Lifelong Learning for Sustainable Community Development: Implication for Renewable Energy Education in Enugu State, Nigeria

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Abstract. The study investigated lifelong learning for sustainable community development: Implication for renewable energy education in Enugu State, Nigeria. Specifically, three research questions and two hypotheses guided the study. The study used descriptive survey research design. The population is made up of 3,960 respondents, comprising of 3,391 adult learners, 552 facilitators and 17 traditional rulers in Enugu State. A sample size of 607 consisting of 358 adult learners, 232 facilitators and 17 traditional rulers were used for the study. Simple random sampling was used to select adult learners and facilitators, while 17 traditional rulers were purposively selected. A structured questionnaire designed by the researchers was the instrument used for data collection. A reliability coefficient of 0.88 was established using Cronbach Alpha. Data collected were analyzed using mean and standard deviation for research questions while ANOVA was used for testing the null hypotheses at 0.05 level of significance. Results showed among others that lifelong learning gave more community members the opportunity to acquire and update themselves with the necessary skills. Analysis of variance of the responses of respondents indicated no significant difference at P > 0.05. The paper recommends among others that Government established departments, ministries, agencies and non-governmental organizations should collaborate and make provision for sufficient fund through adult and non-formal education to make learning more flexible and friendly to people who cannot fit-in into the formal system of education due to one problem or the other.

Key words: Sustainable development, Lifelong learning, Community development, Sustainable community development, Renewable Energy

1. Introduction

There is no doubt that modernization and rapid economic development have impacted positively to the quality of life of people including developing and developed nations of the world. However, the environmental toll of this phenomenon cannot be ignored. This is evident in climate change, pollution and in the extinction of biological species such as the forest, aquatic life etc. The continued impacts of the phenomenon have prompted many countries around the world to come to terms with development that is sustainable.

The term “sustainable development” has become the slang in each development discourse, having been related to completely different definitions, meanings and interpretations, gave rise to the abundance of definitions of the conception [4]. Moreover, sustainable development entails development that meet the desires of the contemporary generation while not compromising the power of future generations to meet their own needs still [10].
[13] were of the view that sustainable development means quality life that can be preserved for many generations because it is: (i) socially desirable i.e., fulfilling people’s cultural materials and spiritual needs in equitable ways; (ii) economically viable, which entails, paying for its self, cost with not exceeding income; and (iii) ecologically sustainable which connotes maintaining the long term viability of supporting ecosystem.

Going by the above, it is explicitly clear that development can only be sustainable if man has the capacity to move away from harmful activities and rather engage in activities with environmental benefits. This is possible through education that is flexible, that is not limited by demography, socio-economic status and physical abilities of one as well as education that will be ongoing for one’s entire life. As a result of this, a greater number of persons will be brought to consciousness of the rapidly changing world, enable them know how to function and exploit opportunities in new and rapidly changing cultural contexts.

This attribute of education was what [14] reemphasized on when they pointed out that education is a womb-to-tomb method for the betterment of all individual in the society. By implication, learning has no bound what so ever, it is a continuous process. It is in light of this understanding that [16] defined lifelong learning as: “A philosophy, a conceptual framework and an organisation principle of all types of education, established to catch-all, emancipatory, humanistic and democratic values; it is broad and integral to the vision of knowledge-based society”

Lifelong learning involves activities which individuals from totally different background engaged in throughout their life to boost their knowledge, skills, values, and ability in a very specific field, given some personal, societal, or employment connected motives particularly now that economies depend on knowledge [7]. In line with [7], [11] defines lifelong learning as the continuous building of skills, knowledge, values of individual which occur through the experiences they encountered in the course of their lifetime. These experiences can either be formal, informal, or non-formal. The concept is inclusive because it carries all citizens along, irrespective of age, gender, location, physically challenged status, education, social and economic, and giving them equal opportunities to access effective and relevant learning required to attain the fullest possible development. This can either be personal, social, vocational, or professional.

