

A Study of Assessment Practices in Mathematics

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Abstract: Continuous and Comprehensive Evaluation (CCE) was introduced in the Indian education system in 2004 as an assessment scheme with an aim to refurbish the existing education system which was exam-oriented, rigid and promoted only lower order learning among students. The application of this scheme was made mandatory in all the State Board Schools of Gujarat from the year 2011. This paper is based on the findings of a survey carried out on thirty per cent of the Secondary and Higher Secondary State Board Schools in the city of Vadodara in January 2014. The survey dealt with an important objective of CCE: 'the development of Higher Order Thinking Skills in students', narrowing the spectrum only to the subject of Mathematics. Responses of the Mathematics teachers were analyzed to attain information on their awareness and comprehension regarding all aspects of CCE, the tools and techniques used to implement CCE, the methods used by them to inculcate and assess higher order thinking skills among students and the difficulties they faced while implementing CCE. A semi structured interview was also conducted to understand the support provided by the State Government to aid Mathematics teachers to comprehend and implement the scheme well. It was found that though teachers had theoretical understanding about CCE, their practical application was mechanical and lacked holistic conceptual understanding. The transaction of higher order thinking skills were yet to get due importance from teachers and authorities and a more intensive training highlighting the bigger perspective of CCE was required to be planned out by concerned authorities.

Keywords: Continuous Comprehensive Evaluation, Mathematics, Higher Order Thinking Skills, Support provided to teachers.

I. Introduction

"Education teaches how to think"[1], by Otto Friedrich is probably the most fitting way to define Education. Indeed education in its most primitive and purest form has been teaching human beings to think, act, evaluate and inculcate a set of values. The dominance of education over mankind has increased many fold times today; as it is the main source of human resource required for the unbounded progress that we aspire for.

The school plays an important role in helping children according to their unique needs and potentialities. It is in the classroom that learners can analyze and evaluate their experiences, learn to doubt, to question, to investigate and to think independently. Shere (as cited in Faith, 2013)[2] defines life skills as "the ability to analyze a situation, propose a solution and, should that solution not work, be able to re-strategize to try again". These skills can mould the mentality of a child and make him a challenge facer and a life winner. The subject of Mathematics displays a wide scope in developing and enhancing these skills. The learning of Mathematics also is an excellent vehicle to train minds, and to develop the capacity to think logically, abstractly, critically and creatively. These are important 21st century competencies that we must imbibe in our students [3].

Higher order thinking skills include critical, logical, reflective, metacognitive, and creative thinking. They are activated when individuals encounter unfamiliar problems, uncertainties, questions, or dilemmas. Valid assessment of higher order thinking skills requires that students be unfamiliar with the questions or tasks they have sufficient prior knowledge, to enable them to use their higher order thinking skills in answering questions or performing tasks. Classroom teachers recognize the importance of having students develop higher order thinking skills yet often do not assess their student's progress [4] (King, Goodson, and Rohani, n.d.). Shah (2005) [5] concluded in his Study that the students lacked higher order skills. The Study of Yerraiah (2013) [6] indicated that one of the factors that cause hindrance in Mathematics learning was examination focused assessment which caused the teachers to dilute the curriculum. The Study of Blom & Saeki (2010) [7] revealed the deficiency of higher-order thinking skills in Indian graduates and the Study of Clark (2001) [7] blamed the teaching-learning process followed in the Indian schools for not promoting these skills.

Thus, it becomes imperative to establish and execute an evaluation system in schools which makes it mandatory to develop and assess higher order thinking skills among students.

In order to renovate, revamp and rejuvenate the existing education system, India's Right to Education Act (RTE, 2009), includes a promising mechanism for improving pedagogical practice; the mandatory

introduction of Continuous and Comprehensive Evaluation (CCE) scheme [8] : the first and the boldest expression of the government's intent to introduce the concept of quality learning into school education.

