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Exploring the Use of Participatory Strategies in Developing Environmental Attitudes in Nigerian Children: Implications for EE Teaching and Learning

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Abstract: Nigeria has since integrated EE concepts into all subjects at the primary and secondary levels of education. However, the major dilemma faced by Nigerian teachers is how to effectively teach these concepts to develop appropriate environment-related attitudes and values in the learners. Most classrooms in Nigeria are still characterized by teacher dominated strategies which may not be able to foster appropriate environmental attitudes. This study therefore explored the use of participatory learning strategies in teaching environmental education concepts. The study further examined the interactive influence of group size and academic ability of students on the dependent measures. The assumption for trying these strategies was based on the premise that EE is not just about telling, but about knowing and acting. Three hundred and sixty Senior Secondary II students drawn from nine schools constituted the subjects for the study. The students were taught the selected EE concepts using the full and quasi-participatory strategies with the conventional lecture as the control. The Environmental Attitude Questionnaire constituted the only instrument used for data collection. Four hypotheses were tested at $p<0.05$ level of significance. Findings from the study show that students taught EE concepts using the participatory approaches developed a more positive attitude to the environment, with those in the full participatory group having the best attitude scores. The results also indicate that students who worked in the small groups demonstrated a more favourable attitude. The participatory approach affords the students to learn and work more effectively with others which made them more sensitive to the necessity of having a descent respect for the opinions of others and be more sensitive to their environment. The implications of these findings for the teaching of EE concepts were discussed. On the whole, it was suggested that the participatory group learning strategies could be a more viable alternative to the traditional conventional methods of classroom teaching.

Key words: Environment, environmental education, participatory learning, teaching strategies, Nigeria

INTRODUCTION

There has been an increasing concern in the last few decades, about the quality of our environment; its relationship with development and our lack of care for the environment. This concern is heightened by society's failure to employ effective means of creating and developing in the people environment awareness and positive attitudes towards the natural, built and social environment, even though man's whole life support system and survival depend on the environment and how he manages it. The concern has been precipitated by evidences of a rapidly deteriorating environment caused by the harmful effects of man's activities on the environment[1]. Such activities as crude oil exploration, emission of dangerous gases from mining operations, fumes from the exhaust pipes of automobiles and industrial machines, the exploitation of forest for economic tree and animals, as well as the exploitation of the rivers for fishes and various forms of soil erosion, contribute to environmental degradation.

In Nigeria, it appears that the fear of global warming is gradually becoming real, especially with the sudden rise in temperature in some parts of the country. In recent times, the temperature of some parts of the North rose to about 46°C while in Lagos area, average temperature has been between 32 and 34°C (NTA Weather Broadcast). To compound the changes in the environment is the strange phenomenon, whereby, contrary to convention, most southern states of Nigeria did not experience harmattan between December 2005 and January, 2006. Rainfall, which ordinarily ought to have been recorded in the months of February and March every year in parts of the south, has, since 1997, occurred

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sparingly in some parts while there has continued to be none in the early part of the year in others. The effect of this on agriculture is great and needs immediate attention and solution[2].

As a result of industrialization, modernization and globalization, this degrading local and global environmental picture has preoccupied a growing number of people and has inspired important international concerns, movements and actions of preservation. These concerns and actions have led to series of seminars and conferences at the local, national, regional and international levels. The most significant of such conferences so far was the United Nations Conference on Environment and Development (UNCED), the popular Earth Summit held in Rio de Janeiro, Brazil, in June, 1992[1].

A major document that emanated from that conference was *Agenda* 21 and a significant point of *Agenda* 21 was its emphasis on education in empowering people for sustainable development. The component of the document states, inter alia, that peoples knowledge, attitudes, values and practices are crucial to the state of the environment and the utilization of the environment for their own well-being[1]. Thus, improved education for and in the environment has been seen to be capable of providing the base for decisions toward a better future and the satisfaction of human needs[3].

