EFFECTIVENESS OF CONTINUOUS AND COMPREHENSIVE EVALUATION (CCE) ON THE DEVELOPMENT OF HIGHER MENTAL ABILITIES IN SCIENCE STUDENTS

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Since independence till today many reasearches as well as innovative steps have been tried by secondary educational boards of India, which are mainly emphasising upon the all-round development of the students. In this context, Central Board of Secondary Education(CBSE) applied Continuous and Comprehensive Evaluation(CCE) system in Class X (2010-2011). In the present research paper, the researcher wants to see the effectiveness of CCE on the development of higher mental abilities i.e. application, analysis, synthesis and evaluation in science students.

For this purpose, a comparative study was made between the science students of Class XI from the CBSE board (who faced the CCE pattern in Class X) and the science students of the same class from UP board (who did not face the CCE pattern in Class X) in 2010-2011. For the present study, hundered students from CBSE board and 100 from UP Board of Bulandshahr district were selected through stratified random sampling technique. A test of higher mental abilities developed by the investigator on the basis of a standardised test developed by Dr D.N. Sansanwal and Dr Anuradha Joshi (1989) was administered on the students. Findings of the study indicate no significant difference in the development of higher mental abilities of science students of both the boards i.e., the CBSE Board and UP Board. The findings support the reconsideration of the applied part of CCE system followed by the CBSE Board.

Introduction

The pursuit of science is a process of unlocking the human mind. It is an exploration of mystery, beauty and method in the universe by stretching the frontiers of our imagination. We need to invoke the power of science in every sphere of life. Today, we are living in the world of science and technology. The scientists of the world have developed the technologies alot. Due to explosion of knowledge during last few decades we are proceeding towards the technocratic age. Now science has become an integral part of our lives. Applications of science have provided us many benefits and ensured a better quality of life. Hence, each individual needs to prepare himself to cope-up with the present situation. For this, it is very essential to develop higher mental abilities as application, analysis, synthesis and evaluation in the students. Scince in india is taught as a body of complete knowledge with answers to all questions that are worth asking. But there is almost complete absence of creativity and experimentation by the students in the classroom. Principles are given more emphasis over the practice and products are given more importance over the processes of science.

Students gradaute from universities with a lot of information but with little ability to apply their learning to solve the real life problems which affect them, their society and their environment. Mukherjee and Verma(2001) are of view that there

is a need to study this problem in depth and come up with a school science curriculum. The main reasons for this may be that science teaching is not child centred, artificially taught and does not arise from daily lives of children. Surveys across the globe suggest that lack of interest in science is mainly due to science being less intrinsically motivating (Global Science Forum, 2003; National Science Survey, Shukla,–2005), nature of science being cut off from real world and its content being overloaded with matters unrelated to the life of students (Hill and wheeler, 1991; Osborne and Collins, 2001). Science teaching methods are unable to provide natural curiosity in children.

Skills as the part of higher mental abilities have been mentioned at the elementary and secondary stages of education by the *National Curriculum Framework* (NCF– 2005), NCF identified some guiding principles for the planning, development and transaction of curriculum as:

1. Ensuring that learning shifts away from the rote methods.
2. Ensuring the curriculum, so that it goes beyond the textbooks.
3. Connecting knowledge to life outside the school.
4. Making examination more flexible and integrating them with the classroom life.

If evaluation is designed in such a manner that it can be used as powerful means of improving the quality of education so as to help the learner internalise the subject matter rather than to make them a storehouse of information.

The goal of science is to discover, evaluate, integrate and redefine the concepts of science. It can be achieved if emphasis is given to the development of higher mental abilities such as comprehension, analysis, synthesis and evaluation in science students.

What is CCE?

Based on the suggestions and guidelines provided by NCF–2005, the CBSE introduced an innovation in 2010-11 in the form of CCE system for Class X. According to H.S. Shrivastava(1989), CCE has long been suggested as a conceptual and workable alternative to redress the shortcomings of the system of conventional evaluation, as it has the inherentability to test attained competencies rather than memorised content as at present. Its main purpose was to emphasise upon the all-round development of the child, continuity in evaluation and assessment of the learning and behavioural outcomes, development of the skills, emphasising the thought process, discouraging the memorisation and regular diagnosis followed by remediation.

