of 6 items related with teacher's eligibility criteria and their teaching, whereas 13 items related with the curriculum are included in the sixth category. The last, i.e., seventh category included 8 items about the functions of the School Management Committees. In the end there is an open-ended question seeking suggestions for the effective implementation of RTE. Useful suggestions given by the experts were incorporated.

Reliability of Information Schedule was calculated by using test-retest method, which equals to 0.84 and content validity was found to be high. Coding, scoring of the data and analysis was done by using the SPSS software. The statistical techniques used for analysing the data were: percentage, t-test and graphs.

Table 1 shows whether National Curriculum Framework (2005), is followed or not in the Schools. An aggregate of 74.1 per cent principals, out of which 75.8 per cent were private and 74.1 per cent government agreed to the fact that NCF is followed in their schools. Similarly, 87.3 per cent private and 82.7 per cent government school teachers, with an aggregate of 85.4 per cent agreed to it. But, not a single private school principal and only 5 per cent government school principals agreed that NCF is not followed in their school. While, 2.1 per cent private and 11.1 per cent government teachers agreed that NCF is not followed in their schools. A total of 16.7 per cent principals and 8.8 per cent teachers did not respond to the question. Table 1 represents the above data.

Table 2 shows the difference between the responses of principals and teachers regarding the norms of NCF (2005). The obtained t-value of private and government school principals is 2.04 which is significant at 0.05 level of significance. The mean score of private school principals (1.75) is more than government school principals (1.74). So, it means that private schools follow NCF (2005) more in comparison to government schools according to the responses of the principals. The obtained t-value of private and government school teachers is 0.03 which is non-significant at 0.05 level of significance. Therefore, it indicates that the private and government school teachers' responses do not differ in following the norms of NCF (2005).

Table 2

Shows the difference between the responses of Principals and Teachers in following the NCF (2005)

Do you follow NCF 2005?	Principal							Teachers						
	Private		S.D.	Government		S.D.	t	Private		S.D.	Government		S.D.	T
	N	Score		N	Score			N	Score		N	Score		
Yes	25	50	2.61	20	40	1.7	df=58 2.04*	371	742	0.59	253	506	0.50	df=729 0.03**
No	–	–		5	5			9	9		34	34		
No Response	8	8		2	2			45	45		19	19		
Total	33	50		27	47			425	796		301	559		
Mean Score		1.75			1.74				1.87			1.82		

* Significant at 0.05 level
** Non-significant at 0.05 level

Table 3
Children are taught in their mother tongue

| Children are taught in their mother tongue | Principal | | | | | | Teachers | | | | | |
| | Private | | Government | | Total | | Private | | Government | | Total | |
	N	%	N	%	N	%	N	%	N	%	N	%
Always	12	36.4	24	88.9	36.0	60	137	32.2	226	73.9	363	49.7
Sometimes	17	51.5	3	11.1	20.0	33.3	258	60.7	64	20.9	322	44.0
Never	3	9.1	–	–	3	5	21	4.9	12	3.9	33	4.5
No Response	1	3.0	–	–	1	1.7	9	2.1	4	1.3	13	1.8
Total	33	100	27	100	60	100	425	100	306	100	731	100

Table 3 provides responses to the question that children are taught in their mother tongue or not. A total of 60 per cent principals responded to the option 'Always' out of which 36.4 per cent were private and 88.9 per cent were government school principals. In the same way, 32.2 per cent private and 73.9 per cent were government school teachers with a total of 49.7 per cent responded to it. 'Sometimes' was marked as a response by 51.5 per cent private and 11.1 per cent government school principals with an aggregate of 33.3 per cent. Similarly, 60.7 per cent private and 20.9 per cent government teachers also marked it. 'Never' as a response was marked by 9.1 per cent private and not by any government principal. A total of 4.5 per cent teachers, out of which 4.9 per cent were private and 3.9 per cent were government teachers also marked it. Table 3 represents the above data.

Table 4 shows the significant difference between the responses of private and government school principals and teachers by using t-test. The obtained t-value of principals is 4.42, which is significant at 0.01 level of significance. The mean score of government school principals (2.88) is more in comparison to the mean score of private school principals (2.24). Whereas, in case of teachers the t-value is found to be 10.48 which is also significant at 0.01 level of significance. The mean score of government school teachers (2.68) is more in comparison to the mean score of private school teachers (2.25). So, the mean score of both private and government school principals and teachers is favoring towards the government schools. Therefore, it indicates that in government schools children are taught in their mother tongue.

Table 4

Shows difference between the responses of Principals and Teachers finding whether the children are taught in their mother tongue

Children are taught in their mother tongue	Principal						Teachers					
	Private		S.D.	Government		S.D.	t	Private		S.D.	Government		S.D.	t
	N	Score		N	Score			N	Score		N	Score		
Always	12	36		24	72		df=58	137	411		226	678		df=729
Sometimes	17	34	0.74	3	6	0.32	4.42*	258	516	0.57	64	128	0.53	10.48*
Never	3	3		–	–			21	21		12	12		
No response	1	1		–	–			9	9		4	4		
Total	33	74		27	78			425	957		306	822		
Mean Score		2.24			2.88				2.25			2.68		

Significant at 0.01 level

Table 5

Curriculum helps to assess the creativity

The curriculum helps to assess the creativity of the students	Principal						Teachers					
	Private		Government		Total		Private		Government		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes	29	87.9	25	92.6	54	90	371	87.3	263	85.9	634	86.7
Somewhat	4	12.1	1	3.7	5	8.3	38	8.9	35	11.4	73	10.0
No	–	–	1	3.7	1	1.7	3	0.7	1	0.3	4	0.5
No Response	–	–	–	–	–	–	13	3.1	7	2.3	20	2.7
Total	33	100	27	100.0	60	100	425	100	306	100	731	100

Table 6

Shows difference between the responses of Principals and Teachers finding whether the curriculum helps to assess the creativity of the students

The curriculum helps to assess the creativity of the students	Principal							Teachers						
	Private		S.D.	Government		S.D.	t	Private		S.D.	Government		S.D.	T
	N	Score		N	Score			N	Score		N	Score		
Yes	29	87	0.33	25	75	0.42	df=58	371	1113	0.496	263	789	0.44	df=729
Somewhat	4	8		1	2		0.10**	38	76		35	70		0.07**
No	–	–		1	1			3	3		1	1		
No Response	–	–		–	–			13	13		7	7		
Total	33	95		27	78			425	1205		306	867		
Mean Score	2.87			2.88				2.83			2.83			

**Non- Significant at 0.05 level

Table 5 shows whether the curriculum helps to assess the creativity of the students or not. A total of 90 per cent principals agreed to the statement out of which 87.9 per cent were private and 92.6 per cent were government school principals. Similarly, 87.3 per cent private and 85.9 per cent government teachers also agreed to it with an aggregate of 86.7 per cent. 'Somewhat' as a response was marked by a total of 8.3 per cent principals, with 12.1 per cent private and 3.7 per cent government school principals. A total of 10 per cent teachers also responded to it, out of which 8.9 per cent were private and 11.4 per cent were government school teachers. Not a single private government school principals disagreed to the statement while, 3.1 per cent private and 2.3 per cent government school teachers with an aggregate of 2.7 per cent also disagreed to the statement. Table 5 represents the above data.

Table 6 shows the insignificant difference between the responses of

principals and teachers in finding out if the curriculum helps to assess the creativity of the students or not. The obtained t-value of private and government school principals is 0.10 which is non-significant at 0.05 level of significance. Similarly, the obtained t-value of private and government school teachers is 0.07 which is also non-significant at 0.05 level of significance. Therefore, it indicates that both the private and government school principals and teachers' responses do not differ regarding that the curriculum helps to assess the creativity of the students.

Table 7 assesses whether the curriculum gives importance to rote memorisation or not. To the response of this, a total of 66.7 per cent principals agreed; out of which 60.6 per cent were private school principals and 74.1 per cent were government school principals. In the same way, 61.4 per cent private and 67.6 per cent government school teachers agreed to it with an aggregate of 64.0 per cent. 'Somewhat' was marked by 18.2 per cent private and 3.7 per cent government school principals, with a total of 11.7 per cent principals. Similarly, 15.1 per cent private and 20.6 per cent government teachers also responded to it with a total of 17.4 per cent. But, 18.2 per cent private and 11.1 per cent government principals with a total of 15 per cent disagreed to the statement. A total of 14.1 per cent teachers, out of which 19.8 per cent were private and 6.2 per cent were government

Table 7
Gives importance to rote memorisation

Gives importance to rote memorisation	Principal									Teachers								
	Private		Government		Total			Private		Government		Total					
	N	%	N	%	N	%		N	%	N	%	N	%					
Yes	20	60.6	20	74.1	40	66.7		261	61.4	207	67.6	468	64.0					
Somewhat	6	18.2	1	3.7	7	11.7		64	15.1	63	20.6	127	17.4					
No	6	18.2	3	11.1	9	15		84	19.8	19	6.2	103	14.1					
No Response	1	3.0	3	11.1	4	6.7		16	3.8	17	5.6	33	4.5					
Total	33	100	27	100	60	100		425	100	306	100	731	100					

Table 8
Shows difference between the responses of Principals and Teachers finding if the curriculum gives importance to rote memorisation

Gives importance to rote memorisation	Principal							Teachers						
	Private		S.D.	Government		t		Private		S.D.	Government		S.D.	T
	N	Score		N	Score			N	Score		N	Score		
Yes	20	60		20	60		df=58	261	783		207	621		df=729
Somewhat	6	12	0.89	1	2	1.08	0.17**	64	128	0.88	63	126	0.79	2.5*
No	6	6		3	3			84	84		19	19		
No Response	1	1		3	3			16	16		17	17		
Total	33	789		27	68			425	1011		306	783		
Mean Score		2.39			2.51				2.37			2.55		

* Significant at 0.05 level
**Non-significant at 0.05 level

teachers also disagreed to it. Table 7 represents the above data.

Table 8 shows the difference between the responses of principals and teachers finding whether the curriculum gives importance to rote memorisation. The obtained t-value of private and government school principals is 0.17 which is non-significant at 0.05 level of significance. Therefore, it indicates that the private and government school principals do not differ regarding that the curriculum gives importance to rote memorisation. Also, the obtained t-value of private and government school teachers is 2.5 which are significant at 0.05 levels. The mean score of government school teachers (2.55) is more than private school teachers (2.37), so it indicates that according to the responses of teachers, the government schools give importance to rote memorisation in comparison to private schools.

Table 9 finds out whether the curriculum helps to assess the intellect of the students or not. An aggregate of 83.3 per cent principals gave their response in affirmation, out of which 87.9 per cent were private and 77.8 per cent were government principals. Similarly, 86.1 per cent private and 85.3 per cent government teachers with a total of 85.8 per cent also answered in affirmation. The response 'Somewhat' was marked by 3 per cent private and

14.8 per cent government school principals with a total of 8.3 per cent. A total of 9.4 per cent teachers with 9.4 per cent as private and 9.5 per cent as government teachers also responded to it. While, a total of 6.7 per cent principals disagreed to the statement, out of which 6.1 per cent were private and 7.4 per cent were government principals. In the same way, 0.2 per cent private and 2.3 per cent government teachers also disagreed to it with an aggregate of 1.1 per cent. Table 9 represents the above data.

Table 10 shows the difference between the responses of principals and teachers finding whether the curriculum helps to enhance the intellect of the students or not. The obtained t-value of private and government school principals is 0.31 which is significant at 0.05 level of significance. Similarly, the obtained t-value of private and government school teachers is 0.47 which is insignificant at 0.05 level of significance. Therefore, it indicates that both the private and government school principals and teachers' responses do not differ regarding that the curriculum helps to enhance the intellect of the students.

Table 11 depicts whether curriculum gives emphasis to personality development or not. A total of 85 per cent principals agreed to the statement, out of which 90.9 per cent were private school principals and 77.8 per cent were government school principals. Similarly, 82.8

Table 9
Helps to enhance the intellect

Helps to enhance the intellect of the students	Principal						Teachers					
	Private		Government		Total		Private		Government		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes	29	87.9	21	77.8	50	83.3	366	86.1	261	85.3	627	85.8
Somewhat	1	3.0	4	14.8	5	8.3	40	9.4	29	9.5	69	9.4
No	2	6.1	2	7.4	4	6.7	1	0.2	7	2.3	8	1.1
No Response	1	3.0	-	–	1	1.7	18	4.2	9	2.9	27	3.7
Total	33	100	27	100	60	100	425	100	306	100	731	100

Table 10

Shows difference between the responses of Principals and Teachers finding whether the curriculum helps to enhance the intellect of the students

Helps to enhance the intellect of the students	Principal							Teachers						
	Private		S.D.	Government		S.D.	t	Private		S.D.	Government		S.D.	t
	N	Score		N	Score			N	Score		N	Score		
							df=58							df=729
Yes	29	87	0.70	21	63	0.60	0.31**	366	1098	0.54	261	783	0.54	0.47**
Somewhat	1	2		4	8			40	80		29	58		
No	2	2		2	2			1	1		7	7		
No Response	1	1		–	–			18	18		9	9		
Total	33	93		27	73			425	1197		306	857		
Mean Score		2.81			2.70				2.81			2.80		

**Non-significant at 0.05 level

Table 11

Gives emphasis to personality development

Gives emphasis to personality development	Principal						Teachers					
	Private		Government		Total		Private		Government		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes	30	90.9	21	77.8	51	85	367	86.4	230	75.2	597	82.8
Somewhat	3	9.1	3	11.1	6	10	47	11.1	67	21.9	114	15.8
No	–	–	1	3.7	1	1.7	3	0.7	3	1.0	6	0.8
No Response	–	–	2	7.4	2	3.3	8	1.9	6	2.0	14	1.9
Total	33	100	27	100	60	100	425	100	306	100	721	100

per cent teachers also agreed to this statement among whom 86.4 per cent were private school teachers and 75.2 per cent were government school teachers. To the response 'Somewhat' only 10 per cent principals responded, out of which 9.1 per cent were private and 11.1 per cent were government principals. Among teachers, a total of 15.8 per cent marked this response, out of which 11.1 per cent were private and 21.9 per cent were government teachers. Not a single private school principal disagreed to the statement, but 3.7 per cent government principals disagreed to it. Whereas, a total of 0.8 per cent teachers disagreed to the statement, among them 0.7 per cent were private and 1.0 per cent were government teachers. Table 11 represents the above data.

Table 12 shows the significant difference between the responses of private and government school principals and teachers by using t-test. The mean score of private school principals (2.9) is more than government school principals (2.66). The obtained t-value of principals is 1.92, which is non-significant at 0.05 level of significance. The mean score of private school teachers (2.83) is more than government school teachers (2.72). The t-value is found to

Table 12

Shows the difference between the responses of Principals and Teachers finding whether the curriculum gives emphasis to personality development

Gives emphasis to personality development	Principal								Teachers							
	Private		S.D.	Government		S.D.	t		Private		S.D.	Government		S.D.	t
	N	Score		N	Score				N	Score		N	Score			
							df=58									df=729
Yes	30	90	0.29	21	63	0.88	1.92**		367	1101	0.40	230	690	0.50	3.5*
Somewhat	3	6		3	6				47	94		67	134		
No	–	–		1	1				3	3		3	3		
No Response	–	–		2	2				8	8		6	6		
Total	33	96		27	72				425	1206		302	833		
Mean Score		2.90			2.66					2.83			2.72			

*Significant at 0.05 level
**Non-significant at 0.05 level

Table 13
Helps in sharpening the communicative skills

Helps in sharpening the communicative skills of the students	Principal						Teachers					
	Private		Government		Total		Private		Government		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes	29	87.9	22	81.5	51	85	358	84.2	228	74.5	586	80.2
Somewhat	3	9.1	4	14.8	7	11.7	57	13.4	62	20.3	119	16.3
No	1	3.0	1	3.7	2	3.3	2	0.5	10	3.3	12	1.6
No Response	–	–	–	–	–	–	8	1.9	6	2.0	14	1.9
Total	33	100	27	100	60	100	425	100	306	100	731	100

be 3.5 which are significant at 0.05 level of significance. Therefore, it indicates that in government schools the curriculum gives emphasis to personality development.

Table 13 finds out whether the curriculum helps in sharpening the communicative skills of the students or not. A total of 85 per cent principals agreed, among whom 87.9 per cent were private and 81.5 per cent were government school principals. In the same way, a total of 80.2 per cent teachers also agreed to it; out of which 84.2 per cent were private and 74.5 per cent were government school teachers. 'Somewhat' was marked as a response by 11.7 per cent principals among whom 9.1 per cent were private school principals and 14.8 per cent were government school principals. A total of 16.3 per cent teachers also marked it as a response, out of which 13.4 per cent were private and 20.3 per cent were government school teachers. Some principals disagreed to the statement with a total of 3.3 per cent, out of which 3 per cent were private and 3.7 per cent were government school principals. Similarly, a total of 1.6 per cent teachers disagreed to the statement out of which 0.5 per cent were private and 3.3 per cent were government school teachers. able 13 represents the above data.

