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Practices of Chemistry Teachers to Implement Continuous Assessment at Abbiyi-Addi College of Teacher Education

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Abstract

Continuous assessment gives both the student and the teacher detailed up-to-date information on the students' development and learning requirements, and it provides information about the learning difficulties and remedial action necessary to support learners who may be experiencing learning difficulties. Thus, this article examined the actual practice of formal continuous assessment in Abbiyi-Addi College. The College was selected purposefully due to the current knowledge of the researcher. As source of data, all chemistry teachers of Abbiyi-Addi College was selected using available sampling techniques. The Research design utilized was descriptive survey type, qualitative and quantitative methods of data analysis were used to analyze dates which were collected through document, questionnaires and interview. From the analyzed data, it was found out that implementation of FCA in chemistry section was weak due to few types of FCA practice and few types of assessment techniques (written task). This revealed that most of the classroom tasks given to learners were paper-and-pencil oriented. In addition to this feedback for individual and group assessments were practiced ineffective way, and support to law learners was also weak to take remedial action. Based on this some recommendation ideas were forwarded.

Keywords: formal continuous assessment; effective continuous assessment; feedback provision; remedial support.

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1. Introduction

The fundamental role of assessment is to provide authentic and meaningful feedback for improving student learning, instructional practice and educational options [13]. The process of continuous assessment is not only examination of student's achievement but also it is a powerful diagnostic tool that enables pupils to understand the areas in which they are having difficulty and to concentrate their efforts and it allows teachers to monitor the impact of their lessons and modify their pedagogical strategies [14].

Continuous assessment is about obtaining marks from tests, exercises, terminal examination, practical laboratory and project work [10]. It is carried out throughout the course of study. On the other hand, summative assessment involves obtaining marks based on a final examination or obtaining marks at the end of a course. As an assessor, the teacher is expected to evaluate his or her learners' performance through continuous assessment [11].

Continuous assessment also called formative assessment has been described as the type of assessment whereby the learners are evaluated throughout the year/semester of their course of study [2, 5]. It enables teachers to get quick information about the student's progress which helps to evaluate their teaching strategies [5]. The Author [1] defines the term formative assessment as an ongoing process which measures the students' achievement during the course of study at specified duration.

Continuous assessment needs careful implementation in order to sustain quality of education. It is a demanding task that requires the use of various assessment tools in order to assure the achievement of curricular objectives by each and every student, and it has a potential to support student learning through feedback and to increase students' motivation for learning [6]. Authors [7] state that continuous assessment has many advantages for both the learner and the educator. Some of these are

- modify his/her teaching strategies,
- monitor learner progress and
- Make decisions about progress in curriculum implementation.

Continuous assessment (CA): is assessment (both formal and informal) that is done on regular and continuous basis.

Formal continuous assessment: an assessment that is crafted with special thoughtfulness and care which is valid and reliable; which is made of all class learners; provides the learners with feedback on what they have learned; and enables the teacher to assign a letter grade to each learner.

Informal continuous assessment: consists of two types. The type which is used in the lower primary phase to assign letter grades and another type used in all Grades to provide the teacher and the learners with feedback on the effectiveness of the learning process.

Research work on the African continent [8] reveals that most science teachers have difficulties in implementing continuous assessment, especially in practical/laboratory work. Many research studies have also shown that the

majority of science teachers are unable to choose the most appropriate procedures and techniques in conducting and administering continuous assessment.

Given this scenario, it would be interesting to study effectiveness of formal continuous assessment during teaching learning Chemistry courses.

1.1. Statement of the problem

Continuous assessment gives both the student and the teacher detailed up-to-date information on the students' development and learning requirements, and it will yield more accurate data reaching the teachers early enough to modify instruction and it place teachers at the center of all performance assessment activities. Ethiopia has been introduced new education policy in 1996 to make reform on the education system in the country; because the assessment system in higher education was traditional. As a result, higher institutions introduced continuous assessment as a framework in their education system. Many findings revealed that teachers' showed to have little capacity in assessment practices. However, teachers have to pay more serious attention to the continuous assessment of students.