Nigeria was among the countries that endorsed the concept of sustainable environmental development at the Earth Summit. It was in response to or in support of this declaration and the preceding ones that the government created or gave increased support to environmental protection agencies to reverse the trends that were leading to ecological disaster[4].

Efforts were made in Nigeria towards the provision of environmental education for sustainable development through the inclusion of a module on the Nigerian Environment in the nation's Citizenship Education Curricular and the Nigerian Educational Research and Development Council/United Nations Development Programme Joint initiative which seeks to produce and implement a master plan for Environment Education. However, the choice for channels, techniques and tools for ensuring effective awareness campaigns and positive attitudes towards this course seems to be posing serious challenges to both the formal and non-formal sectors of Nigeria's educational system[5].

Ever before this initiative, decades of environmental degradation by activities of oil companies did not awaken Nigerians to the need to adopt sound environmental polices. Environmental issues in national development planning were treated from the exploitative point of view. Cries of woes and miseries by communities in oil sensitive environment, their means of livelihood, by oil spillage, gas flaring, acid rain, failed to attract positive response from government or the oil companies[2,5,6].

Recent studies[1,4,7] have shown the level of environmental consciousness, sensitivity and attitude to be abysmally low in Nigeria compared with other parts of the world where environmental awareness, sensitivity, attitudes and skills have led to informed actions. Generally, Nigerians are at best indifferent to the environment. The environment is viewed as merely a source of livelihood; as discrete entities and not a tightly knit system of inter-dependent structures of rivers, forests, animals, microbes and flowers.

The need for Environmental Education (EE): Environmental Education (EE) has increasingly been seen as a potent instrument for mitigating the likely effects of environmental degradation[1,4]. The UNESCO defines Environmental Education (EE) as teaching and learning from, about and for the environmental (which is) manifested through the acquisition and application of knowledge, attitude, skill and motivation for environmental conservation and protection (and wise use).

Environmental education is thus, the development of understandings about our environment, positive attitudes toward the earth and its life and confidence and skills to make positive changes. Environmental education has a long history linked with human's growing interaction with the natural environment and developing appropriate attitudes towards the same.

Environmental Education (EE) is increasingly assuming enhanced attention and status in the education system of many countries. In Nigeria, however, EE in the formal school system is a relatively new development. Even though there had been some channels for teaching some phenomena in the past, the focus was limited to imparting knowledge concerning nature rather than on developing appropriate behaviour towards its protection[4].

Pedagogical approaches to Environmental Education (EE): The foregoing discussion on environmental education has got some pedagogical implications for the school curriculum, especially in Nigeria because the classrooms are still heavily characterized by teacher dominated activities. Hence, how can the environmental education message become an effective part of the daily life of every citizen in this country? To be effective, environmental education requires learning experiences that are planned, focused and cumulative. The strategies employed and the

learning outcomes should enable the student to demonstrate an appreciation of the intrinsic value of life on earth, a concern for the well-being of all living things and their habitats; a sense of joy in the environment, an appreciation of the importance of their own personal behaviour and of participation in social change, a desire to have a quality of life that is ecologically sustainable, an appreciation of other students' perception of the environment and an appreciation of the unique and sensitive nature of the Nigerian environment.

Evidently, research has consistently shown that the dominant traditional pedagogical practices which are confined to transmitting information and involve telling, reading and memorizing and characterized by the dominance of cognitive goals and teacher adopting the fountain of knowledge approach, have failed to cope with problems of development[8]. In an apparent answer to his own question Okebukola[9] remarked to what extent has the Nigerian child benefited from this type of education? said that it is evident that little progress has been recorded. Indeed, not much may have been done to help the child and a great deal may have been taken away.

Furthermore, research has shown that the expository methods may not be effective in changing students' attitudes. Whereas, any method, where necessary experience is provided for the students to interact with could be effective in promoting thought and changing attitudes[4].

