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Teaching in a changing Africa

THREE MODELS OF GROUP LEARNING STRATEGIES, MATHEMATICAL ABILITY AND GENDER AS DETERMINANTS OF STUDENTS' LEARNING OUTCOMES IN MAPWORK

ABSTRACT

This study determined the relative effects of three group learning strategies - the Cooperative Learning Strategy (CLS), the Mastery Learning Strategy (MLS), the Integrated Group Learning Strategy (IGLS) (which is the integration of CLS and MLS) and the conventional method - on students' learning outcomes in mapwork using gender and mathematical ability as moderator variables. A 4x3x2 pretest, posttest, control group quasi-experimental design was adopted in the study. Three hundred and sixty (360) SS II geography students (196 males and 164 females), drawn from 8 public secondary schools in Ibadan metropolis comprised the subjects of the study.

Six major instruments: a Mapwork Achievement Test (MACT), a Mapwork Skill Test (MAST), a Students' Attitude to Geography Questionnaire (SAGQ), a Mathematical Ability Test (MAT), a set of Unit Achievement Tests (UAT) as well as Diagnostic Progress Tests (DPT) were developed and used to collect the requisite data in the course of the 8-week experiment. Seven hypotheses were tested in the study. The data collected were subjected to both descriptive and inferential statistics. The analysis of covariance (ANCOVA) and t-test statistic were used to test the hypotheses at 0.05

probability level. The Scheffé post-hoc Analysis was used, where significant differences were found to determine the source of variation and direction of significance.

The results showed that there was a significant main effect of treatment for all dependent measures: Achievement [$F_{(3,359)}$ = 77.749; P < 0.05], mapskill [$F_{(3,359)}$ = 73.024; P < 0.05], and attitude [$F_{(3,359)}$ = 9.128; P < 0.05]. The Cooperative Learning Strategy was most effective for achievement and mapskills while the Integrated Group Learning Strategy was found more effective for attitude. The results also showed that there was a significant main effect of mathematical ability on students' achievement in mapwork ($F_{(2,359)}$ = 3.778; P < 0.05) and attitude ($F_{(2,359)}$ = 2.918; P < 0.05). It was specifically noted that high mathematical ability students performed better than their low ability counterparts in all the dependent measures. It was however shown that there were no significant main effects of gender on all dependent measures. All the two-way and three-way interaction effects on all the dependent measures were found not to be significant.

A major finding of this study was that both Cooperative Learning and Integrated Group Learning Strategies were more effective than Mastery Learning and individualistic learning strategies in facilitating students' achievement in mapwork. The implications of these findings for effective classroom interaction, especially with reference to large classes are discussed in the thesis. Based on the findings, it is recommended that both the Cooperative Learning Strategy and the Integrated Group Learning Strategy be included in the training of pre-service teachers in order to enhance students' performance in mapwork.

Key Words: Group Learning, Cooperative Learning, Mastery Learning, Integrated Group Learning, Mapwork.

Background to the Study

Science today dominates institutional learning because of its acknowledged importance and contribution to human development through inventions and new discoveries (Majasan, 1969; Emovon, 1985; Okpala, 1995; Amosun, 2002). These discoveries, inventions and contributions are distributed over the landscape, which Geography as a discipline studies. Since geographers try to understand the places and regions of the world, how they came to be, and how they affect each other, they investigate many seemingly diverse topics. Hence, simply put then, geography tries to describe the earth; its physical and human features as they occur over space and how these phenomena interact and interrelate. Therefore all activities of man that take place on earth are the concern of geographers.

> Looking at geography objectives in nigeria, it seems clear that their pursuance and realisation would provide students with the critical skills and competences needed for national development. Notwithstanding this perceived importance of the subject it does not appear to be very popular with students. It has been observed that, the performance of candidates in the West African Secondary School Certificate Examination(WASSCE) in Nigeria is becoming poorer every year. A critical observation of students results of geography through a periods of ten years by Amosun (2002), shows that there was no improvement as no year records even up to 40% pass at credit level (i.e. from A1-C6).

