THE EFFECTS OF COOPERATIVE AND COMPETITIVE TEACHING STRATEGIES ON COGNITIVE PERFORMANCE

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CERTIFICATION

This is to certify that the thesis: THE EFFECTS OF COOPERATIVE AND COMPETITIVE TEACHING STRATEGIES ON COGNITIVE PERFORMANCE

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DEDICATION

This Thesis is dedicated to the Almighty God and all mankind especially lovers of rationalization.

CERTIFICATION

We hereby certify that the work embodied in this Thesis was carried out under our supervision.

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ABSTRACT

This study tested the degree to which the commonly reported low cognitive levels interactions in the classroom could be improved upon in Social Studies through appropriate teacher preparation.

A stratified sample of 588 Social Studies learners drawn from nine secondary schools in Lagos State participated in the study. These were made up of three male schools, three female schools, and three mixed schools. Cooperative and Competitive teaching strategies were the two experimental strategies while Lecture method served as control.

The design was 3 x 3 x 3 factorial: three treatments comprising Cooperative, Competitive, and Lecture (formed the first three); three types of school by gender consisting of Male, Female, and Mixed (formed the second three); and three Ability groups involving High, Low, and Mixed (formed the third three). Other intervening variables tested were: teachers' abilities, learners' school status, their ages, and their parents' academic backgrounds and occupations.

A total of nine instruments were used for the study. An Achievement Test that was used to measure the performances of the Social Studies learners had fifty (50) objective items that covered all the six cognitive levels of Bloom and his associates supplemented by Tanner and Tanner: Information, Comprehension, Application, Analysis, Synthesis, and Evaluation. While Information and Comprehension were combined and tested as low cognitive levels, the others were combined and tested as high cognitive levels.

Teachers that had been given appropriate training, taught the learners in the experiment for six weeks. A pretest was administered before interactions and a posttest was administered at the end of the interactions.

Raw Scores obtained were analysed using statistical techniques, namely: Analysis of Covariance (ANCOVA), Chi-Square (X^2), Step-Wise Multiple Regression, and T-Tests.

Main outcomes of this investigation included:

i. Cooperative and Competitive teaching strategies are capable of helping teachers to achieve significantly improved high cognitive levels performance of learners.

ii. Whereas gender factor did not play special role in the performances of the learners, ability group of learners factor did.

(iii) There were significant variations in the interactive effects of Cooperative and Competitive teaching strategies on gender and ability levels of learners, at the high cognitive levels: either the two strategies with gender or ability levels or the two strategies with both gender and ability levels of learners.

(iv) Combining Lecture Method with Cooperative and Competitive teaching strategies significantly reduces learners' performance (teaching quality).

(v) The percentages of Low Ability group of learners that crossed to High Ability group of learners were 77.3 and 75.0 for Cooperative and Competitive teaching strategies respectively.

(vi) Considering both Cooperative and Competitive teaching strategies, one intervening variable only: learners' school status, did not significantly influence the learners' performances; all others did.

(vii) Comprehension was identified as the beginning of the high cognitive levels.

The major recommendation is that suitable professional training should be given to intending teachers in order to improve classroom interaction. This can be achieved by underscoring high cognitive levels thinking processes that will enable learners to be well developed cognitively.

CHAPTER ONE

I N T R O D U C T I O N

The following is the order of this chapter:

(i) background to the study;

(ii) statement of the problem;

(iii) purpose of the study;

(iv) research questions;

(v) hypotheses;

(vi) theoretical framework;

(vii) significance of the study;

(viii) operational definition of terms.

1.1 BACKGROUND TO THE STUDY

The quality of instruction in Nigerian education at all levels, is oriented toward inculcating certain values including the following: faith in man's ability to make rational decisions, moral and spiritual values in interpersonal and human relations (NPE:7). Social Studies is expected to contribute in this regard by producing individuals that can apply relevant knowledge to solve societal problems (Adeyoyin 1990). The major goals of acquiring desirable skills, values and attitudes considerably depend on the right type of knowledge transmitted. Ability to transmit the right type of knowledge itself depends on the right type of teaching strategy employed by the teachers (Knight et al. 1989). Accordingly, teacher preparation has a vital role to play in the teaching process.

Krathwohl (1971) discussed reception and discovery learnings as two dominant competing strategies of instruction in education. The writer observed that the debate on the two strategies revolved round their relative performances and extent of transfer but that the conflict between the strategies could only be resolved by empirical evidences such as the present study. Knight et al. (1989) gave a similar impression that few studies have been empirically conducted on the effects of particular teaching strategies on social studies learning and recommended that such studies should be carried out.

Oladebo (1980), Obebe (1981), Adeyoyin (1981), Osho (1986), Ogundare (1982 and 1987) and Olakulehin (1986) identified numerous methods of teaching Social Studies: whole class discussion, lecture, role playing, interviewing, inquiry, problem-solving, project, resource person's use, small group discussions, sorting, skits or play-lets, and field-trips.

Although these methods still require empirical teaching investigations for the establishment of more solid bases for the claims attributable to them, generally, studies seeking to establish methodological appropriateness by their share number seem to have lost discriminating power to those seeking to establish qualitative suitability in the depth of instruction.

A crucial aspect of the effects of teaching strategies on Social Studies learning that educators require knowing is learners' performances at high cognitive levels (Adeyoyin 1986; Knight et al. 1989). Cognitive levels for the purpose of clarity have been identified as being in eight maximum and two minimum stages. The eight levels are: recall or information, comprehension, application, analysis, synthesis, evaluation, problem-solving, and creation while the two levels are: information and intellectual (Bloom et al. 1956; Tanner and Tanner 1980; Yoloye 1986; Cangelosi 1990).

Krathwohl made two distinctions on cognitive levels: memory (low cognitive level) and concepts and principles (high cognitive level). Several writers agree with Krathwohl on categorization of these levels into few broad groups. For example, Adeyoyin (1986) considered recall: reception learning as 'lower' order inter-action (high cognitive learning). Other writers that hold similar view include Cangelosi (1990) and Perrot (1992).

Obebe (1987:9) reported a study that was carried out in 1979. The study showed that the learners tended to perform better at the low cognitive levels but performed poorly at the high cognitive levels. This situation of poor performance at high cognitive levels persisted (Imogie 1989; Knight et al. 1989).

Ogundare (1982 and 1987) pointed out the need to investigate learners' performances at high cognitive levels such as application, analysis, synthesis, and evaluation. Knight et al. (1989: 275) suggested the need to investigate the nature of strategies for Social Studies critical thinking tasks (high cognitive levels). Other writers that called for researches at the high cognitive levels include Cangelosi (1990 : 156); Perrot (1992: 55); May Oi and Stimpson (1994:10) ; and Wells (1995 : 238).

1.2 STATEMENT OF PROBLEM

The evidences above seem considerable that investigation into achievement of learners at the high cognitive levels is relatively scanty. More disturbing is the awareness that performances of learners at these levels appear poor. These situations are neither limited to a subject area nor a human ecology. Hence the problem of this study was to test whether the commonly reported poor performance of learners at the high cognitive levels could be improved. Cooperative and Competitive teaching strategies were employed for the test while Social Studies served as the subject.

1.3 PURPOSE OF STUDY

The objective of this study was to:

I a) identify teaching strategies that would elicit better performances of learners at the high cognitive levels;

b) ascertain whether Cooperative or Competitive teaching strategy has a higher effect on learners' performances at the high cognitive levels;

II a) ascertain whether learners' performances at the high cognitive levels vary by gender;

b) determine which gender group of learners would perform best under different teaching strategies;

III a) measure the performances of learners among gender homogenized groups, at the high cognitive levels;

b) measure the performances of learners among gender homogenized groups, under different teaching strategies, at the high cognitive levels;

IV a) measure the effects of Cooperative and Competitive teaching strategies on gender and ability levels of learners, at the high cognitive levels;

b) ascertain whether combining Lecture method with Cooperative and Competitive teaching strategies will reduce teaching quality (learners' performances);

V a) measure the proportions of learners' grades that fall within 60,50, and 40 (all %) and above levels, at the high cognitive levels;

b) determine the proportions/percentages of the Low Ability group of learners that would cross to High Ability group as well as High Ability group of learners that would significantly gain from Cooperative and Competitive teaching strategies;

VI a) determine the contributions of variables surrounding teachers, learners and learners' parents, on the learners' performances;

b) ascertain the differences in the performances of the learners between the high cognitive levels.

1.4 RESEARCH QUESTIONS

This study provided answers to the following questions.

I (a) What teaching strategies can improve performances of learners at the high cognitive levels?

b). Is it Cooperative or Competitive teaching strategy that has a higher effect on learners' performances, at the high cognitive levels?

II a) Do learners' performances at the high cognitive levels vary by gender?

b) Which gender group of learners would perform best under different teaching strategies at the high cognitive levels?

III a). What are the performances of learners among gender homogenized groups at the high cognitive levels?

b). What are the performances of learners among gender homogenized groups under different teaching strategies, at the high cognitive levels?

IV a). What are the inter-active effects of Cooperative and Competitive teaching strategies on gender and ability groups of learners, at the high cognitive levels?

b). Will combining Lecture method with Cooperative and Competitive teaching strategies reduce teaching quality (learners' performances)?

V a) What proportions of the learners' grades at the high cognitive levels fall within the following percentage levels:

1). 60 and above (above average/high)?
2). 50 and above (average/middle)?
3). 40 and above (below average/low)?

b) (a) What proportions/percentages of the Low Ability group of learners will cross to High Ability group from :

1. The pure Low Ability group?
2. The Mixed Ability group?

(b) What proportions/percentages of the High Ability group of learners will significantly gain from:

1. The pure High Ability group?
2. The Mixed Ability group?

VI a) How do the following variables: teachers' abilities, learners' school status, gender, ability levels, ages, their parents' academic backgrounds and occupations, affect learners' performances at the high cognitive levels?

b) Will there be differences in the performances of learners between the high cognitive levels ?

1.5 HYPOTHESES

The following hypotheses were tested in this study .

Ho I a) There will be no significant difference between the performances of the experimental and control groups of learners at the high cognitive levels.

b) There will be no significant difference between the performances of the learners under Cooperative and Competitive teaching strategies at the high cognitive levels.

Ho II a) There will be no significant gender variations among the performances of the experimental and control groups of the learners at the high cognitive levels.

b) There will be no significant gender variations among the performances of the learners under the experimental strategies at the high cognitive levels.

Ho III a) There will be no significant variations among the performances of the experimental and control groups of the gender homogenized learners along ability levels, at the high cognitive levels.

b) There will be no significant ability group variations among the performances of the gender homogenized learners under the experimental strategies, at the high cognitive levels.

Ho IV a) There will be no significant variations among the interactive effects of Cooperative and Competitive teaching strategies on gender and ability levels of the learners, at the high cognitive levels.

b) Combining Lecture method with Cooperative and Competitive teaching strategies will not significantly reduce teaching quality.

Ho V There will be no significant variations among the grades of the learners at 60, 50, and 40 (each and above) percentage levels, at the high cognitive levels.

Ho VI a) The following variables: teachers' abilities, learners' school status, gender, ability levels, ages, parents' academic backgrounds and occupations will not significantly affect learners' performances.

b) There will be no significant differences in the performances of the learners between the high cognitive levels .

1.6 SIGNIFICANCE OF THE STUDY

The objective of this study was to test the degree to which we can improve learners' performances at the high cognitive levels. The result shows that Cooperative and Competitive teaching strategies are capable of helping learners to achieve this objective. With these approaches, an improvement would be witnessed in the quality of classroom interaction, especially when the teacher trainers are very systematic in the preparation of would-be teachers. Similarly, the trainers should emphasise high cognitive levels processes for student-teachers of Social Studies so that after graduation, the latter (as classroom teachers) can extend the processes to their learners. In particular, Teacher Educators and Curriculum Evaluators will find the results of this study very valuable, especially among the target respondents.

1.7 THEORETICAL FRAME WORK

Four theoretical frames guided this study.

The first frame was the assumption that Social Studies underscores knowledge utilization more than knowledge acquisition and so stresses thinking processes as observed by Okam (1989) and Adeyemi (1989). Furthermore, other writers assert that Social Studies education is centred at the high cognitive levels (Mehlinger 1981; Banks and Clegg 1977). Accordingly, a major theory under test in this study was that well trained teachers of Social Studies would enable their learners perform well at the high cognitive levels.

The second frame was on the finding that Cooperative and Competitive teaching strategies were effective in certain subject areas (Peterson 1982: Mathematics; Okebukola 1984: Biology; Okebukola and Jegede 1990: Science). This study tested the effectiveness of the strategies not only in Social Studies area but at the high cognitive levels.

The third frame was a group of cognitive levels theorists positions namely:

I. Bloom et al. (1956) who presented cognitive levels as six:

a.	Knowledge	d.	Analysis
b.	Comprehension	e.	Synthesis
c.	Application	f.	Evaluation

ii. Tanner and Tanner (1980) suggested eight cognitive levels; they replaced Knowledge of Bloom and his associates with Information and added two levels after Evaluation as follows:

a.	Information	e.	Synthesis
b.	Comprehension	f.	Evaluation
c.	Application	g.	Problem-solving
d.	Analysis	h.	Creation

iii. Yoloye (1986) compressed the six levels of Bloom and his group into three namely:

a.	Remembering	(Knowledge)
b.	Understanding	Comprehension and Application
c.	Thinking	Analysis, Synthesis, and Evaluation

The major tests developed by the researcher adapted Bloom et al.'s model by exchanging Knowledge with Information of Tanner and Tanner because the researcher identified with the view of the latter. The conclusive analysis on the cognitive levels used Yoloye's model. Since that model was based on his practical experiences such as this study, the idea was to test Yoloye's finding.

The last frame centred on Aisiku's view of teaching as a triadic process involving three elements: teacher, learner, and subject matter, a dynamic process which culminates in shared meaning of subject matter (referred to by Adeyoyin 1981). The emphasis on interaction is a core of the Basic Practice Strategy (BPS) developed by Weil and Murphy (1982). The BPS itself was a development from Effective Teaching Strategies. Cooperative and Competitive strategies were, therefore, each combined with these strategies hence the word teaching is stressed in this study.

1.8 OPERATIONAL DEFINITION OF TERMS

Terms which prominently featured in this study are defined below to portray their usages:

i. **Cognitive Levels:** intellectual stages of learning (in the cognitive domain): Information, Comprehension, Application, Analysis, Synthesis, Evaluation, Problem-solving, and Creation (Bloom et al. 1956; Tanner and Tanner 1980; Cangelosi 1990; Perrot 1992).

ii. **Performance**: the real behaviour which a learner demonstrates on a given occasion (Meyer 1982).

iii. **Learner:**the acquirer-to-be or acquirer, of a relatively permanent change in behavioural tendency due to experience/s either incidentally or through deliberate instruction (Pliskoff and Ferster 1968; Meyer 1982).

iv. **Cooperative teaching situation:** learners freely work together for a common goal: share ideas and represent each other or the group in relation to the teacher. The teacher practically ensures cooperation of learners involved and his/her responsibility is to the group.

v. **Competitive teaching situation:** this study employed individualized Competition where learners work hard and separately to out-perform each other. The teacher's responsibility is to individuals and he/she controls all affairs (a modified version of Okebukola 1984).

vi. **Teaching strategy:** patterns of behaviour described in activity successions which should ensure that some points in the subject matter would be made clear while reducing the number of irrelevant/wrong responses (Stenhouse 1975: 149; Weil and Murphy 1982:890).

vii. **Teaching:** enhancement of learning (Page and Thomas 1977).

viii. **Learning:** a relatively permanent alteration in a behavioural tendency due to experience (Pliskoff and Ferster 1968; Meyer 1982).

CHAPTER TWO

LITERATURE REVIEW

2. 0. 1 INTRODUCTION

The review of relevant literature in this study would be approached in the following order:

I. studies on teaching and learning-

   (a) general
   (b) Social Studies;

ii. studies on Cooperative and Competitive teaching/learning;

iii studies on Taxonomy of objectives-

   (a) Cognitive, Affective, and Psycho-motor domains
   (b) stages of logical reasoning
   (c) cognitive levels of knowledge;

iv. some learners self issues;

v. (a) summary
   (b) conclusion.

2.1.0 STUDIES ON TEACHING AND LEARNING

2.1.1.0 GENERAL

2.1.1.1 DEFINITION OF LEARNING

Pliskoff and Ferster (1968:114) perceived learning as a relatively permanent difference in a behavioural tendency adding that this difference is subject to reinforced practice.

These writers noted that certain changes in human beings are not actually the results of learning. Examples which they gave included: maturation, motivational fluctuations, forgetting and experimental extinction. Conversely, Pliskoff and Ferster asserted that the following experiences are included in the definition: good habits as well as bad ones, acquired motives, attitudes and values, language habits, and motor skills. They clarified that the word 'tendency' gives room for certain acquired experiences which may not necessarily demand immediate measurement or performance but later.

A distinction was made between learning and performance by these writers. They noted that 'In general, learning refers to the establishment of tendencies, performance refers to the translation of these tendencies into behaviour'. The ideas of Pliskoff and Ferster are considerably shared by Meyer (1982) who observed that learning is a relatively permanent alteration in an individual's knowledge or behaviour as a result of experience. These components were identified as being in the definition:

(i) the duration of the modification is long - term as opposed to short - term;

(ii) the environment of the change is the content and structure of knowledge in memory or behaviour patterns of the learner;

(iii) the cause of the alteration is the learner's experience in the environment, not due to fatigue, motivation, drugs, physical condition or physiological interpose.

On the distinction between learning and performance, Meyer observed that while 'learning' refers to acquisition of knowledge or behaviour, 'performance' is the real behaviour a learner demonstrates on a given occasion (Meyer 1982: 1040).

We may infer from the foregoing that whereas learning is more theoretical or abstract in nature, performance is more practical or concrete. Furthermore, learning is the pre-requisite of performance. Further still, performance is considerably the scientific and conclusive evidence of learning whether the evidence is demanded immediately or later.

The definitions of learning as given by Pliskoff and Ferster(1968) and Meyer(1982) are supported by Dictionaries of Education (Good [Ed.]) 1973:232); Page and Thomas 1977:202).

This study under-scores observable behaviour of learners (performance). Accordingly, enough attempt was made to elicit experiences learnt by the subjects. The emphasis demanded effective teaching on the part of the teachers.

2.1.1.2 DISTRIBUTED VERSUS MASSED LEARNING

Meyer (1982:1047) discussed distributed versus massed practice; here 'practice' seems to have been used for study or learning. He referred to studies which showed that distributed (spaced) practice is more effective than massed practice or rote learning.

Examining three points which were made as support for this finding, it appears that distributed practice would be more effective than massed practice even at the higher cognitive levels. The points were:

i) there is a considerable duration of time for a memory trace to be affirmed into a structural change in nerve cells;

ii) there are more opportunities for learners to rehearse information mentally when it is spaced;

iii) more opportunities to associate a word with so many contexts are available in distributed than massed practice.

Point number (i) above is considerably psycho-physiological: considerably natural hence whether in rote or higher order learning it seems to be relevant.

Points (ii) & (iii) are also close to point number (i) logically.

One issue seems evident: time factor in relation to the psycho-physiological set up of man with regard to learning. This is why mastery learning under-scores good teaching with due recognition of individual time (Walberg and Fredrick 1982: 917-924; Page and Thomas 1977:25).

Although this study is not technically on mastery learning, that strategy is excellent or very high absorption of material presented by a more experienced person or any representative phenomenon, to a learner. The much material absorbed cover both lower and higher cognitive processes in an indiscriminate achievement measurement situation. Tersely, certain basic ideas of mastery learning could be useful to us in this study particularly instructional time.

2.1.1.3 INSTRUCTIONAL TIME AND LEARNING

Walberg and Fredrick (1982:917-924) presented a picture on instructional time. They started the discussion on the note that until recently, instructional time did not attract attention in research. These writers gave a report of thirty four studies on instructional time and learning. 'The typical correlation between amount of instruction and achievement is about .40 to .50 a correlation that leaves sufficient room for other effects but that is comparatively strong and consistent'. Walberg and Fredrick opined that there is a need to increase the time spent in classroom instruction. They cautioned, however, that this time which is stressed including the extra time being advocated for, should not be spent doing nothing or excessively on class management adding that time on task is what is precisely called for. These researchers underscored that learning by the less able pupil is especially hampered by larger amounts of dead time.

On models of school process variables related to outcomes, Walberg and Fredrick reported that models are helpful in organizing differing variables which are potentially effective when one wants to explain why achievements vary. They referred to authorities like Caroll [1963] who asserted that the degree of learning is related to the ratio of time spent to time needed. Other references included

Harnischfeger and Wiley [1977] who prepared a model of achievement which considers teacher and pupil time to be a primary resource in education advocating that policy decisions should focus on optimizing the allocation of instructional time; and Walberg [1980] in which a productivity model developed, demonstrated that several categories of independent variables need to be studied in addition to time so as to fully investigate causal connections to achievement.

Walberg and Fredrick called for researches to test the developed models in order that the relative contribution of the quantity and quality of instruction , entry level skills, social and economic context, classroom environment , motivation and desire, may be analyzed by experimentally manipulated comparison, not by correlational based designs only.

These writers are of the position that two views of instructional time can be identified: acceleration and enrichment, adding that in both conceptions, learning is viewed as a function of ability and time, assuming that other variables are error-proof. They explained that enrichment is more often used in traditional classrooms, holding time the same for all students hence the normal distribution of achievement scores is a function of the normal curve of initial ability. Walberg and Fredrick explained that *acceleration is what is now often called mastery,* that this strategy fixes criterion level of achievement and students are given varying time to achieve it. They went further to say that following this argument, a given criterion level of achievement or mastery in acceleration models of school learning means that, moderate students require relatively moderate amounts of time; brighter students need relatively less; while 'dull' students need relatively more time. Reference was made to Walberg (1981) who argued that 'aptitude and time multiplicatively substitute or compensate for one another ,other things being equal, at diminishing rates of marginal returns'.

The conclusion of Walberg and Fredrick was that a genius would need at least a small amount of time to attain highest performance levels while the 'dull' would need immense time.

Walberg and Fredrick (1982: 921) proposed an acceleration and enrichment model represented in regression formula as follows:

Learning = a + b(ability) + c(time) + error (+ or -)

Where 'a' is a constant and 'b' and 'c' are regression weights that estimate the amount of increased learning linearly associated with a one unit increment, respectively, in ability or time.

Other information from this article included: that learning has positive relations to factors other than time: student motivation and ability, quality of instructions, class, home, peer-group social-psychological environments; exposure to mass media, for example, television. The point is that these factors should be considered. Theories of Carroll [1963], Bloom [1976], and Harnischferger and Wiley(1976) may be interpreted as acceleration models within the production frame-work; they stated Carroll's formulation:

$$\text{Degree of learning} = f\left(\frac{\textit{Time actually spent}}{\text{Time needed}}\right)$$

Further arguments in the article hinging on this formula and production do not seem necessary here. However, the point has been fairly made by Walberg and Fredrick that learning, be it mastery or conventional, considerably depends on time and that school teachers and administrators need to meticulously consider it in schools. The bone of contention is time on task, not time wasted. They remarked that time is not the only variable which affects learning, that other variables within and outside the school: natural and socio-economic, need to be considered.

The main variable of interest in one's study is time in relation to acceleration: achievement in relation to higher cognitive levels. Questions leading to discussions largely take care of individual time. While some variables would be assumed constant, others would be determined in the course of the study (see Chapter Three please).

2.1.2.1 **DEFINITION OF TEACHING**

Good (Ed.) (1973: 588) defined teaching in three forms all of which appeal to one's interest.

(i) Limitedly, teaching is the act of instructing in an educational establishment. The teacher's job is stressed in this perspective.

(ii) Teaching may be seen as synonymous with instruction which broadly implies three main processes:

(a) the planning, designing, and preparing of the material for the teaching-learning situation (theoretical/ scientific skills' use by the teacher);

(b) direct inter-action between the teacher and the taught (when the teacher practically demonstrates his skill);

(c) redirection: evaluation, redesign, and dissemination.

This definition is comprehensive and interesting.

(iii) Teaching collectively is what is taught: a doctrine, for example, of a religious sect.

Page and Thomas (1977) defined teaching in two senses:

(a) the occupation of a teacher;
(b) a doctrine.

Using the words 'to teach' these writers exposed more far-reaching ideas on teaching in relation to education as follows:.

(a) to impart skill or knowledge to someone else;
(b) to give instruction to someone else;
(c) to enlighten or train another individual;
(d) to enhance learning.

These points appear to be in an order: from simple to complex; from least professional to most professional; from least inter-action based to most inter-action based; from least learner-centered to most learner-centered.

What interests this researcher is teaching as highly inter-action based between the teacher and the taught in a dynamic atmosphere which results in shared meaning, relatively permanent learning, and the tendency for the relation to dwell on higher cognitive levels operations. These processes and results will be confirmed as we review more perspectives on teaching as identified by Adeyoyin(1981).Before that, a word on 'lecture.'

Page and Thomas (1977) noted that lecture is a teaching method in which facts or principles are orally exposed to groups of students who write notes, involve in little participation on the learning process hence passive learning.

This study employed Lecture as the control method while Cooperative and Competitive methods(actually strategies):the experimental methods used teaching method where learners were active in the teaching process.

Adeyoyin (1981: 67-75) identified five conceptions of teaching.

(i) The teacher as the fountain of all knowledge. This conception views teaching as a process whereby a knowledgeable person transmits knowledge to an ignorant person depicting the teacher as a 'Mr. know all' or dictator.

(ii) The second perspective was a kind of development from the first. (Adeyoyin cited Hyman [1971]). Although the students are seen as more active in this conception, ideas such as the teacher observes the students, diagnoses their feelings and interests, talks, explains, interprets, gives directions, give the picture of the teacher dominating the classroom: a teacher-centered learning situation.

(iii) Smith [1971] was noted to have developed the concept further as he perceived teaching as activities which are intended to attract learning. This special emphasis on inducement of learning underscores the role of the students better than the teacher-dominated perspective.

(iv) The fourth dimension was suggested by people like Bellack [1963]: the subject matter. The three elements: teacher, learner, and subject matter, need to be related to one another in a very effective fashion. It seems that the addition of the third element to teaching brought the concept to generally acceptable plane but minor developments later.Two other educators whom Adeyoyin referred to at this juncture were Dewey and Kilpatrick. The latter was noted to have stressed that except the learner learns, teaching has not been effected. The former in his contribution opined that there is the same exact equation between teaching and learning as there is in buying and selling.

While the ideas of Kilpatrick and Dewey are fairly similar, it appears that Dewey's assertion tilts more to the extreme than that of Kilpatrick by the former's use of the 'same exact equation'. As Adeyoyin judged, an impression which we have is that the teacher exhausts himself after the teaching enterprise. However, the judgement (itself) seems not attack-free. Dewey might have had it in mind that as a committed seller replaces an exhausted stock, so does the responsible teacher exhaustively expend his knowledge on a willing learner. Nevertheless, the fact that the teacher has given all does not mean that he/she becomes empty. Rather, knowledge and thinking are such phenomena that the more you give, the more you get. Tersely, while one partly agrees with Adeyoyin (1981), one equally agrees with Dewey.

(v) The fifth conception which is labelled 'that of scholars in education' is largely a development from the fourth. Teaching is viewed as a triadic process involving the teacher, learner, and the subject matter, the focus is the subject matter. The teacher and the learners go through a process of ideas which culminates into shared meaning between the two parties involved. This process promises greater classroom effectiveness and dynamism: a rather more complex and exciting process than the rather tacit fashion in which Dewey presented his own.

A basic question which Adeyoyin asked was whether teaching was an art or a science. Her conclusion was that her study upheld the view that teaching was both an art and a science.

One's study also adheres to the view that teaching is both an art and a science. Teaching may primarily be viewed as a science because the fundamental preparations hover round a curriculum (objectives, content, methodology, and evaluation) which is an applied science. Notwithstanding, much of the practical execution of an interesting teaching, is the result of resourcefulness/creativity which transcends scientific/mechanical planning.

A noteable point is that, in a traditional classroom situation, a good degree of what the learner learns depends on a suitable teaching strategy or on strategies.

2. 1. 2. 2 TEACHING STYLES/STRATEGIES/METHODS

Kleine (1982) referred to Dowaliby and Schumer (1973) who found that teacher centered styles optimized learning for highly anxious learners more.Kleine also referred to Tuckman, Stober, and Hyman (1979) who observed that school principals preferred different teaching styles for elementary schools, junior high schools and senior high schools (page 1928).

Reference was also made to Fischer and Fischer (1979) by Kleine. The authors were noted to have described six teaching styles (1) the task oriented (2) the cooperative planner (3) the child-centred (4) the subject-centred (5) the learning-centred (6) the emotionally exciting (page 1929).

Although Kleine did not define these styles, number five (5) seems the most relevant, for one's study.

Four variables of teacher effectiveness were observed to have been identified by Rosenshine in 1976 as cited by Kleine, namely:

i) opportunity to learn material;
ii) task orientation;
iii) direct questions;
iv) teacher criticism of pupils (this variable related negatively to achievement (page 1930).

Rosenshine was also noted to have described a direct instruction pattern as an 'empirically derived model' for Low Socio-Economic Status (SES) learners. The pattern is identified by a dominant leader who chooses the activities that occur and who operates in a direct result -oriented form. This teaching is organized around questions asked by the teacher or materials. Other aspects of the strategy demand much time spent on teaching, seat work using structural activities, immediate feedback, high praise and work in large and small groups with little independent study (Kleine 1982: 1930).

Although one's study adapted much of this strategy, the extra work in small or large groups was not generalized; the second experiment worked in an individualized competition situation.

Perrot (1992:5) cited Ryan (1960), Flanders (1970), and Roseshine and Furst (1973) on effective teaching. Perrot remarked that the two critical dimensions of effective teaching are intent and achievement. The writer added that each teaching strategy can be further analyzed into a set of desirable techniques such as:

(i) asking higher cognitive levels questions rather than knowledge level questions exclusively;

(ii) pausing after asking a question to allow learners time to think;

(iii) asking follow - up questions to help learners improve their original responses to questions;

(iv) distributing participation evenly among learners (Perrot 1992:8).

Teaching skills were observed to be acquired in three forms:

(i) cognitive: forming a concept of the skill;
(ii) practice;
(iii) evaluation (Page 1992: 8 - 9).

It was noted that without feedback (evaluation) learners performances do not improve (page 10).

Weil and Murphy (1982: 890-913) discussed six teaching strategies under the label 'Instruction Processes'. These strategies were: Advance Organizer, Concept Attainment, Cognitive Development, Contingency Management, Self Management, and Basic Practice Strategy. The last strategy was noted as the most practical out of the six strategies and so some due attention will be paid to it in this review shortly. Before then, we note certain interesting points in the article.

(I) Instruction process was noted as a broad term which may accommodate most activities observable in the classroom, school, home, as well as any aspect of instruction including duration, source, group size, nature of the instructional activities as well as precise teacher or student behaviours.

(ii) Teaching strategy was identified as one dimension of instruction process and that the article restricted itself to it.

(iii) Teaching strategy was defined as patterns of behaviour which are described in activity successions.

2.1.2.3.1 THE BASIC PRACTICE STRATEGY(BPS)

Weil and Murphy (1982: 909 - 912) discussed the Basic Practice Strategy and remarked that it was the most practical among the six strategies identified. They noted that the BPS which is also (if not more popularly) known as Direct Instruction was an attempt to synthesise a large part of various research findings from the literature on teacher effectiveness to form a teaching strategy. The writers added that the BPS was not theoretically or empirically derived but through a combination of both theory and practice hence it was distinct from the others.

The authors clarified that their strategy is from the behavioural family of strategies and believed that the synthesis of distinct teacher behaviours into functionally related activities will increase the effectiveness of the strategy as well as teacher training.

2.1.2.3.2 TEACHER - EFFECTIVENESS RESEARCH

This sub - heading was divided under three sub - sections:

(i) learning environment variables;
(ii) the role of the teacher as manager of the learning task;
(iii) time and success rate in relation to student achievement.

Five learning environment variables were identified.

(I) Academic focus: Teachers who stress work in the classroom, maintain strong academic focus, obtain more student engagement with learning task, and attain greater achievement: non - academic materials and non-academic interactions even among students should be de - emphasized.

(ii) Teacher direction and control: Learning environments where teacher directs and controls the activities are associated with greater student involvement and achievement.

(iii) Concern for academic progress or high teacher expectations for learners: If teachers consistently expect more learning from the students, it is helpful to the learners.

(iv) Student accountability and cooperation: Where students are held accountable for their work and share ideas as well as helping each other, students tend to learn better than environments where these features are non - existent.

(v) Non-negative affect: As there is enough evidence that negative affect inhibits student learning, the teaching-learning atmosphere should be negative affect - free.

2.1.2.3.3 THE TEACHER AS MANAGER OF THE LEARNING TASK.

This sub-section is further sub-divided into three: structuring, teacher-student interaction, and supervision.

Structuring

Three basic types of structuring were identified by Weil and Murphy.

They were:

(I) structuring moves made by the teacher on the commencement of a lesson;
(ii) internalized or established structure;
(iii) during and after lesson structuring.

The starting of a lesson type of structuring moves are expected to clarify the purposes, procedures, and actual content of the learning experience, for the learner. The writers noted that there is considerable evidence that such initial structuring activities are associated with enhanced student engagement during lesson as well as over - all achievement.

Established structure represents internalization by pupils of behaviour limits, behaviour patterns which are exhibited and sequences of activities which have already been established. Examples of established structure given were students knowing and practising the rules about where to get supplies, how to correctly use these supplies, how to clean up and return materials. It was noted that these processes reduced the teacher's job on enlightenment for the students about behaviour patterns which are inimical to student achievement.

The final type of structuring activities which are meant for during and after a lesson included:

(i) underscoring concepts to be learned during the lesson;

(ii) drawing students' attention to significant aspects of the lessons;

(iii) synthesizing subsections of a lesson;

(iv) ascertaining coherence between parts of the lesson by making students conscious of departures and using adjoining relationship words such as 'now' 'therefore' 'because of';

(v) synthesizing the whole lesson at the end with a summary.

All these moves are noted to have been positively associated with student achievement.

Teacher - Student Interaction

This process is the most dynamic, meaningful and lively aspect of the classroom atmosphere. Teacher-student interaction has been given other names such as 'controlled practice', 'substantive interaction', 'simple recitation'.

What is common about these terms is a two - way communication process whereby the teacher first explains or presents a material. This is followed by a time of teacher-student exchange of ideas. At this juncture, the teacher directs questions, students respond and the teacher follows up with feedback and more questions or he follows with more questions only, if feedback is not necessary for that particular point.

Weil and Murphy (1982 : 911) observed that there is impressive evidence that this type of classroom atmosphere is associated with students achievement in the following areas:

(I) enhanced rates of student engagement both during the interaction period and independent seatwork activities later:

(ii) higher cognitive responsibilities;

(iii) more favourable student attitudes toward the subject- matter during the interaction.

It was stressed that with regard to learning factual material, this interaction/ strategy, was the most effective method available.

Research findings on the relationship between teacher behaviours during the interaction and student achievement

(I) There is support for the view that teachers should be active and prolific questioners.

(ii) Teachers should use close - ended rather than open - ended questions.

(iii) Teachers should call on students by name before asking questions or the questions should have a patterned order.

(iv) After asking questions, teachers should wait for three seconds before intervening.

(v) At least 75% of the questions asked should be such that the student can answer correctly.

(vi) Primarily, teachers should ask direct academic questions and avoid non - academic ones and responses.

(vii) Pupils initiated questions should be minimized: teachers should therefore spend most of their time asking questions rather than answering students' questions.

(viii) Primarily, teachers should use lower-order cognitive questions rather than higher order cognitive questions.

Student Responses

Two points were noted under this sub - heading.

(I) Students responses to direct academic questions are associated with student achievement.

(ii) The effectiveness of response patterns and consequent feedback may vary with students' socio - economic status.

Teacher Responses and Feedback

Five points were made here.

(I) Two common teaching processes during teacher-student interaction: redirecting unanswered questions to other students and probing to obtain clarification or better answers are correlated with student achievement in the basic skills.

(ii) Waiting at least three seconds after a student's response, enhances the quality of further student exploration.

(iii) Criticism accompanied by information about inappropriate student behaviour as well as non-evaluative disposition are both negatively associated with student learning.

(iv) Feedback provision on academic matters as against behavioural matter is very strongly related to student achievement

(v) Praise which is a consequence of specific responses and made dependent on the quality of those responses is correlated with achievement.

Supervision

These are monitoring activities of the teacher when students are at seatwork, interacting with materials such as textbooks, workbooks, and work sheets. At this time, the teacher is expected to go round the classroom, question the students, monitor progress, keep the students busy, instilling in them individual accountability for individual efforts, and provide feedback on the quality of the work. While these activities are quite similar to the ones discussed under teacher-student interaction, the difference is that whereas the teacher directed the interaction in the previous discussion, the students are basically directed by the materials with which they are engaged and only to a minimal degree by the teacher under supervision.

Students time spent in supervision seatwork activities is significantly more effective in enhancing achievement than unsupervised seatwork. The evidence has a rate of 79 - 88% versus 68 - 73% respectively.

2. 1. 2. 3. 4. TIME AND SUCCESS RATE

The two major points discussed so far: establishment of the learning environment and managing the learning tasks are effected with the aim of maximizing student learning. However, the details of the two points do not directly lead to student achievement, rather, they interact with two inter-vening variables: student time - on task and student rate of success which in turn are associated with student achievement.

The teacher behaviours are expected to produce a structured, academically inclined learning environment in which students are (a) actively engaged (b) experiencing a high success rate at least 75%. Academic Learning Time (ALT) is the name given to time spent by students in which the above two conditions are attained. ALT is highly related to achievement and maximization of it is the goal of the Basic Practice Strategy (BPS).

Weil and Murphy noted that the BPS is unique on two grounds:

(I) it establishes a series of patterned teacher behaviours in a sequential order based on recurring activities;

(ii) it establishes guidelines for teacher behaviours (intra - model wise) which are based on the best research findings.

Weil and Murphy gave a summary of BPS as containing five activity phases:

(i) orientation or structuring phase when the teacher gives the learners a clear understanding of the lesson objective/s, procedures of the lesson, and its content;

(ii) the teacher presents the new information to be learned;

(iii) the teacher leads a discussion in which students receive structured practice;

(iv) guided practice during individual seatwork;

(v) trial of the acquired skill by the student independent of the teacher such as homework.

It should be noted that Aisiku's triadic process and the core of the BPS are essentially the same. The meaningful, dynamic and far-reaching interactive teaching conception is the melting pot of one's study. An indication was given through research findings that teacher - student interactions during lessons have promoted learning not only at the lower cognitive levels but also at the higher cognitive levels (page 911).

One's study is an attempt to systematically test that finding with regards to higher cognitive levels.

Dewalt and Ball (1990: 322) demonstrated that self -concept can be enhanced by a competent teacher if :

(i) his expectations from the learner are high;

(ii) if he shows appreciation of the learner's personal worth.

Twelve variables/competencies were identified for the effective teacher as follows: academic time, accountability, clarity of structure, individual differences, evaluation, affective climate, learner's self concept, meaningfulness, planning, questioning skill, reinforcement, close supervision.

Carr (1989: 5) asserted that teaching quality is not quite much of the skilful application of technical rules but the capacity to translate theoretical ethical values to concrete educational practice, implying resourcefulness and flexibility. Besides this capacity, good teaching cannot be severed from technical expertise hence a teacher who lacks this capacity may not be educationally or morally accountable.

Bintz (1995) through his experience in diverse cultural/multi - cultural settings got the illustration that formal schooling should be based on a diversity model of education (page 40). Schooling is an opportunity for teachers and learners to see, hear and think differently (page 42). Bintz's conclusion suggests that strategies like inquiry, discussion or other interaction based styles generally seem more appropriate.

Beattie (1995: 65) declared: it seems safe to predict that we will always live in classrooms, schools, communities, societies, and a world where others hold different views, values and beliefs to ours. Underscoring the classroom, Beattie's declaration appears to stress the need for co - construction of meaning advocated for by Wells (1995: 234 - 5). According to Wells, because views are fluidly varied and yet there is need for compromise in a society, meanings should be co - constructed hence meanings are made, not found (page 237).

Wells stressed further that at both macro and micro situations, the teaching-learning relationship is of dialogue adding that what counts as knowledge is a cultural construct built over time through inquiry and discourse (pp. 259, 265).

May Oi and Stimpson (1994:9) on their part observed that teachers are facilitators of knowledge, not mere knowledge transmitters.

2.1.2.3.5 THE ROLE OF TRAINING IN EFFECTIVE TEACHING

Dewalt and Ball (1990: 321) made a remark which implies that relevant training is normally effective or yields significant results. They asserted that if pre - service teacher education students were taught about the research on teacher effectiveness, there should have been differences in some competences that favoured the prepared group. They drove their point home with the conclusion that inclusion of research findings in professional education would make teachers more effective.

Perrot (1992: 55) cited two studies which showed that training of teachers improved an aspect of effective teaching: higher cognitive levels teaching - learning: Borg et al. (1970) who found that whereas only 38% of in - service teachers' questions were in high order/category before training, after training (of 15 hours) the percentage increased to 50. The other study was that of Perrot et al.(1975a) which found that 47% of discussion questions were at higher cognitive levels before training, but after training (of 15 hours) of questioning skills, both the percentage of higher cognitive levels questions from the teachers and the percentage of higher cognitive levels responses from the learners significantly increased: 47 - 64(+17) and 50 - 67(+17) for teachers and learners respectively.

An implication of these evidences is that the concentration of lower cognitive level questions in classrooms as generally observed in many parts of the world is a lack of emphasis on higher cognitive levels questions in teacher preparation. One's study is an attempt to fill this gap, by developing a teacher training package which would be capable of improving the proportion of higher cognitive levels questions in the classroom after training.

2.1.2.3.4 THE ROLE OF QUESTIONING IN EFFECTIVE TEACHING

Perrot (1992:41) opined that questioning may well be the most important activity in which the teacher engages. This writer observed that the kinds of questions the teacher asks will disclose to the learner, the type of thinking which is required of him. Reference was made to the following people on the issue:

(i) Stevens (1912) who found that the teachers he studied asked 66% recall questions;

(ii) Floyd (1966) who found that more than 75% of the questions of the teachers he studied, asked information level questions;

(iii) Taba, Levine, and Elzey (1964) and Hunkims(1972) who demonstrated that different types of questions stimulate different kinds of thinking.

Perrot noted that various forms of classifying questions existed and such classifications provide conceptual framework for looking at questions. Bloom's Taxonomy was presented with six levels : Knowledge, Comprehension, Application ,Analysis, Synthesis,and Evaluation (pages42-46).

Two of Perrot's explanations appeared novel (to one) to some degree:

Synthesis: Perrot asserted that although Application questions also require learners to solve problems, Synthesis questions differ from them because the latter do not require answers to problems which have single correct answers but variety of creative answers (page45).

Evaluation: these questions do not have a single correct answer but require the learner to judge the merit of an idea, and solution to a problem, or an aesthetic work; they also ask the learner to offer an opinion (page 46).

