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**Using Role Play to Teach Overpopulation to Basic Science
Students: A Way Forward for Environmental Sustainability**

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Abstract

Population is a major source of environmental degradation and it impacts primarily on the environment through the use of natural resources and production of wastes with its attendant health problems. The study examined population growth and overpopulation in Nigeria and its impact on the environment. To achieve environmental sustainability, the paper stressed the need for intensification of environmental education in Nigerian schools using

Basic Science at the Junior secondary school level in order to 'catch them young'. The paper advocated the use of role play, a method seen as one of the best ways to enable pupils in the classroom share in something of the reality of issues in the real world beyond the school, as a good strategy to impact environmental culture into the young ones. By so doing, the children will acquire relevant environmental skills, attitude and interest that will spur them into action towards maintaining a sustainable environment. The paper also made some recommendations on ways to combat environmental degradation among which is that basic science teachers should effectively teach the environmental topics/elements infused into the basic science curriculum to enable students acquire environmental knowledge, skills and attitudes for environmental sustainability.

Key words: Environmental sustainability, overpopulation, Basic Science, role-play

Introduction

The desire of Nigeria to be identified with contemporary development worldwide called for the infusion of relevant contents of four approved curriculum innovation in the area of: Environmental Education (EE), Drug Abuse Education (DAE), Population and Family-Life Education (POP/FLE), and Sexually Transmitted Infection (STI) including HIV/AIDs (Adeniyi, 2006). Adeniyi further stated that in order to cover knowledge, skills and attitudinal requirements of students, the curriculum (of Basic science) was organized into four main themes namely: You and Environment, Living and Non-Living things, Science and Development, and You and Energy.

Consequently elements of environmental issues were infused into the basic science curriculum from Junior Secondary one to three (JS 1-3). The theme 'You and Environment' was broken down into specific topic some of which include environmental conservation and safety, environmental pollution and environmental hazards. These environmental issues relate closely with population and population growth. Population is said to be a major source of environmental degradation. It impacts primarily on the environment through the use of natural resources and production of wastes with its attendant health problems (Sajini, 2011). Maduewesi (2002, p.13) wrote, 'the contemporary approaches to managing population especially overpopulation occupy a key position in Environmental Education (EE)', hence, the need to teach population as an aspect of environmental education especially at the basic education level.

Let us at this point, examine the major concepts/keywords involved in this discourse.

Environment

The word 'environment' is derived from a French word 'environner' meaning 'surround'. According to Olagunju (2002), the Macmillan Dictionary of the Environment defines environment as the physical, chemical, and biotic conditions surrounding a living organism. Similarly, Oxford Dictionary of Science (2005) defines it as the physical, chemical and biological conditions of the region in which an organism lives. UNESCO-UNEP (1989) in Osuafor (2001) defines environment as the synergistic sum of the biological (living), chemical and physical (non-living) influences upon an organism (plant or animal). For man, this includes all biological, chemical, physical, social, psychological, economic, philosophical and aesthetic surroundings. Man interacts with his environment in order to satisfy his needs and wants. Therefore anything that affects man's environment definitely affects him also.

Sustainability and Environmental Sustainability

Sustainability refers to the capacity of a society to meet current needs without degrading the ecological, social and economical systems on which the society will rely for meeting future needs (<http://www.berea.edu/seas/>). Therefore, sustainability implies that we have and will continue to have the natural resources such as food, water and materials to protect human health and our environment. Sustainability has emerged as a result of significant concerns about the unintended social, environmental and economic consequences of rapid population growth, economic growth and consumption of our natural resources (www.gov/sustainability/basicinfo.htm). Everything we need for our survival and well-being depends, either directly or indirectly, on our natural environment. We therefore, do everything possible to sustain our environment.

Population, Population Growth and Overpopulation

Population as defined by the Oxford Dictionary of Science (2005) is a group of individuals of the same species within a community. Furthermore, population is the total number of individuals of a given species or other class of organisms in a defined area. Population in the context of this paper refers to the total number of people resident in a particular area at a particular time.

Population growth on the other hand, refers to addition to or subtraction from the existing population through the interaction of the three elements of population change namely: birth, death and migration (Sajini, 2011). Sajini also defines population growth as the numerical change in size of a region's population between two periods (eg. between 2008 and 2009). Population growth rates therefore, is the average annual percent change in the population, resulting from surplus (or deficit) of births over deaths and the balance of migrants entering and leaving a country (<http://www.indexmundi.com>).

