

Discourse on the
**PROVISION OF QUALITY
MANAGEMENT OF EDUCATION:
THE ROLE OF SCHOOL PERSONNEL**

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Chapter Nine



THE ROLE OF SCHOOL PERSONNEL IN QUALITY PROVISION AND SAFETY MANAGEMENT OF SCIENCE LABORATORY FACILITIES

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Abstract

This study investigated the role of school personnel in quality provision and safety management of science laboratory facilities. From the population of 184 school personnel, a sample of 84 (school principals (16), science teachers (52) and laboratory assistants (16) in 12 public secondary schools in Eket Local Education Authority attending the 2016/2017 science teachers' training workshop on the use of science kits in Akwa Ibom State were selected using simple random sampling technique. Survey research design was employed for the study. Instrument for data collection was a Questionnaire on Quality Provision and Safety management of Science laboratory Facilities. Face and content validity of the instrument was established by two laboratory technologists, an experienced science teacher and two test and measurement lecturers in science education department, University of Uyo. Instrument reliability was established using Cronbach Alpha test of internal consistency of .83. Research questions were answered using mean and standard deviation. Findings from the study show that the extent of quality provision and safety management of science laboratory facilities is low. The study, therefore, recommended among others, that school personnel should attend short-term courses to update knowledge on procurement of quality science laboratory facilities. It also made further recommendation on how to manage science facilities for teaching effectiveness.

Keywords: School Personnel, Quality Provision, Safety Management, Science, Laboratory Facilities, Science Laboratory Facilities

Introduction

New science developments are constantly emerging with new standards. Only those linked to such opportunities are determined to stay at the cutting edge of science knowledge explosion. This unlocks understanding and transforms the way school personnel teach and think. This also helps in preparing students for investigations in a wide variety of science courses. School personnel have to make science teaching work to keep students learning and doing things that challenge their curiosity and intellect. Science teaching and learning can only be result-oriented when school personnel find new and exciting ways to acquire and improve knowledge as they adopt ideas and apply initiatives to work to achieve results. Realizing educational goals involves the provision, utilization and proper management of science laboratory facilities to improve the quality of teaching. There is therefore, need for quality provision and safety management of science laboratory facilities by school personnel.

Adebisi (2017) posits that when school personnel and learners see the need to apply

appropriate science facilities and safety management, they are able to explore different avenues and devices to meet current needs in science. Good facilities and their safety management ensure quality education. Science laboratory facilities are materials designed to serve specific purposes. They include flexible electrical connections, reagent bottles for storing solutions, fume cupboards and hoods. laboratory boots and coats, apparatus, glass and protective equipment, tap for running water, gas for burners and air hoses. Good educational foundation cannot be laid without necessary provision of quality science facilities and their safety management. Hence, the need for school personnel to be involved to extend the frontiers of knowledge for global competitiveness on science.

Science is inquiry and students should learn it in very interesting ways with appropriate science laboratory facilities. This is to provide learners with required skills, scientific literacy, attitudes and abilities to continue with expertise in real world situations and the world of work. Experimentation is very vital for the growth of science and it is impossible to teach science without practical facilities in a conducive environment. With this knowledge, learners are able to accomplish lifelong ambitions even in the face of unemployment. Science laboratory facilities build knowledge and expertise of school personnel for laboratory teaching and this provides ongoing teacher and student collaboration, reflection and improvement of instruction. A major goal of education is to prepare students to be flexible for new problems, settings and occurrences (FRN, 2014). When science facilities are in place, learners performance are improved and they are able to transfer and apply proficiency to real life situations.

The objectives of science education cannot be achieved without quality provision of facilities and safety management to blend practical knowledge with theoretical knowledge in any field of science specialization. According to Audu, Rufai, and Idris (2014) good quality and standard institution of learning depend largely on the provision, adequacy, utilization and management of science facilities. This makes teaching and learning less rigorous and interesting. Quality provision and safety management of science laboratory facilities by school personnel is therefore, an important function concerned with obtaining, developing and motivating staff and students to achieve laid down academic objectives. It is an integral part of the overall management of the school as it satisfies the physical and emotional needs of the staff and students of the school (Asiabaka, 2008). School Personnel have an important and significant contribution to make towards quality provision and safety management of science laboratory facilities to prepare students and support science practical work in diverse ways. This stimulates students' interest and drives their curiosity towards the learning of science.