By this token, more individuals in communities will be empowered with skills, values, attitude, and knowledge to competently participate in and construct a sustainable way of life. For example, turning “wastes” into resources (e.g., recycling); enhancing efficiency with regard to energy and materials; converting to increased reliance on renewable energy sources; growing community independence (e.g., food and energy production); and management of natural resources, geared to improve the quality of life (e.g., community forestry) [5].

However, an action of this kind does not just happen. It requires some processes of engagement and empowerment of community members. [8] defined community development as a grassroots process by which communities come together to become more responsible, organize and plan together, develop healthy lifestyle options, empower themselves to reduce poverty and suffering, create employment and economic opportunities to achieve social, economic, cultural and environmental goals. Community development ranges from small initiatives within a small group to large initiatives that involve the broader community organized where some form of skills can be acquired by community members.

Community development according to [5] is a process that seeks to empower individuals and groups of people with the skills they need to effect change within their communities. These skills are regularly created through the formation of social groups working for a common programme. At the end of these processes, there will be continual addition of human resource capital both in quality and in numbers. This is the most important
factor of production upon which the wealth of a nation largely depends upon in order to achieve sustainable community development.

The concept of sustainable community development is a development process whereby the efforts of people of participating communities are integrated with those of governmental authorities, non-governmental organizations (NGOs), corporate organizations (COs) among others to improve the living conditions of people of present generation without jeopardizing the abilities of future generations to take care of their own needs [3]. [17] defined sustainable community as one which is incessantly amending to meet the social and economic needs of its inhabitants while protecting the environment’s capacity to support it especially now that the world is advocating for renewable energy.

However, the world’s population is fast growing and the bulk of energy use comes from fossil fuels; a finite energy which cannot be replaced by natural means, which is also known to be hazardous to the environment. For this reason, renewable energy seems to be the best way forward. Simply put, renewable energy is a kind of energy that is sourced from an unlimited natural resources that can be replenished in a short period of time which are generated from natural resources such as sunlight, wind, rain, tides and geothermal heat ([9]. Therefore, the role of renewable energy education cannot be overlooked.

There are many ways in which renewable energy education can be imparted to learners. The important thing is to create interest amongst the learners and to explain to them the significance of learning and studying these courses by the experts [15]. Moreover the experts create awareness to the learners with the aid of facts, figures and practical instances which instill in them the need and the importance of renewable energy and the consequences of not possessing ample information about it. In this way, the learners will learn and excel in technical aspects of renewable energy. Imparting renewable energy education will create a pool of jobs for learners or participants who have completed their education in renewable energy or learners who have acquired skills and knowledge about renewable energy [15].

In Nigeria, there is abundance of renewable energy resources yet the country lag behind in renewable energy development and utilization [12]. This accounts for the persistent use of firewood, charcoal, kerosene, petrol, diesel etc as a source of energy in industries to power plants and machines, and in homes to cook, heat, dry and to light. Switching to renewable energy sources is a change that can be brought about by lifelong learning. Unfortunately, the education offered through the present-day school system is well known to be rigid, unfriendly to learners and most often non-inclusive. On this ground, a number of persons are deprived of education due to one reason or the other: either they have passed the age for it or they are employed; illiterate living in remote areas; out-of-school or drop-outs; people living below poverty line; physically challenged etc. Such is not healthy for the economy of Nigeria and can be a hindrance to sustainable community development in the country. The importance of lifelong learning cannot be over stressed. Based on the above premise, the study sought to examine lifelong learning for sustainable community development: implication for renewable energy education in Enugu State.

1.1Purpose of the Study
The main purpose of this study was to investigate lifelong learning for sustainable community development in Enugu State. Specifically, the study ascertained the following:
- economic contributions of lifelong learning in Enugu State;
- ecological perception in utilization of renewable energy in Enugu State;
- factors that inhibit lifelong learning in Enugu State.
1.2 Research Questions

- What are the economic contributions of lifelong learning in Enugu State?
- What is the ecological perception in utilization of renewable energy in Enugu State?
- What are the factors inhibiting lifelong learning in Enugu State?