Increase in human population results in increase in human activities which may impact negatively on the environment. Thus, according to Botkin and Keller (1998) in Sajini (2011), the human population is the underlying issue of the environment because most current environmental damages result from the very large number of people on the earth.

When an area is excessively populated to the point of overcrowding, depletion of natural resources, or environmental deterioration, the area is said to be overpopulated (Okebukola, 2002). According to Okebukola, there is maximum number of individuals or inhabitants that a given environment can support without detrimental effects to it and this he referred to as its carrying capacity. Therefore, an area becomes overpopulated when its population exceeds its carrying capacity. This creates an imbalance between population and natural resources leading to depletion of natural resources and environmental degradation. Overpopulation according to Olagunju (2002) can result to: malnutrition/malnourishment, lack of Education, poverty and crime, poor housing and ill-health.

These consequences can be likened to a classroom situation. Every classroom space has its carrying capacity, that is, the number of children it can accommodate beyond which problems may arise. Some of these problems may include lack of effective learning as a result of noisy class, loss of concentration by the students and ill health resulting from overcrowded classrooms. In the same vein, a family, as a small community, can also be overcrowded or overpopulated with some consequences.

A look at the highlights on population growth in Nigeria and Africa may help to buttress the need for exposing the children early enough to the knowledge of negative impacts of overpopulation to Nigerian populace and environment.

Highlights on Population Growth in Nigeria and Africa

- Nigeria will be at forefront of population growth in Africa as it has the largest population in the continent – about 170 million in 2013. (<http://www.soschildrenvillages.org.uk/about-our-charity/news/nigeria-will-be-at-the-forefront-of-population-growth-in-africa>).
- Figures from the United Nation's population division predict that the continent (Africa) will be at the forefront of population growth over the next one hundred years.
- Out of 31 countries of the world where the average woman has more than five children, 29 are in Africa.
- More than half of the current predicted growth of the world's population which could rise from 7.2 billion today to 11 billion by 2100 is expected to

stem from Africa. Nations with high fertility rates like Nigeria will be a major factor in this growth.

- With the average woman in Nigeria having at least 5 children, its population is expected to be larger than that of the USA by 2050.
- Nigeria's population is expected to surpass that of the US before the middle of the century and by the end of the century, Nigeria could start to rival China as the second most populous country in the world according to a new United Nations (UN) World Population Prospects report (Premium Times, 13 June, 2013).

These indicators should act as a wake-up call. The astronomic rise in population in Nigeria will no doubt put great strain on all the resources especially food, water, land, shelter, forest and wildlife in the environment (Sajini, 2011).

At this point, one may ask, what do we do? Something needs to be done and urgently too. Our best hope is to fall back on education, that is, environmental education through science education. Junior Secondary School (JSS) level stands in-between and forms a link between Primary and Senior Secondary School (SSS) levels. Children at this level are aged between 10 and 13 years. They are considered young enough to easily assimilate what they are taught and retain what they have learnt while at the same, old enough to make informed decisions and take appropriate action to combat environmental problems.

However, it is not certain whether the environmental topics infused into the Basic science curriculum are effectively taught in a way that the children will actually imbibe environmental culture for sustainability. Olagunju (2002) asserted that teachers are not knowledgeable on how to impart knowledge, skills and values of EE topics to their learners. It is not just enough to infuse the elements of EE into science curriculum. It is more important to ensure that these elements are taught in a way to awaken the consciousness of both the science teachers and learners in order to become fully aware of the importance of environmental protection and friendliness.

Proper environmental education will enable the children to acquire relevant skills and develop appropriate environmental attitude that can motivate and enhance their individual or collective commitment to effectively participate in solving current environmental problems and prevent new ones. Researchers (e.g. Ogunnyemi, 1997; Osuafor, 2001 and Ajiboye in Olagunju, 2002) on effective teaching methods for population and environmental education fields have recommended participatory learner-centred methods such as inquiry or problem solving method, case studies, project method, field trips and role-play. Unfortunately, the traditional lecture method which is less effective is still being used by Basic science teachers.

Role-play is a technique in which participants are asked to accept a different identity to try to think their way into someone else's situation and perhaps, into their minds as well (Osuafor, 2001). It derives its origin in the belief that all children want to play and that learning will occur at the same time. Children out of their own free will spend hours practising adult skills, rehearsing roles and acting out fantasies. Such activities are often pursued with intense concentration over sustained period and because they are shared with others, play fosters team spirit and helps the participants in achieving socially desired goals. There can be no doubt therefore, about the power of role-play to make learning flourish.

