Formative Assessment—Theory Vs Practice
An Experience from Higher Secondary Schools of Kerala

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Abstract

Formative Assessment is an on going evaluation of student performance for the purpose of assessing student learning and planning instruction. Many state boards and national boards like CBSE already implemented Formative Assessment as a component of Continuous and Comprehensive Evaluation (CCE). In Kerala it has been implemented since 1997 at various levels of school education. The present study aims to find out how far the formative assessment practices in the higher secondary classroom correlated with the summative assessment scores over the years. Documentation analysis was used for collecting relevant data for the study. Higher Secondary Board Examination results of 100 students under Science stream from two schools were collected during the year 2007 and 2010 respectively from the school records. The data were analysed with the help of correlation and t-test. The study reveals that correlation between formative assessment and summative assessment was positive in all subjects but small and negligible. More over it was found that there exist no difference in the correlation between formative assessment and summative assessment during 2007 and 2010.

Introduction

The term assessment is widely used in different situations of our daily life. Especially in the domain of education, its application and use is essentially important. Whenever we think about education or discuss about education the 'prime word' that is coming in our mind is the quality. The efforts taken by government for ensuring quality in the

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field of education, especially in the field of school education is commendable. India as a whole has been working for the realisation of universalisation of elementary education through different programmes like DPEP, SSA and RMSA. All these programmes had given emphasis on four essential aspects viz. Universal Enrollment, Universal Retention, Equity and Quality. But unfortunately till date, we are not able to succeed in the attempt of quality dimension. The RTE Act 2009 can be considered as a right move in the direction of the realisation of forth aspect namely quality, provided if it is implemented in the right- spirit and sense with whole hearted support from all. Section 24 (1) (d) of RTE Act state that a teacher appointed as per the rule shall perform the duty of assessing the learning ability of each child and accordingly supplement additional instructions, if any as required. Section 29 (2) (h) mentions that, concerned academic authority should give importance to Comprehensive and Continuous Evaluation(CCE) of child's understanding of knowledge and his or her ability to apply the same while framing school curriculum.

NCF–2005 and its position paper on examination reform provide details the ill effects of the traditional system of evaluation in school and suggest the implementation of CCE.

Theoretically CCE includes two major aspects viz. continuous aspects and comprehensive aspects. Continuous aspects include the evaluation of learning process, at each and every moment of instructional process and comprehensive aspects stress about evaluating the development of each and every dimension of pupil. Schools are expected to make use of formative assessment as well as summative assessment as a part of CCE.

Formative Assessment

Formative Assessment is an on going evaluation of student performance for the purpose of assessing student learning and planning instruction.

Black and William defined it as "all those activities undertaken by teachers and/or by students which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged."

As assessment is formative to the extent that information from the assessment is used during the instructional segment in which the assessment occurred to adjust instruction with the intent of better meeting the needs of the students assessed (Popham, 2006).

The above definitions emphasises the following characteristics of formative assessment

- It is an ongoing activity
- It is a part and parcel of instructional process
- It provides feedback for teacher to modify the subsequent classroom activities
- It gives emphasis to the importance of teacher pupil interaction in instructional process
- It provides feedback to the students about their weakness and strength.

While discussing about continuous aspect of assessment we should be aware about different processes of Assessment. They are as follows:

1. Assessment for Learning

Teachers can make use of different strategies and techniques during the learning process in order to help the student to progress toward a desired goal. Those give aims to bridge the gap between student's current status and the desired outcome. This is a teacher initiated, student-context process and is integrated with each and every learning activity in the classroom.

2. Assessment as Learning

This is a student-oriented process. Though the critical review of the work done by himself or herself the student will be able to recognise by the strong as well as weak arrears during the activity. It is a process where students set learning goals, share learning steps and criteria at success, and evaluate their learning through discussion and self and peer assessment.

3. Assessment of Learning

After the end of an instructional process in order to find out the amount of learning and for informing it to the different stakeholders one can utilise assessment process, which is known as assessment of learning. These are specifically used to determine the degree of achievement of competencies in particular subject areas.

