

PORTFOLIO ASSESSMENT PRACTICE AMONG SCIENCE TEACHERS IN OSUN STATE SECONDARY SCHOOLS

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Abstract

The study was carried out to evaluate portfolio assessment practice among science teachers in secondary schools in Ife Central local Government area (LGA) of Osun state with focus on their level of awareness and perception. The study adopted descriptive survey research design with a population that comprised all the science teachers in secondary schools in Ife central LGA of Osun State. The study sample comprised of hundred science teachers purposively selected from 20 secondary schools. An instrument titled Questionnaire on Awareness and Perception of Portfolio Assessment (QAPPA) with internal consistency reliability coefficient of 0.96 was used for data collection. The findings indicated that awareness of portfolio assessment was low (54, 58.7%) and that most of the science teachers have a positive perception on the use of portfolio assessment in evaluating secondary schools students (59, 64.1%). Finally, the result showed that there is no significant difference in the perception of science teachers as regards the use of portfolio assessment in evaluating students in public and private secondary schools in Ife central local government ($t_{90} = 0.074$, $p > 0.941$; across the science subject taught $F(5,86) = .843$, $P\text{-value} = 0.523$). Also, there is no significant difference in the extent to which male and female teachers use portfolio assessment in evaluating students in senior secondary schools. ($t_{90} = 0.074$, $p > 0.941$). It was recommended among others that there is need to increase awareness about portfolio assessment and subsequent uses as an alternative means of assessments approaches especially among science teachers in secondary schools through short-term course, workshops, symposia and seminars.

Keywords: Evaluation, Portfolio, Assessment, Science Teachers

Introduction

Assessment is the systematic process of gathering information from many sources (test, homework, classwork, presentation and mini project) to make appropriate educational decisions. It identifies the student's strengths and weaknesses and contributes to the design and implementation of effective strategies. Classroom teachers are in a position to offer an abundance of information regarding students in their classrooms. Informal assessments should form the basis of a comprehensive profile of student's strengths and challenges. Nevertheless, assessment is the bridge between teachings and learning process in the classroom. This shows that assessment is the central process in effective instruction. The information gathered can be used by teachers to adjust their teaching strategies, and by students to adjust their learning strategies. Hence, assessment is beneficial to both teachers and students. Onuka and Oludipe (2006) viewed assessment as the effective tools of promoting students' performance. Also, Ojenewu (2006) as cited in Ikekwaba, Unamba and Ikeanumba (2016) defined assessment to include all processes and products which describe the nature and extent of learning; it is the degree of correspondence with the aim and objectives of teaching its relationship with environment which are designed to facilitate schooling and learning.

Assessment can be categorized into two basic types which are summative and formative. However, there are different forms of assessment which are traditional assessment, performance assessment, alternative or authentic assessment and portfolio assessment. The latter is a viable tool used in measuring students' performance. Therefore, portfolio assessment is considered as a necessity in teaching and learning and this has been emphasized by many researchers.

Venn (2000) defined student portfolio as a systematic collection of student's work and related material that depicts a student's activities, accomplishments, and achievements in one or more school subjects. The collection should include evidence of student's reflection and self-evaluation, guidelines for selecting the portfolio contents, and criteria for judging the quality of the work. According to Meng Kay Ling (2016), Portfolios is the collection of an individual's work in a purposefully regular manner. He further noted that in the education context, academic portfolios refer specifically to the consolidated works of the students. Therefore, the use of academic portfolios serves the important function of allowing students to showcase their best works and to demonstrate what they actually know of the subject. Harlin, Lipa and Phelps (1992), view portfolio assessment as a multidimensional system which provides teachers with a complete picture of student's abilities and literacy development.

According to Valeri-Gold, Olson and Deming (1991) portfolios are alternative assessment tools by which students become active learners and question thinkers. Richards and Renandya (2002) argue that a typical portfolio contains the students' total writing output to represent his or her overall performance or students' work from the beginning of the term to the end, giving both the teacher and student a chance to assess how much the latter's performance has progressed. The definitions cited above are explained from different perspectives, but they all have common points in respect of their effectiveness. The goal of portfolio is to help students assemble portfolios that illustrate their talents, represent their writing capabilities, and tell their stories of school achievement. In other words, student's portfolios involve collection of evidence prepared by the student and evaluated by the teacher to demonstrate mastery, comprehension, application, and synthesis of a given set of concepts. Portfolio assessment helps students in numbers of ways; its educational value cannot be over emphasized as it promotes of students centered learning; enhances collaboration among students as well as students-teacher interaction. The potential of portfolios to drive student learning in an educationally desirable direction and the importance of identifying individual strengths and weaknesses is a major nucleus of the application of portfolio assessment in teaching and learning environment. This helps to enhance the overall performance of the students.

