



The Nature of Classroom Assessment in Ethiopian Public Secondary Schools: Subject Teachers' Views

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Authors' contributions

This work was carried out in collaboration between all authors. Author GT designed the study, performed the statistical analysis, wrote the protocol and first draft of the manuscript. Author TT managed the analyses of the study. Author JF managed the literature searches and edited the first draft of the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

This study examined the use of assessment techniques by secondary school teachers in Ethiopia. Little has been known about the classroom assessment strategies teachers use to assess their students in Ethiopian Secondary School contexts [1,2]. All participants (N=423, average teacher experience =14 years) where teachers and they all completed a self-developed questionnaire with 15 items, and of these 8 teachers took part in a face-to-face interview. Principal Component Analysis (PCA) and Chi-square, confirmed that there were three types of assessment techniques: assessment OF learning, assessment FOR learning, assessment AS learning. Most of the teachers reported that assessment OF learning and assessment FOR learning to be the most common and dominant forms of assessments across language, sciences and social sciences. However, only the physical education teachers used assessment AS learning to assess their students. Teachers also identified class size, low student motivation, lack of student knowledge around content area, school

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environment, and time assigned for a lesson, and teaching and learning facilities, to be barriers for fully implementing and exploring the various assessment techniques. Implications for the study are discussed.

Keywords: Assessment of learning; assessment for learning; assessment as learning; classroom assessment; subject teacher.

1. INTRODUCTION

Assessing students' learning is an essential part of teaching and learning [3,4]. Assessment is an integral process for determining the nature of teaching and directing the extent to which students achieve, in that assessment has a bi-directional value to both the teachers and the students [5,6]. Classroom-ready assessments (e.g., quizzes, tests, and exams) are an integral part of the instructional process, accountability, capturing student learning, and reporting to stakeholders both evidence of learning and teaching [4]. The word "assessment" has taken on a variety of meanings within the educational context, but here it refers to the process of measuring and assessing student's knowledge around a specific area either through a test, quiz or assignments, in other words primarily evaluating whether learning has occurred or not [7]. However, within an Ethiopian context, little has been known about what assessment means or what kinds of assessments are being used and whether classroom-ready assessments provide the critical insights into capturing student learning or not.

Assessments are one of the many uses to improve student's learning and teaching instruction, and to this end, there has always been an ongoing debate on the assessment strategies, their purpose and role in both teaching and learning [8]. In general and to a large extent within humanities and social sciences "assessments" or "evaluations" techniques have traditionally have been informed by behaviourist philosophies [5,9,10]. A study by [5] found testing knowledge played a central role in behaviourist instructional systems. The behaviourist notion of assessment is to quantifiable measure (e.g., tests or closed book exam) performance in capturing what has been learnt and gained [11]. However, behaviourist notion of assessment does not fully capture students' learning (i.e., informal knowledge) such as subject positive experiences or impact and further these behavioural strategies do not encourage the use of different assessment techniques other than " performance-based

tests" [4]. Over the past few decades, there has been a shift from behaviourist to a constructivist learning paradigm, [11,12]. Within a constructivist theoretical underpinning, there are three kinds of assessment strategies: Assessment OF learning, assessment FOR learning, and assessment AS learning [4].

The Assessment OF learning is concerned with how students have performed at the end of the instructional process [13,14]. This is perhaps best understood in terms of classroom-ready assessments. Angelo and Cross (1993) argue that "... classroom assessment intends to promote further improvement of student learning by capturing learning experiences and procedures while the instructional process is going on..." (p. 4). The Assessment OF learning techniques (e.g., pop quiz, asking questions to students or asking students to explain what they just heard) are not merely limited to a formal structure or format but any interactive exercise to monitor learning. The advantage of classroom-ready evaluation provides immediate feedback to inform learners of their own learning; a diagnostic tool of informing learner the need for improvements; and how to the role and use curricula, materials, and learning activities (Alderson [3,4]. Additionally, classroom-ready assessments are likely to assist learners to know their areas of strengths and shortcomings [5]. It is irrefutable that when teachers place meaningful assessment at the centre of instruction, teachers create and give students insights into their learning, thinking, and teacher feedback works to assist students to gain new perspectives on their potential to learn [3]. But the challenge is to find suitable techniques and strategies to capture learning with respect to the curriculum specific subject/s.