Continuous and Comprehensive Evaluation (CCE)

The Continuous and Comprehensive evaluation system was introduced and implemented by the Central Board of Secondary Education (CBSE) in Primary classes (I to V) in 2004 in India. It was based on the recommendations presented in the National Curriculum Framework (NCF-2005). The Position Paper on Examination Reforms (2006) [9], states that CCE should be established to (i) reduce stress on children, (ii) make evaluation comprehensive and regular, (iii) provide space for the teacher for creative teaching, (iv) provide a tool for diagnosis and for producing learners with greater skills. It also laid the condition that, the CCE scheme should be simple, flexible, and implementable in any type of school from the elite one to a school located in the rural or tribal areas. Keeping in view the broad principles of the scheme, each school should evolve a simple suitable scheme involving its teachers, and owned by the teachers.

CCE in Mathematics in the Upper Primary Stage [10]

Mathematics in the upper primary stage is a major challenge as it deals with the task of introducing and transiting the child from the world of concrete to that of abstract. This transition, wherein, the child needs to work with ideas alone, leaving the comfort of concrete models, is quite difficult. Thus, this stage presents before the teachers the challenge of engaging the children by using the concrete aspects, but gradually moving away from such dependence. The CCE scheme has all the elements in it, to guide the teachers in elevating the students from the elementary level to the secondary level.

Some of the formative assessment procedures that a mathematics teacher can use to address the challenges are:

- Student questions and their answers to questions posed by the teacher
- Students' written work, notebooks, portfolio, and their communication skills
- Charts, graphs, models, drawings, etc. prepared by students
- Opinions drawn from students regarding demonstrated situations or materials
- Observation of collaboration and cooperation among students when they work in groups
- Observation of concentration and interest when students work individually
- Observation of participation when students work on projects
- Experiences, observations, questions, opinions, guesses and arguments shared by students
- Self made activities or an alternative of the activity given by teacher, designed by students
- Asking student's reaction, after making small changes in a performed activity/situation

These formative assessment procedures used by mathematics teachers, in some way or the other promote the latter four categories of Bloom's Taxonomy and thus promote higher-order thinking skills.

According to Bloom (1956) cited in Pegg (2010, p. 36) [11], "There are six categories to Bloom's Taxonomy. These are: knowledge, comprehension, application, analysis, synthesis and evaluation. While the first two categories: knowledge and comprehension are seen as important lower-level skills; the next four categories: application, analysis, synthesis and evaluation promote higher-order thinking skills.

The subject of mathematics provides enough scope to develop these abilities among students. The philosophy of CCE also revolves around these categories and can thus be used as a very effective tool to help students achieve the above abilities and thus foster higher-order thinking skills among them.

One of the conclusions, of the Study of Pegg (2010 [11]), indicated that, "for the successful development of higher-order thinking skills, activities of instruction and assessment need to be closely intertwined": which again is an important feature of CCE.

Thus, it can be stated that higher-order thinking skill, which is an essential requirement for the 21st century learner can be developed by the implementation of CCE, in the subject of mathematics.

CCE in the State of Gujarat

In the State of Gujarat, CCE was first implemented for class II children in 1998 in 566 schools as a pilot project. Later these were updated as per the NCF-2005. The CCE framework was developed by State Resource Group and approved by the Curriculum Committee. It was piloted during year 2011-2012 in two modes. One model was designed for pilot schools for new textbooks and the second one was for all remaining schools across the states. Since the textbooks of Upper Primary classes have been introduced last year, the piloted CCE model has been scaled up across the state up to class VIII. Textbooks and workbooks have scope for CCE during classroom teaching itself. A package of instruction and formats has been developed. The training of all teachers was organized through teleconference and face to face mode [12].

Role of Teacher Educators/BRC/CRC Personnel in CCE

While organizing professional development of teachers like in-service training, following points need to be addressed by educators[13]:

- Trainings should offer opportunities to teachers to discuss, reflect and share their problems.
- Teachers must be given the chance for peer discussion and sharing of school practices related to CCE, to facilitate mutual and participatory learning.
- Clear understanding on purposes of assessment and evaluation procedure is required otherwise it would damage the learning process.
- Under CCE, many states have developed various formats for recording and reporting progress of children. Clarity on different aspects of CCE is required while generating any kind of assessment data, without which, such prescribed formats waste teaching-learning time instead of helping the teaching-learning process.
- Teachers are working in varied and often difficult situations, a uniform recording and reporting format would not serve the purpose of CCE.

