

Original Research Article

The impact of capacity building training to biology teachers' competence in assessment: the impact of monitoring trainees

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Abstract

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This paper explores the impact of capacity building training to Biology teachers' competence in setting test items after introducing a competence based curriculum. It also examines the impact of monitoring trainees' involvement in capacity building between the years 2005-2013. A survey study was carried out to obtain data from 219 respondents. The study established that only (149) 68% of the sampled Biology teachers in studied schools had received capacity building. Also it was found that, monitoring of teachers who underwent capacity building was poorly done. Furthermore, the findings revealed that on average 68.46% of teachers who received capacity building were able to construct items at higher levels of cognitive objectives. The paper concludes that, lack of monitoring of teachers involved in capacity building has led to the failure of capacity building delivery system to accommodate all Biology teachers in capacity building and consequently affected their assessment competencies negatively. The authors recommend that, keeping records could make enhance monitoring the teachers involved in capacity building and make the intention of improving teachers' assessment competencies realistic.

Key words: Bloom's Taxonomy, Capacity building, Competence based syllabus, Monitoring trainees, Teachers' assessment competences.

INTRODUCTION

Over the past decades many governments have undergone reformation in education system by adopting competence based approach instead of content based approach to maintain high standard of educational assessment and improve student' performance. The new focus has been paralleled by a significant increase in teachers' capacity building training to enhance teacher's competencies in assessment and classroom instruction needed to cope with the reformation. In the year 2005 the Tanzanian government implemented competence based Biology syllabus in ordinary secondary education (MoEVT, 2005). Following this reform, the government aimed at training all Biology teachers in order to improve

their competencies in assessment and classroom instruction. Thus, to help educational stakeholders to plan properly for the intended capacity building training the Ministry of Education and Vocational Training (MoEVT) emphasized much on keeping records about trainees (MoEC, 2004).

Through teachers' capacity building training, teachers acquire skills and competencies required for constructing quality test items. (Nenty et al., 2008) observed that, to maintain high standard of educational assessment all teachers should be able to use Bloom's taxonomy to ensure the most appropriate type of assessment. The Bloom's Taxonomy is a classification of learning

objectives developed by Benjamin Blooms, which categorizes learning objectives into three domains, namely cognitive, affective and psychomotor domains. The cognitive domain is further classified into six major levels, namely knowledge, comprehension, application, analysis, synthesis and evaluation. Knowledge and comprehension are categorized as lower levels and the other four aspects are categorized as higher levels of learning achievement. In the context of competence based curriculum, teaching and learning should focus on all the six levels and, as such, assessment of learning achievement should address all these levels as well. Thus, teachers' capacity building training after adopting competence based approach emphasized much on construction of quality test items basing on Bloom's six levels of cognitive objectives. In addition to that, recording and monitoring of teachers' involvement in capacity building training conducted after adopting competence based approach sought to equip every teacher with skills required to acquire high standards of classroom instruction and assessment which normally lead to improved student performance.

Statement of the problem

Despite the presence of teachers' capacity building programs which have been proved to enable teachers to acquire skills for classroom instruction and in assessment to improve students' performance, reports on certificate of secondary education examinations (CSEE) results between the years 2008–2012 have shown that, students are yet to show impressive performance in science subjects particularly Biology. Majority performed poorly with their grades ranging between D-F (poor and fail respectively) (NECTA, 2008-2012). However this is the era when students' performances were expected would have been improved due to introduction of competence based curriculum intended to improve the whole teaching, learning and assessment approaches. Since teachers' competence in assessment skill is an important aspect in classroom instruction and assessment a number of researches have been done on teachers' capacity building training. However, no attention has been paid to see whether there is monitoring and recording teachers involved in capacity building to make sure that all Biology teachers in ordinary secondary schools receive the intended capacity building and whether monitoring of the exercise has impact to teachers' assessment competence. This paper therefore aimed to investigate that area.

Objectives of the Study

The study had the following objectives:

1. To establish the number of teachers who received capacity building in assessment of Biology subject between the years 2005 –2013.
2. To examine the level of performance in monitoring and recording of teachers who underwent capacity building in Tanzania secondary schools.
3. To examine the effect of monitoring and recording of teachers in capacity building to Biology teachers' competence in construction of examination items using Bloom's cognitive objectives.