Out of these three processes of assessment the first two are generally done during the instructional process or we can say that they are on-going activities. Both of them can be considered as part of formative assessment. But the last process, actually is generally conducted at the end of an instructional process is considered as summative assessment.

Research Evidence

Many researchers found that properly implemented classroom based formative assessment inculcate student learning and performance (Crooks, 1988, Black and William, 1998, Eal and Katz, 2006 Furtak *et al*, 2008, Ross 2004). Formative assessment also helps to develop meta cognitive skill among students (Assessment Reform Group, 2002. Shepared *et al*, 2005, William, 2007). Studies conducted (Black and William, 1998, Furtak *et al*, 2008, Shepared et al, 2005, Yin *et al,* 2008,) suggest the importance of teacher support and professional development to implement formative assessment.

Fery, Caroline Adams (2009) found that in Rhode Island, even though the teachers can define summative and formative assessment, but lack a deep understanding with regard to how these forms of assessment can be used to improve student learning.

Various studies conducted on this area supports that FA has the following effects.

- Pupils learn more effectively.
- Involvement of pupils in the teaching learning activity is more.
- More focus on individualised instruction
- Increase in students' confidence and self esteem.
- Participation of less able pupils is more

Studies conducted in various countries suggests that following strategies can be used for formative assessment

- Short Quizzes
- Reflective Journals.

- Model eliciting activities
- Generative activities
- Observations
- Questioning- higher order
- Self assessment
- Peer assessment
- Problem solving techniques
- Traffic lighting
- Formative feedback
- Formative use of summative assessment

Formative assessment is by definition an interactive process involving both students and teachers. There is a need for deeper understanding of the students' part in the formative process. Similarly the role of parents in formative assessment is crucial since the decrease in the frequency of summative techniques will be viewed negatively.

Rationale of the Study

From the experiences gathered during the introduction of DPEP in select districts of Kerala during 1994-95 from Classes I to IV, the Government of Kerala implemented the system of CCE at various levels of school education. It was implemented up to Class X in 2004-05, and the first batch of students under this system comes out from 10th standard in 2005 and subsequently it was introduced in Higher Secondary level during 2005-06 and the first batch comes out in 2007. Scholastic performances of students in different subjects are assessed based on Formative Assessment namely Continuous Evaluation (CE) and Summative Evaluation namely Terminal Evaluation (TE) score in the high school and higher secondary school levels. In the board examinations at 10th and 12th the state follows 9 point absolute type of indirect grading system. Higher secondary level in the board examinations the students will be given the certificate which consists of scores in CE and TE as well as the corresponding grade total. The maximum score for CE is 20.

Specific guidelines and orientation were given to the teachers to implement CCE. The first author of this paper worked as a Higher Secondary Teacher in Mathematics from 2005 to 2008 and received training and guidelines. Different strategies to be used to evaluate the multi dimensional competencies of the learners were explained in those training programmes. The following strategies were used for assessing students' performance in CE.

- Project
- Seminar
- Practical
- Assignment
- Collection
- Records/albums
- Class tests

Different scoring indicators also were given for each strategy and were given in their respective source books. This system of evaluation has been followed for the last five years in Higher Secondary Schools in Kerala. As a result many teachers incorporate aspects of formative assessment into their teaching, but it is less common to find it practiced systematically. Hence an initiative has been taken to find out how far this strategy reflects in the summative assessment.

Objectives

The objective of the study was to examine how far the formative assessment practices in the higher secondary classroom correlated with the summative assessment scores over the years.

Research Questions

The study was guided by the following questions.

1. To what extent the formative assessment scores are related with the summative assessment score during the first year of implementation?
2. To what extent the formative assessment scores are related with the summative assessment score during the year 2010?
3. Is there any difference in the correlation between FA and SA score over the years?