II. Need For The Study

An article in a reputed daily newspaper (March 25, 2014, p. 10) stated, “As we tried to reach education to the lowest common denominator, we constantly lowered standards so that the weakest could catch up.” It further emphasized the country’s need for intelligent (not clever) and imaginative (not plagiarist) individuals, who are equipped with thinking skills [14]. Education is the only apostle we can look up to, which can take up the challenge of creating such stalwarts. In fact various Educational Commissions and Committees have been emphasizing on the issue of bringing in quality in Indian education.

The major step incorporated to achieve this goal is the introduction of CCE, which not only envisages the all-round development of the child but also aims to equip him with a strong mind ingrained with higher order thinking skills. This long term venture with futuristic goals for the entire nation can reach its final destination successfully only if it is critically studied and modified in its formative stages. The CCE blueprint would become ineffective and futile, if its comprehension does not reach the grass root level, that is, the teachers. Presently, CCE is in its initial implementation stage in Gujarat, and before it gets interpreted and practiced in a wrong way and matures as one more defective system; it is very important to continuously review it, analyze and diagnose it, pick out the hurdles and set it on the right track.

The strategies of CCE, if implemented well, can promote higher-order thinking skills. Also one of the objectives of CCE, as mentioned in the GCERT’s ‘School based Comprehensive Evaluation (SCE)’ Teacher’s Module, happens to be ‘Development of Higher Order Thinking Skills in the students’ [15]. After two years of its execution in Gujarat, it becomes imperative to know, whether CCE has earned a better place in the minds of the teachers? Is there an increase in their awareness levels with respect to its various components? Are they actually using the mechanisms of CCE to inculcate higher-order thinking skills in students, and in doing so, what difficulties are they facing and support are they getting? These are some questions, the investigator sought to find answers to, through this Study.

The present Study addresses these queries with aid of responses attained from *Mathematics teachers* teaching in Upper Primary classes in State Board Schools in Vadodara city and *educationists* responsible for training, monitoring and guiding the teachers.

Key Terminologies

GSHSEB: It is the short form of Gujarat Secondary and Higher Secondary Education Board, which has under its aegis schools that include classes from I to XII. Upper Primary section includes classes VI to VIII.

Continuous and Comprehensive Evaluation (CCE) : It is a system of school based evaluation of students, framed by the Central government and passed on to the State government for implementation. The CCE is also referred to as School based Comprehensive Evaluation (SCE) in Gujarat. The Study is delimited only to the subject of Mathematics.

Higher Order Thinking Skills : The present Study deals with the methods used by Mathematics teachers to assess mathematical thinking skills, logical reasoning, spatial representation and problem solving.

III. The Study

This article reports a Study that took place in January 2014. It used quantitative as well as qualitative research method to accomplish the following objectives:

1. To study the awareness among the Mathematics teachers regarding CCE in the Upper Primary sections of GSHSEB schools of Vadodara city
2. To study the extent to which CCE implementation in GSHSEB schools focus on higher order thinking skills in Mathematics

3. To study the difficulties faced by the Mathematics teachers in implementing CCE
4. To study the support mechanisms provided by the Government officials to the Mathematics teachers teaching in GSHSEB schools for CCE implementation

Research Methodology

Participants

A stratified sampling technique was used to select the samples to address the first three objectives of the Study. Data was attained from total 21 schools and 50 teachers teaching Mathematics in the Upper Primary sections in GSHSEB schools in Vadodara city. To address the fourth objective, 5 government officials out of the 16 were selected.

Delimitation of the Study

The Study was delimited to the Mathematics teachers teaching in the Upper Primary sections of English medium GSHSEB Schools in Vadodara city, India.

Survey Instruments

A questionnaire comprised of three sections, each with close and open ended questions so as to elicit data and also to probe as and when it was thought necessary, was constructed. The open-ended questions were framed in order to check the authenticity of the close-ended answers. This tool mainly focused on the first three objectives of the Study. For the semi structured interview, the investigator had a set of seven questions or themes framed beforehand, keeping the fourth objective in mind.

Procedure

The prepared tool was presented to five experts; comprising of one language expert, two subject experts and two experienced teachers teaching Mathematics in GSHSEB schools. Oral as well as written comments were incorporated to modify the tool before proceeding ahead with the data collection procedure. Data was collected personally by the investigator from each of the 21 sampled schools. The next stage comprised of gaining access to the government officials involved in the operational aspects of CCE in Vadodara which was followed by individual semi structured interviews of 5 officials.