The Assessment FOR learning perhaps is the more teacher-driven notion of evaluations and checks on how to improve student learning, engagement, and performance [15]. In assessment FOR learning, the approach is for teachers to find out of what content students are learning and how well they are learning it [16]. Further, at the pedagogical level student

engagement is essential as it enables teachers to develop appropriate feedback loop and adapt their instruction to match students' need based on their engagement [17]. The Assessment FOR learning techniques (e.g., reflective exercises, peer assessment, problem solving activities ... etc.) are not limited and can be applied to any activity designed to collect information which helps teachers to get insight and feedback into their teaching and learning activities [18,19,20, 6]. In this context, the assessment of learning has two critical roles: it captures student learning and equally it is a reflective tool for teachers to improve their teaching. Accurate and valid information about students' achievement is widely understood to be essential for effective instruction, as it enables teachers to give appropriate feedback (i.e., written and oral) and adapt their instruction to match students' need [17].

Earl and Katz [21] argued that "the emphasis shifts from summative to formative assessment in the assessment FOR learning" [21]. Assessment FOR learning happens often more than once during instruction, rather than at the end. It helps students to understand what they are learning, what is expected of them and it helps them to get feedback and advice on how to improve their work [4,6,22]. In this strategy, the wide variety of information that teachers collect about students' learning processes provide the basis for determining what they need to do next to move student learning forward. It provides the basis for providing descriptive feedback for students and deciding on groupings, instructional strategies, and resources. For example quiz, project works, assignments, and participation are some of the examples of assessment FOR learning. But the question of, what is the most appropriate or meaningful "assessment" still needs to be conceptualized, for summative to formative assessments are likely to vary across year levels, school calendar, and curriculum areas.

Assessment AS learning positions students to monitor their learning, wherein students are encouraged to take responsibility for their own learning [4]. Studies have found that assessment AS learning benefits students in different ways. For instance, it encourages students to take responsibility for learning, proactive about learning, helps good interaction between students and teachers, provides opportunities of self-assessment and peer assessment for

students, which helps them, understand their next steps in learning [4,8,14].

The assessment AS learning emerges from the idea that education is not just a matter of transferring thoughts from someone who is knowledgeable (in this case, the teacher) to someone who is not (the students), but that it is an active process of cognitive restructuring that occurs when individuals share and interact with new ideas [21]. The teachers' role is to promote students' independent learners through assessment as learning [21,22]. For example student self-learning through project work.

2. THE CONTEXT OF THE STUDY

In Ethiopia, very little has been known about three kinds of assessment strategies: Assessment OF learning, assessment FOR learning, and assessment AS learning [4,13,23]. Further, it is not clear how and when these assessments are used in learning and across curriculum areas. Importantly, after the national curriculum reform in Ethiopia, the current secondary school curriculum requires teachers to implement a variety of assessment techniques [1,2]. So, there is a need to explore the types of assessments techniques used by secondary school teachers to assess their students learning and to investigate whether experienced teachers use a variety of assessment compared to others. Consequently, the following study explores whether the three kinds of assessment techniques were used by teachers in Ethiopia.

This study explored the role of these assessments in term of their purpose and appropriateness. In particular, this study attempted to answer the following questions:

1. What are the most common assessment techniques used by subject teachers in public secondary schools in Ethiopia?
2. Is there a relationship between assessment techniques and subject teachers in assessing the secondary school students?
3. What are the challenges that subject teachers faced in implementing the variety of assessment techniques to assess the students in public secondary schools in Ethiopia?
4. What are the pedagogical implications of the study?

3. METHODS

3.1 Participants

A total of 423 out of 667 research participants (F = 178; M = 245) took part in the study. All participants were secondary schools teachers in Ethiopia (Language teachers [n= 122, Amharic; and n= 129 English]; Social Science teachers [n=106, Civics & Ethical Education], and Science teachers [n= 66, Physical Education]). The study employed a purposive sampling technique due to easy access to participants, as participants were attending summer training program at Addis Ababa University in Ethiopia. All the participants (teachers) (N=677) had teaching experiences as they invited for training based on their experience and good teaching performance. These participants were recruited for the study as it was anticipated that this group of participants were a heterogeneous diverse group as they were from different regions, teaching different subjects, and consequently deemed to be demonstrative of teachers in Ethiopia.