Role of School Personnel

School personnel may be defined as a group of people employed in a school system to carry out basic functions by providing quality education in terms of intellectual, emotional and physical outcomes. There are many schools of thought on school

personnel. For instance, Hiler (2016) define school personnel as those that promote and advance quality education through cooperative effort of public school administration and maximize the use of facilities and data for continuous educational improvement. Jegede (2017) sees school personnel as persons employed in official capacity for the purpose of giving instruction whether public or private. They include school administrators, supervisors, classroom teachers and the librarian. School personnel play other functional roles in quality provision and safety management of science laboratory facilities such as managing, planning and supervising laboratory activities; ordering, assembling, receiving and distributing lab supplies to faculty and strict adherence to maintenance of safety procedures. These roles are to improve students' learning outcomes. For science education to be effective and sustainable, school personnel need broad-based understanding in science and have to work hand-in-hand to achieve science objectives. Achieving these objectives makes students inculcate science knowledge and see the course as less abstract.

Quality Provision of Science Laboratory Facilities and school personnel

Quality is concerned with how well or bad a process or product is. It infers a degree of excellence, a distinguishing attribute, and a peculiar standard when compared to other things. Jaiyeoba and Atanda (2005) posit that quality is synonymous with standard, efficiency, excellence, relevance and worthiness. When applied to provision of science facilities in education; it is the success with which school personnel provide laboratory facilities to enable students achieve learning goals, objectives, including appropriate academic standard. Aigboje (2007) also refers to quality provision as the excellence of societal values embodied in school curricula. This involves laboratory experiments that learners engage in until terminal examination certificates are issued.

School Personnel and Safety Management of Science Laboratory facilities

Safety management of science laboratory facilities is sine qua non to effective laboratory activities. The actualization of the goals and objectives of education requires appropriate management of science laboratory facilities. Safety management consists of anticipating the possibility of and consequences of accidents. It is important therefore, for school personnel to know in advance what actions to take in the event of accident occurrence. Knowing in advance what actions to take if an accident should occur is already a measure of safety. Accidents may occur as a result of negligence, inability to adhere to instructions, lack of close supervision, inability of how to appropriately manipulate an object and proper use of equipment by school personnel. There are guidelines and rules that school personnel must take into consideration so that hazards associated with materials handled can be avoided. These rules should be typed, enlarged and pasted at strategic locations for teachers, students, researchers and other users of the laboratory to see. These hazards are cut from sharp objects, shock from high voltage/electrical objects, burns from explosions and fire, suffocation from poisonous gases, dizziness while inhaling obnoxious fumes. However, no set of

rules is of any value unless they are fully understood and measures taken. School personnel must be concerned and recognize the effect of these so as to design appropriate safety measures for students/teachers protection. These are some necessary guidelines and regulations to follow to maintain safety. It is therefore, in the interest of school personnel to train themselves on safety management of science laboratory facilities to ensure safety management consciousness at all times and safeguard students and teachers.

Unfortunately in Nigeria, most school personnel lack knowledge of maintenance culture and are unable to make necessary reports for repairs. Some do not recognize when equipment starts aging to preserve such laboratory facilities. According to Abiama (2012) school personnel lack knowledge of safety management planning. Consequently, these staff fail to integrate facility maintenance into the management of the school. This affects the day-to-day teaching of science practical activities in the school. In other instances, some school personnel do not understand the importance of practical activities so they pay laissez-faire attitude to safety management of science laboratory facilities. The ultimate result is that students are not exposed to practical work, hence students cannot acquire appropriate science skills. These products come out of school ill-equipped to face the world of work. They also do not do well in their tests, assignments and examinations on practical work, neither can they practice on their own during free periods and when out of school.

Funding for science laboratory facilities and School Personnel

Funding is at the heart of research and practical work in schools. Funding is very important and is required for procuring physical and chemical facilities for practical activities in the laboratory. Investment in quality provision of science laboratory facilities enables students acquire pre-requisite skills needed for science and technology advancement in today's knowledge-driven world. For effective teaching and learning, the need for training and retraining, necessary funding for purchase of quality facilities and safety management cannot be underestimated. Funding must be enough to buy durable and lasting facilities. Obi (2010) observed that education system consume significant financial resources especially in equipping science laboratories. School personnel, particularly principals should give priority attention to this. Funding may come through different sources like grants, diaspora elites, public subsidies, private donations through school PTA fund raising events, volunteer support, community support, science project sales, government counterpart contribution, private/public partnership, donations from companies/industries/individuals and international aid agencies. These sources could be mobilized by school personnel to fund quality facilities and safety management of science laboratories.