Research Questions

The following questions guided the study.

1. How many secondary school Biology teachers receive capacity building to improve their competence in assessment and classroom instruction between the years 2005 –2013?
2. To what extent was monitoring and recording of Biology teachers who underwent teachers' capacity building was done?
3. Did capacity building exercise exert any effect to Biology teachers' competence on construction of quality examination items using Bloom's cognitive objectives?

Literature Review

In general empirical literature studied informed, teachers' capacity building training in classroom assessment has a potential to make teachers competent in identifying appropriate area to be assessed and how to rightly assess them Wakjissa (2010). In addition, competence of teachers determines the students' mastery of every instructional process. In the same vein, William and Thomson (2008) found that building teachers' capacity in assessment help teachers to acquire good assessment skills which enable them to use variety of evaluation techniques to enhance teaching and learning in the classroom. This was also revealed in a study carried out by (Nenty et al., 2008) on teachers' capacity building who found that teachers with good assessment skills were able to use Bloom's cognitive skill objectives for construction of test items. Thus, lack of teachers' capacity building can undermine student learning. as Forehand (2005) found that incompetent teachers are the major problem affecting student achievement.

On the other hand Aboki (2008) pointed out that there is high degree of biology failure in Rwandese secondary schools. He also viewed that there is a number of factors that contribute to students' poor performance in Biology examinations among these secondary school leavers of Rwanda do not reflect adequate acquisition of perceptible skill of learned concepts. Wakjissa (2010) explained this fact by adding that most teachers were incompetent in

setting questions, they were only capable of setting them at lower level of Bloom's taxonomy and consequently students tend to perform better in internal examination and poor in external examinations which were constructed in compliance with test item writing rules. He recommended that, there is a need to retrain teachers on item construction so as to maintain examination standard. For this case, monitoring the teachers who are involved in capacity building is necessary to make sure that all teachers have equal chance and access to capacity building.

When it comes to monitoring of teachers' involvement in capacity building training in assessment for improving quality of education, the study conducted by Kaufman and Zahn (1993) on quality of education found that, high quality data, are critical and without useful and timely statistics, rational decision cannot be made and quality of education cannot be ascertained. That means it is very important to keep record of teachers who have and have not received capacity building so as to plan and allocate resources accordingly for their training to improve their competencies in classroom assessment and instruction which in turn leads to improved student performance.

METHODOLOGY

The Research Design

This is both a quantitative and qualitative study with a survey design as it involved the analysis of respondents' views and procedures in monitoring and keeping records of Biology teachers who underwent capacity building in order to improve their competencies in constructing quality examination items for assessment of students.

Population and Sampling of the Study Area

The population of the study involved Biology teachers who were selected randomly from four randomly selected regions which are Da es Salaam, Mbeya, Morogoro and Pwani. Also, national statistic officer and national capacity building coordinator were purposive selected. The selected regions have many teachers enough to form a good representative sample.

Sample Size and Sampling Procedure

A total of 219 respondents served as the sample of this study. Out of this number, 217 were Biology teachers who had graduated at least eight years ago with teaching experience of not less than eight years in teaching. These teachers were purposely selected to control variation of test construction knowledge among teachers

who have graduated before and after the implementation of competence based Biology syllabus. Purposive sampling was conducted to get one national statistic officer and one national teachers' capacity building coordinator.

Instrument for data collection

In order to gather the information related to monitoring and recording of Biology teachers involved in capacity building exercise interview guides were held to heads of schools, teachers' capacity building coordinator and national statistic officer. On other hand, a questionnaire divided into two sections was administered to biology teachers. The first section required a teacher to provide information on whether they had received capacity building in teaching and assessment since the implementation of competence based Biology syllabus between the years 2005 -2013. In the second section, they were required to construct test items which could be used to test students' cognitive abilities in knowledge, comprehension, application, analysis, synthesis and evaluation on any topic of interest in Biology subject.

Data analysis procedure

Data analysis was done in accordance with the research questions of the study. In this study, content analysis was employed for qualitative data. Quantitative data were subjected to descriptive statistical analysis, later on the data were presented in tables showing absolute numbers, frequency and percentages of respondents. Then interpretation was made.