This situation may not be unrelated to the fact that geography is considered by many students to be a conceptually difficult subject with an extremely wide scope (Adegoke,

1987). It appears that students find physical geography particularly difficult, especially, the aspect of mapwork that requires the knowledge of Mathematics. Yau, Wong, and Ma (1992) provide further insight into this problem in their own findings. They emphasise the intricacies involved in mapwork thus**:**

> Mapwork is an important element in geography. It requires abstract thinking and mathematical calculation skills, which are sequentially built up. (p.135)

The problems above may not be unconnected with the methodologies employed in Geography (especially in mapwork) teaching. Okunrotifa (1971) and Igbokwe (1995), noted that in spite of modern trends in geography, teachers employ a limited number of teaching methods in Nigeria, and what one finds is still the predominance of the more teacher-centred approach to the teaching of Geography; this position has not changed since then.

. Many times, teachers never give the child an opportunity to have a direct experience with learning materials. Likewise, they do not give chance for sharing and interaction that can enhance and sharpen students' different schemas and promote learning outcomes (Bajah 1977, 1982; Abdullahi, 1982,Amosun,2002).

It has been contended that the methodology that will really help students develop the right type of skills must be the type which will mutually, cooperatively and actively involve the learners together in groups (Okebukola, 1984; Bennet & Dunne, 1992; Yau, et al., 1992; Cowie, et al., 1994). A review of literature on geography (mapwork) and other subjects in other countries of Asia and Western countries has indicated that a few

number of methodologies have been tried out for this purpose. In fact, the group learning in mapwork is beginning to be used in Hong kong (Yau, et al. 1992). However, the effectiveness of these methods have not been conclusively determined as far as mapwork is concerned.

It is generally believed that one of the fundamental facts of human learning is relations, and that the learning arena is usually pervaded with a network of relation among individuals. It is this net work of relations that is tagged "group dynamics".

Cooperative group work provides a setting where children can explore relationships with one another and can share issues in a trusting setting. When children experience difficulties, group work can be helpful and supportive. Group work provides a context where children learn to be confident in themselves. They can also explore conflicts as microcosm of society where children can come to learn about roles and relationships and learn interactions which will stand them in good stead in their future lives as adults (Cowie & Smith, 1994).

Based on the proclaimed efficacy of group learning strategies and the fact that the effe ctiveness of these strategies have not been conclusively determined as far as mapwork in geography is concerned, there is need for further investigation.

Statement of the Problem

The study determined the relative effects of cooperative learning strategy, mastery learning strategy and integrated group learning strategy (an integration of

cooperative learning strategy and mastery learning strategy), and conventional method (the control) on students' learning outcomes in mapwork (an aspect of geography). The study also investigated the moderating effect of mathematicalability and gender on achievement in mapwork, mapwork skills and attitude to geography.

Hypotheses

The following null hypotheses were tested in the study.

Ho_1. There is no statistically significant main effect of treatment on students' achievement in mapwork, mapwork skills, and attitude to geography.

Ho_2 There is no statistically significant main effect of gender on students' achievement in mapwork, mapwork skills, and attitude to geography.

Ho_3 There is no statistically significant main effect of mathematical ability on students' achievement in mapwork, mapwork skills, and attitude to geography.

Ho_4 There is no statistically significant interaction effect of treatment and gender on students' achievement in mapwork,mapwork skills, and attitude to geography.

Ho_5 There is no statistically significant interaction effect of treatment and mathematical ability on students' achievement in mapwork, mapwork skills, and attitude to geography

Ho_6 There is no significant interaction effect of gender and mathematical ability on students' achievement in mapwork,mapwork skills, and attitude to geography.