Obiweluzor, Momoh and Ogbonnaya (2014) and Koroye (2016) maintain that the quality of education children receive bears direct relevance to quality provision of

lack thereof of science facilities and overall atmosphere in which learning takes place. Facilities are to be presented and used for students to apply the processes of science and solve real problems from their own experiences. Facilities build skills, competence and ensure a high level of quality for expert use of science activities.

The National Policy on Education (FRN, 2013) stipulated the goals and objectives of teaching and learning science to include among others; observing and exploring the environment; developing basic skills like manipulating, classifying, inferring and hypothesis, explaining simple phenomena; developing scientific attitudes of curiosity, self-reliance and confidence through problem-solving activities and applying skills and knowledge gained through science to solve everyday problems; the development of intellectual capability of the individual to understand science and use of science facilities; to acquire scientific skills that enable individuals to be confident and self-reliant and contribute meaningfully to the society.

These objectives involve herculean tasks that may not be achieved without the quality provision and safety management of science laboratory facilities. Katcha and Wushishi (2015) posit that students exposed to relevant and adequate laboratory facilities are opportuned to participate and interact actively in the practical, engage in knowledge construction and acquire skills, scientific attitudes and competency. As such students exposed to adequately equipped laboratory would develop a higher positive attitude change as compared to those students that are exposed to inadequately equipped laboratory. For science education therefore, to be sustained, school personnel must have broad understanding of quality provision and safety management of science laboratory facilities and work hand-in-hand with other stakeholders of education to improve students' scientific skills. Their support, knowledge, and collaboration play major roles in actualizing school objectives for teaching and learning science. This to a large extent will improve teaching quality and academic achievement of students.

Unfortunately in most Nigerian schools, school personnel made up of principals, science teachers and laboratory assistants are unable to teach because they have the challenge of obtaining and assembling laboratory supplies. Abramson (2004) posits that laboratory facilities necessary to safely conduct a variety of laboratory experiment is not available in most science laboratories. Where they do, school personnel lack access to electric outlets, running taps and gas for burners. Lack of adequate supplies and access to these supplies have had severe effects on science teaching and learning. Some concepts in science are abstract and require experimentation for its understanding. Hardly are these concepts effectively taught because school personnel do not provide laboratory facilities for students' experiments. This does not help students to initiate projects that inspire learning. According to Asiyai (2012) the role school personnel play in providing quality equipment and ensuring their safety management have a strong effect on academic performance of students. The absence of these dwindles interest in science teaching and learning as students can only see to believe. Unemployment has been the bane of Nigerian students and graduates because they did not carry out a lot of practical activities that would have inculcated skills and knowledge in them for self-

reliance. This is so because school personnel did not provide science laboratory facilities that would have effectively exposed them.

In spite of available funding to purchase science facilities and safely manage them, school personnel are unable to meet the need of quality provision and safety. For instance, they do not think outside the box to meet donor agencies that are willing to sponsor the purchase of laboratory facilities and safely manage them. Some school personnel do not understand the importance of practical activities so they pay laissez-faire attitude towards funding and safety management of laboratory facilities. According to Etiubon (2011) many laudable projects initiated in the curriculum for students to learn and acquire science skills have been undermined because of negligence by school personnel. Some school personnel who should make funds available to purchase facilities prefer paying small amounts to borrow from private schools that have science facilities. This leads to learners' lack of knowledge of current science programmes and objectives. This does not encourage teachers' teaching and students' learning. This neglect by school personnel affects the quality of learning children get in school.

Need for Science Laboratory Facilities in Schools

In the school system, there are multiplicity of science facilities for teaching and learning. Abiama (2012) outlined some of the needs for facilities in school to include:

- to illustrate concepts
- provide opportunity for firsthand experience
- for experimentation and demonstration
- for scientific investigation and discovery
- to provide diversity of thoughts
- for observation and inquiry for development of scientific attitudes and skills
- to protect the individual and also provide comfort
- increase instructional effectiveness.

These needs, if well articulated and included in laboratory manuals and guides as key objectives to aid teachers' understanding; will enable dissemination of information that focus students' interest in science.