1.3 Hypothesis

- There is no significant difference in the mean responses of adult learners, facilitators and traditional rulers on the ecological perception in utilization of renewable energy in Enugu State.
- There is no significant difference in the mean responses of adult learners, facilitators and traditional rulers on factors inhibiting lifelong learning in Enugu State.

2. Methodology

The study adopted a descriptive survey research design. This study adopted this design since it sought the opinions of adult learners, facilitators and traditional rulers on lifelong learning for sustainable community development. The study was carried out in Enugu State in South East Nigeria. The population comprised 3,960 respondents, comprising of 3,391 adult learners, 552 facilitators and 17 traditional rulers [2], [1]. A sample size of 607 consisting of 358 adult learners, 232 facilitators and 17 traditional rulers were used for the study. Simple random sampling was used to select adult learners and facilitators, while 17 traditional rulers were purposively selected. A structured questionnaire designed by the researchers was the instrument used for data collection. Responses to the items in the questionnaire were based on a four-point Likert type rating scale, ranging from Strongly agree (SA) (4 points), to Agree (A) (3 points), Disagree (D) (2 points), and Strongly disagree (SD) (1 points). The instrument was validated by three experts (2 from Department of Adult Education and Extra Mural Studies and 1 from Measurement and Evaluation unit Science Education department, all from University of Nigeria, Nsukka). Reliability of the instrument was ascertained using Cronbach Alpha. A grand reliability coefficient of 0.88 was established which signified very high reliability of the instrument. Direct method was applied by the researchers and one research assistant was used in distributing and collecting the questionnaire from the respondents at their various locations used for the study. The research assistant was briefed on the modalities for distributing and collecting the questionnaire from the respondents on the spot. This ensured that the respondents appropriately completed the questionnaire. Thus, there was 100% return rate, and the entire questionnaires were duly used for data analysis. Descriptive statistics (mean and standard deviation) were used for data analysis. A criterion mean of 2.50 was used as the benchmark for decision making for each item. Thus any item with a mean of 2.50 and above was considered as accepted by the respondents, while any item with a mean below 2.50 was considered as unaccepted by the respondents. Analysis of variance was used to test the differences among the mean responses of the adult learners, facilitators and traditional rulers at $P < 0.05$. 
3. Results

The results are presented in the Table according to the three research questions and two hypotheses that guided the study.

**Research Question 1: What are the economic contributions of lifelong learning in Enugu State?**

**Table 1: Mean responses of the respondents on the economic contributions of lifelong learning**

| S/N | Economic contributions of lifelong learning                                      | X   | SD   | Decision |
|-----|---------------------------------------------------------------------------------|-----|------|----------|
| 1   | Improve employment and labour efficiency                                        | 3.07| 0.90 | Accepted |
| 2   | Capable of overcoming inequality and exclusion among learners                    | 2.91| 0.98 | Accepted |
| 3   | Improve quality of living                                                        | 2.96| 0.96 | Accepted |
| 4   | Stimulates rural development                                                     | 2.91| 0.97 | Accepted |
| 5   | Strengthens human capital base                                                   | 3.01| 1.06 | Accepted |
| 6   | Capable of transiting a developing economy to a knowledge economy                | 2.76| 1.08 | Accepted |
| 7   | Capable of producing an economy that can adapt to change and demand brought as a result of globalization | 2.90| 1.04 | Accepted |

X = Mean, SD = Standard Deviation

Result in Table one shows that items 1-7 had mean scores above 2.50. This indicate that lifelong learning is capable of contributing positively to the economy of a given place by improving employment and labour efficiency, overcoming inequality and exclusion among learners, stimulating rural development, improving the quality of life, strengthening its human capital base, transiting a developing economy to a knowledge economy and producing an economy that can adapt to change and demand that may arises as a result of globalization.