Need for The Study

It is generally observed that at the secondary level, classroom activities mostly emphasise upon the development of low mental abilities of cognitive domain i.e. knowledge and comprehension in students. Whereas, the development of higher mental abilities i.e. application, analysis, synthesis and evaluation is igonred. When after passing Class X every student should have possesed such abilities so that he may be able to take proper decsions by analysing the situation appropriately. In order to solve real life problems, such mental

abilities should be well developed in every student but particularly in case of science students, it is essential to develop higher mental abilities properly.

The main purpose of this study is to investigate whether CCE system is playing any significant role in the development of such higher mental abilities as application, analysis, synthesis and evaluation in science students or not.

Objectives

The main objectives of the study are:

1. To study the effect of CCE on the development of higher mental abilities in science students of secondary schools.
2. To compare the higher mental abilities of science students of secondary schools following CCE pattern(CBSE) and the schools not following the CCE pattern(UP Board).
3. To compare the higher mental abilities of the science students i.e. boys and girls of the secondary schools.

Methodology

(a) Research Methodology

Survey method of research was employed for the present study.

(b) Sample of the study

Present study was conducted on Class XI Science students of Bulandshahr Distt. of UP to study the effectiveness CCE on the development of their higher mental abilities. 2010-11 was the year in which secondary schools affiliated by CBSE applied CCE pattern in Class X. Whereas, the schools affiliaed by UP Board did not apply CCE pattern in Class X. For present study, 160 students of Class XI; who scored between 6-9CGP or 60-90 per cent in Class X were selected from 10 secondary schools. Out of these schools, 5 schools were affiliated by UP Board and rest 5 were affiliated by
CBSE, by using stratified random sampling technique.

(c) Tools Used

For measuring higher mental abilities of Secondary school science students, a test was developed by the investigator taking help of a standardized test developed by Dr D.N. Sansanwal and Dr Anuradha Joshi (1989). The 112 items of the test were framed so as to test the four action verbs of the four higher mental abilities each (i.e. application, analysis, synthesis and evaluation) in a pattern as :

S.N.	Mental Abilities	Action Verbs	Item No.
1.	Application	(a) To predict (b) To compare (c) To construct (d) To assess	1,17,33,49,65,81,97 2,18,34,50,66,82,98 3,19,35,51,67,83,99 4,20,36,52,68,84,100
2.	Analysis	(a) To analyse (b) To see relationship (c) Dividing (d) To conclude	5,21,37,53,69,85,101 6,22,38,54,70,86,102 7,23,39,55,71,87,103 8,24,40,56,72,88,104

3.	Synthesis	(a) To derive the abstract relations (b) To organise (c) To generalise (d) To summarise	9,25,41,57,73,89,105 1026,42,58,74,90,106 11,27,43,59,75,91,107 1228,44,60,76,92,108
4.	Evaluation	(a) To criticise (b) To evaluate (c) To avoid (d) To defend	13,29,45,61,77,93,109 14,30,46,62,78,94,110 15,31,47,63,79,95,111 16,32,48,64,80,96,112

Statistical Techniques Used

Mean, Standard Deviation and 't' test were used to analyse the data.

Results

Table 1

Sample	N	Mean	S.d.	'T'	Remarks
Students (CBSE)	100	98.71	9.44	2.13*	Significant at
Students (U.P.Board)	100	95.40	9.23		.05 level