One is of the position that hardly is there any impossible conception: within a group of acceptable/meaningful/relevant answers/responses, one only is taken while answers/responses within other groups would certainly be unacceptable/ illogical/irrelevant. Tersely, one still formulated objective questions for both Synthesis and Evaluation. After all, an advantage of research work is provision of evidence for confirmation of a theory or contrary view. Avoidance of trial, removes that venture or originality for true knowledge acquisition. One was experience sick/seeking, by formulating objective questions for Synthesis and Evaluation. The results would thus be exciting -- a vital motivational variable in research.

Higher and Lower Cognitive Levels Questions

King (1991) observed that peer questioning and responding strategy made learners to create their own higher cognitive levels questions which in turn produced highly expanded explanations from group members. King concluded after his study that questioning strategy may enable learners think in high level forms in which they do not normally think.

Perrot (1992) opined that questions may be classified into Lower and Higher Cognitive Levels based on the cognitive level thought desired . Lower cognitive levels questions demand the learner to recall information while higher cognitive levels questions demand manipulation of information by the learner (pp. 47).

On page 48, Perrot stated the characteristics of lower and higher cognitive levels thinking.

Lower-order (Lower Cognitive Levels): The Learner remembers particular facts, pieces of information previously taught or are of general knowledge.

Higher-Order (Higher Cognitive Levels): The learner is required to change the nature/form/organization of information so as to: compare/ contrast; explain /summarize; analyze/synthesise or evaluate.

Higher Cognitive levels answers could be assessed by standards such as logic,rationality, and objectivity screened through cultural/environmental values of good/bad, but are less susceptible to single judgement of right or wrong (page 48-50)

Ones's position on the issue of right or wrong has been raised in the last paragraph before this subheading. A clear major point is that higher cognitive levels thinking starts from Comprehension, not Application as some people believed.

On using questions in classroom discussion, Perrot disclosed that research studies conducted in many parts of the world showed that majority of teachers' questions centered on lower cognitive thought (Perrot 1992 pp.55) Here is a recent global evidence that teaching-learning in the classroom centered on lower cognitive levels.

On page 56, Perrot presented the questioning skills used by Borg et al. (1970) and Perrot et al. (1975a).

Using questioning skills to improve the quality and quantity of pupils' participation in discussion.

Objectives	Related teaching skills
A. To help pupils to give more complete and thoughtful responses.	1. Pausing 2. Prompting 3. Seeking further clarification 4. Refocussing a pupil's response
B. To increase the amount and quality of the pupil's participation	1. Redirecting the same question to several pupils 2. Framing questions that call for sets of related facts 3. Framing questions that require the pupil to use higher cognitive thought.

We observe that it is questioning skills rather than questions that are presented here. Where are the questions and the answers to those questions? How many of the higher cognitive levels were covered in the questions? Perrot's references ended in 1975 whereas the book containing the references was published in 1992. Here is an evidence of a dearth of researches in this area which one's research attempts to ameliorate.

2.1.3.0 **A BRIEF REVIEW ON TEACHING MATERIALS**

'Teaching materials' are the man made products which enable a teacher to present his/her lesson in a meaningful and practical fashion to the learners. The word 'aid' is out-dated. It was logically stressed that the word 'aid' separates teaching from the man-made products. That separation is illogical on the ground that no effective teaching can occur without at least certain fundamental aspects of the man made products such as books hence the products should be properly called 'teaching materials' meaning the materials with which we teach (Kukuru 1983 Chapter Two).

Another confusion is discernible between the words 'teaching' and 'instruction'. Weil and Murphy (1982:890) clarified that teaching is part of instruction processes . On the other hand, instruction processes include activities occurring in classroom, school, home. It is evident that instruction is a blanket word which covers both scientific and unscientific knowledge expansion processes. As a result, for people like Aisiku, the word 'teaching' is preferable. Not only does teaching underscore a situation whereby a human being as opposed to man - made materials like books in correspondence studies or electronic media are used to impart knowledge, teaching underscores a dynamic and interactive process between the teacher and the learner in relation to a subject matter which no man made object can equally execute effectively. This is one vital reason why teaching cannot be wholly perceived as a science but both as a science and an art. Innumerous creative/resourceful exhibitions which are unplannable come to play in a triadic teaching-learning atmosphere.

This study underscores the most possible complex interactions between the teachers and the learners hence it adheres to 'teaching' not 'instruction'.

Adegoke (1988) noted that it would be helpful if teaching methods prescribe suitable materials for particular situations. He added that the numerous teaching materials may be grouped into three:

(i) tangible forms such as realia, model or the specimen itself;

(ii) illusionary representation including skill or motion pictures, audio - tapes of live sound, drawing and graphic representations;

(iii) symbolic representation such as written and spoken words which represent ideas or objects.

The materials as presented by Adegoke, are compact; their separation would simplify the picture for easy identification and diversification as done by Erickson and Curl (1972).

Erickson and Curl classified teaching materials into two: non- projected and projected and electronic media as follows:

2. 1. 3. 1 NON - PROJECTED VISUAL MEDIA

(i) Books and Printed materials
(ii) Real things
(iii) Field trips
(iv) Models and mock ups
(v) Simulation and games
(vi) Graphic symbols
(vii) Bulletin Board and Exhibits
(viii) Chalkboard and chart pads
(ix) Flannel Boards
(x) Study Prints
(xi) Study of pictures

2. 1. 3. 2 PROJECTED AND ELECTRONIC MEDIA

(i) Motion pictures
(ii) Television and Videotapes
(iii) Projected still pictures: slides and film strips

(iv) Camera and photography
(v) Overhead transparencies
(vi) Micro - projection
(vii) Opaque projection
(viii) Audio recordings
(ix) Teaching machines
(x) Computer based instruction.

As this study does not focus on teaching materials, explanation on each of the above materials is not directly the researcher's concern here. Interested reader is referred to Erickson and Curl (1972) or Kukuru (1983). The above basic presentation is also in Kukuru (1988).

The concern here is to remind us that these materials are available. Although in the Nigerian context, projected and electronic media are not commonly available, the list of the non-projected visual media is enough for any creative/resourceful teacher. One advantage of those materials is that several of them can be manipulated to suit desired situations such as field trips, models and mock ups, simulations and games, graphic symbols, bulletin board and exhibits, flannel boards, chalkboard and chart pads.

Generally, drawings should be clear, simple, and suitable for the intended messages. Proper manipulation of the non-projected materials considerably depends on both the scientific skill which a teacher is expected to have acquired in training as well as his personal resourcefulness or creativity. Teaching materials when well used, make teaching lively, more involving for the learners and long lasting experience hence more effective teaching venture.

In this study, the Cooperating Teachers were trained to be resourceful/creative in the use of teaching materials especially the non - projected ones which are abundantly available.

2.1.4.0 STUDIES ON TEACHING OF SOCIAL STUDIES

Ayanaba (1975) examined the efficiency or otherwise of employing instructions to the teachers as a way of guiding their behaviour when using new curricula. Also examined were the effects of teachers' sex, age, and experience, on their use of new curricular materials.

One primary six teacher and his/her class in 33 randomly selected free primary schools were studied. A Social Studies pre-test and an English test were administered to the pupils. The teachers were randomly assigned to experimental and control groups. Experimental group teachers received specific set of instruments while control group teachers had non specified instruments.

The experimental group pupils scored significantly higher than the control group pupils at the .01 level of significance. Teacher variables:age, sex, and experience had no significant effect on performance of pupils. However, a high correlation was found between the English test and the Social Studies post - test.

The specificity of teacher guidance had positive effect on teacher performance. This was the same when the effect of the English ability of pupils was considered; it had implications for curriculum developers and textbook writers. It would be beneficial to incorporate instruments to be used by the teachers into their new curriculum materials so as to make for proper use by them. Perhaps this is the type of innovation carried out by the NERC (now NERDC) in incorporating content and methodology in the Grade 11 syllabus (Akinlaye 1981).

One of the suggestions for further investigation given by Ayanaba is relevant to this study: teachers' attitudes towards knowledge and learning, aimed at the possibility of modifying teachers' attitudes and habits so as to improve the methods used in teacher training: pre-service and in-service.

Oladebo (1980) examined Social Studies offerings at the Advanced Teachers College Level in Nigeria: a case study of innovation and diffusion in education. The result of the investigation revealed the following :students reported that the instructional methods that they found most suitable were field trips and small group discussions. Case studies, team teaching, and projects were considered unsuitable methods in Nigeria. Regarding evaluation, the essay was considered the most appropriate; they of course, did not condemn checklists and multiple-choice questioning .Both the lecturers and experts regarded field trips as the most effective method. The next in order of priority was brainstorming (small group discussions). A suggestion through the findings was that teachers' observation could be introduced as an evaluation device but they added that the device should be used with great caution.

The study offered recommendations for effective diffusion in social studies:

(i) there was need for the experts to agree on the objectives and content of Social Studies;

(ii) instructional materials like books on Social Studies should be made available to learners in order to enable them have access to diverse views of thought and different approaches to problem solving which are the hallmarks of Social Studies;

(iii) Nigerian Universities should expand their Social Studies offerings in order to increase the production of well trained special teachers.

Oladebo gave five suggestions for further studies; four of them are relevant here:

(i) the value and uses of various teaching techniques such as archival work and local exhibits, to promote the objectives of Social Studies;

(ii) the role of individual subjects in Social Studies towards the solution of selected societal problems;

(iii) the various aspects of the culture and values of Nigeria and how these could be used to foster citizenship and national unity;

(iv) how to increase the effectiveness of Social Studies teaching at the A. T. C and other institutions.

Oladebo's work contributed to knowledge in terms of which methods are most useful to social studies teaching and learning; evalutions of teachers: that teachers could be observed although with adequate caution. A striking recommendation was the need for experts of social studies to agree on the subject's objectives and content to qualify as a discipline. Moreover, Oladebo's investigation was carried out on tertiary learners and so affords us the opportunity of comparing and contrasting.

There is some degree of ambiguity, however, about the method which was considered by both lecturers and students as the most useful; that is, field trip. For example, in what type of learning is field trip most useful? The term 'useful' itself seems vague. Following literature, it appears hard for field trip to promise usefulness in all aspects of learning. Small group discussions which ranked next shall be tested in one's study with the tag Cooperative teaching strategy to verify its effectiveness at the higher cognitive levels.

Adeyoyin (1981) studied the dynamics of teaching social studies at the Grade II Teachers College Level in Lagos State. This study was justified both theoretically and empirically in contributing to knowledge in classroom interaction and in influencing curriculum planning and development in social studies.

Analysis of data showed that:

(i) learners conceptualised social studies more as an amalgam of subjects rather than citizenship education or a discipline;

(ii) learners conceptualized teaching more as interaction between the full (knower) and the empty (ignorant) than a triadic process of interaction involving the teacher, learner, and the subject matter;

(iii) teachers and administrators, however, held more appropriate conceptions of social studies as citizenship education, ecological studies, skill development, and of teaching as involving the triadic process.

Adeyoyin's study identified six major factors capable of enhancing dynamism in Social Studies teaching:

(i) the variety of conceptions of Social Studies held;

(ii) the conceptions of teaching held and how close to the triadic process those conceptions were;

(iii) the variety of methods of teaching Social Studies held;

(iv) varying notions of Social Studies held;

(v) the awareness of specific objectives to reflect the effects and nature of Social Studies;

(vi) forms of interaction indicating the ability to achieve stated aims in teaching.

The researcher stated that the factors influence dynamism in the class - room as follows:

(i) the more conceptions of Social Studies held, the more varied the objectives and methods of Social Studies identified and actualized, the more intensive the classroom interaction;

(ii) the greater the teacher's ability to identify and achieve specific objectives which portray the effects of Social Studies, the nearer the achievement of stated aims to reflect Social Studies' nature, the more intensive/comprehensive the classroom interaction.

Adeyoyin gave some recommendations including the following:

(i) emphasis and development of the appropriate conceptions of Social Studies;

(ii) re - examining Social Studies curriculum, the philosophy behind it, and the learners' scheme of work;

(iii) teachers and students should be exposed to the factors which influence dynamism in the classroom;

(iv) teachers should be exposed to a system of analyzing the teaching process with a view to educating them on teaching as involving the learner, teacher, and the subject matter shared between them (the triadic process).

This investigator gave a number of suggestions for further research. Two of them are:

(i) that the teacher training process should be observed to identify the Social Studies methods: problem - solving, role playing, dramatization, inquiry, group work, which make for the most dynamic classrooms;

(ii) effects of realization of objectives to create more dynamic interactions in Social Studies.

These suggestions partly have direct relevance to this study; it is concerned with the effectiveness of Cooperative and Competitive teaching strategies with regard to Social Studies. It specializes on the cognitive objectives without disregarding the other two (affective and psycho-motor) . More dynamic interaction implies more moves between the teacher and the taught in relation to subject matter which is information processing. Information processing entails more time, effort, and results in better comprehension, application, analysis, synthesis, evaluation, problem solving and creation and hence higher order learning or higher cognitive levels learning. The study is consequently, partly an extension of Adeyoyin (1981).

Akinlaye (1981) studied the relationship among the content, teaching method and objective of Social Studies curriculum selection in Lagos primary schools.

The result revealed that there were no relationships between the learning experiences (as provided in the lesson notes and the schemes of work) and the stated objectives of the Social Studies curriculum for primary schools in the Lagos metropolis.

A number of recommendations were made to help teachers reduce the irregularities noted in the teacher's stated objectives and the learning experiences provided: that comprehensive and well structured orientation courses on the concept, scope, nature and appropriate methods of Social Studies be mounted for the primary school teachers, teacher trainers (in the teacher training colleges), curriculum planners and school supervisors.

Akinlaye gave a number of recommendations. Two of them are:

(i) a continuous revision and development of Social Studies curriculum be embacked upon;

(ii) efforts must be made to acquaint classroom teachers through regular seminars and workshops on the methods of the subject.

The latter recommendation is directly relevant to this study which aims at testing Cooperative and Competitive strategies as possibly effective for Social Studies, at the secondary school (which is at a higher level than that of Akinlaye: at the primary school level).

Obebe (1981) undertook an assessment of knowledge of Social Studies content and method of graduating elementary teachers (Grade II) of Lagos and Ondo States, Nigeria. The study was a summative evaluation of a Social Studies programme in four Teacher Training Colleges.

Obebe's major conclusions included:

(i) prospective teachers of elementary Social Studies from the different schools differed in their perceptions of topic coverage and the methods employed by their lecturers;

(ii) the instructors of Social Studies at the teacher training college employed more of lecture method and whole class discussions in teaching Social Studies; they also tended to avoid topics dealing with attitudes and values and makers of Nigeria as well as they did with other topics as revealed in their responses to questionnaire items on topics coverage and methods used.

One may observe that topics dealing with attitudes and values seem to be of higher cognitive levels, perhaps, the reason why they were neglected by the teachers who were ill- prepared to handle them.

(iii) Students from schools where more time was spent on Social Studies and which favoured the traditional methods performed better.

The few lines before this point seem to have prepared the ground. It appears that better performance was a consequence of more time and the method that the lecturers could employ well. The significance of more time is fairly well addressed under the triadic process in which teaching is not rushed.

Indeed, time is taken to be a substitute for aptitude (Walberg and Fredrick 1982). Moreover, that learners' performance considerably depends on the competence of the teacher will also be clarified.

Among Obebe's suggestions for further research, one is most noteworthy here: to determine the relative effectiveness of various teaching methods in Social Studies. The present study is partly taking up that suggestion to test the effectiveness of Cooperative and Competitive teaching strategies in relation to Social Studies learning with stress on higher cognitive levels performance.

Ogundare (1982) tested the effectiveness of problems approach in the teaching and learning of Social Studies in the Nigeria primary schools. The study aimed at highlighting, if any, instructional situations of teaching/learning Social Studies in Nigeria primary schools through problems approach. The measurement of effectiveness was examined in a post-test study by comparing the academic achievement of subjects exposed to the problems approach with those of other subjects exposed to the traditional expository approach.

At the end of four weeks experiment it was found that the experimental group on the problems approach statistically achieved higher in the overall instructional test. The problems approach involved the pupils, encouraged them to probe their own knowledge and evaluated them among others.

Ogundare made three main suggestions for further study; two of them are relevant to this study:

(i) replication of the study since experimental investigation on the problems approach was new in Nigeria;

(ii) investigation into higher cognitive objectives of analysis, synthesis, and evaluation which were not considered in the study.

The present study is not replicating Ogundare's study but is testing two other approaches: Cooperative and Competitive which would be employed to investigate higher cognitive levels objectives. Thus it is (apparently/partly) an extension of Ogundare's work.

Okafor (1983) assessed knowledge of content and methods of teaching Social Studies by graduating Grade II College students in Ondo State. Grade II teachers in Ondo State were prepared in three tiers: one year, two years, and three years to be ascertained as well as the teaching methods which teacher trainers used in teaching Grade II College Social Studies.

The analysis of data showed that the majority of the graduating students had only an average knowledge of Grade II Social Studies, with students doing the 3 years course being better informed than those of 1 and 2 years' programmes. The teachers employed traditional instructional strategies more and most of them had no Social Studies training.

Okafor gave three suggestions for further research:

(i) assessing the ability of the graduating Grade II teachers in teaching primary school Social Studies for which they were trained;

(ii) survey of the instructional materials in schools and colleges assessing their adequacy or otherwise in teaching Social Studies;

(iii) evaluating the then Grade II Social Studies programme with a view to determining whether the component themes were adequate in giving would - be teachers a sound knowledge of Social Studies so that they effectively teach it in primary schools.

Okafor's study is similar to that of Obebe (1981), if it was not a replication.

Amodu (1984) investigated the relationship between pupils' attitudes and achievement in secondary school Social Studies education. The study revealed that there was a high correlation between attitude of students towards Social Studies and achievement. Learners with high scores had favourable attitude towards Social Studies. Girls generally performed better than boys because the former had favourable attitude towards the subject.

This finding is contrasted by two other studies which showed that boys performed better than girls (Olakulehin 1986; Ogundare 1987). Or is there any gender influence on the part of teachers regarding learners' attitude towards a subject? The reason is that Amodu a female found out that female learners performed better; Ogundare a male researcher, found the opposite although one is unaware of Olakulehin's gender.

Ogundele (1984) surveyed problems and prospects of extending Social Studies to all the secondary school classes in Ekiti east and Ekiti north L.G.A.s of Ondo State. Although the NERC (now NERDC) in 1973 recommended that Social Studies should be learnt in all the classes in the secondary school, the National Policy on Education (1977) limited the subject to the Junior Secondary School (JSS). This made the researcher, who had been teaching the subject, to seek the opinion/attitude of selected students, teachers, schools administrators and parents about the problems and prospects of extending the teaching of the subject to senior secondary classes.

The result showed that Social Studies was very popular and quite desired by all the four categories of respondents. However, they did not recommend extension of the subject to the senior secondary school because of:

(i) inadequate trained manpower;

(ii) inadequate fund and instructional materials including standard text books.

The researcher recommended that Social Studies should be made compulsory throughout the secondary school years in line with NERC (1973) proposal; its teachers should be trained; adequate fund and instructional materials should be provided as well as standard textbooks.

Ogundele's recommendation in line with that of the NERC (1973) is yet to materialize in Nigeria. While training of teachers is gradually progressing, adequate funding demand seems to be still far - fetched.

Odeleye (1985) investigated teaching Social Studies through Nigerian Literature: a case study of an innovative approach. Her recommendations are relevant to this section of the review.

(i) The need to select learning experiences from other fields of knowledge to Social Studies. Her result showed a higher academic performance and higher ability to solve problems in the use of literature to teach Social Studies. This point agrees with Social Studies as totality of experiences and relevant knowledge.

(ii) The need to actively involve students in the learning of Social Studies; students discovered things for themselves rather than being receivers. The class taught through literature was pupil oriented and dominated. Perhaps that was why they scored higher.

(viii) A relationship between Social Studies objectives and the teacher's role. Since Social Studies makes students to be aware of the problems of human beings and to equip them with the tools of solving such problems teachers should direct their content and method to help achieve these objectives. In effect, teachers should look into Social Studies objectives and identify experiences that could be collected to help their achievement by looking into all other fields of knowledge and prepare their teaching materials accordingly.

Odeleye's study contributed towards learners' improved performance in Social Studies through the effective use of literature in highlighting the values or morals to be taught.

Olakulehin (1986) studied the effects of reflective teaching model and lecture approach on achievement in Social Studies. The subjects were 160 Form II pupils in Oranmiyan L. G. A of the then Oyo State. Two groups of teachers independently trained participated in the study. The non-equivalent pre - test post - test design made up of the Reflective Teaching Model (RTM) group and the Lecture Approach Model (LAM) group was used. Three instruments: a course unit on Social Studies, an achievement test based on the unit, and a teaching behaviour observation checklist were used to collect data for the study. The duration of the invetigation was 8 weeks; the monitoring of the participating teachers was done by the investigator.

The achievement scores on the pre-test and post - test for the two groups were analyzed using t-test and analysis of covariance. The checklist data was analyzed and the results showed that:

(a) learners in the reflective teaching model class performed significantly better than those in the lecture approach model in Social Studies achievement test;

(b) male students performed better than their female counterparts in the Social Studies unit test.

It may be observed that this gender case agrees with Ogundare (1987) but disagrees with Amodu (1984) as noted earlier.

Olakulehin gave four major suggestions for further investigation and one of them is worth mentioning now: comparative study of relative effectiveness of methods other than reflective and lecture approaches.

In his conclusion (pages 103 - 107) Olakulehin noted that it seemed that the right approach was to integrate methods and use the reflective teaching model more often to make for generally improved performance. It was discovered that the reflective approach is more effective than the lecture method because it takes cognizance of the needs of the learners; they are exposed to real life situations and the method appeals to several senses simultaneously.

Olakulehin's study contributed toward students' better performance generally through teaching methods.

Osho (1986) examined the effects of problem-solving and conventional teaching strategies on students' achievement in Social Studies. This topic was investigated in relation to achievement level of students, attitude, and socio - economic status; students attitude; growth in Social Studies and achievement in Social Studies, attitude to Social Studies and socio - economic status.

The subjects consisted of 360 form II students from three selected schools in Bennin City. The pre-test post- test control group experimental design (3 x3 factorial) was utilized. Subjects in the three treatment groups were exposed to the Social Studies multiple choice objective type achievement test and Social Studies attitude scale on a pre-test post - test basis and were compared using data obtained from the tests.

Analysis of covariance was used to analyze the data and the result was that the problem-solving teaching method emerged more effective than the conventional instructional strategies in promoting achievement in Social Studies whether achievement level, attitudes, and socio - economic status. The differences in the three teaching strategies (problem solving, expository - discussion, and expository were significant ($F= 8.726$, $p<.001$).

While there was no significant differential effect in achievement between attitude and strategy, socio - economic status and strategy, there was a significant difference between achievement and strategy ($F = 209.616$, $p<.001$). There was also a significant interaction effect between strategy and achievement ($F=2, 538$, $p<.05$).

The result also showed that the problem - solving teaching strategy was more effective in improving pupils's attitude towards Social Studies than the conventional strategies although there was no significant difference between the treatment groups in their attitude scores.

Osho's suggestions for further research were:

(i) the effectiveness of teaching methods in Social Studies learning generally. Osho strongly noted that there was a severe dearth of empirical studies in this area especially in Nigeria;

(ii) replication of his study possibly to last longer than his, and to test other content areas (Osho used transport and communication);

(iii) to determine whether gender, age., school location, do influence learners' performance in Social Studies.

In his conclusion (page 342 - 343), Osho recommended that the problem - solving strategy should be used side by side with some conventional teaching methods to cater for the different learning patterns of pupils until the time all learners exposed to it are capable of gaining fully from it than other instructional strategies. He added that this transition should be gradual so that both the teacher and the taught can fully internalize the demands of the strategy.

Osho (in his literature review) identified several Social Studies teaching methods: inquiry, role playing, debate, case study, project, simulation, problem-solving, expository, discussion, field trip. These teaching methods can add to or subtract from those identified by Obebe (1981), Adeyoyin (1981: 1986; 1990) and others like CESAC and HEB. For example CESAC and HEB (1979) added observation.

The attempt made by one's research may add Cooperative and Competitive strategies to this list.

Osho's investigation contributed comprehensively and markedly to effectiveness of teaching - learning and further research among others. The work, was in the main, similar to that of Ogundare (1982). However, while that of Osho was at the Ph.D. level, Ogundare (1982) was at the Masters level. Again while that of Osho was carried out at the secondary school level, that of Ogundare (1982) was at the primary school level.

Ogundare (1987) evaluated Social Studies programme in Grade II teachers' college of Oyo State. It may be noted that this same investigator carried out his M. A study on: Effectiveness of problems approach in the teaching and learning of Social Studies in the Nigeria primary schools reported above (this review followed a developmental order). Ogundare increased the variables at the Ph. D level; notwithstanding, his major focus was the extension of the Masters work. Of course, he suggested a replication of the Masters study and perhaps that was the main thing that he did. Another difference is that while the Masters work was carried out among primary school learners, the Ph.D.

investigation had Grade II learners as its subjects.

Ogundare (1987) evaluated the teachers' college Social Studies programme in terms of how far teachers adopted problems-approach in their Social Studies classroom interaction, assessed the extent of success achieved regarding students cognitive achievement using problems-approach, identified teachers and students' characteristics and the degree of resources utilization that may be associated with the programme's success.

Five instruments were used; two of them were Social Studies achievement test which were pre and post-tests each of which consisted of 30 objective items. There were also two sets of Social Studies Attitudinal Inventories for student and teacher respondents respectively. A Social Studies class observation scheme, was the fifth instrument.

The study consisted of six teachers' colleges that satisfied the specified evaluations criteria, six tutors, and 211 students were observed five lesson times within a total of 175 minutes. Teachers and learners' performances were described and analyzed using chi-square and t-test/analysis of variance (ANOVA) respectively.

Teachers' process occurrence indicated that 33% exhibited marked departure from the problems method. Teacher presage - process relationships showed that high exposure to Social Studies content and methodology and positive attitude were associated with problems approach adoption. The process - product relationship showed that higher teacher problems approach was associated with a greater student presage - product relationship; that positive attitude and career plan in Social Studies were related to high cognitive achievement in Social Studies education.

Two of Ogundare's suggestions for further investigation are relevant to this review:

(i) replication: experimental research on problems approach which was a new thing in Nigeria hence the need for replication, increasing period of observation of the teachers' classroom performance, at different geographical, political or class levels;

(ii) looking into the learning outcomes in Social Studies: affective and skills domains and higher cognitive objectives: synthesis and evaluation in relation to the problems technique.

It may be noted that investigation into higher cognitive objectives suggestion was also made by the same researcher in his Masters work (1982).

Ogundare's studies (1982 and 1987) (Masters and Ph.D respectively) which concentrated on the problems approach and its effectiveness on learning *are two of the few experimental studies on Social Studies teaching methods.* Others are Osho (1986) and Olakulehin (1986) (reflective inquiry). It is significant that all the four studies advocated for replication. We may remove Ogundare (1982) because it had been done by the same investigator in 1987 but all other three suggestions still stand. Moreover, only a few teaching methods have been experimented upon; others need to be investigated.

This research would not merely add to the few experiments but investigate two relatively novel strategies with regard to Social Studies: Cooperative and Competitive.

Adeyoyin (1986) was a research report on the dynamics of teaching Social Studies at the primary school level in Lagos. This study which was a follow-up of previous observations made, aimed at investigating the linguistic behaviour of teachers and learners in Social Studies classes in Lagos State. Each linguistic behaviour was referred to as'move' and the aim was to identify moves which support or negate the teaching - learning process.

Two hundred and seventy nine pupils participated in the classroom interaction processes which concerned classroom teaching, taping and identification of the various moves. On subsequent visits, the lessons were taped within the life space of the principal actors (teachers and learners). After taping the lessons fully, the recordings were back-played, the discourses were transcribed and coded from the observers' view - points. Attention was paid to the eight moves identified: structuring, soliciting, responding, reacting, initiating, reasoned response, high order questioning, silence to increase reasoning.

After teaching, the second instrument: Classroom Interaction Questionnaire (C. I. Q) was administered and completed by the participating teachers. The pupils' information was gathered from C. I. Q. providing the needed background information to participants.

In the discussion, Adeyoyin made several points some of which demand attention here. She referred to Kilpatrick (1926) who asserted that except the learners learn, the teacher has not taught. Understanding requires the teacher structuring the lesson and leaving the pupils to respond, initiate discussions, ask thought - provoking questions and respond with sound common sense. Adeyoyin added that such a situation revealed dynamism and promoted multi-method approach on the part of the teachers to ensure full participation from pupils.

The teacher that scored highest made 36 moves and 195 soliciting moves. The ratio of teacher soliciting to learners' responses were almost one to one. Adeyoyin emphasized that in this situation, teaching or learning became richer, was enhanced and improved upon because the teacher and the taught operated at 'higher' level asking and answering questions which indicated the use of common sense. Dynamism was underscored in the study through the teacher - leaner roles considered as complimentary.

An interesting result of the study was that private schools did not rank higher than public schools in the classroom interaction analysis. It showed that, private schools might not necessarily be better than the public schools in terms of teacher training and perhaps including material supply/equipment.

On the whole, the presage and product variables (teacher characteristics and pupil qualities and teacher - learner verbal interactions or pedagogical moves) exerted greater influence on the product variables (dynamism in the teaching - learning process) in the study.

In conclusion, Adeyoyin stated that the classroom is the life-space of the main actors: learners and teachers, that positive valences (teacher - learner moves which ensure quality and high level performance in the life space) are required for the achievement of goals within the life-space.

Several remarks relevant to this study were made when Adeyoyin (1981) was reviewed. We may recall that the two studies considerably dwelled on 'higher' cognitive levels. A major difference between one's study and those of Adeyoyin is that whereas her studies were aimed at finding out what the situation was like, hence survey, this study attempted to test two teaching strategies that may improve 'higher' cognitive levels performance. As far as time is concerned, the two groups of researches are worthwhile because it is usually a survey before an experiment (Ndagi 1984; Ary et al. 1979).

Adeyoyin (1986) is in a sense, similar to Ayanaba (1975) because of the emphasis on language as a means of effective communication.

Obebe (1987) wrote a paper on the development of Social Studies education in Nigeria and some research studies in the field. Two major issues addressed were:

i. Social Studies development;

ii. reviewing of some research reports.

On page 4, the author stated how Social Studies grew, from an experimental subject at Aiyetoro Comprehensive High School in the 1960s to a core subject specially identified in the National Policy on Education (1981). He added that, the last stage was due to emphasis on the development of a total person whose education is not built on inculcation of information alone but on the application of knowledge to solve problems. Furthermore, for teachers to cope with the demands that Social Studies teaching requires, they needed to acquire basic knowledge from research findings on the content and methods of teaching the subject.

After the last statement, Obebe reviewed 17 research reports at the Masters and Ph. D levels some of which have been referred to in the present review even in more details. The research reports included: Barth and Noris (1976), Ndubusi (1973), Iyontsun (1979), Agboola (1979), Nhene (1980), Ukponu (1981),Guru (1979), Akinlaye (1981), Adeyoyin (1981), Obebe (1981), Boateng (1983), Ayanaba (1975), Dahunsi (1979), Oladebo (1980), Amodu (1984),.

A few points may be noted on these research reports:

(i) they demonstrate development of interest in Social Studies research;
(ii) most of them were survey studies;
(iii) they suggest a number of areas for further investigations.

The reviewer, at the end, asserted that 'Most or all the studies reviewed are students reports. There is need for commissioned research in Social Studies education in Nigeria to such areas as the nature, scope, and content of Social Studies as well as teacher preparation for the teaching of Social Studies'.

Obebe (1987) is a valuable publication for Social Studies practitioners in particular and Nigerian educators generally. This investigation partly picks up the last section of Obebe's assertion: teacher preparation through testing of two strategies which may be added to Social Studies methods' list.

Knight et al. (1989) is another valuable empirical research publication, on students' perceptions of relationships between Social Studies instruction and cognitive strategies. The relationship between elementary learners' use of cognitive strategies during Social Studies critical thinking tasks and their perceptions of classroom instruction were the focus.

One hundred and forty one third, fourth, and fifth grade students were studied. These learners were next asked to indicate the particular cognitive strategies they normally used to solve such problems; assess their teachers' strategy and general classroom instruction. The combination of specific instruction in strategies and generic teacher behaviors influenced the learners' choice of strategies during Social Studies critical thinking.

Crucial points in the body of the report included:

(i) few studies even in other subjects have been carried out on higher level thinking skills like critical thinking and problem-solving.

(ii) One of the current areas of concern in Social Studies is the need to understand how learners think, approach a learning task, process and retain information, and most efficiently solve higher level thinking Social Studies problems.

(iii) Although students' cognitive strategy use has been examined in other subjects like mathematics, science, and reading, little empirical research exists that investigated the strategies students use during critical thinking tasks in Social Studies .

(iv) Since critical thinking or the process of determining the authenticity, accuracy, and worth of information is a basic skill in Social Studies , there is need to understand the strategies learners use to solve these high level cognitive tasks.

(v) The teacher's role need to be investigated in relation to student acquisition of higher level thinking skills as intensely as it previously has been investigated in student basic achievement.

(vi) Twelve specific cognitive strategies identified by previous research and theoretical search for problem-solving [Knight and Waxman 1987] are: (i) writing down important elements (ii) brain - storming (ii) imaging (iv) relating to a similar problem (v) relating personally to the problem (vi) looking for a pattern (vii)guessing (viii) categorizing (ix) seeking help from peers (x) making a table or chart (xi) making an organized list (xii) working backwards.

(vii) Teacher behaviours were divided into two: specific instruction in and generic teacher behaviours; Specific instructions included: writing down important elements, relating personally to the problem, making an organized list, relating to a similar problem, imaging, categorizing, brain-storming, making a table or chart, looking for a pattern, guessing, seeking for help from peers, working backwards; Generic teacher behaviours included: modelling, feedback, pacing, emphasis on process, instructional materials, peer cooperation, opportunity for critical thinking, tolerance for divergent approaches, grouping arrangements.

(viii) The result of the study showed that learners were not frequently using many of the cognitive strategies in the survey, to solve critical thinking problems in Social Studies . Accordingly, elementary school students might learn how to use specific cognitive strategies to facilitate their critical thinking abilities. The importance of the classroom teacher becomes apparent because it is he/she who must first know the various cognitive strategies which learners can employ to solve problems and then instruct them on how to fruitfully utilize those strategies.

(ix) The strategies included on the Social Studies Strategies Survey (SSSS) are those which have been found to be effective in subjects other than Social Studies . Alverman (1987) was quoted to have reported additional reading strategies like predicting outcomes which might be vital for solving higher levels Social Studies tasks. On the other hand, several of the strategies included in the survey might be inappropriate for Social Studies such as working backwards (though found to be effective for mathematics problem solving) might be inappropriate for Social Studies because there are limited well-structured problems in Social Studies . Perhaps that was why working backwards was the least cited strategy.

(x) The result of the study indicated that learners' cognitive strategies for critical thinking tasks generally related to the teaching of specific strategies or to the combined effects of specific strategies with generic behaviour rather than to generic behaviour alone. Precisely, the strategies teachers intentionally mention or fail to mention may prompt learners to use or reject other related strategies as relevant for problem-solving.

Knight et al. (1989) gave two major suggestions for further investigations:

(i) the nature of strategies for Social Studies critical thinking tasks, needs to be more fully investigated; investigation of strategies for different Social Studies tasks may reveal additional categories of strategy use;

(ii) the relationship of strategy use to student learning in Social Studies .

Much enlightening information has been gathered from this research report of Knight et al. on the relationship between elementary learners' use of cognitive strategies during Social Studies critical thinking tasks and their perceptions of classroom instruction. The suggestions for further investigation are particularly crucial to aid us extend knowledge frontiers in terms of effectiveness of teaching strategies on learners especially at the higher cognitive levels.

Apparently, Knight et al. largely gave inspiration to this study. The first point in the body of the report as given in this review says that few studies even in subjects other than Social Studies have been undertaken on higher level thinking skills such as critical thinking and problem-solving. One felt that it would be a fruitful enterprise to carry out a study on higher cognitive levels. This decision was supported by the result of poor performance of learners at the higher cognitive levels (Obebe 1987:9; Imogie 1989). Thus the problem is: what teaching methods/strategies can improve learners performances at higher cognitive levels? Since Social Studies has been identified as the subject which specializes at higher cognitive levels (Banks and Clegg 1977, Mehlinger 1981) it seems contradictory for learners of the subject to perform poorly at the levels. As a result, any effort at checking this undesirable situation seemed worthwhile.

Anise(1989) studied students' evaluation of teachers' effectiveness and implication for Social Studies instruction. The author first cited three cases which give credence to learners' evaluation of their teacher as a reliable exercise notwithstanding the fact that some people objected to it. The three cases were those of Cohen (1981), Kauchak (1982), and Buthram and Wilson (1987).

The study involved 200 JSS II learners randomly selected from 8 schools in Oranmiyan L.G.A. of Oyo State. The result was that of 73% of the learners rated their instructors as being competent: (a) identifying and stating instructional objectives clearly quantifiably (b) arousing and maintaining learners' interest (c) applying various instructional techniques (c)selecting thought-provoking materials. Sixty percent (60%) of the learners reported in the teachers as being punctual but 39.5% of them reported that their teachers did not give them regular assignments.

Anise concluded that since the sample was representative of Nigeria, the result pointed towards possible success of the Social Studies programme but remarked that teachers would need to give more home works to learners. The researcher cautioned that the result was based on two main assumptions (a) that the learners were mature and competent to evaluate their teachers (b) that the learners knew the implication of the evaluation.

Whatever the results, learners' evaluation of their teachers may be encouraged and that researches could be conducted to standardize this type of evaluation. Evaluation may not be learner-centered. Anise observed that another method of evaluating the teachers is observation although Oladebo (1980) found that the consensus of his subjects was that teachers observation should be effected with due caution.

Six approaches to Social Studies education were suggested by Janzen (1995: 134-140): cultural transmission, social action, life adjustment, discovery, inquiry, and multi-culturalism. His main position was revealed on page 138, which is eclectism. Janzen's conclusion is an urge for Social Studies educators to be more critical on their approaches to make for coherent and defensible education in order to avoid confusing learners with illogical curricular organization.

Several highlights in this section are that we are still developing in methods/strategies of Social Studies teaching; teacher preparation is yet to attain a high level. A number of effective methods have been identified, some of them have been empirically tested such as a problem-solving, reflective inquiry, lecture. There were suggestions (calling) for the testing of other strategies.

Evaluation of Social Studies should not be learner-centered but should be both learner and teacher - centred.

This study may add two to the list of empirically tested methods/strategies in Social Studies in relation to higher cognitive levels teaching.

2.2.0 STUDIES ON COOPERATIVE AND COMPETIVE TEACHING STRATEGIES

Okebukola and Jegede (1990) studied eco-culture and concept attainment in science. The emphasis was that the nature of an environment exerts influence on students' concept attainment in science. Two variables in that study are of more relevance to this review. They are:

(i) rural dwellers were predominantly cooperative in out-look;

(ii) students who showed preference for cooperative learning did significantly better on the Science Concept Test than those who showed preference for Competitive and Individualistic work:

Cooperative Number=83; mean =69.53

Competitive Number=14; mean=45.11

Individualistic Number=31; mean=20.23

Two points may be noted here:

(i) results of small groups with learning approaches may partly be a reflection of environmental factor; for example, because ruralism is often synonymous with cooperation, rural dwellers favoured cooperative approach and that may reflect in their approach to study and its results;

(ii) peer-tutoring mechanism characterizes cooperative learning , that is , both the students teaching in the group as well as those receiving instruction tended to gain.

Peterson (1982: 847-48 and 850) referred to an empirical study carried out by him and his associates in 1981, that high ability and low ability students benefitted from small group learning situations but medium ability studdents did slightly better working alone. In a clearer way, Peterson added that children improved their own learning as they taught fellow students in the small groups adding that the teaching benefitted the children who taught more than those who listened or learned. Moreover, high ability and low ability students did more explaining than the medium ability students; the latter group tended not to be involved in explaining and consequently did not quite benefit from small group approach. On page 80, Peterson suggested *that students working in small groups should comprise* mixed ability (high ability and low ability put together) but medium ability students may be encouraged to work individually.

It may be observed that this study apparently focused on cooperative learning. Secondly, it was on mathematics. In short, the case in Social Studies may be different. Nervertheless, it seems reasonable to assume that the same situation holds in both subjects until empirical finding proves otherwise hence Peterson's suggestion needs to be noted.

Okebukola (1984) investigated the effects of Cooperative, Competitive, and Individualistic laboratory interaction patterns on students' performance in biology. The fourth method which served as control, was the conventional(traditional) method. The subjects(number=1,330)were pre-tested, treated for 6weeks and post -tested on all dependent measures.

The experimental sample performed significantly better than the control in cognitive achievement in biology ($F3, 1329 = 70.29; p < .001$),scientific attitudes ($F3, 1329 = 56.54; p < .001$) and practical skills ($F3,1329 = 64.53; p < .001$). The Cooperative group did best in cognitive achievement and scientific attitudes ($F2,997 = 201.95$ and 34.59 respectively; $p < .001$); the Competitive group performed best in practical skills ($F2, 997 = 323.51; p < .001$); while the Individualistic group demonstrated the weakest performance in all the measures.

Okebukola recommended that science teachers in general and biology teachers in particular should encourage within group Cooperation and between group Competition when the goal is to help students develop cognitive, affective and process skills neccessary to become good scientists.

If we take the procress skills to Social Studies, we would come to the focus of this study: information processing or higher cognitive levels performance in Social Studies. We may take the first term ; cognitive as general and skill processing as specific both of which are central to this review . Briefly, Okebukola's suggestion to encourage within group cooperation and between group competition in science and biology especially seem helpful to us as Social Studies educators and teachers.

On the whole, Okebukola's literature review shows that there were evidences that either cooperative, competitive or individualistic strategy is better. There was a fourth position that none of them was better: they produced generally equal results. It seems necessary to cite an example on each of the four positions:

On studies favouring Cooperative group, Okebukola referred to French, Brownele, Graziano and Hartup who in an experiment comprising fourth-grade children randomly assigned to Cooperative (CP) Competitive(CM), and Individualistic (IN) groups discovered that the CP group demonstrated the best performance.

About studies favouring Competition (CM) referred to by Okebukola (1984), a typical one was on Social Studies. It was reported that Ryan and Wheeler(1977) using both 60 5th and 6th grade students , randomly assigned those subjects to CP and CM groups. The result was that the CM group displayed superior performance than the CP group. Both groups were involved in inquiry-related Social Studies lessons for 18days . 'Seal Hunt' the simulation game, was played by both groups under identical conditions .

A study favouring Individualistic group reported by Okebukola(1984) was noted to have been carried out by Sims (1929). Sims investigated the influence of individualistic and group motivation on improvement. He used 126 college sophomores and juniors and found that the IN approach was superior to group Competition in reading rate and substituting rate on a given task.

We may note that this is the only study referred to by Okebukola in favour of IN approach . Secondly, the study is quite old (1929) and so it is possible that several variables such as socio-economic and possibly natural ones might have affected the result. Moreover, the study did not involve Cooperative pattern so we do not know whether the IN group could also have been better than the CP group. Furthermore, following Peterson (1982: 847/8), it is possible that the subjects of Sims were generally of medium ability. Finally, it is possible that reading and substituting rates are best done individually. Experience suggests that this is the situation. An individual would tend to read faster and perfectly when there is no interruption, substitution rate also would tend to be more original and therefore faster when one is alone.