It is clearly obvious that chemistry is difficult for students to understand easily the concepts of their topics. Continuously assessing provides teachers with developing strategies' of learning outcomes and challenges. It will yield more accurate data reaching the teachers early enough to modify instruction and it place teachers at the centre of all performance assessment activities.

With the above respects this research study was interested to study what are the assessment practices of continuous assessment in abbiyi-addi College during chemistry teaching - learning process.

1.2. Objective of the study

- To assess the effectiveness of formal continuous assessment practice during teaching-learning of chemistry courses.

1.3. Limitation of the Study

The study was confined to one College (Abbiyi-Addi College of Teacher Education) which is found in Abi-Adi town in region Tigray. The study aimed to find out how chemistry teachers of the College were practiced the FCA employed in the College during teaching-learning chemistry courses. Due to time constrain, the research was confined to only one aim and the researcher was not addressed to all educational colleges of the region.

2. Design of the Study

2.1. Sampling technique

From two educational colleges of region Tigray, Abbiyi-Addi College is the working place of the researcher and due to current knowledge of the researcher it was selected purposefully. Due to small number of teacher

samples, available sampling technique was used to select all chemistry teachers, Department-head and vice-academic dean.

2.2. Data gathering tools

Document and questionnaire was used as instrument to gather the data. In addition to this, interview was also employed to triangulate the information given through document and questionnaire.

2.3. Data gathering and interpretation procedure

First, the primary data was gathered through document and questionnaire. Documents were collected from chemistry section (department). The questionnaire was prepared in English with closed and open ended type of questions, and the questionnaire was distributed to all respondents.

The questionnaire distributed was collected, and the results were analyzed by changing in to percentage. The results of these higher values which were taken from the respondents were taken as major finding during the practice of formal continuous assessment.

3. Analysis and Interpretation of Data

In this chapter data's gathered from respondents were analyzed.

3.1. Practices to implement formal continuous assessment (FCA)

- Practice of FCA was studied based on three activities
 - i. Types of FCA employed in the college
 - ii. Feedback provision
 - iii. Giving support

I. Practicing types of FCA techniques employed in the college

In this college there are two learning programs (Cluster learners and linear learners). Cluster learners are learners of environmental science (learners to become teachers to teach from grade 1- 4), and integrated science (learners to become teachers to teach grade 5 & 6). Linear learners are learners to become teachers to teach from grade 5 - 8.

The above data shows that 1st semester 10 chemistry courses was given, and 2nd semester 12 chemistry courses were given and total of 21 courses was given per-year, but one course (Chem. 105 was given in both 1st & 2nd semester).

Table 1: Data regarding to chemistry Courses given per-semester

| Learning program | Year | Sections | No of sections | Courses given per-semester | | Total courses |
|--------------------------|----------------------|---|----------------|--|---|---------------|
| | | | | 1 st semester | 2 nd semester | |
| Cluster learners | 1 st Year | • Environmental, Civics, Integrated, Tigrina & Soc.science(1&2) | 6 | BNSc. 101 | BNSc. 102 | 2 |
| | 2 nd Year | • Environmental • Integrated (1,2,3&4) | 1 4 | Chem. 201 Chem. 211 | Tes. 202 Chem. 222 | 2 2 |
| Linear learners | 1 st Year | • Chemistry (1&2) • Biology | 3 | Chem. 101 Prac-chem. 103 | Chem. 102 Prac- chem. 104 | 4 |
| | | • Physics (1,2&3) | 3 | Chem.. 105 Chem. 112 | ----- Chem. 122 | 1 |
| | 2 nd Year | • Chemistry | 1 | Prac- chem. 114 | Prac- chem. 124 Chem.241 Pract= chem. 243 Chem.232 T.Chem.242 | 8 |
| | | • Biology • Maths | 1 2 | Chem. 340 Pract- chem. 343 ----- | ----- Chem.. 105 | 2 --- |
| Total number of sections | | | 21 | 1 st semester T- courses 10 2 nd semester T- courses 12 | | |

Table 2: Response regarding for types of FCA practiced in the college

| Item | Respondents | |
|---|-------------|-----|
| | No | % |
| Practicing types of FCA techniques employed in the college, | | |
| A. Group- Work | 8 | 100 |
| B. Individual-assignment | 8 | 100 |
| C. short test | 8 | 100 |
| D. Attendance | 8 | 100 |
| E. Mid exam | 8 | 100 |
| F. other | — | — |

The above table showed that, all chemistry teachers (100% respondents) practiced the types of FCA techniques employed in the college, but no one use other type of FCA to assess students performance. This indicates that chemistry section is used blocked system to practice FCA.