FINDINGS AND DISCUSSION

The first research question was to find out how many secondary school Biology teachers receive capacity building to improve their competence in assessment and classroom instruction between the years 2005 –2013. In this question, data were obtained mainly from Biology teachers. Findings from teachers who responded to questionnaires are summarized in Table 1.

Findings from Table 1 reveals that majority of teachers 149 (68%) in studied regions have received capacity building in teaching, learning and assessment based on competence based curriculum more than two times. However, further observation from questionnaires indicated that 70 (32%) of the teachers has never attended capacity building in teaching, learning and assessment since the introduction of competence based curriculum.

The interpretation that can be made from the finding above is that, while some teachers attend the capacity

Table 1. Summary of Biology teachers' responses on attendance to teachers' capacity building in assessment of Biology subject after the implementation of competence based syllabus to date
(N = 219)

Region	Number of teachers trained more than two times	Percentage Trained	Number of untrained teachers	Percentage untrained	Total
Dar es Salaam	72	69.23	32	30.77	104
Mbeya	41	61.20	26	38.80	67
Morogoro	23	74.20	08	25.80	31
Pwani	13	76.47	04	23.53	17
Total	149	68.00	70	32.00	219

Source: Field Data (2013)

building repeatedly, still there are some teachers who were trained in teachers colleges before implementation of competence based approach are still in the education system without receiving capacity building in teaching and assessment even once. Thus, these teachers still use outdated pedagogical skills and experience because they did not receive capacity building in assessment and teaching that would improve student learning and instruction (Stiggins, 1991). This situation affected teachers' ability in classroom assessment practices which greatly undermined learning and leading to poor performance of students.

The second research question was to examine the level of performance in monitoring Biology teachers involved in capacity building. On being interviewed on how monitoring and recording Biology teachers' involvement in capacity building training was done in Tanzanian secondary schools, the national statistics officer (NSO) explained that, for the time being statistic office is concerned with collection of data on quantity of available teaching and learning resources but not their quality. Similarly, when national capacity building coordinator (NCBC) was asked to present teachers' capacity building training inventory no document was found. However, the coordinator informed that data of teachers involved in capacity building are recorded by regional capacity building facilitators who send them to the national capacity building facilitator for compilation. Later on the compiled data is compared with the total number of teachers in Tanzania.

The interpretation made from the information obtained from NSO and NCBC is that planning and decision making on teachers' capacity building are obviously made from generalized data which are not based on real school data showing the number of teachers involved in capacity building. Thus, the delivery system of capacity building failed to accommodate all Biology teachers in capacity building as it was observed in the preceding section that some teacher had never since the implementation of competence based curriculum.

The third research question sought to find out whether

monitoring and recording of teachers involved in capacity building had effect to Biology teachers' competence on construction of examination items using Bloom's cognitive objectives. Findings were obtained through questionnaire administered to Biology teachers who constructed test items. The aim here was to see if there is any difference in construction of test items between teachers who received capacity building and those who did not. Information obtained from respondents was presented in Table 2 below.

Table 2 reveals that majority of teachers regardless of whether these teachers had received capacity building in assessment or not were able to construct items at lower cognitive level. For example, 149 (100%) of the trained teachers and 63 (97%) of the untrained were able to construct items at knowledge level while teachers were able to construct item at knowledge level. Furthermore the results reveal that on average 102 (68.46%) of teachers who received capacity building were able to construct test items at higher levels of cognitive objectives that is application (79%), analysis (73%), synthesis (65%) and evaluation (43%).

However most teachers who had not received capacity building in assessment were not able to construct items at higher level of cognitive objectives. Example, 74% of them were not able to construct item at application level, 59% at analysis level, 81% at synthesis level and 96% at evaluation level. Generally, findings revealed that on average 68.46% of teachers who received capacity building in assessment compared to 22.25% of teachers who had not received capacity building in assessment were able to construct items at higher level of cognitive objectives.