Briefly, considering several variables, it appears that Sims (1929)'s study may not be generalized, although it is worthy of mention if only for a check.

Concerning studies without superiority, four were reported by Okebukola (1984).But none of them included IN group. All four had CP and CM groups only. One of them, as example was undertaken by Bloom and Schuncke published in 1979. They studied the effectiveness of a set of curricular activities and varying group experiences in facilitating interdependent task structuring by 7th graders. No significant differences were found in the structures selected by the experimental groups.

As remarked at the beginning of the last paragraph , the four studies favouring similar results did not include IN pattern. It should be noted , however, that the Competition in one's study is individualized (a blend of Okebukola's group Competition and his ordinary individualized group) to test higher cognitive levels performance of Social Studies learners. Secondly, as noted under Sims (1929)'s study as well as others (Okebukola 1984; Okebukola and Jegede 1990; Peterson 1982), the IN group has the least evidence in its favour. We are now left with two (CP and CM). The evidence suggests that CM favoures more activities/processes than CP. The handicap in this sudy is that Social Studies has limited practical activities. More precisely, the emphasis of this study is on higher cognitive levels which demand limited psycho-motor activities. Thirdly, following the last two points, the Competition in this study is individualized as opposed to group competition. There are therefore, several peculiarities in one's study compared to those reviewed, making the study considerably original and motivating.

Stevens et al. (1991) observed that Cooperative learners are in 4-6 numbers (page 9). Moreover, duration of Cooperative experiments which have produced valid and reliable results range from 4-30weeks (pp. 9) Furthermore, Cooperative learning is likely to enhance higher cognitive learning. It has been stated elsewhere that this was a theory under test in one's study.

It may be noted that Stevens et al. (1991) was a Cooperative learning integrated with direct instruction. One's study is Cooperative teaching strategy: the competent teacher as a go-getter (strategically) helping the learners to learn. Also, the mention of higher cognitive learning was not only indiscriminate but speculative. One's study is discriminate on the mention of higher cognitive levels and attempts at improving the below average achievement (recorded globally) are where the resources of one's study are utilized.

2.3.0 STUDIES ON TAXONOMY OF OBJECTIVES (COGNITIVE, AFFECTIVE, AND PSYCHO-MOTOR)

Cangelosi (1990:7) observed that behavioural constructs are traditionally classified into three domains: cognitive, affective, and psycho-motor.

Cognitive domain: this domain requires learners to do something mentally such as recalling information or deducing a method for solving a problem. As this domain is the focus of this study,we shall return to it.

Affective domain: This domain requires development of attitude or feeling, for example, to read or work at something.

Psycho-motor domain: This domain requires learners to develop some physical attribute such as muscle flexibility or physical skill such as manipulating a pencil to produce letters.

The following examples, covering the three domains were given by Cangelosi on page 8:

Mr. John helps Bello to 'recite' the steps for writing the letter x (Cognitive domain). Bello 'decides to' write the letter x (Affective domain).

Bello 'physically manipulates a pencil properly enough' to follow the procedure/sequence for writing the letter x(Psycho-motor domain).

2.3.1.0 THE COGNITIVE DOMAIN

As stated above, this domain is the focus of this study and two main areas shall be reviewed under it:

(i) stages of logical reasoning;
(ii) cognitive levels of knowledge.

Whereas the first section dwells on intellectual development, the second section stresses the various operations of the well developed cognitive set up of man.

2.3.1.1 STAGES OF LOGICAL REASONING

The focus here is cognitive development and the greatest (perhaps) is Piaget; several writers refer to him. Three comprehensive writings on Piaget at one's disposal are those of McGuire and Rowland (1971), Elkind (1971), and Di Vesta (1982).

Di Vesta (1982) noted that cognitive development has to do with changes in age as it relates to the system of what is known and changes in the way the system interacts with other aspects of behaviour. The writer added that characteristics of human intellectual functioning which have been identified as part of cognitive processes include: attention, perception, memory, imagery, and motor learning. Di Vesta observed that these factors are detached processes but that they are clearly influenced by or under the control of higher order intellectual processes. It was added that affective aspects of life such as beliefs, attitudes, judgement and values are connected with the cognitive structures and so cannot be ignored when considering cognitive influences. Much of cognitive development takes place through nature and nurture (biological and environmental factors respectively), and maturation which is growth as a result of biological factors, happens also through nature and nurture. Developmental changes occur through adaptation process and adaptation is effected through assimilation and accommodation processes. Assimilation and accommodation have processes to undertake or will have some kind of conflict until equilibrium is reached before adaptation takes place (McGuire and Rowland 1971: 144; Di Vesta 1982; 286).

The above introductory facet has been taken briskly because it is not our focus, even the stages of development are mainly to let us see whether the subjects of this study: JSS II learners whose mean age in Lagos State would be 13 or 14 can perform formal operations which this study demand (performance at higher cognitive levels). The reasoning ability of JSS II learners or their logical ability at this level is the problem, to make it plain to the reader, to avoid doubt. So what are these developmental stages and what main abilities are spelt out by Piaget which have received wide acceptance?

Four main stages were identified by Di Vesta (1982: 286/7(; McGuire and Rowland (1971:146); Dore and Dumas (1993:429):

(i)	sensori motor stage	0-2 years;
(ii)	pre-operational stage	2-7 years;
(iii)	concrete operations	7-11 years;
(iv)	formal operations	11-15 years.

Di Vasta observed that these ages are approximations; some children may reach the stages earlier or later. Thus the issue of experience underscored by Smedslund (1977:3) seems vital.

In the sensori-motor stage, the child employs reflexes or body movements initially, and about 12-18months, it manifests the first characteristics of intellectual behaviour: object permanence. At the end of this stage, the child can use symbolic behaviour. For example, the first manifestations of pretence or plays in symbolic forms, are manifested.

In the pre -operational stage, the child is ready to use semantic components of symbol systems. Several new behaviours occur more or less simultaneously; they differ in complexity, however, in form of deferred imitation, symbolic play, drawing or direct graphic representation, mental imagery and verbal evocation of events when they are not present. Ability to communicate grows consequently. Self behaviour regulation occurs between 4 and 5 years.

The child can think accurately but in concrete terms (at the concrete stage). Conservation is synonymous with this stage. The task is to deal with an initial experience, the intervening process of transformation, and in the final state, the child is expected to handle these concrete operations concurrently; for example, in the experiment involving two cylinders or beakers with water but differing widths and heights.

Conservation is observed to occur in the following order in various tasks (approximately): number, area, length, mass and volume. Other skills acquired in this stage include seriation, notions of time, velocity, causality, space, motion; social, moral and affective aspects of life of the child.

Formal operations: The last stage, is most important to us in this research. This is the stage that completes cognitive development. It is averagely taken to be from 11 to 15 years. The child can think, not only in concrete but also in abstract terms and able to formulate hypotheses. Perhaps one main difference between the adult and adolescent is that whereas the adolescent initially sees values as fixed and immutable and only time and experience would save him/her from this trap, adults regard values as relative and mutable (Elkind 1971: 156). Besides a few such qualitative differences which early exposure can quickly take care of at the formal operations level, man's cognitive development is complete and he is expected to operate rationally.

Elkind noted that 'between 12 and 15 years of age, young people enjoy proposing, testing out, and rejecting a multitude of ideas'. Following this statement, the writer observed that in a study suggested by Piaget's work (Peel

1960) a paragraph concerning Stonehenge was read to adolescents and children. Both groups were asked whether the paragraph referred to a religious shrine or a fort. Whereas the children employed only one evidence to form their judgements and demonstrated reluctance to change in the event of negative evidence, the adolescents were encompassing and based their judgement on many evidences; they showed willingness to change their judgement, if contrary evidence was provided.

Brown and Desforges (1977:7-17) critiqued certain aspects of Piagetian psychology. A number of points they made included:

(I) the pendulum task (reasoning test) aimed at testing the logical reasoning of students known as the Piagetian task, is too sophisticated for 11 year olds (page 8);

(ii) object permanence is a cognitive developmental process which Piaget fixed at between 12 and 18 months.

But these researchers referred to one Bower who experimented on quite young infants (2-6 months) and concluded that through recordings of head and eye movements and change in heart beat, the infants expected the re-emergence of removed objects and indicated surprise at the non-appearance of the objects (page 9). Briefly, object permanence, through this evidence, can occur quite earlier than Piaget had indicated.

Several problems are discernible in this report. The subjects were not specified; specification would have enabled us know the culture clearly and the quantity, if it is worth generalizing. Moreover, as Di Vesta observed (page 287), Piaget's ages are approximations. Some children may develop the corresponding cognitive abilities earlier or later due to nature or nurture. Consequently, this point of Brown and Desforges seems not strong enough to alter Piaget's time. Notwithstanding, their finding is note-worthy.

(iii) Brown and Desforges referred also to Blasi and Hoeffel [1974] who reviewed a large number of studies. They found that the percentage of average children between ages 11 and 14, who are considered by Piaget as operating within formal stage (using various tests) varied from 100% to 0% (zero). When the same test was applied to different samples, the percentage varied from 35 to 0. These findings, in a sense, contrast that of object permanence above; also the environments are excluded. The omissions do not allow us see enough picture to facilitate our thinking.

(iv) Reference was made to Wason and Johnson-Laird who in 1972 'reported evidence of heterogeneity being more impressive than that of homogeneity on tests involving formal or logical problems. In a number of their studies, subjects were given either concrete or abstract content. Even those who passed in the concrete content could not transfer their solution to the same problem manipulated in abstract form. As a result, the authors concluded that formal operations were not cognitive skills that can be applied to any problem; rather, they are practical rules (page 11.)

A problem discernible in this report is that Piaget's instrument may be culture-bound and so foreign to several other cultures.

(v) Still on page 11, Brown and Desforges referred to Harris (1975) who explored the abilities of children of 5-7 years. Harris aimed at inferring the attributes of nonsense concepts from knowledge of the class membership of the concepts. The writer's conclusion was that children of this age appeared to possess the needed operations for inference. He/she thus suggested that formal operational stage might be re-defined in terms of the spontaneous use of the rules of inference, not on their availability as such.

(vi) Further on page 11-12, Brown and Desforges cited Geleman [1972] who reported that children between 2½ and 4 years were discovered to be capable of conserving pattern and recognize numbers; they understood quantity changes owing to addition and subtraction; understood the one unit between numbers 2 and 3. Brown and Desforges cited German and Tucker [1975] who found that children of 3, 4, and 5 years discriminated colour changes from number relevant changes in columns of three items.

The major tendency in points v and vi above is that several operations are likely to occur earlier than Piaget had fixed. Nevertheless, Di Vesta (1982: 287) had clarified that point as already mentioned above.

Smedslund (1977: 1-6) was also a critique of Piaget's psychology in practice. One point made on the issue of culture or environment has been referred to above. Another major point in the article is the relationship between logicality and understanding. Smedslund noted that the usual principle is for people to assume understanding following Piaget's theories and test logicality. The writer stated that his/her practical experience made him/her to believe the reverse. Therefore, logicality is the skill to be assumed and understanding is what we should test in practice (pp. 3-4). This situation seems to suggest that experience is necessary to enhance understanding as well as to maintain it (Wason 1993: 197).

Smedslund's conclusion was that Piaget's brilliant and penetrating insights need to be incorporated into a psychological view capable of being lived and practised. This conclusion seems to call for more research to test and adapt Piagetian principles, and if there are clear contrary evidences, changes can be effected. All would mean better development for man.

At this juncture, we want to answer the question posed at the beginning, to remove doubt for the reader: are JSS II learners not too young for a study of higher cognitive levels?

The point has been made above that the higher cognitive levels mean formal operations stage. We have also stated that the mean age of Lagos State JSS II students is 13 or 14. The formal operations age is 11 - 15 years. It seems that JSS II learners are old enough in the formal operations stage: they are expected, to have spent at least two years (11,12 years) before being in JSS II. Among the fastest learners/in the best schools, the age might be 12 in JSS II. But we need to note that it is among such learners that we are likely to find the early developers whose reports are likely to be similar to those of Brown and Desforges: where the learners develop earlier than the prescribed ones of Piaget. Moreover, as asserted by Di Vesta (1982: 294), it is inadequate knowledge and insufficient strategies that have mainly caused the 'apparent or presumed lower intellectual levels'.

Considering several variables, it appears clear enough that JSS II learners are suitable for a study of higher cognitive levels. If they seem incapable at the beginning, there would be no embarrassment. Indeed, a major point under test is: can we train them to operate at higher cognitive levels? What ever the result, we would have achieved something.

If the ages and abilities of the subjects have been proved to be appropriate, we may now go to specialists on non - developmental aspects of cognitive behaviour.

2.3 2.1 COGNITIVE LEVELS OF KNOWLEDGE

Bloom et al. (1956) in the Taxonomy of Educational Objectives identified cognitive levels of knowledge as being in a hierarchy, meaning a progression from simple to complex intellectual skills and abilities, namely Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. Tanner and Tanner (1980: 169) regarded the work of Bloom and his associates as 'One of the most systematic approaches ....' to the study of cognitive processes for the goal of assessing learning outcomes. But they criticized the taxonomy including the following points:

(i) the representation (schema) could not be considered as taxonomy in a truly scientific sense stressing that even Bloom and his associates admitted that the determination of the cognitive levels was somehow arbitrary adding that any number of approaches could be employed to identify and classify cognitive levels.

(ii) There is doubt if cognitive processes follow that hierarchical order in practical learning environments. Tanner and Tanner gave an example of the possibility of someone synthesizing in language use such as in a poem before analyzing the structural elements and relationships of the communication.

(iii) The criticism above, notwithstanding (Tanner and Tanner noted), the representation of Bloom and his associates ' can serve as a valuable device for enabling teachers to design instructional activities encompassing a wider range of cognitive learnings (page 169).

(iv) Tanner and Tanner admitted that classroom interactions centered at lower cognitive levels in form of recitation, pupils assignments, teacher made tests, which dwelled mainly on recall of specifics and the ways and means of dealing with specifics. They added that the reason why teachers centered on those areas is their relative ease in evaluation. Thus the classification can help teachers achieve fuller evaluation .

(v) Tanner and Tanner opined that equating information with knowledge is an error. They asserted that there are evidences that learners receive and recite information without showing understanding or ability to apply such information in similar situations. The writers presented a case of the great educator (Dewey) which indicated that he was very disappointed that people equated information with knowledge unconsciously and that the same problem had almost dominated instruction (page 169).

(vi) The taxonomy needed an extension to add problem-solving. Tanner and Tanner demonstrated that although different elements in the taxonomy are fundamental to problem-solving act by means of reflective thinking, the fact that the learner engages in particular activities that fit each category of the classification is not to say that the learner engages in such problem-solving. Problem-solving is the complete act of thought as stated by Dewey, the critics noted.

(vii) Creation might also be added to the taxonomy. Tanner and Tanner argued that when a learner engages in synthesis and evaluation acts, he/she develops unique ideas, plans, and products, rather than remaining in only one hitherto established position (page 170).

(viii) Following the arguments above (from point 5 to 7),the taxonomy might be modified to read: (i) Information (ii) Comprehension (iii) Application (iv) Analysis (v) Synthesis (vi) Evaluation (vii) Problem solving (viii) Creation.

Yoloye (1986: 4-5)recalled the presentation of Bloom and his associates and asserted that in practice, the various categories are not easy as regarding drawing of achievement tests. He noted that because of the practical problem, the six categories are sometimes condensed into three:

(i) Remembering: Knowledge

(ii) Understanding : covering Comprehension and Application.

(iii) Thinking: encompassing Analysis, Synthesis and Evaluation .

Yoloye observed that this condensed categorization has proved useful as a basis of communication between test item writers (page 5). Another point made was that the assumption is that the categories apply irrespective of subjects admitting that particular subjects have their unique content objectives usually indicated as topics in the syllabus.

Cangelosi (1990: 8) classified the cognitive domain into two: Knowledge and Intellectual levels. A knowledge level objective requires learners to remember defined content areas such as a name or principle. Intellectual level behavioural construct requires learners to employ reasoning to make judgements relative to defined content.

Knowledge level cognition was sub-divided into two: simple and knowledge of a process. Simple knowledge is the level where the content to be remembered by learners is not more than a simple response to a given stimulus; for example in Social Studies, the purpose of the Nigerian Constitution is to provide a general plan for governing the country. In Knowledge of a process, the content to be remembered by learners is a sequence of steps in a process (procedure); for example, in Social Studies, describing the general process for amending the constitution. The purpose here is to enable the learners know how to carry out processes (page 9).

Intellectual Level Cognition was sub-divided into four by Cangelosi (1990):

(i) Comprehension of a communication

(ii) Conceptualization

(iii) Application

(iv) Beyond Application

Comprehension of a communication: objectives at this level deal with ascertaining the overt or covert meaning of a message ; for example in Social Studies, explaining the general provisions in the Bill of Rights.

The concern here is for learners to be able to interpret and translate ideas expressed by others.

Conceptualization: The objective at this level requires learners to use inductive reasoning to either distinguish examples of a given concept or discover why a given relationship exists; for example, in Language arts, given a complex sentence, the learner identifies the action verbs in the sentence.

Application: This objective requires learners to use deductive reasoning to decide how to solve an identified problem. Also when confronted with a problem, the learner can ascertain whether a process, principle, fact, formula, law, or other relationship identified in the objective's content is relevant to solving the novel problem; for example, in Social Studies, given a description of a well known current issue, the learners should be able to determine, what if any, learning the Nigerian constitution, has on the resolution of that problem/issue.

Knowledge of a process objective was noted as sometimes mistaken for Application objective. But the difference is that whereas knowledge of a process 'merely requires remembering the act', Application requires taking decision on 'when to do the act' as well as doing it (pages 10-12).

Cognition beyond Application: Cangelosi referred to Bloom (1984) who talked about cognitive behaviours that are more advanced than Application level:

Analysis: breaking content into its component parts;

Synthesis: production of content within a specified area;

Evaluation: judging content based on criteria.

These objectives require learners to examine, produce, or judge content (page 12).

One point is clear: the Cognitive domain (according to Cangelosi) is divided into two main levels: Knowledge and Intellectual (two and four categories respectively). Intellectual level corresponds to Higher Cognitive levels which are the focus of one's investigation .

On items at these levels, this writer (on page 156) observed that the items centre on analytical and creative thinking adding that although the objectives are extremely important, they are not stressed in most school curricula. This is another evidence that classroom interactions (irrespective of subject areas) centred on lower cognitive levels. One's study is aimed at reversing the situation through appropriate teacher preparation.

It would be observed that there are three positions on the beginning of the higher cognitive levels:

(I) **Comprehension** (Poggo 1976 in Ezewu 1981; Odunusi 1983; Cangelosi 1990; Stevens et al. 1991; Perrot 1992);

(ii) **Application**(Nwana 1965; Block and Tierney 1974 and Ware 1976 cited by Ezewu 1981; Levin 1979 cited by Onasanya 1985);

(iii) **Analysis** (Ogundare 1982).

It is only empirical result which would strongly confirm any of these positions.

Tanner and Tanner (1980) have been referred to as observing that it is an error to equate information with knowledge. Their argument suggests that comprehension and ability to apply information mean knowledge.

One's stand is that understanding is the bedrock of knowledge. It seems to be the originator of knowledge considered either in linear, process, or shapeless form. Once understanding is achieved, man can accelerate to application, analysis, synthesis, evaluation, problem-solving, and creation. One does not mean that these processes would be automatic. They would require learning and truly, understanding itself requires information processing which is an act of learning. The idea is that without understanding, there can hardly be progress to the remaining levels. But there can be information without comprehension as observed by Tanner and Tanner.

The condensed version of Yoloye appears to provide clue to the argument above. That version suggests that remembering is low cognitive level and that seems to agree with the argument of Tanner and Tanner. Comprehension and application grouped under understanding may be termed primary high cognitive levels while analysis, synthesis and evaluation tagged thinking may be called secondary high cognitive levels.

We are aware of the vitality of primary education, as educators. Without it there would be no secondary education hence tertiary education would be a non-issue. All education hinges on the primary . The fact that the last group is labelled thinking does not mean that there is no thinking at all in understanding; rather, the thinking in the third group received a solid background under group two and accordingly appears to specialize. Nevertheless, its root is group two.

The fore-going view suggests that we should consider information only as low cognitive level meaning that comprehension to creation are high cognitive levels. The empirical aspect of this study will confirm or disprove this position. The middle level (Application) however, would be used in test construction and especially in analysis of data that would be collected.

2.3.2.2. EMPIRICAL FINDINGS ON COGNITIVE LEVELS OF KNOWLEDGE

Nwana (1965) examined cognitive education in school certificate biology. Certain points of interest were stated in the conclusion:

(i) There was rather less improvement in the ability to apply biological facts and principles than the ability to memorize the facts. Nwana contended that until biology teaching method was changed to underscoring more student participation, the relationship between knowledge and application will not be expected to record much higher improvement (page 67-68). It meant that student participation is a strategy that enhances higher cognitive behaviour of students.

(ii) Nwana projected that the new emphasis should result in much less attention being paid to textbooks and facts but in pupils having a much deeper understanding of life: pupils comprehending the facts they know such that they perceive their relevance or otherwise in solving daily problems. As argued toward the end of the last sub-heading, comprehension is a vital element in knowledge and also seems to suggest that it is a higher order cognitive process.

(iii) Nwana suggested that his type of study should be carried out for non - science subjects such as English, History, and Religion (page 71). Although Nwana's study is fairly old (1965) the suggestion was a challenge and today although Social Studies has replaced History and other subjects including Religion at the JSS level, following other evidences, we find that the suggestion is still current. Thus here is another justification for this study.

(iv) Nwana observed that the most useful aspect of the study through the correlation and factorial design, was the indication that the mental process of the higher and lower forms are similar if not the same, but vary only in their extent of manifestation in the five forms. He noted that such notion as the pupils in the lower forms (ages 12-14) do not exhibit higher cognitive skills stands to be discredited. As clarified under cognitive development using empirical evidences, Nwana's finding and assertion are true. Learners of this age, if exposed to the right experiences, naturally possess the cognitive capacity to operate formally.

Dunkin and Biddle (1974: 230-273) captioned Knowledge and Intellect, contains several studies using Bloom's Taxonomy of Educational Objectives, Guildford's model for the structure of the intellect, and Taba's model that dwelled on cognitive development in children. These studies shed some light on our interest.

Under studies using Bloom's taxonomy, Dunkin and Biddle reviewed twelve studies which dates range from 1968 to 1972 (pages 239-741) on field survey and presage-process experiments. Noteable points include:

(i) the classrooms studied showed more use of questions which required lower level cognitive processes that involved knowledge (information) in particular (page 242);

(ii) teachers can be trained to elicit higher cognitive behaviour in learners; on the other hand, if teachers concentrated on lower level cognitive processes, the learners also operated at that level (page 242);

(iii) Dunkin and Biddle quoted one of the reviews [Wood 1970:92] which observed that peer group relationship seems to be vital in the facilitation of students' high level cognition;

(iv) while it is theoretically assumed that teachers should stress higher level processes such as synthesis and evaluation, there was no evidence to that data (1974) suggesting that the exercise will give desired product /effect-learners' growth ;

(v) an ideal classroom discussion ought to be conceived and analyzed along simple-complex and concrete-abstract situations (page 224).

Under researches using Guildford's model, Dunkin and Biddle reviewed studies which focused on *operations*. It may be recalled that Guildford's model is three-dimensional comprising operations, contents, and products:

Operations consists of cognition, memory, divergent production, convergent production, and evaluation (five);

Content types are figural, symbols, semantic , and behavioural (four);

Products constitute units, classes, relations, systems, transformations, and implications (six).

Guildford's theory, as a result, suggests 5 x 4 x 6: 120 unique intellectual abilities.

Dunkin and Biddle, under this model, reviewed four studies which dates are from 1965 to 1969 (pages 253-254) [Gallayher 1965, Hudgins and Ahlbrand 1967; Medley et al. 1966; Thompson and Bowers 1968]. Noteable results include the following:

(i) like the studies which were based on Bloom's taxonomy, the studies reported that classroom interaction centered on simple cognitive processes and tended to avoid divergent and evaluative thinking;

(ii) also as it was observed in the studies which used Bloom's model, the category of cognitive processes underscored by the teacher co-varied with the category emphasized by the learners; thus the teacher considerably controls the cognitive processes in the classroom (page 255).

(iii) Evidence on the relationship between cognitive process in the classroom and pupil growth was scanty. Only one Grade IV field survey of Thompson and Bowers (1968) investigated the problem. The result was that teachers who were given moderate scores on convergence-divergence continuum were associated with higher learner vocabulary growth than those who either scored high or low. Dunkin and Biddle concluded that, it seemed that, although some educators felt that classrooms high in divergent thinking would produce better effects on learners than classrooms which underscored convergent thinking (rote memory) there was no evidence then and the little available evidence suggested non-linear relationship (page 255).

Concerning studies which used Taba's model, Dunkin and Biddle noted that attention was given to certain principles which the research team found in theories of cognitive development:

(i) cognitive processes are subject to training, that is, they respond to training;

(ii) thinking follows certain developmental sequences such that *mastery* of each preceding unit/phase is a pre-requisite to the mastery of the next;

(iii) thinking matures by way of continuous organization and reorganization of conceptual structures which involve the processes of assimilation and accommodation (256).

Dunkin and Biddle stated five implications of these principles for education; two of them appear more useful to this review:

(i) learning tasks progress in cycles such that the simpler concrete cognitive operations precede the more complex and abstract ones;

(ii) thought development is not a short term goal, rather, it requires time, practice in relation to a curriculum, and teaching strategies which include upward spiralling in the content and tasks for cognitive operation (functioning) (page 256).

As remarked by Dunkin and Biddle, this model was based on knowledge about cognitive development in children. The implication is that the premise is basically not on learners whose ages centre on formal operations which stage is the one for this study. In essence, the findings under this model would have to be taken with caution.

Studies reviewed under this model were three: Taba et al. (1964; Taba 1966; Wright and Nuthall 1970) (page 266-268). The summary of the results included:

(i) no evidence regarding the position that classroom thought was usually too low;

(ii) teacher's behaviour can be influenced by appropriate training and that such training can produce change in learner's behaviour;

(iii) there was only weak support to the question whether the change in learner's behaviour results in enhanced achievement;

(iv) there was no evidence that the change would result.

Several points are worth noting in the conclusion of this chapter as given by Dunkin and Biddle.

(i) Learners are probably used to participating or otherwise in a setting which is typical of lower level cognitive thoughts. Accordingly significant impact on pupil learning on changes in the prevailing classroom atmosphere are not likely possible in the short run. This position of Dunkin and Biddle agrees with the second implication of Taba's model for education.

(ii) On the distinction between high-level and low-level, Dunkin and Biddle observed that the approaches of Guilford and Taba suggest that complexity applies more to cognitive processes and products while abstractness applies especially to content. They concluded, therefore, that the observed negative relationship between abstractness and high degrees of complexity might show that whereas teachers are capable of managing both simple and complex processes with concrete material, or concrete and abstract content with simple process, they are likely to encounter difficulty when attempting to use both complex processes and abstract content.

(iii) It is also possible that a number of the combinations might be more effective in promoting particular types of learner's growth than others, according to Dunkin and Biddle. They opined that a possible explanation for the observed positive relation between simplicity of processes and higher cognitive learner's growth would be that learners were more likely to encounter abstract content if teachers underscored simpler processes. This point appears to tally with the principle of moving from the known to the unknown.

iv. On page 97, on findings for use of logic in the classroom, one result was that experienced teachers used higher cognitive demands more often.

It may be noted that experience means more time, more practice, and more capability which in turn would affect learner's behaviour positively.

Ezewu (1981) studied the effect of mastery learning strategy on selected learning outcomes. In his literature review, Ezewu referred to some studies, one of which seems relevant here:

Poggo (1976) who re-tested more than 250 college students on contents previously learned. The result was that the mastery taught students significantly retained more knowledge behaviour (low order) but failed to significantly retain more comprehension, application, analysis (high order behaviours).

Poggo's result is in line with the findings of Dunkin and Biddle (1974); Obebe (1987); Knight et al. (1989) that classroom teacher-learner interaction had concentrated on lower cognitive levels. These are evidences which make one's study worthwhile: it is to help raise the inter-action level of teaching-learning in the classroom.

Onasanya (1985) studied the effect of combining student support system with feedback corrective on learning outcomes in geography. Certain studies which Onasanya referred to are related to this study.

(i) Levin [1979) who focused on improving higher mental processes by underscoring the mastery of lower mental processes, was noted to have provided learning experiences which enable the learners to apply principles in varying problem situations. On the summative examinations, the learners were reported to have scored very high in both the knowledge of principles and facts and in the ability to apply the principles to new problems. This evidence suggests that mastery learning may result in better performance at higher cognitive levels. However, there are certain cloudy variables in the report: the environment, the class level, the particular subject matter or combination of courses. The absence of these variables does not afford us a clear enough picture of the study.

(ii) Mevarech [1980] aimed at improving mental processes by stressing heuristic problem-solving. Like Levin [1979], Mevarech was reported to have included both higher and lower mental processes questions in the formative test and in the feedback corrective processes. On the higher processes part of the summative test, the group using the heuristic method plus mastery learning scored significantly higher than the control group. The subject used was mathematics.

Onasanya made some vital comments as part of his closing remarks: a significant task of research and teaching would be seeking ways of accomplishing the result that is possible under tutoring condition in the normal classroom setting. He opined that certain processes to combine were:

(i) improve student processing of instruction by employing the mastery learning feedback-corrective process and or the enrichment of the initial cognitive pre-requisite for sequential courses;

(ii) selecting a curriculum, textbook, or other instructional material that has proved very effective, improves the tools of instruction;

(iii) a dialogue between the school and the home may improve the home environmental support of student learning;

(iv) provide favourable learning conditions for all the learners in each classroom and increase the stress on higher mental process learning for all learners.

The last especially is very significant and agrees with Dunkin and Biddle's finding that teachers can help learners to improve their cognitive behaviour: if teachers operate at higher cognitive levels, learners are likely to follow suit. It is this theory that was experimentally investigated in one's study.

Cangelosi (1990:8) when discussing behavioural constructs under the three domains in education: cognitive, affective, and psychomotor, classified the cognitive domain into two broad categories: Knowledge and Intellectual levels. While Knowledge level corresponds to lower cognitive levels, Intellectual level, starting from comprehension, corresponds to the Higher Cognitive Levels.

On page 156, where Cangelosi presented test items beyond Application, he observed that beyond Application objectives dwell on analytical and creative thinking. The writer ironically (or sadly) revealed that although these objectives are extremely important, they are not generally emphasized in most school curricula. Perhaps due to the discouraging situation of few researches in this area, Cangelosi was not quite encouraged to do serious work, why? He/she gave only two indiscriminate examples of teaching/learning on analytical and creative thinking processes.

The question is, why had researchers (in any subject area) avoided a serious continuum of studies on the higher cognitive levels when we are not unaware of their role in personal, social, economic, and political developments? People like one, decided to take up the challenge.

Stevens et al. (1991) discussing cooperative learning in relation to higher cognitive levels, asserted that, as learners inter-act cooperatively, they explain processes to each other in their own words thereby helping each other further process the complex cognitive strategy, that is, understanding. It was opined that understanding would be more likely to occur when a learner is required to explain, elaborate, or defend a personal position to others.

The concepts: explain, elaborate or defend position can be called acts of comprehension, analysis, and syntheses/evaluation in Bloom's Taxonomy. Tersely, the suggestion is that cooperative learning is likely to enhance higher cognitive learning. This was therefore a theory under test in one's study.

Using understanding to represent the higher cognitive levels is suggested by other research works. Simons and Wild (1994:58) showed that an appreciated learning (by the learners) is 'deep learning' which stresses understanding: making ideas explicit, a kind of analytical skill acquisition implying that people appreciate higher cognitive levels learning. Wells (1995:238) asserted that learning through co-construction of meaning results in understanding. On page 265, Wells declared that inquiry is the most effective route to understanding which should be the goal of teaching -learning at all levels in the educational system. It is already common knowledge (especially to specialists) that inquiry processes hover round higher cognitive levels, although indiscriminately. Moreover, if the goal of teaching-learning at all levels is supposed to be understanding, that goal must exceed lower level/s.

May Oi and Stimpson (1994: 10) observed that although the teachers on environmental studies in Hong Kong were encouraged to use inquiry and learner-centred approach, the picture surrounding other documents and the examinations pointed toward knowledge transmission.

This picture in a sense, is an ecological evidence (although not the general curricula) that teaching-learning was lower cognitive levels based.

. Through Book Review, we see that Wilhelm (1995 in Allen [Ed.]: 93) disclosed that Zevin had published a useful book in 1992. Areas covered in the book include giving of guide-lines on higher cognitive levels teaching.

The emphasis, however, is not clear. Are those speculative or empirical works. Suppose they are empirical, what are the emphases and results? As Zevin's book is far-fetched, these issues cannot be addressed. One can only say that one's area of emphasis remains without any serious challenge hence worthwhile.

It may be added that the empirical facet of one's study was effected in 1993-4 before Wilhelm published his review in 1995 on Zevin's book.

A peripherally minute issue but perhaps significant enough, comes to mind. The literature on compression of the cognitive levels talks about such terms as:

(i) 'higher' and 'lower' cognitive levels;

(ii) 'higher' and 'lower' order interactions/thoughts.

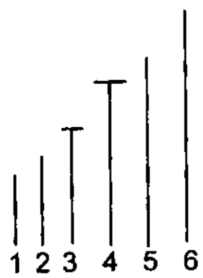
Reflection on these terms depict them as not quite logical.

We remember that in our simple grammar days, we used to talk about:

(i) high, higher, highest;

(ii) low, lower, lowest.

The implication is that before lower, is low and before higher is high. This expression can be illustrated by the six vertical lines below:



Lines 3, 2, 1, represent low, lower, lowest while lines 4, 5, 6 represent high, higher, highest.

Our expressions appear imprecise on two grounds:

(i) they point at lines 2 and 5 for lower and higher respectively;

(ii) they are particularly silent on lines 3 and 4, if we assume that lines 1 and 6 are implied in lower and higher respectively.

While critics may argue that researchers are not necessarily grammar biased individuals, it appears that we would adulterate logic and meaning (philosophy) if we throw precision over-board where such action seems unwarranted. On this basis, the two terms above are modified as:

(i) high and low cognitive levels;

(ii) high order and low order interactions/thoughts.
We may examine the modification:

One (i) in expanded form would be:

(a) high cognitive levels

(b) low cognitive levels

Two (ii) in expanded version would read:

(a) high order inter-actions/thoughts

(b) low order inter-actions/thoughts.

The two 'as' logically and grammatically talk about all lines 3, 2, 1, or 1, 2, 3 depending on how a person starts. The two 'bs' of both expressions equally logically and grammatically describe lines 4, 5, 6 or 6, 5, 4. These are therefore precise terms that leave no rooms for vagueries. The expressions mean that lines 4 and 3 are the lines of demarcation for high and low cognitive levels respectively. All lines on the left of 3 (if they are more than those used in one's explanation) are covered by the word 'low; while all lines on the right of 4 (whatever the number) are covered by the word 'high'.

4.0 SOME LEARNERS SELF ISSUES

The literature on learners self variables (at one's disposal) suggests that they are:

(i) mainly for predictive purposes (Pajares and Miller 1994; Rothstein et al. 1994);

(ii) not necessary for special consideration where treatment would be effected such as in a quasi-experimental research design (Pajares and Miller 1994);

(iii) problematic according to Rothstein et al. (1994:528) who observed that the separate links they found connecting personality with classroom performance and the links connecting cognitive ability with performance at written work might vary, in various academic programmes.

Some twelve years earlier, Kleine (1982) noted something similar when he said that on variables such as self esteem, independence, and creativity of learners, his evidence had mixed result. In that article, Kleine referred to Bennett (1976) who found that all personality types learned better under formal teaching. The writer observed that although Bennet's study was criticized on grounds of sampling problems, conceptual confusion, and statistical errors, other studies pointed toward the same direction (Kleine 1982: 1928).

Evidences before Kleine's article were noted as generally favouring the formal or direct traditional teacher especially for younger lower-ability or lower status learners (page 1928). This evidence is supported by writers such as Dunkin and Biddle (1974); Weil and Murphy (1982); Perrot (1992) on an even general scale, that whatever level the teacher operates, the learners follow suit. Dewalt and Ball (1990:320) demonstrated that self-concept can be enhanced by a competent teacher if:

(i) his expectations from the learner are high;

(ii) the teacher shows appreciation of the learner's personal worth.

This evidence suggests that enhancement of self-concept is an inbuilt facet of effective teaching model which is the melting pot of one's study.

Twelve variables as competencies were presented by Dewalt and Ball: academic time, accountability, clarity of structure, individual differences, evaluation, affective climate, learner self concept, meaningfulness, planning, questioning skill, reinforcement, close supervision (page 322). These competencies were generally taken care of in one's study.

Considerable distinction was made by Pajares and Miller (1994) between self-efficacy and self-concept. Self efficacy, they observed, is context specific assessment of competence to perform a given task; it is a judgment of one's capabilities to demonstrate a defined behaviour in a defined situation. Self-concept, on the other hand, is not measured at the level of particularism, it includes beliefs of self worth associated with one's perceived competence.

Pajares and Miller referred to Bandura (1986) who stressed that self concept and self-efficacy are different phenomena which must not be mistaken for one another (page 194).

Self-concept was observed to have variations such as general, academic, social, emotional and physical. Academic self-concepts were further distinguished into English, History, Science, or Mathematics self-concepts. Self-concept judgements in academic enterprises may be subject or course specific/related but never item/task directed: they are not precise assessments of capability.

Compared with self-efficacy judgements, self-concept judgements are more general and less context dependent. Examples were given as follows:

Self-Concept: are you a good mathematics student? This question is course specific and taps different cognitive and affective processes.

Self-Efficacy: can you solve this mathematics problem? This question mainly demands cognitive processes, for a given mathematics problem.

Self-efficacy must be precisely rather than generally assessed, must correspond to the criterial performance task, and must be measured as closely as possible with regard to time, to the defined task.

Pajares and Miller referred to Bandura (1986) who observed that self-efficacy assessment *precede* performance assessment (page 197). This point is vital: self efficacy assessment which is the one for predicting defined tasks, must be conducted before the task, not the reverse.

We may now note that:

(i) one's study had treatment, so self phenomena were not to be given special attention;

(ii) enhancement of self-concept (as well as self-efficacy) were embedded in the design: through effective teaching model which was the converging point of one's study.

5.1 SUMMARY

Notable points in the major sections of this review include the following:

Ia(1) Learning was seen as relatively permanent change in behaviour due to experience and this study adheres to the position. Permanence was noted as the scientific and conclusive evidence of learning.

(2) The concept teaching, was noted to have passed through developmental stages and the height was teaching as interaction based, between the teacher and the taught over subject matter in a dynamic atmosphere which results in shared meaning. That is the focus of this study because discussions tend to enable teaching to dwell on high cognitive levels. The Basic Practice Strategy (BPS) of Weil and Murphy is a standardization of Effective Teaching research findings. More current trends on Effective Teaching also guided this study.

(3) Teaching materials are the man-made products that enable a teacher to present his/her lesson in a practical fashion to the learner. Although the projected and electronic media are not commonly available, the non-projected ones are quite available and are capable of enabling the resourceful/creative teacher to be more effective at presenting his/her lessons.

I(b) We are still developing regarding Social Studies strategies/methods and teacher preparation is yet to reach its peak. Certain effective strategies/methods for the subject had been identified; some of them had been experimentally tested like problem- solving , reflective inquiry, and lecture. There were several calls to experiment on the others which this study partly responds to.

Evaluation of the subject should not be learner-centered but that the teacher should equally be evaluated through his/her learners and directly observing him/her.

(II) It is somehow controversial whether Cooperative or Competitive strategy was more appropriate in teaching. However, the evidences suggest that Competitive teaching is more suitable for a situation that demands more activities than Cooperative teaching. Since Social Studies has limited practical activities and the paramount interest of this researcher is on high cognitive levels, this study would only help to shed some light.

III (a) Junior Secondary School Two (JSS II) learners were proved not too young for a study on high cognitive levels.

(b) While all the taxonomy of educational objectives: Cognitive, Affective, and Psycho-motor, are relevant to this study, the Cognitive domain is the focus.

(c) Studies on high cognitive levels are few not only in Nigeria but even in advanced countries. Consequently, results on high cognitive levels performances are limited and unstable hence the need for intensive research in this area.

(d) The terms 'higher' and 'lower' used by writers to qualify cognitive levels or order of interactions/thoughts, were modified to 'high' and 'low'.

IV Learners self variables were basically taken care of in this study through effective teaching processes.

2.5.2. CONCLUSION

The literature review has revealed the state of things as far as the focus of the study is concerned. When completed, this research will add to the few (at one's disposal) aimed at improving classroom interaction through improved high cognitive behaviour between the teacher and the taught. The practical contribution of this study is therefore pedagogical but theoretically cognitive.

CHAPTER THREE

METHODOLOGY

3.0.1 INTRODUCTION

This chapter is presented in the following order:

i. design of the study;

ii. population of the study;

iii. sampling;

iv. research instruments;

v. administration of instruments/order of the experiment; and

vi. phases of the study.

3.10. DESIGN OF THE STUDY

This was a quasi-experimental investigation:

a. experimental scheduling was not controlled;

b. randomization of subjects was not possible;

learners in their intact classrooms participated in learning under specially trained teachers (Ary et al. 1979:260; Babbie 1979; Ndagi 1984).

Naturally, the design was a 3 X 3 X 3 factorial one: Cooperative and Competitive teaching strategies and Lecture method, form the first three (3); three types of school by gender consisting of Male, Female, and Mixed, form the middle three (3) and three Ability Groups involving High, Low, and Mixed Abilities, form the last three (3).

Statistically, the researcher was first interested in all the variables (the factors and their sub-factors) for clarity. Accordingly, the general analysis took the form: 3, 9, 27, 9: the three treatments each having three types of school by gender (9); each type of school by gender had three ability groups (27); finally, gender was homogenized within each treatment thereby returning 27 to 9 for another (fourth) group, of variables. This 3, 9, 27, 9 summarily (factorially) means 3 X 3 X 3. Cooperative and Competitive treatments were the experimental groups while Lecture method served as control.

(See the design on tables please).

Table 301: THE DESIGN ON TABLE FOR ALL VARIABLES OR CELLS

Treatment	Type of School by Gender	Ability Groups	Combined Common Ability Groups
Cooperative	Male	High Ability Low Ability Mixed Ability	All High Ability
	Female	High Ability Low Ability Mixed Ability	All Low Ability
	Mixed	High Ability Low Ability Mixed Ability	All Mixed Ability
Competitive	Male	High Ability Low Ability Mixed Ability	All High Ability
	Female	High Ability Low Ability Mixed Ability	All Low Ability
	Mixed	High Ability Low Ability Mixed Ability	All Mixed Ability
Lecture	Male	High Ability Low Ability Mixed Ability	All High Ability
	Female	High Ability Low Ability Mixed Ability	All Low Ability
	Mixed	High Ability Low Ability Mixed Ability	All Mixed Ability
3	9	27	9 VARIABLES/CELLS

Table 302: THE DESIGN, FACTORIALLY

Treatment	Type of School by Gender	Ability Groups of Learners
Cooperative	Male	High
Competitive	Female	Low
Lecture	Mixed	Mixed
3 X	3 X	3 (FACTORIAL).