The deficiencies of the teaching and learning situations in our schools have called for alternative and more effective approaches that will provide an environment for growth-approaches that will create among other things, person-oriented skills-being positive, valuing others and conflict resolution. In place of the traditional lecture methods has been advocated active learning in which students must do more than just listen[10]. They must read, write, discuss, or be engaged in solving problems. Much more than these, active learning involves students engaging in such higher-order thinking tasks as analysis, synthesis and evaluation. In a way, students are actively involved in doing things and thinking about what they are doing.

Among the strategies which promote active learning is the participatory learning strategy. This is a group investigation model of learning in which learners work together in small groups for one or several class sessions to achieve shared goals and complete jointly specific tasks and assignments.

Johnson, Johnson and Johnson[10] noted that emphases in the teaching/learning environments are currently leaving an era of competitive and individualistic learning. The me classrooms and do your own thing academic work are fading and efforts are towards an era of interdependence and mutuality. The current trend is for we classrooms and we are all in this together teaching[11].

A group has been defined by Atherton as a *collection* of people, in each other's *presence* (a site which is mainly about face-to-face teaching), who are *aware* of each other and who *interact* with each other. The size of the group does matter, at least as far as groups are concerned. In very small groups, for instance, the addition or loss of one member can, of course, make a radical difference to the group process. larger groups need to be managed in quite different ways from smaller ones.

Grouping emphasizes students' active participation. Participation in small group discussion helps students foster personal involvement encourages cooperation and sensitivity among the participants and may help to clarify knowledge and values. Grouping students assist the teacher to link individual student efforts so that they can assist and support each other's learning[10]. By grouping individuals with different abilities, backgrounds and viewpoints in such a way that they share ideas, the teacher can accomplish much more content coverage. Groups insure that students engage actively with course materials, necessitating participating in ways which are not possible otherwise.

Student academic ability has been found to be important in influencing students' performance in school projects, activities and tasks[12]. These characteristic abilities are reflected in behaviour such as handling difficulties that arise, getting right to work on task and expressing interest. The academic ability levels of students show their scholastic aptitude and this goes a long way in determining achievement of learners[4]. It has also been shown that learners with different academic ability respond differently to situations and perform differently depending on the types of methods and materials used for the subject of instruction[12]. It is apposite, therefore, to find out whether the use of one method or another will bring about better performance of learners with varying ability.

The problem: This study determined the effects of two models of participatory learning strategies (full participation and quasi-participation) on secondary school students' attitude to selected environmental issues and concepts. Furthermore, the study examined the interaction effect of group size (small 4 students and large 8 students); and academic ability (high, average and low) on subjects' attitudes to the environmental concepts.

Hypotheses:

H_{01} : There is no significant main effect of treatment on subjects' attitude to the environmental concepts.

H_{02} : There is no significant interaction effect of treatment and group size on subjects' attitude to environmental concepts.

H_{03} : There is no significant interaction effect of treatment and subjects' academic ability on their attitude to environmental concepts.

H_{04} : There is no significant interaction effect of treatment, group size and academic ability on attitude scores of subjects in each of the treatment conditions.

MATERIALS AND METHODS

This study adopted a pre-test, post-test, control group, quasi experimental design using a 3×3×2 factorial matrix. The independent variable was the mode of instruction varied at three levels; Full Participatory Learning Strategy (FPLS), Quasi-Participatory Learning Strategy (QPLS) and Conventional Lecture Method (CLM). The dependent variable was attitudes to environmental issues and concepts, while Academic Ability of subjects (High (HAA), Average (AAA) and Low (LAA) and class size (small-4 students and large-8 students) were the intervening variables.

Three hundred and sixty Senior Secondary two (SSII) students drawn from nine secondary schools in Irepodun Local Government of Kwara State, Nigeria, constituted the subjects of the study. The stratified random sampling method was used in selecting the nine schools from the three zones Omu-Aran, Oro and Ajasse-Ipo that make up the Local Government Area. The selection of the three schools from each of the three zones was done by fish bowl random sampling. In each of the nine schools sampled, one randomly selected intact SSII class was involved in the experiment. Six of the nine schools were randomly assigned as experimental group and three as the control group. Forty regular students per class per school were used for the purposes of analysis and discussion.