Table 14 shows the difference between the responses of private and government school principals and teachers by using t-test. The obtained t-value of principals is 0.57, which is non-significant at 0.05 level

of significance. It means that private and government school principals do not differ regarding that the curriculum helps in sharpening the communicative skills of the students. Whereas in case of teachers, the t-value is found to be 3.61 which is significant at 0.05 level of significance. The mean score of private school teachers (2.81) is more than government school teachers (2.67). So, it indicates that according to the responses of teachers in private schools the curriculum helps in sharpening the communicative skills of the students more in comparison to government school teachers.

　　Table 15 assesses whether the curriculum helps in building the confidence level of the students or not. A total of 85 per cent principals agreed to the statement, out of which 90.9 per cent were private and 77.8 per cent were government school principals. Similarly, 81.5 per cent teachers also agreed to the statement among whom 86.4 per cent were private and 74.8 per cent were government teachers. 'Somewhat' as a response, was marked by an aggregate of 11.7 per cent principals with 6.1 per cent as private and 18.5 per cent as government school principals. 15.3 per cent teachers also marked it, out of which 11.1 per cent were private and 21.2 per cent were government school

Table 14

Shows the difference between the responses of Principals and Teachers finding whether the curriculum helps in sharpening the communicative skills of the students or not

Helps in sharpening the communicative skills of the students	Principal							Teachers						
	Private		S.D.	Government		S.D.	t	Private		S.D.	Government		S.D.	t
	N	Score		N	Score			N	Score		N	Score		
Yes	29	87		22	66			358	1074		228	684		
Somewhat	3	6	0.44	4	8	0.50	0.57**	57	114	0.41	62	124	0.56	3.61*
No	1	1		1	1		df=58	2	2		10	10		df=729
No Response	–	–		–	–			8	8		6	6		
Total	33	94		27	75			425	1198		306	824		
Mean Score	2.84			2.77				2.81			2.67			

**Not significant at 0.05 level*
Significant at 0.05 level

Table 15
Helps in building the confidence level

Helps in building the confidence level of the students	Principal						Teachers					
	Private		Government		Total		Private		Government		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes	30	90.9	21	77.8	51	85	367	86.4	229	74.8	596	81.5
Somewhat	2	6.1	5	18.5	7	11.7	47	11.1	65	21.2	112	15.3
No	1	3.0	1	3.7	2	3.3	2	0.5	3	1.0	5	0.7
No Response	–	–	–	–	–	–	9	2.1	9	2.9	18	2.5
Total	33	100	27	100	60	100	425	100	306	100	731	100

Table 16
Shows difference between the responses of Principals and Teachers finding whether the curriculum helps in building the confidence level of the students or not

Helps in building the confidence level of the students	Principal					Teachers				
	Private		S.D.	Government		S.D.	t			
	N	Score	S.D.	N	Score	S.D.	t			
Yes	30	90		21	63		df=58			
Somewhat	2	4	0.41	5	10	0.52	1.13**			
No	1	1		1	1					
No Reponse	–	–		–	–					
Total	33	95		27	74					
Mean Score		2.87			2.74					

Helps in building the confidence level of the students	Teachers					
	Private		S.D.	Government		t
	N	Score	S.D.	N	Score	t
Yes	367	1101		229	687	df=729
Somewhat	47	94	0.41	65	130	0.56	3.84*
No	2	2		3	3	
No Reponse	9	9		9	9	
Total	425	1206		306	829	
Mean Score		2.83			2.70	

**Not significant at 0.05 level*
Significant at 0.01 level

teachers. A total of 3.3 per cent principals disagreed to the statement with 3 per cent as private and 3.7 per cent as government school principals. In the same way, an aggregate of 0.7 per cent teachers disagreed to the statement with 0.5 per cent private and 1.0 per cent as government school teachers. Table 15 represents the above data.

Table 16 shows the difference between the responses of private and government school principals and teachers by using t-test. The obtained t-value of principals is 1.13, which is non-significant at 0.05 level of significance. It means that private and government school principals do not differ regarding that the curriculum helps in building the confidence level of the students. Whereas in case of teachers, the t-value is found to be 3.84 which is significant at 0.05 level of significance. The mean score of private school teachers (2.83) is more than government school teachers (2.70). Therefore, it indicates that according to private school teachers the curriculum helps in building the confidence level of the students more in comparison to government school teachers.

Table 17 finds out if the curriculum helps in the psychomotor development of the students. An aggregate of 65 per cent principals agreed to the statement, among whom 63.6 per cent were private and 66.7 per cent were government principals. A total of 78.1 per cent teachers agreed to the statement

Table 17
Helps students in their psychomotor development

Helps students in their psychomotor development	Principal						Teachers					
	Private		Government		Total		Private		Government		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes	21	63.6	18	66.7	39	65	335	78.8	236	77.1	571	78.1
Somewhat	7	21.2	6	22.2	13	21.7	71	16.7	53	17.3	124	16.9
No	1	3.0	1	3.7	2	3.3	3	0.7	4	1.3	7	0.9
No Response	4	12.1	2	7.4	6	10	16	3.8	13	4.2	29	3.9
Total	33	100	27	100	60	100	425	100	306	100	731	100

Table 18

Shows difference between the responses of Principals and Teachers finding whether the curriculum helps students in their psychomotor development

Helps students in their psychomotor development	Principal							Teachers						
	Private		S.D.	Government		S.D.	t	Private		S.D.	Government		S.D.	t
	N	Score		N	Score		df=58	N	Score		N	Score		df=729
Yes	21	63		18	54			335	1005		236	708		
Somewhat	7	14	1.02	6	12	0.89	0.46**	71	142	0.59	53	106	0.64	0.70**
No	1	1		1	1			3	3		4	4		
No Response	4	4		2	2			16	16		13	13		
Total	33	82		27	69			425	1166		306	831		
Mean Score		2.48			2.55				2.74			2.71		

**Not significant at 0.05 level

with 78.8 per cent and 77.1 per cent as private and government teachers respectively. 'Somewhat' was responded by a total of 21.7 per cent principals, out of which 21.2 per cent were private and 22.2 per cent government school principals. Similarly, it was also marked by 16.9 per cent teachers out of which 16.7 per cent were private and 17.3 per cent were government school teachers. A total of 3.3 per cent principals disagreed to the statement, out of which 3 per cent were private and 3.7 per cent were government school principals. In the same way, 0.9 per cent teachers out of which 0.7 per cent was private and 1.3 per cent was government school teachers disagreed to it. Table 17 represents the above data.

Table 18 shows the difference between the responses of principals and teachers finding whether the curriculum helps in the psychomotor development of the students or not. The obtained t-value of private and government school principals is 0.46 which is insignificant at 0.05 level of significance. Similarly, the obtained t-value of private and government school teachers is 0.70 which is also insignificant at 0.05 level of significance. Therefore, it indicates that both the private and government school principals and teachers' responses do not differ regarding that the curriculum helps in the psychomotor development of the students.

Table 19 assesses if the curriculum helps in developing an aesthetic sense among the students or not. A total of 61.7 per cent principals supported the statement, out of which 63.6 per cent were private and 59.3 per cent were government school principals. Similarly, a total of 68.4 per cent teachers supported the statement, out of which 71.5 per cent were private and 64.0 per cent were government school teachers. 'Somewhat' as a response was supported by 30.3 per cent private and 29.6 per cent government principals with a total of 30 per cent. A total of 26.7 per cent teachers also supported this response, out of which 24.2 per cent were private and 30.1 per cent were government school teachers. Not a single private school principal disagreed to the statement while 3.7 per cent government principals disagreed to the statement. Similarly, a total of 1.6 per cent teachers disagreed to the statement, out of which 0.9 per cent were private and 2.6 per cent were government teachers respectively. Table 19 represents the above data.

Table 20 shows the difference between the responses of principals and teachers finding whether the curriculum helps in developing an aesthetic sense among the students or not. The obtained t-value of private and government school principals is 0.49, which is insignificant at 0.05 level of significance indicating that the private and government school principals do not differ regarding

Table 19
Helps in developing aesthetic sense

Helps in developing aesthetic sense among the students	Principal						Teachers					
	Private		Government		Total		Private		Government		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Yes	21	63.6	16	59.3	37	61.7	304	71.5	196	64.1	500	68.4
Somewhat	10	30.3	8	29.6	18	30.0	103	24.2	92	30.1	195	26.7
No	–	–	1	3.7	1	1.7	4	0.9	8	2.6	12	1.6
No Response	2	6.1	2	7.4	4	6.7	14	3.3	10	3.3	24	3.3
Total	33	100	27	100.0	60	100	425	100	306	100	731	100

Table 20

Shows difference between the responses of Principals and Teachers finding whether the curriculum helps in developing aesthetic sense

Helps in developing aesthetic sense among the students	Principal						Teachers					
	Private		S.D.	Government		t	Private		S.D.	Government		t
	N	Score		N	Score		N	Score		N	Score	
Yes	21	63		16	48	df=58	304	912		196	588	df=729
Somewhat	10	20	0.79	8	16	0.49**	103	206	0.59	92	184	2.04*
No	–	–		1	1		4	4		8	8	
No Reponse	2	2		2	2		14	14		10	10	
Total	33	85		27	67		425	1136		306	790	
Mean Score	2.57			2.48			2.67			2.58		

S.D. (Government, Principal) = 0.88   *S.D. (Government, Teachers)* = 0.64

**Non-significant at 0.05 level*
Significant at 0.05 level

Table 21

CCE is undertaken for understanding of child's knowledge

CCE is undertaken for understanding of child's knowledge	Principal						Teachers					
	Private		Government		Total		Private		Government		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Always	28	84.8	20	74.1	48	80	325	76.5	204	66.7	529	72.4
Sometimes	1	3.0	3	11.1	4	6.7	76	17.9	80	26.1	156	21.3
Never	3	9.1	3	11.1	6	10	9	2.1	2	0.7	11	1.5
No Response	1	3.0	1	3.7	2	3.3	15	3.5	20	6.5	35	4.8
Total	33	100	27	100	60	100	425	100	306	100	731	100

that the curriculum helps in developing an aesthetic sense among the students. While, the obtained t-value of private and government school teachers is 2.04 which is significant at 0.05 level of significance. The mean score of private school teachers (2.67) is more than government school teachers (2.58) which indicate that in private schools the curriculum helps in developing an aesthetic sense among the students more in comparison to government schools.

Table 21 shows the responses of the principals and teachers on the statement that CCE is undertaken for understanding of child's knowledge or not. 'Always' as a response was marked by a total of 80 per cent principals, out of which 84.8 per cent were private and 74.1 per cent were government school principals. Similarly, a total of 72.4 per cent teachers marked this response with 76.5 per cent private and 66.7 per cent government teachers. 'Sometimes' was marked by a total of 6.7 per cent principals, out of which 3.0 per cent were private and 11.1 per cent were government school principals. A total of 21.3 per cent teachers also marked this response with 17.9 per cent as private and 26.1 per cent as government school teachers. 'Never' was marked by a total of

Table 22

Shows the difference between the responses of Principals and Teachers finding if CCE is undertaken for understanding of child's knowledge

CCE is undertaken for understanding of child's knowledge	Principal							Teachers						
	Private		S.D.	Government		S.D.	t	Private		S.D.	Government		S.D.	t
	N	Score		N	Score			N	Score		N	Score		
Always	28	84	0.77	20	60	0.84	df=58	325	975	0.61	204	612	0.76	df=729
Sometimes	1	2		3	6		0.67**	76	152		80	160		2.89*
Never	3	3		3	3			9	9		2	2		
No Response	1	1		1	1			15	15		20	20		
Total	33	90		27	70			425	1136		306	794		
Mean Score		2.69			2.55				2.70			2.59		

**Not significant at 0.05 level
*Significant at 0.01 level

Table 23
Examination is required to promote the child

Examination is required to promote the child for the next higher class	Principal						Teachers					
	Private		Government		Total		Private		Government		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Always	29	87.9	22	81.5	51	85	373	87.8	243	79.4	616	84.3
Sometimes	1	3.0	5	18.5	6	10	31	7.3	46	15.0	77	10.5
Never	2	6.1	–	–	2	3.3	11	2.6	2	0.7	13	1.8
No Response	1	3.0	–	–	1	1.7	10	2.4	15	4.9	25	3.4
Total	33	100	27	100	60	100	425	100	306	100	731	100

10 per cent principals, with 9.1 per cent as private and 11.1 per cent as government school principals. In the same way, a total of 1.5 per cent teachers also marked it with 2.1 per cent as private and 0.7 per cent as government school teachers. Table 21 represents the above data.

Table 22 shows the difference between the responses of private and government school principals and teachers by using t-test. The obtained t-value of principals is 0.67, which is insignificant at 0.05 level of significance. It means that private and government schools' principals do not differ regarding that the CCE is undertaken for understanding of child's knowledge. In case of teachers, the t-value is found to be 2.89 which is significant at 0.01 level of significance. The mean score of private school teachers (2.70) is more than government school teachers (2.59). This score is favoring towards private school teachers, so it means that in private schools CCE is undertaken for understanding of child's knowledge more in comparison to government schools.

Table 23 finds out the responses of the principals and teachers on the statement that 'Examination is required to promote the child for the next higher class.' 'Always' was responded by a total of 85 per cent principals, out of which 87.9 per cent were private and 81.5 per cent were government principals. Similarly, an aggregate of 84.3 per cent teachers also responded to it,

out of which 87.8 per cent were private and 79.4 per cent were government teachers. 'Sometimes' was responded by a total of 10 per cent principals with 3.0 per cent private and 18.5 per cent as government school principals. In the same way, a total of 10.5 per cent teachers responded to it with 7.3 per cent as private and 15 as government school teachers. 'Never' was not marked by any government school principal, but was marked by 6.1 per cent private school principals. An aggregate of 1.8 per cent teachers also marked it, out of which 2.6 per cent were private and 0.7 per cent were government school teachers. Table 24 represents the above data.

Table 24 shows the difference between the responses of private and government school principals and teachers by using t-test. The obtained t-value of principals is 0.37, which is insignificant at 0.05 level of significance. It means that the private and government schools principals do not differ regarding that the examination is required to promote the child for the next higher class. In case of teachers, the t-value is found to be 3.0 which is significant at 0.01 level of significance. The mean score of private

Table 24

Shows the difference between the responses of Principals and Teachers finding if examination is required to promote the child

Examination is required to promote the child for the next higher class	Principal						Teachers					
	Private		S.D.	Government		t	Private		S.D.	Government		t
	N	Score		N	Score		N	Score		N	Score	
			0.70			df=58			0.47			df=729
Always	29	87		22	66	0.37**	373	1119		250	750	3.0*
Sometimes	1	2		5	10		31	64		28	56	
Never	2	1		–	–		11	4		6	6	
No Response	1	1		–	–		10	10		15	15	
Total	33	90		27	76		425	1197		306	827	
Mean Score		2.72			2.81			2.81	0.65		2.7	

*Not significant at 0.05 level
**Significant at 0.01 level

Table 25
Child is awarded a certificate

The child is awarded a certificate after completing the elementary education	Principal						Teachers					
	Private		Government		Total		Private		Government		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Always	30	90.9	23	85.2	53	88.3	373	87.8	250	81.7	623	85.2
Sometimes	1	3.0	2	7.4	3	5	32	7.5	28	9.2	60	8.2
Never	–	–	–	–	–	–	4	0.9	6	2.0	10	1.4
No Response	2	6.1	2	7.4	4	6.7	16	3.8	22	7.2	38	5.19
Total	33	100	27	100	60	100	425	100	306	100	731	100

Table 26
Shows difference between the responses of Principals and Teachers finding if child is awarded a certificate

The child is awarded a certificate after completing the elementary education	Principal						Teachers					
	Private		S.D.	Government		t	Private		S.D.	Government		t
	N	Score		N	Score		N	Score		N	Score	
Always	30	90		23	69	df=58	373	1119		250	750	df=729
Sometimes	1	2	0.74	2	4	0.41**	32	64	0.55	28	56	2.7*
Never	–	–	0.82	–	–		4	4	0.76	6	6	
No Response	2	2		2	2		16	16		22	22	
Total	33	94		27	75		425	1203		306	834	
Mean Score		2.78			2.77			2.83			2.72	

**Not significant at 0.05 level
*Significant at 0.05 level

school teachers (2.81) is more than government school teachers (2.7). This score is favoring towards private school teachers so it means that in private schools the examination is required to promote the child for the next higher class more in comparison to government schools.