**Research Question 2: What is the ecological perception in utilization of renewable energy in Enugu State?**

**Table 2: Mean responses of the respondents on ecological perception in utilization of renewable energy**

| S/N | Ecological perception in utilization of renewable energy | X   | SD   | Decision |
|-----|---------------------------------------------------------|-----|------|----------|
| 1   | Solar energy is a better alternative to using fossil-fuel in generating electricity | 3.08| 0.90 | Accepted |
| 2   | Solar energy is harmless to the environment and wild life around it                  | 2.65| 0.99 | Accepted |
| 3   | Clean cook stoves that require less wood would reduce deforestation                   | 2.95| 0.96 | Accepted |
| 4   | Production of biogas from cow dung, pig waste, chicken droppings, cassava peeling, sugar cane etc. could reduce CO₂ emission | 2.70| 1.05 | Accepted |
| 5   | Energy sources such as solar, wind, hydropower, biogas etc. would secure a sustainable future | 2.67| 0.99 | Accepted |

X = Mean, SD = Standard Deviation

From Table 2, it can be seen that all items had mean scores above 2.50 indicating that respondents were aware of energy use and its implication to sustainable development.
Research Question 3: What are the factors inhibiting lifelong learning in Enugu State?

Table 3: Mean responses of the respondents on factors inhibiting lifelong learning

| S/N | Factors inhibiting lifelong learning                      | X  | SD  | Decision |
|-----|-----------------------------------------------------------|----|-----|----------|
| 1   | No adequate support institution                          | 2.90| 1.07| Accepted |
| 2   | Lack of media and material for instruction               | 2.80| 1.10| Accepted |
| 3   | Values and attitude of learners                          | 2.80| 1.08| Accepted |
| 4   | Inflexible learning system                               | 2.86| 1.02| Accepted |
| 5   | Lack of political will                                   | 2.91| 1.01| Accepted |
| 6   | Rigid learning system                                    | 2.94| 1.02| Accepted |

X = Mean, SD = Standard Deviation

Result in Table 3, shows that all items 1-6 were factors inhibiting lifelong learning (X>2.50).

Hypothesis One (H01): There is no significant difference in the mean responses of adult learners, facilitators and traditional rulers on the ecological perception in utilization of renewable energy.

Table 4: Analysis of variance on the mean differences of the responses of adult learners, facilitators and traditional rulers on the ecological perception in utilization of renewable energy.

| Groups         | N  | X   | SS   | Df | MS  | F_cal. | F_crit. | Decision |
|----------------|----|-----|------|----|-----|--------|---------|----------|
| Adult learners | 358| 2.82| 0.47 | 2  | 0.24| 0.37   | 1.96    | Not Rejected |
| Facilitators   | 232| 2.79| 388.26| 604| 0.64|         |         |           |
| Traditional rulers | 17 | 2.94|      |    |     |        |         |           |
| Total          | 607|     | 623.18| 606| 0.55| 1.96   |         |           |

F-crit. = F- critical, F-cal. = F-calculated, X = Mean, SD = Standard deviation, N = Sample, SS=Sum of Squares, MS= Mean Squares.

The results of the analysis of variance in Table 4 indicated that traditional rulers had higher mean response (2.94) relative to the mean response of adult learners (2.82) and facilitators (2.79). The differences in the mean response was not significant at 0.05 level of significance calculated F-value (0.37) < table F-value (1.96). This shows that there were no significant differences in the mean response of the groups. Therefore the null hypothesis was not rejected.

Hypothesis Two (H02): There is no significant difference in the mean responses of adult learners, facilitators and traditional rulers on factors inhibiting lifelong learning.

