Review Article

Performance-based assessment: The way to go in contemporary classroom assessment

Abstract

Performance-based assessment is one of the contemporary forms of assessment that is being advocated for by many assessment experts. This is because it has proven to bridge the gap between knowing and doing. It allows students to apply learned concepts in solving real life situational problems. It has advantage over o the traditional assessment which only requires student to choose rather than creating responses. It also allows students to think differently in creating a solution to a real-life problem. However, teachers have little knowledge the forms and nature of performance-based assessment. This paper therefore presents the forms and nature of performance-based assessment that teachers can employ for classroom assessment.

Keywords: Performance-based assessment, on-demand, structured, extended, oral presentation

Introduction

One of the noticeable challenges of performance-based assessment has to do with the ability to design a performance assessment such that the items can be presented on an individual student's level (Pegg, 2013). In today's classrooms, children exhibit wide range of abilities and the teacher has the mandate of teaching these children. It is thinkable that a well-designed performance assessment could be used and still fail to provide relevant data. This may happen when the assessment task is either too difficult or too easy for the student being assessed. The purpose of this study is to develop and validate such assessments taking into considerations the traits typical of high-quality performance assessments in mathematics.

Classroom assessments in mathematics have faced a series of challenges to students' achievement in relations to PBA. These challenges have been listed by Gao (2012) to include a focus on recall of isolated items of knowledge. To improve student achievement, mathematics, Gao (2012) suggested that assessment should be fused into planned instruction and relate to the students' real world experiences Sun-Geun and Eun-Hui (2015), Kone (2015) and Sung-Eun (2015) reported in their studies that performance-based assessment has educational value as far as teaching of learning in the classroom is concern.

Brennan (2006) stated that with performance assessment, the potential value of the test lies in its closeness to reality and has the feature of different approach to the test hence different correct results. The application of the knowledge is to real life situation. Asamoah-Gyimah and Anane (2018) proposed that performance assessment is effective as a formative assessment.

Performance-based assessment is not popular among most classroom teachers. For instance, in Ghana, Ankomah (2020) reported that most classroom teachers use items under the knowledge and comprehension levels of the cognitive domain. Ghana's performance on the Trends in International Mathematics and Science Study (TIMSS) has continued to be poor (Anamuah-Mensah et al., 2004; Burt, 2017; Butakor, 2016). The items of TIMSS are mostly on application of mathematical and scientific knowledge. This is because there is little room for application of knowledge in assessment in Ghanaian schools. There is therefore the need to consider alternate forms of assessment in mathematics against the backdrop of the weakness of the traditional assessments. This is the teachers have limited on the forms of performance-based assessment they could use in their teaching and learning.

Performance based assessment

According to Lane (2010), educational reform in the 1980s was based on the premise that too many students knew how to repeat facts and concepts, but were unable to apply those facts and concepts to solve realistic problems that require complex thinking and reasoning skills. Thus, performance assessment is a great way to make learning meaningful to students and to encourage them to be creative, innovative, and constructive. Meanwhile, as posited by Lane, performance assessment is an essential component and process in education yet with limited recognition and practice in many nations. Osterlind (2006) noted this assertion by saying that performance assessment got its recognition when traditional assessment of knowledge using multiple-choice could not give better account of individuals' knowledge in demonstrations, performance tasks, proficiency in writing skills, creation of products and even group work in tests. However, Khattri, Kane and Reeve (1995) believed that performance assessment is unknowingly practiced by assessors in diverse procedures. Regardless of the fact that performance assessment was informally known to assessors, the authors believed it is an old tool that is used to measure students' cognitive, affective and psychomotor skills

On the other hand, Leon and Elias (1998) believed performance assessment originated from the Chinese proverb "I do I understand" because the assessment tasks require application of

learnt content in realistic situations. The authors believed the assessment tasks encourage demonstration of learnt concepts in using activities that are thought provoking and require dedication and responsibilities from students. This made Khalanyane and Hala-hala (2014) to say that performance assessment emphasizes on procedures employed to solve unique problems in society. This is an indication that tasks of performance assessment require students to act by performing or constructing a product other than recalling and selecting existing answers to a task.