3.1.1.0.2 VARIABLES IN THE DESIGN

There were three types of variables in the design: independent, dependent, and inter-vening/sub-independent variables (Kerlinger 1973; Ary et al. 1979; Ndagi 1984).

3.1.1.1 I INDEPENDENT VARIABLES

The independent variables were the treatments in the design as follows:

a.	Cooperative Teaching Strategy:	Experiment I
b.	Competitive Teaching Strategy:	Experiment II
c.	Lecture Method :	Control

3.1.1.2 II. DEPENDENT VARIABLES

All the Cognitive Levels and their combinations (Bloom et al. 1956 supplemented by Tanner and Tanner 1980 and Yoloye 1986) formed the dependent variables. These were:

a.	Information (Knowledge of Bloom et al.)	) Low Cognitive Levels
b.	Comprehension	)
c.	Application	)High
d.	Analysis	)Cognitive
e.	Synthesis	)Levels
f.	Evaluation	)
g.	Combination of Low Cognitive Levels	
h.	Combination of High Cognitive Levels	

3.1.1.3 III INTERVENING/SUB-INDEPENDENT VARIABLES

The variables which could have contributed to the performances of the subjects included:

a. Teachers' abilities;
b. Learners' abilities;
c. Learners' school status;
d. Learners' gender (sex);
e. Learners' ages;
f. Learners parents' academic backgrounds:
g. Learners parents' occupations.
(Obe 1980; Weil & Murphy 1982):

Data on these variables were incorporated into the Pre and Post -Tests and thus collected simultaneously to avoid the problem of history (Ary et al. 1979:239).

3.1.1.4 WHY LEARNERS SELF ISSUES WERE EXCLUDED IN THE INTERVENING VARIABLES

Learners variables such as self concept, self efficacy, and self worth were not supposed to be specially tested; they were rather embedded in the design (taken care of) (Dunkin and Biddle 1974; Weil and Murphy 1982; Kleine 1982; Dewalt and Ball 1990; Pajares and Miller 1994).

3.1.2.0 MAIN FEATURES OF THE TREATMENTS

3.1.2.1 **COOPERATIVE TREATMENT:** The learners under this strategy were divided into small groups of an average of six (Stevens et al. 1991: 9).

In each school, there had to be :

i. High Ability Group of learners;

ii. Low Ability Group of learners;

iii. Mixed Ability Group of learners.

Members in each of these groups were allowed, by the teacher, to cooperate: discuss with each other. If a question was posed to a member of the group, that member answered for all members of the group. If there was assignment, all members in one group submitted one script only. Teachers in the Cooperative strategy marked less number of scripts on assignment but they had to ensure that the group members practically worked together.

3.1.2.2 **COMPETITIVE TREATMENT:** The learners under this strategy practically learned individually. Although theoretically, they were also divided into High, Low, and Mixed Ability groups for uniformity and so it appeared to be groups' competition, this situation was individualized competition. Each learner was to study apart, struggle and beat any other learner, refusing to disclose information either in or outside school. Each learner submitted separate assignment.

Teachers in the Competitive strategy marked more papers on assignments but their practical problems were less than those of Cooperative treatment.

3.1.2.3 **LECTURE METHOD:** The learners under this method (control group) were also divided into High, Low, and Mixed Abilities by the teachers theoretically for uniformity. The teachers maintained Lecture method throughout the course of the experiment: more of giving information by the 'teachers' (actually lecturers) allowing most questions only at the end of the lessons and a few at the beginning. Questions and discussions during lessons were seldom allowed (Page and Thomas 1977:338).

3.1.3.0 FOCUS OF COOPERATIVE AND COMPETITIVE TEACHING STRATEGIES

How to ensure the High Cognitive Levels: Comprehension, Application, Analysis, Synthesis, and Evaluation, in the classroom was the melting pot of the two experimental groups.

Comprehension - explanations in personal words; it was necessary to start from this level otherwise the learners would not be able to proceed to the others (Tanner and Tanner 1980).

Application - using related and familiar things, objects, materials, putting theory to practice.

Analysis - comprehensive discussions, comparisons, contrasts, discriminations, components, rigorous touch of everything on an issue.

Synthesis - linking related parts to form a meaningful whole, clear descriptions, ability to summarize.

Evaluation - judgmental discussions, reason for considering something good or acceptable needed to be well understood by a considerable percentage of the learners in a class.

The above features demanded the following qualities from the teachers:

i) patience and humaneness generally;

ii) making questions and discussions the fundamental approaches in the classroom;

iii) use of comprehensive, appropriate, simple, and clear teaching materials;

iv) ability to prepare adequate Lesson Notes which objectives underscore high cognitive levels (Dunkin and Biddle 1974; Aisiku in Adeyoyin 1981; Weil and Murphy 1982; Kleine 1982; Dewalt and Ball 1990: Perrot 1992).

Question types stressed in classroom were those of 'how' 'how and why' and 'value type of why', in agreement with high cognitive levels objectives underscored in the Lesson Notes (Cangelosi 1990; Perrot 1992). These questions were expected to lead to interactions between teachers and learners thus:

Comprehension:	how ?
Application:	how ?
Analysis)) Synthesis)	how and why ?
Evaluation)	value type of why ?

Reasoning and critical thinking were the orders of the day in the experimental groups (Cangelosi 1990; Perrot 1992).

3.1.4.0 CRITERIA USED FOR GROUPING THE LEARNERS INTO HIGH, LOW, AND MIXED ABILITIES

i) All learners whose scripts had 60% and above at the Pre-Test, were put together as High Ability group of learners.

ii) All learners whose scripts had below 60% (0 - 59) were put together as Low Ability group of learners.

iii) Normally, three learners from High Ability group and three learners from Low Ability group, were put together as Mixed Ability group of learners (Peterson 1982: 850; Stevens et al. 1991).

This process can be illustrated as follows:

a)	6 High	)	
b)	6 Low	)	First complete grouping in a school
c)	6 Mixed	)	

iv) Other complete groupings (depending on the number of High and Low Ability scores) followed till the learners in a school were exhausted.

Adjustments or experimental deaths (failure of some learners to take the post-test) brought the range of numbers in the groups to between 4 and 8. The mean was, however still 6.

In some schools, it was impossible to get learners whose scores reached 60% to form complete groupings. This problem made the researcher to reduce the score to 50% for High Ability group of learners. The decision seemed necessary because:

(i) high cognitive levels operations which the Achievement Test (Pre-Test) stressed, were not emphasised in schools;

(ii) uniformity was vital for all the cooperating schools;

(iii) the main objective was what the learners would gain from the treatment hence the result of the Post-Test.

Middle Ability was not considered because the researcher's interest was to see to what extent the 'Low Ability group of learners' could be improved based on Mastery Learning Theory (Kulik 1982: 855; Peterson 1982: 846-7) which was partly embedded in the Triadic process (BPS or Effective Teaching): a vital academic professional concern.

3.1.4.1 WHY SCHOOL GRADES WERE NOT USED TO GROUP THE LEARNERS

i) The common malpractice cases before and during examinations in the identified population, threatened the validity and reliability of such scores.

ii) Markings leading to obtaining such grades are usually subjective as the tests are also usually subjective (essay tests).

iii) It has been overwhelmingly shown that the focus of this study - high cognitive levels, was not stressed in the classroom.

iv) It seems acceptable (for researchers) to remove a usual variable, provided such removal promises valid and reliable result (Pajares and Miller 1994: 201).

3.1.5.0 TRAINING OF TEACHERS

The teachers in the experimental schools had to be trained before the experiment (Dewalt and Ball 1990: 322; Perrot 1992:55). The training lasted for 6 weeks (30 hours: 5 hours weekly) (Perrot 1992: 55 reported 15 hours in two studies).

The teachers fully cooperated because they were student teachers in an NCE College in Lagos. As Student Teachers, they saw the training as helpful to them. Accordingly, they were amenable to instruction (Okebukola 1984; Onasanya 1985; Bintz 1995: 42).

3.1.5.1 AREAS COVERED BY THE TRAINING AND THEIR DURATIONS

WEEK ONE (FIVE CLASSES/HOURS)

i) Meaning of Cooperative teaching;

ii) Meaning of Competitive teaching;

iii) Distinction between Cooperative and Competitive teaching;

iv) How to ensure cooperation in class by the teacher;

v) How to ensure competition in class by the teacher.

WEEK TWO (FIVE CLASSES/HOURS)

vi) What Ability groups of learners are;

vii) How to put learners into High, Low, and Mixed Ability groups;

viii) Good quality instruction and its major parts:

a) the teacher
b) appropriate teaching materials and their effective use.

WEEK THREE (FIVE CLASSES/HOURS)

ix) Aisiku's view of teaching as interaction involving the teacher, learner, and subject matter.

x) Twelve implications of Aisiku's definition:

1) The evidence that a teacher has taught is the taking place of teaching: agreement between A & C.

2) The teacher is a facilitator of learning.

3) Learners have the potential to learn.

4) The degree of learners'' performances considerably depends on the teacher's competence.

5) A competent teacher requires both professional and academic skills/abilities.

6) If we are allowed to discriminate, competence in academic ability seems superior to professional competence but the teacher that combines equal proportions at every stage, would excel, all things being equal.

7) Teaching is sharing of ideas or the teacher guiding a discussion, not telling.

8) The learners must be allowed to air their views on every point (feedback is necessary in teaching).

9) At each appropriate juncture, concrete materials (teaching materials) can be brought in.

10) Teaching cannot be rushed.

11) A maximum of four objectives should be stated within a 40 minute lesson following point number ten (10) above.

12) This definition stresses a situation where a real human being

actually interacts with learners, not just instructional materials hence it is a definition that most precisely suits Teacher Training Colleges/Teacher Education Departments in Universities.

xi) Three developments on the Cognitive Levels: Bloom et al. (1956); Tanner and Tanner (1980); and Yoloye (1986); these developments have six, eight, and three cognitive levels respectively.

WEEK FOUR (5 CLASSES /HOURS)

xii) How to practically ensure: Comprehension, Application, Analysis, Synthesis, and Evaluation in the classroom. This was the core of the training, the differences between Cooperative and Competitive teaching strategies were secondary. It should not be a surprise, therefore, that this phase took a full week.

WEEK FIVE (5 CLASSES /HOURS)

xiii) a) The main parts of a good Lesson Note: objectives, content, methodology, and evaluation, which correspond to a curriculum.

b) The whole Lesson Note being based on objectives.

c) The number of objectives that should be formulated for a number of minutes e.g. not more than four in a 40 - minutes class.

d) High Cognitive Levels objectives to form a larger proportion of each Lesson Note Objectives, to enable teachers and learners actualize Comprehension, Application, Analysis, Synthesis, and Evaluation.

WEEK SIX (5 CLASSES/HOURS)

xiv) Terminal Test (End of Training Test) to ensure that no would-be teacher scored below 60% otherwise he/she would be disqualified.

xv) Revision of the test with the trainees and effecting necessary corrections.

xvi) How to administer the major instruments: Pre and Post-Tests: need to space out learners very well because the questions were objective: laboratories and libraries' use, were suggested.

iii) a. Pre-Test: Achievement Test IA
(An Objective Test) (QTAT IA)
b. Answers to the Test (ASAT IB)

c. Frequency Table for the Test (FTATI)

iv) a. Post -Test : Achievement Test IIA
(An Objective Test) (QTAT IIA)

b. Answers to the Test (ASAT IIB)

c. Frequency Table for the Test (FTATII)

v) Some Guidelines for the Training of Teachers (GLTT)

vi) General Instructions to Teachers (GIT)

vii) Rating Scale on: Cognitive Levels and How to Ensure them in the Classroom (CLHEC)

viii) Instruction Booklet for Experimental Groups' Teachers and Observers (IBETO)

ix) General Teaching Practice Assessment Instrument (GTPAI).

3.4.1.1 CONSTRUCTION/DEVELOPMENT OF THE INSTRUMENTS

All the instruments except the ninth were constructed by the researcher (Green 1963; Obe 1980; Cangelosi 1990: 27; Greer 1994: 169). Instruments III and IV which were the most central ones, were given deserved attention. These two Achievement Tests which were to measure Pre and Post-Tests performances of the learners were virtually the same in structure and construct; they were merely different in content because the schools used were the regular ones which would not cooperate if setbacks were introduced. There is therefore no doubt that no significant differences in scores would have been effected due to the differences in the contents of the two tests.

An advantage of this method of using different contents for the Pre and Post-Tests was that, the Pre -Test was based on the topic that was just taught in class. Another advantage was reduction in the sensitization usually effected by a Pre-

Test which later uses the same content whether the serial numbers are changed or not.

The Pre-Test was based on 'Aspects of Development' while the Post Test was based on 'Science, Technology, and Society'. The topics followed that order in the JSS II Social Studies Syllabus in Lagos State.

3.4.1.2 STAGES IN THE DEVELOPMENT OF THE INSTRUMENTS AND THEIR THEORETICAL VALIDATION

Twelve academics comprising eight experts in the areas of Curriculum studies, Measurement and Evaluation, and four Ph.D. students validated the instruments for the study. The validation of the two major instruments was here also given due attention. There were two main phases: the first phase was done before the Pre-Pilot stage of the study while the second phase was effected after the Pre-Pilot stage of the study. The first phase only shall be stated here: it had five processes:

i) development of the objectives after a thorough study of the two topics stated above; the objectives covered every subsection of both topics;

ii) formulation of theory questions following the stated objectives;

iii) development of model answers to the theory questions;

iv) *turning the theory questions to objective questions, to make room for precision and increased number of questions:

v) balancing the structure of the questions.

There were fifty (50) questions altogether. These were distributed to cover the six taxonomies of Bloom and his associates (1956) which were Knowledge (replaced by Information of Tanner and Tanner 1980), Comprehension, Application,.Analysis, Synthesis, and Evaluation. The questions were distributed 9,9,7,9,7,9, for the levels respectively. The first two levels (9,9) (18) were

**I am greatly indebted to Dr. T. D. Baiyelo in this regard.*

ix) marking and compilation of results (raw scores obtained);

x) computer analysis using Statistical Package for the Social Sciences (SPSS).

It should be noted that this order strictly applies to the Pilot and Main stages of the study. The Pre-Pilot stage of the study was stopped at item analysis (as we shall see below).

3.6.0.0 PHASES OF THE STUDY

3.6.1.0 THE PRE-PILOT PHASE

3.6.1.1 SAMPLE

A total of 174 learners from five secondary schools drawn from the identified population, participated in the study: two female, one male, and three mixed gender classes in two schools.

3.6.1.2 INSTRUMENTS

All the nine instruments which had gone through the five stages of development and validation as stated above, were used for the study.

3.6.1.3 DURATION AND OBSERVATION OF THE EXPERIMENT

A total of 15 periods of interaction between the teachers and the learners were conducted in each school (literature prescribed a minimum of 10 periods).

Two observers: a Federal Government researcher and Evaluation expert (an external observer) and the researcher (an internal observer) monitored the experiment.

3.6.1.4 INITIAL DATA PROCESSING

At the end of the experiment, the teachers through the supervision of the researcher marked the Post-Test scripts and recorded both Pre and Post Tests scores side by side for easy comparison.

At this juncture, the researcher discovered that learners scores meant for

High Cognitive Levels and those meant for Low Cognitive Levels did not show overt enough differences. This picture suggested that some questions/ items which were formed as belonging to High Cognitive Levels might actually be for Low Cognitive Levels. The unclear situation led to the next major review processes of the main instruments.

3.6.1.5 NEXT REVIEW PROCESSES AS DICTATED BY EMPIRICAL RESULTS

The following processes were undergone for the instruments under this phase of review:

i) *sending the two major instruments to a Social Studies/Measurement and Evaluation specialist who effected item analysis (Cangelosi 1990: 36) on all the fifty (50) questions/items; the result confirmed the researcher's suspicion: 33% only, out of the questions/items which were meant for High Cognitive Levels were actually in place;

ii) a serious review by the researcher and submission to the experts;

iii) review by the experts;

iv) review again by researcher in line with *suggestions* of the experts;

v) *a most rigorous review by another Measurement and Evaluation expert with the researcher;

vi) final review by researcher effecting corrections following stage five (v) above;

vii) adjustment of stems and keys by the researcher to ensure balance and fairness; there was no room for advantage to a learner by picking one alphabet more than others; the right options(right keys) did not follow an order; they were rather random.

The researcher felt quite satisfied after this phase of review and so with considerable degree of confidence, proceeded to the field for the Pilot Phase of the study.

***I am greatly indebted to the contributions of Dr. T. D. Baiyelo and Miss M. Kedi with regards to the mutiple moderation of the Achievement Tests coded QTAT used in this study.*

combined to form a seventh group called Low Cognitive Levels (LCL) while the remaining levels (7, 9,7,9) (32) were combined to form the eight and last group called High Cognitive Levels (HCL). The latter group formed the focus of this study.

Each of these processes was validated (theoretically: face and construct validities) and after the fifth process the researcher went to the field to test the instruments (Pre-Pilot stage of the study).

3.5.0 THE EXPERIMENT'S PROCEDURE

Below is the sequence of the experiment:

i) approaching Secondary Schools Principals in the identified population and formally applying to them;

ii) selecting schools which covered 'Aspects of Development': the Social Studies topic that was to form the Pre-Test content;

iii) assigning of teachers to experimental and control schools randomly; however, schools that were closely not assigned different treatment to avoid putting different treatments in nearby schools;

iv) administration of the Pre -Test;

v) immediate marking of the Pre-Test (in the first week);

vi) grouping of the learners into High, Low, and Mixed Abilities using the Pre-Test scores;

vii) starting real interactions between the teachers and learners (beginning of second week):

a.	Cooperative Teaching Strategy	-	Experiment I
b.	Competitive Teaching Strategy	-	Experiment II
c.	Lecture Method	-	Control

(Real interactions lasted for five weeks)

viii) administration of the Post-Test at the end of the sixth week (of the whole duration);

ix) marking and compilation of results (raw scores obtained);

x) computer analysis using Statistical Package for the Social Sciences (SPSS).

It should be noted that this order strictly applies to the Pilot and Main stages of the study. The Pre-Pilot stage of the study was stopped at item analysis (as we shall see below).

3.6.0.0 PHASES OF THE STUDY

3.6.1.0 THE PRE-PILOT PHASE

3.6.1.1 SAMPLE

A total of 174 learners from five secondary schools drawn from the identified population, participated in the study: two female, one male, and three mixed gender classes in two schools.

3.6.1.2 INSTRUMENTS

All the nine instruments which had gone through the five stages of development and validation as stated above, were used for the study.

3.6.1.3 DURATION AND OBSERVATION OF THE EXPERIMENT

A total of 15 periods of interaction between the teachers and the learners were conducted in each school (literature prescribed a minimum of 10 periods).

Two observers: a Federal Government researcher and Evaluation expert (an external observer) and the researcher (an internal observer) monitored the experiment.

3.6.1.4 INITIAL DATA PROCESSING

At the end of the experiment, the teachers through the supervision of the researcher marked the Post-Test scripts and recorded both Pre and Post Tests scores side by side for easy comparison.

At this juncture, the researcher discovered that learners scores meant for

High Cognitive Levels and those meant for Low Cognitive Levels did not show overt enough differences. This picture suggested that some questions/ items which were formed as belonging to High Cognitive Levels might actually be for Low Cognitive Levels. The unclear situation led to the next major review processes of the main instruments.

3.6.1.5 NEXT REVIEW PROCESSES AS DICTATED BY EMPIRICAL RESULTS

The following processes were undergone for the instruments under this phase of review:

i) *sending the two major instruments to a Social Studies/Measurement and Evaluation specialist who effected item analysis (Cangelosi 1990: 36) on all the fifty (50) questions/items; the result confirmed the researcher's suspicion: 33% only, out of the questions/items which were meant for High Cognitive Levels were actually in place;

ii) a serious review by the researcher and submission to the experts;

iii) review by the experts;

iv) review again by researcher in line with *suggestions* of the experts;

v) *a most rigorous review by another Measurement and Evaluation expert with the researcher;

vi) final review by researcher effecting corrections following stage five (v) above;

vii) adjustment of stems and keys by the researcher to ensure balance and fairness; there was no room for advantage to a learner by picking one alphabet more than others; the right options(right keys) did not follow an order; they were rather random.

The researcher felt quite satisfied after this phase of review and so with considerable degree of confidence, proceeded to the field for the Pilot Phase of the study.

***I am greatly indebted to the contributions of Dr. T. D. Baiyelo and Miss M. Kedi with regards to the mutiple moderation of the Achievement Tests coded QTAT used in this study.*

3.6.2.0 THE PILOT PHASE OF THE STUDY

3.6.2.1 SAMPLE

A total of 312 JSSII learners from 9 secondary schools, all drawn from the identified population participated in the study: 3 male, 3 female and 3 mixed (gender) schools.

3.6.2.2 INSTRUMENTS

All the nine identified instruments were used for this phase of the study after the major review processes of the two main instruments reported (just preceding this phase).

3.6.2.3 DURATION AND OBSERVATION OF THE EXPERIMENT

The experiment lasted six weeks; interactions lasted five weeks (May to June 1993). Each teacher inter-acted with his/her learners fifteen (15) times (periods): three periods per week.

Three observers including the researcher, monitored the experiment. They used a Rating Scale on 'Cognitive Levels and How to Ensure them in the Classroom' (CLHEC) (Medley 1982: 1845). Besides the Rating Scale, each Observer was provided with an Instruction Booklet which highlighted basic technical aspects of the study (Okebukola 1984). Moreover, the third Observer apart from the expert who accompanied the researcher at the Pre-Pilot phase, was a Ph.D Student. Thus all the three Observers were qualified researchers.

Each teacher was observed by each Observer three times. The Observers' Agreement was 0.95 using Pearson's Product Moment Correlation Coefficient(r).

3.6.2.4 EMPIRICAL VALIDITY

T-Test was used to compute the empirical validity. The T-value for the comparison between the Low Cognitive Levels(LCL) and the High Cognitive Levels (HCL) results was 26.37 at .001 level of significance (the table value was 3.291) It meant that high cognitive levels questions were truly harder than low cognitive levels questions. This result showed that the instrument was valid.

3.6.2.5 RELIABILITY

Kuder Richardson 21 formula was used to compute the reliability (Ary et al. 1979 : 215) and the result was 0.74. This figure showed an improvement of 0.094 over the reliability figure of the Pre-Pilot's phase.

3.6.2.6 STATISTICAL TOOL EMPLOYED FOR DATA ANALYSIS

Analysis of Co-variance (ANCOVA) was used to analyse the data collected.

3.6.7 CRITERIA FOR CHOICE OF THE STATISTICAL TOOL USED

Two factors needed to be considered in the choice of statistical tools for analysis of data collected. These were differences in number of subjects used and marked initial mean differences with regards to the Ability groups: High, Low, and Mixed. The means of the Low Ability groups were different from even the Mixed Ability groups needless mentioning those of High Ability groups compared to Low Ability groups.

On both problems' Kerlinger (1973: 370-376) stressed that the best statistical tool to solve them is ANCOVA, that the tool is capable of adjusting for the differences to effect precise measurement; Nie et al. (1975) and SPSS manual

(1986) support Kerlinger. Besides, Kerlinger observed that where intact classes are used which disallows randomization of subjects, ANCOVA is the appropriate tool for analysis to effect corrections/adjustments for precision.

3.6.2.8 RESULTS

The first three (the central ones) out of the six hypotheses were tested at this Pilot stage; all hypotheses were tested at the .05 level of significance (95% confidence level). The following are the summaries of the results obtained (Please see details in Appendix C 19).

i) a. Both experimental strategies (Cooperative and Competitive) significantly improved the learners' performances under them more than the improvements effected by the control method (Lecture) for learners under it, at the high cognitive levels.

b. Cooperative and Competitive teaching strategies were not significantly different from one another in their effectiveness, at the high cognitive levels.

ii) a. While male and mixed gender learners' performances under Cooperative strategy significantly improved more than male and mixed learners' performances under Lecture method, all the three gender learners' performances under the Competitive strategy significantly improved more than all the gender learners's performances under Lecture method, at the high cognitive levels.

b1. Female learners' performances under Competitive strategy significantly improved more than female learners' performances under Cooperative strategy. Conversely, mixed (gender) learners' performances under Cooperative strategy significantly improved more than mixed learners' performances under Competitive strategy, all at the high cognitive levels.

b2. Whereas mixed gender learners' performances significantly improved more than male and female learners' performances under Cooperative strategy, male and mixed learners' performances significantly improved more than female learners' performances under Competitive strategy, at the high cognitive levels.

iii) a. Only the comparison between Cooperative and Lecture approaches for High Ability group of learners which was insignificant. All other (five) comparisons were significant in favour of the experimental strategies Ability groups of learners' performances, at the high cognitive levels (gender homogenized).

b1. While High Ability group of learners under Competitive strategy significantly out- performed High Ability group of learners under Cooperative strategy, Low and Mixed Ability groups of learners under the two experimental strategies did not significantly out-perform one another.

b2. Within Cooperative strategy, Low and Mixed Ability groups of learners significantly out-performed High Ability group of learners while High and Mixed Ability groups of learners significantly out-performed Low Ability group of learners under Competitive strategy at the high cognitive levels (among gender homogenized learners).

b3. If we limit ourselves to 'gains' within groups from pre to post test, the Mixed Ability group of learners gained most followed fairly closely by Low Ability group of learners while High Ability group of learners gained least under Cooperative strategy; under Competitive strategy, the order was Low, Mixed, and High Ability groups of learners respectively.

3.6.3.0 THE MAIN PHASE OF THE STUDY

Validity and Reliability indices of the Pilot phase of the study (26.37 at .001 level of significance with table value only at 3.291 and KR21 = 0.74 for validity and reliability respectively) showed that the second processes of review of the major instruments: after the Pre-Pilot phase of the study, was adequate (an improvement of 0.094). Accordingly (by these indicators), need for further review of the instruments was not suggested. In another sense, these indices projected the feasibility of the Main phase of the study. Other design areas adjusted for the Main phase included:

i) meeting Secondary Schools' Principals early enough to avoid offending some;

ii) increasing the sample: larger classes were sought for;

iii) increasing the number of periods for interaction from 15 to 20.

3.6.3.1 SAMPLE

A total of 588 JSS II learners from 9 secondary schools all drawn from the identified population participated in this Main phase: 3 male, 3 female, and 3 mixed gender schools (see the design on tables please).

3.6.3.2 INSTRUMENTS

All the nine identified instruments were used for this last phase of the study, as in the earlier ones.

3.6.3.3 DURATION AND OBSERVATION OF THE EXPERIMENT

The experiment lasted six weeks (late January to early March 1994). Interactions between each teacher and his/her learners lasted five weeks. During this time, each teacher conducted 20 periods with his/her learners: 04(four) periods per week.

For the purposes of continuity and uniformity, the same Observers that observed the Pilot phase of the study monitored this Main phase. They used the same Rating Scale and were all armed with the Instruction Book-let. Each teacher was observed by each Observer three times. The Observers' Agreement was 0.98 using Pearson's Product Moment Correlation Coefficient (r).

3.6.3.4 EMPIRICAL VALIDITY

T-Test was used to compute the empirical validity. The T-value for the comparison between the Low Cognitive Levels (LCL) and the High Cognitive Levels (HCL) (Kerlinger 1973; Ary et al. 1979) result was 36.88 at .001 level of significance (table value was 3.291). It meant that High Cognitive Levels questions were really *harder* than those of Low Cognitive Levels showing that the instrument was valid.

3.6.3.5 RELIABILITY

Kuder Richardson 21 formula was used to compute the reliability (Ary et al. 1979:215) and the result was 0.73: a very high reliability value and a marginal improvement (.01) over the value for the Pilot phase of the study.

3.6.3.6 VALIDITY AND RELIABILITY VALUES OF ALL THE PHASES OF THE STUDY AT A GLANCE

TABLE 303: CONSTRUCT VALIDITY OF INSTRUMENT

STUDY & SAMPLE	CONSTRUCT VALIDITY			GENERAL REMARK
	MEANS OF LCL & HCL	DIFFERENCE BETWEEN LCL & HCL	REMARK	
PRE PILOT (174)	LCL = 22.0 HCL = 20.0	2.0	Smallest mean difference	Difference for Pilot and Main phases are apparently significant: high cognitive levels questions were truly higher than low cognitive levels questions.
PILOT (312)	LCL = 21.39 HCL = 16.69	4.72	Mean difference of Pilot phase more than doubles that of Pre-Pilot	
MAIN (588)	LCL = 21.62 HCL=16..90	4.72	Mean difference of Main phase same as Pilot's and more than doubles Pre-Pilot's	

LCL = LOW COGNITIVE LEVELS

HCL = HIGH COGNITIVE LEVELS

TABLE 304: VALIDITY AND RELIABILITY VALUES

STUDY & SAMPLE	MEAN	STANDARD DEVIATION	VALIDITY	RELIABILITY	REMARK
PRE -PILOT (174)	27.36	8.23	T=8.16	KR21=0.83	Significance level of table
PILOT (312)	28.70	6.67	T=26.37	KR21=0.74	value at .001 is 3.291 for
MAIN (588)	29.06	6.51	T=36.88	KR21=0.73	Validity

Subsequent studies improved on preceding ones in both Means and Standard Deviations as well as in Validity and Reliability.

NOTE

i) Mean controls/affects validity values

ii) Standard Deviation controls/affects Reliability values in KR21 formula

iii) The smaller the Standard Deviation, the smaller the KR21 value and the better the over-all performance in an Achievement Test.

3.6.3.7 VALIDITIES OF THE RESULTS AT A GLANCE: VARIOUS EVIDENCES TO SHOW THAT THE GAINS WERE MAINLY DUE TO THE TREATMENTS

i. Exposing the teachers-to-be, to a systematic professional training which was both in content and methodology considerable.

ii. Teaching procedure central to the two strategies (Cooperative and Competitive) was the Basic Practice Strategy (BPS) exemplified in Aisiku's triadic process (questions and discussions) a dynamic process which is noted as capable of effecting improved performance of learners.

iii. Administration of Competence/Terminal Test for the trainees: minimum scores were 62 and 63 for Pilot and Main phases of the study respectively.

iv. Observers' Agreements on practical competence of teachers after using a Rating Scale, were 0.95 and 0.98 for Pilot and Main phases respectively (there were three Observers).

v. Teaching Practice Scores of Teachers: internal evidence: all the teachers were scored credit (62-68) by two internal supervisors for both Pilot and Main phases of the study.

vi. Teaching Practice Scores of Teachers: External Supervisors(four for Pilot and five for Main phases) maintained the credits awarded by the internal Supervisors and upgraded one to distinction at the Pilot stage and two to distinction at the Main stage of the study.

vii. Consideration of Pre-test scores: this condition enabled the researcher to deduct the base-line results from the final scores (Post Test scores) hence gains mainly due to the duration of the experiment were scientifically determinable.

viii. A considerable proportion of the gains were not merely at boarder-line significant levels but at perfect significant levels: probability being zero in a thousand cases, not just five in a hundred cases.

ix. Regression analysis using attribute variables to show the contributions of those variables on the learners' scores; the contributions were deducted and there were still (overtly) significant gains quite traceable to the treatments.

NOTE: Points I & ii formed the general picture imbibed and exhibited by the teachers; points iii, iv, v, vi, vii, & viii were six various evidences showing the competence of the teachers; point ix balanced/moderated the gains traceable to the treatments, using a/an precise/acceptable statistical tool: regression. After this moderation, there were still significant gains that may be termed directly due to the treatments.

3.6.3.8 STATISTICAL TOOLS USED FOR DATA ANALYSIS

For the central hypotheses (1-3), Analysis of Covariance (ANCOVA) test was used to analyze the data collected. The criteria used were explained in the sub-section before the results of the Pilot phase of the study.

ANCOVA was also used to analyze the inter-active effects of the experimental treatments on Gender and Ability Groups of learners (hypothesis 4A). Both ANCOVA and T-Tests were used to show whether the experimental treatments were significantly more appropriate at eliciting High Cognitive learning (hypothesis 4B) (Kerlinger 1973; Nie et al. 1975; SPSS Manual 1986).

Chi-Square (X^2) test was used to analyze the proportions of the performances of the learners at 60%, 50%, and 40% levels (Kerlinger 1973: 157-183; Ary et al. 1979 :162-166) (hypothesis 5). Simple percentages and graphs were used to show (I) the learners who moved to High Ability group from the pure Low Ability group and Low Ability to High Ability group from the Mixed Ability group (ii) the learners who significantly gained from the pure High Ability group to significantly Higher Ability level and High Ability learners who significantly gained from the Mixed Ability Group.

Step-Wise Multiple Regression test was used to obtain the effects of intervening variables on the Cognitive Levels and their Combinations (Kerlinger 1973: 632 -641; Ary et al.1979:239-240) (hypothesis 6A).

T-Test was used to compare the mean scores of the learners between the Cognitive Levels (Kerlinger 1973 :219-220; Ary et al. 1979: 144-152) (hypothesis 6B).

The both higher validity and reliability values (than the values of the Pilot Phase of the Study) of the Main phase of the study gave us double assurance that the development of the instruments was adequate. With this double assurance, we can proceed to examine the data analysis in Chapter Four, with considerable measure of confidence.

CHAPTER FOUR

PRESENTATION OF RESULTS

4.0.1 INTRODUCTION

The presentation of results of this study is arranged according to the hypotheses : 1-6.

4.0.2 DESCRIPTIVE STATISTICS

TABLE 4001: DESCRIPTIVE STATISTICS OF COOPERATIVE TREATMENT

TYPE OF TEST	COGNITIVE LEVEL	MEAN SCORE	STANDARD DEVIATION	VARIANCE	RANGE	NO OF SUBJECTS
PRE-TEST	RAW SCORE (50)	20.72	7.58	57.48	34.00	196
	RAW SCORE X 2 =100	41.45	15.16	229.93	68.00	196
	INFORMATION (I)	2.84	1.50	2.26	7.00	196
	COMPREHENSION ©	4.23	2.10	4.40	9.00	196
	APPLICATION (AP)	3.70	1.72	2.97	7.00	196
	ANALYSIS (AN)	4.12	1.98	3.94	8.00	196
	SYNTHESIS (S)	2.82	1.73	2.99	7.00	196
	EVALUATION (E)	3.01	1.79	3.21	8.00	196
	COMBINATION OF I & C	7.08	2.95	8.73	15.00	196
	COMBINATION OF AP-E	13.65	5.26	27.67	25.00	196
POST-TEST	RAW SCORE (50)	30.95	6.37	40.57	32.00	196
	RAW SCORE X 2 = 100	61.90	12.74	162.29	64.00	196
	INFORMATION (I)	6.99	1.57	2.45	7.00	196
	COMPREHENSION ©	5.64	1.44	2.08	7.00	196
	APPLICATION (AP)	3.87	1.53	2.35	7.00	196
	ANALYSIS (AN)	5.18	1.64	2.68	9.00	196
	SYNTHESIS (S)	3.76	1.36	1.86	7.00	196
	EVALUATION (E)	5.52	2.31	5.35	8.00	196
	COMBINATION OF I & C	12.63	2.54	6.46	13.00	196
	COMBINATION OF AP-E	18.32	4.64	21.56	20.00	196

TABLE 4002: DESCRIPTIVE STATISTICS OF COMPETITIVE TREATMENT

TYPE OF TEST	COGNITIVE LEVEL	MEAN SCORE	STANDARD DEVIATION	VARIANCE	RANGE	NO OF SUBJECTS
PRE-TEST	RAW SCORE (50)	20.52	6.54	42.81	30.00	193
	RAW SCORE X 2 =100	41.04	13.09	171.25	60.00	193
	INFORMATION (I)	3.12	1.34	1.80	6.00	193
	COMPREHENSION ©	3.96	1.78	3.15	9.0.0	193
	APPLICATION (AP)	3.48	1.58	2.51	7.00	193
	ANALYSIS (AN)	4.22	2.05	4.21	9.00	193
	SYNTHESIS (S)	2.54	1.44	2.07	7.00	193
	EVALUATION (E)	3.21	1.54	2.36	7.00	193
	COMBINATION OF I & C	7.08	2.50	6.24	13.00	193
	COMBINATION OF AP-E	13.44	4.80	23.02	24.00	193
POST-TEST	RAW SCORE (50)	31.30	6.32	39.92	28.00	193
	RAW SCORE X 2 = 100	62.60	12.64	159.68	56.00	193
	INFORMATION (I)	7.20	1.63	2.65	8.00	193
	COMPREHENSION ©	5.85	1.66	2.74	8.00	193
	APPLICATION (AP)	3.66	1.41	1.98	6.00	193
	ANALYSIS (AN)	5.48	1.26	1.59	6.00	193
	SYNTHESIS (S)	3.90	1.48	2.20	7.00	193
	EVALUATION (E)	5.21	2.09	4.35	8.00	193
	COMBINATION OF I & C	13.05	2.74	7.48	13.00	193
	COMBINATION OF AP-E	18.25	4.36	18.98	21.00	193

TABLE 4003:

DESCRIPTIVE STATISTICS OF LECTURE METHOD

TYPE OF TEST	COGNITIVE LEVEL	MEAN SCORE	STANDARD DEVIATION	VARIANCE	RANGE	NO OF SUBJECTS
PRE-TEST	RAW SCORE (50)	22.83	5.65	31.95	29.00	199
	RAW SCORE X 2 =100	45.66	11.30	127.80	58.00	199
	INFORMATION (I)	3.18	1.49	2.21	7.00	199
	COMPREHENSION ©	4.59	1.54	2.37	8.00	199
	APPLICATION (AP)	3.75	1.41	1.98	7.00	199
	ANALYSIS (AN)	4.23	1.87	3.50	8.00	199
	SYNTHESIS (S)	3.07	1.49	2.22	7.00	199
	EVALUATION (E)	4.02	1.55	2.39	8.00	199
	COMBINATION OF I & C	7.77	2.28	5.22	13.00	199
	COMBINATION OF AP-E	15.06	4.04	16.32	21.00	199
POST-TEST	RAW SCORE (50)	24.92	6.85	46.96	32.00	199
	RAW SCORE X 2 = 100	49.85	13.71	187.84	64.00	199
	INFORMATION (I)	5.90	1.77	3.14	8.00	199
	COMPREHENSION ©	4.89	1.80	3.23	9.00	199
	APPLICATION (AP)	3.31	1.52	2.32	8.00	199
	ANALYSIS (AN)	4.06	1.92	3.70	8.00	199
	SYNTHESIS (S)	2.62	1.54	2.37	7.00	199
	EVALUATION (E)	4.15	1.92	3.69	8.00	199
	COMBINATION OF I & C	10.79	2.96	8.75	15.00	199
	COMBINATION OF AP-E	14.13	5.01	25.11	23.00	199

TABLE 4004

COMPRESSED DESCRIPTIVE STATISTICS OF THE TREATMENTS

TYPE OF TEST	COGNITIVE LEVEL	MEAN SCORE	STANDARD DEVIATION	VARIANCE	RANGE	NO OF SUBJECTS
A. COOPERATIVE						
PRE-TEST	RAW SCORE (50)	20.72	7.58	57.48	34.00	196
	RAW SCORE X 2 =100	41.45	15.16	229.93	68.00	196
	COMBINATION OF I & C	7.08	2.95	8.73	15.00	196
	COMBINATION OF AP-E	13.65	5.26	27.67	25.00	196
POST-TEST	RAW SCORE (50)	30.95	6.37	40.57	32.00	196
	RAW SCORE X 2 = 100	61.90	12.74	162.29	64.00	196
	COMBINATION OF I & C	12.63	2.54	6.46	13.00	196
	COMBINATION OF AP-E	18.32	4.64	21.56	20.00	196
B. COMPETITIVE						
PRE-TEST	RAW SCORE (50)	20.52	6.54	42.81	30.00	193
	RAW SCORE X 2 =100	41.04	13.09	171.25	60.00	193
	COMBINATION OF I & C	7.08	2.50	6.24	13.00	193
	COMBINATION OF AP-E	13.44	4.80	23.02	24.00	193
POST-TEST	RAW SCORE (50)	31.30	6.32	39.92	28.00	193
	RAW SCORE X 2 = 100	62.60	12.64	159.68	56.00	193
	COMBINATION OF I & C	13.05	2.74	7.48	13.00	193
	COMBINATION OF AP-E	18.25	4.36	18.98	21.00	193
C. LECTURE						
PRE-TEST	RAW SCORE (50)	22.83	5.65	31.95	29.00	199
	RAW SCORE X 2 =100	45.66	11.30	127.80	58.00	199
	COMBINATION OF I & C	7.77	2.28	5.22	13.00	199
	COMBINATION OF AP-E	15.06	4.04	16.32	21.00	199
POST-TEST	RAW SCORE (50)	24.92	6.85	46.96	32.00	199
	RAW SCORE X 2 = 100	49.85	13.71	187.84	64.00	199
	COMBINATION OF I & C	10.79	2.96	8.75	15.00	199
	COMBINATION OF AP-E	14.13	5.01	25.11	23.00	199

4.1 Problem 1

The problem was to identify teaching strategies which are capable of improving learner's performance at the High Cognitive Levels.

An Analysis of Covariance (ANCOVA) test was conducted on the outcomes of learner's performances in a pre-post treatment experimental design. In the test the learners were divided into two experimental groups (Cooperative and Competitive) and a control group (Lecture). The tests were broadly divided into Low Cognitive Levels and High Cognitive levels. The result of this analysis is presented on Table 401AI.

TABLE 401AI: ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY THREE TREATMENT GROUPS: COOPERATIVE, COMPETITIVE, AND LECTURE.

GROUP + NO.	VARIABLE	SCORE OBTAINABLE	GRAND MEAN	SUM OF SQUARES	DEG. OF FREEDOM (DF)	MEAN SQUARE	F RATIO	SIGN. OF F
	LCL	18	12.145					
196 CP 193 CM 199 LC								
COVARIATES				321.549	1	321.549	47.107	.000
MAIN EFFECTS				686.837	2	343.419	50.311	0.0
EXPLAINED				1008.387	3	336.129	49.243	0.0
RESIDUAL				3986.326	584	6.826		
TOTAL				4994.713	587	8.509		
	HCL	32	16.881					
CP								
CM								
LC								
COVARIATES				2624.841	1	2624.841	164.274	.000
MAIN EFFECTS				3141.446	2	1570.723	98.303	0.0
EXPLAINED				5766.286	3	1922.095	120.290	0.0
RESIDUAL				9331.380	584	15.978		
TOTAL				15097.667	587	25.720		

TABLE 401AI:	MULTIPLE CLASSIFICATION ANALYSIS (MCA)					
GROUP + NO.	UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENDENTS DEVIATION	BETA	ADJUSTED FOR INDEPENDENTS+ COVARIATES DEVIATION	BETA
LCL						
CP 196	.48		SAT		.56	
CM 193	.90				.98	
LC 199	-1.35				-1.50	
		.34				.37
			R^2	.202		
			R	.449		
HCL						
CP	1.44		SAT		1.65	
CM	1.37				1.69	
LC	-2.75				-3.27	
		.39				.46
			R^2	.382		
			R	.618		

SAT = SAME AS UNADJUSTED DEVIATION ALTHROUGH

It can be seen from Table 401AI that at the Low Cognitive Levels (LCL), the Competitive strategy is the most appropriate among the three treatments followed by the Cooperative strategy while the Lecture method recorded least performance.