The selection of concepts for this study was based on the information and data gathered from previous works[1,3,13]. The starting point and motivation for the EE concepts selected for the study, therefore, lay in the immediate environment. These concepts were; the human environment-natural and man-made; natural resources in Nigeria; interdependence in the Nigerian environment; pressures on the environment; major environmental issues and problems in Nigeria-desertification, soil erosion, flooding, environmental pollution, population issues and problems and environmental education objectives, sustainable development and conservation.

Instruments: The instruments used in generating data for the study were (1) General Aptitude Test (GAT) which was used to categorize students into the academic ability groups (high, average and low); (2) Participatory Learning Guide (PLG) - Teacher's Instructional Guide on: (i) full participatory learning and (ii) Quasi-Participatory Learning; (3) Environmental Educational Module (EEM)-notes on the concepts for the study and (4) Environmental Attitude Questionnaire (EAQ). The two response instruments, i.e., GAT and EAQ were exposed to some validation processes. The reliability coefficient of the test (GAT) was calculated using the Kuder Richardson (kr_{21}) formula and this yielded reliability co-efficient of 0.78. The EAQ was adopted from Mansaray and Ajiboye[1] and had been validated accordingly with reliability co-efficient of 0.74, using the Cronbach Alpha.

Procedure: A total of nine teachers (research assistants) were involved in this study. These teachers were those who had at least a university degree, preferably a B.Ed in any field, since EE cuts across many disciplines. The teachers had a minimum of five years post-qualifications experience.

The Full Participatory and Quasi Participatory Learning Strategy Guides were a 3 h and 20 min session of five periods each, split into three separate sessions of 80 min for each of the first and second sessions and 40 min for the third and last session. Students were assigned to a four-member group for small group and eight-member group for large group. This was in line with suggestion of not more than four members for small groups. All groups were mixed in performance level: high, average and low, based on their scores in the General Aptitude Test (GAT).

The activities in the FPLS group included teacher presentation of lesson for twenty minutes, one of the two major activities performed by the teacher and the second, spending some time going from group to group, answering questions and clarifying issues.

The major activities of the students included assuming and assigning roles to members-recorder, reporter, time-keeper and monitor, discussion in groups of four and eight the question posed by the teacher based on the teacher's previous discussion and the assignment given to the students earlier on. Each group presented a report which was the outcome of the members' consensus on the questions. In the groups, students shared ideas, helped each other to learn, pooled resources, shared discoveries, justified their thinking and critiqued each other's idea.

The group reporter, a representative of the groups, presented the groups' report to the general class, to mark the close of the day's session, while members from the

other groups reacted to the presentation. These reports were later submitted to the class teacher for grading. The scores went to the groups accordingly.

There was a weekly competition of forty minutes duration. This took place in the third and last session for the week. Three members from each group competed with members from the other groups in quiz to contribute to group scores. This was also an inter-group competition as against intra-group competition or individuals competing for an elusive goal.

Students rotated roles of recorder, reporter, monitor and time-keeper for three weeks after which new groups were formed.

Certificates were awarded to the best groups every week. The award was based on the group's performances in the group reports submitted and the scores received in the weekly competition. Individual members of the group also received rewards in the form of praises for active participation in and contribution to the groups' success and efforts. Thus, cooperation and competition as well as rewards were carried out at group levels.

Teacher's activities in the Quasi Participatory Learning Strategy (QPLS) were the same as in FPLS group. In the students' activities, however, instead of going straight to group discussion, after teacher's presentation, students worked individually and independently of the other students answering the questions. The answers were submitted to the teacher and grades were awarded on individual basis.

The third session which was the last in the week, the forty-minute session, was split into two. The first was a ten-minute weekly test taken by individuals in the groups. This was marked and graded. Individuals were rewarded for high performance and, at the same time, groups which produced the best students were rewarded with bonus marks. The remaining thirty minutes were spent on quiz competition involving all the groups, scores here went to the groups.

