

EXPLOITING THE INSTRUCTIONAL POTENTIALITIES OF SCHOOL ENVIRONS FOR MEANINGFUL SCIENCE TEACHING

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Abstract

This paper observes the general scarcity of resources for the provision of instructional materials in our Basic and Senior Secondary Schools, and goes on to direct the attention of science teachers to some specific locations in the environs of the schools which can be visited for educational experiences. Some of these locations are: carpentry workshops, welder's workshops, the blacksmiths forge, the sawmill, market places, abattoirs, nearby farmlands, erosion sites etc. prospects of these visits are highlighted and some recommendations made.

Introduction

Science teaching has and will always depend largely on the quantity, quality and diversity of instructional materials available to the teacher. Traditionally speaking, the provision of instructional materials in schools has been seen as the sole responsibility of government, hence the repeated call by individuals and organizations for increased government funding of education.

Following from this rather faulty understanding, many science teachers have formed the habit to sit on the fence and wait for government to deliver lorry-loads of every kind of instructional materials, or in the alternative, large sums of money for the acquisition of these materials. Adamaechi and Romaine (2000) have in addition to government's sponsorship suggested the participation of civil servants, companies, banks, community development unions and the trade unions in the provision of funds for education as a way to "complement and supplement the efforts of government...."

Though laudable, the translation of this and similar suggestions into practical reality cannot be guaranteed bearing in mind the level of accountability it deserves. The problem has also been compounded by steady increase in the population of school-age Nigerians. It is this situation that has motivated a refocus on the environs of the school, as a ready source of instructional materials and learning experiences, which can be maximally exploited by a science teacher for more meaningful science teaching. Environs of the school as used here refers to areas in its neighbourhood. The nature and composition of this will vary depending on the location of each school. Trips made in school neighbourhood fall within educational tours which according to STAN (1988) are ways of using resources and the natural environment to provide the pupils with additional knowledge and experience not available within the classroom, thus ensuring that learning at school is not confined within the four walls of the classroom or science laboratory.

The ability to tap these resources is part of the teacher's ingenuity. Etuk (1984) argues that teachers are expected to be creative, drawing from their environment, materials appropriate to the needs of their students, and according to their particular teaching situations. Below are some locations in the neighbourhood of our schools which science teachers can visit with their students. Some instructional materials likely to be found in each location are listed so as to highlight the importance of the location to the teacher.

Location

Instructional Potentials

1. Carpentry workshop:

Carpentry tool such as; hammer, mallet, chisel, clamp, saws, nails, plank of softwood and hardwood, putty, wood sharing, wood preservatives etc.

2. Welder's workshop:

Welding machine, oxygen cylinder, various metals, oxyacetylene flame and its use etc.

3. Blacksmith's forge:

Bellows used to blow air into fire and its operation, charcoal for heating, anvil, red-hot pieces of metal being beaten into

various shapes to show expansion of heated solids, and malleability of metals. Locally – made farm tools such as hoes, knives, spades etc for gardening.

4. Sawmill:

Logs of wood as photosynthetic products of plants showing seasonal rings, hardwood, softwood, timber and sawdust often used in the laboratory as insulator and in germination experiments.

5. Market:

Fabrics, leather, mammals and birds and their external features; fruits as source of vitamins and for the study of placentation, flour, root and stem tubers, grains, chemicals, measuring and weighing devices as used in life situations, grinding machines in use in processing farm products and the application of friction in daily life. Etc.

6. Abattoir:

Mammalian skeleton (skull and other bones), internal organs of mammals and their natural locations e.g. heart, liver, lungs, kidney, intestine, spleen all of which are not often made available to students except in charts and drawings, infected muscles of pigs and sheep, various horns and hooves.

7. Nearby Farmland:

Various species of plants cultivated and wild for morphological and anatomical studies, weeds and their adaptive structures, parasitic plants and their hosts; stems, leaves and roots with their modifications; fruits, seeds and grains in their developmental stages; Arthropods, birds, soil samples, simple food chains, nests, nuts, pollinating insects at work etc.

8. Fish Ponds:

Variety of fishes, their feeding habits, swimming movements, courtship behavior as well as their structural adaptation to the aquatic environment.

9. Streams and Ponds:

Frogs, toads, tadpoles, variety of bugs, beetles, carnivorous birds, mosquito larvae and pupae, ferns, floating aquatic plants. Students can be assigned projects here on the life cycle of these organisms.

10. Medical Clinics:

Nurses and doctors at work, pharmacists, laboratory technologists, various medical equipment etc. Seeing these professionals at work creates opportunity for a career talk.

11. Mining and quarrying sites:

Opportunity to see various minerals and rocks, miners and mining equipment, effects of indiscriminate mining on the environment etc.

12. Erosion sites:

Types of erosion, soil profile, effects of erosion on farmland. These sites can only be better appreciated through visits, while students are given opportunities to suggest possible control measures. The list of places to be visited is not exhaustive. It also includes: breweries, nearby industries, photographic studio, printing centres bakery etc.