3.2 Design

This study had a mixed research design where all participants completed a survey, but only a few selected teachers based on experience took part in face to face interview. After consenting to the study, information about the study and purpose was clearly explained to participants, and they were informed that the study was voluntary and that they have the right to drop out of the study at any time. They were also informed that the data from the questionnaire and interview are kept confidential and used only for this study. Those teachers (n=8) that had reported over 10 years of actual classroom teaching experience were invited to take part in a face-to-face interview, for about thirty minutes long. The interview was held with teachers to document detailed and underlying information related to their assessment strategies used in the classroom [24].

3.3 Instrument

The study employed two types of instruments, a self-developed questionnaire and a set of interview questions. The self-developed questionnaire had two parts: part one had 4 questions that were about the background information of the participants (e.g. age, gender, teaching experience, and their region), and part two had a questionnaire of 15 items. All the 15

items were five points Likert scale (i.e., 5 being from strongly agree to 1 being disagree strongly). These questions were developed based on the existing literature review [16,25,26]. The 15 items questionnaire was pilot tested among a sample of secondary school teachers to estimate the reliability, and it had .872 Cronbach alpha. The questions in the interview were adapted from various literature [4,21,27,28].

The face to face interview had 10 questions. Of the 10 questions, 6 questions aimed to document the assessment techniques used by teachers another 4 captured barriers they encountered in implementing these assessment techniques. All of these questions were adapted from the works of [4,21,27] as they provided practical scenarios of classroom assessment and challenges related to classroom assessment in a broad perspective.

3.4 Data Collection and Analysis

Data was collected quantitatively and qualitatively. Quantitative data was collected through surveys. Qualitatively data was collected through interview transcripts. Quantitative data was analysed using descriptive statistics, Principal Component Analysis, and Chi-square to see the assessment strategies exhibited by secondary school teachers across their area of teaching. Qualitative data was analysed through thematic analysis. The audio interview data transcribed verbatim, and major themes were captured from the interview transcriptions.

4. RESULTS AND DISCUSSION

The 15 items of the Classroom assessment practice were subjected to principal components analysis (PCA) using SPSS. Before performing Principal Component Analysis (PCA), the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of many coefficients of .3 and above. The Kaiser-Meyer-Olkin value was .894, exceeding the recommended value of .6 reached statistical significance, supporting the factorability of the correlation matrix [29-31]. Bartlett's test of sphericity reached statistically significant, i.e., Bartlett's test of sphericity (423)=1992.57, p=.000) supporting factorability of the correlation matrix.

As shown in Table 1 Principal Components Analysis revealed the presence of three components with eigenvalues exceeding 1,

explaining 35.89%, 10.99%, and 7.33% of the variance respectively.

As shown in Table 1, the principal component analysis reduced the fifteen items measuring the Classroom English Assessment Practice to **3 factors** such as *assessment OF learning, assessment FOR learning, and assessment AS learning*. Following the guidelines recommended by [32], factor loading higher than **.30** is taken as cut off and hence, factor loading of **.46** was also retained.

The first factor labelled 'assessment AS learning' consisted of six items. All the items deal with assessment related to students' independent learning activities. These are improving students' academic performance, students' monitoring their learning progress, encouraging students to get learning autonomy, promoting students to become independent and responsible learners, guiding students' self-learning, and getting students' assessment feedback for the effectiveness of teaching-teaching learning process.

The second component, 'assessment FOR learning' was composed of four items related to teachers' assessment information to design and differentiate teaching and learning activities. For instance, assessment FOR learning theme consisted of items such as assessing students through different assessment techniques, designing activities based on students need

assessment, using students' assessment feedback to improve teaching techniques and marking students based on various assessment mechanisms like an assignment, test, class participation, and project.