Certificates of excellence were awarded to groups based on their performances in their group reports, the quiz and the bonus marks accruing to such groups for producing the best student for the week in the individual tests. Individual members were also praised for their contributions toward the success of their groups. Roles were rotated every week; groups were changed every three weeks. Thus, in the QPLS, competition, cooperation and rewards were at two levels; individual and group levels.

All subjects for the study were pre-tested using the General Aptitude Test (GAT) and the Environmental Attitude Questionnaire (EAQ). Teaching in both the experimental and control groups were carried out for three periods (sessions) of 200 min (80 + 80 + 40 min) per week for six weeks. Data collected were analyzed using ANCOVA, MCA, t-test and Scheffe multiple range test.

RESULTS

Teaching strategy and subjects' attitudes to environmental concepts: H_{01}: There is no significant main effect of treatment on subjects' attitude to the environmental concepts.

To determine the main effect of instructional strategy on students' attitude to the environment, reference will be made to Table 1-3.

Table 1 shows that only the treatment variables, that is, strategy, had a significant main effect on the variations in subjects' attitude scores ($F_{(2,341)} = 23.636$; $p<0.05$). The summary of ANCOVA in (Table 1) shows that the mean effect of instructional strategy on the subjects' attitude towards the environment was significant ($F_{(2,341)} = 23.636$; $p<0.05$). This shows that there was a significant difference in the post-test attitude scores of subjects exposed to the two experimental and the control groups. In effect, hypothesis one is rejected.

Table 1: Summary of Analysis of Covariance (ANCOVA) on the post-test attitude scores of subjects according to strategy, group size and academic ability

Source	SS	df	MS	F	Sig. of F
Covariates	513.951	1	513.951	50.177	0.000
Main effects	513.586	5	102.717	10.028	0.000*
Strategy	484.200	2	242.100	23.636	0.000*
Group size	16.840	1	16.840	1.644	0.201*
Academic ability	3.118	2	1.559	0.52	0.859
2-way interactions	158.268	8	19.784	1.931	0.055
Strategy x group size	113.424	2	56.712	5.537	0.004*
Strategy x academic ability	30.445	4	7.611	0.743	0.563
Group size x academic ability	10.387	2	5.194	0.507	0.603
6-way interactions	13.041	4	3.260	0.318	0.866
Strategy x group size x academic ability	13.041	4	66.603	0.318	0.866
Explained	1198.847	18	10.243	6.502	0.000
Residual	3492.253	341	13.069		
Total	4691.000	359			

* Significant at $p<0.05$

Table 2: Multiple Classification Analysis (MCA) of the post-test scores according to strategy, group size and academic ability

Variable+category	N	Unadjusted deviation	Eta	Adjusted for indep-beta Endents + deviation	Beta
Strategy					
Full participatory	120	-0.15		1.61	
Quasi participatory	120	-1.13		-1.20	
Conventional lecture	120	-0.05	0.25	-0.30	0.33
Group size					
Small	120	-0.08		1.25	
Large	240	0.17	0.26	-2.50	0.14
Academic ability					
Low	152	-2.33		-0.01	
Average	135	-0.17		0.10	
High	73	0.15	0.05	-0.16	0.03
Multiple R^2					0.219
Multiple R					0.468

Table 3: Scheffe multiple range comparison of the post-test mean attitude scores according to strategy

Mean	Groups	Group 1	Group 2	Group 3
73.74	Full participatory		*	
70.83	Quasi-participatory	*		*
71.83	Lecture method		*	

* Denotes pair of means that significantly differs from each other at $p<0.05$

To determine how each of the groups performed, a Multiple Classification Analysis (MCA) was done and this is shown in (Table 2).