IV. Data Analysis And Interpretation

4.1 Awareness of teachers regarding the components of CCE

Analysis of the data referring to the awareness of the teachers regarding the several components of CCE can be summarized in the graph below. With due consideration to all the components of CCE as shown in Fig. 1, it can be inferred that around 78% of the teachers were aware about all the components of CCE. Majority of them could identify with the vivid characteristics of CCE.

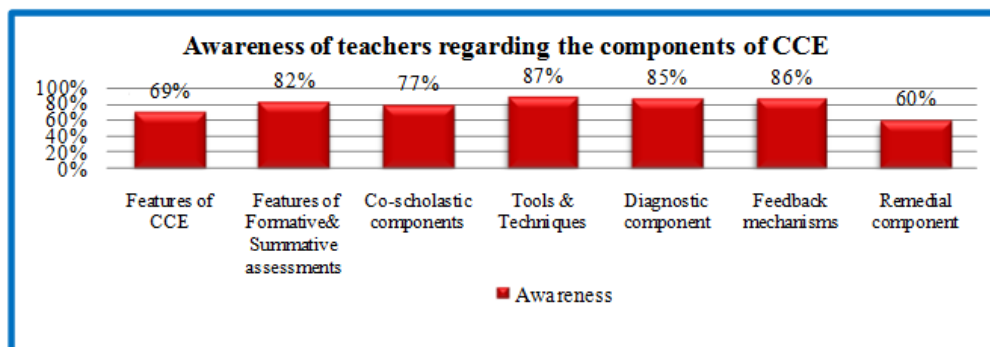


Figure 1 : Awareness of teachers regarding all the components of CCE

Co-scholastic component

Most of the teachers used scholastic activities like group discussions, project presentations, group activities etc. to assess and inculcate co-scholastic aspects like cooperation, regularity, leadership, initiative and interpersonal relationships in the students.

Tools and techniques component

Majority of the teachers seemed to use Questions, Observations, Examinations, Tests, Assignments, Group discussions and Projects as tool/techniques to assess students. Use of Interview, Document analysis, Checklist, Activities, Research; though less, but used by teachers in varied math topics was appreciable.

TABLE 1 - Use of Tools and Techniques

	Contents (Mathematics)	Tools (appropriate)			Techniques (inappropriate)		
		Interview	Document Analysis	Checklist	Research	Debate	Experiment
1	Numbering System	2	1	5	-	2	-
2	Fractions - Decimals	-	4	-	-	-	-
3	Exponents & Power	2	1	3	-	-	2
4	Comparing Quantities	1	11	10	-	1	-
5	Algebra	-	3	-	1	-	-
6	Data Handling	-	-	-	-	-	2
7	Geometry	3	7	-	4	1	-
8	Mensuration	-	3	-	2	-	-
9	Graphs	-	-	-	-	1	-
10	Playing with numbers	4	4	1	1	1	2
Total (50 teachers)		12 (24%)	34 (68%)	19 (38%)	8 (16%)	6 (12%)	6 (12%)
					Average : 13.3%		

As indicated in TABLE 1, there seems to be a mismatch between the Math contents and the techniques used for assessment. For example, use of ‘Debate’ for assessment in topics like Numbering system, Comparing quantities, Geometry, Graphs is unlikely. Similarly, Research and Experiment were techniques misinterpreted among teachers. Thus, it could be concluded that teachers used comprehensive Tools and Techniques for assessment, but whether or not they were being appropriately used needs a deeper scrutiny.

Diagnosis, Feedback and Remedial component

The three main aspects of CCE which go hand in hand are Diagnosis, Feedback and Remedial. TABLE 2 and TABLE 3 enumerate the responses of teachers in this regard.

