

Challenges and Opportunities in implementing performance-based assessment in science education: A study of under-resourced schools in Ghana.

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ABSTRACT

In contemporary education, performance-based assessment (PBA) is becoming an increasingly important instrument, particularly in science, where the capacity to apply theoretical knowledge in real-world situations is crucial. Nonetheless, there are many obstacles to overcome before performance-based assessment can be implemented in Ghana's underfunded schools. This paper examines these issues, including a lack of resources, a lack of preparedness among teachers, and time limits, while also looking at the benefits that performance-based assessment offers, such as encouraging critical thinking, raising student involvement, and advancing 21st-century skills. The paper provides suggestions for a more successful adoption of this strategy in Ghana's underfunded schools after reviewing the literature on performance-based assessment application in scientific education in underdeveloped nations.

KEYWORDS: 21st-century skills, critical thinking, performance-based assessment, science education, teacher preparedness, under-resourced schools.

1. INTRODUCTION

In science education, performance-based assessment (PBA) is acknowledged as an essential technique that gives students a chance to show their comprehension through real-world applications. In contrast to traditional assessment methods, which mostly concentrate on using exams to test knowledge, performance-based assessment places more emphasis on soft skills like problem-solving, critical thinking, and teamwork—all of which are essential for success in the twenty-first century. Nonetheless, Ghana presents specific difficulties in implementing performance-based assessment, especially in schools with little resources. The purpose of this essay is to look at these difficulties and investigate ways that performance-based assessment might be used in these kinds of schools.

2. LITERATURE REVIEW

In my review of the literature, I look at important studies that discuss the challenges and possibilities of introducing performance-based assessment (PBA) in schools with little resources, especially in Ghana. The examined literature describes how using PBA in science education is hampered by a lack of funding, inadequate teacher preparation, and a strong dependence on standardized testing. For example, research (Airasian, 2005; UNESCO, 2018) demonstrates that a shortage of laboratory equipment and packed classrooms are examples of resource limitations that restrict students' access to hands-on learning, which is a crucial part of PBA. These results offer a starting point for talking about the particular difficulties Ghanaian schools face.

I also look at case studies of other developing nations that have effectively implemented elements of PBA despite facing comparable obstacles. Adarkwa (2020) and Mueller (2012), for instance, provide examples of how, even in environments with limited resources, gradual teacher preparation and the introduction of practical evaluations have improved student learning outcomes. By combining these observations, my literature study highlights the gaps that currently exist while also illuminating possible solutions. This history provides context

for my paper's analysis and lays the groundwork for a more thorough examination of how Ghanaian schools might deal with the challenges of integrating PBA into science instruction.

2.1. Overview of Performance-Based Assessment in Science Education

Performance-based assessment is especially useful in science education since it enables teachers to evaluate their students' application of knowledge in practical settings. It incorporates activities like as group projects, presentations, and laboratory investigations in addition to standard tests and quizzes (Mueller, 2012). A dynamic assessment environment that fosters critical thinking and problem-solving with real-world scenarios is necessary for performance-based assessment.

2.2. Performance-Based Assessment in Developing Countries

Studies conducted on performance-based assessment in poor nations, such as Ghana, show that structural obstacles frequently make implementation challenging. There is a scarcity of teaching resources, lab equipment, and certified teachers in many schools. The transition to performance-based assessment is made more difficult by the conventional emphasis on standardized testing and rote learning (Adarkwa, 2020).

2.3 Challenges in Implementing PBA in Under-Resourced Schools

Insufficient Resources

Ghana's underfunded schools frequently lack the supplies needed to successfully adopt performance-based assessment. The lack of functionality or inadequate equipment in laboratories makes it challenging for students to participate in practical experiments. The degree to which performance-based assessment may be incorporated into the curriculum is greatly limited by these resource limitations; (UNESCO, 2018).

Teacher Preparedness

The majority of educators in schools with limited resources lack the necessary training to administer performance-based evaluations. They are more accustomed to more conventional forms of assessment, like standardized examinations and multiple-choice questionnaires. The difficulties in putting this cutting-edge evaluation strategy into practice are exacerbated by teachers' restricted usage of PBA due to their lack of training in it (Airasian, 2005; UNESCO, 2018).