Table 2 shows that the full participatory group obtained the highest mean score (x = 73.74), followed by the lecture method group (x = 71.83) while the quasi-participatory group had the lowest attitude scores with a mean score x = 70.83. This shows that the order of increasing means of performance in attitude is $E_1 > C > E_2$. The table also shows that the small class group had a higher mean scores than the large class (x = 73.38 and x = 69.63, respectively). Similarly, subjects with low academic ability had a x = 72.12; the average academic ability group obtained x = 72.23; while the high academic ability group had the lowest mean attitude scores of 71.92.

To determine the actual source of the observed significant difference indicated in the ANCOVA, a Scheffe post-hoc analysis was done on the mean attitude scores of the group. This is presented in (Table 3).

The quasi-participatory learning strategy (E_2) group differed significantly from the full participatory learning (E_1) group and the conventional lecture method (C) group.

Interaction effects of teaching strategies and group size on subjects' attitude to the environment: H_{02}: There is no significant interaction effect of treatment and group size on subjects' attitude to environmental concepts.

To test for significance based on the null hypothesis two, Table 1 earlier presented and Table 4 are referred to.

From Table 1, it was obtained that the 2-way interaction of strategy and group size on the post-test mean attitude scores of subjects was significant ($F_{(2,341)} = 23.636$; $p<0.05$). On the basis of this finding, the null hypothesis two (H_{02}) was rejected.

Table 4: T-test comparison of the post-test mean achievement scores of subjects in the small and large group according to treatment

Treatment	Class size	N	X	SD	Df	T-value	Sig. of t
Experimental 1 (FPLS)	Large	80	74.48	3.06	118	2.84	0.005*
	Small	40	72.58	3.62			
Experimental 2 (QPLS)	Large	80	71.03	2.93	118	0.04	0.967
	Small	40	71.00	3.23			
Control (Lecture)	Large	80	71.40	4.06	118	1.60	0.113
	Small	40	72.58	3.67			

*Significant at $p<0.05$

Table 4 presents the t-test comparison of the post-test mean attitude scores of subjects in the small and large groups across the three treatment group. This made it possible to isolate the contributions of each of the three treatment groups towards the observed significant difference.

From Table 4, it was noted that large groups had a higher mean attitude scores than the small groups in the experimental group 1 (x = 74.48 and 72.58 for large and small groups respectively). The scores in experimental group 2 were x = 71.03 for large group and 71.00 for small group. In the control group, the small group obtained a higher mean score (72.58) than the large group (71.40). The respective t-values and their probabilities show that for the various differences presented earlier, only that of the experimental group 1 was significant (t = 2.84; $p<0.05$). These finding shows that the significant interaction effect observed in Table 1 was as a result of the significant difference between the large and the small group of experimental group one only.

Interaction effect of teaching strategy and academic ability on subjects' attitude to the environment: H_{03}: There is no significant interaction effect of treatment and subjects' academic ability on their attitude to the environment. From Table 1, it was observed that the 2-way interaction of strategy and academic ability on the post-test mean attitude scores of subjects was not significant ($F_{(4,341)} = .743$; $p>0.05$). On this basis, the null Hypothesis three (H_{03}) is not rejected. A similar result was obtained for hypothesis four. Hence, the null hypothesis which states that 'there is no significant interaction effect of treatment, group size and academic ability on attitude scores of subjects in each of the treatment conditions' is not rejected.

DISCUSSION

Previous researches have shown the role of active participation of students in improving their environmental attitudes, knowledge or both. The present

study encouraged students to participate in class activities during the six-week period. Three categories of variables were involved in this study; teaching strategy (full participatory, quasi participatory learning strategies and the conventional lecture method), group size (small group of four students and large group of eight students) and students' academic ability (high, average and low academic ability).

Participatory learning strategies (FPLS, QPLS), conventional lecture method and subjects' affective outcome: People have been known to change their attitudes toward issues, objects, situations and ideas as a result of one factor or a combination of factors. Among such factors is source of information and prestige of the source; self-esteem or self-presentation.