Yeggm (2011) asserts that some educators consider portfolio as an alternative assessment tool which includes students' achievement records and assignments, while other educators consider the portfolio as a document of students' learning process in terms of promoting learner reflection. However, Sayed (2009) pointed out that portfolios are considered a good alternative to traditional forms of assessment because they incorporate the perspective of students and teachers about learning and assessment. Another significance of a portfolio is that unlike the traditional synoptic evaluations, such as the final exam or any standardized test that happens once, portfolios provide a longitudinal observation of student progress as they show incremental gains in knowledge, skills, and proficiencies (Herrera, Murry, & Cabral, 2007). Portfolios are also authentic because they are driven by classroom activities. In most cases, they reflect in-process adaptations to instructional methods and assessment, and they assess learning which motivates students (Herrera et. al. 2007). Schools, including colleges and universities, are relying much on traditional paper-and-pencil tests which cannot help to develop creative skills. However, one of the best innovative strategy towards enhancing manipulative skills among the students is by adopting portfolio assessment in teaching and learning of science oriented subjects.

Portfolios can be employed at all levels of education: primary schools, secondary schools, tertiary education and in professional and vocational programmes. However, the level of education in which portfolio assessment strategies will be employed could largely depends on the type of portfolio to be adopted. Therefore, Maree and Fraser (2004) identifies different types of portfolios, each fulfilling a different purpose along continuum of formative, diagnostic and summative assessment. However, the educator will decide on the kind of portfolio or the combination of portfolio types that will be utilized depending on the purpose, the outcomes to be achieved and the education situation.

According to various authors such as Barrett and Wilkerson (2004), Beattie (1994), Pole (1998), Salend (1998), Seely (1994), and Wilcox (1997), there are several types of portfolios. These include: (a) showcase portfolio; (b) cumulative portfolio; (c) documentation portfolio; (d) goal-based portfolio; (e) process portfolio; (f) active portfolio; (g) reflective portfolio; (h) passive portfolio; (i) evaluation portfolio; (j) electronic portfolio / ePortfolio; and (k) mini-portfolio. While some portfolios vary greatly in content and purpose, others are similar in characteristics. The showcase portfolio exclusively contains examples of a student's best work (Poel, 1998; Salend, 1998; Seeley, 1994). The cumulative portfolio contains a collection of items gathered over an extended period of time, with each item analyzed to verify the changes in the products and process associated with student learning (Salend, 1998). The documentation portfolio documents a student's steps and progress over time Seeley (1994), the goal-based portfolio demonstrates student progress toward specific goals (Salend, 1998) while the process portfolio shows the steps and course of action the student used for each portfolio item (Seeley, 1998; Poel, 1998).

Furthermore, the active portfolio is similar to the process portfolio, containing diverse artifacts that are assessed in a variety of ways by different evaluators. The reflective portfolio emphasizes the reflections of students, teachers, and parents on the learning process (Salend, 1998) while the passive portfolio is similar to a reflective portfolio containing samples of student work (Wilcox, 1997). The evaluation portfolio focuses on predetermined tasks proposed by the state or local districts (Poel, 1998). Electronic portfolios, also known as ePortfolios, have grown in popularity and can adapt to meet the requirements of paper portfolios while incorporating the use of technology (Barrett & Wilkerson, 2004). The mini portfolio is primarily used by students to exhibit their art work along with an explanation of the conceptually developmental process of the piece (Beattie, 1994). The active, process, and goal-based portfolios can generate new ideas and promote academic growth as the student and teacher work on the portfolio items (Wilcox, 1997). Passive, showcase, and reflective portfolios cannot be changed. Thus, its creator, the student, may not learn new information from the portfolio entries (Wilcox, 1997).

The emerging society demands for outcome based assessment that is borne out of creativity with problem solving skills, critical thinking, analysing data and presenting them orally and written format. Ikekwaba et.al. (2016) pointed out that the society which requests new trends in educational development must improve towards a more powerful learning environment. They further asserted that for this reason, alternative form of assessment approaches are needed in assessing both learning process and learning outcomes. Even the National Research Council (NRC, 1996) as cited in Ikekwaba et.al. (2016), published the standards for school mathematics (NCTM 2002) which also call for the use of multiple and complex assessment tools including written, oral and demonstration format and recommended that assessment should contribute to students learning. This implies that assessment technique should focus on what the students know as well as what they do not know. However, this recommendation can be achieved through alternative assessment measuring student's performance and developments in learning process through the use of portfolio.