At the High Cognitive Levels (HCL), it seems that the two experimental strategies significantly improved the performances of the learners more than the control method. To avoid imprecision arising from mere examination of the Multiple Classification Analysis (MCA) values, a Pair-wise ANCOVA test was further conducted between the experimental strategies and the control method separately. The result of the analysis is presented on Table 401AII.

TABLE 401AII: PAIR-WISE ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BETWEEN THE EXPERIMENTAL AND CONTROL GROUPS

PAIR		NO. IN PAIR	F OF PAIR	SIGN. LEVEL OF PAIR	ADJUSTED MCA VALUES OF PAIR	SIGN. IN FAVOUR OF
1	CP & LC	196 199	100.804	..000	2.49 -2.45	CP
2	CM & LC	193 199	96.725	..000	2.50 -2.43	CM

It can be seen from Table 401AII that both the Cooperative and Competitive strategies significantly improved the performances of the learners under them more than the learners under the Lecture method.

One problem arose from our observation of the High Cognitive Levels performances of the learners : the extent of differences in effectiveness of the two experimental strategies. This problem was investigated by undertaking a comparison of both Cooperative and Competitive strategies using the Analysis of Covariance test. The result of this analysis is presented on Table 401BI.

TABLE 401BI: ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES UNDER THE EXPERIMENTAL STRATEGIES (COOPERATIVE AND COMPETITIVE).

GROUP + NO.	VARIABLE	SCORE OBTAINABLE	GRAND MEAN	CELL MEAN	SUM OF SQUARES	DF	MEAN SQUARE	F RATIO	SIGN. OF F
	LCL	18	12.84						
196 CP				12.63					
193 CM				13.05					
COVARIATES					367.244	1	367.244	60.861	.000
MAIN EFFECTS					17.044	1	17.044	2.825	.094
EXPLAINED					384.288	2	192.144	31.843	0.0
RESIDUAL					2329.182	386	6.034		
TOTAL					2713.470	388	6.993		
	HCL	32	18.29						
CP				18.32					
CM				18.25					
COVARIATES					2633.491	1	2633.491	194.882	.000
MAIN EFFECTS					.155	1	.155	.011	.915
EXPLAINED					2633.646	2	1316.823	97.447	0.0
RESIDUAL					5216.107	386	13.513		
TOTAL					7849.753	388	20.231		

TABLE 401 BI: MULTIPLE CLASSIFICATION ANALYSIS (MCA)				
GROUP PLUS NO.	UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS +COVARIATES DEVIATION	BETA
LCL				
CP (196)	-0.21		-0.21	
CM (193)	0.21		0.21	
		0.08		0.08
			R^2	0.142
			R	0.376
HCL				
CP	0.3		-0.02	
CM	-0.03		0.02	
		0.01		0.00
			R^2	0.336
			R	0.579

It can be seen from Table 401BI that at the Low Cognitive Levels, there is no significant difference in the effectiveness of the experimental strategies (Main Effects F = 2.825 at 0.094 level of significance, beta weight = 0.08).

At the High Cognitive Levels, it could be observed that the difference in the effectiveness of the experimental treatments is marginal (Main Effects F=.011 at .915 level of significance; beta weight = .00).

Table 401 AII also provides the test of hypothesis 1A which states that there will be no significant difference between the performances of the experimental and control groups of the learners at the High Cognitive Levels. The evidence from this table is that at .05 significance level with one degree of freedom, both the experimental strategies significantly improved the learners' performances under them more than the learners' performances under the control method. Hypothesis 1A is therefore rejected.

Table 401B1 on the other hand, provides the test of hypothesis 1B which states that there will be no significant difference between the performances of the learners under Cooperative and Competitive teaching strategies at the High Cognitive Levels. Since the evidence from this table agrees with the postulation,the hypothesis is accepted.

4.2 Problem 2

The next problem was to ascertain whether the learners' performances would vary by gender at the High Cognitive Levels.

An ANCOVA test was conducted on the outcomes of learners' performances which were grouped under Cooperative and Competitive strategies and Lecture method. Other major design aspects like the structure of the test and the number of times the test was administered were the same as reported under Problem 1. The analysis under Problem 2 is presented on Table 402AI.

TABLE 402AI: ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY GENDER (MALE, FEMALE, MIXED) UNDER COOPERATIVE AND COMPETITIVE STRATEGIES AND LECTURE METHOD.

GROUP + NO.	VARI-ABLE	SCORE OBTAI-NABLE	GRAND MEAN	SUM OF SQUARES	DF	MEAN SQUARE	F RATIO	SIGN. OF F
	LCL	18	12.145					
CP 51 ML								
75 FL								
70 MX								
CM 73 ML								
51 FL								
69 MX								
LC 51 ML								
73 FL								
75 MX								
MAIN EFFECTS				697.370	8	87.171	13.521	0.0
COVARIATES				570.968	1	570.968	88.563	.000
EXPLAINED				1268.358	9	140.926	21.839	0.0
RESIDUAL				3726.374	578	6.447		
TOTAL				4994.713	587	8.509		
	HCL	32	16.881					
CP ML								
FL								
MX								
CM ML								
FL								
MX								
LC ML								
FL								
MX								
MAIN EFFECTS				3553.757	8	444.220	29.005	0.0
COVARIATES				2691.708	1	2691.708	175.754	.000
EXPLAINED				6245.465	9	693.941	45.310	0.0
RESIDUAL				8852.201	578	15.315		
TOTAL				15097.667	587	25.720		

TABLE 402AI: MULTIPLE CLASSIFICATION ANALYSIS (MCA)				
GROUP + NO.	UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS + COVARIATES DEVIATION	BETA
CP 51 ML	.33		.78	
75 FL	.47		-.15	
70 MX	.61		1.21	
CM 73 ML	1.73		2.19	
51 FL	1.09		.52	
69 MX	-.12		.09	
LC 51 ML	-.62		-2.17	
73 FL	-1.19		-.98	
75 MX	-1.33	.37	-.166	.045
			R^2	.254
			R	.504
CP ML	0.33		1-.02	
FL	2.97		2.02	
MX	0.6		1.69	
CM ML	2.2		3.15	
FL	3.00		1.45	
MX	-0.71		.29	
LC ML	-0.80		-2.21	
FL	-4.73		-4.38	
MX	-2.15		-2.84	
		.49		.49
			R^2	.414
			R	.643

A close inspection of table 402AI shows that, at the Low Cognitive Levels, the learners' performances did not significantly vary by gender under the three treatments and that the Competitive strategy proved most appropriate followed by Cooperative strategy while the Lecture method recorded least effectiveness.

At the High Cognitive Levels, it could be observed that among male learners, both the Cooperative and Competitive strategies are more suitable than the Lecture method. Among female and mixed gender learners, although the Cooperative strategy is the most suitable, both experimental strategies again proved more suitable than the control method.

For precise judgement, a Pair-wise ANCOVA test was conducted between the experimental strategies and the control method separately for their corresponding variables. The result of this further analysis is presented on Table 402AII.

TABLE 402AII: PAIR-WISE ANALYSIS OF COVARIANCE TEST ON LEARNERS PERFORMANCES BY GENDER BETWEEN THE EXPERIMENTAL STRATEGIES AND CONTROL METHOD

PAIR		NO.IN PAIR	F OF PAIR	SIGN.LEVEL OF PAIR	ADJUSTED MCA VALUE OF PAIR	SIGN.IN FAVOUR OF
CP & LC	CPML & LCML	51 51	2.223	.139	1.90 -1.90	NS
	CPFL & LCFL	75 73	206.761	.000	3.15 -3.24	CPFL
	CPMX & LCMX	70 75	11.122	.001	2.19 -2.04	CPMX
CM & LC	CMML & LCML	73 51	18.143	.001	2.09 -2.99	CMML
	CMFL & LCFL	51 73	171.752	.000	3.19 -2.23	CMFL
	CMMX & LCMX	69 75	3.356	.069	1.49 -1.37	NS

It can be seen from Table 402AII that the difference in the performances of the learners by gender between the Cooperative strategy and Lecture method are significant for female and mixed learners in favour of the experimental strategy.In the comparison between Competitive strategy and the Lecture method, male and female learners performances are significant in favour of the experimental strategy.

One problem arose from our observation of the High Cognitive Levels performances of the learners, namely, the extent of difference in the effectiveness of the two experimental treatments.This problem was investigated by under-taking a comparison of both Cooperative and Competitive strategies using ANCOVA test. The result of this analysis is presented on table 402BI.

TABLE 402BI : ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY GENDER (MALE, FEMALE, MIXED) UNDER THE EXPERIMENTAL STRATEGIES: COOPERATIVE AND COMPETITIVE.

GROUP + NO.	VARI-ABLE	SCORE OBTAIN-ABLE	GRAND MEAN	CELL MEAN	SUM OF SQUARES	DF	MEAN SQUARE	F RATIO	SIGN. OF F
	LCL	18	12.84						
CP 51 ML				12.47					
75 FL				12.61					
70 MX				12.76					
CM 73 ML				13.88					
51 FL				13.24					
69 MX				12.03					
COVARIATES					357.244	1	367.244	66.958	.000
MAIN EFFECTS					251.079	5	50.266	9.216	.000
EXPLAINED					618.323	6	103.054	18.789	0.0
RESIDUAL					2095.147	382	5.485		
TOTAL					2713.470	388	6.993		
	HCL	32	18.29						
CP ML				17.22					
FL				19.85					
MX				17.49					
CM ML				19.08					
FL				19.88					
MX				16.17					
COVARIATES					2633.491	1	2633.491	205.618	.000
MAIN EFFECTS					323.73	5	64.746	5.055	.000
EXPLAINED					2957.221	6	492.87	38.482	0.0
RESIDUAL					4892.533	382	12.808		
TOTAL					7849.753	388	20.231		

TABLE 402BI : MULTIPLE CLASSIFICATION ANALYSIS (MCA)				
GROUP + NO.	UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS + COVARIATES DEVIATION	BETA
CP 51 ML	-.36		.02	
75 FL	-.22		-.99	
70 MX	-.08		.46	
CM 73 ML	1.04		1.43	
51 FL	.40		-.33	
69 MX	-.81		-.69	
		.23		.32
			R^2	.228
			R	.477
CP ML	-1.07		-.62	
FL	1.57		-.30	
MX	-.80		.07	
CM ML	.79		1.52	
FL	1.59		-.30	
MX	-2.11		-1.34	
		.31		.20
			R^2	.377
			R	.614

It could be observed from Table 402BI that, at the Low Cognitive Levels among male and female learners, the Competitive strategy out-performed the Cooperative strategy. The situation is, however, reversed among mixed (gender) learners as the Cooperative strategy out-performed the Competitive strategy.

At the High Cognitive Levels, it could be seen that the differences in the performances of the learners by gender between the experimental treatments are significant (Main Effects' F = 5.05 at .000 level of significance; beta weight = .20). These differences are represented in the details of the MCA values which convey the information that whereas the Competitive strategy, improved male learners' performances more than the Cooperative strategy, the latter strategy improved female and mixed (gender) learners' performances more than the former strategy.

On the order of the learners' performances by gender under each strategy, it is female mixed, and male for Cooperative strategy while the order is male, female, and mixed for Competitive strategy.

The desire for precision in relation to significance or otherwise concerning these differences made the researcher to conduct a Pair-wise ANCOVA test for the variables between and within the experimental treatments. The result of this further analysis is presented on Table 402BII.

TABLE 402II: PAIR-WISE ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY GENDER BETWEEN AND WITHIN THE EXPERIMENTAL TREATMENTS.

PAIR		NO.IN PAIR	F OF PAIR	SIGN LEVEL	ADJUSTED MCA VALUES	SIGN. IN FAVOUR OF
TSG BETWEEN CP & CM	CPML & CMM	51 73	7.539	.007	-1.23 .86	CMML
	CPFL & CMFL	75 51	0.002	.961	.24 -.35	NS
	CPMX & CMMX	70 69	4.433	.037	.71 -.72	CPMX
TSG WITHIN CP	ML & FL	51 75	17.524	.000	-.57 .38	CPFL
	ML & MX	51 70	0.141	.708	-.42 .31	NS
	FL & MX	75 70	15.026	.000	.12 -.13	CPFL
TSG WITHIN CM	ML & FL	73 51	1.524	.219	.54 -.77	NS
	ML & MX	73 69	23.820	.000	1.39 -1.47	CMML
	FL & MX	51 69	38.430	.000	.15 -.11	CMML

It can be seen from Table 40BII that whereas male learners' performances under Competitive strategy significantly improved more than those under their Cooperative counterpart, mixed (gender) learners' performances under Cooperative strategy significantly improved more than those under Competitive strategy.

Within Cooperative strategy, the difference in the performance of the learners between male and female genders is significant in favour of female gender, while that between female and mixed genders is also significant in favour of female learners.

Within Competitive strategy, performances of both male and female learners significantly improved more than mixed (gender) learners.

Table 402AII also provides the test of hypothesis 2A which states that there will be no significant gender variations among the performances of experimental and control groups of the learners at the high cognitive levels. The evidence from this table is that at 95% degree of confidence with one degree of freedom, female and mixed (gender) learners performances under Cooperative strategy significantly differed from female and mixed gender learners' performances under Lecture method while male and female learners' performances under Competitive strategy significantly improved more than male and female learners' performances under Lecture method. Hypothesis 2A is consequently rejected.

Table 402BII also provides the test of hypothesis 2B which states that there will be no significant gender variations among the performances of the learners under the experimental strategies at the high cognitive levels. The evidence from this table is that at 95% confidence level with one degree of freedom, female learners significantly out-performed the others under Cooperative strategy. Under Competitive strategy, both male and female learners' performances significantly improved more than mixed (gender) learners' performances. Hyphothesis 2B is rejected as a result.

4.3 Problem 3

The next problem was to measure the distribution of the learners along ability levels at the High Cognitive Levels, gender homogenized.

An ANCOVA test was conducted on the performances of the learners which were grouped under Cooperative and Competitive strategies and Lecture method. Other major design conditions such as the structure of the test and the number of times it was administered, were the same as stated under Problem 1. The result of the analysis on Problem 3 is presented on table 403 AI.

TABLE 403A1: ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY ABILITY GROUPS (HIGH, LOW, MIXED) 'GENDER HOMOGENIZED' UNDER COOPERATIVE & COMPETITIVE STRATEGIES & LECTURE METHOD

GROUP + NO.	VARI ABLE	SCORE OBTAIN-ABLE	GRAND MEAN	SUM OF SQUARES	DF	MEAN SQUARE	F RATIO	SIGN OF F
	LCL	18	12.145					
CPTSG 35 AHA								
87 ALA								
74 AMA								
CMTSG 37 AHA								
119 ALA								
37 AMA								
LCTSG 54 AHA								
99 ALA								
46 AMA								
MAIN EFFECTS				1071-659	8	133.957	20.470	.0.0
COVARIATES				140.527	1	140.527	21.474	.000
EXPLAINED				1212.185	9	134.687	20.581	0.0
RESIDUAL				3782.527	578	6.544		
TOTAL				4994.773	587	8.509		
	HCL	32	16.881					
CPTSG AHA								
ALA								
AMA								
CMTSG AHA								
ALA								
AMA								
LCTSG AHA								
ALA								
AMA								
MAIN EFFECTS				5243.291	8	655.411	45.795	0.0
COVARIATES				1582.035	1	1582.035	110.539	.000
EXPLAINED				6825.326	9	758.370	52.988	0.0
RESIDUAL				8272.341	578	14.312		
TOTAL				15097.667	587	25.720		

TABLE 403A1: MULTIPLE CLASSIFICATION ANALYSIS (MCA)				
GROUP +NO.	UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS + COVARIATES DEVIATION	BETA
CPTSG 35 AHA	1.60		.86	
87 ALA	-.63		-.17	
74 AMA	1.26		1.22	
CMTSG 37 AHA	2.04		1.55	
119 ALA	.12		.44	
37 AMA	2.26		2.02	
LCTSG 54 AHA	-1.03		-1.63	
99 ALA	-2.07		-1.87	
46 AMA	-.17		-.37	
		.46		.42
			R^2	.243
			R	.493
CPTSG AHA	3.58		1-.01	
ALA	-1.69		-.49	
AMA	4.11		4.41	
CMTSG AHA	4.28		1.98	
ALA	.08		1.45	
AMA	2.63		1.72	
LCTSG AHA	-.14		-2.30	
ALA	-4.79		-3.99	
AMA	-1.42		-2.59	
		.59		.53
			R^2	.452
			R	.672

It can be seen from Table 403A1 that at the Low Cognitive Levels, the ability group of learners' performances under the experimental treatments improved more than those under the control method in all the three levels although the Competitive strategy has an edge over the Cooperative strategy in all the three ability groups of learners.

At the High Cognitive Levels, the situation of the experimental treatments' more appropriateness than the control method is repeated.

For the purpose of precise measurement in relation to significant levels in the differences, the researcher conducted a Pair-wise ANCOVA test for the corresponding variables between the experimental treatments and the control method . The result of this analysis is presented on Table 403AII.

TABLE 403AII: PAIR-WISE ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY ABILITY GROUPS (HIGH ,LOW, MIXED) 'GENDER HOMOGENIZED' BETWEEN THE EXPERIMENTAL STRATEGIES AND CONTROL METHOD.

PAIR		NOS IN PAIR	F OF PAIR	SIGN. LEVEL	ADJUSTED MCA VALUES	SIGN IN FAVOUR OF
CP TSG/AAG & LC TSG/AAG	CP TSG/AHA & LC TSG/AHA	35 54	20.189	.000	1.87 -1.21	CP TSG/AHA
	CP TSG/ALA & LC TSG/ALA	87 99	29.836	.000	1.83 -1.61	CP TSG/ALA
	CP TSG/AMA & LC TSG/AMA	74 46	61.565	.000	2.66 -4.28	CP TSG/AMA
CM TSG/AAG & LC TSG/AAG	CM TSG/AHA LC TSG/AMA	37 54	27.456	.000	2.54 -1.74	CM TSG/AHA
	CM TSG/ALA LC TSG/ALA	119 99	76.579	.000	2.37 -2.84	CM TSG/ALA
	CM TSG/AMA LC TSG/AMA	37 46	18.414	.000	2.45 -1.97	CM TSG/AMA

It can be seen from Table 403AII that all the F ratios for the comparisons between the experimental treatments and the control method are perfectly significant at the one degree of freedom. Moreover, all the significant differences are in favour of the experimental treatments meaning that among High, Low, and Mixed Ability groups of learners, the experimental treatments significantly improved the learners performances more than the control method.

One problem emerged from our observation of the High Cognitive Levels performances of the learners, namely , the extent of differences in the effectiveness of the experimental treatments. This problem was investigated by undertaking a comparison of both Cooperative and Competitive strategies using the ANCOVA test. The result of this analysis is presented on Table 403 B1.

TABLE 403 B1 : ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY ABILITY GROUPS (HIGH, LOW, MIXED) 'GENDER HOMOGENIZED' UNDER THE EXPERIMENTAL STRATEGIES.

GROUP + NO.	VARIABLE	SCORE OBTAIN-ABLE	GRAND MEAN	SUM OF SQUARES	DF	MEAN SQUARE	F RATIO	SIGN OF F
	LCL	18	12.835					
CPTSG 35 AHA								
87 ALA								
74 AMA								
CMTSG 37 AHA								
119 ALA								
37 AMA								
46 AMA								
MAIN EFFECTS				401.233	5	80.247	13.922	0.0
COVARIATES				110.423	1	110.423	19.158	.000
EXPLAINED				511.656	6	85.276	14.795	0.0
RESIDUAL				2201.814	382	5.7644		
TOTAL				2713.47	388	6.993		
	HCL	32	18.288					
CPTSG AHA								
ALA								
AMA								
CMTSG AHA								
ALA								
AMA								
MAIN EFFECTS				2107.343	5	421.469	37.812	0.0
COVARIATES				1484.422	1	1484.422	133.173	.000
EXPLAINED				3591.764	6	598.627	33.705	0.0
RESIDUAL				4257.989	382	11.147		
TOTAL				7849.753	388	20.231		

TABLE 403 BI: MULTIPLE CLASSIFICATION ANALYSIS (MCA)				
GROUP +NOS	UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS+ COVARIATES DEVIATION	BETA
LCL				
CPTSG 35AHA	.91		.10	
87 ALA	-1.32		-.91	
74 AMA	.57		.47	
CMTSG 37 AHA	1.35		.78	
119 ALA	-.57		-.30	
37 AMA	1.57		1.27	
		0.38		.26
			R^2	.189
			R	.434
HCL				
CPTSG AHA	2.17		-.89	
ALA	-3.09		-2.04	
AMA	2.70		2.79	
CMTSG AHA	2.87		.10	
ALA	-1.33		.01	
AMA	1.23		-.03	
		0.52		.35
			R^2	.458
			R	.676

It could be observed from Table 403 B1 that at the Low Cognitive Levels, although the detailed differences between the performances of the experimental treatments as given by the MCA values seem not significant, the Competitive strategy proved more suitable than the Cooperative strategy in all the three ability groups of learners.

At the High Cognitive Levels, the differences in the performances between the experimental treatments are summarily given as significant by the Main Effects' F =37.812 at 0.0 level of significance while beta weight is .35.

The MCA values on the table convey the information that whereas the Competitive strategy proved more suitable than the Cooperative strategy in its ability to improve learners performances in relation to High and Low Ability groups of learners, the Cooperative strategy proved more appropriate than the Competitive strategy among Mixed Ability group of learners.

In the order of performance within each strategy, it is Mixed, High, Low Ability groups of learners under Cooperative while the order is reversed under Competitive: High, Low, Mixed ability groups of learners.

To eliminate the error of imprecision if one was to merely interpret the differences in the MCA values, a Pair-wise ANCOVA test was undertaken for the corresponding variables of the two experimental treatments and the variables within each treatment. The result of this further analysis is presented on Table 403 BII.

TABLE 403 BII : PAIR-WISE ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY ABILITY GROUPS (HIGH, LOW, MIXED) 'GENDER HOMOGENIZED' BETWEEN & WITHIN THE EXPERIMENTAL TREATMENTS.

GROUP	PAIR	NOS IN PAIR	F OF PAIR	SIGN LEVEL	ADJUSTED MCA VALUES	SIGN IN FAVOUR OF
CPATSG/AAG & CMATSG/AAG	CPATSG/AHA & CMATSG/AHA	35 37	1.060	.307	-.54 .52	NOT SIGNIFICANT
	CPATSG/ALA & CMATSG/ALA	87 119	12.587	.000	-1.16 .85	CM ATSG/ALA
	CPATSG/AMA & CMATSG/AMA	74 377	5.126	.026	.97 -1.94	CP ATSG/AMA
WITHIN CP ATSG/AAG	AHA & ALA	35 87	81.986	.000	-04 -.02	AHA
	AHA & AMA	35 74	0.788	.377	-2.48 1.18	NOT SIGNIFICANT
	ALA & AMA	87 74	148.542	.000	-2.23 2.62	AMA
WITHIN CM ATSG/AAG	AHA & ALA	37 119	37.354	.000	1.23 -.38	AHA
	AHA & AMA	37 37	4.537	.037	-.24 .24	AMA
	ALA & AMA	119 37	12.596	.001	-.01 .03	AMA

It could be observed from Table 403 BII that the difference in the performances of the High Ability group of learners between the two strategies is not significant. On the other hand, whereas the difference between Low Ability group of learners' performances is significant in favour of Competitive strategy, that between Mixed Ability group of learners is significant in favour of Cooperative strategy.

Within each strategy, the comparison between High and Low Ability groups of learners' performances is significant in favour of High Ability group of learners and the comparison between Low and Mixed Ability groups of learners' performances is significant in favour of Mixed Ability groups of learners although the difference between High and Mixed Ability groups of learners' performances improved better than the former within Cooperative strategy.

Within Competitive strategy, all the comparisons are significant in favour of High and Mixed Ability groups of learners' performances. Nevertheless, Mixed Ability group of learners still significantly out-performed High Ability group of learners.

Table 403 AII also provides the test of hypothesis 3A which states that there will be no significant variations among the performances of the experimental and control groups of the learners, gender homogenized, along ability levels at the High Cognitive Levels. The evidence from this table is that at the .05 level of significance with one degree of freedom for each comparison, all the ability groups of learners performances under the experimental treatments significantly improved more than those under control method. Hypothesis 3 A is therefore rejected.

Table 403BII on its part, provides the test of hypothesis 3B which states that there will be no significant ability group variations among the performances of the gender homogenized learners under the experimental strategies, at the high cognitive levels. The evidence from this table is that at the .05 level of significance with one degree of freedom for each comparison, High and Mixed Ability groups of learners' performances significantly improved more than Low Ability group of learners under Cooperative strategy. The situation is the same under Competitive strategy's intra-comparisons. Hypothesis 3B is rejected as a result.

4.4 Problem 4A

The problem was to measure the interactive effects of Cooperative and Competitive teaching strategies on gender and ability levels of learners, at the High Cognitive Levels.

A 2x3x3 Analysis of Covariance (ANCOVA) test was conducted on the outcomes of learners' performances. The results of the analysis on this problem are presented on tables 404 AI & II.

TABLE 404AI : 2X3X3 ANALYSIS OF COVARIANCE TEST OF THE EXPERIMENTAL TREATMENTS ON GENDER & ABILITY LEVELS AT THE LOW COGNITIVE LEVELS.

GROUP + NO.	VARIABLE	SCORE OBTAIN-ABLE	GRAND MEAN	SUM OF SQUARES	DF	MEAN SQUARE	F RATIO	SIGN. OF F
	LCL	18	12.84					
MAIN EFFECTS				500.256	5	100.051	19.709	0.0
TREATMENTS (TRT)				37.437	1	37.437	7.375	.007
TYPE OF SCHOOL BY GENDER (TSG)				102.216	2	51.108	10.068	.000
ABILITY GROUPS (AG)				433.219	2	216.609	42.669	0.0
COVARIATES				169.121	1	169.121	33.315	.000
2- WAY INTER ACTIONS				107.805	8	13.476	2.655	.008
TRT & TSG				104.535	2	52.267	10.296	.000
TRT & AG				1.213	2	.606	.119	.887
TSG & AG				3.054	4	.763	.150	.963
3-WAY INTER-ACTIONS				57.992	4	14.498	2856	.024
TRT & TSG & AG				57.992	4	14.498	2.856	0.24
EXPLAINED				835.174	18	46.399	9.140	0.0
RESIDUAL				1878.297	370	5.076		
TOTAL				2713.470	388	6.993		

TABLE 404AI: MULTIPLE CLASSIFICATION ANALYSIS (MCA)							
GROUP + NO.		UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS DEVIATION	BETA	ADJUSTED FOR INDEPENDENTS +COVARIATES DEVIATION	BETA
TRT	NO						
CP	196	.21		-.32		-.25	
CM	193	.21		.32		.25	
TOTAL	= 389		.08		.12		.09
TSG	NO						
ML	124	.46		.75		.91	
FL	126	.03		-.57		.85	
MX	139	-.44		-.16		-.04	
TOTAL	389		.14		.21		.27
AG	NO						
HA	72	1.14		1.39		.66	
LA	206	-.88		-1.09		-.73	
MA	111	.90		1.11		.92	
TOTAL	= 389		.36		.44		.29
						MR=	.497
						MR^2=	.247

$MR = .497$; $MR^2 = .247$

TABLE 404AII : 2X3X3 ANALYSIS OF COVARIANCE TEST OF THE EXPERIMENTAL TREATMENTS ON GENDER & ABILITY LEVELS AT THE HIGH COGNITIVE LEVELS.

GROUP + NO.	VARIABLE	SCORE OBTAINABLE	GRAND MEAN	SUM OF SQUARES	DF	MEAN SQUARE	F RATIO	SIGN. OF F
	LCL	32	18.29					
MAIN EFFECTS				2122.392	5	424.578	42.483	0.0
TREATMENTS (TRT)				39.399	1	39.399	3.943	0.048
TYPE OF SCHOOL BY GENDER (TSG)				188.465	2	94..233	9.430	.000
ABILITY GROUPS (AG)				1514.121	2	757.061	75.761	0.0
COVARIATES				1207.735	1	1207.735	120.862	.000
2- WAY INTER-ACTIONS				637.668	8	79.709	7.977	0.0
TRT & TSG				166.231	2	83.116	8.318	.000
TRT & AG				351.117	2	175.558	17.569	.000
TSG & AG				54.979	4	13.745	1.375	0.242
3-WAY INTER-ACTIONS				184.459	4	46.115	4.615	0.001
TRT & TSG & AG				184.459	4	46.115	4.615	0.001
EXPLAINED				4152.453	18	230.692	23.086	0.0
RESIDUAL				3697. 300	370	9.993		
TOTAL				7849.753	388	20.231		

404AII :		MULTIPLE CLASSIFICATION ANALYSIS (MCA)					
GROUP + NO.		UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS DEVIATION	BETA	ADJUSTED FOR INDEPENDENTS +COVARIATES DEVIATION	BETA
TRT	NO						
CP	196	.03		-.33		-.23	
CM	193	-.03		.33		.23	
TOTAL	= 389		.01		.07		.05
TSG	NO						
ML	124	.03		.61		.80	
FL	126	1.58		.44		-.20	
MX	139	-1.45		.94		.53	
TOTAL	389		.28		.16		.13
AG	NO			.2.32			
HA	72	2.53		-2.03		-04	
LA	206	-2.07		2.27		-1.06	
MA	111	2.21				2.00	
TOTAL	= 389		.49		.48		.29
MR = .651; MR^2 = .424							

From table 404AI (for Low Cognitive Levels) the following can be seen:

(I) There are significant differences in the performances of the learners between and among all the variables within each factor (Treatments , Type of School by Gender and Ability groups).

(ii) The order of differences in the performances of the learners within each factor from highest to lowest is Ability groups, followed by Type of School by Gender, and Treatments last.

(iii) Two out of the four interactions are significant, namely, Treatments and Type of School by Gender and the three way interaction : Treatments and Type of school by gender and Ability groups.

(iv) Treatments and Type of School by Gender has the highest F ratio and significance level out of all the interactions.

At the High Cognitive Levels (from Table 404AII), the following could be observed:

(i) There are significant differences in the performances of the learners between and among all the variables within each factor (Main Effects' Fs are: 3.943, 9.430, 75.761 at .048,.000,0.0 levels of significance for Treatments, Type of School by Gender, and Ability levels of learners respectively)

(ii) Ability Groups of learners' F ratio is the highest followed by Type of School by Gender, and the least is Treatments showing the extent of the differences in the performances of learners within the variables under each factor.

(iii) Three out of the four interactions are significant (Treatments and Type of School by Gender: F = 8.318 at .000 level of significance; Treatments and Ability groups: F = 17.569 at .000 level of significance; the three way interaction: Treatments and Type of School by Gender and Ability Groups of learners: F = 4.615 at .001 level of significance).

(iv) The interaction with the highest F ratio is markedly Treatments and Ability Groups of learners. It suggests that learners Ability levels are more important than Gender in relation to teaching strategies. This factor is only averagely followed by the other: Treatments and Type of school by Gender.

(v) The non-significance of the interaction of the two intervening variables (Type of School by Gender and Ability Groups of learners) suggests that the variables (intervening) cannot be independent of teaching strategies. This as... ...eems justified by the highly significant level of the three-way interaction.

Table 404 AII also provides the test of hypothesis 4A which states that there will be no significant variations among the inter-active effects of Cooperative and Competitive teaching strategies on gender and ability levels of learners, at the high cognitive levels.

The evidence from this table on the above mentioned factors is that at the .05 level of significance, there are significant variations in both of them: either the two strategies with Gender or Ability Groups or the two strategies interacting with both Gender and Ability Groups of learners. Hypothesis 4A is therefore rejected.

Problem 4B

The problem was to ascertain whether combining Lecture Method with Cooperative and Competitive teaching strategies will reduce learners performances (measure the interactive effects of the combination of all the treatments: Cooperative, Competitive, and Lecture, in a teaching situation).

A 3X 3 X 3 Analysis of Covariance test was conducted on the outcomes of the learner's performances. The results of the analysis on this problem are presented on tables 404B I&II.

TABLE 404BI: 3X3X3 ANALYSIS OF COVARIANCE TEST OF THE COMBINATION OF ALL THE TREATMENTS: COOPERATIVE, COMPETITIVE, AND LECTURE AT THE LOW COGNITIVE LEVELS

GROUP + NO.	VARIABLE	SCORE OBTAIN-ABLE	GRAND MEAN	SUM OF SQUARES	DF	MEAN SQUARE	F RATIO	SIGN OF F
	LCL	18	12.145					
MAIN EFFECTS				1063.453	6	177.242	29.293	0.0
TREATMENTS + CONTROL (TRT + C)				598.700	2	299.350	49.474	0.0
TYPE OF SCHOOL BY GENDER (TSG)				18.979	2	9.489	1.568	.209
ABILITY GROUPS (AG)				470.117	2	235.058	38.848	0.0
COVARIATES				158.554	1	158.554	26.204	.000
2 WAY INTERACTIONS				319.070	12	26.589	4.394	.000
TRT + C & TSG				276.391	4	69.098	11.420	0.0
TRT + C & AG				8.493	4	2.123	.351	.843
TSG & AG				11.411	4	2.853	.471	.575
3 WAY INTERACTIONS				65.237	8	8.155	1.348	.217
TRT + C & TSG & AG				65.237	8	8.155	1.348	.217
EXPLAINED				1606.314	27	59.493	9.832	0.0
RESIDUAL				3388.399	560	6.051		
TOTAL				4994.713	587	8.509		

TABLE 404BI:	MULTIPLE CLASSIFICATION ANALYSIS (MCA)						
GROUP + NO.		UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS DEVIATION	BETA	ADJUSTED FOR INDEPENDENTS +COVARIATES DEVIATION	BETA
LCL							
TRT + C CP	NO. 196	0.48		0.34		0.42	
CM	193	0.90		1.06		1.05	
LC	199	-1.35		-1.36		-1.43	
TOTAL	588						
	NO.		0.34		0.35		0.36
ML	175	0.35		0.25		0.33	
FL	199	0.02		0.00		-0.13	
MX	214	-0.3		-0.2		-0.15	
TOTAL	= 588		0.09		0.06		0.07
NO (AG)							
HA	126	0.6		0.77		0.15	
LA	305	-0.8		-0.87		-0.53	
MA	157	1.08		1.07		0.92	
TOTAL	= 588	0.29		0.31		0.21	
				R^2	0.213		0.245
				R	0.461		0.495

TABLE 404BII: 3X3X3 ANALYSIS OF COVARIANCE TEST OF THE COMBINATION OF ALL THE TREATMENTS: COOPERATIVE, COMPETITIVE, AND LECTURE, AT THE HIGH COGNITIVE LEVELS.

GROUP + NO.	VARIABLE	SCORE OBTAIN ABLE	GRAND MEAN	SUM OF SQUARES	DF	MEAN SQUARE	F RATIO	SIGN OF F
	HCL	32	16.881					
MAIN EFFECTS				5171.891	6	861.982	63.398	0.0
TREATMENT PLUS CONTROL (TRT +C)				2408.500	2	1204.250	88.571	0.0
TYPE OF SCHOOL BY GENDER (TSG)				130.265	2	65. 133	4.790	.009
ABILITY GROUPS (AG)				2705.431	2	1352.716	99.491	0.0
COVARIATES				1340.826	1	1340.826	98.617	.000
2 WAY INTERACTIONS				746.600	12	62.217	4.576	.000
TRT + C & TSG				218.214	4	54.554	4.012	.003
TRT + C & AG				433.492	4	108.373	7.971	.000
TSG & AG				30.472	4	7.618	.560	.692
3 WAY INTERACTIONS				224.384	8	28.048	2.063	.038
TRT + C & TSG &AG				224.384	8	28.048	2.063	.038
EXPLAINED				7483.701	27	277.174	20.386	0.0
RESIDUAL				7613.966	560	13.596		
TOTAL				15097.667	587	25.720		

TABLE 404BII: MULTIPLE CLASSIFICATION ANALYSIS (MCA)

GROUP + NO.		UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS DEVIATION	BETA	ADJUSTED FOR INDEPENDENTS + COVARIATES DEVIATION	BETA
LCL	NO. TRT + C						
TRT + C CP	NO. 196	1.44		1.17		1.42	
CM	193	1.37		1.73		1.78	
LC	199	-2.75		-2.83		-3.12	
TOTAL	588		0.39		.40		.44
TSG ML	NO. 175	0.78		0.65		0.75	
FL	199	0.15		-0.01		-0.36	
MX	214	-0.78		-0.52		-0.28	
TOTAL	= 588		0.13		0.09		.10
AG	NO.						
HA	126	2.19		2.55		0.51	
LA	305	-2.01		-2.09		-1.04	
MA	157	2.14		2.01		1.61	
TOTAL	588		.41		0.43		.23
			R^2	=	0.343		.431
			R	=	0.585		0.657

From Table 404BI, the following can be seen:

(i) Although the combined effects are on the whole significant, one is not significant: Type of School by Gender, the other two: Treatments plus Control (combination of all the Treatments) and learners Ability Groups are significant.

(ii) The combined Treatments F ratio is the highest followed by that of Ability Groups of learners while that of Type of School by Gender is the least.

(iii) One only, out of the four interactions (combined Treatments and Type of School by Gender) is significant; consequently, it has the highest F ratio.

(iv) The three-way interaction is not significant.

At the High Cognitive Levels (from Table 404BII), the following could be observed:

(i) There are significant differences in the performances of the learners between and among all the variables within each factor (individual Main Effects are: 88.571, 4.790, and 99.491 at 0.0, .009, and 0.0 levels of significance for combined Treatments, Type of School by Gender, and Ability Groups respectively).

(ii) Ability Groups of learners F ratio is the highest followed by combined Treatments while that of Type of School by Gender is the least, indicating the extent of variations in the performances of the learners within the variables under each factor.

(iii) Three out of the four interactions are significant (combined Treatments: Treatments plus Control and Type of school by gender: F = 4.012 at .003 level of significance; Treatments plus control and Ability groups of learners : F= 7.971 at .000 level of significance; the three-way interaction: Treatments plus control and Type of School by Gender and Ability Groups of learners: F = 2.036 at .038 level of significance).

(iv) The interaction with the highest F ratio is Treatments plus Control and Ability Groups of learners suggesting that learners Ability levels are more important than Gender with regards to teaching strategies /methods.

(v) The non-significance of the interaction of the two intervening variables (Type of School by Gender and Ability levels of learners) suggests that the two variables cannot significantly function independent of teaching strategies/methods. This reasoning seems supported by the fact that the three-way interaction where these two variables interact with the teaching strategies/method is significant.

(vi) Combining Lecture method with Cooperative and Competitive teaching strategies significantly reduces teaching quality as shown by Main effect F ratios and significance levels of 2 x 3 x 3 compared to the corresponding values of 3x3x3 as well as comparisons of their two Grand Means:

(a) Treatments (Cooperative and Competitive/Lecture)
F = 3.943 at .048 level of significance (2x3x3): 5 cases in one hundred
F = 88.571 at 0.0 level of significance (3 x 3 x3): 0 case in one thousand (marked difference in favour of 2 x 3 x 3: Lecture method un-added).

(b) Grand Means
18.29 (2 x 3 x 3)
16.881 (3 x 3 x 3)

If we recall the standard deviations of each (from descriptive statistics), we have 4.50 and 4.67 respectively. This comparison gives us a T - value of 9.93 with a degree of freedom of 975. The table value is 3.291 at .001 level of significance implying that the calculated/obtained T-value is highly significant.

Table 404BII also provides the test of hypothesis 4B which states that combining Lecture method with Cooperative and Competitive strategies will not significantly reduce teaching quality (learners' performances). The evidence from this table is that at the .05 level of significance, combining Lecture method with Cooperative and Competitive teaching strategies significantly reduces teaching quality or learners performances. Hypothesis 4B is accordingly rejected.

4.5.1 Problem 5A

The next problem was to measure the proportions of the learners' performances at the High Cognitive Levels at 60, 50, and 40 percentages and above levels.

Chi-Square (X^2) Test was conducted on the outcomes of the learners' performances which were grouped under Cooperative and Competitive teaching strategies and Lecture method. The results of this analysis are presented on Tables 405A & B.

TABLE 405 AI - IX: SUMMARIES OF X^2 CALCULATIONS BETWEEN THE EXPERIMENTAL GROUPS(COOPERATIVE AND COMPETITIVE (CP & CM RESPECTIVELY) AND THE CONTROL GROUP (LC) AT THE COMBINATION OF THE LOW COGNITIVE LEVELS (LCL).

GROUP PLUS NO.	CHI-SQUARE (X^2)	SIGNIFICANCE LEVEL	CONTINGENCY COEFFICIENT(CC)	PERCEN-TAGE	PERCENTAGE DIFFERENCE	TABLE NO
LCL AT 60(SCORES OF 11 TO 18)						
CP+CM 389 LC 199	35.326	..0000	.24	80.7 57.3	23.4	I
CP 196 LC 199	22.818	.0000	.24	80.1 57.3	22.8	II
CM 193 LC 199	25.465	.0000	.25	81.3 57.3	24.0	III
LCL AT 50 (SCORES OF 9 TO 18)						
CP+CM 389 LC 1 99	36.478	.0000	.25	93.3 75.4	17.9	IV
CP 196 LC 199	21.222	.0000	.23	92.9 75.4	17.5	V
CM 193 LC 199	23.879	.0000	.25	93.8 75.4	18.4	VI
LCL AT 40 (SCORES OF 7 TO 18)						
CP+CM 389 LC 199	15.197	.0001	.17	97.9 90.5	7.4	VII
CP 196 LC 199	8.825	.0030	.16	98.0 90.5	7.5	VIII
CM 193 LC 199	8.605	.0034	.16	97.9 90.5	7.4	IX

NOTE: CRITICAL VALUE IS 3.841 AT ONE DEGREE OF FREEDOM

TABLE 405 BI - IX: SUMMARIES OF X^2 CALCULATIONS BETWEEN THE EXPERIMENTAL GROUPS COOPERATIVE AND COMPETITIVE: CP & CM RESPECTIVELY AND THE CONTROL GROUP LC AT THE COMBINATION OF THE HIGH COGNITIVE LEVELS (HCL).

GROUP PLUS NO.	CHI-SQUARE (X^2)	SIGNIFICANCE LEVEL	CONTINGENCY COEFFICIENT(CC)	PERCENTAGE	PERCENTAGE DIFFERENCE	TABLE NO.
HCL AT 60(SCORES OF 19 TO 32)						
CP+CM 389 LC 199	42.120	.0000	.26	48.6 20.6	28.0	I
CP 196 LC 199	37.304	.0000	.30	50.5 20.6	29.9	II
CM 193 LC 199	28.675	.0000	.27	46.6 20.6	26.0	III
HCL AT 50 (SCORES OF 16 TO 32)						
CP+CM 389 LC 199	57.039	.0000	.30	71.7 39.2	32.5	IV
CP 196 LC 199	33.829	.0000	.29	76.9 39.2	29.7	V
CM 193 LC 199	48.604	.0000	.34	74.6 39.2	35.4	VI
HCL AT 40% (SCORES OF 13 TO 32)						
CP+CM 389 LC 199	63.897	.0000	.32	87.7 58.3	29.4	VII
CP 196 LC 199	36.967	.0000	.30	86.2 58.3	27.9	VIII
CM 193 LC 199	46.201	.0000	.33	89.1 58.3	30.8	IX

* THE MOST DIRECTLY RELEVANT TABLES

From Table 405AI for 60%, we can see that the comparison between the combined experimental treatments and the control method yields a X^2 value of considerable significance in favour of the combined experimental treatments. Similar situations are observable on Tables 405A IV (for 50% and above level) and 405 AVII (for 40% and above levels). The implication is that at each level, the combined experimental treatments proved significantly more effective than the control method.