Time Restrictions

Performance-based assessment development, implementation, and evaluation take a lot longer than they do for standard assessments. Many instructors in underfunded schools find it difficult to find the time to plan performance-based assessment activities and give personalized feedback because of their packed classrooms and heavy teaching loads (Mueller, 2012).

2.4 Performance - based assessment's Available Opportunities

Notwithstanding the difficulties, performance-based assessment presents a number of chances to improve scientific instruction in schools with limited funding. They include;

Fostering Critical Thinking

Performance-based assessment challenges students to use their critical thinking skills and knowledge to solve practical situations. This is especially significant for science education, since comprehending how scientific principles are applied is just as vital as learning the principles themselves (Adarkwa, 2020; Airasian, 2005).

Increasing Student Engagement

Studies have indicated that when students actively participate in their education, they tend to be more engaged. Performance-based assessment increases student motivation and creates a more engaging learning environment by integrating students in real-world experiments and projects (Mueller, 2012).

Developing 21st-Century Skills

Performance-based assessment is in line with the trend in education toward cultivating 21st-century abilities including communication, teamwork, and creativity. Performance - based assessment is a useful tool for preparing students for the future because these abilities are necessary for their success in both academic and professional settings (UNESCO, 2018).

3. METHODOLOGY

The foundation of this work is a study of the literature on performance-based assessment in science teaching and learning, with a focus on underfunded schools. Peer-reviewed journal articles, official reports, and case studies from developing nations are examples of primary sources. In order to identify common obstacles and opportunities in performance-based assessment implementation in such situations, the technique focuses on examining these studies.

4. RESULTS AND DISCUSSION

4.1. Pedagogical Shift and Teacher Readiness

Many teachers in schools with limited resources are ill-prepared for the fundamental shift in pedagogy that comes with switching from traditional evaluations to performance-based assessment. Although some educators show enthusiasm in implementing performance-based assessment, they frequently lack the support and resources needed to do so successfully. Teachers are likely to stick with traditional assessments if they do not have institutional support and receive continual professional development (Airasian, 2005; UNESCO, 2018).

4.2. Difficulties with Funding and Institutional Support

Ghana has a large number of schools that lack the resources and facilities necessary to support performance-based assessment, especially in rural areas. For schools with limited resources, the expense of setting up science labs, buying supplies, and educating teachers might be prohibitive. Furthermore, standardized testing continues to be the main means of evaluating students, with little institutional focus placed on PBA (Adarkwa, 2020; Mueller, 2012).

4.3. Learning Outcomes and Student Engagement

Notwithstanding these difficulties, performance-based assessment can result in better learning results and student engagement when used properly. According to studies, children in performance-based assessment situations exhibit more creativity, critical thinking, and problem-solving skills than their counterparts in standard assessment settings (UNESCO, 2018). Additionally, these students have improved their ability to apply their information in real-world settings, which is crucial for success in science classes.

5. CONCLUSION AND RECOMMENDATIONS

Putting performance-based assessment into practice in Ghana's underfunded schools is fraught with dangers as well as opportunity. The possible advantages of performance-based assessment, such as encouraging critical thinking and preparing students for 21st-century issues, make it a worthy attempt, even though there are significant obstacles, including a lack of resources, teacher preparation, and time constraints. Teachers, legislators, and donors must work together to address these issues and make sure that schools with limited resources have the resources and assistance they need to successfully adopt performance-based assessment.

To provide instructors with performance-based assessment methods training, ongoing professional development programs must to be set up. Funding for providing schools with the tools they need to implement performance-based assessment should be given top priority by the government and non-governmental organizations. With an emphasis on science education, educational policy ought to encourage the inclusion of performance-based assessment in the national curriculum.

