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# Performance-Based Assessment in Contemporary Classroom Assessment: The Forms and Nature

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***Authors' contributions***

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## ABSTRACT

Performance-based assessment (PBA) 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 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, most teachers have little knowledge of the forms and nature of performance-based assessment even though some have taken at least a course in classroom assessment. This paper therefore presents the forms and nature of performance-based assessment that teachers can employ for classroom assessment.

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## 1. INTRODUCTION

Performance-based assessment (PBA) has gained much attention from educators in recent times. PBA has numerous advantages to improve students' performance. To improve student achievement, Gao [1] suggested that assessment should be fused into planned instruction and relate to the students' real-world experiences. Sun-Geun and Eun-Hui [2], Kone [3] and Sung-Eun [4] reported in their studies that PBA has educational value as far as teaching and learning in the classroom are concerned. Brennan as cited in Kan and Bulut [5] stated that with PBA, the potential value of the test lies in its closeness to reality and has the feature of a different approach to the test hence different correct results. The application of the knowledge is to a real-life situation. Asamoah-Gyimah and Anane [6] proposed that PBA is effective as a formative assessment.

Similar to performance-based is outcome-based assessment (OBA). Outcome-based assessment is the form of assessment that focuses on what students will be able to do at the end of the course (outcome). OBA then becomes PBA when the assessment of the expected outcome represents real-life experiences. According to Asim, Vaz, Ahmed and Sadiq [7], OBA is used in education because it focuses and organizes everything in an educational system around what is necessary for all students to be able to do at the end of their learning. Outcome Based Education (OBE) has appeared as a chief direction for educational reform [8]. OBE has become necessary because students of the current generation do not want to develop only the theoretical basis but also seek an educational approach where the focus lies on future employment also [9,10]. OBE ensures that students relate classroom learning to real-life situations which makes it possible to gain employment. The basis of OBE is the focus of PBA. This means PBA and OBA are synonymous.

One of the noticeable challenges of PBA has to do with the ability to design a PBA such that the items can be presented on an individual student's level [11]. In today's classrooms, children exhibit a wide range of abilities and the teacher has the mandate of teaching these children. It is thinkable that a well-designed PBA 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.

PBA is not popular among most classroom teachers. For instance, in Ghana, Ankomah [12] reported that most classroom teachers use items under the knowledge and comprehension levels of the cognitive domain of the Blooms' taxonomy. Assessment at these levels deprives students' opportunity to apply the knowledge in different situations and also create new things by themselves. Ghana's performance on the Trends in International Mathematics and Science Study (TIMSS) has continued to be poor [13-15]. The items of TIMSS are mostly on the application of mathematical and scientific knowledge. This is because there is little room for the 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 because the teachers have knowledge limited of the forms of PBA they could use in their teaching and learning.

## 2. PERFORMANCE-BASED ASSESSMENT

According to Lane [16], 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, PBA is a great way to make learning meaningful to students and to encourage them to be creative, innovative, and constructive. Meanwhile, as posited by Adeyemi [17], PBA is an essential component and process in education yet with limited recognition and practice in many nations. Yousefpoori-Naeim [18] asserted that PBA got its recognition when the traditional assessment of knowledge using multiple-choice could not give a better account of individuals' knowledge in demonstrations, performance tasks, proficiency in writing skills, creation of products and even group work in tests. However, Villarta, Atibula, and Gagani [19] believed that PBA is unknowingly practiced by assessors in diverse procedures. Although the PBA 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 as cited in VanTassel-Baska [20] believed PBA originated from the Chinese proverb "I do I understand" because the assessment tasks require the application of learned content in realistic situations. The authors believed the assessment tasks encourage the demonstration of learned concepts by using activities that are thought-provoking and require dedication and responsibility from students. This made Khalanyane and Hala-hala [21] to say that PBA emphasizes procedures employed to solve unique problems in society. This is an indication that tasks of PBA require students to act by performing or constructing a product other than recalling and selecting existing answers to a task.

PBA is characterised by assessing multiple learning targets, especially with tasks that require the students to create objects, produce a report, or put up a demonstration of an activity or event [16,22]. The assessment procedures require the execution of more than one learning outcome 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 the principles involved, and gather and arrange relevant materials required before putting up the demonstration just to ensure that the activity incorporates all necessary principles and assumptions. This confirmed what Herrera et al.., [23] said that PBA tasks assess all aspects of student learning by 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 PBA. Such learning targets include declarative statements that need to be assessed with traditional tasks because they require the recalling of facts.