- In this college, student's grade is determined based on criteria reference, and if one student accomplished the above tasks then the following grades can be given.

The one who score > 85% gets "A", IF > 80,"A-", IF > 75,"B+", IF >70,"B", IF > 65,"B-", IF > 60,"C+", IF > 50,"C", IF >35,"D.

Table 3: Data regarding to marks in % for type of FCA practiced

| Learning program | Courses Given | Marks in % for a given tasks of assessment | | | | | | Total |
|------------------|---------------|--|-----|------|------|-------|-------|-------|
| | | In. asst | G.W | S. t | Att. | M.Exm | F.Exm | |
| Linear learners | Chem.101 | 15% | 10% | 10% | 5% | 20% | 40% | 100% |
| | Chem.105 | „ | „ | „ | „ | „ | „ | „ |
| | Chem.112 | „ | „ | „ | „ | „ | „ | „ |
| | Chem.340 | „ | „ | „ | „ | „ | „ | „ |
| | Chem.102 | „ | „ | „ | „ | „ | „ | „ |
| | Chem.122 | „ | „ | „ | „ | „ | „ | „ |
| | Chem.241 | „ | „ | „ | „ | „ | „ | „ |
| | Chem.232 | „ | „ | „ | „ | „ | „ | „ |
| | T-chem. 242 | 15% | 30% | 15% | — | 20% | 40% | 100% |
| Cluster learners | Chem.201 | — | 25% | 10% | 5% | 20% | 40% | 100% |
| | Chem.211 | — | „ | „ | „ | „ | „ | „ |
| | Chem.222 | — | „ | „ | „ | „ | „ | „ |
| | BNSc.101 | — | 5% | 5% | — | 10% | 14% | 34% |
| | BNSc.102 | — | „ | „ | — | „ | „ | „ |
| | Tes-202 | 30% | 25% | — | 5% | 20% | 40% | 100% |

- The above data shows that the college is used few systems to practice FCA such as Group- Work (G.W), Individual-assignment (In.asst), short test (S.t), Attendance (Att.) & mid exam (M.Exm), and majority chemistry courses were given high attention to practice students in group.

The above data shows that, from 21-chemistry courses given in this year, few (only 5) chemistry courses were practiced individual and group-work using written and presentation tasks, but for short-test and mid-exam, only written task was practiced.

This indicates that majority chemistry courses were practiced using written task, but with one type task it is difficult to make clear and easily understandable for the abstract chemistry concepts.