Although the results from this study indicate no statistically significant difference in the effectiveness of the three modes of instruction on attitude development in environmental education, the students were found to have generally developed positive attitudes to the environment regardless of the mode of instruction used. However, it is important to note that subjects in the FPLS group recorded the highest mean attitude scores among the three groups. The development of positive attitude by the students to the environment might have been due to the opportunity of exchanging ideas that was provided by working in groups. It had been postulated that working in groups could facilitate the satisfaction of psychological and social needs. Odia stated that one feels safe within the confines of the group and vulnerable outside of it. Webb and Faniver[14] found that in group work, giving and receiving answers with explanation help to obtain superior argument, which brings about change in attitude. This is a pointer to the existence and value of positive interdependence among group members which is an essential feature of group learning. Other studies, Johnson and Johnson[10] also supported the effectiveness of the participatory approaches. The students in the participatory groups demonstrated a more positive environmental attitude.

This finding has a very serious implication for the teaching of environmental education in Nigeria cannot be over-emphasized. Environmental education, like population education, is a value-laden subject which allows for individual learner's decisions that affect learners' decision-making and choice[15]. Ajiboye[15] further observed that if learners are then exposed to salient facts relating to environmental education concepts through active participation (participatory or group learning), they will better be able to make informed and reasoned decisions after due consideration of the alternatives as presented to them in a more cognitive framework.

Another inference to be drawn from these results on the attitude scores of the subjects in the two experimental groups is that if students were exposed to the participatory learning strategies for a longer period than it was during the study the gap in the attitude scores of the two groups might be narrowed. This contention is supported by the psychological findings that with strong background knowledge, attitudes change over a long period of time[15,16]. As a matter of fact, an individual's attitude depends to a large extent on the knowledge the person has gained about the object of affection. It can be said, therefore, that the effectiveness of the participatory learning strategies in developing the knowledge base or cognitive component will enable the learners to also develop positive attitudes towards environmental issues and problems.

Changes in attitudes towards teachers and fellow students in general were also noticed in the participatory groups. The teachers, on their part, confessed that they really started thinking of the children as individuals or people, not just someone to whom they were to impact certain knowledge and skills. They saw that their attitudes with children had become less dictatorial and that children could work out many of their own problems if left alone, with a bit of good guidance on the teacher's part. This resulted in a more cooperative classroom atmosphere.

Group size, strategies and subjects' affective outcomes: Another point of note in this study in the classroom participatory learning is that groups of different size and composition could be formed either by the teachers or by the students themselves. Benneth and Dunne[17] and Panitz[18] noted that informal groups composed by learners are usually heterogeneous or mixed ability and that learners in the groups learn better in a natural company of others they socialize with. In such groups also, learners feel secured, relaxed and confident. In spite of the differences in their abilities, the learners in such groups readily interact and are willing to seek help from peers without being ashamed and offer assistance without a feeling of superiority. In the groups, the social, psychological and academic-based needs are interwoven and catered for.

Where groups are formed by the teacher based on tests administered, like it was done in this study, the groups could still achieve a lot. The position taken in this study in respect of formation of groups by the teacher

was fashioned after Slavin's[19]. Slavin[19] believes that it is expedient for the teacher to use ability or sex as the criterion for grouping rather than personality, or socio-economic background. This position enabled learners of varying ability levels (high, average and low) to interact, socialize, solve problems together and take common decisions. This position, too, created positive interdependence among the groups in this study and led to the satisfaction of social, psychological and academic needs of the learners.

The findings of this study suggest that EE materials can be favourably programmed for and effectively implemented in small group size. The findings also showed that the formation and working in small participatory groups led to improved human relations and social interaction. Changes in attitudes and feelings towards human beings as such were one of the most common and most important of the outcomes of participatory learning strategies. Students sat in groups-sitting down with other students to meet as humans, not just as other isolated entities. Each participatory student in the groups had come to reorient himself to the whole business of being human among other humans. He learned to expect (and did see), to differ from him, not out of ignorance, but out of differences in what they know.