Ho_7 There is no statistically significant interaction effect of treatment, gender and mathematical ability on students' achievement in mapwork,mapwork skills, and attitude to geography

The study adopted a quasi-experimental, pre-test, post-test, control group design.Three variables were involved in this study:

A The Independent Variable – This is the teaching strategy or the instruction mode, which occurs at four levels:(i)Cooperative Learning Strategy (CLS);(ii)Mastery Learning Strategy (MLS)(iii) Integrated Group Learning strategy (IGLS);(iv) Control group (conventional method) (CM)

B Two Intervening Variables, namely:(i)Gender – Male and Female;(ii) Mathematical Ability, this occurs at three levels: High; Average; Low

C The Dependent Variables(i) Mapwork Achievement;(ii) Map skills; and (iii) Attitude to geography.

Selection of Subjects

The target population for this study was the Senior Secondary School Two (SSII) geography students from public secondary schools in Ibadan, Oyo State. In all, three hundred and sixty (360) SSII geography students started and completed the study. These eventually comprised the subject of the study. From the total sample, 196 were males while 164 were females.

Research Instruments

The following instruments were used in this study.(i) Mapwork Achievement Test (MACT)(ii)Mapwork Skills Test (MAST)(iii) Students' Attitude to Geography Questionnaire (SAGQ)(iv) Unit Achievement Test (UAT)(v) Diagnostic Progress Test (DPT)(vi)Mathematical Ability Test (MAT)

Procedure for the Study

The teachers who participated in this study were adequately trained on the purpose, principles and procedures governing the group learning and the use of each treatment. The manual for training was given to them, and they were asked to revisit it

from time to time.After the teacher had prepared the students, the pretest were applied. These included the four major instruments i.e. MACT, MAST, the SAGQ and finally the MAT.

Method of Data Analysis

The data collected were analysed using Analysis of Covariance (ANCOVA). The pretest scores were used as covariates. The Multiple Classification Analysis (MCA) technique was employed to find out how each of the groups performed. Where differences were observed in the ANCOVA results, the Scheffé post-hoc test was used to determine the source of variation and direction of significant differences among the groups. The seven hypotheses were tested at 0.05 alpha.

Effects of treatments on students' achievement in mapwork

HO_1: There is no statistically significant main effect of treatment on students' achievement in mapwork, mapwork skills, and attitude to geography.

To test this hypothesis, a 4x3x2 analyses of covariance was used. The summary of the result of this analysis is presented in Tables 4, 5 and 6.

Table 4: Summary of 4x3x2 analysis of covariance on post-test achievement scores of subjects according to treatment, gender and mathematical ability

SOURCE OF VARIATION	SUM OF SQUARE	DF	MEAN SCORE	F	SIG. OF F.
COVARIATES (pretest)	1425.618	1	1425.618	16.563	.000
Main Effects	20779.034	6	3463.172	40.235	.000
Treatment	20076.345	3	6692.115	77.749	.000*
Gender	52.315	1	52.187	.608	.436
Ability	650.375	2	325.187	3.778	.024*
2-WAY INTERACTIONS	882.372	11	80.216	.932	.510
Treatment x Gender	397.165	3	132.388	1.538	.204
Treatment x Ability	431.714	6	71.952	.836	.543
Gender x Ability	8.981	2	4.491	.052	949
3-WAY INTERACTIONS	89.423	6	14.904	.173	.984
Treatment x Gender x Ability	89.423	6	14.904	.173	.984
Explained	23176.447	24	965.685	11.219	.000
Residual	28834.528	335	86.073		
TOTAL	52010.975	359	144.877		

* Significant at $P < 0.05$

The Table above shows a significant main effect of treatment on students mean achievement scores [$F_{(3,359)} = 77.749$; $P < 0.05$]. Hypothesis 1a (HO1(a) that states that there is no significant main effect treatment on students' achievement in mapwork is therefore rejected.

Effects of Treatments on Students' Acquisition of Mapskills

HO_1(b): There is no statistically significant main effect of treatment on students' mapskills.

To test this hypothesis, a 4x3x2 analysis of covariance was used.