Performance assessment is characterised by assessing multiple learning targets especially with tasks that require the students to create objects, produce a report or to put up a demonstration of an activity or event (Lane, 2010; Nitko, 2001). The assessment procedures require execution of more than one learning outcomes in accomplishing a task. An instance is when a student is asked to demonstrate a hands-on activity. In this process, the student will initially picture the whole activity at a glance, outline principles involved, gather and arrange relevant materials if required before putting up the demonstration just to ensure that the activity incorporate all necessary principles and assumptions. This confirmed what Herrera *et al..*, (as cited by Mussawey, 2009) said that, performance assessment tasks assess all aspects of student learning through determining means by which students assimilate information, store and apply information in novel ways. However, Nitko argued that, every learning target cannot be assessed using performance assessment. Such learning targets include declarative statements that need to be assessed with traditional tasks because they require recalling of facts.

Performance assessment has multiple names based on the diverse perception of authors. Brown and Hudson (as cited in Koné, 2015), said the assessment is also known as authentic assessment or performance–based assessment because the assessment procedures allow students to produce responses that are similar or exactly to the real thing in life by using their own productive skills. Brooks (1999) and Oosterhof (2001), on other hand, said performance assessment subsumes authentic and alternative assessments because all of them require the employment of higher-order thinking skills.

Darling-Hammond (as cited in Koné, 2015) posited that performance assessment judges students on laid down criteria essential for the precise performance of the activity similar to the work place. Similarly, the Standards for Educational and Psychological Testing, indicating that performance assessments “emulate the context or conditions in which the intended knowledge or

skills are actually applied" (American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 1999, p.137). To the proponents, performance assessment has a broad range of assessment types subsuming authentic, alternative and performance-based assessments and these are interchangeable based on evidence of similar characteristics existing among them (Brooks; Herman, Aschbacher, & Winters, 1992).

However, Frey and Schmitt (2007) argued to differentiate between authentic and performance assessment by noting that authentic assessment tasks ensure the presentation of the real world in its activity and interpretations while the performance assessment ascertains the degree of a skill or ability. Kane, Crooks, and Cohen (as cited in Lane, 2010) said, "the close similarity between the performance that is assessed and the performance of interest is the defining characteristic of a performance assessment" (p. 4). This means, is just not the exact answer but any desired response that relates the original requirement is acceptable and describes the assessment. To limit the argument, Meyer (1992) believed only the assessor has the capability of determining when a task is authentic or performance assessment depending on the laid down criteria of authenticity that seem essential to the assessor.

Modes of Performance Assessment

According to Stiggins (2007), in performance assessment, there are variety ways tasks can be presented to attain appropriate response from students. Nitko (2001), however, outlined the modes of which performance assessment tasks are executed as follows:

Structured, On-Demand Tasks*:* Here, the assessor exercises control over all activities in the assessment process. It includes when and how administration should occur, when and how materials should be used during examination/testing and even the expected outcomes of the tasks. The structured on-demand tasks include:

1. ***Paper and pencil tasks*** such as solving a complex contextual mathematical problem, and drawing diagrams and graphs to illustrate mathematical or scientific idea. As noted by Lane (2010), the tasks also include persuasive essays or written performance tasks which can be stand-alone or text-based prompt writings that cause students to synthesize and apply knowledge through rethinking of issues.

2. ***Equipment and resources tasks*** that require students to use materials to respond to given tasks. These include moulding or developing an object, taking measurement of an object and carrying out hands-on activity in the Science classroom.

Natural Occurring or Typical Performance Tasks*:* In these tasks the assessor observes the best occurring typical performance of the students in the natural settings. The tasks pose difficulty to assessor because he/she has limited control over the activities students perform and the responses as well. An example is observing how each student is performing hands-on activity in a group.

Long-Term Projects: In projects, students are required to make use of prior knowledge (targeted learning outcomes) to design series of complex topics which aid them in accomplishing a specific but complex task. Projects take days, weeks or months to be completed since students are required to do library research, referencing, communicate through written reports on data collection process, analysis and interpretation, and outlined evaluative conclusions built from agreed upon criteria between the assessor and students. Projects can be individual or in collaborative base work depending on the request of the assessor. Students' projects include building a model or craft work of an object and writing on how it was built, designing an application software in ICT or surveying and writing on the impact of teenage pregnancy in a community.