TABLE 2 : Responses of Teachers Regarding Diagnosis as a Feature of CCE

	Diagnosis of learning difficulties	Always	Very often	Sometimes	Rarely	Never	No Response
1	Done on continuous basis	52%	18%	12%	4%	0%	14%
2	Done using diagnostic tests	6%	28%	30%	18%	4%	14%
3	Done using regular unit tests	44%	7%	14%	20%	0%	15%

Awareness regarding the diagnostic aspects of CCE among teachers is 85% (average of all the responses given by the teachers)

From TABLE 2, it can be interpreted that majority of the teachers diagnosed the learning difficulties of students on a continuous basis – during regular instructions or from unit tests. A small number of teachers also designed special diagnostic tests for the same purpose. The graphical representation of the tabulated data is shown in Fig. 2, below.

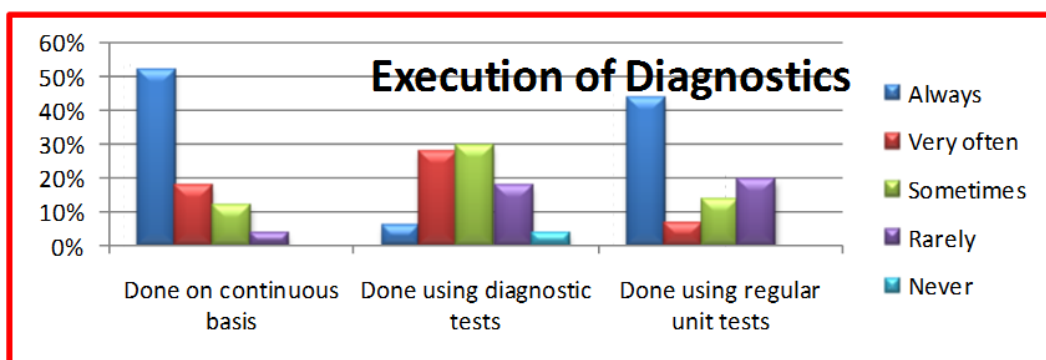


Figure 2 : Execution of diagnostics by teachers

4.2 Analysis of the data related to the awareness of teachers about feedback mechanisms used under CCE

TABLE 3: Responses of teachers regarding feedback mechanisms used

	Feedback	Always%	Very often%	Sometimes%	Rarely%	Never%	No Response%
1	Verbal feedback	66	14	8	2	0	10
2	Written feedback	16	28	38	4	0	14
3	Self assessment	34	16	18	12	2	18
4	Peer assessment	18	16	38	4	8	16

Awareness regarding the feedback mechanisms of CCE among teachers was 86%

Results in TABLE 3 revealed that majority of the teachers provided verbal feedback on a continuous basis, while a few of them took the effort to provide written feedbacks. Some of the teachers also provided opportunities for self assessment and peer assessment to students. The identification of learning difficulties of the students was followed by the provision of remedial measures to them. Majority of the teachers made use of extra or free periods for this purpose. Around sixty per cent of the teachers were identified to provide remedial to student. The graphical representation of the tabulated data is shown below.