The observed difference suggests that, lack of monitoring teachers who are involved in capacity building has led to some teachers to attend capacity building repeatedly while others have never attended as it was revealed in research question one that 68% of teachers had attended capacity building in assessment of Biology attended three to four times, a situation which has lowered the number of teachers who had received

Table 2. Distribution of number and percentage of trained and untrained teachers' ability to constructing test items reflecting Bloom's six levels of cognitive objectives (N= 219)

Lower Level Item Category Higher Level Item Category

Number of T/U teachers	knowledge		Comprehension		Application		Analysis		Synthesis		Evaluation	
	AB	NA	AB	NA	AB	NA	AB	NA	AB	NA	AB	NA
T = 149	149	00	147	02	117	32	1077	42	97	52	85	64
	100%	00%	99%	1%	79%	18%	3%	28%	65%	35%	57%	43%
U = 70	63	07	65	05	18	52	29	41	13	57	03	67
	90%	10%	93%	7%	26%	74%	41%	59%	18%	81%	4%	96%
TOTAL = 219	212	07	212	07	139	84	136	83	110	109	88	131
	97%	3%	97%	3%	63%	38%	62%	38%	50%	50%	40%	60%

Source: Field data

Note: T=Trained teachers

U = Untrained teachers

AB = Teachers who were able to construct item at a given level

NA = Teachers who were not able to construct item at a given level

capacity building. This has consequently contributed to affect the assessment competence to majority of teachers in construction of items as shown in table 2. Most teachers were able to construct low level test items which are said to function at lower level of student thinking as they require students to just remember and recall what they have been given. This has some implications for the teachers and hence to students. For teachers it implies that most of them do set examinations which do not challenge students to require critical thinking skills. This in turn, affects students at their final national examination which is normally constructed based on Bloom's taxonomy and requires them to explore and discover rather than just recalling and understanding facts and ideas.

Implication of Findings to the Quality of Education

A number of researchers have attempted to adequately define quality in the context of education and observed that there is no universal consent on quality of education. According to UNESCO (2000), quality in the context of education should include students' outcomes and the educational experiences that help to produce such outcomes. Mosha (2004) viewed quality education as a function of quality of the context, input, process and output. However, for the sake of this paper, the study adopted Omari (1995) perspective which considers quality of education by identifying indicators of poor quality education in the education system that include underperforming workforce who are academically under qualified, professionally under trained in teaching and assessment and education which is accompanied with poor performance in examinations.

However, poor students' performance in examinations that raised much concern to the poor quality of education has been linked partly to the lack of teachers' capacity building (William & Thomson, 2008). Advocacy of capacity building provides that, the quality of education cannot be ascertained without monitoring teachers' capacity building in classroom assessment and instruction to improve teachers' competence in assessment (Okeke, 2004). The author concluded that, building teachers' capacity in classroom assessment is a great demand in whatever education enterprises aiming to improve the quality of education since there is no quality education which is above the quality of their teacher.

CONCLUSION

Since the study has revealed that large number of Biology teachers have not received capacity building since inception of competence based Biology syllabus, and that, teachers who have not received capacity building in assessment have poor knowledge in construction of test items at higher level of cognitive objectives, it is evident therefore that student poor performance in National Biology Examination is attributed by among other factor lack of teachers' skills in constructing quality internal examinations. Majority of Biology teachers who have not attended capacity building do construct internal examination that require student to recall what they have been given. This situation in turn affect student negatively at their National examination as they found themselves being able to answer questions which measure low level of think while the examination provided measures all six cognitive levels of thinking.

Finally they end up scoring D and F grades. Therefore, there is a call for immediate proper monitored teachers' capacity training to ensure that all teachers are involved in training in order to acquire skills need for construction of test items that are valid and require students to think critically. This will help students to improve their performance in national examination. Since student performance is an indicator of quality education, then the quality of education will be improved.

Recommendations

- The MoEVT should continue to periodically organize training sessions in test items construction for teachers.
- Government and school proprietors should continue to encourage their teachers to attend seminars on assessment so as to upgrade their knowledge in test items construction and educational assessment generally.
- MoEVT should implement Education Management Information System (EMIS) for proper monitoring and recording of teachers' involvement in capacity building so as to enable proper planning and allocation of fund for organizing capacity building training.

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