Table 25 assesses if the child is awarded a certificate after completing the elementary education or not. 'Always' was marked by a total of 88.3 per cent principals, out of which 90.9 per cent were private and 85.2 per cent were government school principals. Similarly, an aggregate of 85.2 per cent teachers also responded to it, out of which 87.8 per cent were private and 81.7 per cent were government teachers. 'Sometimes' as a response was marked by a total of 5 per cent principals with 3 per cent as private and 7.4 per cent as government school principals. It was also marked by 8.2 per cent teachers out of which 7.5 per cent and 9.2 per cent were private and government school teachers respectively. 'Never' was not marked by any private and government school principal but, it was marked by a total of 1.4 per cent teachers out of which 0.9 per cent were private and 2.0 per cent were government school teachers.

Table 26 shows the difference between the responses of private and government school principals and teachers by using t-test. The obtained t-value of principals is 0.41, which is insignificant at 0.05 level of significance. It means that private

and government schools' principals do not differ regarding that the child is awarded a certificate after completing the elementary education. In case of teachers, the t-value is found to be 2.7 which is significant at 0.05 level of significance. The mean score of private school teachers (2.83) is more than government school teachers (2.72). As this score is favoring towards private school teachers, so it means that in private schools the child is awarded a certificate after completing the elementary education more in comparison to government schools.

FINDINGS

Findings regarding the implementation of RTE Act in context of curriculum among private and government elementary school Principals and Teachers are given below:

1. The government schools follow NCF (2005) more in comparison to private schools according to the responses of the principals. The private and government school teachers do not differ in following the NCF (2005).

2. In government schools children are taught in their mother tongue more as compared to private schools which can be seen from the responses of private and government school principals and teachers.

3. The private and government school principals and teachers' responses do not differ regarding that the

curriculum helps to assess the creativity of the students.

4. The private and government school principals do not differ regarding that the curriculum gives importance to rote memorisation. According to the responses of teachers, the government schools give more importance to rote memorisation in comparison to private schools.

5. The private and government school principals and teachers' responses do not differ regarding that the curriculum helps to enhance intellect of the students.

6. In government schools, the curriculum gives emphasis to personality development according to the responses of private and government school principals and teachers.

7. The private and government schools principals do not differ regarding that the curriculum helps in sharpening the communicative skills of the students. According to the responses of teachers, in private schools the curriculum helps in sharpening the communicative skills of the students more in comparison to government schools.

8. The private and government schools principals do not differ regarding that the curriculum helps in building the confidence level of the students. According to the responses of teachers, in

private schools the curriculum helps in building the confidence level of the students more in comparison to government schools.

9. The private and government school principals and teachers' responses do not differ regarding that the curriculum helps in the psychomotor development of the students.

10. The private and government school principals do not differ regarding that the curriculum helps in developing an aesthetic sense among the students. According to the responses of teachers, in private schools the curriculum helps in developing an aesthetic sense among the students more in comparison to government schools.

11. The private and government schools principals do not differ regarding that the CCE is undertaken for understanding of child's knowledge. According to the responses of teachers, in private schools CCE is undertaken for understanding of child's knowledge more in comparison to government schools.

12. The private and government school principals do not differ regarding that the examination is required to promote the child for the next higher class. According to the responses of teachers, in private schools the examination is required to promote the child

for the next higher class more in comparison to government schools.

13. The private and government school principals do not differ regarding that the child is awarded a certificate after completing the elementary education. According to the responses of teachers, in private schools the child is awarded a certificate after completing the elementary education more in comparison to government schools.

IMPLICATIONS

1. NCF (2005) is still not followed in many government and private schools. The present study highlights the need of proper monitoring and counseling of the administrators and teachers belonging to private schools more in comparison to government schools.

2. The private schools should be encouraged more in comparison to the government schools to teach the students in their mother tongue as already mentioned in NCF (2005) and RTE Act- 2009. The present study emphasises on the need of mother tongue for effective school education.

3. School environment should be made child friendly, which is free of stress and fear that will definitely enhance the creativity and intellect in the students of elementary school.

4. The present study elucidates that all norms and provisions given in the RTE Act-2009, regarding curriculum should be properly understood by the principals and teachers so that these can be effectively implemented by them.

CONCLUSIONS

The present paper has assessed the implementation of the provisions of the RTE Act-2009 in context of curriculum by the private and government elementary schools of the western Uttar Pradesh. The responses of the principals and teachers of the private and government schools are depicted by calculating percentages, means and S.D., which are shown in the tabular form. It clearly shows that some of the provisions of RTE Act, 2009 in context of curriculum are being implemented by all elementary schools and some are not because of many reasons.

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Research Trends in Nature of Science
Analysis and Implications

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Abstract

It's been more than 100 years now since the term 'Nature of Science (NOS)' is being emphasised in the field of science education. Central Association of Science and Mathematics Teachers advocated NOS as an important goal for studying science as early as 1907. Science education reform documents worldwide such as Science for All Americans (AAAS, 1990), Benchmarks for Science Literacy (AAAS, 1993) and National Curriculum Framework (NCF-2005) suggest NOS as an important educational outcome. National Science Teachers Association, NSTA (1982) regarded understanding NOS as one of the critical components of scientific literacy. In such a scenario, the research in this area also has to be on the priority. The focus of the research has been different areas ranging from developing assessment tool on NOS, evaluating students' and teachers' understanding to studying the impact of curriculum and instruction. The early research in this area has been confined to measuring students' attitudes, interest or ability to engage in the process of science. Gradually the focus of the research shifted to epistemological conception of nature of science, that is, science as a way of knowing, values and beliefs inherent to scientific knowledge and its development. With this focus the instruments designed to measure the nature of science became more open ended. This paper presents an overview of several emerging research trends on Nature of Science.

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INTRODUCTION

In the field of science education and pedagogy, Nature of Science (NOS) is an emerging and significant area of research. Researchers and scholars have defined NOS in several ways. During the early 1900's the Nature of Science was equivalent to knowledge of concepts, laws and theories in science. The focus shifted to scientific method and process skill in the 1960's. More recently, nature of science has been associated with the epistemological view of science. Nature of Science (NOS) typically refers to the epistemology of science, science as a way of knowing, or the values and beliefs inherent to scientific knowledge and its development (Lederman, 1992). Similarly, McComas (1998) points out that, the Nature of Science (NOS) is a fertile hybrid arena which blends aspects of various social studies of science including history, sociology and philosophy of science combined with research from cognitive sciences such as psychology into a rich description of what science is, how it works, how scientists operate as a social group and how society itself both directs and reacts to scientific endeavors. Recognising the complex and multifaceted nature of science, an attempt has been made to delineate some common characteristics of NOS that could be used by the researchers, teachers, educators and policy makers in their attempts to develop assessment tools and emphasise NOS in science education. Some of these aspects being tentativeness, laws, vs., theory, subjectivity, imagination and creativity, social and cultural embeddedness, etc. There may be some other aspects which some researchers may include or exclude in the list but more or less the term NOS acquired some consensus about its meaning. In this paper the author has discussed several research trends in the area of Nature of Science and their implications for education. The three main focus areas of research have been as given below.

- Research on development of tools and instruments
- Research on students and teachers' perception of NOS
- Research on curriculum and instruction about NOS

RESEARCH ON DEVELOPMENT OF TOOLS AND INSTRUMENTS

Considering the importance of understanding NOS by the educationist and curriculum makers all over the world, a need was felt to assess the level of understanding NOS among students and teachers. Various tools and instruments have been developed over past few decades to assess students and teachers' conception of NOS. The first formal assessments done in 1960's were mostly quantitative, and various instruments were developed by researchers that could easily grade or quantify the students' and teachers' understanding. Such a trend was more common till mid 1980's.

However, some open-ended questions formed a part of discussions related to construction and validation of test items. More recently, there has been a greater emphasis on getting an in-depth view of understanding NOS. This has resulted in more open-ended probes about NOS. Many of the earlier attempts to assess NOS have focused on assessing science process skills, attitudes and interest thereby limiting the scope and meaning of Nature of Science.

Lederman (2007) points out that the validity of many of these instruments is questionable. One of the first instruments,Test on Understanding Science (TOUS) (Cooley and Klopfer, 1961) consisted of the four-alternative 60-item multiple choice test that can be scored with an "overall" or "general" score as well as three subscale scores (I) understanding about the scientific enterprise; (II) the scientist; (III) the methods and aims of science. The instrument was reasonably good choice at the time it was developed, but later studies have suggested that it is not a good measure of nature of science as some items of TOUS evoke a response of attitude and conveys obscure meaning. Wiscons in Inventory of Science processes (Scientific Literacy Research Center,1967) was criticised for its length and long time required for administration. Also, while scoring the option of inaccurate and not-understood are combined to mean as opposite of accurate. The instrument does not have any sub-scales and therefore the respondents' only get a unitary score. However, Lederman (2007) reported that the inventory was one of the widely used instruments after TOUS in that time. Science Process Inventory (SPI) by Welch (1967) consisted of 135 two-choice (agree-disagree) items. Items cover perceptions of the role of scientists, the nature and functions of theories, underlying assumptions made by scientists, and other aspects of the scientific process. The test is suitable for high school students and adults. The long length, having only forced choice items and no subscales were some of the shortcomings of SPI. Nature of Science Scale (NOSS) developed by Kimball (1968) consisted of Likert type statements where the respondents get a score of 2 for agree, 1 for neutral and 0 for disagree. The scale was deemed suitable for scientists, teachers and educators but not for high school students. The lack of subscales restricted the scales ability to gauge differentiated understanding of NOS on various dimensions. Rubba (1977) developed another instrument called Nature of Scientific Knowledge Scale (NSKS) which had 48 statements in Likert five-point response format which can be divided in six subscale-amoral, creative, developmental, parsimonious, testable and unified. Despite some overlaps among the subscales, overall, the scale has been viewed positively by the research community. Lederman

(2007) warns of some concern about the face validity of the instrument. Some items in the subscales are identical except that they are worded negatively. Conceptions of Scientific Theories Test (COST) developed by (Cotham and Smith, 1981) tested several aspects of NOS but was biased in placing a high emphasis on the tentativeness of scientific theories as compared to other dimensions. Another significant test called Views on Science–Technology-Society (VOST) by Aikenhead, Fleming and Ryan (1987) had 114 multiple choice items on various issues related to science–technology and society. The test is unique in the sense that the respondents do not get a numeric score for their choice; rather the respondents have to generate an argumentative paragraph to defend their position. The test has been widely used in many researches concerning STS issues. Views of Nature of Science (VNOS-A) developed by Lederman and O, Malley (1990) is an open-ended survey consisting of seven items primarily focused on the tentativeness of science. The test was supposed to be used in conjugation with the follow-up interviews. The interviews helped to clarify the responses on the paper and pencil test. Certain problems were later noted by the authors as the responses of the paper pencil test indicated that the respondents had difficulty in comprehending the questions. The later forms (VNOS-B, C, D, and E) were developed by other

researchers for specific groups. VNOS-B and VNOS-C are very lengthy with respondents taking about 90 minutes to complete the test. VNOS-D was developed to reduce the time taken by previous forms and was expected to produce similar results. VNOS-E was developed for very young students (K-3). The items can also be used for students who cannot read or write. A modified form of NSKS instrument Modified Nature of Scientific Knowledge Scale (MNSKS) was developed by Meichtry (1992). The test is simplified for use with 6th, 7th and 8th grade students. Nott and Wellington (1995) used critical Incidents tests consisting of a series of critical incidents closely related to classroom and requires the teachers to answer questions such as—what would you do; what could you do and what should you do, in such situations. The test has been criticised as the teachers' responses may or may not be related to their views about NOS. Views of Science and Education Questionnaire (VOSE) by Chen (2006) is designed to measure participants' concepts of the Nature of Science (NOS) and relevant teaching attitudes on a five-point scale. The test was validated on college students and was most suitable to teacher educators, pre-service and in-service teachers as it also measures participants' attitude towards teaching NOS. Students Understanding of Science and Scientific Inquiry (SUSSI) developed by Ling L. Liang,

Sufen Chen Xian Chen, Osman Nafiz Kaya, April Dean Adams, Monica Macklin and Jazlin Ebenezer (2008) blends Likert type items with related open ended questions to assess subjects' views on nature of science. The instrument is quantitative as well as qualitative and that provides the opportunity to look at inconsistencies in the participants views on likert type items and qualitative items. This is very useful feature of the test. Several other instruments like NOSI-E, The Nature of Science Instrument Elementary (NOSI-E) by Shelgah, P. (2012) based on Rasch Principles is another instrument to assess understanding of NOS among participants.

The researches done on development of instruments have demonstrated that there is a continuous attempt to improve the validity of instruments. Some of the earlier instruments used in 1960s for assessing NOS have been criticised for having a poor validity as they often ended up measuring attitudes, skills or abilities in science instead of NOS conceptions. The instruments in 1980's addressed this issue by focusing on the most commonly identified aspects of NOS. However, most of these instruments included forced choice items such as agree or disagree, Likert type or multiple choice items. Lederman and O' Malley (1990) criticised these test for carrying developers' views and biases. The assumption that the respondents perceive and interpret the items in a similar manner as the developer is

problematic. The instruments also ended up labeling the respondents as informed or un-informed type categories based on a numerical score. However, what numerical score was adequate for a particular category was questionable. These instruments did not focus on the reasons for making a particular choice. Also, even though almost all students believed scientific knowledge is tentative, the underlying reasons were very different. If one did not assess the underlying reasons, the analysis would be very superficial to reveal participants' conceptions of NOS.

NOS studies after the late 1980s shifted from being more quantitative to more qualitative in nature, utilising more flexible tools such as the Images of Science Probe (Driver, Leach, Millar and Scott, 1996); Small Group Discussion (Solomon,1992); Situated-Inquiry Interviews (Ryder, Leach and Driver, 1999; Welzel and Roth, 1998). Besides, the studies also utilised reviews of lesson plans and documents; field observations of classrooms and teachers; concept maps; and case studies for assessing NOS. These studies, however, had their own limitations. The tools such as interviews, group discussions and concept maps required longer time to administer and hence were not feasible for large scale studies. Also, the interpretations of detailed responses on questionnaires and interviews tended to be subjective and hence reliability became a concern in these studies. The possibility of the respondents being influenced by the

researcher's point of view in a face-to-face interaction cannot be ruled out. To overcome the shortcoming of purely quantitative or qualitative assessment, a more recent trend has been to use both the forms for data collection. The findings can then be triangulated to ensure better reliability.

Research on Students' and Teachers' Conceptions of NOS

Assessing the students' and teachers' understanding of Nature of Science has been the main concern of researchers in the field of science education. Some researchers' have also attempted to explore scientist's (those involved in the scientific research) understanding of NOS. This paper describes some research trends in this this area in the last two decades. The studies have examined students and teachers' conceptions of nature of science in different disciplines of science, teachers teaching at different levels, students in various grades with respect to role of gender, cross cultural comparisons and impact of instruction, etc.   Kim and Nehm (2011) did the the cross-cultural comparison of Korean and American science teachers' views of evolution and the nature of science. The study compared Korean and American science teachers' understandings of evolution and nature of science and acceptance of evolution in order to elucidate how knowledge and belief relationships are manifested in different cultural contexts. It was found that Korean science teachers exhibited 'moderate' evolutionary acceptance levels comparable to or lower than American science teacher samples. Gender was significantly related to Korean teachers' evolution content knowledge and acceptance of evolution. Liang, Chen S., Chen, X., Kaya, O.N., Adams, A.D., Macklin, M. and Ebenezer, J. (2009) investigated pre-service teachers' views on the nature of scientific knowledge development with respect to six elements: observations and inferences, tentativeness, scientific theories and laws, social and cultural embeddedness, creativity and imagination, and scientific methods in an international collaborative study. A total of 640 pre-service teachers, 209 from the United States, and 212 from China, and 219 from Turkey, participated in the study. Across the three countries, the participants demonstrated better understanding of the tentative aspect of NOS but less understanding of the nature of and relationship between scientific theories and scientific laws. The Chinese sample scored highest on five of the six Likert subscales, the USA sample demonstrated more informed views on observation and inference, and the Turkish pre-service teachers possessed relatively more traditional views in all six NOS aspects. Dogan and Abd-El-Khalick (2008) assessed grade 10 Turkish students' and science teachers' conceptions of nature of science (NOS) and whether these conceptions

were related to selected variables. These variables included participants' gender, geographical region, and the Socioeconomic Status (SES) of their city and region; teacher disciplinary background, years of teaching experience, graduate degree, and type of teacher training program; and student household SES and parents' educational level. Teacher views were mostly similar to those of their students. Teacher and student views of some NOS aspects were related to some of the target variables. These included teachers' graduate degree and geographical region; and student household SES, parents' education, and SES of their city and geographical region. The relationship between student NOS views and enhanced economic and educational capitals of their households, as well as the SES status of their cities and geographical regions pointed to significant cultural (specifically Western) and intellectual underpinnings of understandings about NOS. In another study about students' conceptions, Dagher, Brickhouse, Shipman and Letts (2004) explored college students' representations about the nature of theories during their enrolment in an astronomy course with instruction designed to address a number of Nature of Science issues. This study suggested the need to explicitly address the nature of proof in science and issues of tentativeness and certainty students' associate with scientific theories, and provide students with more opportunities to utilise the language of science. Some studies also explored participants' conceptions of 'scientists'. Reis and Galvão (2004) found that socio-scientific controversies and the way science and scientists were depicted in the media, seemed to have produced some impact on students' conceptions about scientists.