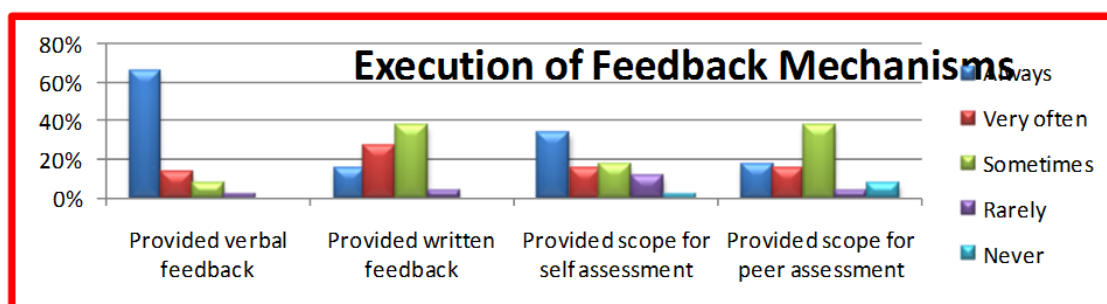


Figure 3 : Execution of different feedback mechanisms adopted by teachers

4.3 Assessment of higher order thinking skills by Mathematics teachers

TABLE 4 : Methods Used for the Assessment of Higher Order Thinking Skills

Responses of Teachers		Assessment of HOTS%	
1	Allowed students to use own techniques to memorize tables	[MTS]	73%
2	Allowed students to use any relevant method to solve math problems	[RA]	85%
3	Framed question paper with sums other than the ones in the text books	[RA]	73%
4	Directed questions to assess the ability of students to think in different directions	[MTS]	66%
5	Allowed the students to explore the given mathematics activity/project without providing well framed steps	[MTS]	27%
6	Allowed the students to explain solutions verbally to assess their reasoning ability	[RA]	88%
7	Provided questions like 'Explain why $2/3 < 3/2$ using diagrams' over ' $2/3 > 3/4 (<, >, =)$ '	[SR]	46%
8	Focused on the ability to accurately measure a given object / liquid to assess measurement skills	[SR]	37%
9	Expected students to make or learn from geometrical models or designs	[SR]	70%
10	Included real life experiences like surveys or market research for math projects	[PS]	68%
11	Allowed students to frame word problems to assess thinking ability	[MTS]	70%

MTS : Mathematical thinking skill, RA : Reasoning ability, SR : Spatial representation

PS : Problem solving skill

The assessment of higher order thinking skills in students were done by around 66% of teachers, which was calculated by taking the average of the tabulated responses.

TABLE 5 : Tools/ Techniques Used for the Assessment of Higher Order Thinking Skills

Sr.No.	Responses	Used by	
1	Thinking skills		Total
	Questioning in the form of word problems, oral questioning, mental ability tests, quizzes, puzzles & extra questions	68%	80%
	Laboratory activities	7%	
	Paper pencil test	5%	
No/Unsuitable response		20%	
2	Logical Reasoning		
	Written assessments	24%	62%
Games & Puzzles	26%		

	Various activities	12%	
	No/unsuitable response		34%
3	Spatial Representation		
	Drawing of two dimensional figures	15%	55%
	Geometrical models	29%	
	Cut & paste activities and chart making	7%	
	Geometrical activities	4%	
	No/Unsuitable response		45%
4	Problem Solving		
	Word problems	34%	57%
	Activities related to real life	15%	
	Field work	5%	
	Tests	3%	
	No/Unsuitable response		43%
The average of 80%, 62%, 55%, and 57% is 63.5%			

From the analyzed data shown in TABLE 4, it can be interpreted that around 27% of the teachers set question papers with the same sums given in text books – which indirectly promoted rote memorization. More than 50% of the teachers provided lower order questions in the tests and although 68% of the teachers admitted they provided surveys or market research in the close ended question, the open ended question as analyzed in TABLE 5 revealed only 5% teachers engaged the students in field work. Also the TABLE 6, given below contradicts the same, revealing the fact that only 6.25% of the teachers provided real life learning experiences in the form of research to students.

TABLE 6 : Responses of Teachers Regarding the Implementation of Tools and Techniques

Sr. No.	Tools	% of Usage	Techniques	% of Usage
1	Question	41%	Examination & Test	29%
2	Observation	32.5%	Assignment	18.50%
3	Interview	4.1%	Project	18.25%
4	Checklist	9.1%	Debate	1%
5	Document Analysis	13.3%	Group Discussion	11.25%
6			Activity	12.25%
7			Experiment	3.50%
8			Research	6.25%

Thus, through different questions addressing the same issue, the investigator was able to detect dichotomies in the responses given by the teachers and that is how the authenticity of the Study was established. An overall analysis of the attained data, provided ground to the investigator to conclude that although the teachers were aware of the components of CCE, only around sixty per cent of them were able to implement it, to sharpen the higher order thinking skills of the students. The same can be represented graphically as shown in Fig. 4.