Assessment of learning is the third component. This component was connected to summative assessment, which composed of five items. These are: Assessing students only through mid and final exams, assessing students based on what the subject teacher taught them, giving assignment based on only the set criteria by subject teacher, leading students to do their test only through memorization, and giving assignments to students only based on what they have studied in class.

As shown in Table 2, there is an association between teachers' subject area of teaching and assessment OF learning in assessing students. While 50.8% of Amharic subject teachers, 52.7% of English subject teachers, and 73.6% Civics and ethical teachers agree on applying assessment OF learning to assess their students, only 63.6% Sport subject teachers disagreed.

A Chi-square test revealed that there is a statistically significant association between teachers' subject area of teaching and the three assessment techniques such as assessment OF learning assessment FOR learning assessment AS learning.

Table 1. Rotated component Matrix^a

Items	Component		
	Assessment as learning	Assessment for learning	Assessment of learning
Q11	.755		
Q10	.707		
Q13	.628		
Q14	.627		
Q15	.617		
Q12	.586		
Q6		.736	
Q9		.679	
Q7		.637	
Q8		.626	
Q4			.706
Q3			.670
Q2			.581
Q5			.575
Q1			.460

*Extraction Method: Principal component analysis.
Rotation Method: Varimax with Kaiser normalization.
a. Rotation converged in 13 iterations.*

Table 2. Teachers subject area of teaching *assessment of learning

		Assessment of learning		Total	
		No	Yes		
Teachers' of teaching	Amharic	Count	60	62	122
		% within Field of studies	49.2%	50.8%	100.0%
	English	Count	61	68	129
		% within Field of studies	47.3%	52.7%	100.0%
	Civics	Count	28	78	106
		% within Field of studies	26.4%	73.6%	100.0%
	Sport	Count	42	24	66
		% within Field of studies	63.6%	36.4%	100.0%
Total		Count	191	232	423
		% within Field of studies	45.2%	54.8%	100.0%

As shown in Table 3, a Chi-square test revealed that there is a statistically significant association between teachers' subject area of teaching and the assessment OF learning, $X^2(3, n = 423) = 25.17, P = .000$. The p-value shows that there is a statistically significant relationship between the categorical variables.

The result from the interview was also related to that of quantitative results. For instance, one participant (TA1) reported that the purpose of assessment as:

"... I use assessment to identify my students' learning progress, to understand to what extent they comprehend the given lesson, and also to check my teaching techniques..."

Another participant (TE1) went to say that the purpose of classroom assessment was

"... It assisted me to mark the knowledge of my students about the subject I taught them..."

And another participant (TC1) answered by saying

"... I use assessment to check students' understanding of the lesson I teach them..."

These responses, attempt to explain that classroom ready assessments were used to map and document students' learning of a particular lesson. This explanation shows teachers use classroom assessment only from one side, that is, to know student level of understanding, which leads the role towards *assessment OF learning*. However, teachers are not only expected to use classroom assessment only for this purpose [5, 8]. Assessment needs to be used FOR learning and AS learning, too. Hence, teachers are not apparently able to state what the purposes of assessments are.

As shown in Table 4, there is a relationship between teachers' area of teaching and assessment FOR learning. Although 56.6% of Amharic subject teachers, 52.7% of English subject teachers, and the majority of Civics and ethical teachers agree (73.6%) on applying assessment OF learning to assess their students, 59.1% sport subject teachers disagreed.

Table 5, with p-value shows that the variables are dependent of each other and that there is a statistically significant relationship between variables. A Chi-square test also revealed that there was a statistically significant relationship between teachers' area of teaching and the assessment FOR learning, $X^2(3, n = 423) = 19.86, P = .000$.

Table 3. Chi-Square tests

	Value	df	Asymptotic significance (2-sided)
Pearson Chi-Square	25.169 ^a	3	.000
Likelihood Ratio	25.953	3	.000
N of Valid Cases	423		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 29.80.