Challenges in Safety Management of Science laboratory Facilities

Most school personnel lack policy guidelines for laboratory safety management domiciled in science laboratories. Science laboratory facilities are haphazardly handled and instructions neglected. In most cases, the laboratory facilities for carrying out researches, experiments and project studies are left to deteriorate, and in a state of disrepair. This poses threats of impending danger to its users anytime due to lack of safety management personnel. Some laboratories have tight spaces where facilities are stocked for years without inspection of what is available. This leads to facilities deterioration. In other words, school personnel are rather, running around to grow their businesses of enlarging student population to the detriment of

safety management of the few available science laboratory facilities. This situation arises because the states, local governments and Federal ministries of education lack established policy directives on minimum standards in safety management of school facilities. While few schools have safety standards, others have none as the standards are poorly adhered to. It is therefore, necessary for different levels of school personnel and the government to address safety management standards on science laboratory facilities to effect quality provision of facilities. This will greatly influence the outcome of science teaching and learning in schools. Checks should be routinely done to identify sources that need safety management.

Problem Statement

Despite the critical role school personnel play, their involvement in quality provision and safety management of science laboratory facilities has been less than informative. Quality provision and safety management of science laboratory facilities is facing great challenges because of weak ethics of the school personnel. Many topics in science are not taught practically because school personnel do not provide laboratory facilities for students experiments in schools. Quality of facilities provided is poor and safety management is inadequately understood. Hardly are professionally skilled science personnel that can deploy the use of quality science laboratory facilities employed to manage science laboratory facilities to protect learners from unnecessary risks. Even when facilities are provided they do not know how to use them. It is on the basis of these that this study looks into the role of school personnel in quality provision and safety management of science laboratory facilities in secondary schools.

Objectives of the study

The objectives of this study are to:

1. find out the extent funding is provided for quality provision of science laboratory facilities.
2. find out the extent of safety management of science laboratory facilities.

Research Questions

1. To what extent is funding provided by school personnel for quality provision of science laboratory facilities?
2. What is the extent of safety management of science laboratory facilities by school personnel?

Research Procedure

A survey research design was employed for the study. The population was all 184 school personnel (school principals, science teachers and laboratory assistants) in 12 public secondary schools attending the 2016/2017 science teachers' training workshop on the use of science kits in Eket Local Government Area of Akwa Ibom State. Some schools had junior and senior sections with both principals and laboratory assistants in attendance at workshop.

Sample and Sampling technique

The sample was obtained using simple random sampling technique. The sample provides 84 school personnel (school principals (16), science teachers (52) and laboratory assistants (16) in 12 public secondary schools secondary schools in Eket Local Education Committee.

Instrument for the study

Instrument for data collection was a Questionnaire on Quality Provision and Safety management of Science laboratory Facilities. It used a 4-point rating scale of Very Great Extent (VGE=4), Great Extent (GE=3), Moderate Extent (ME=2), Low Extent (LE=1). Mean and Standard deviation was determined for the participants on responses obtained from data on the questionnaire. Decision rule of a mean below 2.50 is regarded as low extent, 2.50 to 2.75 is moderate extent, 2.75 to 3.00 is great extent, and 3.00 to 3.50 is very great extent. Face and content validity of the instrument was established by two laboratory technologists, two experienced science teacher and a lecturer test and measurement lecturers in science education department, University of Uyo. The instrument reliability was established using Cronbach Alpha test of internal consistency that gave a value of .83. Research questions were answered using mean and standard deviation.

Results

Table 1 : Mean Ratings on extent of funding for quality provision of science laboratory facilities of School Personnel

Funding on provision of facilities	Mean	SD	Decision
1.School devote funds during inspection/accreditation	3.25	0.86	VGE
2. Facilities bought only during examinations	2.03	0.77	LE
3. Too costly to purchase	1.73	0.74	LE
4. Low quality facilities purchased	2.18	0.75	LE
5. Adequate facilities supplied	1.93	0.69	LE
6. Pay to get facilities from other schools	3.06	0.81	VGE
7. Support from government	1.70	0.62	LE
8. Support from community services/leaders	1.86	0.76	LE
9. Support from foreign assistance	1.91	0.75	LE
10. support from Diaspora elites	2.06	0.42	LE
11. Individual support	2.54	0.64	ME
12.From grants, public subsidies, revenue from business, ancillary activities	1.87	0.41	LE

Data in Table 1 indicate that nine out of twelve items for extent funding for quality provision of science laboratory facilities had mean ratings of below 2.50, while only three on extent of funding for quality provision which include individual support shows moderate extent of quality provision and school devote funds during inspection/accreditation and pay to get facilities from other schools had mean ratings above 2.50 showing moderate and very great extent respectively. In other words, the extent of quality provision of facilities is low for facilities bought only during examinations, too costly to purchase, low quality facilities purchased, adequate facilities supplied, support from government, support from community services/leaders, support from foreign assistance, support from diaspora elites, individual support, from grants, public subsidies, revenue from business and ancillary activities show low extent of funding for quality provision of science laboratory facilities.