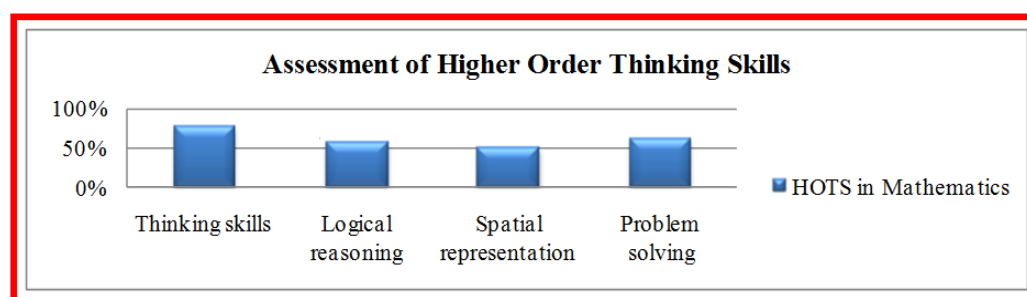


Figure 4 : Assessment of Higher Order Thinking Skills in Mathematics

4.4 Difficulties faced by teachers in the implementation of CCE

TABLE 7 : Major Difficulties Faced by Teachers

Sr.No.	Difficulties	%
1	Syllabus completion	71%
2	Changing the instructional methods	48%
3	Provision of individual attention to students	83%
4	Equal distribution of tasks in group activities	54%
5	Provision of grades in group activities	44%
6	Provision of grades in projects	28%
7	Selection of relevant activities/projects	58%
8	Time constraints	74%

On an average 58% of the teachers faced difficulties in varying amounts in different aspects related to CCE implementation. The graphical representation of the same is shown below.

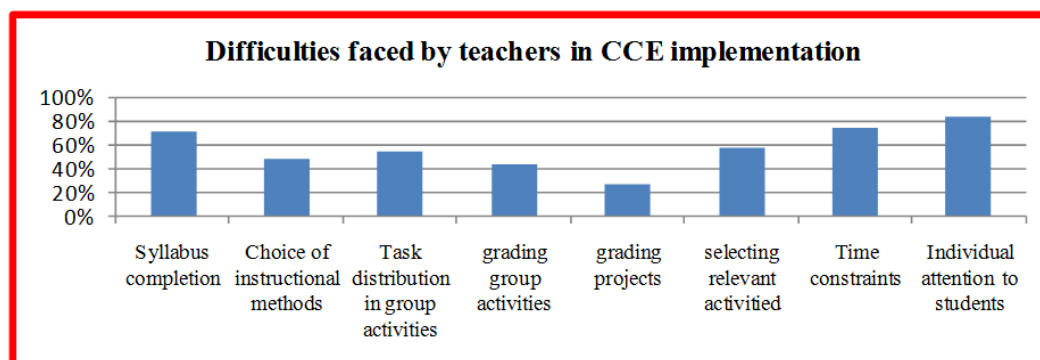


Figure 5 : Difficulties faced by teachers in CCE implementation

4.5 Support mechanisms provided by the Government officials to the teachers

The data collected from the semi-structured interview and an intrinsic study of the Teacher Education Module (School based Comprehensive Evaluation-SCE) issued by Gujarat Council of Education Research and Training (GCERT) made available to all teachers, helped the investigator to interpret in a nutshell that, ‘the CCE in Gujarat was in its formative stage and efforts were on for its fruitful implementation’.

The Government’s efforts in initializing the CCE included arranging mass training programmes, organizing workshops, voluntary visits to schools to extend help, providing guidelines in the form of the Teacher Module and Handbook, and publishing CCE incorporated textbooks. All the teachers and schools in the district could not be covered yet. The Teacher’s module in the government website could be viewed for reference by schools and teachers.

The Teacher’s Module prepared to help the teachers, had the various components of SCE described in a clear and detailed manner, but was available only in local language and this was a setback for most of the English Medium schools in Vadodara, under the wings of GCERT.

The Formatted sheets prepared to help the teachers with the documentation had its set of merits and demerits. Sheet A filled up by teachers could provide information regarding the continuous assessment of students, diagnosis of the learning difficulties done regularly and provision of remedial for the objectives not achieved. Sheet B included 40 indicators encompassing all the aspects of student development. All these efforts would get diluted if the school authorities did not take it up seriously. Unless the tasks were not streamlined, work was not distributed and teachers were not provided with complete support, the authenticity of the filled up sheets would be questionable.

To address the comprehensive component of the SCE, Sheet B included enough pointers to guide the teachers well. Here, one of the setbacks that the investigator could identify was the use of tools and techniques; only the usual Questioning in written and oral forms and Observation were listed. Mechanisms like group discussions, experiments, document analysis, research which could promote higher order thinking in students were not transacted to the teachers in any form.