Summary of 4x3x2 analysis of covariance of students posttest map skill scores by treatment, gender and mathematical ability.

SOURCE OF VARIATION	SUM OF SQUARE	DF	MEAN SCORE	F	SIG. OF F.
COVARIATES	96.748	1	96.748	6.671	.010
Main Effects	3234.569	6	539.095	37.174	.000
Treatment	3176.961	3	1058.987	73.024	.000*
Gender	.000	1	.000	.000	.999
Ability	57.608	2	28.804	1.986	.139
2-WAY INTERACTIONS	186.978	11	16.998	1.172	.305
Treatment x Gender	50.498	3	16.833	1.161	.325
Treatment x Ability	123.542	6	20.590	1.420	.206
Gender x Ability	3.019	2	1.510	.104	.901
3-WAY INTERACTIONS	9.535	6	1.589	.110	.995
Treatment x Gender x Ability	9.535	6	1.589	.110	.995
Explained	3527.830	24	146.993	10.136	.000
Residual	4858.159	335	14.502		
TOTAL	8385.989	359	23.359		

* Significant at P < 0.05

Tables 7 indicates a significant main effect of treatment on students' mean mapskill scores [$F_{(3,359)} = 73.024$; $P < 0.05$].

Therefore the hypothesis that states that there is no significant main effect of treatment on students' mapwork skills is rejected.

Effects of Treatment on Students' Attitude to Geography

HO_1(c): There is no statistically significant main effect of treatment on students' attitude to geography.

This hypothesis was tested using a 4x3x2 analysis of covariance (ANCOVA). The results of the analysis are presented in Table 10, 11 and 12.

Summary of 4x3x2 analysis of covariance of students posttest attitude scores by treatment, gender and mathematical ability.

SOURCE OF VARIATION	SUM OF SQUARE	DF	MEAN SCORE	F	SIG. OF F.
COVARIATES	3001.762	1	3001.762	19.670	.000
Main Effects	5535.934	6	922.656	6.046	.000
Treatment	4178.988	3	1392.996	9.128	.000*
Gender	466.464	1	466.464	3.057	.081
Ability	890.482	2	445.241	2.918	.050
2-WAY INTERACTIONS	3020.563	11	274.597	1.799	.053
Treatment x Gender	915.501	3	305.167	2.000	.114
Treatment x Ability	1343.552	6	223.925	1.467	.189
Gender x Ability	720.214	2	360.107	2.360	.096
3-WAY INTERACTIONS	464.501	6	77.417	.507	.803
Treatment x Gender x Ability	464.501	6	77.417	.507	.803
Explained	12022.760	24	500.948	3.283	.000
Residual	51123.140	335	152.606		
TOTAL	63145.900	359	175.894		

* Significant at P < 0.05

It could be observed from the Table In other words, the Table shows a significant main effect of treatment on students' mean attitude scores [$F_{(3,359)}$ = 9.128; P < 0.05]. Based on this finding, the hypothesis is therefore rejected.

Effects of Gender on Students' Learning Outcomes in Mapwork

HO_2: There is no statistically significant main effect of gender on students'

(a) achievement in mapwork, mapwork skills, and attitude to geography.

With respect to achievement, hypothesis 2(a) states that there is no statistically significant main effect of gender on students' achievement in mapwork.

Table indicates that there is no significant main effect of gender ($F_{(1,359)}$ = .608; P > 0.05) on achievement. Hence hypothesis 2(a) [$HO_{2(a)}$] that states that there is no significant main effect of gender on students' achievement in mapwork achievement is not rejected.

With respect to mapwork skills, hypothesis 2(b) [HO_2(b)]: there is no statistically significant main effect of gender on students' mapwork skills.

From the table, there is no observed statistically significant main effect of gender on students' mapwork skills [$F_{(3,359)}$ = 0.000; P > 0.05].

With respect to attitude, hypothesis 2(c) [$HO_{2(c)}$] – There is no statistically significant main effect of gender on students' attitude to geography.