The students were able to gain new meaning for the idea that all persons are equal. The grouping and the discussions that took place in the groups enabled the students to see quality in that all had contributions to make, all had unique experience to contribute, all had problems which must be solved and all were capable of spending themselves on the problem of others. These findings agree with earlier findings on the influence of grouping on both cognitive and affective outcomes by Sheppard[20]; Kelley[21]; Panitz[22].

The opportunity given to each member of the participatory learning groups to play the role of a leader and a follower at one time or the other motivated the students to support their groups. Deviant behaviours which could have marred the achievement of group goals were prevented. Changing of roles in groups might have also helped to promote acquisition of good social skills which Slavin[23] regarded as an essential ingredient of group learning. This also helped the students to communicate effectively, provide leadership for group work, build, maintain and sustain trust among group members and meaningfully resolve conflicts within the group. These could lead to the construct of social engineering in the group.

The involvement of all members of the groups in each discussion time ensured that group processing was made specific. It also assured the maintenance of effective working relations through the teachers' supervision. Group activities in the participatory learning also afforded students the opportunity to face common problems collectively. Individuality, which could strain students' relationship with the environment should everyone do things individually, was reduced to minimal level. The findings of this study in respect of group-based efforts are, therefore, important for understanding and using the environment in sustainable manner.

Implications of findings and recommendations: The findings of this study would seem to have some implications for the teaching and learning of EE as well as of other subjects in Nigeria. First, the participatory group learning programmes have been found to be a good and viable alternative to the traditional methods of teaching in classrooms. It is possible, therefore, to explore the participatory approaches to replace the face-to-face teaching practices commonly found in schools, particularly when it is realized that a value-laden subject like environmental education, is not a matter of telling.

These findings call for urgent and concerted efforts aimed at invigorating the wide use of the group learning approaches in Nigerian classrooms, particularly in the teaching and learning of Social Studies and its allied areas, the new subjects such as environmental education, population education, citizenship and low-related education. Ajiboye[15] has shown in his review of the current practices of teachers handling these new emerging subject areas that a majority of the teachers still used the conventional teaching methods. This situation is appalling and unsatisfactory. It is, therefore expected that findings in this study will serve as a guide to school teachers, in the new as well as in the old subjects.

The results here have confirmed that the active participation of the learner in the learning situation leads, in effect, to favourable attitudes to learning. This results, in consequence, in higher achievement of the learners. For a higher effectiveness, the participatory learning programmes can be supplemented by some other innovative strategies such as open discussion, debates, brainstorming in environmental education classrooms. These methods and strategies, as observed by Ajiboye[15] and further tested and confirmed by Ogunleye[24] should be encouraged at home and in the school to promote attitudes and rational behaviours among young and adult learners.

The findings also show that group size and academic ability had great influence on subjects' performance in all

the groups. However, the participatory strategies appear to be more suited to high student effectiveness in small groups. Students in the small group of four members performed better and adapted more quickly to situations than students in the large group of eight members. In the conventional lecture method where students were also grouped into four and eight members for small and large groups respectively, even if for no other reason than to encourage social interaction, the feeling of group belongingness and acceptance helped the students achieve high results. As a result of the participatory group work, there was a reduction in prejudice and discrimination among the students. Surely, the reduction in prejudice and discrimination in any area lies in having an opportunity to really know those for whom these feelings are held. Little or no knowledge of a thing is seen by Kelley[21] as an acute case of a disease of serious social consequence.

CONCLUSION

It is clear from the results of this study, the discussion and the implications that the problem of the scarcity of teachers, the apparent lack of adequate teachers preparation in environmental education as well as in other subjects, in Nigerian schools, can be successfully overcome with the adoption of the participatory learning programmes which will result in student self-learning. Relevant agencies for curriculum development for schools and colleges in Nigeria should begin to examine the possibility of preparing what Ajiboye[15] called programmed materials in environmental education for secondary schools. These programmes should cut across all fields of study-arts, sciences and commercial. This could be done by preparing various participatory learning modules on selected concepts in environmental education. The results of this study have provided a basis for the advocacy and use of the participatory learning programme in environmental education.

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