The support and guidance provided to mathematics teachers were in the form of a few workshops, orienting the teachers to mathematical activities that could be embedded within the instructional process, to exercise the SCE philosophy. The Math Resource Center served the purpose of making mathematics real life oriented. But very few teachers could take the advantage of these opportunities. Limited staff caused hindrance in the proper dissemination of knowledge.

Very few steps were taken to promote the teaching of higher order thinking skills among students. Concentrating only on Mathematics, the investigator could find very few sums in the text books (GCERT) which promoted such skills in the students. Also the activities enlisted in the textbooks did not provide much scope for higher order thinking.

With ‘Capacity building’ as the agenda for future trainings and workshops, the government authorities were on the right track. It is only excellent quality training that could make the CCE implementation successful; this has been acknowledged by various research studies. The same followed here can reap great results.

V. Major Findings Of The Study

The major findings of the Study are as follows:

- Around seventy eight per cent of the Mathematics teachers teaching in the GSHSEB schools were aware of the various features and benefits of CCE.

- The Co-scholastic aspects of CCE, which was the major concern, as depicted in most of the earlier Studies, was better comprehended and assessed by the teachers, as interpreted from the responses obtained in the present Study.
- Assessment of Co-curricular activities had earned a place in the evaluation scheme, which could be concluded from the teachers' responses and the GCERT released formatted assessment sheets (Sheet B) which included many pointers addressing this aspect.
- The Study indicated that mathematics teachers required more intensive training by the State government regarding the various tools and techniques as well as their implementation, to enhance the proper utilization of tools and techniques for assessment.
- Around seventy five per cent of the teachers were using activity-based assessment techniques along with written unit tests; which proved, if not directly, that some preliminary measures were being taken to promote the objectives of CCE among students.
- The present Study indicated that only around sixty five per cent of the mathematics teachers focused on higher order thinking skills of the students.
- The Study also indicated the reasons for the limited emphasis on higher order thinking skills by mathematics teachers of the GSHSEB schools:
 1. Teachers were yet to be given training in this regard.
 2. The mathematics textbook followed in GSHSEB schools offered limited scope to infuse higher order thinking skills in students.
 3. Mechanisms like provision of real life experiences, research projects, provision of higher level questions in tests, which indirectly promote higher order thinking skills, had limited use in assessments carried out by mathematics teachers.
- Major difficulties faced by the teachers while implementing CCE, were :
 1. Syllabus completion
 2. Organizing, grading and distribution of tasks in group activities
 3. Designing relevant activities and projects
 4. Providing individual attention to each student.
- Inadequate training and guidelines, management of time and resources for CCE related activities and an increased and tedious paper work, also posed difficulties for around fifty per cent of the teachers.
- Only fifty per cent of the teachers admitted to be satisfied with the support they got from school authorities for CCE administration.
- Around eighty two per cent of the teachers, who had received training from School or Government authorities, admitted that they needed more clarity regarding CCE with respect to its implementation.
- Around seventy three per cent of the teachers were yet to receive any written documents from the State government with CCE related guidelines.
- The ratio of the training staff to that of the number of teachers to be trained was highly in congruent. Thus, a need to increase the staff responsible for the training and periodic monitoring of teachers was emphasized in the present Study.

VI. Conclusion

CCE implemented well, can truly pull out this generation from their memorizing and plagiarizing tendencies and help them develop original thinking skills. This necessity is acknowledged not only by experts and stalwarts but also the common man. But, sadly, the present Study states that this issue needs to be given greater importance in the State of Gujarat. Despite all the challenges, there is no doubt that CCE is a good scheme and the government should carry it forward, giving due considerations to the difficulties faced by the teachers and students, by making it more achievable.

In a nutshell, this Study intrinsically scans various aspects of CCE implementation in GSHSEB schools of Vadodara and concludes that CCE is being implemented in all schools but needs to be implemented with greater thought and rigor.

A major suggestion to the government would be to strengthen the existing mechanisms (training, guidelines for CCE implementation) promoting higher order thinking skills within their CCE scheme, and transact it through their future programmes and workshops. Finally, the investigator visualizes this Study as an enlightening journey and has strived hard to present an authentic and relevant report.

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