Rubin, Bar and Cohen (2003) investigated the image of scientists held by Israeli pre-service teachers, the majority of whom were female. The population consisted of students belonging to two cultures, Hebrew-speaking and Arabic-speaking. It was found that the image of the scientist is perceived as predominantly male, a physicist or a chemist, working in a laboratory typical of the eighteenth, nineteenth or the early-twentieth century. Students did not differentiate between scientists and inventors. Different images were held in the two cultures. Most of the Arabic-speaking students put Classical Islamic scientists near the top of their lists and thought of the scientist as an Arab male, while the Hebrew speaking students' was as a typical Western male. The interplay between participants' socio-cultural beliefs and conceptions of nature of science was illustrated by Liu and Lederman (2002) in their study where they explored the relationship, if any, between an individual's culturally based worldviews and conceptions of Nature of Science among 54 Taiwanese prospective science teachers. Moss (2001) examined pre-college students'

understandings of the Nature of Science and tracked those beliefs over the course of an academic year. The study was conducted in a semi-rural school of North East US. The study distinguished between Nature of scientific knowledge and nature of scientific enterprise. Students held more complete understandings of the nature of scientific knowledge than the nature of the scientific enterprise. Their conceptions remained mostly unchanged over the year despite their participation in the project-based, hands-on science course.

Although, in this paper the author has only quoted few researches done in the more recent years, there are numerous other studies that have attempted to study students and teachers' conceptions of Nature of science. While the earlier studies involved quantitative measures, the later ones used more qualitative measures. Regardless of the assessment approach used, there are some general trends from the researches. Students at all levels including middle school, high school or college level have inadequate conceptions on various aspects of Nature of science. The most informed views are about the tentativeness of science, whereas the least informed views are indicated about the distinction between laws and theories. Studies with the primary level students are very few. The studies that compared students' and teachers' have also indicated that the teacher's understanding is not better

than the students' understanding. Also, the teachers' views about NOS do not necessarily affect students' views. This may be because the teachers do not make an attempt to explicitly teach NOS or use strategies that help in developing better understanding of NOS. Language, religion and gender have emerged as significant factors related to the understanding of NOS. However, the causal relationship of these factors with NOS understanding needs to be more systematically and deeply probed.

TRENDS FROM REVIEW OF RESEARCHES ON CURRICULUM, TEXTBOOKS AND IMPACT OF INSTRUCTION

The inadequate conceptions of students' and teachers' about NOS and the constant emphasis of curriculum reform documents led the researchers to develop and implement curricula and instructions designed to enhance NOS understanding. The first such attempt was made by Klopfer and Cooley (1963). He designed the first curriculum called History of Science Cases (HOSC) for high schools. The researchers proposed that using cases from History of Science in the curriculum would help in developing a better understanding of NOS. The study conducted on a large sample of students from various disciplines (physics, chemistry and biology) showed significant improvement in the post-test score of treatment group using TOUS (Lederman, 1992). Several curriculum research projects of 1960's such as Physical Science

Study Curriculum (PSSC), Biological Science Curriculum Study (BSCS) showed enhanced understanding of NOS in different studies by Crumb (1961) and Yager and Wick (1966). These curricula used laboratory centered approaches besides paying specific attention to historical development of major concepts and principles in science. Aikenhead (1979) developed a curriculum titled "Science as a way of knowing" that emphasised that the nature, process and social aspect of science through a variety of inquiry skills and focus on science-technology-society interactions. The curriculum showed positive response with grade 11 and 12 students.

Not all studies however showed the positive impact of curriculum specifically designed to address NOS. The studies by Troxel (1968) and Jungwirth (1970) as cited in Lederman (1992) showed that there is no significant difference between the pre-test and post-test scores used to see the effectiveness of CHEM, CBA and BSCS curricula respectively.

The influence of the teachers' views on classroom practices or student's views was explored by several studies in 1980s. There is research supporting a direct influence on classroom practice (Brickhouse, 1989, 1990; Gallagher, 1991) as well as the position that there is no influence (Duschl and Wright, 1989). The interaction with teachers' showed that the administrative constraints, infrastructure, level of

students and various other factors influence the translation of teachers' belief into practice. Bell, Lederman, and Abd-El-Khalick (2000) reported the factors that mediate translation of nature of science into practice as articulated by the participants (pre-service teachers) were (a) perceiving the nature of science as less significant than other outcomes, such as science content and processes (b) concern for students' needs and attitudes, and (c) preoccupation with classroom management and routine chores (d) discomfort with understandings of the nature of science (e) lack of resources and experience for teaching and assessing understandings of the nature of science, and constraints specific to student teaching. The result of the investigation by Lederman (1999) involving five high school biology teachers showed that although the teachers possessed informed views of NOS, there classroom practices were not directly affected by their views. Their students did not learn NOS as there was no explicit attempt to do so. Therefore, one cannot assume that an improved understanding of NOS among teachers would influence students' understanding in a positive manner.

With such studies there has been a shift in the research involving more explicit instructional approaches. Palmquist and Finley (1997) reported pre-service teachers understanding of NOS in a teaching program using contemporary teaching strategies,

such as conceptual change and co-operative learning. The direct teaching about NOS aspects was very little. Similar findings are reported by Abd-El-Khalick (2001) in his study on prospective teachers. The use of explicit reflective approach to teach NOS resulted in significant improvement in the NOS aspects including tentative, empirically based, theory laden, inferential, imaginative and creative characteristics of scientific knowledge. Abell, Martini and George (2001) targeted several aspects of NOS in a moon investigation. The students learnt that scientists make observations and generate patterns but they did not realise that observation could precede or follow the development of a theory. Students were able to articulate the several aspects of NOS but they did not see the connection between what they learned and the scientific community. The researchers recognised the importance of being explicit for improving NOS understanding among participants. Abd-El-Khalick (2005) reported the positive impact of Philosophy of Science Course along with the methods course for prospective science teachers whereas Kim and Irving (2010) indicated the positive impact of contextual examples from history science while teaching genetics on the targeted aspects of NOS. The results of most of these studies have shown positive impact of explicit instruction about NOS aspects. The focus is however not on the traditional mode of citing examples from the history of science but on the use of reflective inquiry-oriented approaches.

Conclusion

The earlier researches on NOS focused on measuring NOS using Likert scale type of items. These items pertained to measuring the attitudes, skills or interest in science but the epistemological aspect of science were often neglected. Many of these instruments have been criticised for poor validity. Another concern with the use of these instruments has been the inherent bias in the interpretation of scores or the written response. There have been significant discrepancies between the written responses of the students or teachers on a particular test and the responses that were given during interviews. The instruments with more open–ended items that helped to assess a deeper understanding of NOS. Also, there have been attempts to supplement the quantitative assessment with qualitative assessment so that more valid conclusions about participants understanding can be drawn. An interest in developing instruments or tools to assess NOS has led to more clear articulation of nature of science. For instance, most researchers now agree to some common aspects such as law vs. theory, social and cultural influence, creativity and imagination. Scientific method, etc., as important dimensions of NOS. However, the researchers have also mentioned the flexibility in these aspects.

Students and teachers at all levels have shown lack of NOS understanding with respect to various dimensions of NOS. Many of these instruments were commonly used for students and teachers and have indicated similar results both for students and teachers. A few researchers have also indicated the influence of academic qualification, experience and socio-economic status of teachers on their NOS understanding. However, the correlation between understanding of NOS and any of these factors is not well established. Explicit curriculum and instruction related to NOS helps in developing better understanding of NOS. However, the focus should be on reflective, inquiry oriented, conceptual change approaches for NOS instruction rather than merely citing examples from history of science.

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Vocational Skill Interventions
Dropout Reduction and Employability

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Abstract

Dropping out of school mid-way is a serious educational and social problem. By leaving school mid-way, most dropouts have serious educational deficiencies that severely limit their economic and social well-being throughout their adult lives. Many school dropouts find it difficult to secure steady employment and an adequate income. Overtime dropouts face bigger disadvantages because they have fewer opportunities to obtain additional education and training needed to remain relatively relevant and competent in the job market, especially in the context of increased use of new technologies, and changes in the composition of jobs in the economy that will require more educational skills. In the educational hierarchy of school education, India registers disproportionate rate of drop out at secondary level. Significantly, in the educational hierarchy, secondary education is also an important transitory and preparatory stage for school going adolescent youth for preparation of higher education and the world of work. The study is primarily based on reviews of literature on vocational education, dropout reduction or prevention and its effect on employability. Based on these studies, we find that, when dropout programmes are designed, vocational education strategy in school emerges as an effective tool in developing dropout prevention, preparation of skilled workforce; geared towards sustainable livelihood and productive in society. In conclusion, an effective vocational policy intervention is very much in need of the hour in Indian context.

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INTRODUCTION

Vocational education aims at increasing the employment potential of young people by imparting appropriate skills and training in specific trades, occupations and crafts. Through preparation for specific competencies in different trades, vocational education helps individuals to be more productive by developing skills, abilities, work habits, employment opportunity and geared towards sustainable livelihoods. Vocational education stream in India has more than 100 courses in various areas of trades and crafts (World Bank Report, 2006. When relevant vocational skill is imparted in schools, it can promote a meaningful pedagogy—improve educational access; completion of meaningful level of learning; skilling by doing, enhance skills for individuals to be self-reliant and positive contributions to society.

VOCATIONAL EDUCATION POLICIES IN INDIA: A BRIEF HISTORICAL BACKGROUND

Vocational education was integral to Indian education system that can be traced to Epic and Vedic period when numerous skills such as carpentry, smithy, foundry, and weaving formed an integral part of traditional education system (Vedalankar, 2002). The works of various scholars including those of Altekar (1954), Chatterjee and Mitali (1999), and Rashtriya (2008) reveal that ancient Indian literature refers to various trades—agriculture, weaving, dyeing, spinning, art of tanning leather, manufacture of boats and chariots, jewels making, implements and equipment, dance, music, building houses, sculpture, medical and veterinary sciences, manufacture of perfumes and a host of other trades. Most students earned their livelihood by taking up various occupations. Even a student aiming to achieve the highest philosophical knowledge was duty bound to do some manual labour daily. Craft education was not ignored during the Buddhist system of education too. The monks in the monasteries learnt architecture to enable them build new monasteries or repair old ones, apart from training in different types of vocation to earn their livelihood such as spinning, weaving, printing of clothes, tailoring, sketching, accountancy, medicines, surgery and coinage that formed an integral component of Buddhist education system. Scholar such as Vedalankar (2002) is of the of the opinion that such an education system operated on similar modus operandi such as the present education experiment—basic education, *Vishwa Bharti*, *Aurobindo Ashram*, *Gurukula Kangri Vishwavidyala* and *Banasthali Vidyapeeth*. During medieval India, vocational skill reached great heights as it is evident from the findings of the numerous archaeological remains of the period. With the introduction of western formal

education, the traditional system of vocational and technical education lost its importance. The colonial administration established a number of vocational centers, with the primary objective of facilitating colonial administration by creating technical persons for construction and maintenance of public buildings, roads, canals, ports, harbors, railways and other services such as artisans and craftsmen in the maintenance of instruments and equipment for Army and Navy. For example, the British administration established a survey school at Madras in 1794 to train Indians in modern land survey for assisting them. Later, the first industrial school in India was established at Guindy in Madras in 1842. It was attached to the local Gun Carriage Factory (Sen, 1989). In 1844, a school for the training of overseers was opened at Poona (Rashtriya, 2008). Since then, the major initiative of starting new centres for technical education began. Setting up of these centres was a response to facilitate British administration.

The colonial agenda of vocational education gained a momentum through the Woods Despatch Act (1854), that first highlighted the need for the introduction of occupational education for many students by introducing vocational education at the secondary education level. With this, vocational education as integral to modern education system was formalised in India. Since then, several Committees and Commissions were appointed from time to time by the colonial state to examine educational problems in India. In this direction, the Hunter Commission (1882); Indian Education Policy (1902); the Government Resolution on Educational Policy (1913); the Hartog Committee (1929); and the Sergeant Commission (1944) are of special significance.

During the freedom struggle movement, Mahatma Gandhi redefined the meaning of vocational education, seeking to integrate theoretical cognition and productive labour. In his book 'Gandhiji's Experiments in Education' (1960), Avinash ilingam discusses about how Gandhi's experience at the Tolstoy farm in South Africa made him realise the great educational value of manual labour as Gandhi stated on his experimental journey, "The weak became stronger in the Tolstoy farm and the labour proved to be a tonic for all" (19:1960). In his book, 'The Problem of Education in India' (1962), Gandhi observed, in India, where more than 80 per cent of the population was involved in agriculture and another 10 per cent in industry; it was a crime to make education merely literary and to make boys and girls incapable of engaging in manual labour. Gandhi insisted that manual work must find a place in in the school curriculum and it should be sufficiently productive. The idea was further developed in his discourse

on the ideals of national system of education during the education ministers' conference in 1937. Under the leadership of Gandhi, the resolution of free and compulsory and craft-centric education for every child from the age of 7 to 14 was passed. The first model school was set up at Sevagram to run the programme on experimental basis. The success of the programme could be noticed from the overwhelming response from every part of the country. Gandhi promoted mass education that inspired cooperative life through pedagogic practice of 'learning by doing' in an atmosphere of freedom which enabled young people to earn freedom, a sense of self-respect, life skills and sustainable livelihood. Gandhi's education project could not be sustained after its short glorious journey, as it was poorly and falsely perceived as a system meant for the rural folk by the political masters and elites, whose sole aspiration was to promote English education as an escape route for their children.

Developments in the Post 1947

During the post-independence period, extensive policy attempts to reform vocational education were framed. Several policy documents such as the Radhakrishnan Commission (1948), the Mudaliar Commission (1952), the Kothari Commission (1964), and the Ishawarbhai Committee (1977) emphasised the importance of vocational skill education. There

were renewed policy commitments in the National Policy of Education Resolution (1968), the National Education Policy (1986), the National Knowledge commission (2006), and the policy of Vocationalisation of Secondary and Higher Education (2012). Taking a cue from the Kothari Commission report, the National Education Policy (1986) provided a well-planned strategic programme of vocational education to make it a distinct stream to prepare students for identified occupations. The policy also envisaged that vocational courses to be imparted to students after Class VIII instead of Class XII as recommended in the previous policies. The NPE set a target to cover 10 per cent of higher secondary students under vocational courses by 1990 and 25 per cent by the end of 1995. As a consequence of NEP recommendation, a centrally sponsored scheme, such as vocationalisation of secondary education scheme, 1988 was introduced.

Developments in the Post 2000s

Currently, India stands at the threshold of demographic dividend and is set to become one of the youngest countries in the world by 2020 (Mehrotra, 2014). To address India's challenges of population dividend and skills gaps through comprehensive efforts, at various levels, catering to different needs of the society and industry, National Skill Development Policy was formed

in 2009, with the aim to create 500 million skilled workforces by 2022, and 15 million workforce every year to meet the requirement of both organised and unorganised sector. The Eleventh Five Year Plan provided a roadmap for skill development in India, with the aim of forming skill development missions, both at the state and national level. To create such an institutional base for Skill Development in India at the national level, a 'Coordinated Action on Skill Development' with three-tier institutional structure consisting of the Prime Minister's National Council on Skill Development, the National Skill Development Coordination Board (NSDCB) and the National Skill Development Corporation (NSDC) was created in 2008. To make vocational education attractive and facilitate skill mobility and interaction between vocational and general education, Government of India, through National Policy on Skill Development launched an integrated qualification framework, National Skills Qualification Framework (NSQF). NSQF promotes multiple pathways of horizontal and vertical mobility both within vocational and general education, by linking one level of learning to another higher level; and allow multiple pathways between vocational education, skills, general education and job markets. Further more, to formally integrate vocational education with its current general educational streams across school and higher education (Institute of Applied Manpower Research, 2012), the Government of India formed the National Vocational Education Qualification Framework (NVEQF). According to MHRD, GOI (2012), NVEQF is a framework that organises qualifications according to a series of levels of knowledge along with skills. These levels are defined in terms of learning outcomes, i.e., the competencies which the learners must possess regardless of formal, non-formal or informal education and training the learners have acquired. Qualifications are made up of occupational standards for specific areas of learning units. It is, therefore, a nationally integrated education and competency based skill framework that will provide for multiple pathways both within vocational education and between general and vocational education to link one level of learning to another higher level, and enable learners to progress to higher levels from any starting point in the education or skill system. It further stated that the key elements of the NVEQF are to provide national principles for providing VE leading to international equivalency, multiple entry and exit between VE, general education and job markets, progression within VE, transfer between VE and general education, and partnership with industry or employers.