Methodology

Survey method using documentation analysis was used for the study. Higher Secondary Board Examination results of 100 students under science stream from two schools were collected during the year 2007 and 2010 respectively from the school records. The result contains the score in continuous evaluation (Formative assessment) and Terminal Evaluation (Summative Assessment) separately in 6 different subjects. The scores were statistically analysed with the help of product moment correlation coefficient, correlated t-test and significance difference between correlations.

Analysis of Data

The correlation coefficient between FA and SA score was calculated and the significance of the correlation also tested during the year 2007 and 2010 separately. The results are given in the following tables.

Table 1
Correlation between FA and SA score during 2007

Subject	*Mean score*		*Correlation Coefficient*
	CE(FA)	*TE(SA)*	
English	19.5	47.3	0.13
Malayalam	18.7	71.8	0.23
Physics	18.8	29.7	0.28*
Chemistry	17.4	25.9	0.12
Mathematics	18.9	40.7	0.26*
Biology	17.4	33.1	0.38*

*Significant at 0.01 level.

Table 1 gives the mean score obtained during 2007 in FA and SA together with the product moment correlation between them. The mean score in formative assessment ranges between 17.4 and 19.5 out of maximum possible score of 20. In the case of summative assessment score, it can be seen that the mean score in English is 47.3, in Malayalam 71.8 and in Mathematics 40.7 out of 80. In the case of Physics the mean SA score is 29.7, in Chemistry 25.9 and in Biology 33.1 out of 60.

Again from the table, it can be seen that all the correlation coefficient are positive but very small and negligible in the case of English and Chemistry. In the remaining subjects correlation is low. But correlation between FA and SA score for the subjects Physics, Biology and Mathematics is found to be statistically significant at 0.01 level.

Table 2
Correlation between FA and SA score during 2010

Subject	*Mean score*		*Correlation coefficient*
	CE	*TE*	
English	18.9	49.3	0.16
Malayalam	19.4	70.5	0.27*
Physics	18.3	29.5	0.19
Chemistry	18.1	30.2	0.21
Mathematics	17.7	40.4	0.23
Biology	18.3	33.7	0.33*

*Significant at 0.01 level.

Table 2 gives the mean score obtained during 2010 in FA and SA together with the product moment correlation between them. The mean score in formative assessment ranges between 17.7 and 19.4 out of maximum possible score of 20. In the case of summative assessment score, it can be seen that the mean score in English is 49.3, in Malayalam 70.5 and in Mathematics 40.4 out of 80. In the case of Physics the mean SA score is 29.5, in Chemistry 30.2 and in Biology 33.7 out of 60.

Again from the table, it can be seen that all the correlation coefficient are positive but very small and negligible in the case of English and Physics. In the remaining subjects correlation is low. But correlation between FA and SA score for the subjects Malayalam and Biology is found to be statistically significant at 0.01 level.

In order to find out the significance difference between the mean scores of FA and SA during 2007 and 2010, the scores were converted into percentage and then t-test was applied. The results are given in the following tables.

Table 3
Mean, SD and t- value for FA and SA score during 2007

Subject	*Mean score in percentage*		*Standard Deviation*		*t-value*
	CE	*TE*	*CE*	*TE*	
English	97.5	59.1	3.35	15.07	24.27*
Malayalam	93.5	89.8	1.88	6.89	5.02*
Physics	94	49.5	5.52	9.86	38.74*
Chemistry	84	43.2	5.57	15.87	25.38*
Mathematics	94.5	50.9	6.1	13.31	28.31*
Biology	87	55.2	4.58	8.41	31.27*

*Significant at 0.01 level.

From the table 3, it can be observed that, mean score in percentage of formative assessment is very high in all subjects. But in the case of summative assessment the maximum score is in Malayalam, which is comparatively high, in rest of the subjects, it is found to be average. The calculated t-value in all subjects are found to be greater that the critical value of 2.63 at 0.01 level. Hence, it can be concluded that there exist a significant difference in the mean score between FA and SA. In all subjects the mean- score in percentage is higher for formative assessment.