Effects of Mathematical Ability on Students' Learning Outcomes in Mapwork

Hypothesis 3: There is no statistically significant main effect of mathematical ability on students' achievement in mapwork,mapwork skills, and attitude to geography.

Hypothesis 3(a) ($HO_{3(a)}$) states that there is no significant main effect of mathematical ability on students achievement in mapwork.

With respect to achievement, Table 4 shows that there is a significant main effect of mathematical ability [$F_{(2,359)}$ = 3.778; P < 0.05] on students' achievement in mapwork.

Effects of Treatment and Gender on Students' Learning Outcomes in Mapwork

Hypothesis 4 (HO_4): There is no statistically significant interaction effect of treatment and gender on students'(I)achievement in mapwork, (ii)mapwork skills, and (iii)attitude to geography

With regards to achievement in mapwork, hypothesis 4(a) [$HO_{4(a)}$] states that there is no statistically significant interaction effect of treatment and gender on students' achievement in mapwork.

The summary of ANCOVA as presented in the Table shows the result of the two-way interaction of treatment and gender. The result indicates that there is no statistically significant interaction effect of treatment and gender on the achievement scores [$F_{(3,359)} = 1.538$; $P > 0.05$]. Therefore, the hypothesis (4a) that states that there is no statistically significant interaction effect of treatment and gender on students' achievement in mapwork is not rejected.

With reference to mapwork skills, hypothesis 4(b) [$HO_{4(b)}$] states that there is no statistically significant interaction effect of treatment and gender on students' mapwork skills. From the summary of ANCOVA , the result reveals that there is no statistically significant interaction effect of treatment and gender on students' mapwork skills scores [$F_{(3,359)} = 1.161$; $P > 0.05$]. Hence, the hypothesis 4(b) is not rejected.

With respect to attitude, hypothesis 4(c) [$HO_{4(c)}$] states that there is no statistically significant interaction effect of treatment and gender on students' attitude to geography.

From the summary of ANCOVA , the result indicates a non-statistically significant interaction effect of treatment and gender on students' attitude scores [$F(3,359) = 2.000$; $P > 0.05$]. The hypothesis is therefore not rejected. On the basis of these findings,

hypothesis 4 that states that there is no statistically significant interaction effect of treatment and gender on students' achievement in mapwork, mapwork skill, and attitude to geography is not rejected. This means there is no statistically significant difference in achievement, mapskill and attitude scores of the subjects as a result of interaction of treatment and gender.

Effects of Treatment and Mathematical Ability on Students' Learning Outcomes in Mapwork

Hypothesis 5 (HO_5) There is no statistically significant interaction effect of treatment and mathematical ability on students' (a) achievement in mapwork (b) mapwork skill and (c) attitude to geography.

There is no significant interaction effect of treatment and mathematical ability on all the dependent measures, i.e. achievement [$F_{(6,359)} = .836$; $P > 0.05$] mapskills [$F(_{6,359)} = 1.420$; $P > 0.05$] and attitude [$F_{(6,359)} = 1.467$; $P > 0.05$]. Thus hypothesis 5 (HO_5) which states that there is no statistically significant interaction effect of treatment and mathematical ability on students' (a) achievement in mapwork (b) mapwork skill and attitude to geography is not rejected.

Effects of Gender and Mathematical Ability on Students' Learning Outcomes in Mapwork

Hypothesis 6 (HO_6): There is no statistically significant interaction effect of gender and mathematical ability on students' (a) achievement in mapwork (b) mapwork skills and (c) attitude to geography.

The results presented show that there are no statistically significant interaction effects of gender and mathematical ability on students' achievement [$F_{(2,359)} = 0.52$; $P >$

0.05], mapskills [$F_{(2,359)}$ = .104; P > 0.05] and attitude [$F_{(2,359)}$ = 2.360; P > 0.05]. The hypothesis is therefore not rejected.