Table 1
Architecture of NVEQF

Case 1   Case 11

Level	Certificate	Equivalence	Equivalence	Certifying Body
10	NCC 8	Degree	Doctorate	University and SSC
9 8	NCC7 NCC6	PG Diploma	Master's Degree	University and SSC
7 6	NCC5 NCC4	Advanced Diploma	Bachelor's Degree	Board of Technical Education and SSC, University and SSC
5 4 3	NCC3 NCC2 NCC*1	Diploma	Grade XII Grade XI	Board of Technical Education and SSC, School Board and SSC
2	NCWP2	Grade X	Grade X	School Board and SSC
1	NCWP*1	Grade IX	Grade IX	School Board and SSC
RPL*	RPL2 RPL1	GradeVIII Grade V	Grade VIII Grade V	NIOS/State Open schools and SSC NIOS/State Open Schools and SSC*

RPL*: Recognition of Prior Learning
NCWP*: National Certification for Work Participation
NCC*: National Competency Certificate
SSC*: Sector Skill Council
Source: Ministry of Human Resource Development. Govt. of India 2012

Table 1 reveals different Levels such as 1–10 corresponding to different Levels of national competency certification, vocational degrees with its equivalent academic qualifications. For example, when a person has been provided skill training as Level 10, its vocational qualification is termed as Degree, which is equivalent to doctorate degree and the level of national competency certification is 8. Level 10 requires a person to acquire highly specialised skilled knowledge in a particular area including problem solving skills to provide original contribution to knowledge through research. The job skills in such profile needed are ability to take strategic decisions especially in unpredictable complex situations of work or study. Level 8 and 9 are equivalent with Post-Graduate in Diploma, and its general academic qualification is equivalent with Masters Degree. The national competency certificates of Level 8 and 9 are 6 and 7 respectively. At this level, a person is trained to acquire critical understanding of a particular subject, demonstrating mastery and innovation, completion of substantial research, etc. Similarly,the vocational degree of Level 6 and 7 is Advanced Diploma that is equivalent with Honours degree with its national

competency certificate Level 4 and 5. The vocational skill needed in these Levels include wide range of specialised technical skill, clarity of knowledge and practice in broad range of activity involving standard and non-standard practices, knowledge command over wide ranging specialised theoretical and practical skills, etc. Levels 3, 4 and 5 correspond to national competency certificate 1, 2 and 3 respectively. Its vocational degree equivalence is Diploma, while the academic degree for Level 5 is Class XII, it's Class XI for Levels 3 and 4. Job profiles of Level 5 is that of a supervisory role that includes having knowledge of facts, procedures, and concepts in a field that requires cognitive and practical skills in order to accomplish problem solving tasks, etc. Job profile of Level 4 is that of a skilled worker whose job role requires practical skill, routine and repetitive in narrow range of application, using appropriate rule and tool. The position of Level 3 is assigned to semi-skilled worker whose job role requires limited range of activities that are routine and predictable. Levels 1 and 2 correspond to national certificate of work preparation whose job roles demand limited service skill used in limited context such as selection and application of tools, assist in professional works, safety and security measures, etc. The vocational and educational qualification of Level RPL2 and RPL are grade viii and grade V. The knowledge required in

RPL1 and RPL2 are not much of a difference. The knowledge profession of both the profiles requires making oneself acquainted with common tools, equipment, process, basic numeracy skills and literacy skills, etc. In addition, the framework allows industries to interface with training and education centres, while there is also the provision of accumulation and transfer of credits and accreditation of skill knowledge, assessment, certification and quality assurance can be provided. The new policy development is an initiative to re-organise the existing vocational education system by taking stock of the given realities of India's rapidly changing economic landscape; youth aspirations for employment and global skill competency challenges.

National Skill Development and Entrepreneurship Policy envision the integration of 25 per cent of schools with the skill development programmes by 2022. To achieve the goal, the National Policy on Education (2016) has taken up policy measures as part of its initiative for vocationalisation of secondary education in the country. The policy of vocationalisation of secondary and higher secondary education scheme aims at integrating vocational education as an integral component of general education system. The main thrust of the policy is to enhance employability of youth through demand driven competency based vocational skills by employing nationally and state designed frameworks to

implement vocational education, linking vocational education and employment in various skill sectors by involving key stakeholders on public-private mission mode. The scheme of vocationalisation of secondary and higher secondary education was subsumed under *Rashtriya Madhyamik Shiksha Abhiyan* introduced in 2009. The new policy seeks to integrate vocational education with general education, mainly to enhance employability of youth through demand driven competency based modular vocational courses. Its component includes introduction of vocational education from Class IX onwards in government schools, aided recognised and un-aided private schools. Vocational modules are offered as additional or compulsory subject at secondary stage and compulsory (elective) at higher secondary stage. The policy is implemented on sharing mode between center and states on 75:25 bases. For effective policy implementation, NSDC considers the involvement of local community at the time of skilling individual students trades and schools located in special focus districts, educationally backward blocks, and violence affected districts and districts with high dropout rates at the secondary level.

VOCATIONALISM AND DROPOUT REDUCTION

Over the past two decades, India launched multiple education schemes, programmes and strategies leading to school expansion and increase in enrolment for all children across all social groups. Through the Right to Education Act (2009), all children under the age of 14 are able to access elementary (Grade 8) school. For smooth transition from elementary to secondary education, India introduced *Rashtriya Madhyamic Shiksa Abhiyan in* 2009, to achieve universal access to quality secondary education for all children in the age group of 14–18. With these educational schemes and programmes, India has made significant improvement in school expansion and enrolment of children. However, on the downside, these policies have not translated to successful educational inclusion for all the children. According to the Unified District Information System for Education (2015–16), NUEPA, MHRD, Govt. of India, the gross enrolment rate at primary level during the period 2014–15 and 2015–16 were 100.08 and 99.21. During the same period, the corresponding figures were 96.89 and 96.91 for elementary level, 78.51 and 80.01 for secondary level and 54.21 and 56.16 for higher secondary level. The data reveals that in spite of impressive enrolment rate at primary and elementary level, the same could not be retained and high proportion of dropout among students could be noticed from secondary stage in which the rate becomes severe at higher secondary level. This further indicates that an overwhelming proportion of secondary students

leave school before the completion of higher secondary stage. Table 2 indicates annual school dropout rate among children at different stages of learning. The drop rate at secondary stage is disproportionately high when compared with the dropout rate at other levels of learning.

Table 2
Annual Average Dropout by
Educational level (2014–15)

Grades	Year- 2014-2015		
	Males	Females	Total
Primary	4.36	3.88	3.49
Upper primary	3.49	4.60	4.03
Elementary	4.07	4.13	4.10
Secondary	17.21	16.88	17.06
Class XI–XII	0.25	–	–

Source: U-DISE, NUEPA, MHRD, Govt. of India, 2015-16

The drop rate at secondary stage is disproportionately high when compared with the dropout rate at other levels of learning. In the following year, i.e., 2015–2016, as shown at Table 3, the number of students who continued to at secondary and senior secondary level is also alarming.

Table 3
Level-wise Enrolment in School and
Senior Secondary Education
(In thousand) (2015–2016)

Learners by Grades	Males	Females	Total
Upper Primary (VI-VIII)	34720	32874	67594
Secondary (IX–X)	20547	18598	39145
Senior Secondary (X1–XII)	13002	11733	24735

Source: Educational Statistics at a Glance, MHRD, Deptt. of Education and Literacy, Govt. of India (2018)

Table 3 indicates that the proportion of enrolment among older children is much lesser when compared with children of lower age groups as shown in case of upper primary level. The enrollment figure at the secondary level IX–X is quite alarming as almost half of the children who are in the upper primary level could not complete the upper primary cycle and continue at secondary level. **(**Govinda and Bandyopadhyay's study (2008) reveal that boys at higher class are likely to drop out in order to support household income while girls are more likely to drop out in order to carry out domestic chores, in addition to other socio-cultural factors. The study further reveals that there are also children who continue to be enrolled at school, but who are at risk of dropping out. These children are often silently excluded from schools; despite of their physical presence and gaining little cognitive benefit from the experience. These children are generally first generation learners and many of them live in an environment that does not have academic support for children.

Dropping out of school mid-way is a serious educational and social problem. By leaving school mid-way, most dropouts have serious educational deficiencies that severely

limit their economic and social well-being throughout their adult lives. Research studies (R.W. Russell, 1987) reveal that the most immediate consequence of dropping out of school is a low level of academic skills. Because of low levels of academic skills, many school dropouts find it difficult to secure steady employment and an adequate income. Overtime dropouts face bigger disadvantages because they have fewer opportunities to obtain additional education and training needed to remain relatively relevant and competent in the job market, especially in the context of increased use of new technologies, and changes in the composition of jobs in the economy that will require more educational skills. The consequences of students' dropping out of school are costly to both the individual and society. For example, dropouts have fewer options for employment and are usually employed in low skilled, low paying positions. School dropouts are likely to engage in anti-social activities, incapable of realisation of their potential self and become productive in society.

Dropout is a process of disengagement from school owing to school or familial related factors or a combination of both factors that culminate in the final act of leaving school. There are several school factors that include a lack of provisioning of quality education including inefficient school management and administration, unsuitable curriculum, poor pedagogical organisation, etc., (Banerjee, 1997 and Varghese, 1995), while home factors include poor socio-economic status such as low educational and occupational attainment levels of parents, absence of learning opportunities at home, compulsion to work to financially help families or looking for employment, etc., (Chugh, 2011, Sekher and Sateesh, 2014, Horner *et al*, 2015). Absenteeism, individual behavioural and frequent discipline referrals and disinterest in academic could be other problems leading to dropout. Furthermore, rather than an impulsive action, dropping out of school is a cumulative process that requires targeted interventions.

Literature surveys suggest that when dropout programmes are designed, vocational education strategy emerges as an effective tool in developing dropout prevention (Pittman, 1981). The broadest conception of vocationalism is the view that schools are primarily devoted to preparing students for different occupations (Grubb, 1985). Quoting studies done by Toles, Rumberger Schulz and Rice, found that many high schools in the Chicago region had much lower dropout owing to vocational programs interventions. Alan Weisberg (1983) argues that in the USA system, vocational education programs keep youths in school longer by citing the case of lower dropout rate for students in business programs than for those in general curriculum. The author further claims

that vocational education is a logical, effective way of integrating those at the bottom of the economic into the mainstream; vocational education helps solve national economic problems by somehow matching workers to jobs, thus overcoming employment bottlenecks by increasing worker productivity. Such intense policy interest in vocational education in the USA began as early as the 60s and 70s (Grubb 1985), by examining the vocational education policy trajectories in advanced, and developing countries argues that there has been substantial convergence of vocationalism in the educational systems of many countries across the globe. Vocational education systems have been promoted as a solution to many problems, especially as rising youth unemployment has challenged the school to be more relevant.

Countries recording high-skilled labourers indicate that in these countries there is high proportion of vocational education component in the mainstream general education. For example, Word Bank Report (2006) reveals that secondary enrolment ratio in vocational-technical courses at secondary stage is as high as 93 in Korea, followed by Russia (88), Chile (70), South Africa (77), Malayasia (59) and China (52). Bishop and Ferran' study (2003) reveals that there is also strong evidence that vocationalism in schools by providing diversified courses enable youth to stay in school longer than they might have if they had the choice of an academic curriculum. Their study further reveals that Organisation for Economic Co-operation and Development (OECD) countries provides clinching evidence of the positive trend on the relationship between vocationalism in schools and low dropout rates. The study reports that a 100 per cent increase in the share of upper secondary students in vocational and pre-vocational programs is associated with 2.6 per cent increase in the secondary school graduation rate and a 1.9 per cent increase in the proportion of 15–19 years old in school. This observation depicts that access to secondary and tertiary education becomes important as does access to technical and vocational education (Adams, 2012).

Industrialised countries such as Germany, Japan, Korea, and China supported vocational education at the school level on a large scale since the decade of 1970s. Further, the World Bank (2006) report shares some of the key practices followed by international communities. For example, Korean vocational education system focuses on equipping students with basic knowledge and skills and providing them with a foundation which will enable them to learn further, inclusion of extensive elements of general education in vocational education, active partnership between private-public sectors in bearing financial resources, such as in the form of tuition entrance, etc., and linking up vocational schools with specific industries to ensure curriculum and
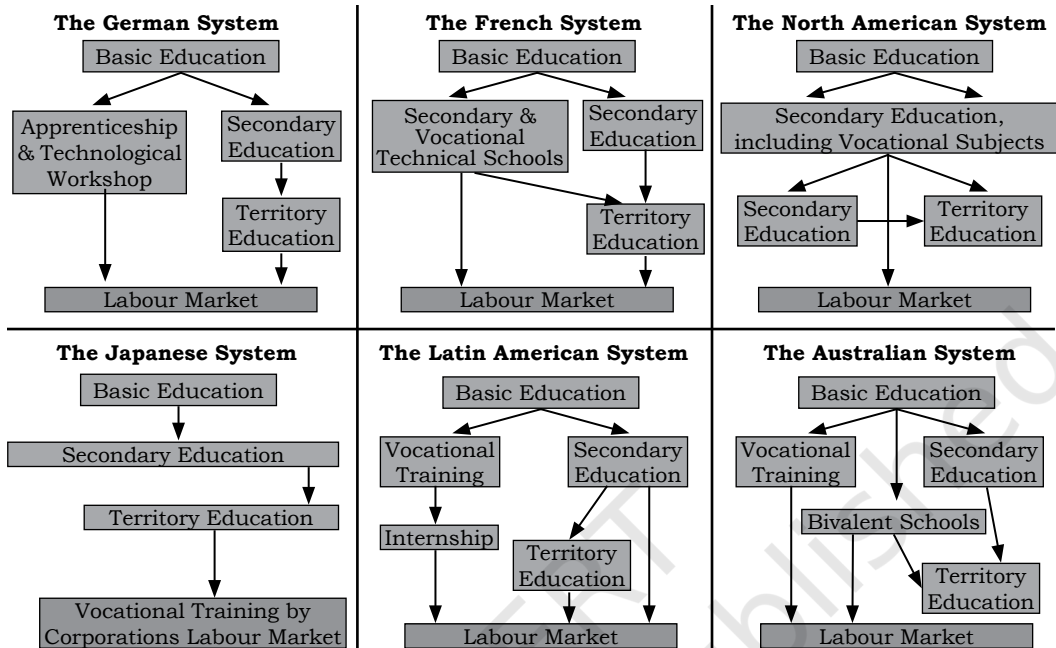
Figure 1: Education and Vocational Training System around the World

Source: The Vocational and Training System (World Bank), 2006

industry requirements match. In the Japanese system, with its simplest design, students after completing basic education enroll in general secondary education from where, they enter firms that provide entry level training or move to tertiary level education. The French system is based on streaming students into vocational course at the secondary level and these students are prepared for entry into labour market, while those in humanities are prepared for higher education. The German system is based on a long tradition of apprenticeships where dual system such as general instruction and firm-based occupation specific-training exist. The dual system regulated by

the guilds has a set for qualifications that provides broad equivalence between graduates of the academic and the dual subsystems, while the Australian system allows transitions between the vocational and tertiary education systems. In the Australian system, employers play a key role in the management of the vocational system. Of late, Latin American countries have been able to respond successfully to the pressing challenges of skilling youth based on a variety of skills development policies (Servo, 2012). In the past two decades, many skill development initiatives were implemented by focusing on post-primary formal education; and technical and vocational training

(based on traditional Vocational Training Institutions; and youth entrepreneurship. The successful model of the Latin American experience is attributed mainly to the management structure of a broader and diversified set of stakeholders. There are thus different traditions and strategies adopted by international communities according to their suitability and requirements.

By international standards, India is still far behind in introducing new and innovative trades and skill trainings at the school level and attracts young students to vocational stream. According to Planning Commission (2017), currently, India doesn't have more than 8 per cent of all senior secondary schools that impart vocational education with considerable state level variation. Further more, reports such as Apeejay Stya Education Research Foundation, quoting data from CRY, NGO Global March Against Child Labour, and UNICEF, (UNICEF-India-Statistics (2004), (Report of the Committee on India Vision 2020, Planning Commission, 2002) reveals that in India every year 5.5 million students pass out of Class X, of which 3.3 million go to Class XI, leaving 2.2 million out of the education stream. Hence those who dropout after Class VIII are young population without being equipped of skills of any kind. Reports by Federation of Indian Chambers of Commerce and Industry (2010), India Brand Equity Foundation (2013), National

Policy for Skill Development and Entrepreneurship (2015) indicate that about 63 per cent of school students dropout at different stages before reaching Class X. Quoting World Bank Report, 2006, country wise labour force data indicates that population in the age group of 20–24 years that had undergone formal vocational training varies from 5 per cent in India to 60 to 96 per cent of industrialised countries. The scenario calls for urgent appropriate policy interventions to prepare for India's millions of youth into skilled force.