REFERENCES

1. Adarkwa, F. (2020). *Challenges and opportunities in science education in Ghana*. Kwame Nkrumah University of Science and Technology.
2. Airasian, P. (2005). *Classroom assessment: Concepts and applications*. McGraw-Hill.
3. Andrade, H. L., & Valtcheva, A. (2009). Promoting learning and achievement through self-assessment. *Theory Into Practice*, 48(1), 12–19. <https://doi.org/10.1080/00405840802577544>
4. Black, P., & William, D. (1998). Assessment and classroom learning. *Assessment in Education: Principles, Policy & Practice*, 5(1), 7–74. <https://doi.org/10.1080/0969595980050102>
5. Darling-Hammond, L., & Adamson, F. (Eds.). (2014). *Beyond the bubble test: How performance assessments support 21st century learning*. Jossey-Bass.
6. Gipps, C. V. (1994). *Beyond testing: Towards a theory of educational assessment*. Falmer Press.
7. Gulikers, J. T. M., Bastiaens, T. J., & Kirschner, P. A. (2004). A five-dimensional framework for authentic assessment. *Educational Technology Research and Development*, 52(3), 67–86. <https://doi.org/10.1007/BF02504676>

8. Kanjee, A., & Sayed, Y. (2013). Assessment policy in post-apartheid South Africa: Challenges for improving education quality and learning. *Assessment in Education: Principles, Policy & Practice*, 20(4), 442–469. <https://doi.org/10.1080/0969594X.2013.838541>
9. Kizlik, B. (2012). *Measurement, assessment, and evaluation in education*. Educational Psychology Interactive. Valdosta State University.
10. Linn, R. L., & Miller, M. D. (2005). *Measurement and assessment in teaching* (9th ed.). Pearson Education.
11. Mosier, G., & Fisk, P. (2013). Shifting the focus: The impact of PBA on high school science education. *Science Educator*, 22(1), 25–32.
12. Pellegrino, J. W., Chudowsky, N., & Glaser, R. (2001). *Knowing what students know: The science and design of educational assessment*. National Academies Press.
13. Popham, W. J. (2010). *Classroom assessment: What teachers need to know* (6th ed.). Pearson.
14. Shepard, L. A. (2000). The role of assessment in a learning culture. *Educational Researcher*, 29(7), 4–14. <https://doi.org/10.3102/0013189X029007004>
15. Shute, V. J., & Becker, B. J. (2010). *Innovative assessment for the 21st century: Supporting educational needs*. Springer Science & Business Media.
16. Stiggins, R. J. (2008). *Assessment manifesto: A call for the development of balanced assessment systems*. ETS Assessment Training Institute.
17. Stobart, G. (2008). *Testing times: The uses and abuses of assessment*. Routledge.
18. Struyven, K., Dochy, F., & Janssens, S. (2005). Students' perceptions about evaluation and assessment in higher education: A review. *Assessment & Evaluation in Higher Education*, 30(4), 325–341. <https://doi.org/10.1080/02602930500099102>
19. Torrance, H. (2007). Assessment as learning? How the use of explicit learning objectives, assessment criteria, and feedback in post-secondary education and training can come to dominate learning. *Assessment in Education: Principles, Policy & Practice*, 14(3), 281–294. <https://doi.org/10.1080/09695940701591867>
20. UNESCO. (2018). *Transforming education: The role of PBA in developing countries*. United Nations Educational, Scientific, and Cultural Organization.
21. Van den Akker, J., & Voogt, J. (1994). Assessment of the quality of curriculum materials in developing countries: A case from South Africa. *Journal of Curriculum Studies*, 26(2), 167–182. <https://doi.org/10.1080/0022027940260203>
22. Volante, L., & Fazio, X. (2007). Exploring teacher candidates' assessment literacy: Implications for teacher education reform and professional development. *Canadian Journal of Education*, 30(3), 749–770.
23. Wiggins, G. P. (1998). *Educative assessment: Designing assessments to inform and improve student performance*. Jossey-Bass.
24. Wolf, D. P., Bixby, J., Glenn, J., & Gardner, H. (1991). To use their minds well: Investigating new forms of student assessment. *Review of Research in Education*, 17, 31–74. <https://doi.org/10.3102/0091732X017001031>