Table 2: Mean Ratings on the extent of safety management for quality provision of science laboratory facilities of School Personnel

Items	Mean	SD	Decision
13. Provide accurate, appropriate information about dangers	1.63	0.55	LE
14. Instruct students prior to laboratory activities	1.70	0.75	VGE
15. Explain proper procedures/techniques	1.97	0.68	LE
16. Provide greater supervision in more dangerous situation	1.76	0.73	LE
17. Not using defective equipment	2.54	0.66	ME
18. Follow all guidelines for handling and disposing of chemicals and codes	2.34	0.73	ME
19. Awareness of potentially harmful chemicals	2.08	0.41	LE
20. Putting preventive safety measures in place	2.36	0.78	LE
21. Identify and codify laboratory safety procedures	1.73	0.58	LE
22. Correction of hazardous conditions or defective equipment	2.25	0.70	LE

23.	Guideline to protect indoor air quality	2.46	0.63	LE
24.	Identify and clarify any specific rules	2.54	0.71	ME
25.	Guidelines for establishing correct design/installation	3.59	0.85	VGE

Mean scores interpretation: 1.50-2.49 (Low extent, LE), 2.50-2.75 (Moderate extent, ME), 2.76-3.00 (Great extent, GE), 3.00-3.50 (Very Great extent, VGE).

Data in Table 2 show that eight out of thirteen items for safety management of science laboratory facilities with mean ratings below 2.50. This means that the extent of safety management of science facilities is low for items on providing accurate, appropriate information about dangers, explanation of proper procedures/techniques, providing greater supervision in more dangerous situation, awareness of potentially harmful chemicals, putting preventive safety measures in place, identify and codify laboratory safety procedures, correction of hazardous conditions or defective equipment, guidelines to protect indoor air quality is low while items on not using defective equipment, following all guidelines for handling and disposing of chemicals and codes, identifying and clarifying any specific rules indicate moderate extent. Items on instructing students prior to laboratory activities and guidelines for establishing correct design/installation show very great extent.

Discussion of Findings

The result of the study on quality provision of science laboratory facilities show that funding for quality provision of science laboratory facilities by school personnel is low. This indicates that most topics that should be taught with laboratory facilities are theoretically taught because facilities are not provided in the laboratory for teaching students. This agrees with the findings of Obiweluzor, Momoh and Ogbonnaya (2014) and Koroye (2016) that the quality of education children receive bears direct relevance to quality provision or lack thereof of science facilities and overall atmosphere in which learning takes place. Facilities are to be presented and used for students to apply the processes of science and solve real problems from their own experiences. Facilities build skills, competence and ensure a high level of quality for expert use of science activities. The fact that three out of twelve items are to a moderate and very great extent respectively show that there is urgent need for intervention on quality provision of science laboratory facilities to boost learners academic performance and lifelong workplace skills.

Findings on safety management of science laboratory facilities indicate a low extent by school personnel. This shows that school personnel do not give priority to safety management of laboratory facilities as they do not integrate this academic programme planning of the school. This finding corroborates Abiama (2012) that school personnel lack knowledge of safety management planning and

consequently, they fail to integrate safety management into the management of the school. This reduces knowledge content of what students would have known if safety management were effectively addressed. The fact that five out of thirteen items are to a moderate and very great extent respectively show that risk management must be given adequate attention to reduce harm in the laboratory. Laboratory practical must be seen as a necessary part of a teacher's preparatory adequacy to improve learners achievement of instructional objectives.

Conclusion

The role of school personnel in quality provision and safety management of science laboratory facilities cannot be overemphasized. Students need experimentation to own knowledge for themselves. This can only be achieved when school personnel provide and safely manage science facilities to facilitate teaching.

Recommendations

1. School personnel should make efforts to contact various funding-sources to procure quality science facilities for practical activities.
2. School Personnel need to train appropriate persons/staff on safety management of science laboratory facilities to ensure safety consciousness at all times.
3. School personnel should improvise few/non-available facilities to encourage science learning by students. They can do this by exploring sources like internet simulation classrooms to enhance students' appreciation of abstract concepts in science in the absence of quality provision of science facilities.
4. School personnel should attend short-term courses to update knowledge on procurement of quality science laboratory facilities and how to manage them for teaching effectiveness.

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