Recently, the Government of India has launched several vocational skill schemes to empower youth population, while the challenges are complex and manifold. As these complexities and challenges remain unresolved, the status of vocational education in the new skilled based policy framework remains vague, while some of its significant policy prerogatives are misplaced. The new policy framework outlines the need to increase flexibility of vocational education within mainstream education, introduction of new innovative methods of training, building strong linkages between vocational stream education, school and higher education, strategic partnership between concerned departments of central, state and district level, accreditation and certification, etc. The new skill policy must be inclusive by bringing all new entrants to labour and vulnerable groups such as women,

scheduled castes, scheduled tribes, disadvantaged rural youth, informal workforce and dropouts. It is however in the schools that vocationalisation effort has to take off in a big way by utilising high enrolment of children in schools. Studies (Ramaswamy, 2015, Pilz, 2016) point out that vocationalism in schools can create newer opportunities for students from early on in life by facilitating school-to-work transition programmes. Substantial convergence of vocational skill interventions with school education will not only address the goal of inclusive growth; but also produce skilled workforce and geared for sustainable livelihoods especially for those who would have opted out of school for want of such opportunities while they are in school. Vocationalisation means learning a skill that is related to readily suitable for a given job, as vocational education has the very definite object-which general education has not—of preparing young men and women for work in specified occupations or groups of related occupations (Abbot, 1939). With the right vocational skill, a trained person is better equipped for employment in the long run. Hence, from early school onward if students from rural and urban, class and caste are given the opportunity for vocational skill in various crafts and trades, the learnability of various skills at the early stage is far higher with better career options. Alternatively, if these young students opt to discontinue higher education,

by that time, they would have picked up certain skills by which they would be able to acquire decent employment. Secondly, vocational skills consist of numerous trades and crafts that cut across rural and urban, caste and class divide and involve both cognition and manual labour.

Youth population constitutes a major resource for a nation's development. Harnessing young potential, however, remains a national challenge. In the world, India has one of the most extensive network systems for education. It is only with the use of this system that can put vocational education programme wider reach, effective and make vocational education a national aspiration. Vocational programmes are likely to be much more successful and attractive when delivered with quality enriched and flexibility options by interfacing with local potential resources such as geographic presence of industries, bio-resources, local skills and human economic activities. Skill policy interventions in this way will help children to organically connect with their immediate environment, longer stay in schools; delay in dropping out of school, and much likely to be successful in imparting vocational skills of different trades, crafts; become self-reliant and productive in society.

CONCLUSION

With the establishment of the new Ministry of Skill Development and

Entrepreneurship, the vocationa-lisation of secondary education policy has received renewed commitment. The policies envision that along with academic education, imparting the right kind of vocational skill to adolescent youth is a larger effort of holistic and all-round development of individual potential.The effective implementation of these policies at school level will improve access, quality of education and retention of student upto a desired level of learning by preventing dropout mid-way. For this to happen, there is a need for speedy re-organisation of ecosystem of education by integrating vocational skills in school as an important site of innovative and new pedagogies of learning.

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Decentralised School System through Community Participation
From Expectation to Implementation

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Abstract

Decentralisation plays a vital role in school management. It makes local community involved in planning and decision making in school affairs at grassroot level. After the commencement of Right of Children to Free and Compulsory Education Act (RTE), 2009 the importance of School Management Committee (SMC) was seriously taken into consideration, though the community participation had earlier existed with different nomenclature. The emphasis on SMC at the school level has been laid to actualise the goal of Universalisation of Elementary Education (UEE). Despite growing emphasis on SMC, there is a gap between the planning and implementation process of community participation in real sense. The paper makes an attempt to examine the nature of challenges confronted by the SMC members from two broad perspectives; (i) set of external issues which are beyond the margin of members and (ii) set of internal issues which exist among them. In the last section, based on some empirical evidences the paper suggests some measures with policy implications for effective functioning of SMCs.

INTRODUCTION

India is the largest democratic country in the world with provision of some fundamental rights to safeguard the interests of its citizens. To actualise the vision of democracy and to promote equality, accountability, transparency and efficiency among

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the people the governance system has been decentralised. Post-independent scenario in the country is confronted with a number of challenges like illiteracy, hunger, unemployment, communal conflict. The then policy makers and great leaders of the country had realised that the real freedom was not achieved, and it was realised that education is one of the important means through which the developmental process can be accelerated. Hence, in the post-independent period, the major concern of the states and central government has been the development of education sector. Decades of policies and plans like National Policy on Education, (NPE) 1968, NPE, 1986; NPE, 1986 (Programme of Action, 1992), District Primary Education Programme (DPEP),1994; *Sarva Shiksha Abhiyan* (SSA), 2002 and Right of Children to Free and Compulsory Education Act (RTE), 2009 have been implemented to achieve the goal of Universalisation of Elementary Education (UEE). These policies and plans have brought many positive changes in elementary education, consequently impacting upon secondary and higher education. In the last decades many schools have developed their school infrastructures, decreased dropout rates, increased enrolment and retention. The total literacy rate of the country has considerably increased from 1951 to 2011 (see Table 1). Though there is a gap between literacy rate among male and female population, the literacy rate of females has been increasing in both rural and urban areas since independence. But issues like quality of education, shortage of teachers, social exclusion on the basis of caste, class and gender, corruption and lack of adequate infrastructure are still lying within the education system. After the steady implantation of plans and programs, the progress

Table 1
Literacy Rates in India (Different Census Years)

Year	Rural (%)			Urban (%)			Combined (%)		
	F	M	Total	F	M	Total	F	M	Total
1951	4.87	19.2	12.1	22.33	45.6	34.59	8.86	27.15	18.32
1961	10.1	34.3	22.5	40.5	66	54.4	15.35	40.4	28.31
1971	15.5	48.6	27.9	48.8	69.8	60.2	21.97	45.96	34.45
1981	21.7	49.6	36	56.3	76.7	67.2	29.76	56.38	43.57
1991	30.17	56.96	36	64.5	81.9	67.2	39.29	64.13	52.21
2001	46.7	71.4	59.4	73.2	86.7	80.3	53.67	75.26	64.83
2011	58.75	78.57	67.8	79.92	89.67	84.1	65.46	82.14	74.4

Source: Ministry of Statistics and Programme Implementation, 2016

in education was not found to be satisfactory as per the expectation. The Government of India has enacted RTE Act in the year 2009, with some strict guidelines to ensure free and compulsory education to all the children between 6 to 14 years in a safe and conducive environment. To monitor the overall activities of the school and to make the school management decentralised the Act has made a provision in Section 21 to constitute School Management Committee (SMC) in every government and government aided schools. The members of the committee are elected representatives of parents or guardians, members of the Panchayati Raj Institutions (PRIs), Health Worker, *Anganwadi* Worker, school teachers and students.

The SMC plays a very vital role in bringing positive reform in elementary schools. It identifies out of school children and enrols them in schools. It monitors overall activities of the school and assist the school management for effective implementation of RTE Act. In many states of India SMCs have developed school infrastructure, involved out of school children in mainstream education, narrowed students and teacher's absenteeism, monitored Mid-Day Meal Schemes (MDMS) and checked quality of foods, appointed voluntary teachers to solve the problem of unavailability of teachers in schools (Ramchandran and Naorem, 2013, Paltasingh, 2014,

Reddy and Devi, 2015, Chand and Kuril, 2018). The census data of India from 1951–2011 reflects that the total literacy rate of its population has increased over the last decades (Table 1). SMC may not take the exclusive credit for improvement in literacy rate, enrolment or infrastructure development, but certainly has played a significant role in overall school development and bridged the school-community association.

SCHOOL MANAGEMENT COMMITTEE: A BRIEF OVERVIEW

Decentralisation is one of the important forms of democracy. It is a process by which powers, roles and responsibilities are shared among the people. School is considered as a little democracy. Decentralised management system is promoted thorough community participation. The demand for decentralisation of school education had started during 1950s. After the emergence of *Pancchayati Raj* and *Gram Swaraj*, people wanted to devolve the power from top to bottom. It was realised that school and community must come together for mutual development. In 1966, the Kothari Commission recommended greater control of local communities over school education. During 1970–1980s, through the recommendation of NPE (National Policy on Education), 1986 the central government ordered the states to establish the Village

Education Councils (VECs) to look after the primary education. In 1993 the Central Advisory Board of Education (CABE) setup a committee to frame the strategies to decentralise the education system in the line of the 73rd Constitutional Amendment. It made VECs at the lowest level to enhance the quality of primary education. To make education more accessible, transparent and accountable, the *Sarva Shiksha Abhiyan* (SSA), a centrally sponsored government scheme was initiated in 2002. It involved Village Education Committees (VECs) and Parent-Teachers Associations (PTAs) to monitor the overall activities (Pandey, et al., 2010). But when it was realised that the goal of universalisation of elementary education is yet to be achieved, the government of India made education as a fundamental right through the RTE Act. The Act had received the president's consent on August 04, 2009 and came in to force from April 1, 2010 and was implemented throughout country except Jammu and Kashmir. It ensured to provide eight years of free and compulsory education to the children of six to fourteen years. But mere declaration of the Act is not sufficient and it needs proper monitoring and implementation. To safeguard the rights of the children as well as to monitor school activities through community participation, the RTE Act has made a provision in Section 21 to form SMC.

Process and Formation of the SMC

Community participation has become an important part of the development process. It identifies the felt needs of the people, develops a sense of ownership among them and mobilises resources for development of a community (Sharma et al., 2016). School and community are interlinked with each other (Dayaram, 2011). School fulfil the needs of the community providing education, while community helps the school for its development. Keeping this in view Section 21 of the RTE Act, 2009 mandated the formation of SMC in all the government and government aided schools (Government of India, 2009). It is the local democracy where parents, guardians, teachers and local people are the members. The main idea behind the constitution of SMC is to decentralise the education system for bringing accountability, transparency and effective delivery of education. The other purpose is to involve local people in school affairs to achieve the goal of Universal Elementary Education (UEE), implementing the norms of RTE in an inclusive manner with representation from members of the disadvantaged sections like Scheduled Caste (SC), Scheduled Tribe (ST) and Women. The Act has also mandated to include 75 per cent of the parents or guardians and 25 per cent of local authorities to constitute SMC. Total 19 members are elected to the committee, of them 12 members are the parents (6 males and 6 females), remaining 07

members include member of the PRIs, school principal, a class teacher, one Asha Karmi or Health worker, an *anganwadi* worker and two students members, i.e., head of the student cabinet and head of the *Meena Manch* (MHRD, 2014).

Expectation from SMC

The RTE Act has clearly outlined certain roles for the SMC to perform for school development. Members of SMCs have a role in planning and developing neighbourhood schools. With the support from school authority, they are expected to ensure the enrolment of never enrolled children through enrolment drive and their retention in school till the completion of elementary education (GoI, 2009). SMC should be monitoring the regular attendance of teachers and students in schools and should be in touch with the parents, in case of absenteeism. The committee is expected to facilitate the cleanliness and beautification of school environment, review and monitor the school health programme, organise *Sikshya Mela* (educational fair) and some school based competitions among children. Members of SMC are likely to ensure adequate infrastructure like drinking water, separate toilets for boys and girls, playground and so on (MHRD, 2014).

In a generic sense many parents and other stakeholders think that SMC is like a magic wand which can solve all school related issues. When RTE Act was implemented, parents thought that quality of education would increase all of a sudden and the country would achieve universal elementary education. It was also expected that SMC would play crucial role in fulfilling minimum infrastructure norms in all the elementary schools of the country. School teachers thought that they would get some relaxation from the burden of school management. But practically such instances may not be possible. SMC has been given limited power to work within certain guidelines. The members cannot do everything they want as most of the activities are rooted through a democratic process, which takes time and channelised through specified process to work out the plan. Research studies have revealed that school teachers are over-burdened with non-academic works as parent members included in SMC are not cooperating with them in monitoring and facilitating school activities. Many of them are not aware of the school activities as they are not attending SMC meetings (Kumar, 2018).

EXTERNAL ISSUES: BEYOND THE MARGIN OF SCHOOL MANAGEMENT

Implementation of RTE Act can be positively viewed in terms of increasing enrolment, attendance and developing infrastructure. SMC has no doubt contributed in school development and decentralisation process has brought productive partnership between the school

and the community. Still, there are many issues that need to be resolved. Despite these positive changes contributed by SMC, there are growing dissatisfaction among the teachers and other stakeholders regarding the school management (Rao, 2009). There are glaring gaps in planning and implementation of the Act across the Indian states (Maqbool and Rajaguru, 2015). Mere passing of an Act does not meet the objectives unless it is implemented in true spirit. The enactment of RTE Act has passed more than one decade but many of the commitments related to the Act are yet to be achieved. SMCs and schools are confronted with number of challenges in school management. These challenges include—growing preference for private schools, insufficient budget allocation, poor infrastructure, enrolment difficulties in age appropriate classrooms, diversities in school system shortage of teachers and related issues. Many of these are external issues and are not under the direct control of the school teachers or the member of the SMCs.

Growing preference for Private Schools

In the last few years there is a growing tendency among the parents to send their children to private schools. They are not even regretting to spend huge amount of money as they assume that government schools are no longer providing quality education. On the other hand RTE promises to provide free education, but stakeholders are not interested to take the benefit. Consequently, enrolment of students has increased considerably in private schools and decreased in government schools. According to the data released by the MHRD, the students' enrolment in government school has decreased from 19.9 crore in 2011–12 to 18.9 crore in 2016–17. Surprisingly, majority of the students who have opted for private schools are from underdeveloped states like Bihar, Jharkhand and Odisha (Sharma, 2019).

The permanent government school teachers get regular salaries and are not scared of losing jobs, which often affect the teaching-learning process (PROBE, 1999). Privatisation of education has become a serious issue in the contemporary scenario. As per RTE norm the school should enrol minimum number of students. Many neighbourhood schools having less than 30 students are about to close down due to the opening up of new private schools in the vicinity. Teachers in the government schools are appointed through a proper process having suitable qualifications, but as far as teaching-learning process is concerned, they need to be more committed (Goyal and Pandey, 2012). The growing interest towards private education does not mean that quality of education is better in such schools as there are number of unregulated private schools operating in different parts of the country. But privatisation is affecting the students'

enrolment in Government schools (Goyal and Pandey, 2012).

Insufficient Budget Allocation for Education Sector

Like health and economy; education is one of the important determinants which plays a vital role in country's development. That is why proper attention towards education sector is necessary and need of the hour. Better school infrastructure and school environment contributes to teaching-learning process, which is possible through adequate financial provisions. The need of sufficient financial allocation in education sector had been felt more than half century ago. As per the report of Kothari Commission (1968), the country should try to allocate the largest share of gross national product (GNP) for educational development. The committee during that time had recommended to have 6 per cent Gross Domestic Product (GDP) allocated to education. The share of spending in education as per allocation in Union budget has decreased from 4.6 per cent in 2014–15 to 3.5 per cent in interim budget of 2019–20 (Agha, 2019). Low budget allocation poses serious challenges in school development.

Poor Infrastructure

There is a positive correlation between school infrastructure and students' academic performance. That is why the RTE Act promotes that the school should be all-weather friendly and there should be office-cum store for head teacher, teacher's common rooms, and separate toilets for boys and girls, separate kitchen shed, drinking water facilities, a library and a playground. Section 18 of the RTE Act lays down that no private school should establish or can function without obtaining a certificate of recognition, and that such certificate of recognition would be issued to schools that fulfil the prescribed norms and standards. But the Act does not have such provisions for recognition of Government schools. In many states, Government schools do not have adequate rooms, toilets, drinking water and other basic facilities; there is shortage of teachers due to vacancies. Therefore, the requirement of the recognition of schools should also be applicable to all Government schools. That is why TSR Subramanian committee, is of the view that Government should in fact set an example by providing required facilities to all the schools before it takes punitive action against private schools for not doing so (Ministry of Human Resource Development, 2016).

Enrolment difficulties in Age Appropriate Class Rooms

As per the RTE Act, the children above six years, who have never been admitted to any school, or even if they are admitted have not completed elementary education and have dropped out, they have the right to be admitted to school in a class

appropriate to his or her age. The Act also states to give special training to the children admitted on the basis of age appropriate class to enable them to be at par with other children. But this only has become a provision in several instances. Neither head teacher nor other teachers of the school are aware of the special training in many school of India (Ojha, 2013).