Table 4
Mean, SD and t- value for FA and SA score during 2010

Subject	*Mean score in percentage*		*Standard Deviation*		*t-value*
	CE	*TE*	*CE*	*TE*	
English	94.5	61.6	4.28	13.21	23.67*
Malayalam	97	88.1	2.31	5.43	12.28*
Physics	91.5	49.2	5.11	10.47	34.12*
Chemistry	90.5	50.3	4.87	11.94	29.76*
Mathematics	88.5	50.5	7.23	16.27	19.49*
Biology	91.5	56.2	5.18	9.76	29.93*

*Significant at 0.01 level.

From the table 4, it can be observed that, mean score in formative assessment is very high in all subjects. But in the case of summative assessment the maximum score is in Malayalam, which is comparatively high, in rest of the subjects, it is found to be average. The calculated t-value in all subjects are found to be greater that the critical value of 2.63 at 0.01 level. Hence, it can be concluded that there exist a significant difference in the mean score between FA and SA. In all subjects the mean- score in percentage is higher for formative assessment.

Correlation between FA and SA over the years 2007 and 2010

In order to find out the significance of the correlation between FA and SA score over the years 2007 and 2010, the data were analysed using significance difference between correlations. The detail of the analysis is given in the table 5.

Table 5
Significance difference between Correlation- 2007 and 2010

Subject	*Correlation coefficient between CE and TE*		*t-value*
	2007	*2010*	
English	0.13	0.16	0.29
Malayalam	0.23	0.27	0.39
Physics	0.28	0.19	0.88
Chemistry	0.12	0.21	0.88
Mathematics	0.26	0.23	0.29
Biology	0.38	0.33	0.49

*Significant at 0.01 level.

Table 5 reveals that the t-value calculated for the difference between correlation coefficient in 2007 and 2010 for all subjects are less than the critical value of 2.63 at 0.01 level. Hence, it can be concluded that there exist no difference in the correlation coefficient between FA and SA score during 2007 and 2010 for all subjects. Therefore, we can say that the relationship between formative assessment score and summative assessment score during 2010 is resembles with that of implementing year.

Findings and Discussion

The present study reveals the following:

1. there exist a positive but small and negligible correlation between the FA and SA score for English and Chemistry during the year 2007 and for English and physics during 2010.
2. there exist positive but low corre-lation between FA and SA score for subjects Malayalam, Physics, Mathematics and Biology during 2007 and for Malayalam, Chemistry, Mathematics and Biology during 2010.
3. the correlation between FA and SA score is statistically significant for the subjects Physics, Biology and Mathematics during 2007 and for Malayalam and Biology in 2010.
4. there exist a significant difference in the mean score in percentage between FA and SA score in all subjects during 2007 as well as in 2010.
5. there exist statistically no significant difference in the correlation

between FA and SA Score in 2007 and 2010.

The findings of the present study indicate that, the relationship between formative assessment and summative assessment scores is low and negligible in some cases. The findings also indicate that the same trend has been seen during 2007 and 2010. This result shows that even after four years of implementation of CCE practices in higher secondary schools, no significant difference has been reflected in the assessment process. The studies reviewed earlier shows that if formative assessment is implemented in effective way, that surely will influence student learning (Crooks, 1988, Black and William, 1998, Eal and Katz, 2006 Furtak *et al*, 2008, Ross 2004). Hence the present findings contradict the findings of these studies. It clearly indicates the shortcomings of the implementation and scoring strategy followed in formative assessment. The high mean score in formative assessment with a low standard deviation shows that students are homogenous. But in the case of summative assessment the mean score is moderate with a high standard deviation. This shows that the same group is heterogeneous.

Employing formative assessment strategies in the classroom setting need much more practice and change in the traditional attitude of teachers. The traditional view of teaching as a process of transmission of knowledge and learning as the process of acquisition of knowledge should be changed. Teachers should know how to use appropriate strategies of formative assessment and how to use it effectively for the better development of pupil. He/She should be well aware about how to construct and administer and interpret the assessment, to help the students to involve in their own assessment process. More over they should be able to use the result for giving appropriate suggestions to the students and for developing apt instructional materials in the future.

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