Prospects of the Visits

1. Visits made to the places listed above and others reveal to the science teacher the various instructional materials often specified for practical and theoretical considerations in various science subjects at the basic education and senior secondary levels. Some of these materials are often described as “not available”, and at best are described in class.
2. These visits help to reduce the boredom often experienced sitting all day in organized classrooms.
3. The excitement that accompanies out-door activities helps to sustain students interest in science subjects.
4. Visits made in the environs of schools promote interaction between schools and people living, selling and working around them. This in turn promotes their neighbourhood watch over the schools.
5. The places visited provide opportunity for projects, chosen by students or assigned by the teacher.
6. Human violation of the environment leading to its deterioration is better appreciated in a natural setting during these visits.
7. Students are given opportunities to see different professionals and artisans at work. This can go a long way to influence their future choice of career. Maduabum (1984) opines that when students have direct contact with different occupations, they learn and develop positive notions and views of the world outside the school.
8. In addition to admiring some workers at work, students and their teachers use the opportunity to understand and possibly appreciate the problem, hazards, difficulties, discomfort and stress associated with various means of livelihood, as opposed to the comfort and returns associated with other areas of work. One may consider for example the comfort and monetary returns of a laboratory technologist with those of a road-side mechanic or welder.
9. Often, instructional objectives are stated mainly in the cognitive domain with a little in the psychomotor. The affective has often been neglected as well (STAN, 1988). Trips out of classroom create opportunity for students to acquire more information or facts. For example at the end of these trips they will be able to name various carpentry tools and state their uses. At the end of these trips, having watched the carpenter at work they should be able to draw a chisel and a saw, and demonstrate their uses if given some pieces of wood.
10. More importantly however, at the end of these trips a teacher having decided on how he/she wants the students to feel and/or react can build their experiences into objectives in the affective domain. For example:
 - i. Having visited nearby erosion sites, students should be able to appreciate the predicament of families that have lost their homes, farmlands and crops.
 - ii. Having visited nearby hospitals, students should be able to:
 - a. appreciate the gift of good health,
 - b. see the need to maintain a healthy lifestyle and
 - c. show compassion for the sick
 - iii. At the end of a visit to a nearby market, students should be able to condemn its insanitary state.
 - iv. At the end of a trip to the abattoir, students should be able to defend the need for regular sanitary inspection of markets and abattoirs.
 - v. At the end of a trip to a nearby flooded farmland, students should be able to (a) express sympathy for the affected farmers and (b) volunteer to join the crusade for proper maintenance of water channels.

It is important to state here that these trips should as much as possible be regular for them to have positive effects on attitudinal change. In support of this, Ndubuisi (1981) states that; a lot of patience and tact is needed in order to achieve objectives in the affective domain. The hidden nature of human feelings and emotions tend to thwart the efforts of the teacher to teach affective educational objectives.

The National Commission for Colleges of Education (2008) clearly states that field trips/excursions should be part of the teaching mode for Biology, Chemistry, Mathematics,

Physics, Computer Science, as well as Physical and Health Education at the NCE level of teacher training. This is to ensure that the products of this programme learn to teach science using field trips/excursion as they are taught after leaving school. However, experience has shown that these trips and excursion tend to be in favour of distant places to the neglect of nearby locations. The result is that these student teachers graduate to teach with less focus on the school environs. The same may be true for those who are trained at the degree level.

In conclusion, the ability to exploit the instructional potentialities of a school's neighborhood for effective science teaching is a measure of a teacher's initiative. This according to Afe (1995) is a good quality that a teacher needs and should possess. The environs of our schools are endowed with unmemorable teaching materials that the science teacher can rely on to achieve expected instructional objectives with limited financial resources.

Recommendations

School authorities should endeavour to establish some rapport with dwellers in their neighbourhood, so as to make the area easily accessible to teachers and students with minimum suspicion. This can be done through the Parents Teachers Association (PTA).

Science teachers should try to be familiar with their working environment so as to locate some locations of interest for science teaching.

References

- Adamaechi, B. C. & Romaine, H. A. (2001). *Issues, problems and prospects of free, compulsory and qualitative education in Nigeria*. Onitsha, Nigerian Education Publishers Ltd.
- Afe, J.O. (1995). *Teacher education in Nigeria: Trends, issues and challenges*. University of Benin, Nigeria Educational Research Association (NERA).
- Etuk, G. K. (1984). *A survey of material resources for science teaching around Uyo, Cross River State*. JSTAN. 22 (2)
- Maduabum, M.A. (1984). *Teaching integrated science effectively*. Onitsha, Space Matrix Publications Ltd.
- National Commission for Colleges of Education (2008). *Minimum Standards for NCE, Science and Mathematics 4th Edition*. Abuja.
- Ndubuisi, A. F. (1981): *Curriculum objectives for effective teaching*. Onitsha, Africa Educational Publishers.
- Science Teacher's Association of Nigeria STAN (1988). *Science teachers handbook*. Ikeja, Longman Nig. Ltd.