Portfolio as a form of assessment has proven to be useful for assessing student's learning in different disciplines (Knight, 1992; Johns & Van Leirsburg, 1993; Kathy & Laura, 1999 etc.) and at different levels (Hall & Gervais, 2000). Many practical problems related to the use of portfolio as an assessment tool has not only been identified but addressed and overcome through familiarity and increased use of

portfolios for assessment (Johns & Van Leirsburg, 1992). However, the use of portfolio as an assessment tool has a range of benefits for teachers to better understand their teaching practices and as a result they can better facilitate their students teaching (Knight, 1992). The benefits of keeping a portfolio as an alternative assessment in educational practices are immeasurable. The fact that keeping a portfolio fosters learner autonomy and increases motivation of the students is one of the most significant features of portfolio assessment. According to Banfi (2003), the flexibility of portfolios is considered to make them ideal as tools for encouraging learner autonomy. With the use of portfolios, students become fully engaged in the learning process, which promotes learner autonomy and increases motivation. The students become active in learning since they produce their own works and follow the activities which are necessary for keeping a portfolio.

Having examining portfolio assessment and its benefit in educational practice, it is pertinent to look at how it can be implemented. Ikekwaba et.al. (2016) pointed out that effective use of the portfolio as a learning assessment tools depends on the knowledge and experience of teachers who apply them on a large scale. However, some of the problems faced by teachers in implementing portfolio assessment may include the following; lack of knowledge and deep understanding of teachers in implementing student portfolio assessment; poor attention and cooperation of students in creating the portfolios; lack of materials and budgets to support teachers in implementing student portfolio assessment; lack of information on scoring criteria; lack of rater that are trained when making decision on portfolio evaluation; lack of skill to develop rubric in assessing students portfolio and the intensity of the curriculum might make it difficult to implement portfolio assessment among others.

In spite of long-time historical use of portfolio assessment in developed countries and given it widespread usage in teaching and learning, its reported benefits by researchers, conducting a research study to scrutinize its implementation and contributions to teachers' professional development and students' learning will add valuable to educational practices. Furthermore, from informal discussions, the researcher had with teachers in schools, teachers seem not to have much information regarding portfolio as another form of alternative assessment practice. In addition, it was observed that some teachers see it as something coming from an external body to the school rather than considering it as a tool instrumental to their professional development and their students learning. However, there is a deficiency of evidence that shows the perception and implementation as well as constraints to the use of portfolio assessment among science teachers in Osun state, hence this study.

Objectives of the Study

The following objectives are to:

- (a) determine science teachers' portfolio assessment awareness in secondary schools in Ife central LGA of Osun state.
- (b) determine science teachers' perception of the use of portfolio assessment in secondary schools in the study area.

Research Questions

1. To what extent are science teachers in secondary schools aware of portfolio assessment?
2. How do the science teachers perceive the use of portfolio assessment in evaluating secondary schools students?

Research hypotheses

- (i) there is no significant difference in the perception of science teachers as regards the use of portfolio assessment in evaluating students in public and private secondary schools.
- (ii) there is no significant difference in the perception of science teachers as regards the use of portfolio assessment in evaluating students across the science subject taught.

(iii) there is no significant gender difference in the extent to which male and female teachers use portfolio assessment in evaluating students in senior secondary schools in Ife central LGA of Osun state.

Methodology

The study adopted the descriptive survey research design. The study population comprised science teachers in secondary schools in Ife central LGA of Osun State. The study sample comprised of 100 science teachers. The science teachers were purposively selected from 20 secondary schools and used for the study. An instrument developed by the researchers titled “Questionnaire on Perception and Implementation of Portfolio Assessment (QPIPA)” was used to collect data from the respondents. The instrument was divided into two sections A and B. Section A contained items on demographic information such as school type, subject taught, sex, years of teaching experience. Section B contained number of items scored on a 5 point likert scale to measure science teacher perception and implementation of portfolio assessment (QPIPA). The QPIPA was reviewed by research experts in Tests and Measurement to ensure face and content validity of the instrument. The internal consistency reliability of the instrument was ascertained using Cronbach Alpha with a 0.96 coefficient. The data collected were analyzed using frequency counts, percentage,

Results

Research question one: To what extent are science teachers in secondary schools aware of portfolio assessment?

Table 1: Extent of science teacher’s awareness of portfolio assessment

Extent of awareness	Frequency	%
Low extent	54	58.7
High extent	38	41.3

In Table 1, the results indicated that the extent of science teachers’ awareness of portfolio assessment is low (54, 58.7%). However, 38(41.3%) of the teachers are highly aware of portfolio assessment. Hence, it can be concluded that the extent of science teachers’ awareness of portfolio assessment is low.

Research question two: How do the science teachers perceive the use of portfolio assessment in evaluating secondary schools students?

Table 2: Science teachers’ perception on the use of portfolio assessment in evaluating secondary school students

Perception	Frequency	%
Negative	33	35.9
Positive	59	64.1

The results as presented in Table 2 shows that most of the science teachers have a positive perception on the use of portfolio assessment in evaluating secondary schools students (59, 64.1%). However, 33(35.9%) of the teachers have a negative perception on the use of portfolio assessment in evaluating their students. Hence, it can be concluded that the science teachers have a positive perception on the use of portfolio assessment in evaluating secondary schools students.