Effects of Treatment, Gender and Mathematical Ability on Students' Learning Outcomes in Mapwork

Hypothesis 7 (HO_7) There is no statistically significant interaction effect of treatment, gender and mathematical ability on students' (a) achievement in mapwork (b) mapwork skills and (c) attitude to geography.

Results show that there is no statistically significant interaction effect of treatment, gender and mathematical ability on students' achievement [$F_{(6,359)}$ = .173;P>0.05], mapskills [$F_{(6,359)}$ = .110; P > 0.05] and attitude [$F_{(6,359)}$ = .507; P > 0.05]. Thus, the hypothesis which states that there is no statically significant interaction effects of treatment, gender and mathematical ability on students (a) achievement in mapwork (b) mapwork skills are (c) attitude to geography is not rejected.

Group Learning and Students' Cognitive Achievement in Mapwork

The main focus of this study was to determine whether or not there would be any significant difference in the achievement in mapwork of subjects exposed to group learning strategies and control group. The result of the study show significant difference between the experimental and control groups in cognitive achievement scores.

The results of this study has come to empirically support other findings in CLS, MLS and IGLS on students' cognitive achievement as found in many subjects and

especially in mapwork (Okebukola, 1984; Onasanya, 1985; Olubodun, 1985; Guskey, 1990; Yau, et al, 1992; Akinsola, 1994; Igbokwe, 1995;).

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It seems clear from the results of the study that the CLS and IGLS are better for promoting achievement in mapwork than both the MLS and CM (Table 4). This finding agrees with many studies which have compared CLS to other instructional methods on various social and academic measures, especially student achievement (Okebukola, 1984; Bennett and Dunne, 1994; Cohen, 1994; Slavin, 1995; Amosun, 1999; Sharan, 1999; Veeman et al, 2000). For the IGLS, Guskey (1990) contends that in the recent past, only few systematic studies have investigated the effects of integrating CLS and MLS, and that the one early investigation on the combination of CLS and MLS yielded rather discouraging results.

Guskey (1990) investigated the CLS and MLS; and the combined effects of CLS and MLS, and the results from these investigations show that CLS and MLS both yielded positive benefits for students but that the greatest benefits were generally seen in classes where CLS and MLS were used in combination.

Yau, et al. (1992) also discovered that group learning strategy, as he called it (i.e. the integration of CLS and MLS) was found to be more effective in helping junior secondary students to learn mapwork compared to the traditional learning method. They conclude that the group learning strategy not only encourages students to master materials in small sequential steps, it also helps to mobilize students to help one another. In this way as they explain, peers complement the teacher who cannot give slow students enough timely individual help because of an overload of teaching

and administrative duties. These reasons and others may have been responsible for the marked effect of CLS and IGLS on students' achievement in mapwork in this present study.

Group Learning and Students' Mapwork Skills

. As could be observed from the Tables the CLS and IGLS groups scored significantly higher than their counterparts – MLS and CM. This superiority then may have come as a result of exposure to the treatment which made students to acquire useful information relevant to appropriate mapwork skills tasks.

The difference between the two groups (CLS and IGLS) as far as students' mapwork skills are concerned was not found to be significant. The students in these groups were involved in solving problems together in groups. Skills required in mapwork include observation, selection, location and recording skills, mathematical, manipulative and interpretation skills. These skills were taught and tested. The results seem to inform us that CLS and IGLS are better suited to enhance students' mapwork skills in senior secondary school geography. Although students taught using CLS performed slightly above those in IGLS, there is no significant difference between them. Literature has it that CLS and IGLS can be used successfully to help students learn higher cognitive processes (Bloom, 1988; Johnson and Johnson, 1989). There is also a growing realisation that pupils must learn to think, solve problems; integrate their knowledge and apply their skills (Veenman, et al. 2000). CLS and IGLS appear to be the right means of achieving these.

Group Learning and Students Attitude to Geography

Hypothesis 1 (c) sought to test if there would be any statistically significant main effect of treatment on students' attitude to geography. The results show that there is a statistically significant main effect of treatment on students' attitude to geography. It also means that the experimental strategies help to improve students' attitude to geography.