At the High Cognitive Levels on Table 405BI, at 60% and above level, the comparison between the combined experimental treatments and the control method is significant in favour of the experimental treatments ($X^2 = 42.120$ at .0000 level of significance). The strength of the association is 26% (cc=.26) while the percentage difference is 28 in favour of the experimental treatments. This result shows that the experimental Treatments significantly proved more effective than the control method at this 60% and above level.

On Table 405BIV (for 50% and above level), the situation is similar to that of 60% and above level: the experimental treatments significantly helped the learners to perform better than the control method: (x^2=57.039 at .0000 level of significance). The strength of the relation is

30% (cc= .30) while the percentage difference in favour of the experimental treatments is 32.5.

At 40% and above level (on Table 405BVII), the experimental treatments are still observed as more suitable than the control method (X^2=63.897 at .000 level of significance). The magnitude of the association is 32% (cc= .32) and the percentage difference to the credit of the experimental treatments is 29.4.

It should be noted that the degree of freedom for any of the above tables is one (1) and the critical value at .05 is 3.841 only.

4.5.2. Problem 5B

We note that on Tables 405BI - IX, at 60, 50, and 40 (percentage) levels, we have 48.6, 71.7, and 87.7 percentages respectively for the proportions of the learners who did well at the High Cognitive Levels. But this picture was devoid of clarity in relation to Ability group of learners which was identified as the most influential intervening variable under Table 404BII. The problem led the researcher to conduct further test (using the raw scores) to determine the proportions of the learners' performances in relation to Ability groups of learners. The results of this analysis are presented on Tables 405CI - VIII and Graphs 405AI & II; Graphs 405BI & II.

TABLES 405ICI-VIII: PROPORTIONS OF THE LEARNERS' PERFORMANCES IN ABILITY GROUPS UNDER COOPERATIVE AND COMPETITIVE STRATEGIES (DISCRIMINATELY: EXCLUDING LOW ABILITY GROUPS OF LEARNERS WHO FAILED TO ENTER HIGH ABILITY GROUPS OF LEARNERS FROM BOTH LOW & MIXED GROUPS).

(A) Co-operative Treatment
Learners movement

(1) From HA to significantly HA

(a) At combination of LCL & HCL
= $^{15}/_{35}$ = 42.86% I

(b) At HCL
= $^{15}/_{35}$ = 42.86%

LCL+HCL	HCL
42.86%	42.86%

(ii) HA from MA to significantly HA

(a) At combination of LCL & HCL
= $^{27}/_{30}$ = 90.00% II

(b) At HCL
= $^{27}/_{30}$ = 90.00%

LCL+HCL	HCL
90.00%	90.00%

(iii) LA from MA to HA

(a) At combination of LCL & HCL
$= {}^{42}/_{44} = 95.5\%$

(b) At HCL = 77.3%

III

LCL+HCL	HCL
95.5%	77.3%

(iv) LA from LA to HA

(a) At combination of LCL & HCL
$= {}^{58}/_{87} = 66.67\%$

(b) At HCL = 37/87 = 42.53%

IV

LCL+HCL	HCL
66.67%	42.53%

(B) **Competitive Treatment**
Learners movement

(i) From HA to significantly HA

(a) At combination of LCL & HCL
$= {}^{29}/_{37} = 78.4\%$

(b) At HCL
$= {}^{29}/_{37} = 78.4\%$

V

LCL+HCL	HCL
78.4%	78.4%

(ii) HA from MA to significantly HA

(a) At combination of LCL & HCL
$= {}^{15}/_{17} = 88.24\%$

(b) At HCL
$= {}^{15}/_{17} = 88.24\%$

VI

LCL+HCL	HCL
88.24%	88.24%

(iii) LA from MA to HA

(a) At combination of LCL & HCL
$= {}^{16}/_{20} = 80.0\%$

(b) At HCL
$= {}^{15}/_{20} = 75.0\%$

VII

LCL+HCL	HCL
80.0%	75.0%

(iv) LA from LA to HA

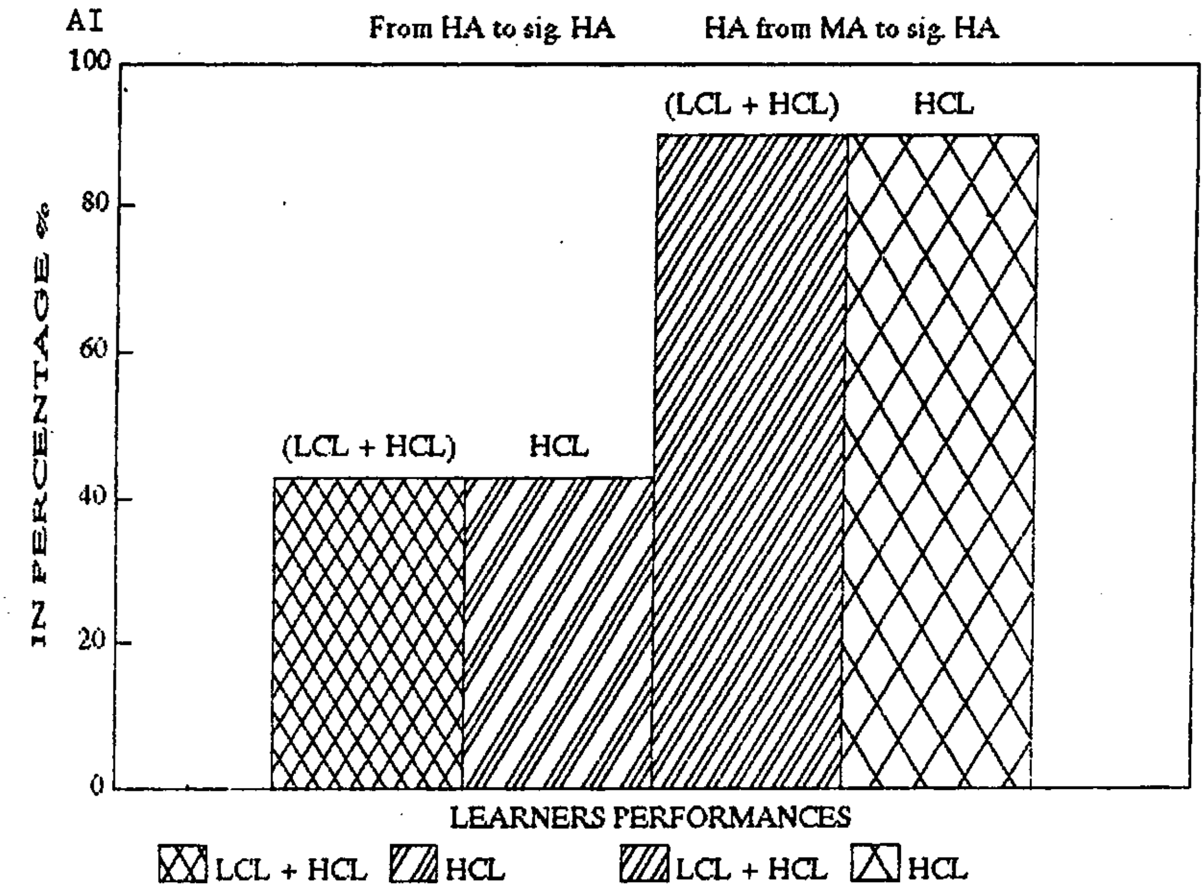
(a) At combination of LCL & HCL
$= {}^{90}/_{119} = 75.6\%$

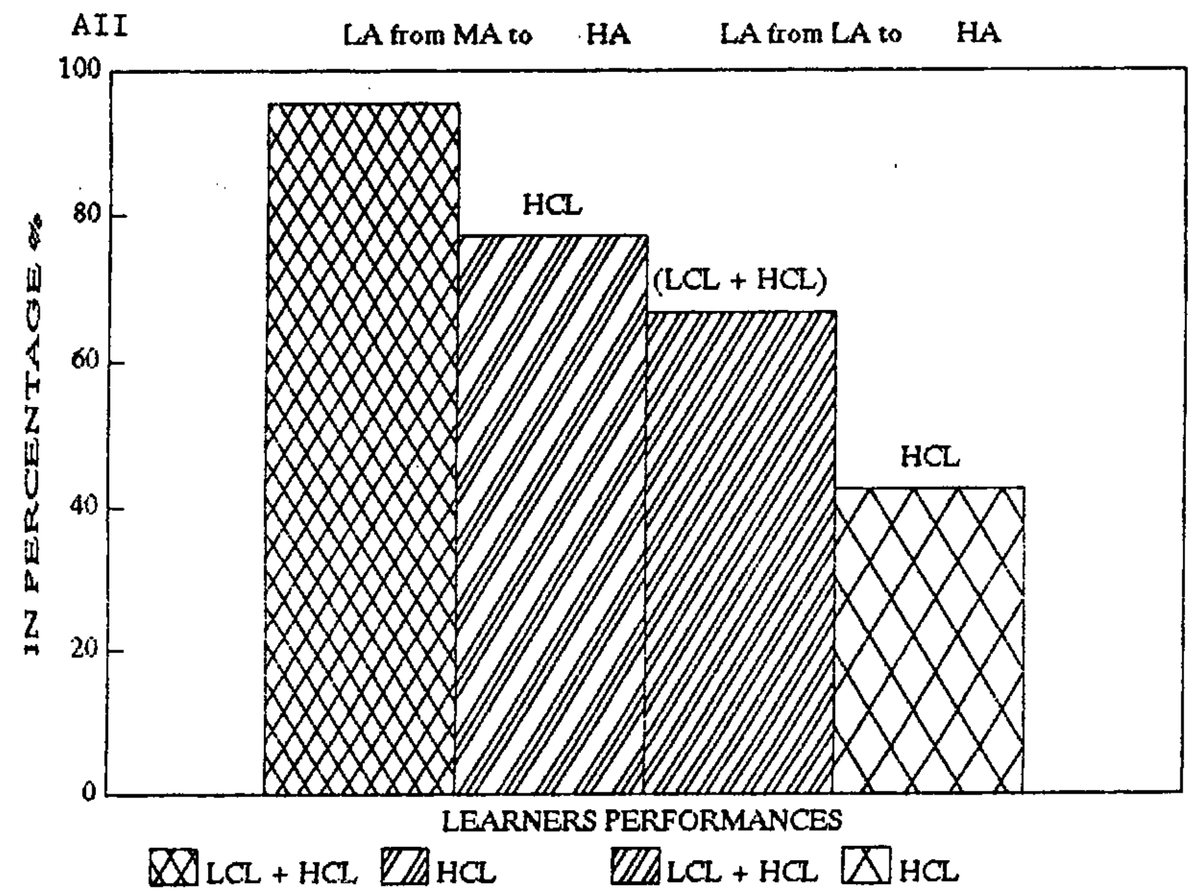
(b) At HCL = 84/119 = 70.6%

VIII

LCL+HCL	HCL
75.6%	70.6%

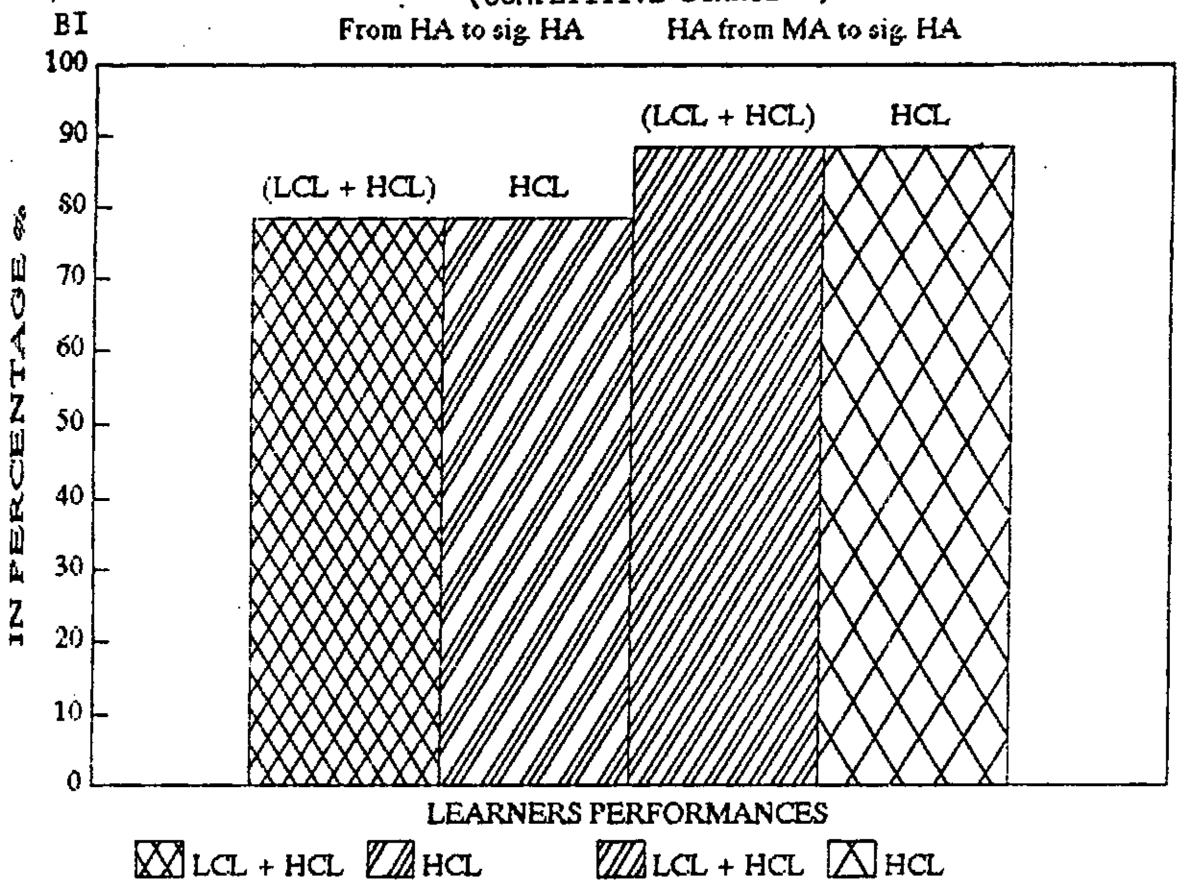
GRAPH 405A: THE LEARNERS PERFORMANCES ALONG ABILITY LEVELS (COOPERATIVE STRATEGY)

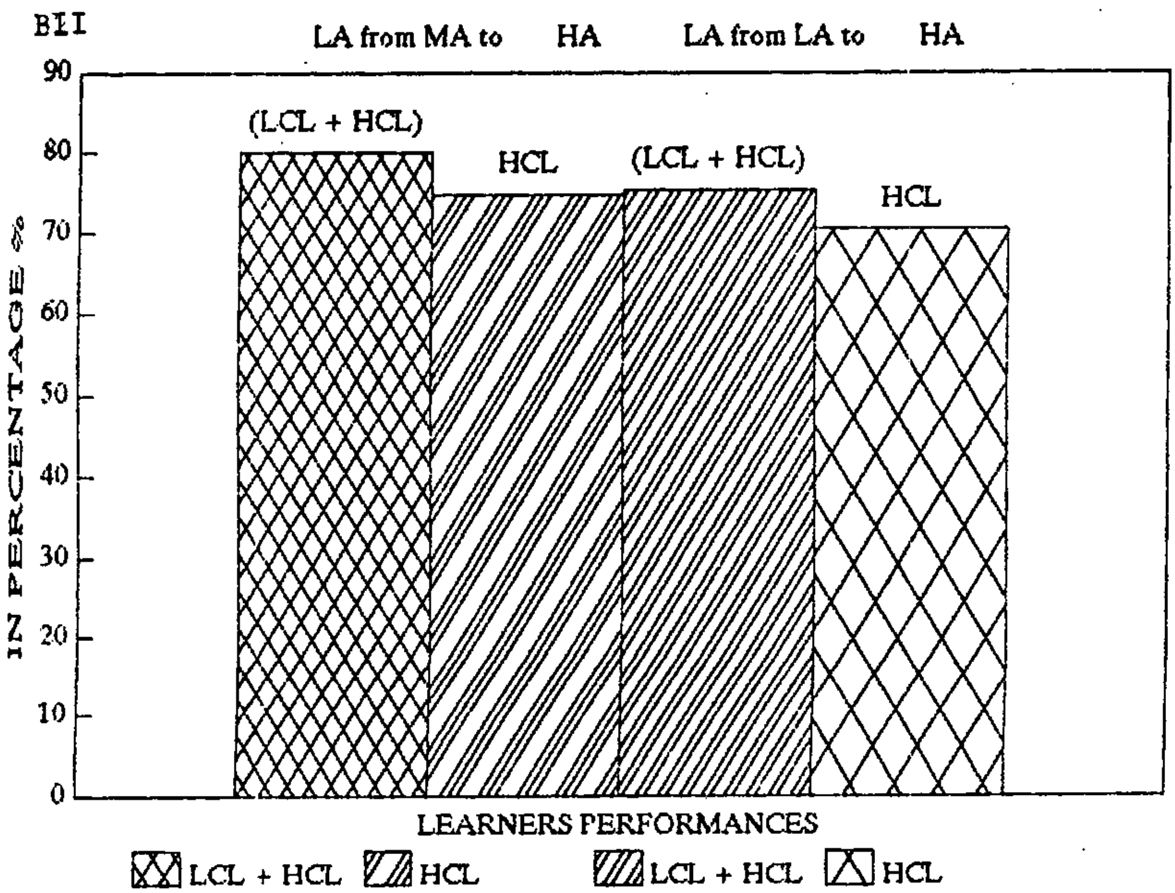




NOTE: Performances of the Low Ability group of learners who although might have significantly gained but failed to enter High Ability group from both Low and Mixed Ability groups are excluded in this analysis.

GRAPH 405B: THE LEARNERS PERFORMANCES ALONG ABILITY LEVELS (COMPETITIVE STRATEGY)





NOTE: Performances of the Low Ability group of learners who although might have significantly gained but failed to enter High Ability group from both Low and Mixed Ability groups are excluded in this analysis.

On Tables 405C I-VIII, the following can be seen:

(i) The percentages of the High Ability groups of learners which significantly gained from the experiment from the pure High Ability group of learners, at the High Cognitive Levels are 42.86 and 78.4 for Cooperative and Competitive strategies respectively.

(ii) The percentages of the High Ability group of learners which significantly gained from the Mixed Ability group of learners, at the High Cognitive Levels are 90.0 and 88.24 for Cooperative and Competitive strategies respectively.

(iii) The percentages of the Low Ability group of learners which significantly gained from the Mixed Ability group of learners, at the High Cognitive Levels are 77.3 and 75.0 for Cooperative and Competitive strategies respectively.

(iv) The percentages of the Low Ability group of learners which significantly gained from the pure Low Ability group of learners, at the High Cognitive Levels are 42.53 and 70.6 for Cooperative and Competitive strategies respectively.

Tables 405C I-VIII are further simplified by representing them in Graphs 405 AI & II; 405 BI & II.

The summary picture from these tables and graphs is that whereas Cooperative strategy is more appropriate than Competitive strategy for Mixed Ability group of learners, the former strategy seems not very effective for separate High and Low Ability groups of learners. On the other hand, Competitive strategy is generally (moderately) effective for all Ability groups of learners: High, Low, and Mixed, all at the High Cognitive Levels.

Table 405B also provides the test of hypothesis 5 which states that there will be no significant variations among the grades of the learners at 60, 50 and 40 (each and above) percentage levels, at the High Cognitive Levels.

The evidences from these tables are that at .05 significance level at one degree of freedom, at each of the identified levels, the experimental treatments significantly improved the performances of the learners more than the control method since all the calculated X^2 values several times exceed the critical value; hypothesis 5 is rejected therefore.

4.6.1 Problem 6A

The problem was to ascertain the effects of intervening/sub-independent variables on learners' performances.

Step-Wise Multiple Regression Test was conducted on the outcomes of learners' performances on the experimental treatments separately for clarity. The results of the analysis on this problem are presented on Tables 406A I&II.

TABLE 406AI & AII:
STEP-WISE MULTIPLE REGRESSION OF THE EXPERIMENTAL GROUPS: COOPERATIVE AND COMPETITIVE USING THE POST TEST SCORES TO SHOW INFLUENCES OF SUB-INDEPENDENT (INTER-VENING) VARIABLES:

(i) Abilities of Teachers

(ii) School Status of Learners

(iii) Type of School by Gender

(iv) Ability levels of learners

(v) Learners Parents' Academic Backgrounds

(vi) Learners Parents' Occupations

ON THE DEPENDENT VARIABLES

B:	Information/Recall	)	Low Cognitive
C:	Comprehension	)	Levels
D:	Application	)	
E:	Analysis	)	High
F:	Synthesis	)	Cognitive
G:	Evaluation	)	Levels

LCL: Combination of B & C: (Low Cognitive Levels)

HCL: Combination D, E, F, & G: (High Cognitive Levels)

TABLE 406 AI: EXPERIMENTAL GROUP I: COOPERATIVE (CP)

STEP	MR	MR²	F (Eqn)	SIGN. OF F	SUB-INDEPENDENT VARIABLE	BETAIN
DEPENDENT VARIABLE B: INFORMATION						
1	0.184	0.03	6.78	0.01	PARENTS' QUALIFICATIONS	0.1838
DEPENDENT VARIABLE C: COMPREHENSION						
NO. VARIABLES ENTERED/RETURNED FOR THIS BLOCK END BLOCK NO 1 PIN=.050 LIMITS REACHED (NOTHING SIGNIFICANT)						
DEPENDENT VARIABLE D: APPLICATION						
1	0.173	0.03	6.01	0.015	TYPE OF SCHOOL BY GENDER	0.1733
2	0.232	0.05	5.504	0.005	TEACHERS' ABILITIES	0.1554
DEPENDENT VARIABLE E: ANALYSIS						
1	0.165	0.03	5.402	0.021	TEACHERS' ABILITIES	0.1646
DEPENDENT VARIABLE F: SYNTHESIS						
1	0.141	0.02	3.95	0.048	TYPE OF SCHOOL BY GENDER	-0.1413
DEPENDENT VARIABLE G: EVALUATION						
1	0.389	0.152	34.645	.000	PARENTS' QUALIFICATIONS	0.3893
2	0.455	0.207	25.248	0.0	ABILITY LEVELS OF LEARNERS	0.2368
3	0.502	0.252	21.578	0.0	TEACHERS' ABILITIES	0.2336
4	0.523	0.273	17.93	0.0	PARENTS' OCCUPATIONS	0.1788
5	0.539	0.29	15.516	0.0	LEARNERS' AGE	-0.1516
6	0.534	0.285	19.01	0.0	PARENTS' QUALIFICATIONS	_
DEPENDENT VARIABLE LCL: LOW COGNITIVE LEVELS' COMBINATIONS SAME AS C ABOVE						
DEPENDENT VARIABLE HCL: HIGH COGNITIVE LEVELS COMBINATION						
1	0.299	0.09	19.028	.000	PARENTS' QUALIFICATIONS	0.2989
2	0.343	0.118	12.896	.000	LEARNERS' ABILITIES	0.1693
3	0.38	0.144	10.794	.000	LEARNERS' AGE	-0.1784
4	0.407	0.166	9.469	.000	PARENTS' OCCUPATION	0.1827
5	0.401	0.161	12.249	.000	PARENTS' QUALIFICATIONS	_
6	.4222	.1782	10.356	..000	TEACHERS' ABILITIES	.1473

TABLE 406 AII: STEP-WISE MULTIPLE REGRESSION OF EXPERIMENTAL GROUP II: COMPETITIVE (CM)

STEP	MR	MR^2	F (Eqn)	SIGN. OF F	SUB-INDEPENDENT VARIABLE	BETAIN
DEPENDENT VARIABLE B: INFORMATION						
1	0.2386	0.0569	11.530	.001	TEACHERS' ABILITIES	-2.386
2	0.3099	0.0961	10.096	.000	TYPE OF SCHOOL BY GENDER	-.1979
DEPENDENT VARIABLE C: COMPREHENSION						
1	0.2875	0.0827	17.211	.000	TYPE OF SCHOOL BY GENDER	-.2875
2	0.3299	0.1089	11.605	.000	TEACHERS' ABILITIES	.1619
DEPENDENT VARIABLE D: APPLICATION						
1	0.2523	0.0637	12.989	.000	TEACHERS' ABILITIES	-.2523
2	0.3212	0.1031	10.926	.000	TYPE OF SCHOOL BY GENDER	-.1987
DEPENDENT VARIABLE E: ANALYSIS NO VARIABLES ENTERED/REMOVED FOR THIS BLOCK END BLOCK NO. 1 PIN = 050 LIMITS REACHED (NOTHING SIGNIFICANT)						
DEPENDENT VARIABLE F: SYNTHESIS						
1	.3403	.1158	25.018	.000	TYPE OF SCHOOL BY GENDER	-.3403
DEPENDENT VARIABLE G: EVALUATION						
1	.2154	.0464	9.290	0.003	TYPE OF SCHOOL BY GENDER	-.2154
2	.2775	.0770	7.926	.000	TEACHERS' ABILITIES	-.175
DEPENDENT VARIABLE LCL: LOW COGNITIVE LEVELS COMBINATION						
1	.2897	.0839	17.500	.000	TYPE OF SCHOOL BY GENDER	-.2897
DEPENDENT VARIABLE HCL: HIGH COGNITIVE LEVELS 'COMBINATION						
1	.2836	.0804	16.710	.000	TYPE OF SCHOOL BY GENDER	-.2836
2	.3644	.1328	14.543	.000	TEACHERS' ABILITIES	-.2287

On Table 406 AI (for Cooperative strategy), the following can be deduced:

i) Parents' qualifications significantly affected the learners' performances to the tune of 03% ($R^2 = .0338$; F (Eqn) = 6.780 at .010 level of significance) at Information level.

ii) At Comprehension level, no variable significantly affected the learners' performances.

iii) At Application level, two variables: Type of School by Gender and Teachers' Abilities significantly affected the learners' performances. The respective percentages are 04 and 05.

iv) At Analysis level, Teachers Abilities contributed 03% (R^2 = .0271) to the learners' performances.

v) Type of School by Gender contributed 02% to the learners' performances at Synthesis level (R^2 = .0200).

vi) Evaluation experienced the most comprehensive effect from six out of the seven variables : Parents' Qualifications, Ability levels of learners, Teachers' abilities, Parents' occupations, Learners' ages, and Parents' qualifications each contributing 15%, 21%, 25%, 27%, 29%, 29% respectively (R^2 =.1515, . 2074, .2521, .2730, .2899, .2848 respectively).

vii) At the combination of the Low Cognitive Levels, there was no significant effect from any variable.

viii) At the combination of the High Cognitive Levels, all the variables under Evaluation are repeated except that there are changes in the order and percentage effects. The order now is: Parents' qualifications, Learners' abilities, Learners' ages, Parents' occupations, Teachers' abilities, contributing 09%, 12%, 14%, 17%, 16%, 18% respectively (R^2 = .0893, .1179, .1443, .1655, .1606, .1782 respectively).

On Table 406AII, the following can be seen with regards to the Competitive treatment:

(i) Teachers' abilities and Type of School by Gender significantly affected the learners' performances by 6% and 10% respectively (their respective R^2 are .0569 and .0961) at Information level.

(ii) At Comprehension level, Type of School by Gender and Teachers' abilities significantly affected the learners' performances with 08% and 11% respectively (their respective R^2 are .0827 and .1089).

(iii) At Application level, Teachers' abilities and Type of School by Gender significantly influenced the learners' performances with 06% and 10% respectively (their respective R^2 are .0637 and .1031).

(iv) No inter-vening variable significantly influenced the learners' performances at Analysis level in this treatment.

(v) Type of School by Gender significantly contributed to the learners' performances with 12% (R^2 = .1158) at Synthesis level.

(vi) Type of School by Gender and Teachers' abilities significantly contributed to the learners' performances at Evaluation level with 05% and 08% respectively (their R^2 are .0464 and .0770).

(vii) Type of School by Gender significantly influenced the learners' performances at the combination of the Low Cognitive Levels by 08% ($R^2 = .0839$).

(viii) Type of School by Gender and Teachers' Abilities significantly affected the learners' performances at the combination of the High Cognitive Levels by 08% and 13% respectively (their R^2 are .0804 and .1328).

We note that under Cooperative treatment, one intervening variable only: Learners' School Status, did not significantly influence the learners' performances.

Under Competitive treatment, two intervening variables only: Teachers' Abilities and Type of School by Gender, almost consistently influenced the learners' performances across the Cognitive Levels; five did not.

Considering the two experimental treatments, one intervening variable only: Learners' School Status, did not significantly influence the learners' performances.

Tables 406AI & II also provide the test of hypothesis 6A which states that Teachers' Abilities, Learners' School Status, Gender, Ability Levels, Ages, Parents' Academic Backgrounds, Parents' Occupations, will not significantly affect learners' performance at the post test. The evidences from these Tables show that at the .05 level of significance, one of the above variables only: Learners' School Status, did not significantly affect the learners' performances at the post test; six variables did; hypothesis 6A is therefore rejected.

4.6.2. Problem 6B

The problem was to measure the performances of the learners between the High Cognitive Levels.

T-Test was conducted on the out-comes of the learners' performances for the experimental treatments and the results of this analysis are presented on Tables 406 BI, II, III, IV, & V.

TABLE 406BI: COMBINED MEANS AND STANDARD DEVIATIONS OF THE EXPERIMENTAL TREATMENTS WITH THE EFFECTS OF R^2 SUBTRACTED.

COGNITIVE LEVELS		MEAN OF R^2 FROM REGRESSION		MEAN% OF BOTH CP & CM R^2	MEAN SCORES OF CP & CM AT POST TEST	EFFECT OF COMBINED R^2 SUBTRACTED FROM THEIR MEANS	CONVERSION TO EQUAL OBTAINABLE SCORES	MEAN OF ORIGINAL STANDARD DEVIATION	MEAN OF STANDARD DEVIATION AFTER REMOVAL OF R^2 EFFECTS
EACH LEVEL	SCORE OBTAINABLE.	COOPERATIVE	COMPETITIVE						
B	9	4	8	6	7.09	6.67	6.67	1.6	1.50
C	9	0	10	5	5.74	5.45	5.45	1.55	1.47
D	7	4	8	6	3.77	3.54	4.55	1.89	1.78
E	9	3	0	1.5	5.33	5.25	5.25	1.45	1.43
F	7	2	12	7	3.88	3.61	4.64	1.83	1.70
G	9	24	6.5	15	5.37	4.57	4.57	2.20	1.87
LCL	18	0	8	4	12.84	12.33	21.92	4.69	4.50
HCL	32	14	10.5	12	18.29	16.10	16.10 *	4.50	3.96 *

* THE TRUE MEANS AND STANDARD DEVIATION COLUMNS OF COMBINED EXPERIMENTAL GROUPS: COOPERATIVE AND COMPETITIVE (CP & CM RESPECTIVELY)

* D'S MEAN SHOULD HAVE BEEN BETWEEN 5.04 AND 5.30 SO IT WAS .75 ABOVE EXPECTED MEAN. SEVERAL POINTS MAY HELP US EXPLAIN THIS SITUATION.

NOTE

B - INFORMATION/ RECALL
C - COMPREHENSION
D - APPLICATION
E - ANALYSIS
F - SYNTHESIS
G - EVALUATION
LCL - COMBINATION OF B & C (LOW COGNITIVE LEVELS)
HCL - COMBINATION OF D, E, F,& G (HIGH COGNITIVE LEVELS)

TABLE 406BII: T-TEST COMPARISONS OF THE EXPERIMENTAL TREATMENTS' COGNITIVE LEVELS USING THEIR UNINFLUENCED MEANS AND STANDARD DEVIATIONS.

COGNITIVE LEVELS & THEIR COMBINATIONS			T VALUES	DEGREE OF FREEDOM	SIGNIFICANCE LEVELS	REMARK
1	B & C	INFORMATION & COMPREHENSION	9.61	387	0.001	
2	D & E	APPLICATION & ANALYSIS	5.5	387	0.001	
3	D & F	APPLICATION & SYNTHESIS	0.67	387	NS	NOT SIGNIFICANT
4	D & G	APPLICATION & EVALUATION	O.15	387	NS	
5	E & F	ANALYSIS & SYNTHESIS	4.84	387	0.001	
6	E & G	ANALYSIS & EVALUATION	5.27	387	0.001	
7	F & G	SYNTHESIS & EVALUATION	0.52	387	NS	NOT SIGNIFICANT
8	LCL & HCL	LOW COGNITIVE LEVELS & HIGH. COGNITIVE LEVELS	27.74	387	.001	

TABLE 406BIII: UNINFLUENCED MEANS AND STANDARD DEVIATIONS OF THE EXPERIMENTAL TREATMENTS' COGNITIVE LEVELS BASED ON YOLOYE'S MODEL.

COGNITIVE LEVELS & COMBINATIO N	UNINFLUENC ED MEANS	UNINFLUENCED STANDARD DEVIATION	DIVISION INTO HIGH & LOW	FIRST REMARK	LAST REMARK
B	6.67	1.50	LOW	DETAILS OF YOLOYE'S ORDER	INSTRUMENT SCORED 100% BASED ON YOLOYE'S ORDER WHICH WAS BASED ON PRACTICAL EXPERIENCE LIKE THIS
C + D	5.00	1.63	FIRST HIGH		
E+F+G	4.82	1.67	SECOND HIGH		
B	6.67	1.50	LOW		
C+D+E+F+G	4.91	1.65	ALL HIGH		

TABLE 406BIV: EXPERIMENTAL TREATMENTS COGNITIVE LEVELS' COMPARISONS BASED YOLOYE'S MODEL, USING THEIR UNINFLUENCED MEANS & STANDARD DEVIATIONS.

COGNITIVE LEVELS AND THEIR COMBINATIONS		T - VALUES	DEGREE OF FREEDOM	SIGNIFICANCE LEVEL	REMARK
1	B INFORMATION VS C + D COMPR +APPLIC.	13.15	387	.001	
2	B INFORMATION VS E + F + G ANALYSIS + SYNTHESIS+EVALUATION	14.45	387	.001	
3	B INFORMATION VS C+D+E+F+G COMP + APPLIC. + ANAL. + SYNTH. + EVAL.	13.75	387	.001	
4	C+D COMPR.+APPLI. VS E+F+G ANAL.+SYNTH+EVAL.	1.39	387	NS	NOT SIGNIFICANT

TABLE 406BV: EXPERIMENTAL TREATMENTS MODERATED INFLUENCES' ADDED SCORES OF THE LEARNERS AT EACH COGNITIVE LEVEL.

COGNITIVE LEVELS	OBTAINABLE SCORES ON EACH COGNITIVE LEVEL	MEAN SCORES OF CP & CM AT POST TEST	EFFECTS OF COMBINED R^2 SUBTRACTED FROM SCORES	DIFFERENCES	MEAN EFFECT OF LOW AND HIGH COGNITIVE LEVELS	MODE RATED SCORES	CONVERSION TO EQUAL OBTAINABLE SCORES
B	9	7.09	6.67	.42		7.03	7.03
C	9	5.74	5.45	.29	.36	6.10	6.10
D	7	3.77	3.54	.23		3.89	5.00
E	9	5.33	5.25	.08		5.60	5.60
					.35		
F	7	3.88	3.61	.27		3.96	5.09
G	9	5.37	4.57	.80		4.92	4.92

NOTE: THE ORDER AT EVERY LEVEL IS THE SAME AS THE ONE WITHOUT MODERATION BUT THE LATTER BRINGS THE SCORES CLOSER TO THE LEARNERS UNTOUCHED FINAL SCORES SINCE INTER-VENING VARIABLES NORMALLY INFLUENCE LEARNERS' PERFORMANCES

On Table 406BI, we can see that:

(i) the asteriked columns show the uninfluenced means and standard deviations of the combined experimental treatments; it was considered necessary to remove the R^2 effects before serious considerations of the levels because the effects were not proportionate;

(ii) all the Cognitive Levels' questions were in order except some of those for Application according to Bloom et. al.'s theory; thus following their theory, the instrument scored 83.3% (75% at the High Cognitive Levels).

On Table 406BII, the *outward structure of the major instrument and its administration* are proved perfect: T-value between the combination of the Low Cognitive Levels and High Cognitive Levels is 27.74 at .001 level of significance (100% correctness); critical value is just 1.960.

Two other major comparisons are:

(i) between Information and Comprehension levels (Low Cognitive Levels) there is a significant difference (T-value = 9.61 at .001 level of significance).

(ii) between the High Cognitive Levels:

(a) Application and Analysis is significant with T-value of 5.5 at .001 level;

(b) Analysis and Synthesis is also significant with T-value of 4.84 at .001 level.;

(c) Analysis and Evaluation also significant with T-value of 5.27 at .001 level; the three other comparisons:

Application and Synthesis,
Application and Evaluation,
Synthesis and Evaluation,
are not significant.

We note that the T-values of the High Cognitive Levels are the lowest, followed by that of the Low Cognitive Levels while the T-value for the Comparison between the Low and High Cognitive Levels is the highest (2.9 times higher than the second highest).

Table 406BIII shows that the *level to level structure of the instrument and its administration* were perfect following Yoloye's model based on practical experiences like the ones encountered in this study. The means are 6.67, 5.00, 4.82 for Information, Understanding, and Thinking, respectively or 6.67 and 4.91 for Information and combination of all other levels respectively.

Table 406BIV shows that *comparisons between the Low Level and either of the High Levels* is significant; only the comparison between the two High Level divisions is not significant.

Table 406BV shows *moderated influences added scores* of the experimental groups at the Cognitive Levels.

(i) It was considered necessary to add the moderated (proportionate) influences to the uninfluenced scores for conclusion:

(a) to take the scores nearer to the original scores of the learners;

(b) except for a serious study like this, effects of intervening variables are usually not severed from learners' scores;

(c) to avoid significant deviations from the original pass levels of the subjects.

(ii) While the order of scores on this table is generally the same as that of uninfluenced, it seems that if practical statistical comparisons are made, each level would be significantly different from the other (a difference of 0.30 in this sample reaches significance).

(iii) While Application level still remains relatively difficult among the High Cognitive Levels, it has proved simpler than Evaluation in the moderated influences added scores.

Tables 406BII and 406BIV also provide the test of hypothesis 6B which states that there will be no significant differences in the performances of the learners between the high cognitive levels. Table 406BIV's compressed model which has not shown significant differences (blurs the significant differences) was based on practical experiences that there are difficulties. This information is partly confirmed on Table 406BII which indicates that the performances of the learners between them are significantly different; hypothesis 6B is consequently rejected.

4.7.0 SUMMARY OF OUTCOMES

Below are the conclusions of the results of this study.

I (a) Both experimental treatments (Cooperative and Competitive) significantly improved the learners' performances under them more than the learners' performances under the control method (Lecture), at the high cognitive levels.

(b) The difference in the effectiveness of the experimental treatments was negligible at the high cognitive levels.

II (a) Female and mixed gender learners' performances under Cooperative strategy significantly differed from female and mixed gender learners' performances under Lecture method while male and female learners' performances under Competitive strategy significantly improved more than male and female learners' performances under Lecture method at the high cognitive levels.

(b_1) Whereas male learners' performances under Competitive strategy significantly improved more than male learners' performances under Cooperative strategy, mixed gender learners' performances under Cooperative strategy significantly improved more than mixed gender learners' performances under Competitive strategy, at the high cognitive levels.

(b_2) Female learners significantly out-performed male and mixed gender learners under Cooperative strategy while male and female learners' performances significantly improved more than mixed gender learners' performances under Competitive strategy, at the high cognitive levels.

III(a) All the Ability groups of learners' performances under the experimental treatments significantly improved more than all the Ability groups of learners' performances under the control method (gender homogenized), at the high cognitive levels.

(b) Whereas Low Ability group of learners under Competitive strategy significantly outperformed Low Ability group of learners under Cooperative strategy, Mixed Ability group of learners under Cooperative strategy significantly outperformed Mixed Ability group of learners under Competitive strategy (among gender homogenized learners) at the high cognitive levels.

III(c) High and Mixed Ability groups of learners' performances under both experimental treatments significantly improved more than Low Ability group of learners' performances, at the high cognitive levels.

(d) Indiscriminate gains measurement within groups from pre to post test shows that Mixed Ability group of learners gained most, followed fairly closely by Low Ability group of learners while High Ability group of learners gained least, under Cooperative strategy. The order of gains under Competitive strategy was Low, Mixed, and High Ability groups of learners respectively.

IV (a) There are significant variations in both teaching strategies: Cooperative and Competitive, on Gender and Ability levels of learners, at the high cognitive levels: either the two strategies with Gender or Ability levels or the two strategies interacting with both Gender and Ability levels of learners.

(b) Combining Lecture method with Cooperative and Competitive teaching strategies significantly reduces teaching quality or learners' performances.

V (a) The experimental treatments significantly improved the learners' performances at the high cognitive levels more than the control method at 60, 50, and 40 percentages and above levels.

(b) Whereas Cooperative strategy is more appropriate than Competitive strategy for Mixed Ability group of learners, the former strategy seems not very effective for separate High and Low Ability groups of learners. On the other hand, Competitive strategy is generally (moderately) effective for all Ability groups of learners: High, Low, and Mixed, all at the high cognitive levels.

VI (a) One variable only (Learners' School Status) did not significantly affect the learners' performances at the high cognitive levels at the post test; six variables did:

(1) Teachers' abilities;

(2) Type of school by gender;

(3) Ability levels of learners;

(4) Ages of learners;

(5) Academic backgrounds of learners' parents;

(6) Occupations of learners' parents.

(b) Whereas in a compressed analysis, significant differences are not observed, there are significant differences in the systematic analysis of the high cognitive levels (Application, Analysis, Synthesis, and Evaluation). Thus while significant variations exist in the latter, there are none in the former analysis. Finally, although there are no significant differences between the high cognitive levels when they are compressed to three (Remembering: Information; Understanding: Comprehension and Application; Thinking: Analysis, Synthesis, and Evaluation), significant differences are seen when all the six levels (including the Low ones - Information and Comprehension) are separately considered.

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.0.1 INTRODUCTION

This chapter will be approached as follows:

(i) stating each problem and the corresponding finding from the empirical investigation; attempt will then be made to offer explanations/clarifications;

(ii) clarify the theoretical framework of the study;

(iii) provide summary for the chapter;

(iv) conclude the chapter.

5. 1. 1 CAPABILITIES OF COOPERATIVE AND COMPETITIVE TEACHING STRATEGIES AT ELICITING IMPROVED PERFORMANCES OF LEARNERS, AT THE HIGH COGNITIVE LEVELS.