Research hypothesis one: There is no significant difference in the perception of science teachers as regards the use of portfolio assessment in evaluating students in public and private secondary schools

Table 3: t-test showing difference in the perception of science teachers as regards the use of portfolio assessment in evaluating students in public and private secondary schools.

School type	N	Mean	Std. Deviation	t-value	df	p-value
Public	48	30.0208	9.37967	0.074	90	0.941
Private	44	29.8864	7.96859			

Given the t-value of 0.074, p-value > 0.941, the results in Table 3 indicated that there is no significant difference in the perception of science teachers as regards the use of portfolio assessment in evaluating students in public and private secondary schools.

Research hypothesis two: There is no significant difference in the perception of science teachers as regards the use of portfolio assessment in evaluating students across the science subject taught.

Table 4: Subject taught by science students

Subject taught	Frequency	%
Mathematics	21	22.8
Biology	17	18.5
Agricultural science	9	9.8
Chemistry	19	20.7
Computer science	14	15.2
Physics	12	13

Most of the science teachers used for the study taught Mathematics (21, 22.8%) while 17 (18.5%) taught Biology, 9 (9.8%) of the science teachers taught Agricultural science. However, 20.7% (19) of the respondents taught Chemistry, 14 (15.2%) taught Computer science while 12 (13%) taught Physics. The subjects was further used as grouping variable to determine whether a significant difference exists using ANOVA and the results presented in Table 5.

Table 5: ANOVA showing difference in the perception of science teachers as regards the use of portfolio assessment in evaluating students across the science subject taught

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	320.846	5	64.169	.843	.523
Within Groups	6544.980	86	76.104		
Total	6865.826	91			

Given the F-value of 0.843 and P-value of 0.523, the results in Table 5 shows that there is no significant difference in the perception of science teachers as regards the use of portfolio assessment in evaluating students across the science subject taught. Hence, the null hypothesis was accepted and it was therefore concluded that there is no significant difference in the perception of science teachers as regards the use of portfolio assessment in evaluating students across the science subject taught.

Research hypothesis three: There is no significant gender difference in the extent to which male and female teachers use portfolio assessment in evaluating students in senior secondary schools in Ife central LGA of Osun state.

Table 6: t-test showing gender difference in the extent to which male and female teachers use portfolio assessment in evaluating students in senior secondary schools in Ife central LGA of Osun state

Sex	N	Mean	Std. Deviation	t-value	df	p-value
Male	48	30.4375	8.42970	0.553	90	0.582
Female	44	29.4318	9.02554			

Given the t-value of 0.074, p-value > 0.941, the results in Table 6 indicated that there is no significant difference in the perception of science teachers as regards the use of portfolio assessment in evaluating students in public and private secondary schools.

Discussion of Findings

The research finding shows that the awareness of portfolio assessment among science teachers is low. As majority of the respondent indicated that they are not aware of portfolio assessment for students, this shows that teachers in senior secondary school in Ife central Local Government are not familiar with the use of portfolio in assessing students. The finding also revealed that most of the science teachers have a positive perception on the use of portfolio assessment in evaluating secondary schools students, however, this is in tandem with the work of Hall and Hewitt-Gervais's (2000), where teachers were surveyed regarding their perceptions of developing portfolios. The results showed that most teachers perceived the value of portfolios for enhancing communication, showing student growth over time, and promoting students' motivation and efforts.

Furthermore, that there is no significant difference in the perception of science teachers as regards the use of portfolio assessment in evaluating students in public and private secondary schools this implies that science teacher are not aware of the use portfolio assessment in private and public secondary schools in Ife central local government. And also the results indicated that there is no significant difference in the perception of science teachers as regards the use of portfolio assessment in evaluating students across the science subject taught. Finally, the result indicated there is no significant difference in the extent to which male and female teachers use portfolio assessment in evaluating students in senior secondary schools.

Conclusion

It is important to consider the implication of portfolios as a new assessment method in the secondary school curriculum, findings from the result clearly shows that portfolio as an alternative way of assessment has not being used by many teachers. However, awareness of portfolio assessment for students among the teacher was very low.

Recommendations

Based on the research findings, the following recommendations were made:

1. There is need for stakeholders in education to increase awareness about portfolio assessment as an alternative means of assessment approaches among science teachers in secondary schools.
2. There is need to increase the knowledge of classroom assessment within science teachers in secondary schools, short-term course, workshops, symposia and seminars should be conducted and supported.
3. Classroom assessment should involve the use of multiple assessment mode and the classroom teachers should ensure that assessment is used to enhance learning. Hence there should be a paradigm shift from assessment of learning to assessment for learning.

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