PBA has multiple names based on the diverse perception of authors. Brown and Hudson [3], said the assessment is also known as authentic assessment or performance–based on the real thing in life by using their productive skills. Kirmizi and Komec [24] and Yulia [25], on other hand, said PBA subsumes authentic and alternative assessments because all of them require the employment of higher-order thinking skills. Darling-Hammond [3] posited that PBA judges students on laid down criteria essential for the precise performance of the activity similar to the workplace. Similarly, the Standards for Educational and Psychological Testing, indicated that PBAs "emulate the context or conditions in which the intended knowledge or skills are applied" [26]. To the proponents, PBA has a broad range of assessment types subsuming authentic, alternative and PBAs and these are interchangeable based on evidence of similar characteristics existing among them [27].

However, Frey and Schmitt (2007) argued to differentiate between authentic and PBA by noting that authentic assessment tasks ensure the presentation of the real world in its activity and interpretations while the PBA ascertains the degree of skill or ability. Kane, Crooks, and Cohen [16] said, "the close similarity between the performance that is assessed and the performance of interest is the defining characteristic of a PBA" (p. 4). This means, is just not the exact answer but any desired response that relates to the original requirement is acceptable and describes the assessment. To limit the argument, Kim, VanTassel-Baska, Bracken, Feng and Stambaugh [27] believed only the assessor has the capability of determining when a task is an authentic or PBA depending on the laid down criteria of authenticity that seem essential to the assessor.

## 3. FORMS OF PERFORMANCE-BASED ASSESSMENT

According to Yulia [25] in PBA, there are various ways tasks can be presented to attain appropriate responses from students. Nitko as cited in Kirmizi and Komec [24], however, outlined the modes by which PBA 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 assessment because the assessment procedures allow students to produce responses that are similar or exactly to how the 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 the following as stated by Taylor, Kokka, Darling-Hammond, Dieckmann, Pacheco, Sandler & Bae [28]:

1. **Paper and pencil tasks** such as solving a complex contextual mathematical problem, and drawing diagrams and graphs to illustrate a mathematical or scientific idea. As noted by Lane [16], 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 a rethinking of issues.

2. **Equipment and resource tasks** that require students to use materials to respond to given tasks. These include moulding or developing an object, taking a measurement of an object and carrying out hands-on activities 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 [19]. The tasks pose difficulty to the 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 the 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 a series of complex topics which aid them in accomplishing a specific but complex task [24]. Projects take days, weeks or months to be completed since students are required to do library research, reference, communicate through written reports on the 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 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 Yulia [25], a portfolio is a collection of evidence, gathered over time, which gives insight into the student's growth in understanding and skill development. Portfolio allows students to take responsibility for their learning with little input from a teacher so that they can make an evaluative conclusion about themselves. Every activity in a portfolio is an indicator of what the student knows and can 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 [24,19]. Demonstrations are mostly completed within a short time frame. Tasks possess evaluative criteria best known to the assessor and students. Examples include the 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**: An experiment is an "on-demands performance in which a student plans, conducts and interprets the results of an empirical research study" [22] 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 conclude an issue or phenomenon. An example of an experiment is an investigation of the brightness of bulbs in series and parallel connections in the laboratory. Another example given by the U.S. Department of Education [29] 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 [16] 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 [19]. However, in dramas, oral presentations 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 setting 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 [19]. An example is when a student is made to roleplay the practice of puberty rites among the Krobos in Ghana, and the assessor observes and questions the purpose of an activity in the event.

## 4. NATURE OF PBA

PBA assesses either the process or product or both [17]. 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 the process and the product [30]. An example of product performance is when students are asked to design a model and submit it. The teacher cannot assess how the student made the model but can only assess the final product the student has submitted. In the case of research project work, the supervisor assesses the student at every stage of the work and the final product as well. This is an example of process-product PBA. Stone and Lane further stated that PBA could be task-centered 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. Essay writing is task-centred performance-based since the various aspect such as expression and mechanical accuracy for that particular essay cannot be taught and made known to the students. PBA could also be construct–centred when the set of knowledge and skills to be assessed are valued in the instruction of the task. Research project work is a typical example of construct-centered PBA. The aspect of the work that would be assessed such as the statement of the problems, the purpose of the study, and the methodology are taught and made known to students.

Aside from being either task-centred or construct-centred, Stone and Lane [30] and Nitko [31,32] also stated that PBA could be an on-demand task or restricted responses task which requires students to create responses within a short period such as pencil and paper performance-based tasks. This is usually under supervision. PBA could also be an extended task that lasts for a longer time undertaken by students on an assigned topic like a thesis or project work.

## 5. CONCLUSION

PBA has the potential of reducing most of the challenges of traditional assessment. Even though PBA comes with its challenges such as subjective scoring, and differentiated assessment among others, there are different forms of PBA available to the teacher. Again, PBA 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 PBA to move students' knowledge from the classroom to the real world.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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