Portfolio*:* According to Stiggins (2008), a portfolio is a collection of evidence, gathered over time, which gives insight to the student's growth in understanding and skill development. Portfolio allows students to take responsibility for their own learning with little input from a teacher so that they can make evaluative conclusion about themselves. Every activity in portfolio is an indicator of what the student knows and is able to do. The collection may include test results, student written work, projects, videos, tapes, or other artifacts of student involvement/work.

Demonstrations*:* Tasks of demonstration require students to carry out observable hands-on activities or exhibit body gestures to execute acquired knowledge and skills in accomplishing a task. Demonstrations are mostly completed within a short time frame. Tasks possess evaluative criteria best known to the assessor and students. Examples include exhibition of a dancing style to a cultural troupe, and an activity built on scientific principles to illustrate proficiency in using a piece of equipment or a technique.

Experiments: Experiment is an "on-demands performance in which a student plans, conducts and interprets the results of an empirical research study" (Nitko, 2001, p. 258) to a set of questions developed from logical guesses known as research questions/hypotheses. In experiments, students use inquiry skills and systematic procedures with scientific based explanations to reach the conclusion on an issue or phenomena. An example of an experiment is an investigation of brightness of bulbs in series and in parallel connections in the laboratory. Another example given by U.S. Department of Education (2005) is when…

> "Floating Pencil was provided to students with a set of materials, including bottles of freshwater, salt water, and "mystery" water. Students are required to perform a series of investigations to determine the properties of salt and freshwater, and to determine whether the bottle of mystery water is salt water or freshwater" (p. 10)

Lane (2010) added tasks to it as follows:

"Is the mystery water fresh water or is it salt water? How can you tell what the mystery water is? When people are swimming, is it easier for them to stay afloat in the ocean or in a freshwater lake? Explain your answer." (p. 19)

Oral Presentations and Dramatizations: Oral presentations are the main vehicle students use to exhibit their knowledge and skills through articulation such as verbal communication in interviews, recitals of poems, debates, dramas and speeches. However, in dramas, oral presentation are used in conjunction with explicit body gestures to help communicate messages clearly while in debates logical, persuasive and evaluative arguments are used in convincing the audience. For instance, students might be asked to research both sides of the issue and to deliver persuasive speeches on the issue.

Simulations and Contrive Situations: These are on-demand tasks in which students are asked to role-play an event in its natural settings and respond to thought provoking questions built from the mimic event displayed. Here, students are engaged in imitation of a real-life problem that they must solve using the knowledge and skills they have gained in a course of study (Rudner & Boston, 1994; Wiggins, 1990). An example is when a student is made to role-play the practice of puberty rites among the Krobos in Ghana, and the assessor observes and questions the purpose of an activity in the event.

Nature of performance-based assessment

Performance-based assessment assesses either the process or product or both (Brennan, 2006). When it is difficult to assess the processes, only the product is assessed, and when the product is embedded in the process, the focus is placed on the process. It is also possible to assess both process and product (Stone & Lane, 2006). Stone and Lane further stated that performance-based assessment could be task-centred when the knowledge and skills that contribute to the proficiency of the task is not specified in advance but specified when preparing the scoring rubrics. Performance-based assessment could also be construct–centred when the set of knowledge and skills to be assessed are valued in the instruction of the task. Brennan (2006) stated that the strength of performance-based assessment lies in ability to have good psychometric values.

Aside being either task-centred or construct-centred Stone and Lane (2006) and Nitko (2014) also stated that performance-based assessment could be on-demand task or restricted responses task which requires students to create responses within a short period of time. Performance-based assessment could also be extended task which last for a longer time undertaking by students on an assigned topic like thesis or project work.

Conclusion

Performance-based assessment has the potentials of reducing most of the challenges of the traditional assessment. Even though performance-based assessment comes with its own challenges such as subjective scoring, differentiated assessment among others, there are different forms performance-based assessment available to the teacher. Again, performance-based assessment ranges from on-demand, which is taking within a limited time, to an extended one like a project. Teachers are therefore encouraged to make use of performance-based assessment in order to move students' knowledge from the classroom to the real world.

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