Diversities in School System

India is a country where government learns from the failures most of the time. That is why large varieties of government schools have been setup on experiment basis since independence. Currently, we have Model Schools, Central Schools, *Navodaya* Schools and other schools run by the state. There are also private schools, *Saraswati Sishu Vidya Mandir,* Aurobindo Schools across the Indian states. All these schools do not have a common syllabus and common infrastructure facilities. So the quality of education throughout the country differs and creates a huge gap between different types of schools.

Shortage of Teachers

Lack of sufficient teachers in elementary school is one of the main challenge. According to RTE students-teachers ratio norm must be followed and this is more crucial at elementary level. But till date the requirement of the teachers have not been fulfilled. In India, primary schools are managed with limited number of teachers. There are more than 80 lakhs teachers in elementary schools. About 59 per cent teachers are in government schools, and yet around 8 per cent of all elementary schools in the country are single teacher schools (Ministry of Human Resource Development, 2016). It has been observed that the single teacher schools are facing a lot of challenges for providing quality education. The single teacher alone cannot teach all the subjects and handle the children from different standards at a time. Consequently, she or he takes combined classes and the attention gets diverted. Again due to the unavailability of subject teachers in schools the quality of teaching gets hampered. Sometimes, the science teachers cannot teach language appropriately and the language teachers may not be competent enough to teach science and mathematics. They take classes only because they do not have any alternatives. As long as the teachers' vacancies are not filled; problem will continue. Though the SMCs play a role in appointing voluntary teachers; in many schools they are not appointed due to lack of human resources in the locality. As the recruitment of teachers is decided by the state government, SMC has very little or almost no control over it.

Challenges confronted by SMC Members

There are many plans and polices which has been formulated for the welfare

of the people by the Government of India. Since independence a number of good initiatives have been taken to bring reform in education sector. Being the second largest populous country in the world and with its diversity and complexity, effective implementations remains a challenge. SMC members themselves confront a number of challenges, which question their efficiency to handle the school related issues.

Level of Education among SMC Members

Education plays a vital role in individual's life. It enables individuals to take crucial decisions in both personal and professional life. Hence, the level of education of the SMC members determines the effectiveness of the committee. It has been observed that in many schools even illiterate persons are elected as members as their children study there. Due to their ignorance they cannot take part in crucial matter of school effectively. They only play the role of a silent observer and feel hesitant to give their opinions. Consequently, other members who are literate and highly qualified play dominant role and take important decisions. Often, teachers or principals select illiterate persons to the committee deliberately who only may attend meeting without raising their voice. In such instances teachers take all the decisions regarding school development as per their choices. They conduct meeting, take crucial decisions, write minutes

and send it to the other members for signatures (Rao, 2009). The grassroot democracy is affected due to such practices. SMC members with less education may not actively contribute to school development and play a minor role in decisions making process.

Poor socio-economic Background

Many of the members of the SMC are from poor socio-economic background. The schooling system does not offer them anything nor does it make any promises to its members. The roles and responsibilities are purely voluntary in nature. People join in the committee to be a part of their children's development as well as for the development of their community. The school does not provide any financial incentive to its members. Several research studies have revealed that poverty is one of the main reasons of low involvement of the members in SMC meeting. Particularly, members who are economically not well off and work as daily wage labourer do not attend meeting in spite of several reminders by the school teachers because every day they have to earn a livelihood to feed the family. They do not have time to think about school development (Sharma, et al., 2016).

Conflict among Teachers and SMC members

Most of the developmental work of schools is half-done today because of the conflict of interest among

the members and school teachers. In many instances teachers are playing dominant role in taking decisions related to finance and not disclosing to SMC members which has been responsible for growing dissatisfaction among them. In some other cases parent members and local authorities are demanding share of the money which are being received for infrastructure development (Sharma, 2014). If the teachers refuse to provide the said money, member are not allowing any kind of activities to be done. That is why in some occasions teachers the members away from school related activities and from the decision keep making process.

Lack of Training for Capacity Building

Training provides knowledge regarding the roles and responsibilities and enables SMC members to work effectively. But in most of the Indian schools, training of the SMC members are not given importance. A large number of SMC members across the country are untrained and not aware of their roles and responsibilities. In 2006 a survey was carried out in Karnataka, Madhya Pradesh and Uttar Pradesh to measure the students' learning achievement, teachers' efforts and community participation. The survey had revealed that a large number of committee members in all three states had not received any training on their role and responsibilities. In

all these states, head teacher was the only person who was informed about the roles and responsibilities of the SMC (Pandey, et al., 2010).

Gender Related Issues

Indian society is patriarchal in nature and men play a dominant role in society. Women are socialised in such a way that they cannot understand the status of their subordination and accept it as a way of life. In many schools in different states women who are the members of SMC are not known as members rather their husbands are identified as the same. Women also depute their husbands to attend the SMC meeting (Sharma, et al., 2016). Gender related discriminations have also kept the females away from the various decision making process. In the real sense men are taking the opportunity to take part in school affairs actively. Women are just playing the role of passive observers. Their names are in the committee just in pen and paper. Record of the SMC and registers reveal that women are generally absent in the meetings. In Haryana, the females put veil on their heads and do not speak in front of their elders. This system hinders the women members to take part in crucial decisions of the schools (Narwana, 2015).

Caste Issues

Caste discrimination is one of the important factors which have become a barrier in implementing many

programs and policies in India. For many decades it has been alienating some groups from the mainstream of society. The caste system has also affected the education system of the country. In many schools teachers from lower caste are being humiliated by the upper caste teachers, and students of lower class are being asked to clean the school campus. Particularly, the caste based discrimination is being noticed during serving of Mid-Day Meal (MDM). In many schools villagers are not allowing lower caste people to cook and distribute food during school lunch. If the cook happens to be from lower caste, the MDM attendance is severely affected. In such situations SMC members are reluctant to intervene and they do not raise their voice (Narwana, 2015).

Suggestions and Policy Implications for strengthening SMCs

The smooth functioning of SMC can facilitate school development. It depends upon a number of factors. Bridging school-community linkage can be possible through different strategies.

Monitoring mechanism —Every plans and policies needs proper monitoring for its effective implementation. Research studies have noted that some of the SMCs are functioning only in pen and papers. Hence, the overall activities should be monitored by the school authorities or external members from the district administration. The SMC also can monitor the activities of the schools. It should ensure that the school is functioning as per the guidelines of RTE Act. If the SMC can notice any kind of issues that are violating children's right, it may be immediately reported to the standing committee.

Diversity in School System— Due to the diversities in Indian social system, the schools also experience certain amount of multiplicities. There are varieties of schools in the country and follow differences including the syllabus, pattern of examinations, teaching methods, infrastructure, and teachers' strength, etc., which vary from one another. It is very difficult to measure the quality of education among all children in a single yardstick. Hence, the Government should take care to provide minimum common facilities in all the schools as much possible.

Transparency in Schools—It has been observed that the principals of the schools and other SMC members hesitate to disclose the information regarding utilisation and receiving of funds before public. In many schools SMC, members are not aware of the received grants and their utilisation. The head teachers and other teachers spend it on their own ways without consulting the SMC, and take the signatures of the members in minutes and in other documents. Hence, to bring accountability and transparency in the school system the minutes and reports of the SMC should be

publicly available through websites or in notice board of the schools.

Education of the Members— Education plays a significant role in decision making process and expands the horizon and make individuals to think from diverse ways. The role of education in community development has widely been recognised. Illiterate rural women in local self-government are ignorant about the manipulation by elder males and relatives (Chatopadhyay and Duflo, 2004). They are also unaware of many developmental schemes and the financial procedures. The lower educational achievement in local self-government is the result of 73rd constitutional amendment which has made reservation of one third seats for women and included no educational entry point barriers at all. The same rule is also largely applied in selecting SMC, members and illiteracy among the SMC members is one of the important barriers to implement the RTE norms. Illiterate members in local government unintentionally involve themselves in corrupt activities (Kudva, 2003). Particularly, to encourage women's participation in school development a provision has been made in RTE Act to include 50 per cent women in SMC (Sharma, et al., 2016). But lack of education may restrict their true participation in school activities. Parental education affects children's educational outcomes in several ways (Dreeze and Kingdon, 2001; Chudgar and Shafiq, 2010). As 75 per cent of the members of SMC are guardians or parents of the children, care should be taken to include literate members during the formation of SMC.

Provision for Capacity Building— It has been observed that in some of the schools, SMC members as well as school teachers are not aware of roles, responsibilities and power extended to SMCs. Hence, there should be a compulsory provision for relevant training so that they may be able to make effective school development plans and the implementation in a time-bound period. The trainings should be imparted in simple language and made interesting for better participation, which can help in meeting the practical requirement of the school.

Conclusion

To bring reform in country's education, government of India has initiated a number of plans and policies since independence. Decentralisation of elementary education with the involvement local community is one of the noble steps. Involvement of communities or local groups in school affairs has benefited Indian schools in several ways. It has ensured enrolment, retention and regular attendance of teachers and students. It has been playing a crucial role in school infrastructure development, monitoring mid-day meal scheme and quality education. As discussed above, effective school management through SMC can be linked with school related issues

which are inbuilt within the school system. The responsibilities include monitoring the regular attendance of teachers and students, facilitating the cleanliness and beautification of school environment, reviewing and monitoring the school health programme and MDM, organising educational fair and some school based competitions and overall creating a child-friendly atmosphere. The policy as per RTE envisages that the local communities would directly be involved with the affairs of primary education and can solve many of the school related problems. But it again depends on a large number of external factors like, the growing preference for private schools, insufficient budget allocation for education sector, poor infrastructure and many related matters. Such challenges confronted by the school as well as by the SMCs can be addressed at the policy level, but not at the school or community level. So

SMCs cannot be accountable or held responsible for any inconveniences or limitations within a specific school or a community. The issues related to diversities in Indian schools can also influence the local schools and this again can be addressed in a larger context. Shortage of teachers in schools for instance is a state level query, which can affect the quality education at the same time schools and SMCs have very little role to address such questions. Those apart, SMC members themselves are confronting a number of challenges due to their poor socio-economic background, struggle for survival to meet the daily requirements, lack of education and training for capacity building, caste and gender based hierarchy. Community participation should be focused in the specific context and for effective school management through SMCs—both external as well as internal matters need to be taken into consideration.

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Growth and Development of Higher Education in Uttarakhand

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Abstract

Higher education institutions are the centers that provide opportunities to the youth to empower themselves through higher knowledge, attitude and skills, which are crucial for the progress of any nation or the society. Such empowerment is not only the basis of the development but is also responsible for ensuring better quality of life, progress and happiness. In the era of cut-throat competition, survival of any nation depends upon its higher education system, therefore, higher education is considered as key determinant of national growth. After independence, higher education sector in India has also witnessed manifold growth. Uttarakhand as new born state has also witnessed rapid changes in its higher education system in the recent past. Numbers of institutions including universities and colleges have also grown rapidly. The need therefore is to assess the status of higher education system in Uttarakhand as detailed in the present paper.

INTRODUCTION

Education is the basic need of every society. A better education system can enhance the social, scientific, and technological improvement of a country. Education is one of the most powerful instrument for reducing poverty and inequality in a country. Education is equally key to enhance India's competitiveness in the global economy. Therefore, providing quality education for all is central to the economic and social development of India (Ponnavaikko, 2015). It provides skills and competencies for economic

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well-being. It also strengthens democracy by imparting to citizen the tools needed to fully participate in the governance process.

In the same way, higher education plays a vital role in nation building. Any nation of the world cannot survive in the race of development and progress without strengthening their higher education system. Therefore, higher education is being considered as a key element to serve the purpose of national growth.

Today higher education is expected to match the unprecedented period of globalisation and its 'knowledge economy', forcing people to venture into different world and cultures. The role of higher education institutions in development is vital, but it is also complex, fluid and dynamic. Higher education institutions exhibit numerous capabilities and scope and can affect the process of development, both directly and indirectly through teaching, research, and service.

At present, higher education is passing through a transitional phase because contemporary society has high expectation from higher educational institutions to make changes in the life of people. The society also creates pressure on various stakeholders of education to make the higher education system more responsible and relevant for the development of the economy. Higher education is a powerful instrument for national development and it can act as an instrument of social change based on the principles of justice, equality, liberty and dignity (Jeyabalan, 2015). Today, each country of the world is trying to make their people well qualified and well equipped knowledge workers with skilled practical knowledge. Today's economy is knowledge-based economy, that's why higher education plays a predominant role in providing top-level manpower to all sectors of the society. Realising this fact, government of India established the University Grants Commission (UGC) led by late Shri Maulana Abul Kalam Azad, the then Minister of Education, Natural Resources and Scientific Research, on 28 December, 1953. The UGC, however, was formally established in November 1956 as a statutory body of the Government of India through an Act of Parliament for the coordination, determination, and maintenance of standards of university education in India (UGC, Genesis). Thereafter, state governments and the Government of India established so many higher educational institutions which led the expansion of higher education in almost all states of India. Uttarakhand as a newly born state also witnessed such type of expansion. However, even after sixty-three years of establishment of UGC, coordination, determination and maintenance of standards in higher education haven't reached the grass root level. Meanwhile, the higher education system has undergone remarkable structural changes, due to liberalisation. It has increased

capacity with the entry of private players. The entry of private institutions in the higher education sector resulted in dynamism of the higher education system.

HIGHER EDUCATION

Higher education generally means the education provided at the college or university level. It starts after the higher secondary or 10+2 level. Higher education sector refers to undergraduate and postgraduate courses, i.e., B.A., B.Sc., and B. Com, and professional courses like B. Tech., B.C.A., B. Arch., B. Design, etc., which comprised of four to five years duration. These courses run in various types of higher educational institutions, which can be classified in various categories such as Central Universities, Deemed to be Universities, Institutes of National Importance, State Public Universities, State Private Universities, Stand-alone institutions, Government Colleges and Private Colleges.

HIGHER EDUCATION IN UTTARAKHAND: AN OVERVIEW

Uttarakhand as a separate state was created on the 9th of November 2000, as the 27th State of Republic of India. Administratively, with a total of 13 districts the state is divided into two divisions, Garhwal and Kumaon. According to 2011 Census report, the total population of Uttarakhand was 10,086,292, of which male and female population was 5,137,773 and 4,948,519 respectively. The

Gross Enrolment Ratio (GER) for Higher Education in 2017-18 was 36.3 per cent (AISHE Report, 2017–18). Uttarakhand has a long history of higher education since it was a part of the undivided state of Uttar Pradesh. Dayanand Anglo Vedic Post Graduate (D.A.V.) College, Dehradun is one of the oldest college in the state, which was founded in the year 1948. Uttarakhand's first engineering college was established in the year 1949 at Roorkee and first Government Degree College was established in 1951 at Nainital. Thereafter, many higher educational institutions came into existence in the state. From the year 1948 till 2000, 42 higher educational institutions were established in the state. After one year of the formation of the new state, the Directorate of Higher Education came into existence at Haldwani (Nainital) in 2001 (Directorate of Higher Education Uttarakhand, Progress Report).

INSTITUTIONAL GROWTH OF HIGHER EDUCATION IN UTTARAKHAND

Universities, university-level institutions, and degree colleges play a very important role to make a vibrant society, making every individual, independent, responsible citizen, qualified expert, and specialist in a particular field. Without such institution, a nation could not progress economically, socially, culturally and politically.

Higher education of Uttarakhand has undergone many transformations

in the recent past. Large number of higher educational institutions were established during the last two decades. Presently, there are 1 Central University, 1 Deemed to be University (Government), 1 Deemed to be University (Aided), 1 Deemed to be University (Private), 3 Institutions of National Importance, 15 State Private Universities, 10 State Public Universities and 607 all types of colleges running in the state (AISHE Report 2017–18).