Table 4: Response regarding to tasks practiced to implement FCA

| No of Trs | Semester | Courses code | In. | G.W | S.t | Att. | M.Exm | F.Exm | Other |
|-----------------|-----------------|--------------|------|-------|-----|------------|-------|-------|-------|
| | | | Asst | | | | | | |
| T ₁ | 1 st | Chem-101 | W | W | W | Att.&part. | W | W | — |
| | 2 nd | Chem-102 | „ | „ | „ | „ | — | „ | — |
| T ₂ | 1 st | BNSc-101 | — | „ | „ | — | „ | „ | — |
| | 2 nd | Chem-201 | — | „ | „ | „ | „ | „ | — |
| T ₃ | 1 st | BNSc-102 | — | „ | „ | — | „ | „ | — |
| | 2 nd | Tchem-242 | W+ P | W+ P | „ | „ | „ | „ | — |
| T ₄ | 1 st | Chem-340 | W+ P | W+ P | „ | „ | „ | „ | — |
| | 2 nd | Chem-241 | W | W | „ | „ | „ | „ | — |
| T ₅ | 1 st | BNSc-101 | — | „ | „ | — | „ | „ | — |
| | 2 nd | Chem-105 | „ | „ | „ | „ | „ | „ | — |
| T ₆ | 1 st | Chem-122 | „ | „ | „ | „ | „ | „ | — |
| | 2 nd | Tes-202 | W+P | „ | „ | „ | „ | „ | — |
| T ₇ | 1 st | Chem-211 | — | „ | „ | „ | „ | „ | — |
| | 2 nd | Chem-102 | W | „ | „ | „ | „ | „ | — |
| T ₈ | 1 st | Chem-222 | — | „ | „ | „ | „ | „ | — |
| | 2 nd | Chem-211 | — | „ | „ | „ | „ | „ | — |
| T ₉ | 1 st | BNSc-101 | — | „ | „ | — | „ | „ | — |
| | 2 nd | Chem-112 | W | W+P | „ | „ | „ | „ | — |
| T ₁₀ | 1 st | Chem-222 | — | W+P | „ | „ | „ | „ | — |
| | 2 nd | Chem-105 | W | W | „ | „ | „ | „ | — |
| T ₁₁ | 1 st | Chem-101 | W | „ | „ | „ | „ | „ | — |
| | 2 nd | BNSc-102 | — | „ | „ | — | „ | „ | — |
| T ₁₂ | | Chem.-232 | „ | W + P | „ | „ | „ | „ | — |

Where, W-written task, P-presentation, Att-attending &Part-participating

Table 5: Response regarding to frequency FCA practiced

| Semester | Frequency | In. asst | | G. w | | S. t | | Mid exm. | | Attend. | |
|-----------------|---------------------|----------------|------|----------------|------|----------------|-----|----------------|-----|----------------|-----|
| | | Rpts | | Rpts | | Rpts | | Rpts | | Rpts | |
| | | N _o | % | N _o | % | N _o | % | N _o | % | N _o | % |
| 1 st | Daily | — | — | — | — | — | — | — | — | — | — |
| | Every week | — | — | — | — | — | — | — | — | 8 | 100 |
| | Every 2-3 weeks | — | — | — | — | — | — | — | — | — | — |
| | Every month | — | — | — | — | — | — | — | — | — | — |
| | Twice in a semester | — | — | — | — | — | — | — | — | — | — |
| 2 nd | Once in a semester | 8 | 100 | 8 | 100 | 8 | 100 | 8 | 100 | — | — |
| | Daily | — | — | — | — | — | — | — | — | — | — |
| | Every week | — | — | — | — | — | — | — | — | 8 | 100 |
| | Every 2-3 weeks | — | — | — | — | — | — | — | — | — | — |
| | Every month | — | — | — | — | — | — | — | — | — | — |
| T ₁₂ | Twice in a semester | 1 | 12.5 | 1 | 12.5 | — | — | — | — | — | — |
| | Once in a semester | 7 | 87.5 | 7 | 87.5 | 8 | 100 | 8 | 100 | — | — |

Where, Rpts - Respondents

Here, the above table showed that, majority of chemistry teachers (87.5%) were practiced once in semester for types of FCA employed in the college, but one teacher (12.5%) practiced twice in a semester for individual and group assignments only, and most of them were taken attendance every week. This indicated that students were not assessed continuously every weak or every month for the type of FCA employed in the college.

II. *feedback provision for the types of FCA implemented*

Feedback information: is important in implementing formative assessment through self-regulation for both teachers and learners. One of the key characteristics of assessment for learning (continuous assessment) is that it provides feedback which leads to students recognizing their next steps and how to take them.

The Authors [4] encourage teachers to apply different strategies in assessing learners, for example, questioning, self-assessment and classroom discussion. These strategies provide opportunities to develop learners' new knowledge through their prior misconceptions and also improve teaching and learning.

In order to practice effective formative assessment teachers must ask meaningful and reflective questions in relation to specific lessons taught and provide learners enough time to respond.