Role-play influences acquisition of environmental knowledge and development of interest in environmental matters (Osuafor, 2011). If children's interest in environmental matters is sufficiently motivated, they will be actively involved in working towards resolution of environmental problems. Role-play should therefore be utilised for classroom instruction in order to get the learners interested in what the teacher wants them to learn and bring into focus the idea of 'catching them young' for better tomorrow.

Using Role-Play to Teach Overpopulation

Planning of Role-Playing

For role play to be successful as a teaching technique:

- Role play must be simple and straight forward especially in primary classes.
- The objectives of the role play activities must be made clear. That is to say, the teacher should be clear about what he/she is trying to achieve and design the activity towards this end.
- The children must be provided with concrete information and clear role descriptions so that they could play their roll with confidence.
- Teacher must emphasize the goal of each role and make the instruction brief; the player will enjoy filling in the detail.
- The teacher may not assign characters to the players. They will feel more involved if they are allowed to do that themselves, but they must be guided.
- Describe each role in a manner that will let the children identify with the characters. Use the second person 'you' rather than the third person 'he' or 'she'.
- Children can go home with the role briefs to acquaint themselves with what is expected of their roles. They can act out the role play in the next class.

- Cue cards can be used. These cards contain detailed instruction of what the player should do or say.
- Clearly, the players will need to be given background details about the scenario being played out, perhaps including briefing on what they know about other characters.
- Observers can be assigned to particular players. For example, they might be given a checklist. The observations can then be used as a focus for the debriefing session.

Role-Play Written by the Author for Teaching Overpopulation

This role-play will last for two periods of about 40 minutes each. It is hoped that at the end of the lesson, after participating in role-play, the children will be able to:

1. Correctly define the term 'overpopulation'.
2. State man's activities that can bring about overpopulation in the family.
3. Outline the effects of overpopulation on man and his environment.
4. Suggest ways of preventing overpopulation.
5. Develop interest and participate in creating awareness for the importance of preventing overpopulation.
6. Apply the skills and knowledge gained in solving this and other environmental problems.

The Play Proper

The role-play handouts which contain the different roles and brief explanation of what the children are expected to do are distributed to the children about two days before the actual lesson for them to study at home.

Two families are involved – The family of Mr and Mrs Usondu with three children and one house help (who is placed on a salary) and the family of Mr. & Mrs. Ugwu with seven children and one house help (also on salary).

First Play: Mr & Mrs Usondu's family

Cast	-Mr Usondu	Daddy (a banker)
	-Mrs Usondu	Mummy (a school teacher)
	-1st Child	Kingsley (Primary 5)

-2nd Child	Uche (Primary 3)
-3rd Child	Joy (Primary 2)
-House help	Ngozi

Stage 1:

5.45 a.m- Mummy wakes up the children. After family morning prayers, they quickly do their morning chores and get ready for school.

Mrs Usondu and Ngozi get breakfast ready and mummy gets ready for school while Ngozi sets the table.

Daddy is ready for work too. After breakfast, he drops the children off to school. Mummy is also off to school.

Stage 2:

Ngozi tidies the house, washes clothes and gets lunch ready.

Dad brings children home and goes back to office.

Children - (greeting aunt Ngozi) Good afternoon, aunty

Ngozi - Good afternoon and welcome. Go and change your dresses and come down for Launch.

The children take their launch and retire to their rooms for one hour siesta

Stage 3:

3p.m - Mummy is back from school

Ngozi - Mummy welcome (collecting her bag from her) Mummy takes launch and rests for a while

4.30p.m - Children are busy with their take-home assignment with Mummy offering a helping hand when necessary

Daddy comes back from work

Everybody - "Daddy welcome". Ngozi collects his bag and keeps in the room. Mummy gets his food ready

Stage 4:

About 6p.m - Daddy relaxes with the children in the living room, discussing and sharing jokes with them while at the same time going through the pages of the newspapers he bought.

Television is on showing children's movies. Mummy and Ngozi are busy in the kitchen preparing supper.

Joy - Daddy, I had a little fever in the school today and complained to our aunty who took me to the school clinic.

Daddy - Did they give you any drug?

Joy - Yes, Daddy

Daddy - And the fever stopped?

Joy - Yes daddy

Daddy - That's why I like your school. They take very good care of children. Tomorrow I will find out the details of your treatment from the school matron

Uche - I saw Nkechi Ugwu yesterday when she was coming back from school. She was looking sick. Their school doesn't have a clinic. Daddy why don't they come to our school?