The main finding here was that both Cooperative and Competitive teaching strategies significantly improved the learners' performances under them more than the learners' performances under Lecture method, at the high cognitive levels. The result in simple terms is that both Cooperative and Competitive teaching strategies are capable of eliciting significantly improved performances of learners, at the high cognitive levels.

There was a speculation by Stevens et al. (1991) that cooperation among learners is likely to enhance high cognitive learning. The finding from this study has empirically proved that speculation right.

5.1.2 WHETHER COOPERATIVE OR COMPETITIVE TEACHING STRATEGY IS SIGNIFICANTLY MORE APPROPRIATE THAN THE OTHER IN ITS ABILITY TO ELICIT IMPROVED PERFORMANCES OF LEARNERS, AT THE HIGH COGNITIVE LEVELS.

The main result here was that the difference in effectiveness between Cooperative and Competitive teaching strategies was negligible, at the high cognitive levels. It may be argued that the non-significance was due to the incorporation of effective teaching strategy into Cooperative and Competitive strategies that the difference was consequently neutralized. While that perspective makes sense, Okebukola (1984) had presented similar result in his literature review. In his own study too, the result suggested that while Competitive learning is better for a situation which demands more activities than Comparative learning, the latter strategy proved more appropriate for practical skills. That finding, in a sense, suggests that neither strategy is significantly inappropriate.

It was explained that in a subject like Social Studies, opportunities to use practical skills are limited, moreover, the emphasis of Okebukola was not high cognitive levels. Thirdly the Competition in this study is individualized one, slightly different from Okebukola's version.

It may be concluded that on the whole (indiscriminately) Cooperative and Competitive teaching strategies are not significantly more appropriate than one another. Only in discriminate aspects, may we see some significant differences as we shall observe under 5.4.2.

5.2. THE ROLE OF GENDER IN THE PERFORMANCES OF THE LEARNERS AT THE HIGH COGNITIVE LEVELS.

Several common comments such as 'gender is not important', 'gender is not necessary', required proof through an empirical endeavour as this study. As a result, gender factor was systematically incorporated into the design. The following are the outcomes:

(i) female and mixed (gender) learners' performances under Cooperative strategy significantly differed from female and mixed learners' performances under Lecture method while male and female learners' performances under Competitive strategy significantly improved more than male and female learners' performances under Lecture method, at the high cognitive levels;

(ii) whereas male learners' performances under Competitive strategy significantly improved more than male learners' performances under Cooperative strategy, mixed (gender) learners' performances under not stable. In a sense, we mean that gender did not play a special/distinct role in the performances of the learners, in this study.

Madukwe (1984) found something similar. The researcher observed that whereas all boys (male) secondary school significantly performed better than mixed (gender) school, mixed (gender) school, in turn, significantly performed better than all girls (female). There was the clear statement that there was no significant gender difference in the performance of students on mole concept. Okebukola (1984) also found that gender of his subjects was not significant for achievement, scientific attitudes, and practical skills.

This study has empirically shown that gender factor is not significantly special in the performances of learners.

5.3 DISTRIBUTION OF LEARNERS ALONG ABILITY LEVELS AT THE HIGH COGNITIVE LEVELS.

Ability level/group was a vital factor in this study hence its analysis was given two columns. The summary results are in the following four points:

(i) all the Ability groups of learners' performances under the experimental strategies significantly improved more than all Ability groups of learners' performances under the control method (gender homogenized) at the high cognitive levels;

(ii) whereas Low Ability group of learners under Competitive strategy significantly out-performed Low Ability group of learners under Cooperative strategy, Mixed Ability group of learners under Cooperative strategy significantly out-performed Mixed Ability group of learners under Competitive strategy (among gender homogenized learners) at the high cognitive levels;

(iii) High and Mixed Ability groups of learners' performances under both experimental strategies significantly improved more than Low Ability group of learners' performances, at the high cognitive levels;

(iv) indiscriminately, gains measurement within group from pre to post-test showed that Mixed Ability group of learners gained most, followed fairly closely by Low Ability group of learners while High Ability group of learners gained least under Cooperative strategy. The order of gains under Competitive strategy was Low, Mixed, and High Ability groups of learners respectively.

These summary results show comparisons: *between* the experimental strategies and the control, *between* the experimental strategies, *within* the experimental strategies, and *order of gains within* the experimental strategies. Some stable inferences are that in relation to the Lecture method, we do not have problem as to the role of Ability groups. Secondly, Cooperative strategy seems to favour Mixed Ability most while Competitive strategy favours Low Ability most whereas both strategies appear to moderately favour High Ability group of learners. These stable results are discernible under analyses ii and iv above.

In the case of Cooperative strategy, Peterson (1982: 847, 850) observed that in a small Mixed Ability group on seatwork problems, High and Low Ability groups of learners gained from small group situations, whereas Medium Ability group of learners did slightly better working alone. Peterson therefore suggested that in small Cooperative groups, High and Low Ability groups of learners should be grouped together. *It was this suggestion which made one to group High and Low Ability groups of learners together to form Mixed Ability group of learners.* The result has proved that Peterson's suggestion was useful.

Concerning Competitive (and perhaps some other strategies as well) performances of learners which determine Ability seem to considerably depend on a competent teacher. Dunkin and Biddle (1974: 242,255) asserted that whatever level a teacher operates , the learners follow suit. Perrot (1992: 41,55) noted that the type of question which the teacher asks will reveal to the learner the thinking level which the teacher expects from him. Ability levels of learners can significantly be improved, therefore , through a competent teacher. This inference also implies that self variables do not pose a significant threat to the validity of an experimental teaching strategy's results (Dewalt and Ball 1990:322).

5.4.1 THE INTER - ACTIVE EFFECTS OF COOPERATIVE AND COMPETITIVE TEACHING STRATEGIES ON GENDER AND ABILITY LEVELS OF LEARNERS, AT THE HIGH COGNITIVE LEVELS.

Significant variations in teaching strategies: Cooperative and Competitive on gender and ability levels of learners at the high cognitive levels, either the two strategies with gender or ability levels of learners or the two strategies interacting with both gender and ability levels of learners, were obtained (Please refer to Table 404AII).

It was observed that the differences in the performances of the learners within each factor from highest to lowest was ability group, followed by type of school by gender (sex) and treatments last. This order showed the extent of differences in the variables under each factor. We also noted that the interaction with the highest F ratio was markedly treatments and ability groups of learners.

Briefly, ability groups of learners are more significant to learners' performances than gender (sex) factor. We should therefore be more concerned with the ability levels of learners than their gender (sex). Okebukola (1984) and Madukwe (1984) lend support to this position.

5.4.2 THE EFFECT OF COMBINING LECTURE METHOD WITH COOPERATIVE AND COMPETITIVE TEACHING STRATEGIES ON TEACHING QUALITY (LEARNERS' PERFORMANCES) AT THE HIGH COGNITIVE LEVELS.

Combining Lecture method with Cooperative and Competitive teaching strategies significantly reduces teaching quality or learners' performances (please see Table 404BII). This result is a corollary or confirmation of the result under 5.1.1, implying that there is a significant difference between either Cooperative or Competitive strategy on one hand and Lecture method on the other, in helping learners to elicit high cognitive levels performances.

Like the case on the role of gender in the learners' performances, it is known through experience /practice that 'teaching' and 'lecturing' are two different approaches capable of yielding different results. Although, many professionals are conscious of the inadequacies of lecture method, they adhere to it. The reasons for their adherence are not far- fetched; Lecture method has a place:

i) it is one of the methods/strategies recognized for teaching Social Studies (Oladebo 1980, Obebe 1981, Adeyoyin 1981, Osho 1986, Ogundare 1982 and 1987, Olakulehin 1986);

ii) it (perhaps) has no rival where large classes are warranted;

iii) for convenience;

iv) where time is controlled to cover syllabus/content.

On the other hand, Cooperative and Competitive teaching strategies have certain disadvantages:

Cooperative

i) it is not generally applicable in the present school system in Nigeria;

ii) it is best for an Ability group of learners: Mixed Ability; it is not quite good for either High or Low Ability group of learners;

iii) it requires a lot of energy and care which most of our average teachers can hardly handle effectively;

iv) learners' scores will generally be the same for about six learners per test (between the terminal or semester examination);

v) individual abilities are seldom tested in seat works.

Competitive

i) it is not quite normal, where learners are instructed to refuse disclosing information even to their best friends;

ii) the individualized version is unrealistic for Mixed Ability group of learners;

iii) it favours Low and High Ability groups of learners only;

iv) the teacher may mark a lot of notes/exercises in large classes;

v) It is a huge task on the teacher to ensure that learners actually compete.

It seems that an eclectic approach would yield best results. When a clear, concise, sharp introduction or clarification is required, Lecture method seems appropriate; learners may be assigned group works in Mixed Ability group (of High and Low) where they can cooperate and learn together; at other times, learners may be challenged to compete and bring out their best individual efforts in certain aspects of the curriculum. The teacher on his/her part needs to be learning conscious (interactions in discussions and clarifications geared toward shared meaning of subject matter: Aisiku (1981) or co-construction of meaning: Wells (1995: 234-5) hence he/she should be an effective teacher.

5.5.1. PROPORTIONS OF THE LEARNERS' PERFORMANCES AT 60, 50, 40, PERCENTAGES AND ABOVE LEVELS, AT THE HIGH COGNITIVE LEVELS.

In this analysis, the experimental strategies: Cooperative and Competitive, significantly improved the learners' performances at the high cognitive levels more than the control method: Lecture, at each of the specified percentages and above levels. It would be observed that this analysis is 5. 1 - 3 including 5.4 in a sense, but in simple/clear/popular form, disregarding gender and ability levels of learners. Thus this is the finding which collapses all hitherto findings, hence, vital .

Several implications may be highlighted:

(i) JSS II learners are hereby proved not too young for formal operations (Elkind 1971: 156; Di Vesta 1982: 294);

(ii) Social Studies learners tended to perform poorly at the high cognitive levels (Obebe 1987: 9).

The Pre-test scores of this study confirmed that Obebe's finding was valid/applicable to other learning environments.

Allied to this was that classroom interactions centred at the low cognitive levels (Dunkin and Biddle 1974:239-41). But this study has shown that we can change poor performance to good performance (which will be clearer in the next discussion stage); moreover, classroom interaction can centre at the high cognitive levels. Both these goals can be achieved through Cooperative/Competitive teaching strategy.

We recall that a conception of Social Studies was the subject which specializes at the 'high' cognitive levels (Banks and Clegg 1977; Mehlinger 1981; Osunde 1989; Famwang 1989; Okam 1989). It was interpreted that this conception implied that well taught Social Studies learners would perform well at the high cognitive levels. That speculation is proved to be realistic by the good performances of the learners at the high cognitive levels. Weil and Murphy (1982:911) observed something similar when they said that interaction during lessons have promoted learning not only at the low cognitive levels but also in high cognitive responsibilities.

The suggestion here is that Social Studies learners should be made to think at the high cognitive levels through Cooperative and Competitive strategies or at least through good quality instruction which stresses discussions and clarifications through appropriate high cognitive levels questions.

What was advocated for by Janzen (1995:138) appears not too alien to this conclusion. The writer advocated for an eclectic approach when he or she discussed six approaches to Social Studies education. The six approaches were : cultural transmission, social action, life adjustment, discovery, inquiry, and multi-culturalism. Janzen's suggestion seems to be content combined with methodology/strategy. Two strategies, that is, discovery and inquiry appear to hover round high cognitive processes perhaps indiscriminately. Peterson, when discussing 'Education for the 80s' had declared a similar impression in the preceding decade: the greatest potential for educating individually different students seems to be through diversified instruction having either a single objective or multiple objectives (Peterson 1982:849). Effective teaching allows the use of multiplicity of techniques which considerably makes room for (takes care of) individual differences.

5.5.2 PROPORTIONS OF THE LEARNERS' PERFORMANCES DISCRIMINATELY IN ABILITY GROUPS, AT THE HIGH COGNITIVE LEVELS.

Discriminate percentage gains of the learners in ability groups at the high cognitive levels were:

(i) High Ability to significantly Higher Ability from pure High Ability:42.86 and 78.4 for Cooperative and Competitive strategies respectively;

(ii) High Ability group to significantly Higher Ability from Mixed Ability group: 90.8 and 88. 24 for Cooperative and Competitive strategies respectively;

(iii) Low Ability group to High Ability group from Mixed Ability group: 77.3 and 75.0 for Cooperative and Competitive strategies respectively;

(iv) Low Ability group to High Ability group from pure Low Ability group:42.53 and 70.6 for Cooperative and Competitive strategies respectively.

It should be noted that performances of the Low Ability group of learners who although significantly gained but failed to enter High Ability level from both pure Low and Mixed Ability groups of learners were excluded in this analysis hence this one is *discriminate* percentage gains measurement.

Major implications of the above findings (in I-iv) include:

i) Cooperative strategy is more appropriate for Mixed Ability group of learners while Competitive strategy is more suitable for the pure High and Low ability groups of learners;

ii) whereas Competitive strategy is moderately appropriate for all Ability groups of learners, Cooperative strategy is just good enough for the pure High and Low Ability groups of learners;

iii) while Cooperative strategy is an extreme performance strategy (highest for Mixed Ability group of learners but lowest for the pure High and Low Ability groups of learners), Competitive strategy is generally appropriate for all the ability groups of learners (High, Low, Mixed).

Certain suggestions are that informed choices need to be made to get the best performances of learners in relation to Ability groups following implications i-iii above.

Certain theories seem relevant here. Nwana (1965:67-68) observed that exchange of ideas encourages high cognitive levels operations. Thus Cooperative strategy affords learners the forum for exchange of ideas among themselves in one perspective and among them and their teachers in another perspective. Competitive strategy also affords exchange of ideas between individual learners and their teachers in two dimensions; firstly, in the classroom discussions and secondly during seat-works, class or home assignments when the teacher interacts with learners in a more tutorial fashion.

Under 5.3 above, we referred to Peterson (1982:847,850) who observed that in a small Mixed Ability group on seatwork problems, High and Low Ability groups of learners benefitted from small group learning situation whereas medium ability group of learners did slightly better working alone. The writer therefore suggested that High and Low Ability groups of learners should be grouped together in Cooperative teaching/learning situation. That theory (suggestion) was tried in this study and the result proves it workable.

Learners considered as low in ability can become high ability learners through mastery learning strategy which stresses good quality instruction supplemented by allowing individual time (Peterson 1982; Kulik 1982). Effective teaching which is the meeting point of Cooperative and Competitive strategies in this study, appears not to be significantly different from mastery learning strategy or vice versa. Some technical aspects only of mastery learning strategy such as clear individual time (hence not all learners progress at the same speed/time) are the differences. But in effective teaching, there is a kind of undeclared waiting for each other which actually improves learning for both the stronger and weaker learners (Peterson 1982).

In this study, 77.3% of the Low Ability group of learners from the Mixed Ability group, crossed to High Ability group. This achievement level is quite considerable/ significant.

5.6.1 CONTRIBUTIONS OF VARIABLES SURROUNDING TEACHERS, LEARNERS, AND LEARNERS PARENTS, ON THE LEARNERS' PERFORMANCES AT THE HIGH COGNITIVE LEVELS

The main findings here were that under Cooperative treatment, one intervening variable only: learners' school status, did not significantly influence the learners' performances: all others: abilities of teachers, type of school by gender, ability levels of learners, ages of learners, learners parents' academic backgrounds and occupations, did; under Competitive treatment , two intervening variables only: teachers abilities and type of school by gender, almost consistently influenced the learners' performances across the cognitive levels of the learners; the other five variables did not significantly influence the learners' performances.

Considering both Cooperative and Competitive strategies, one intervening variable only: learners' school status , did not significantly influence the learners' performances.

These results are backed up by literature that learners performances considerably depend on practice, schooling, and other socio-economic backgrounds of learners (Obe 1980:123,135-7; Walberg and Fredrick 1982:922).

A point seems noteworthy here. Under 5.2, using other studies as well as this one, we concluded that gender did not play significant role in the performances of the learners. It should be clear that using this study , one gender or another proved significantly better than one other gender. *Gender did not play a significant role* was taken to mean the instability/unpredictability in the significantly different performances of the learners. *The variations suggest that any gender may perform significantly better than the other(s) at any time in any situation.* So we can hardly conclude that male learners are significantly better than female learners and vice versa, male learners significantly better than mixed(gender) learners and vice versa; female learners significantly better than mixed (gender) learners and vice versa; male learners significantly better than both female and mixed learners and vice vasa; female learners significantly better than both male and mixed (gender) learners and vice versa; and mixed (gender) learners significantly better than both female and male learners and vice versa.

Perhaps it is useful to represent these (gender) comparisons in shortened forms for easy identification:

(i) male versus female and vice versa;

(ii) male versus mixed (gender) and vice versa;

(iii) female versus mixed(gender) and vice versa;

(iv) male versus female and mixed (gender) and vice versa;

(v) female versus male and mixed (gender) and vice versa;

(vi) mixed (gender) versus female and male and vice versa.

5.6.2 PERFORMANCES OF THE LEARNERS BETWEEN THE COGNITIVE LEVELS.

Main findings from this test included:

(i) the structure of the major instrument (Achievement Test) including its administration were proved adequate: T-value for comparison between the combination of the Low and High Cognitive Levels was 27.74 at .001 significance level; the critical value was 1.960;

(ii) the T-value of the High Cognitive Levels are the lowest, followed by that of the Low Cognitive Levels while the T-value for the comparison between the combined Low and High Cognitive Levels is the highest;

(iii) Table 406BIV shows that comparisons between the Low Level (Information) and either of the High Levels is significant, only the comparison between the two High Level divisions is not significant.

It should be noted that Table 406BIV is a compressed model. It blurs the significant differences observable in Table 406BII. The compressed model of

Yoloye was observed to have been necessitated by practical experiences that there are complications in the uncompressed approach (Yoloye 1986:5): the various categories of cognitive levels are not easy in relation to test development. Tanner and Tanner (1980:167) also made a similar remark: there is doubt if cognitive processes follow that hierarchical order in practical learning environments. This study has confirmed the findings/doubts of the above authorities that the high cognitive levels significantly vary in the teaching task.

A vital empirical result is identifiable in Table 406BII: Comprehension level is significantly higher than Information level suggesting that the starting point of the cognitive levels is Comprehension.

This empirical result is supported by Tanner and Tanner (1980:169) that without understanding, further movement along the cognitive levels seems impossible, implying (overtly enough) that understanding is the beginning (key) of the high cognitive levels.

We recall that three positions were identified under Literature Review with regard to the beginning of the high cognitive levels:

(i) *Comprehension* (Poggo 1976 in Ezewu 1981; Odunusi 1983; Yoloye 1986 (implied by one); Cangelosi 1990; Stevens et al. 1991; Perrot 1992);

(ii) *Application* (Nwana 1965; Block and Tierney 1974 and Ware 1976 cited by Ezewu 1981; Levin 1979 cited by Onasanya 1985);

(iii) *Analysis* (Ogundare 1982 and possibly Yoloye 1986).

Out of these three positions, there are more evidences in support of Comprehension. These evidences are also the most recent out of the three groups of evidence. Thirdly, one (this researcher) got the picture presented by Tanner and Tanner and Yoloye quite clearly and so argued in favour of Comprehension. The final evidence is the empirical result which supports the position. Briefly, this study empirically lends support to the position that Comprehension is the beginning of the high cognitive levels.

The adoption of Application as the beginning in the course of the investigation was a matter of using the middle position, even after, stressing Comprehension in theory (please see Literature Review: 2.6.2.). Empirical result over-rules a trial/theoretical position provided the former is valid and reliable.

We now revisit the issue of the hierarchy of the cognitive levels. Tables 406BI and 406BV show that *Application* level defied that hierarchy, in this study.

It may be argued that this situation may be special to more theoretical/abstract courses like Social Studies, that because there are few practical situations for learners to apply skills learnt, Application in this subject involved more of turning theory to practice or changing one abstract idea to another seemingly more concrete idea but which process still involved representations in language or symbols hence, Application items proved hard to the learners.

While this perspective may hold sway, it appears difficult to make a strong conclusion solely based on it except we can get a similar result from a more practical subject like Biology, Physics, or Chemistry, compare its result to that of this study and obtain a significant difference in favour of the more practical subject. Until that is done, we can only speculate hence possibility.

There are, however, old/previous evidences (of Yoloye 1986:5) which tell us that in practical test development situations, the six levels of Bloom and his associates are difficult to realise, hence, he compressed them to three. We have noted above(under this same sub-heading) that the central instrument developed for this study scored full marks using Yoloye's model to assess it. Consequently, the instrument for this study is valid and reliable for practical situations.

The perspective of Tanner and Tanner (1980:167) may even be more directly relevant. They observed that there is doubt if cognitive processes follow that hierarchical order in practical learning environments. Tanner and Tanner gave example of how someone can synthesise in language use before analyzing the structural elements and relationships. This picture challenges the validity of the hierarchy.

Conclusively, we may say that the level of performance of Application which is in second or fifth position (depending on which way one views it: up - down or down - up) may be due to:

(i) the abstract nature of Social Studies as a subject;

(ii) an example of the problems faced by Yoloye in his practical attempts or doubts aired by people like Tanner and Tanner;

(iii) or combination of i and ii above.

Perphaps this is why more recent writers on the issue like Cangelosi (1990) and Perrot (1992) were hesitant on dwelling extensively on the high cognitive levels.

The solution to the fore-going problem is in employing Yoloye's model or collapsing levels two and three of Yoloye into one level, as high cognitive levels which is displayed on Tables 406BIII and 406BIV (rows five and four respectively).

5.7.1. HOW WE CAN ACHIEVE IMPROVED HIGH COGNITIVE LEVELS TEACHING PERFORMANCE

Efforts at teacher preparation are central here. The teachers in this study were appropriately trained; next, they were made to practice what they learnt from training by teaching learners systematically. The first of these two processes is crucial.

The teachers in this study were trained based on theoretical findings: that appropriate training yields significant results. Tersely, considerable degree of the useful product of practice depends on suitable input in the teaching industry.

Dunkin and Biddle (1974: 239-41, 266-8) observed that teachers can be trained to elicit high cognitive behaviour in learners or that teachers behaviour can be influenced by relevant training and such training can produce change in learners behaviour patterns, that relevant training for teachers is usually effective and yields good results. Perrot (1992:55) found that appropriate training of teachers significantly improved an aspect of effective teaching: high cognitive levels.

The summary of the results of this study (5.1-6.2) shows that high cognitive levels performance of learners can be significantly improved through appropriate training which is also systematically implemented in practice in the classroom. This summary confirms the theories and justifies the training endeavours of this study. It therefore seemed necessary to put the training programme of the study in clear expressive language for teacher trainers so that it can improve teacher preparation and eventually improve classroom interaction, in relation to high cognitive levels (Please see the Developed and Validated Teacher Training Package in Appendix E).

5.7.2. CLARIFICATION OF THE THEORETICAL FRAME WORK OF THIS STUDY

In the Introduction of this study (Chapter One), four theoretical frames were observed to have monitored this study.

Frame one is the assertion that Social Studies was noted as centring at the high cognitive levels. Accordingly, a major theory under test in this study was that well trained teachers of Social Studies would enable their learners perform well at the high cognitive levels. This inference has been dealt with and proved as true/valid under discussions 5.5.1 and 5.7.1.

Frame two was on testing of suitable strategies for the teaching of Social Studies in order to facilitate thinking processes in learners. Cooperative and Competitive strategies which had been identified as generally effective in physical and natural sciences as well as in language area, were tested in a different subject area: Social Studies. More distinctly, this study discriminately tested the two teaching strategies at the high cognitive levels. The result is that the two teaching strategies are suitable for the teaching of Social Studies in order to facilitate thinking processes in learners (discussions 5. 1. 1; 5. 4. 1; 5. 4. 2.; 5. 5. 1; 5.5.2).

Frame three was a group of cognitive levels theorists positions which put the levels as two, six, eight, and three (following how they were presented)

(Krathwohl 1971; Bloom et al. 1956; Tanner and Tanner 1980; Yoloye 1986; Cangelosi 1990; Perrot 1992). This frame was used in test construction and therefore it ran through the whole study. But the most distinct touch of this frame is discernible under discussion 5. 6. 2. An empirical gain from the study is that the high cognitive levels start from Comprehension implying that Information only is low cognitive level, which most and current literature support.

The last frame centered on Aisiku's view of teaching as a triadic process involving three elements: the teacher, learner, and subject matter; a dynamic process which culminates in shared meaning of subject matter. This emphasis on interaction is a core of the Basic Practice Strategy (BPS) developed by Weil and Murphy (1982). The BPS itself is a development from (extract of) Effective Teaching Strategy.

This last frame was the melting pot of frames one to three, in a sense. Even the two strategies met there hence both the details and over-all results of this study considerably depended on frame four. Discussions 5. 5. 1 and 5. 5. 2 are particularly loud on it.

It can be seen from the fore-going that none of the four frames was either irrelevant or dormant in the investigation.

5.7.3 SUMMARY

Notable points in this discussion include the following:

(Ia) Stevens et al. (1991) speculated that cooperation among learners was likely to enhance high cognitive learning. The assertion was proved right in this study.

(Ib) Cooperative and Competitive teaching strategies are experimentally added to problem-solving, reflective inquiry, and lecture, for teaching Social Studies.

(Ic) The prevailed general theoretical state was confirmed that neither Cooperative nor Competitive strategy seemed significantly inappropriate to elicit high cognitive levels operations in learners.

(II) The finding of Madukwe and Okebukola (both 1984) that gender factor did not play special/distinct role in performances of learners was supported by this study.

(IIIa) Peterson (1982) suggested that in small cooperative groups, High and Low Ability learners should be grouped together. That suggestion was tested in this study and found useful.

(IIIb) Dunkin and Biddle (1974) and Perrot (1992) suggested that Ability Levels of learners could be significantly improved; this study confirmed that the suggestion is true.

(Iva) Madukwe and Okebukola (both 1984) found that Ability Levels of learners were more significant than their gender factor. The result of this study is in line with their finding.

(IVB) Although Cooperative and Competitive strategies were found to be significantly more appropriate for improving learners' performances at the high cognitive levels than Lecture method, Lecture Method has its merits hence well informed eclectic approach promises best results.

(Va1) Junior Secondary School Two (JSS II) learners who were theoretically proved not too young for formal operations (Elkind 1971; Di Vesta 1982) were empirically confirmed by the significant improvements in this experiment.

(Va2) The need to use diversified instruction to take care of individual differences was advocated for by Peterson (1982) and Janzen (1995). Effective teaching which considerably incorporates the methodology was embedded in the design of this study hence the significant improvements can be attributed to it.

(b) A very high proportion of the learners tagged 'Low Ability', at the beginning, crossed to High Ability at the end of the experiment. This finding partly supports suggestions of people like Peterson and Kulik (both 1982) that what any learner can learn, can also be learnt by others.

(VIa) Considering both Cooperative and Competitive strategies, one intervening variable only: learners' schools status, did not significantly influence the learners' performances. This result is backed up by literature that learners' performances considerably depend on practice, schooling, and other socio-economic backgrounds (Obe 1980; Walberg and Fredrick 1982).

(b1) Comprehension as the beginning of the High Cognitive Levels, suggested by a group of specialists including Odunusi (1983), Cangelosi (1990), Stevens et al. (1991), and Perrot (1992) was supported by the result of this study.

(b2) Yoloye's suggestion that we should compress the cognitive levels in practical test development situations was found useful.

(VII) The suggestions of people like Dunkin and Biddle (1974), Dewalt and Ball (1990) and Perrot (1992) that appropriate training could enable teachers to elicit significantly improved performances in their learners, was proved valid in this study.

5. 7. 4 CONCLUSION

A number of theories or suggestions that were tested in this study were found valid/useful. The evidences give the researcher experience/tested knowledge which could be further extended by others through reading; the researcher (himself) can take up any aspect as post - doctorate investigation for more knowledge extension.

CHAPTER SIX

CONCLUSION (AND SUGGESTIONS FOR FURTHER RESEARCH)

6.0.0 INTRODUCTION

This chapter covers the following areas:

(i) summary of the investigation;

(ii) recommendations;

(iii) conclusion;

(iv) suggestions for further research.

6.1.0. SUMMARY

This study investigated the possibility of achieving improved high cognitive levels performance of Social Studies learners through Cooperative and Competitive teaching strategies. A sample of 588 Social Studies learners drawn from nine secondary schools (of male, female, mixed) in Lagos State participated in this quasi-experimental research on Cooperative, Competitive, and Lecture approaches. Whereas Lecture method served as control, the others were experimental.

Nine instruments were used for the study; all were validated by experts. Achievement test was used to measure the performances of the Social Studies learners. Empirical validation of the instruments was effected through a Pre-Pilot study after which more vigorous adjustments of the instruments were carried out. The researcher conducted the Pilot phase of the study which postulated the feasibility of the Main phase. There was Pre-Test before treatment, and Post Test after. The number of periods and duration, in each phase of the investigation, were acceptable, following literature.

Raw scores obtained were analysed using Statistical Package for the Social Sciences (SPSS). Specifically, Analysis of Covariance (ANCOVA), Chi-Square (X^2), Step-Wise Multiple Regression, and T-Test, were employed from the Package to analyse the data collected.

Major outcomes of the data analysis include:

Ia). Both Cooperative and Competitive teaching strategies significantly improved the learners' performances under them more than the learners' performances under Lecture method, at the high cognitive levels.

II Gender factor was unstable; any gender significantly out-performed the other/s in various situations implying that gender did not play a unique role in the performances of the learners, at the high cognitive levels.

III. Ability levels of the learners played a significant role in the performances of the learners, at the high cognitive levels.

IV(a). There were significant variations in the interactive effects of Cooperative and Competitive strategies on gender and ability levels of learners, at the high cognitive levels: either the two strategies with gender or ability levels or the two strategies interacting with both gender and ability levels of learners. Here, the relative importance of gender and ability levels was compared. The result showed that ability levels are more important to learners' performances than gender.

(b) Combining Lecture method with Cooperative and Competitive teaching strategies significantly reduces teaching quality or learners' performances, at the high cognitive levels.

V(a). Cooperative and Competitive teaching strategies significantly improved the learners' performances at the high cognitive levels more than the Lecture method at 60, 50, and 40 percentages and above levels.

b). Discriminate percentage gains of the learners in Ability groups at the high cognitive levels were:

(1) 42.86 and 78.4 for Cooperative and Competitive strategies respectively, that is, from learners who moved to significantly higher Ability from High Ability;

(2) 90.8 and 88.24 for Cooperative and Competitive strategies respectively, for High Ability group to significantly higher Ability from Mixed Ability group;

(3) 77.3 and 75.0 for Cooperative and Competitive strategies respectively, for Low Ability to High Ability from Mixed Ability group;

(4) 42.53 and 70.6 for Cooperative and Competitive strategies respectively, for Low Ability to High Ability from pure Low Ability group.

VI (a) Under Cooperative treatment, one only: learners' school status, out of the tested inter-vening variables, did not significantly influence the learners' performances; the others: abilities of teachers, type of school by gender, ability levels of learners, ages of learners, learners parents' academic backgrounds and occupations, did. Under Competitive treatment, two intervening variables: teachers abilities and type of school by gender almost consistently influenced the learners' performances across the cognitive levels; the other five variables did not. Considering both Cooperative and Competitive strategies, one intervening variable only: learners school status, did not significantly influence the learners' performances.

(b) The high cognitive levels vary in the teaching task. The issue of hierarchy of the cognitive levels which was doubted by other researchers is also doubted in the outcome of this quasi-experimental investigation. Moreover, Comprehension was identified as the beginning of the high cognitive levels.

6.2 RECOMMENDATIONS

Based on the outcomes of this study, recommendations are systematically presented in out-line form, following the order of presentation of findings.

I(a) Cooperative and Competitive teaching strategies should be added to the list of empirically tested strategies for Social Studies teaching: they are capable of eliciting significantly improved performances of learners at the high cognitive levels.

b) Because Cooperative and Competitive teaching strategies do not have higher effects in relation to one another, both strategies should be employed by teachers, for specific purposes. While we are conscious that the closed school system be-deviled by tight durations force teachers to adhere to conventional approaches, Cooperative and Competitive teaching strategies may serve as spices which can also help to bring out the best of learners' potentials (Fafunwa 1974).

II. Gender did not play special role in the performances of the learners; we should therefore expect any gender: male, female, or mixed, to excel in any Social Studies teaching/learning millieu.

III. Since ability levels of learners were found to play a vital role in this study (as well as in others reviewed) we should carefully consider learners ability levels either in pure teaching or research situations. A means of caring for different abilities is, following a moderate pace/speed in teaching hence one of the principles which guided this investigation was 'teaching cannot be rushed'. This technique (of following a moderate pace) takes care of individual time, to a considerable degree: individual time is the factor that is technically different from good quality instruction in Mastery learning strategy, which was embedded in this study.

IV.a) While it seems vital to consider both gender and ability levels of learners, the latter factor is weightier hence it should be given more attention, as just stated in iii above.

b). In a situation where there is enough time, Lecture method should not be combined with teaching, as the former method significantly reduces teaching quality or learners' performances, at the high cognitive levels. But if alternative is far-fetched or the time is too limited or in an advanced class like Senior Secondary School (SSS) learners/undergraduates, Lecture method may be discriminately combined with teaching. Such a class may be termed 'teaching-based lecture'. If critically handled, there may be no significant difference, between it and pure teaching class (in such special situations).

V. To get the best results from Cooperative strategy, the learners should comprise Mixed Ability (of High and Low Abilities); to obtain maximum result from Competitive strategy, we should allow either High or Low Ability group of learners (of course Mixed Ability in individualized Competition is illusionary). The suggested discriminations will raise the percentage of Low Ability learners to High Ability learners markedly (significantly) and the High Ability group of learners will also significantly gain.

VI a) Researchers and even classroom teachers should always assess the contributions of variables surrounding learners, their school, and other socio-economic backgrounds if they wish to minimise errors in their achievement test results.

b) We should take the high cognitive levels as starting from Comprehension; most literature as well as this empirical study suggest so.

c) The terms 'higher' and 'lower' whether in relation to cognitive levels or order of interactions/thoughts, seem imprecise; we should be precise by using 'high" or 'low' cognitive levels or order of interactions/thoughts.

d) For practical test development purposes, a compressed model of cognitive levels, promises full marks. But a critical researcher may develop items for all levels (to see things for oneself). The researcher might finally see the need to compress both the result and items (as done in this study).

6.3 CONCLUSION

This study has shown that significantly improved high cognitive levels performance of learners can be achieved through appropriate teacher preparation. In other words, we can change the widely reported low cognitive levels classroom interaction through relevant teacher preparation.

As a way of helping to realise this goal of improved high cognitive levels performance in the classroom, a Teacher Training Package based on the content of teacher preparation that was tested in this investigation, has been developed by this researcher. The Package is attached to this thesis as Appendix E.

64. SUGGESTIONS FOR FURTHER RESEARCH

The following areas are identified for further investigation.

1. Replication of this study:

   (a) in other subject areas as well as in Social Studies carrying out more multiple observations;

   (b) in other human ecologies/states of the federation for possible generalization.

II. Two experiments : one employing pure effective teaching strategy and the other using either Cooperative or Competitive strategy should be carried out by the same researcher. The results of the two experiments should be compared to ascertain the contributions of pure Effective Teaching strategy and Cooperative or Competitive strategy at improving high cognitive levels performance of learners.

III. In order to test the validity of the assertion that beyond Application (from Analysis) questions ought to be essay, two instruments should be developed by the same researcher: one in objective items while the other should be in essay form (both based on the same content). The two instruments should be administered at the same time; then the results can be compared to see whether there will be a significant difference in favour of the essay questions.

IV. A valid empirical result of all the cognitive levels (six of Bloom's) in Biology, Chemistry or Physics should be identified and its Application result in relation to other levels should be compared to that of this study. Or:

Two researchers: one in Social Studies and the other in Biology, Chemistry, or Physics should obtain results in all the cognitive levels and compare Application result in relation to other levels in Social Studies to Application result in relation to other levels in Biology, Chemistry, or Physics.

V. Using either Cooperative or Competitive teaching strategy or pure Effective Teaching strategy, a devise should be sought whereby the average indices on self issues of learners are determined before treatment is effected such that after treatment, we obtain the average extent to which effective teaching strategy takes care of learners' self matters.

VI A single strategy (Cooperative), using Medium Ability group of learners on the one hand and Mixed Ability group of learners on the other hand; results of the Ability groups are then compared to see whether the non-inclusion of Medium Ability group of learners in this investigation has significant implications.

VII. An individualized Competitive study having High, Low, and Medium Ability groups of learners and the results of the three Ability groups are compared. The focus here is the Medium Ability group of learners, testing Peterson's suggestion that individualism favours this Ability group of learners.

VIII. Competitive research only (using group Competition) comprising two Ability levels of learners: Medium and Mixed (of High and Low Abilities); results of the two Ability levels of learners should be compared.

It is common knowledge that a global academic and professional problem is how to improve on learners' intellectual abilities. Results of suggestions six (VI), seven (VII) and eight (VIII) (when available) will combine with those of this study to give us divergent information on Ability levels of learners. We would, consequently, be better equipped on how to handle them which will considerably help us to achieve our universal objective of improving learners' abilities.

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APPENDIX A: INSTRUMENTS USED FOR THE STUDY

APPENDIX A1

Pre-Test Objectives based on the 'Aspects of Development' (OPET)

In this test, the learners should be able to:

Remembering/Information

1) define growth and development;
2) name one large commercial company which operated in Nigeria in the British Colonial days;
3) state (summarily) the positive changes which have taken place in Nigeria;
4) identify the people who started modern education and health facilities in Nigeria;
5) state the year Nigeria was amalgamated;
6) identify the three main religions in Nigeria;

Understanding(Comprehension and Application) Comprehension

7) explain political development in one statement and give an example;
8) explain modern education and make a statement to show its importance;
9) give reason why more Nigerian infants are now surviving till the age of 3 and more.

Application

10) state how development has affected them;
11) name any modern health facility and show how useful it is to them;
12) identify what kind of development electricity is and show how useful it is to them;

Thinking (Analysis, Synthesis, Evaluation)

Analysis

13) discuss the various aspects of development;
14) state why political development is different from social development;
15) compare and contrast growth and development;
16) state the main difference between traditional religion and Islam and Christianity;

Synthesis

17) relate positive changes in politics, economy, social and cultural aspects to society;
18) relate positive changes in society to development;
19) give reasons why we say that education, health, religion, food and eating habits, entertainment, festivals, sports, dressing are socio-cultural;

Evaluation

20) state the aspect of development which appeals to each of them most, giving reasons;
21) identify the aspect of development which each of them considers most significant;
22) identify the area we are most behind in development, giving reasons

APPENDIX A2

INSTRUMENT II

Objectives for the Post-test using a JSS II topic: Science, Technology, and Society (OPTT).

At the end of this Post-Test, the learners should be able to:

Remembering/ Information

1) define science, technology, and society;
2) state why science and technology are vital to society;
3) identify four aspects of traditional science and technology;
4) identify at least four problems created by science and technology;
5) recall efforts made to solve the problems created by science and technology;
6) state the future of science and technology in the world;

Understanding (Comprehension and Application)

Comprehension

7) explain in their own words what is meant by science, technology, and society;
8) explain why defining, observing, experimenting, and analyzing are significant in science;
9) explain the difference between local society and state society; national or world society;

Application

10) identify and state a number of things they have gained from science and technology;
11) name a product of science and show how useful it is to them;
12) identify what type of product is biro and explain how useful it is to them (one statement);

Thinking (Analysis, Synthesis, Evaluation)

Analysis

13) discuss the various components of science;
14) differentiate between science and technology;
15) state the similarities in science and technology;
16) describe the ways traditional science and technology and modern science and technology are similar and different;

Synthesis

17) relate defining, observing, experimenting, and analyzing to science and technology;
18) relate science and technology to society;
19) discuss how science and technology serve society or vice-versa;

Evaluation

20) give reasons to know whether or not science and technology have been beneficial to society.
21) argue the case whether or not science and technology have done more harm than good to society.

22) evaluate which has contributed more to society: traditional science and technology or modern science and technology.

APPENDIX A3

INSTRUMENT IIIA QTATI

PRE-TEST: ACHIEVEMENT TEST I

JSS II

SOCIAL STUDIES TEST BASED ON ASPECTS OF DEVELOPMENT

SECTION A

Tick the appropriate box; time allowed is 5 minutes.

(i) Sex of student: Male ☐ Female ☐

(ii) Age of student: 12 – 13 years ☐
14 – 15 years ☐
16 – 17 years ☐
above 17 years ☐

(iii) Class of student: JSS I ☐
JSS II ☐
JSS III ☐

(iv) Sex type of student's school (a) all boys ☐
(b) all girls ☐
(c) both boys and girls ☐

(v) Highest educational qualification of student's parent/s:
(a) below School Certificate or Grade II ☐
(b) School Certificate or Grade II ☐
(c) N. C. E. or Advance Level ☐
(d) First degree (B.A./B.Sc./B.A. ED/B.Sc. ED/B.ED) ☐
(e) Post Graduate (M.A./M.Sc./M.ED/M.D.A/M.B.A./PH.D) ☐

(vi) Occupation of student's parent/s:
(a) Farming ☐
(b) Trading ☐
(c) Arts and Craft ☐
(d) Professionals e.g. doctors, lawyers, accountants, engineers, teachers ☐

(e) Other/s (name it/them)..

....

SECTION B TO G

Instruction: Answer every question; tick the correct option at the left hand side of the paper.

Time allowed is 55 minutes

SECTION B

Items/Questions on Information Level

1. Society means
   a. common things in different places
   b. common people in a group
   c. people from different states
   d. people from the same state
   e. a group of people who have common interest

2. Growth means
   a. increase in quality of a thing
   b. increase in quantity or size of a thing
   c. decrease in quality of a thing
   d. decrease in quantity or size of a thing
   e. increase in both quality and quantity of a thing

3. One of the following was a large commercial company which oper639582*1ated in Nigeria in the colonial days.
   a. Kingsway
   b. Leventis
   c. Chelarams
   d. The Dutch East India Company
   e. United African Company (U.A.C.)