The superiority of the treatment over the control group in their attitude towards geography may not be unconnected with the nature of the task the students were exposed to during the experiment.

In sum, the CLS and IGLS groups are significantly different from MLS and the control groups. it is worthy of note here that the CLS and IGLS groups have consistently performed better than the MLS and the control groups – in achievement, mapskills and now in attitudes scores.

Group Learning, Gender and Students' Cognitive Achievement, Mapskills and Attitude

One of the intervening variables considered in this study is gender. Hypothesis two deals with this variable. The hypothesis seeks to determine whether there would be statistically significant main effect of gender on students (a) achievement in mapwork (b) mapskills and (c) attitudes to geography. The findings on this hypothesis as shown that there is no statistically significant main effect of gender on achievement in mapwork, mapwork skills and attitude to geography. Again, no

statistically significant interaction effect of treatment and gender is observed in the ANCOVA for achievement in mapwork, mapwork skills and attitude to geography.

Group Learning, Mathematical Ability and Students' Cognitive Achievement, Mapskills and Attitude

The mathematical ability of the subjects was considered an important crucial factor that could have effect on students' achievement in mapwork, mapwork skills and attitude to geography. This is because Geography, and mapwork especially involve a lot of calculations. Hypothesis three was formulated to seek whether there would be statistically significant main effect of mathematical ability on students' (a) achievement in mapwork (b) mapwork skills and (c) attitude to geography. The results of the analysis of covariance (ANCOVA) indicate that mathematical ability has a significant main effect on the variations in subjects' achievement. [$F_{(2,359)}$ = 3.778; $P < 0.05$]. However it is surprising to note that no two groups are significantly different at the 0.05 level when the source of the observed significant difference indicated in the ANCOVA was subjected to a Scheffé post-hoc analysis.

Group Learning, Gender, Mathematical Ability and Students' Cognitive Achievement, Mapskills and Attitude

It is intended in this study to determine the interaction effects of treatment, gender and mathematical ability on students' achievement in mapwork, mapwork skills and attitude to geography. Hypothesis seven (HO_7) was formulated to test this. The results show that the impact of treatment did not depend on the other two

factors – gender and mathematical ability. That irrespective of gender and mathematical ability differences, group learning strategies will still facilitate learning.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. That CLS and IGLS be adopted as modes of instruction, since it is clearly shown that it is efficacious in raising achievement, attitude and mapskill and also capable of solving the problem of large classes..
2. Teacher trainers should begin to expose student teachers to these strategies through micro-teaching, demonstrations and the like.

5.11 Summary and Conclusion

Geography as a school subject has laudable purposes and relevance; its recognition as one of the core subjects in the senior secondary school education; its central position between the liberal arts, social and natural sciences; its importance in the present age of globalisation, characterised with IT cannot be underestimated. In spite of these, the performance of students has continued to decline over the years. This poor performance has been attributed to a lot of factors among which are; the gross inadequate instructional materials, problem of large classes, poor quality of instruction just to mention a few. These and other factors have led to the search for better strategies that will enhance students performance inspite of the apparent negative factors.

Hence, this study was carried out to determine the relative effects of three group learning strategies – the cooperative learning strategy (CLS), the mastery learning strategy (MLS), the Integrated Group Learning Strategy (IGLS) (which is the integration of CLS and MLS) and the conventional method – on students' learning outcomes in mapwork.

Major findings include the fact that cooperative learning strategy and integrated group learning strategy have been found to be more effective in improving students' achievement in mapwork, mapwork skills and attitude to geography.

In conclusion, it was suggested that CLS and IGLS should be adopted as modes of instruction to replace the conventional method which dominates our secondary school classes. This, of course, may further solve the problem of large classes, inadequate instructional materials and make peers complement the teacher who cannot afford to attend to students one by one because of an overload of teaching and administrative duties.

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