Daddy - May be their daddy cannot afford to send them there

All children - Ei yaa!!!

Kingsley - May be because they have many children

All laugh

Mummy comes to the living room occasionally to enjoy their jokes. She announces that the food is ready. They retire to the dining room.

End!!!

Second Play	-	Mr & Mrs Ugwu's family
Cast	-	Mr Ugwu - Daddy (a lawyer)
	-	Mrs Ugwu - Mummy (a school teacher)
	-	1st Child - Ijeoma (JS 3)
	-	2nd Child - Emeka (JS 1)
	-	3rd Child - Nkechi (Pri.5)
	-	4th Child - Okey (Pri.3)
	-	5th Child - Ikenna (Pri.1)
	-	6th Child - Nkiru (Not Schooling Yet)
	-	7th Child - Uju (Still a toddler)
	-	House help - Mary

Stage 1:

6.00a.m. Mummy quickly prepares breakfast while Mary takes care of the little ones.

7.00a.m. Daddy leaves for work . Children take their food and leave for school. Mummy hurriedly prepares and leaves for school too.

Mary sends the little ones to sleep and does the household chores

Stage 2:

2.00a.m. The children come back from school. Mary gives them food. As they are eating, an argument erupts and they start quarrelling. Some of the food is poured on the ground.

Mary (shouting at them) Stop that ! Stop that ! Emeka ! okay ! I will beat you. Poor Mary cannot even control them. They use abusive words freely on themselves

Ijeoma You people are stupid. You behave like animals

Emeka Shut-up! Shut-up! you fool

Ijeoma Me shut-up? I will tell daddy that you are moving with bad boys in school.

When they get tired of quarrelling, Emeka and Okey go out to play football.

Ijeoma (shouting at them) Won't you come and do your home work?

They both ignore her. She goes to do her own home work and help Ikenna with his own.

3p.m: Mummy comes back. The children won't let her have her lunch in peace, complaints here and there; all talking at the same time. She brings her cane to flog them. Emeka runs away shouting at her and throwing stones at her and Ijeoma.

6p.m Daddy comes back

After his meal, Mummy complains to him about the behaviour of the children

Mummy Daddy, these children are becoming very unruly. They keep fighting every day. They learn all kinds of bad languages from their school mates. Can you believe that Emeka was throwing stones at me today?

Daddy Is that so? Well, because you don't give them good home training.

Mummy How? Is it not you who should discipline them? So you expect me alone to control seven children?

She starts sobbing...

End!!!

Source: Environmental Education Project Series No 6, p. 108-112.

Debriefing Session

Debriefing is done immediately after each role play. It is a discussion session. The aim is to reflect on role play and discuss what has happened and what they have learned from the play and reach some general conclusions. Ask the children about their opinion concerning the role play and welcome their comments. As mentioned earlier, it is important to note that it will be counterproductive for the teacher to begin to point out mistakes and correct them. The children should be encouraged to make these observations themselves.

Way Forward for Environmental Sustainability

- Environmental Education should be intensified at all levels of education. It is not just enough to infuse the elements of EE into the science curriculum. It is more important to ensure that these elements are thought in a way to awaken the consciousness of both the science teachers and learners to become aware of the importance of environmental protection and friendliness.
- There is equally a great need for informal environmental education to the entire Nigerian populace. People need to be thought how to use the resources of the environment without causing damage to the environment. This can be achieved by creating awareness through mass media, posters, talks, seminars, workshops and other relevant programmes.

- There should be a limit to the number of children assigned per family and not just per woman. In fact, as recommended by Rinmak (2002), the tradition of men deciding on the number of children in the family should be reversed to the women because women know more about the quality of food and other resources consumed by the family members.
- Education of women should be encouraged in all parts of the country to enhance their economic status and place them in a position to take rational and informed decision on population issues so as to improve the quality of their lives.

Conclusion

Underlying every environmental problem is the issue of human population growth. The obvious implication of the persistent increase of Nigerian population is that much pressure is placed on the resources of the environment – food, water, shelter, forest, wildlife, land etc – which invariably leads to environmental degradation thereby jeopardizing sustainability. Therefore to tackle the issue of environmental degradation and be able to sustain our environment, we must start by addressing the issue of rapid population growth in Nigeria. In other words, to be able to sustain our environment, we need to first of all put in place strategies that will help control our ever increasing population and in the long run bring it down over time. Some of these strategies have been suggested as a way forward. Most importantly, EE must be intensified especially at the junior secondary school. Nigeria needs to be able to cater for its human population for it to achieve sustainable environment.

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