Table 6: Response regarding to type of feedback used

| Item | Respondents | |
|-----------------------------------|-------------|------|
| | No | % |
| Which type of feedback do use? | | |
| A. Written feedback only | — | — |
| B. verbal/oral feedback only | 5 | 62.5 |
| C. Written & verbal/oral feedback | 3 | 37.5 |

The table showed that, majority (62.5% chemistry teachers) gave feedback using written, and 37.5% chemistry teachers also gave feedback using written & verbal feedback.

The table showed that, in both semester the same frequency of feedback was given, and most of chemistry teachers (62.5%) gave immediate feedback for mid-exam and short-test, but majority of them gave feedback after 2-3 week for individual and group assignments. (In this context immediate feedback means within a week after submission).

This indicates that short-test and mid-exam were practiced effectively, but attendance and assignments were not practiced effectively and they need improvement to practice effective feedback.

Table 7: Response regarding to frequency of feedback provision

| Semester | Frequency Of Feedback Given | In. asst | | G.w | | S.t | | M.Exam | | Att. | |
|-----------------|--------------------------------------|----------|------|------|------|------|------|--------|------|------|-----|
| | | Rpts | | Rpts | | Rpts | | Rpts | | Rpts | |
| | | No | % | No | % | No | % | No | % | No | % |
| 1 st | Immediately | 1 | 12.5 | 1 | 12.5 | 5 | 62.5 | 5 | 62.5 | — | — |
| | After a week | 2 | 25 | 2 | 25 | 3 | 37.5 | 3 | 37.5 | — | — |
| | After 2-3 weeks | 5 | 62.5 | 5 | 62.5 | — | — | — | — | — | — |
| | After a month | — | — | — | — | — | — | — | — | — | — |
| | After final exam | — | — | — | — | — | — | — | — | — | — |
| | Never | — | — | — | — | — | — | — | — | 8 | 100 |
| 2 nd | immediately | 1 | 12.5 | 1 | 12.5 | 5 | 62.5 | 5 | 62.5 | — | — |
| | After a week | 2 | 25 | 2 | 25 | 3 | 37.5 | 3 | 37.5 | — | — |
| | After 2-3 weeks | 5 | 62.5 | 5 | 62.5 | — | — | — | — | — | — |
| | After a month | — | — | — | — | — | — | — | — | — | — |
| | After final exam | — | — | — | — | — | — | — | — | — | — |
| | Never | — | — | — | — | — | — | — | — | 8 | 100 |

III. Support for low achievers to during FCA implementation

Continuous assessment has the potential to support student learning through feedback and to increase students' motivation for learning [6]. This could play a vital role in diagnosing and remediating areas of learners' weakness if properly anchored in what occurs in classroom [3]. Assessment must take into account skills like data handling, analysis of experimental data, drawing appropriate conclusions, understanding the implications of chemical situations, as well as the assessment of how well the pupils actually understand the ideas of chemistry. All of these are very different from recall and recognition which often underpin much assessment and needs effective support by taking remedial action for low achievers through interactive feedback.

Table 8: Response regarding to students fail

| Item | Respondents | |
|---|-------------|-----|
| | No | % |
| Which type of FCA students fail and get support?, | | |
| A. Group- Work | — | — |
| B. Individual-assignment | — | — |
| C. short test | — | — |
| D. Mid exam | 8 | 100 |

The above table showed that, most of students fail and get support after they have taken Mid-exam, and similarly from the interview, not all of us give support only, few chemistry teaches give support for formality.

This indicates that students of low achievers were identified by few chemistry teaches after they have taken mid-exam, and they could not get remedial before mid-exam.

Table 9: Response regarding to support for lower achievers

| Item | Respondents | |
|---|-------------|-------------|
| | No | % |
| Do you give support when students fail? | | |
| A. yes | 3 | 37.5 |
| If yes | | |
| • Kind support | | |
| A. Tutorial:- by identifying low achievers | 2 | 67.7 |
| B. General support:- given support for the whole class without identifying students of low, middle and high achievers | 1 | 33.3 |
| • Satisfaction :- | | |
| A. No | 3 | 37.5 |
| B. Yes | 1 | 12.5 |
| B. No | 5 | 62.5 |

The above table showed that, most chemistry teachers (37.7%) gave support when students fail after mid-exam, and 62.5% didn't give any support.