Table 4. Teachers subject area of teaching *assessment for learning

Crosstab			Assessment for learning		Total
			No	Yes	
Teachers' of teaching	Amharic	Count	53	69	122
		% within Field of studies	43.4%	56.6%	100.0%
	English	Count	61	68	129
		% within Field of studies	47.3%	52.7%	100.0%
	Civics	Count	28	78	106
		% within Field of studies	26.4%	73.6%	100.0%
	Sport	Count	39	27	66
		% within Field of studies	59.1%	40.9%	100.0%
Total	Count	181	242	423	
	% within Field of studies	42.8%	57.2%	100.0%	

Table 5. Chi-square tests

	Value	df	Asymptotic significance (2-sided)
Pearson Chi-Square	19.861 ^a	3	.000
Likelihood Ratio	20.399	3	.000
N of Valid Cases	423		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 28.24.

Participants were interviewed to explain the assessment techniques they employed in their classes. For instance, one participant (TA2) explained that he usually uses homework, questioning and answering, group work as classroom assessment techniques he employed in his class. In the same way, another participant (TC2) stated that he used homework, and questioning and answering the main assessment techniques. And another participant (TE2) reports that he also listed a variety of classroom assessments in their classroom assessments. These classroom assessments are: peer assessment, group work, project work, class participation, quiz, presentation, and test.

Another participant (TS2) mentioned that the

“... assessment techniques I employ in my classroom depends on the nature of the content I teach. For instance, in Physical Education subject, I usually ask the student to do their activities independently. In this case, I did not give them written the exam, but I gave them to project work, physical exercise activities, home take assignment...”

This is in line with Gonzales and Aliponga [28] who have noted the importance of assessment FOR learning as, *“...in conducting an assessment [FOR] learning, it is necessary that there is a balance in the types of test items and more complex performance assessment tasks need to be selected with*

care to ensure that the full range of critical instructional objectives is assessed...” [28]. From the interviewees' responses, only participant (TE2) and TS2 used to use the balance in the assessment. TA2 and TC2 listed that they use only questioning and answering and homework as classroom assessment techniques. From this, it is possible to assert that even experienced teachers are not employing a variety of classroom assessment techniques, which is not in line with the results obtained through quantitative data where the majority suggested that they are using various classroom assessment techniques. On the contrary, TS1 and TS2 explained that due to the nature of their subject, Physical education, they assess their students using activities that help them responsible, independent, and self-reliant. Their explanations show that Sport subject teachers employed more of *assessment AS learning* than *assessment OF learning* and *assessment FOR learning*. Interestingly, the quantitative result is in line with the interview results.

As shown in Table 6, there is a relationship between teachers' area of teaching and *assessment AS learning* in assessing secondary school students. For instance, 60.7%, 60.5%, and 54.7% of Amharic subject teachers, English subject teachers, and Civics and ethical teachers disagreed in applying *assessment AS learning* to assess their students. However, only 63.6% sports teachers agreed on applying assessment as learning.

Table 6. Teachers subject area of teaching *assessment as learning

Crosstab		Assessment as learning		Total	
		No	Yes		
Teachers' of teaching	Amharic	Count	74	48	122
		% within Field of studies	60.7%	39.3%	100.0%
	English	Count	78	51	129
		% within Field of studies	60.5%	39.5%	100.0%
	Civics	Count	48	58	106
		% within Field of studies	54.7%	45.3%	100.0%
	Sport	Count	24	42	66
		% within Field of studies	36.4%	63.6%	100.0%
Total		Count	181	242	423
		% within Field of studies	42.8%	57.2%	100.0%

The p-value indicates that the relationship between teachers' area of teaching and assessment AS learning. A Chi-square test indicated that there is a statistically significant association between teachers' area of teaching and the assessment AS learning, $X^2(3, n = 423) = 8.42, P = .04$ (see Table 7).

4.1 Problems in Implementation

With regard to the problem teachers faced during the implementation of classroom assessment techniques, one of the participants explained that the students were not motivated to learn and take part in the class. The participant (TE2) further explained

"... The arrangement of the classroom, as the benches and desks are fixed in the classroom, it reduces students activities engagement in group work. For this reason, teachers mostly lecture the subject, which affects the students' active learning. Class sizes are mostly more than 85 students in a class, and that makes difficult for me to communicate skills and knowledge among learners in a congested and noisy atmosphere..."