Table 5: Analysis of variance on the mean differences of the responses of adult learners, facilitators and traditional rulers on factors inhibiting lifelong learning in Enugu State.

| Groups         | N  | X   | SS   | Df | MS  | F_cal. | F_crit. | Decision |
|----------------|----|-----|------|----|-----|--------|---------|----------|
| Adult learners | 358| 2.89| 1.14 | 2  | 0.54| 0.55   | 1.96    | Not Rejected |
| Facilitators   | 232| 2.82| 623.18| 604| 1.03|        |         |           |
| Traditional rulers | 17 | 3.03|       |    |     |        |         |           |
| Total          | 607|     | 606   |    |     |        |         |           |

F-crit. = F- critical, F-cal. = F-calculated, X = Mean, SD = Standard deviation, N = Sample, SS=Sum of Squares, MS= Mean Squares.

The results of the analysis of variance in Table 5 indicated that traditional rulers had higher mean response (3.03) relative to the mean response of adult learners (2.89) and facilitators (2.82). The differences in the mean response was not significant at 0.05 level of significance calculated F-value (0.55) < table F-value (1.96). This shows that there were no significant
differences in the mean response of the groups. Therefore the null hypothesis was not rejected.

4. Discussion
The results of this study revealed that there is a direct correlation with lifelong learning and economic development. Lifelong learning overcome learning barriers that could result from any form of inequality and exclusion among learners. It gave more members of the community equal opportunity to acquire new skills and update themselves with relevant skills that enabled them to be self-reliant, productive and subsequently, live better life. With the acquisition of more skills that meets the demand of the contemporary time is an added advantage to the human capital base of such a community. By extension, the human capital base at the community will contribute their quota to the economic growth and stability of the community and country at large. This finding is in consonant with the findings of [6] who in their study found out that lifelong learning improved employment, income and community base of a community.

The study found out that lifelong learning influenced the way respondents perceived energy use and its implication to sustainable community development. The respondent perceived that solar, wind, hydropower, biogas among others are better sources of energy because it causes no harm to the environment. This is due to the fact that so much was gained from these sources of energy as it concerns sustainable community development. For instance, in the area of cooking, the emission of CO₂ will be reduced and forest life will be preserved. The community standing as regards sustainable development was an indication that they were willing to accept alternative renewable energy sources for all their household and economic activities.

Lastly, the study found out that a number of factors are still playing in the background depriving most developing nations including Nigeria to reap the benefits that comes with lifelong learning. Most especially as it has to do with sustainable development, the education system of Nigeria still lacks a well-organized institutions, media and materials for delivering lifelong learning through non-formal education. Aside this, the predominant system of education practiced in Nigeria is formal education which is characterized by rigidity and inflexibility system of learning. This has limited a great number of people to partake in such educational system. Another factor inhibiting lifelong learning is the learner’s attitude to life and belief which is a form of set back on its own.

Analysis of variance of the response of adult learners, facilitators and traditional rulers on the ecological perception of energy use indicated no significant difference at P > 0.05, as calculated F-value (0.37) was below table F-value (1.96). Thus hypothesis one was not rejected. Similarly, responses of adult learners, facilitators and traditional rulers on factor inhibiting lifelong learning also indicated no significant difference at P > 0.05, as calculated F-values (0.55) was below the table F-value of 1.96. Hence, a hypothesis two was retained.

5. Conclusion
Lifelong learning is capable of redressing the many environmental challenges threatening man’s social and economic well-being. As a matter of fact, lifelong learning is an instrument for economic growth, the answer to the education system in Nigeria, and an appropriate measure to keep community members abreast with skills, values and knowledge as well as making them responsive to renewable energy.

6. Recommendations
- Government established departments, ministries, agencies and non-governmental organizations should partner together and make provision for sufficient fund for adult
and non-formal education in order to make learning more flexible and friendly to people who cannot fit-in into the formal education due to one problem or the other.

- Government should make sufficient provision for teaching and learning materials for learners for effective result.
- Experts in renewable energy technology should organize workshops and conferences at least twice yearly for community members at their local government areas in order to educate them on renewable energy applications.
- Learners’ generated instructional materials using locally made materials should be encouraged by educators in order to promote active participation during teaching and learning processes in learning centres.
- Government should organize on the job training for facilitators on regular basis in order to improve their efficiency.

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