Table 2

Mental Abilties	Action Verbs	Schools Following CCE Pattern(CBSE)				Schools Not Following CCE Pattern(UP Board)				'T'
		Mean	ΣX_1	ΣX_1^2	Ss_1	Mean	ΣX_2	ΣX_2^2	Ss_2	
1. Application	To predict	4.9	196	928	32.4	5.4	216	1224	57.6	3.84*
	To compare	6.1	244	1516	27.6	5.9	236	1332	60.4	0.83
	To construct	6.6	264	1760	17.6	6.3	252	1604	16.4	2.00
	To assess	5.5	218	1226	56.6	4.8	194	927	31.8	2.91
2. Analysis	To analyse	6.1	244	1516	27.6	5.7	228	1184	115.6	1.33
	To relate	5.9	236	1332	60.4	5.1	204	1076	29.6	3.33*
	To divide	6.9	265	1700	55.6	6.4	256	1664	25.6	2.17
	To conclude	6.3	252	1601	13.4	5.5	220	1226	16.0	5.71**
3. Synthesis	To derive	6.0	240	1476	36.0	5.1	204	1076	35.6	4.09**
	To organise	5.4	216	1224	57.6	4.9	196	928	32.4	2.08
	To generalise	4.8	192	944	22.4	6.5	260	1708	18.0	3.45*
	To summarise	6.4	256	1648	9.6	6.2	248	1544	6.4	1.92
4. Evaluation	To criticise	6.1	244	1432	56.4	6.0	240	1464	24.4	0.43
	To evaluate	5.9	236	1332	60.4	4.9	196	928	32.4	3.01*
	To avoid	5.4	216	1224	57.6	5.9	236	1332	60.4	1.78
	To defend	5.9	236	1332	60.4	4.8	192	944	22.4	4.78**

Table 3

Variables	Catagory	N	Mean	S.d.	'T'	Remarks
Schools Following CCE Pattern (CBSE)	Boys	65	97.02	8.89	1.42	The difference is insignificant
	Girls	35	95.34	8.66		
Schools Not Following CCE Pattern(UP board)	Boys	45	95.40	9.23	0.289	The difference is insignificant
	Girls	55	94.95	7.72		

It is evident from Table 1 that the Class XI science students of the secondary schools following CCE pattern i.e. (CBSE) scored a mean of 98.71 out of 112 items that is approaximately 88.13 per cent whereas the Class XI science students of the secondary schools not following CCE pattern i.e. (UP Board) scored a mean of 94.40 out of 112 items that is approximately 84.28 per cent. On the basis of the findings it is concluded that the Class XI science students of the secondary schools following CCE pattern i.e. (CBSE) have more developed higher mental abilities.

It is observed from Table 2 that there is a significant difference in the development of higher mental abilities of Class XI science students of the secondary schools following CCE pattern i.e. (CBSE) and the Class XI science students of the secondary schools not following CCE pattern i.e. (UP Board) as to Predict(t=3.84*),See relationship(t=3.33*), to conclude(t=5.71**), to derive(t=4.09**), to Evaluate(t=4.01**) and to defend(t=4.78**). Whereas there is no significant difference in the mental abilities such as to compare(t=0.83),to construct(t=2.00), to assess(t=2.91), to analyse(t=1.33), to divide (t=2.17), to organise (t=2.08), to summarise (t=1.92), to criticise (t=0.43), to avoid (t=1.78)

Table 3 shows no significant difference in scores of higher mental abilities of boys and girls. It is observed from the value that the variable sex does not play any significant role in the development of higher mental abilities.

Discussion

Going through the findings it has been found that students from both the groups scored almost same on some of the higher mental abilities as ability to compare, to construct, to assess, to divide, to organise, to summarise, to criticise and the ability to avoid. The reason may be a similar school environment for both the groups. On such ground it may be interpreted that the implimentation of CCE in CBSE schools could not bring so much positive and additional change as expected. In the prescribed schedule of CCE, practical aspect of science and other subjects is emphasised more. But the actual condition was entirely different i.e. on the basis of certain projects made by the groups of the students, those were considered as their practical work and marks were given. Recent studies in India have shown that there is a shift away from science at plus two level (Patil, 2003). Students at secondary and senior secondary level should be given real laboratory experiences as it will create interest in the students for opting science. The findings support the need to renovate the applied part of the CCE so that there may be a proper development of higher mental abilities in science students.

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