Another participant TE1 explained the challenges in light of classroom conditions such as large class size and fixed desks.

"... This year we are facing serious challenges because of many students are assigned to my class. This year we have more than 85 students in one class. With a large number of students in the classroom, let alone to check students' learning progress daily; I could not even check my

students' exercise book. When I checked their exercise book, the time allotments to teach the subject in a period is not even enough...."

Another participant (TE2) goes on to report that the physical conditions of the schools and large student number are not conducive to implement classroom assessment efficiently.

"... As English language teacher, I face many challenges. For instance, in English language classes, at school levels, I am expected to include the frequent and considerable use of local language (Amharic/Afan Oromo), as students hardly get exposed to English. As a result of this, usually face the challenges such as failing to check individual student's progress because of large number of students, students' low motivation to learn, and shortage of time to run classroom activities, etc., students failure to come with textbook (size of the textbook), and background of students..."

Another participant (TA2) goes on to say,

"... Some of the students come to the school without exercise-book and textbook. In the absence of these learning equipments, it is difficult to run effective teaching-learning processes. Also, it is obvious that in language teaching, some of the assessment techniques, in fact, require a good physical condition. If we take role play, students cannot practice it in their class due to the fixed nature of seats and desk. Because of this, I cannot fully say that I was implementing a variety of classroom assessment techniques effectively..."

Table 7. Chi-square tests

	Value	df	Asymptotic significance (2-sided)
Pearson Chi-Square	8.423 ^a	3	.038
Likelihood Ratio	8.366	3	.039
N of Valid Cases	423		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 28.24.

Additionally, the same participant goes to comment on motivation by noting.

"I sometimes feel bad when students lose the interest in learning. I do not know why these days, students are not willing to learn, even students who perform well in the classroom are not interested in doing some classroom activities...this needs in-depth investigation..."

In summary of the above with regard to the various challenges, it appears that low motivation of learning, classroom conditions, and large class size have significantly restricted teachers' ability to implement various assessment techniques the teacher came across.

5. CONCLUSION

The results of this study showed that secondary school teachers in Ethiopia did employ three types of assessment techniques in assessing their students: *Assessment of learning, assessment FOR learning, and assessment AS learning* [4,7,8,14,21,23,27,28,33]. The result also showed that the implementation of these assessment techniques varies according to the subject teachers. For instance, Amharic, English, and Civics and Ethical Education subject teachers, the majority of the respondents used classroom assessment for the purpose of *assessment OF learning and assessment FOR learning*. That is, assessment OF learning is primarily meant for determining the status of student achievement against learning outcomes, and assessment FOR learning has been designed to give teachers information to modify and differentiate teaching and learning activities. It is roughly equivalent to formative assessment. Assessment FOR learning also intended to promote further improvement of student learning by performing assessment procedures while the instructional process is going on [16,33].

Importantly, only Physical Education (i.e., sport) subject teachers agreed in using assessment AS learning. Physical Education subject

teachers disagreed in using assessment OF learning and assessment FOR learning, and the majority of them claimed that they were using assessment AS learning. A majority of Physical Education subject teachers used classroom assessment for assessment AS learning. Assessment AS learning developed and supported meta-cognition of students – the knowledge of one's own thought processes [21]. In terms of challenges, subject teachers cited challenges such as class size, students 'low motivation, nature of the subject, school environment, time allotted for one period, and other teaching and learning facilities.

The study suggests that institutional support is needed to foster classroom assessment techniques in the case of secondary schools. Importantly, the Ministry of Education and Regional Education Bureaus should consider the best ways to address the challenges raised by teachers in implementing diverse assessment techniques. For example, they can organise professional development training for school teachers on how to assess their students using diverse assessment strategies. They can also establish a link with teacher education institutions, and introduce on job training interventions that would help teachers to improve classroom assessment practices. Furthermore, students should be encouraged and given awareness to be independent learners by taking learning responsibilities, as this is a challenge in the cultural context of the Ethiopian secondary schools. This kind of research in a different level of schools and the countries with similar contexts is recommended in the future to see the general picture of assessment strategies teachers employ to assess their students.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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