From these who gave support, 33.3% of them gave support to all students without identifying low achievers and 67.7% of them gave support by identifying low achievers, but the support was not satisfactory.

- From the interview of *vice-academic* dean, He said that, FCA is given for every department of the college, and teachers are expected to practice the types of FCA employed in the college by giving immediate feedback and support through remedial action, but it is open to use the teacher different tasks and can use other type of FCA like skill tasks based on the nature of the subject.
- *Department-head* also said that chemistry teachers are practicing the types of FCA employed through feedback and support, but due to work load it was difficult to give effective support for students of low achievers.

4. Summary and Conclusion

This chapter summarizes the major findings of the study and based on the findings, some important recommendations were forwarded.

4.1. Summary

To improve quality education, the designed curriculum should provide various assessment techniques for the teaching learning process. This study revealed that the majority of chemistry teachers failed to implement effective continuous assessment. As can be seen from this study, the main techniques of FCA employed in the college are individual work, group work, short test, attendance, mid exam and final exam, and for these techniques, majority of chemistry teachers were practiced once in semester, and students were not assessed continuously every week or every month and these needs improvement to practice effective FCA.

- FCA is a demanding task that requires the use of various assessment tools in order to assure the achievement of curriculum objectives. Here as higher institution the college is expected to practice higher order thinking using different techniques, but written task was practiced as the main technique, but few chemistry teachers were trying to use presentation as alternative. This revealed that most of the classroom tasks given to learners are paper-and-pencil oriented, and this is contrary to what scholars [11], have recommended for FCA activities. Assessment must take into account skills to implement chemical situations, as well as the assessment of how well the pupils actually understand the ideas of chemistry which are different from recall and recognition [12].
- The Author [15] has been suggested that FCA should involve a variety of tasks including assessment of observational skills, use of checklists, portfolios, written tests (e.g. multiple choice, short answers, essay), self-assessment, oral presentations, interactive presentations, student projects, interviews, problem-solving, projects, homework, take home tests, and inventories e.g., attitude, interest and learning styles.

Feedback provision; Interactive feedback through marking is a central component of formative assessment and enhances learning outcomes. Here, chemistry teachers were used written & verbal feedback and feedback frequency were practiced immediately for short-test and mid-exam, but for individual and group assignments mostly give feedback after a week and few after 2-3-weeks, and these needs improvement to practice effective feedback.

The kind of support; According to [6], Continuous assessment has the potential to support student learning through feedback and to increase students' motivation for learning, but implementation of remedial action in chemistry section was weak and this was practiced after students have taken mid-exam for few days by few chemistry teachers.

For effective assessment, the teacher must be skilled and competent in constructing and administering formal continuous assessment. This is important for improving the effectiveness of the teaching and learning process. It is important that teachers be able to follow assessment procedures when constructing and administering continuous assessment in the classroom [9].

4.2. Conclusion

Continuous assessment provides information about the learning difficulties and remedial action necessary to support learners who may be experiencing learning difficulties. The purpose of continuous assessment is not about promotion (pass. fail. conditional transfer) but about progression. However, implementation of FCA in

chemistry section was weak due to practicing few types of FCA and few assessment techniques (written task) this revealed that most of the classroom tasks given to learners are paper-and-pencil oriented. In addition to this individual and group assessments were practiced feedback ineffective way. More ever this study was proved that support to law learners was weak to build their confidence and show self-perceived improvement in their overall competence.

4.3. Recommendations

The teaching learning process requires continuous follow-up where the development pace of a learner is rapid. Therefore, student's progress should provide frequent assessment, and great emphasis should be placed on the interpretation of chemistry situations rather than on the recall of the outcomes.

The various dimensions of the learning activities of the learners should be assessed by different methods. On the other hand, not all desired outcomes can be assessed with paper and pencil tests like psychomotor skills.

To promote students' learning by building their confidence and their understanding, teachers and students need to have profound knowledge of the application of continuous assessment in order to utilize it effectively.

To affirm higher order and critical thinking, the formative assessment in the college should provide interactive feedback to both the teacher and the learners.

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