Dayanand Anglo Vedic Post Graduate College, Dehradun is one of the oldest government aided postgraduate college of Uttarakhand State. The establishment of public sectors higher educational institutions in Uttarakhand started in early 1950s within the erstwhile Uttar Pradesh. After that, continuation of the establishment of higher educational institutions is going on at large scale and till the year 2015, there were 17 government aided college and 94 government colleges established in the state (Directorate of Higher Education, Uttarakhand).
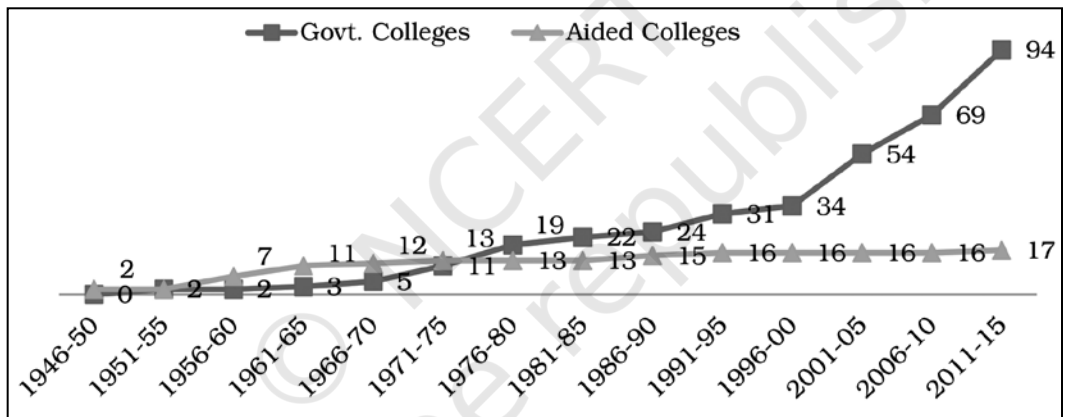

Figure 1: Growth of Government and Aided Colleges in Uttarakhand
Source: Directorate of Higher Education Uttarakhand (April 2019)

India's first agricultural university, and Uttarakhand's first state university was Govind Ballabh Pant University of Agriculture and Technology established in Pantnagar (then in Uttar Pradesh) Uttarakhand. It was inaugurated by the first Prime Minister of India Pt. Jawaharlal Nehru on 17 November 1960. After that from the year 1960 to 1972 there was no single university established in the state. In the year 1973 state government decided to establish one public university in each division of the state. Presently Uttarakhand has 11 state public universities. Plan wise growth of higher educational institutions in the state is shown in Figure 2.
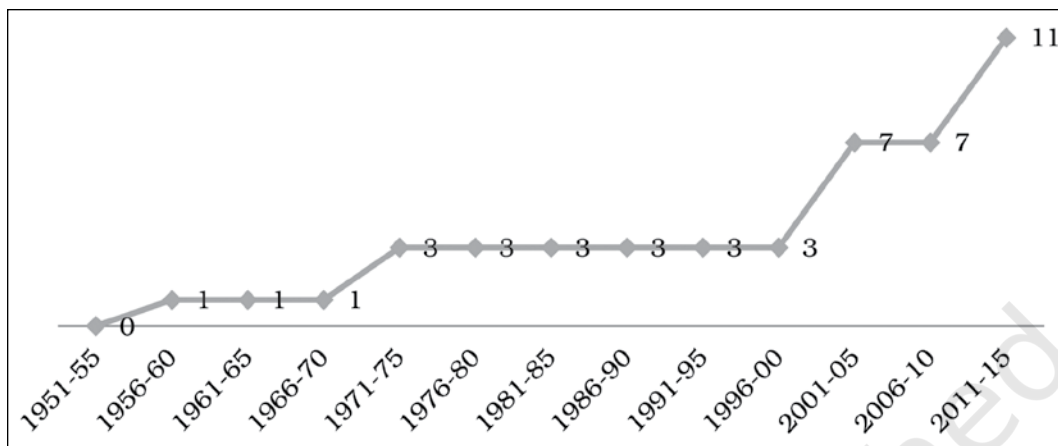
Figure 2: Growth of State Public Universities
Source: Directorate of Higher Education Uttarakhand (April 2019)

Figure 3 shows the growth of universities within the state of Uttarakhand. As depicted in the figure, first public university was established in the year 1960. After that, the process of establishment of various types of universities is going on consistently, and till 2015, 29 universities were established during the last six decades.
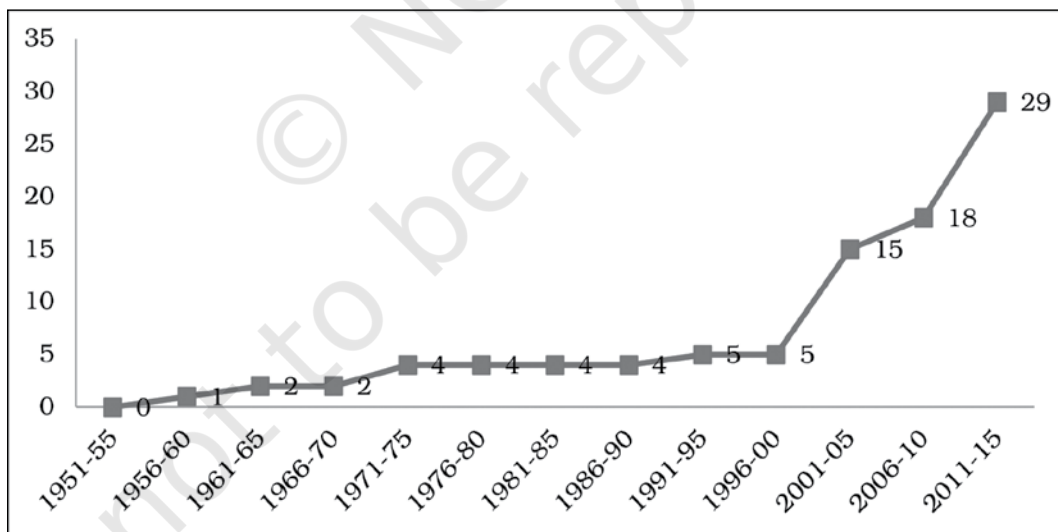

Figure 3: Growth of All Types of Universities in Uttarakhand
Source: Directorate of Higher Education Uttarakhand 2019)

Table 1
Growth of Universities during last 8 years

Year	2010–11	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18
No. of Universities	18	20	22	24	26	28	28	33

Source: All India Survey on Higher Education (2018)

Table 2
Type-wise Universities during last 8 years

Session	Central University	Deemed to be University Government	Deemed to be University Aided	Deemed to be University Private	Institute of National Importance	State Private University	State Public University
2017–18	1	1	1	1	3	15	10
2016–17	1	1	1	1	3	11	9
2015–16	1	1	1	1	3	11	9
2014–15	1	1	1	1	3	10	8
2013–14	1	1	1	2	3	7	8
2012–13	1	1	1	2	2	6	8
2011–12	1	1	1	2	2	6	6
2010–11	1	1	0	3	2	5	5

Source: All India Survey on Higher Education (2018)

Table 2 shows the growth of various types of universities during the last 8 years. Data clearly reveals that there is a single central university existing in the state of Uttarakhand. Earlier, this university had the status of state university till the year 2008. In the year 2009, it was upgraded from state university into central university, through an act of parliament. Uttarakhand has three deemed to be Universities: 1 deemed to be University (Government), 1 deemed to be university (aided) and 1 deemed to be university (private). There are 3 Institutions of National importance also existing in the state. Therefore, the rate of establishment of private universities is increasing faster as compared to the state public funded universities.
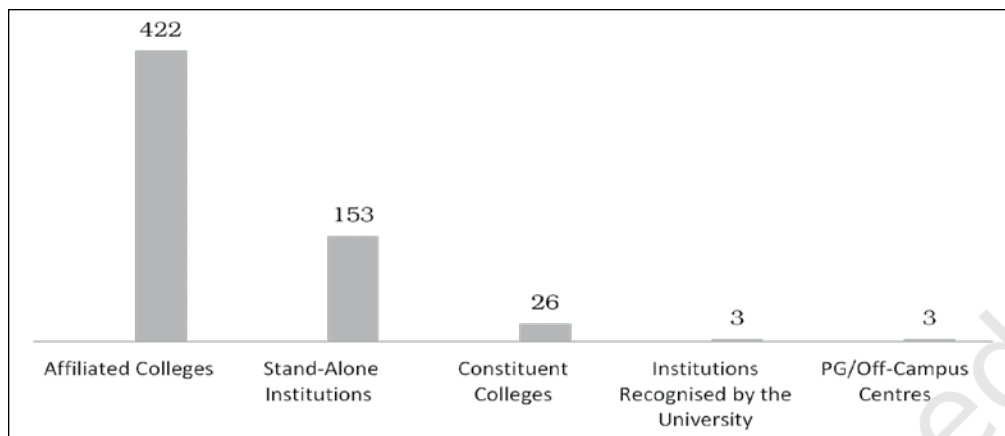
Figure 4: Type-wise Number of Colleges/Institutions in 2017–18
Source: All India Survey on Higher Education (2018)

On the basis of organisational structure, educational institutions have been categorised in various categories by the governing authority. Table 4 represents the various types of educational institutions existing in Uttarakhand state. The detail description of these educational institutions, according to AISHE report 2017–18 is as under:

- **Affiliated Colleges:** These are institutions which can run degree programmes but are not empowered to provide degree on their own and are required to be attached with a University/ University level institution for the purpose of awarding the degree. By the year 2017–18, there were 422 affiliated colleges within the state.

- **Stand-Alone Institutions**: There are several institutions which are outside the purview of the University and College. These Institutions generally run Diploma or PG Diploma level programmes for which they require recognition from one or other statutory bodies. By the year 2017–18, there were 153 stand-alone institutions in the state.

- **Constituent Colleges**: A college maintained by the University. In the year 2017–18, there were 26 constituent college within the state.

- **Institutions Recognised by the University:** These are the institutions attached with the University for the purpose of awarding degree in respect of programmes being run in these institutions, e.g., Army Cadet College Wing, Indian Military Academy, Dehradun is not

Social Category-wise Student Enrolment
Table 3
Category-wise Students Enrolment during the last seven years

Session	General			SC			ST			OBC		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
2017–18	144377	140471	284848	30944	29558	60502	8008	8139	16147	41279	34375	75654
	(64.3)	(66.1)	(65.1)	(13.8)	(13.9)	(13.8)	(3.5)	(3.8)	(3.7)	(18.4)	(16.2)	(17.3)
2016–17	141173	150669	291842	28421	26407	54828	7628	7788	15416	32872	27679	60551
	(67.2)	(70.9)	(69)	(13.5)	(12.4)	(13)	(3.6)	(3.6)	(3.6)	(15.6)	(13)	(14.3)
2015–16	141389	133329	274718	28147	25980	54127	7753	7142	14895	32676	28970	61646
	(67.3)	(68.2)	(67.7)	(13.4)	(13.3)	(13.3)	(3.7)	(3.6)	(3.7)	(15.5)	(14.8)	(15.2)
2014–15	156822	140653	297475	26817	22896	49713	7659	8330	15989	28092	24499	52591
	(71.5)	(71.2)	(71.5)	(12.2)	(11.6)	(11.9)	(3.5)	(4.2)	(3.8)	(12.8)	(12.5)	(12.6)
2013–14	148828	151205	300033	27775	26957	54732	6318	6570	12888	23777	25068	48845
	(72)	(72)	(72)	(13.4)	(12.8)	(13.1)	(3)	(3.1)	(3.1)	(11.5)	(11.9)	(11.7)
2012–13	149532	150654	300186	25363	23168	48531	8292	9108	17400	23652	23050	46702
	(72.3)	(73.1)	(72.7)	(13.3)	(11.2)	(11.7)	(4)	(4.4)	(4.2)	(11.4)	(11.2)	(11.3)
2011–12	144389	151244	295633	20656	19838	40494	7666	8246	15912	19045	17584	36629
	(75.3)	(76.8)	(76)	(10.8)	(10.1)	(10.4)	(4)	(4.2)	(4.1)	(9.9)	(8.9)	(9.4)

Source: All India Survey on Higher Education (2018)

* Figures in parenthesis denotes the percentage

affiliated with any University, but the degree in respect of programmes run in the institute are awarded by Jawaharlal Nehru University. By the year 2017–18, there were 3 recognised institutions within the state.

- **PG/Off-Campus Centre:** A centre of the University established by it, outside the main campus (within or outside the state) operated and maintained as its constituent unit, having the university's compliment of facilities, faculty and staff. Teaching departments of the university, where post graduation level courses are offered should not be treated as PG centre. By the year 2017–18,
- there were 3 PG/Off-campus centre within the state (AISHE 2017–18).

Table 3 reveals that the highest percentage of general category students enrolled in the year 2011–12 and in the subsequent year, this percentage is going down slowly. Conversely, the percentage of OBC category students' enrolment is very low mainly in years 2011–12 to 2013–14 as compared to their existing percentage population in Uttarakhand state. Enrolment of ST category students is highly satisfactory in all years, whereas, enrolment of SC category students is dissatisfactory in all years in context to total percentage existing in Uttarakhand state. One more important thing has been seen

in the above table that female student's enrolment is almost equal to male counterparts. It may be due to the fact that parents are equally aware of higher education of their girl child and as such, do not appear to be discriminating among their girl and boy child with regards to imparting education.

Gross Enrolment Ratio (GER) in Higher Education

Gross Enrolment Ratio in Higher Education in India is calculated from 18–23 years age group of students. When data on Gross Enrolment Ratio (GER) in higher education in Uttarakhand is analysed, it was observed that in the year 2010–11 GER for state average was 27.8 per cent, whereas GER for Schedule Castes (SC) and Schedule Tribes (ST) categories was 17.7 per cent and 44.2 per cent respectively. On the basis of GER table (Table 4), it can be analysed that GER for ST category students is very high in 2010–11 and subsequent years. However, GER for all categories in higher education registered a gradual increase in consecutive years and it reached the level of 36.3 per cent in the year 2017–18. Therefore, Uttarakhand has reached 7th position after Chandigarh (56.4), Tamil Nadu (48.6), Delhi (46.3), Puducherry (45.4), Himachal Pradesh (37.9) and Sikkim (37.4). Conversely, 29 states and union territories have low GER as compared to Uttarakhand. Whereas in hilly states, Uttarakhand has third position after Himachal Pradesh (37.9)

Table 4
Gross Enrolment Ratio in Higher Education in Uttarakhand during the last eight years

Session	All			SC			ST		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
2017–18	36.3	36.3	36.3	26.4	26.7	26.6	42.1	42.5	42.3
2016–17	33.8	33.0	33.4	24.1	23.7	33.9	39.9	40.4	40.2
2015–16	33.6	32.9	33.3	23.8	23.2	23.5	40.3	36.8	38.6
2014–15	34.9	32.8	33.9	22.5	20.3	21.4	39.2	42.7	41.2
2013–14	32.7	34.9	33.8	23.2	23.7	23.5	32.5	33.4	33.0
2012–13	32.7	34.9	33.3	23.2	23.7	23.5	32.5	33.4	33.0
2011-12	30.1	32.3	31.1	17.1	17.2	17.2	39.1	41.4	40.2
2010-11	26.1	29.6	27.8	17.5	18.0	17.7	42.2	46.3	44.2

Source: All India Survey on Higher Education (2018)

and Sikkim (37.4). The GER of the national average in the year 2017–18 has registered only 25.8 percent. It is again an indication that Uttarakhand has registered an unprecedented growth in GER of higher education (AISHE Report 2017–18, T-19).

People Teacher Ratio in Higher Education

People-teacher ratio is a major important aspect for maintaining quality in any educational institution. Viewing this concept in mind UGC has constituted a committee under the chairmanship of Professor J A K Tareen, a former member of the UGC and Vice Chancellor of Puducherry University for various disciplines and programs. The committee has set uniform norms for the people-teacher ratio which is given as under:

People-teacher ratio for PG programs in Universities to have at least one teacher for every 10 students for science, media and mass communication, and one teacher for every 15 students for humanities, social sciences, commerce, and management. For the Undergraduate Programmes universities and colleges need to have at least one teacher for every 15 students in the media and mass communication programs, while the people-teacher ratio should be 1:30 for social sciences and 1:25 for the science stream (PIB GoI 2011). On the other hand, the committee did not take any kind of attention on B.Ed. and M.Ed. programmes, because these programmes come under the purview of NCTE guideline. Therefore, according to NCTE Regulation 2014, one teacher

is required for every 10 students in M.Ed. programme, and one teacher for every 13 B.Ed. students (NCTE Regulation 2014). If Table 5 data is analysed, it can be concluded that the maximum numbers of educational institutions are not completing UGC norms of people teacher ratio. However, regular mode institutions are slightly in better position as compared to regular and distance mode.

Table 5
Pupil Teacher Ratio during the last seven years

Session	All Institutions		University and Colleges		University and Its Constituents Unit	
	Regular and Distance Mode	Regular Mode	Regular and Distance Mode	Regular Mode	Regular & Distance Mode	Regular Mode
2017–18	28	24	46	40	33	22
2016–17	26	24	28	25	33	23
2015–16	22	20	23	22	24	18
2014–15	23	22	25	23	26	19
2013–14	30	28	32	29	33	23
2012–13	29	27	31	29	34	23
2011–12	31	30	33	31	29	21

Source: All India Survey on Higher Education (2018)

CONCLUSION

The higher education system of Uttarakhand has undergone massive expansion in the recent past. At the time of formation of the state, there were 5 universities or university level institutions, which have gone up to 33 in the year 2017–18. The number of colleges and college level institutions has gone up from 37 to 607 during the same period. In the academic session, 2010–11, GER for the state was 27.8 per cent, whereas for Schedule Caste (SC) and Schedule Tribe (ST) categories, it was 17.7 and 44.2 per cent respectively. Conversely, in the academic session, 2017–18, GER for state average has reached with a high surge of 36.3 per cent. However, GER for schedule castes has reached 26.6 per cent only, whereas, it was 42.3 per cent for schedule tribes, which is the highest percentage among various social categories.

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