4. The changes which have taken place in Nigeria can be grouped under.
   a. geographical, historical, and continental
   b. education, health, and religion
   c. transport and communication
   d. political, economic, and socio-cultural
   e. scientific, technical, and human

5. The following is usually a sudden change which makes us have mixed feelings
   a. independence
   b. modern education
   c. coup d'etat
   d. bank or finance house
   e. modern health facility

6. Modern education and modern health facilities were state by.......................in
   a. Muslim missionaries
   b. Christian missionaries
   c. The British
   d. The French
   e. The Portuguese

7. ....looks like a negative aspect of modern education in Nigeria.
   a. Loss of respect for age
   b. Emphasis on farming
   c. Emphasis on science and technology
   d. Ability to read and write
   e. Respect for elders

8. One important aspect of socio-cultural change was the introduction of
   a. modern economic processes
   b. modern political processes
   c. new dances
   d. formal education
   e. traditional education

9. Nigeria was amalgamated in

a. 1985

b. 1861

c. 1906

d. 1912

e. 1914

SECTION C

Items/Questions on Comprehension Level

10. Growth in society means

a. decrease in the production of goods and services above the previous years

b. stable production of good s and services

c. increase in the production of goods and services above the previous year

d. decrease in the population

e. increase in population

11. Development of society means

a. concern for efficient and progressive ways of doing things than before

b. lack of concern for efficient and progressive ways of doing things than before

c. using equally efficient and progressive ways of doing things

d. increase in the houses in society

e. decrease in the houses in society

12. Power and its use to control a state which brings about good changes is an explanation of

a. scientific development

b. economic development

c. social development

d. military development

e. political development

13. Nigeria's independence in 1960 is an example of

a. scientific development

b. military development

c. social development

d. political development

e. economic development

14. Formal education which is carefully planned to cover every major aspect of life can otherwise be called

a. traditional education

b. modern education

c. ancient education

d. children education

e. adult education

15. More Nigerian infants are now surviving beyond the age 2 years because

a. of traditional health facilities

b. more children have decided to live longer

c. of modern health facilities

d. infants now love their parents more than before

e. parents now love their infants more than before

16. The present day health facilities

a. hospitals, dispensaries, clinics

b. hospitals, shops churches

c. hospital, clinics, supermarkets

d. dispensaries, clinics, mini-markets

e. clinics, hospitals, mosques

17. Economic development is directly concerned with

a. Churches

b. Mosques

c. Schools

d. Sports and games

e. Resources or factors of production

18. Stealing has the most direct bad effect on

    a. social development
    b. political development
    c. military development
    d. economic development
    e. cultural development

SECTION D

Items/Questions on Application Level

19. Nowadays, we cast news on radio or T.V. and write on the chalkboard to express our feelings. These skills directly improve our

    a. economic process
    b. entertainment process
    c. communication process
    d. transport process
    e. both transport and communication process

20. Vaccination and inoculation against deadly diseases in hospitals, dispensaries, clinics, render......................to modern man.

    a. useful political services
    b. useful health services
    c. useful educational services
    d. useful economic services
    e. useful military services

21. Mixing of different chemicals to make drugs, using several irons as equipment, and long training of human beings relate more to

    a. machine gun
    b. library
    c. projector
    d. hospital
    e. training/school

22. The producer, wholesaler, and retailer render......................to the consumer (man)

a. helpful economic services

b. good political services

c. useful social services

d. beneficial religious services

e. gainful cultural services

23. The use of electricity for light, ironing, playing radio or t.v. through science and technology can be more clearly called

a. educational development

b. socio-economic development

c. cultural development

d. traditional development

e. military development

24. Tolu is in Ikoyi yet he spoke to his friends: Tayo, in Ikeja yesterday within three minutes. This contact must have been in through

a. newspaper

b. magic

c. tele-communication

d. transport

e. postal services

25. When there was political crisis in 1993 in Nigeria, the military and police used fire-arms and so several people were killed. Firearms are therefore

a. deadly to man

b. friendly to man

c. harmless to man

d. respectful to indigenes

e. mental where indigenes are concerned

SECTION E

Items/Questions on Analysis Level

26. ....deals with power and its use to control the people in a state as well as the other aspects of development. Thus all the other aspects of development in a sense are subject to it.

    a. Social development
    b. Economic development
    c. Cultural development
    d. Religious development
    e. Political development

27. ....concern resources or factors of production. It is the use of material and human resources to produce goods and services to satisfy human wants.

    a. Economic development
    b. Political development
    c. Educational development
    d. Health development
    e. Cultural development

28. ....largely depends on education and health facilities, emphasising how a people live and how they do things. Health facilities also largely depend on education.

    a. Political development
    b. Social development
    c. Economic development
    d. Military development
    e. Religious development

29. ....emphasises power and its use to control a society whereas ....emphasises education and health facilities

    a. Cultural development; military development
    b. Social development; economic development
    c. Military development; political development
    d. Economic development; cultural development
    e. Political development; social development

30. Growth and development both have ideas of....................although the types are different

    a. subtraction
    b. division
    c. addition
    d. stability
    e. moderation

31. Growth is different from development because

    a. growth emphasises quantity but development emphasises quality
    b. growth emphasises quality whereas development emphasises quantity
    c. growth emphasises outward things while development emphasises inward things
    d. growth emphasises inward things but development growth emphasises outward things
    e. one of them is superior to the other

32. Traditional religion, Islam, and Christianity all have basic link between human beings and the Supreme Being (God/Allah)

    a. angels
    b. spirits
    c. satan
    d. belief in smaller goods by traditional believers, belief in Mohammed by Muslims, and belief in living Son of God.
    e. Spirits and satan

33. Economic development is different from political development because

    a. political development concerns resources and their use to satisfy human wants while economic development is about power and its use to control a state
    b. economic development concerns resources and their use to satisfy human wants whereas political development is about power and its use to control a state
    c. political development concerns money while economic development is about society
    d. economic development is about people whereas political development talks about learning

e. economic development is calculating while political development has to do with fighting

34. Although dancing is part of social development, it is also part of cultural development because
    a. it concerns human beings
    b. it concerns human beings and non-human beings
    c. Nigerians like it
    d. Every society likes it
    e. It is a way of doing things in a society

SECTION F

Items/Questions on Synthesis Level

35. Education, health, and culture can be grouped under social development because
    a. each of them has something to do with how a people live
    b. each of them has something to do with human beings
    c. each of them is in society
    d. each of them is in a nation
    e. each of them helps man

36. Increases in society which also have good quality are usually used to help man live better. Man looks at this better life seriously by examining every detail of it. If he feels satisfied, he leaves the details, if not, he re-arranges them. This process can be called
    a. underdevelopment
    b. utilization
    c. underutilization
    d. development
    e. retrogression

37. This object  is best described as
    a. 'two rectangles with two lines cutting through the two rectangles
    b. a cross on two blocks
    c. a smaller rectangle in larger rectangle with two lines cutting through the two rectangles

d. two lines on two blocks

e. two blocks having two lines

38. This diagram  is best described as

a. three circles in a place

b. three circles on one another

c. three joined lines

d. many dots which formed lines which are joined

e. a smaller circle inside a bigger circle with an intermediate circle on them

39. 'People live in better houses although the environmental sanitation in the urban centres is worse than in the rural areas. Our cities are generally dirty and the stench from the opwn gutters is bad. ' This quotation can be best replaced by

a. In urban centres, people live in better houses

b. In urban centres, people enjoy better accommodation than in rural areas but the rural areas have better environmental sanitation

c. In rural areas, people have better air properties

d. In urban centres, people have better environment and better accommodation

40. 'The village was largely self-supporting. Requirements were simple and those that could not be met in the village could easily be found in the market.' This quotation can be replaced by

a. The village provided everything

b. The village provided little

c. The market provided much

d. The village provided much and the market supplied the remaining

e. The village and the market provided half each

41. 'Before 1861, no part of what is nowadays Nigeria was under the rule of any foreign power.'

a. Foreign rule came to Nigeria

b. Foreigners came to Nigeria in 1861

c. Nigeria was independent before 1861 but began to lose independence from 1861

d. Nigeria's map was carried to foreigners in 1861

e. Nigeria's map was not carried by foreigners before 1861.

SECTION G

Items/Questions on Evaluation Level

42. The most important aspect of development is..

   a. political development because political development is superior
   b. cultural development because cultural development helps us to have traditions
   c. military development because military development makes us to be powerful.
   d. Educational development because it gives birth to the aspect of development through learning
   e. Economic development because economic development makes us to be wealthy

43. Although we are development because educationally, we still have a long way to go because

   a. we have many students in our schools and we do not know what to do
   b. human development is still low hence we have serious indiscipline among both old and young people
   c. we have many teachers in schools that are wasting time
   d. our banks are disturbing us
   e. our health facilities are not serving us well

44. We seem to have done best in

   a. economic development because our economy is improving fasting through SAP
   b. social development because our standard of living is high
   c. cultural development because we have put up certain traditions
   d. health development because we have many hospitals, clinics, dispensaries
   e. political development because we are in a military regime

45 Certain harmful aspects of development are

   a. danger to life and property through fire-arms industrial wastes, thefts, accidents because they make man unhappy
   b. hospitals because human beings are cured in them
   c. moderate population because less number of infants die nowadays

d. immigration and emigration because people are now free to move into a country or go out of a country

e. epidemics because diseases have also developed chronique germs

45. One-thing which is slowing our development process is

a. religion because there are many ways of doing it and so we are confused

b. culture because it is too broad to define, therefore we cannot know which aspect to practice at a time.

c. Tradition because life itself is a changing process, so, holding too much to tradition has not allowed us to move fastly enough

d. Formal education because it is taking away out

e. Epidemics because diseases have also developed chronique germs

46. One thing which is slowing our development process is

a. religion because there are many ways of doing it and so we are confused

b. culture because it is too broad to define, therefore we cannot know which aspect to practice at a time.

c. Tradition because life itself is a changing process, so, holding too much to tradition has not allowed us to move fastly enough

d. Formal education because it is taking away our tradition which would have helped us to develop fastly

e. Society because it is too large for us to manage

47. One thing which we must do to help us develop is

a. be neutral about our own trays and those of others so that nature may do it for us

b. not do things in our own ways because we do not know what to do

c. do things the way other countries do them because the other countries know better

d. do things in our own ways because that is when we shall understand that we are doing and also call then ours

e. forget everything about the past and start afresh because all the old ways are bad

48. One thing which may not help development is

a. increase import duties on costly goods so that it will be difficult for many people to buy them

b. decrease exports and increase imports because that will help us to get more money from other countries

c. decrease both imports and exports when necessary because that will balance our spending and our income

d. increase both imports and exports because that will help usto balance what we are spending and what we are receiving

e. decrease exports and increase imports because that will make us to send more money to other countries

49. It is important to encourage science and technology for development because

a. science is the study of physical or natural things and technology is practically trying out those things to produce goods and services to satisfy human wants

b. science and technology help us to think about religion better

c. science and technology help us to produce military equipment which we use to defend ourselves

d. science and technology helps us to take care of our culture properly because culture is very important

e. science and technology help us to go to the moon and that achievement makes us great people

50. Certain factors which can help us to develop fastly include

a. dishonesty and indiscipline because they are part of fashion or civilization

b. laziness and enjoyment because they bring about easy living

c. hardworking, dedication, and honesty because they will help us to produce goods and services well

d. indiscipline and enjoyment because they make a cost balance

e. enjoyment and dishonesty because they are approved ways for development.

APPENDIX A3II

INSTRUMENT IIIB : ANSWERS TO ACHIEVEMENT TEST I

ASAT I

J S S 11

SOCIAL STUDIES TEST BASED ON ASPECTS OF DEVELOPMENT

SECTION A

Subjects' responses will vary in the I – VI items

SECTION B TO G

There is only one correct option in each of the 1 to 50 questions. The alphabet of each correct option for each question is hereby written against the number of each item as follows:

1.	E	22.	A	43.	B
2.	B	23.	B	44.	C
3.	E	24.	C	45.	A
4.	D	25.	A	46.	C
5.	C	26	E	47.	D
6.	B	27.	A	48.	E
7.	A	28.	B	49.	A
8.	D	29.	E	50.	C
9.	E	30.	C		
10.	C	31.	A		
11.	A	32.	D		
12.	E	33.	B		
13.	D	34.	E		
14.	B	35.	A		
15.	C	36.	D		
16.	A	37.	C		
17.	E	38.	E		
18.	D	39.	B		
19.	C	40.	D		
20.	B	41.	B		
21.	D	42.	D		

NOTE: Each correct option carries one mark and each wrong option carries zero. The total obtainable score is 50

APPENDIX A3III

INSTRUMENT IIIC

FREQUENCY TABLE FOR ANSWERS TO LEARNERS' ACHIEVEMENT TEST (FTAT I)

TABLE FOR FREQUENCY OF ALPHABETS IN THE RIGHT KEYS

ALPHABETS	FREQUENCY IN RIGHT KEY		
	TOTAL FOR EACH ALPHABET	LOW LEVEL	HIGH LEVEL
A	10	5	5
B	10	5	5
C	10	5	5
D	10	5	5
E	10	5	5
TOTAL NO. OF ALPHABETS = 5	EACH ALPHABET APPEARS 10 TIMES TOTAL NO. OF QUESTIONS = 50	EACH ALPHABET APPEARS 5 TIMES =1/2 EACH TOTAL	EACH ALPHABET APPEARS 5 TIMES = 1/2 EACH TOTAL

A BALANCED SET OF FREQUENCY. THERE IS NO ROOM FOR ADVANTAGE BY PICKING ONE ALPHABET MORE THAN OTHERS. MOREOVER, THE OPTIONS (RIGHT KEYS) DO NOT FOLLOW AN ORDER; THEY ARE RATHER RANDOM. AT THE LOW AND HIGH LEVELS TOO, THE RIGHT KEYS ARE BALANCED TO ENSURE FAIRNESS.

APPENDIX A4I

INSTRUMENT IVA

POST-TEST: ACHIEVEMENT TEST II

JSS II

SOCIAL STUDIES TEST ON SCIENCE, TECHNOLOGY AND SOCIETY

Section A

Tick the appropriate box; time allowed is 5 min.

(i) Sex of student: Male ☐ Female ☐

(ii) Age of student: 12 - 13 years ☐
14 – 15 years ☐
16 – 17 years ☐
above 17 years ☐

(iii) Class of student: JSS I
JSS II
JSS III

(iv) Occupation of student's parent/s:

(a) Farming

(b) Trading

(c) Arts and Craft

(d) Professionals e.g. doctors, lawyers, accountants, engineers, teachers

(e) Other/s (name it/them) ....

....

(v) Type of school by gender :

(a) all boys

(b) all girls

(c) both boys and girls

(vi) Highest educational qualification of student's parent/s:

(a) below School Certificate or Grade II

(b) School Certificate or Grade II

(c) NCE or Advance Level

(d) First Degree (B.A./B.Sc./B.A.ED./B.SC.ED./B.ED)

(e) Post Graduate (M.A./M.SC./M.ED/M.P.A./M.B.A./PH.D)

SECTION B TO G

Instruction: Answer all questions by ticking the correct option at the left hand side of the paper.

Time allowed is 55mins

SECTION B

Items on Information

1. Science is
   a. studying
   b. reading and writing
   c. calculating
   d. historical
   e. the study of physical or natural things.
2. Technology is
   a. technical science
   b. the application of knowledge gained from science to solve society's problems
   c. practical work
   d. another work
   e. African Science
3. Society is
   a. social way of life
   b. socialization process
   c. a group of people with a common culture in a geographical area
   d. a group of people
   e. common culture
4. Science and technology are important to society because
   a. they help to control society
   b. they give information
   c. they give education
   d. most concrete things are created by them
   e. they increase the population
5. Aspects of traditional science and technology include
   a. identification of food plants, pot making, brass and bronze casting
   b. innoculation and vaccination
   c. aeroplanes and motor cars

d. radio, television and telephone

e. machine guns and bombs

6. Problems created by science and technology include

a. education

b. bombs and pollution

c. coup d' etats

d. cinema

e. over-population

7. Efforts made to solve the problems created by science and technology include

a. societies fighting one another

b. endurance

c. immigration and emigration

d. provision of good Government

e. organizing research and using knowledge in beneficial areas

8. Science and technology may

a. find solution to most of man's problems in the future

b. not find solution to most of man's problems in the future

c. stop totally in the future

d. not be beneficial in future

e. solve our transport problems in the future.

9. We should use science and technology to

a. fight one another

b. find another world for man

c. increase our population

d. make the world a better home for man

e. steal one another's properties

SECTION C

(Items/Questions for Comprehension)

10. Science may be explained as

a. the study of one society

b. unsystematic and it creates problems

c. the art of reading, writing, and reciting

d. spiritual and abstract

e. being systematic; its study brings about knowledge having to do with definition, observation, experimentation, and analysis

11. Technology may be explained as
    a. the application of knowledge gained from science to solve society's problem; its study has to do with definition, observation, experimentation; and analysis
    b. practical work which emphasises the use of hands and legs
    c. another science which Africans developed
    d. various techniques of doing things
    e. technical science involving drawing.

12. Society may be explained as
    a. social well being of people
    b. socialization among people
    c. social development in all forms
    d. having certain main parts: group of people living together: people with common culture including language, religion, in a particular geographical area.
    e. a group of people without common interest

13. Definition is important in science because
    a. it helps to remove confusion
    b. it does the work for us
    c. it does not involve equipment
    d. it is easy to do
    e. it is what we must do

14. Observation is important in science because
    a. it is theoretical
    b. it is abstract
    c. it is natural or practical experience
    d. it is spiritual
    e. we have eyes to see

15. Experimentation is important in science because
    a. we use laboratory
    b. we not only observe but find ways to test hypothesis
    c. it is experience
    d. we use classroom
    e. it is the third in a science process

16. Analysis is important in science because

  a. it keeps us busy
  b. we gain employment through it
  c. it is interesting to do
  d. it helps us to see clearly
  e. it is a step or way of interpreting data collected.

17. A local society is

  a. the one whose people are uncivilized
  b. limited to two separate geographical locations
  c. limited to one geographical location
  d. the one whose people are uneducated
  e. concerns all the earth

18. The world society

  a. is limited to one geographical location
  b. concerns all the earth
  c. is the one whose people are uncivilized
  d. is the one whose people are uneducated
  e. is not limited to one geographical location

SECTION D

(Items/Questions on Application)

19. Nowadays we use motor vehicles to move from one place to another; we also use aircrafts to move in the air from one place to another. These ideas mean that through science and technology we have directly improved our

  a. transport system
  b. social system
  c. communication system
  d. economic system
  e. political system

20. Through science and technology we have developed high breeding seedlings which increase our agricultural productions. Science and technology therefore directly render .... to modern man.

  a. useful political services
  b. useful health services

c. useful educational services

d. useful economic services

e. useful military services

21. When I am working, I put a time piece by my side so that I can often look at it as I work. The use of wristwatch therefore helps to

a. make me look big when working

b. show that I have money

c. avoid time wasting

d. keep my eyes busy when working

e. fulfil a work condition for me

22. Biro, which is a product of science and technology, is used for writing. The use of biro, therefore, has directly helped man's

a. postal system

b. transport system

c. tele-communication system

d. transport and tele-communication system

e. communication system

23. Through vehicles, accidents often happen. It seems that there is no way we can avoid accident as long as we use vehicles. These accidents can be called a disadvantage from

a. political organization

b. religious development

c. art and craft

d. science and technology

e. military organization

24. There are bombs, nowadays, which can destroy the whole world (man and every living things) within a short time and these bombs are products of science and technology. It means that science and technology can

a. be harmful to man

b. cannot bring an end to the world

c. bring an end to the world, suddenly

d. bring a gradual end to the world

e. be dangerous, to man's existence

25. Mixing of different chemicals to make drugs, using several irons as equipment, and long training of human beings are processes developed through science and technology. However, these processes relate more to

a. library

b. hospital

c. machine gun

d. projector

e. school

SECTION E

(Items/Questions on Analysis)

26. Definition, observation, experimentation, and analysis are the four main parts of science and technology. However, definition serves the others in the sense that

    a. it is like key which opens for the others, it clarifies things for the others

    b. it is before the others

    c. the others are after it

    d. the others are inferior to it

    e. it is superior to the others according to the laws of science and technology

27. The four processes of science and technology: definition, observation, experimentation, and analysis are in a sense dependent on the last one, that is, analysis because

    a. analysis is an orderly way of interpreting data

    b. every data has to be touched in analysis

    c. it is last of the four processes

    d. the other processes are before it

    e. if the data collected through the first three processes are not well analysed, the whole work will spoil

28. The four processes of science and technology: definition, observation, experimentation, and analysis are at a time dependent on observation because

    a. observation must take its turn

    b. observation is a law of science

    c. without observation, we cannot know how certain things function

    d. it comes after definition

    e. it comes before experimentation and analysis

29. The four processes of science and technology, that is, definition, observation, experimentation, and analysis must at time, wait for experimentation because

    a. it completes the practical aspect which was started by observation through which data can be collected

    b. it is good to perform experiment

c. experimentation is the third step

d. it comes before analysis

e. experimentation must take its turn in science and technology

30. Observation is different from experimentation because

a. observation helps us to serve what is above, experimentation helps us to serve what is below

b. observation helps us to serve what is underneath, experimentation is an expert doing something in science

c. observation is watching the good side of a process of science, experimentation is trying to note when a process of science will end.

d. observation is a step to experimentation meaning that experimentation comes after observation

e. observation is watching the good side of a process of science while experimentation has to do with the total process

31. Science and technology are similar in a sense because both of them have to do with

a. definition and analysis

b. definition, observation, experimentation, and analysis

c. definition, observation and experimentation

d. observation and experiment

e. observation, experimentation and analysis.

32. Science is different from technology because

a. the two words have different spellings and so must be different

b. technology is superior to science

c. technology is more of theory while science is more of practical

d. science is superior to technology

e. science gives us basic knowledge on how to do something whereas technology is applying knowledge gained from science to show societies problems.

33. Traditional science and technology and modern science and technology are similar because both of them have to do with

a. the use of herbs and production of arms

b. mixing up of various things to produce medicine

c. the use of herbs, mixing up of various things to produce medicine, production of arms, identifying food crops

d. mixing up of various things to produce medicine and arms

e. the use of herbs and identifying food crops

34. Modern science and technology are different from traditional science and technology because

a. Tradition and modern are not the same and so they are different from one another.

b. Traditional ones are better than modern ones in the area of transportation.

c. Traditional ones turned poisonous roots to harmless foodstuffs, modern ones could not

d. Traditional ones were more effective in the production of household facilities.

e. Generally, modern science and technology are more refined and more effective in the production of goods and services in both quantity and quality.

SECTION F

(Items/Questions on Synthesis)

35. Science and technology are products of society to serve society. By making things easier for man, science and technology are serving society. The society in turn serves science and technology by

a. improving them through hardwork, dedication, and sacrifice

b. being subject to science and technology

c. being neutral to science and technology

d. being above science and technology

e. enjoying the products of science and technology

36. .... are the different stages in a .... Therefore, removal of one or more of them will make the process incomplete because the stages are to be followed step by step.

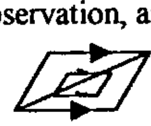
a. Experimentation and definition; social process.

b. Experimentation, definition, and observation; economic process

c. Observation, experimentation and analysis; craft process

d. Definition, observation, experimentation, and analysis; scientific process

e. Definition, observation, and analysis; art process

37. This object  is best described as

a. one line on two parallelograms

b. two parallelograms and a line

c. a smaller parallelogram inside a larger parallelogram with a line cutting through them.

d. nine lines

f. eight lines with arrows and a ninth line without arrow.

38. This object  is best described as

a. three triangles
b. a smaller triangle inside a larger triangle with an intermediate triangle on them
c. one triangle on two triangles
d. nine lines
e. nine joined lines

39 'The truth .... is that all ancient societies had some form of science and technology. They were not in the form in which we know them today. But it was from such ancient beginnings that the present structure was built'. This quotation can be replaced by

a. There were types of science and technology in all ancient societies
b. The types of science and technology which we had in ancient times were different
c. The present types of science and technology developed from the ancient types
d. Although ancient societies had types of science and technology those ones were simpler than what we have today
e. All ancient societies had simpler types of science and technology and the modern types developed from the ancient types.

40. "The result of this great advancement is that science and technology touches on everything we do. Any idea can be investigated scientifically and this process produces a great body of knowledge". This quotation can be replaced by

a. There had been great advancement in science and technology making them to influence everything that man does
b. The great advancement of science and technology make them to influence everything man does; any idea can be studied step by step to result in much knowledge
c. There has been a great advancement in science and technology
d. Any idea can be studied step by step
e. Any idea can be studied step by step and this process results in knowledge

41. "The role of science and technology in the future of mankind is bound to be very great". This means that

a. Science and technology have a role
b. Science and technology have a role today

c. Science and technology have a role to play in man's future

d. The role which science and technology will play in man's future will be great

e. The role of science and technology is the future of mankind

SECTION G

(Items/Questions on Evaluation)

42. Science and technology are beneficial to society because they

a. produce electricity, radio, easy means of transport and communication, improve social and economic services which make life better for man

b. cause accidents which may lead to loss of life

c. are neutral to society in the production of goods and services

d. have improved our transportation system

e. have improved our communication system

43. Science and technology have done more good than harm to society because

a. science and technology have caused danger to man

b. whether through accidents or not, human beings normally die

c. although people even die through accidents, life is today, more comfortable to man through science and technology

d. science and technology have polluted our environment

e. science and technology have brought about drug abuse

44. Modern science and technology have contributed more to society than traditional science and technology. This is because

a. traditional science and technology gave birth to modern science and technology

b. traditional science and technology were in existence before modern science and technology

c. modern science and technology are current

d. modern science and technology are more refined and more effective in the production of goods and services in both quantity and quality

e. the products of traditional science and technology are too many

45. It is important to encourage science and technology for fast development because

a. science and technology help us to produce military equipment which we use to defend ourselves

b. science and technology help us to think about religion better

c. science is the study of physical or natural things and technology is practically trying out those things to produce goods and services to satisfy human wants

d. science and technology help us to take care of our culture properly because culture is very important

e. science and technology help us to go to the moon and the achievement makes us great people.

46. Nigeria has not developed its own science and technology. One main reason is

a. we were supposed to wait till now to develop our own science and technology

b. we have too man blacksmiths so we cannot take care of them

c. we do not have raw materials with which to produce goods and services.

d. we hated science and technology before now

e. low human development hence we have serious indiscipline among both young and old people

47. Traditional science and technology did a good job for modern science and technology because

a. traditional science and technology helped modern science and technology

b. traditional science and technology laid the foundation for modern science and technology and so modern, science and technology are simply building upon traditional science and technology.

c. modern science and technology are just enjoying the works of traditional science and technology

d. traditional science and technology are the raw materials of modern science and technology

e. modern science and technology depend upon traditional science and technolgy

48. One thing which we must do to help us develop our science and technology is

a. be neutral about our own ways and those of others so that nature may do them for us.

b. not do things in our own ways because we do not know what to

c. do things the way other countries do them because the other countries know better.

d. do things in our ways because that is when we shall understand what we are doing and also call them ours.

e. forget everything abut the past and start afresh because all the old aspects of science and technology are bad.

49. Certain factors which can help us to develop our science and technology fastly include

a. dishonesty and indiscipline because they are part of fashion and civilization

b. hardwork, dedication, and honesty because they will help us to produce goods and services well

c. laziness and enjoyment because they are approved ways for development.

d. Indiscipline and enjoyment because they make a good balance

e. Enjoyment and dishonesty because they are approved ways for development

50. Science and technology will continue to play important role as long as life continues because

a. science and technology are the clear ways of dealing with nature in all aspects to improve man's life

b. science and technology require step by step study which is helpful.

c. science and technology help us politically which is very important

d. science and technology help us economically to make money

e. science and technology help us traditional so that we can help our traditions.

APPENDIX A4II

INSTRUMENT IVB: ANSWERS TO LEARNERS ACHIEVEMENT TEST II (ASAT II)

JSS II

SOCIAL STUDIES TEST ON SCIENCE, TECHNOLOGY AND SOCIETY

SECTION A

Subjects' responses will vary in the I - VI items.

SECTION B TO G

There is only one correct option in each of the 1 to 50 questions. The alphabet of each correct option for each question is hereby written against the number of each question.

1.	E	18.	B	35.	A
2.	B	19.	A	36.	D
3.	C	20.	D	37.	C
4.	D	21.	C	38.	B
5.	A	22.	D	39.	E
6.	B	23.	D	40.	B
7.	E	24.	C	41.	D
8.	A	25.	B	42.	A
9.	D	26.	A	43.	C
10.	E	27.	E	44.	D
11.	A	28.	C	45.	C

12.	D	29.	A	46.	E
13.	A	30.	D	47.	B
14.	C	31.	B	48.	D
15.	B	32.	E	49.	B
16.	E	33.	C	50.	A
17.	C	34.	E		

NOTE: Each correct option carries one mark and each wrong option carries zero. The total obtainable score is 50.

APPENDIX A4III

INSTRUMENT IVC

FREQUENCY TABLE FOR ANSWERS TO LEARNERS ACHIEVEMENT TESTII (FTAT II)

POST TEST BASED ON SCIENCE, TECHNOLOGY AND SOCIETY

TABLE FOR FREQUENCY OF ALPHABETS IN THE RIGHT KEYS

ALPHABETS	FREQUENCY IN RIGHT KEY		
	TOTAL FOR EACH ALPHABET	LOW LEVEL	HIGH LEVEL
A	10	5	5
B	10	5	5
C	10	5	5
D	10	5	5
E	10	5	5
TOTAL NO. OF ALPHABETS = 5	EACH ALPHABET APPEARS 10 TIMES TOTAL NO. OF QUESTIONS = 50	EACH ALPHABET APPEARS 5 TIMES =1/2 EACH TOTAL	EACH ALPHABET APPEARS 5 TIMES = 1/2 EACH TOTAL

WE HAVE A BALANCED SET OF FREQUENCY. THERE IS NO ROOM FOR ADVANTAGE BY PICKING ONE ALPHABET MORE THAN OTHERS. MOREOVER, THE OPTIONS (RIGHT KEYS) DO NOT FOLLOW AN ORDER; THEY ARE RATHER RANDOM. AT THE LOW AND HIGH LEVELS TOO, THE RIGHT KEYS ARE BALANCED TO ENSURE FAIRNESS.

APPENDIX A5

INSTRUMENT V

SOME GUIDE LINES FOR THE TRAINING OF TEACHERS (GLTT)

A. Definition of key concepts of the project:

Cooperative teaching

Competitive teaching

Good quality instruction

High Ability

Low Ability

Cognitive Levels of knowledge/ Thoughts.

B. Example of training procedure Okebukola (1984)

Phase I: General introduction on the various segments of the study but no indication of the hypotheses to be tested.

Phase 2: Special training of individual group teachers: Cooperative and Competitions separately: model lessons based on each of the conditions.

Phase 3: Teachers in training tried out things following phase 2. Each participating teacher organized three practical lessons based on his or her assigned mode. Each lesson presentation was thoroughly discussed by all members of the group.

Phase 4: Training in the administration of instrument. Provision of Instruction Booklet to the participating teachers containing:

a. General description of the experiment

b. Protocols for each condition

c. Mode of Pre and Post Tests administrations

d. Flow chart of the study's procedure

Phase 5: Assessment of trainee teachers in each group to determine competence.

FOR THIS STUDY/EXPERIMENT

C. I Cooperative strategy

Principle: Working together as a group in ideas, assignments, submissions or conclusions.

No. in group: the number in each group will be 6 on the average

Ability groups: three ability groups will be used:

High ability

Low ability

Mixed ability (High and Low abilities together)

Main techniques required: questioning, discussion, application of content to life situations, lecture should be sparingly used.

II. Competitive strategy

Principle: strugling to outperform one another in class assignments, ideas generation, submissions or conclusions.

No in group: this is just theoretical, but the average number will also be 6.

Ability groups: three ability groups will be used

High ability

Low ability

Mixed ability (High and Low abilities together)

Main techniques required: questioning, discussion, application of content to life situations, lecturing should be sparingly used.

D. Cognitive Levels: Bloom's Taxonomy will be the focus. Other authorities like Tanner and Tammer and Yoloye will be used to supplement Bloom's taxonomy. The emphasis shall be to ensure the high cognitive levels in the classroom.

E. How to write a Good Lesson Note: ability to represent all that a teacher intends to achieve based on A - D above, on paper, shall be the professional destination of the training procedure, preceding the Competence/End of Training Test.

The emphasis on how to ensure the high cognitive levels in the classroom should be clear in the cognitive levels objectives' formulation

APPENDIX A6

INSTRUMENT VI

GENERAL INSTRUCTIONS TO TEACHERS (GIT)

1. Divide the learners in each class for experiment into groups of 6 as follows:

   -High Ability: all the 6 learners should have scored 60% and above in the first test

   - Low Ability: all the 6 learners whose scores are below 60% in the first test

   - Mixed ability: take 3 learners each from both High and Low ability groups and form a third group.

2. Employ teaching techniques such as

   - questioning
   - discussion
   - application of content to life situations
   - information giving (lecture) should be minimised.

   The questions and discussions should enable the learners to understand issues clearly such that they would be capable of applying those things learnt; they should be able to analyse, synthesis, and evaluate things/situations.

3. Take the each unit work as meant for a week
4. Formulate objectives for each unit
5. Formulate objectives for the whole experiment by incorporating all the units
6. Plan and write your Lesson Note in good time to ensure adequate preparation.
7. At the end of each unit, administer the corresponding test.
8. Ensure that you teach for a minimum or 20 periods in the course of the experiment, let the periods be proportionately distributed.
9. Record the periods as you teach them for accountability
10. At the end of the whole experiment, administer the over all test.

APPENDIX IX A7

INSTRUMENT VII

COGNITIVE LEVELS AND HOW TO ENSURE THEM IN THE CLASSROOM (CLHEC)

(RATING SCALE)

1. **INFORMATION/RECALL:** The teacher or learner asks questions which require little thinking and little explanation e.g. when did Nigeria regain independence? The least time and words are enough here either on the part of the teacher or learner.
   Maximum occurrences expected are five times = 5marks

2. **COMPREHENSION:** Classroom interaction should take the form of explanations in personal words on the part of both the teacher and taught. Hence here, more time and words than those used in information/recall are expected.
   Minimum occurrences expected are five times = 10 marks.

3. **APPLICATION:** This is using related and possibly familiar things, that is, putting theory to practice e.g. if the topic is on socialization, the teacher can ask learners to discuss and let them tell one another what each learner has gained from the other; if it is on weather, the teacher can ask any learner about how he/she feels at that point in time. A teacher's resourcefulness seems to be largely called to action here.
   Minimum occurrences expected are five times in a 40 min lesson = 15 marks.

4. **ANALYSIS:** Classroom interaction gets to its highest level in terms of comprehensiveness, comparisons and contrasts, discriminations, components: rigorous touch of every detail e.g. a curriculum contains four main parts: objectives, content, methodology, evaluation. These components will have to be in turn clearly addressed one after another. Much time and patience on the part of the teacher are required here. The teacher's philosophical ability is questioned.
   Minimum occurrences expected in a 40 min lesson are five times = 20 marks.

5. **SYNTHESIS:** The interaction here is to link related parts to form a meaningful whole. Learners must be made aware of why those parts can be joined together and why if any part is exchanged with an extraneous material, it becomes a square peg in a round hole. This is supposed to show why for example, the collar of a shirt cannot be joined to sleeve. Synthesis is a kind of adequate summary.

Minimum occurrences expected in a 40 min lesson are five times = 25 marks.

6. **EVALUATION:** Classroom interactions at the judgment level. If we consider something good, learners need to know why that thing is good and if we consider something bad, learners also need to know. Fair or reasonable judgement seems to give the learner a kind of final understanding about an issue, which only puts the rational man's intellect at rest. Apparently, the teacher needs to be patient and accommodating here. The highest level of emotional maturity on the part of the teacher is called for: some learners might not get things as quickly as expected.
Maximum occurrences expected in a 40 min lesson is five times = 30 marks.

NOTE

1. The first level attracts 5 marks.
2. Each succeeding level increases by the first score: 5.
3. The total obtainable score is 105 marks.
4. The total score for the first two levels is 15
5. The total score for the latter three levels is 90:six and a half times the first three levels.
6. In all the six levels, Information (Recall) level is expected five times maximum, but that number (five) is the minimum expected in all the others. That means that recall/information operations are least expected from participating teachers.
7. Both theoretically (qualitatively) and practically, it is visible that the high cognitive levels (3-6) carry more weight.
8. Your major tools for the realization of others are Comprehension and Analysis(the second and the fourth levels respectively).
9. Your major tools to make the learners operate at high cognitive levels are Comprehension and Analysis consequently.
   Teaching briefly, stress Comprehension and Analysis in your situation. The use of dictionary in class is vital to facilitate learning at these two levels.

APPENDIX A8

INSTRUMENT VIII

EXPERIMENT ON HIGH COGNITIVE LEVELS IN RELATION TO COOPERATIVE AND COMPETITIVE STRATEGIES

INSTRUCTION BOOK-LET (IBETO)

CONTENT

GENERAL *INSTRUCTIONS TO TEACHERS ON THE EXPERIMENT*

1. Divide the students for experiment in each class into groups of 6 as follows:
   - (a) high ability: all the 6 students (take them from students with total score of 60% and above)
   - (b) low ability: all the students (take them from students with a total of below 60
   - (c) mixed ability: 3 from high ability group and 3 from low ability group.
2. Employ teaching techniques such as: questioning, discussion, application of content to life situations; information giving (telling/lecture) should be minimized. The questions and discussions should train the learners in the arts of application, analysis, synthesis, and evaluation if they understand.
3. Consider each unit work as meant for one week
4. Formulate objectives for each unit.
5. Formulate tests for each unit.
6. Formulate objectives for the whole experiment by incorporating all the units.
7. At the end of each unit, administer the corresponding test.
8. Ensure that you teach for a minimum of 20 periods in the course of the experiment.
9. Record the periods as you teach tem for accountability.
10. At the end of the whole experiment, administer the over-all test.

PRINCIPLES FOR ADMINISTRATION OF THE STANDARD TESTS AND THEIR PROCESSING

The standard tests *(first and last) are objective, therefore note the following:*

i the sitting arrangement should be well spaced;

ii be vigilant during the tests;

iii let each learner write his/her name on the top of his/her question and answer sheets provided;

iv. collect every question paper/answer sheets at the end of the test;

v. score over 50 and multiply by 2 to make 100;

vi leave both scores of 50 and 100;

vii record the score of every student in duplicate;

viii hold a copy of the score and submit one copy;

ix after administering the last test, score the learners following the first (side by side: the first on the left and the last on the right);

x. return scripts of the first test after marking;

xi return scripts of the last test after marking;

xii return the sheet containing both scores (side by side);

xiii indicate whether your class was Cooperative Competitive strategy.

HOW TO ENSURE GOOD TEACHING IN THE CLASSROOM

1. Teach properly using discussion and questioning techniques mainly;
2. distribute questions democratically;
3. take care of hidden curriculum e.g. do not allow learners to sleep or wander away in the classroom;
4. use simple, bold, and suitable teaching materials;
5. bring in teaching materials only when they are needed and remove them once you finish using them;
6. use local and familiar materials for illustration;
7. use signs and gesticulations;
8. be humane, humorous, and pleasant;
9. take care of the mouse kind of characterise the class; in short, politely encourage introverts to talk and also politely check extroverts not to monopolise discussions;
10. be moderate when teaching: not too fast and not too slow;
11. do not allow your objectives to be too many in any one lesson; spend about ten minutes on one objective;
12. encourage learners to bring dictionaries to the class and freely use them; dictionary use facilitates understanding and analysis which are two vital high cognitive levels;

13. be explicit and analytical;
14. avoid mixing up ideas and concepts: ensure that you say what you mean.

HOW TO ENSURE COOPERATION IN THE CLASSROOM

1. Make it clear to the learners that cooperation increases the performance of both the fast and less fast learners;
2. encourage every member to work very hard by gathering materials and ideas for an excellent success of the group;
3. divide the learners into groups of 6 following abilities (see General Instructions);
4. let each group members sit near each other;
5. allow group members to discuss among themselves if a question is posed to a group;
6. allow about 30 seconds for one question;
7. let any group member answer any question posed to any group member or the group;
8. let group members put their ideas together if the question demands writing and submit one paper;
9. the score of the paper becomes that of every group member;
10. give them both class and home assignments;
11. give two home assignments in a week;
12. promptly mark the assignments;
13. promptly announce the results of the groups' papers;
14. learners' interaction is basically between the group as a whole and the teacher.

HOW TO ENSURE INDIVIDUALIZED COMPETITION IN THE CLASS

1. Tell the learners to study apart;
2. tell them that you want everybody to struggle and beat the other learner;
3. do not allow them to talk to one another during lessons;
4. tell them to maintain that individualism about academic matters after school;
5. give both class and home assignments;
6. tell them not to allow others to spy what they are writing in class;
7. give three class assignments but two home assignments each week;
8. promptly mark any assignment
9. promptly announce the best score and its owner;
10. challenge others to beat that best learner next time;
11. divide the learners into groups of 6 following ability groups(see General Instruction);

12. sitting arrangement may not change inspite of grouping since the learners are not practically competing; grouping here is therefore limited to paper work;
13. learners interaction is between individuals and the teacher;
14. introduce a material reward system, no matter how small;
15. be vigilant (when making home assignments) to detect contrary practice (cooperation);
16. announce glaring malpractice (cooperation);
17. lightly punish (at least threaten) learners that cooperate;
18. in the classroom, allow learners to think: about 30 seconds on each question.

COGNITIVE LEVELS AND HOW TO ENSURE THEM IN THE CLASSROOM:

PLEASE SEE APPENDIX A7 ABOVE

APPENDIX A9

UNIVERSITY OF LAGOS

FACULTY OF EDUCATION

OBSERVATION SCHEDULE, INDICATORS AND SCORES, FOR TEACHING PRACTICE SUPERVISORS

INSTRUMENT IX GENERAL TEACHING PRACTICE ASSESSMENT INSTRUMENT (GTPAI)

GUIDING FORMAT FOR SUPERVISION.

OBSERVATION SCHEDULE:

1. Lesson planning:- 15 marks
2. Presentation:
    - i. Introduction
    - ii. Mastery of Subject-matter
    - iii. Variety of Methods
    - iv. Practice: relevance adequacy, consolidating.
    - v. Communicative abilities:
    - vi. Motivation: sustenance of interests of learners.
    - vii. Use of visuals

5 marks each with flexibility = 35 - 40marks

3. Evaluation: effective, valid: assessing the teaching and learning done

15 marks

4. Classroom Climate and Discourse:

Lively/dull; teacher-dominated; learner-centred; activity-packed; teacher-pupil, pupil-pupil (peer) interaction, pupil-resources interaction, group, pair work, cross-group activities, group collective responsibility and cohesion.

20 marks

5. Personal Traits of the Teacher:
Pleasantness: dressing, neatness; voice of the teacher, clarity, volume, right in over-populated class; use of visuals as feed-back to teacher; visual contact with learners etc, etc.

10 marks

Total = 100 marks

APPENDIX B

PRE - PILOT PHASE OF THE STUDY

APPENDIX B1

APPLICATION TO SCHOOL PRINCIPALS TO ALLOW STUDENT TEACHERS TEACH SOCIAL STUDIES/ALLOW THE RESEARCHER CARRY OUT AN EXPERIMENT

School of Postgraduate Studies,
Department of Curriculum Studies,
University of Lagos,
Lagos.

14th February, 1993.

The Principal
....
....
....
....

Sir/Madam,

<u>APPLICATION TO USE YOUR SCHOOL FOR EXPERIMENT</u>

I am a Post-Graduate student of the above named Department in the University of Lagos. I shall be very grateful, if you allow me carry out an experiment simultaneously as the Student Teachers from National Institute of Moral and Religious Education (Project TIME) practice in your School, between February 23 and March 31, 1993.

Thank you for your cooperation.

Yours faithfully,

J. D. Kukuru

APPENDIX B2
PRE - PILOT PHASE OF THE STUDY
DETAILS OF SAMPLE

S/NO	NAME OF SCHOOL	TREATMENT EFFECTED	TYPE OF SCHOOL BY GENDER	NO. OF LEARNERS IN EACH CLASS
1	Reagan Memorial Baptist Secondary School, Sabo	Cooperateive	Female	35
2.	Our Lady of Apostles Secondary School, Yaba	Cooperative	Female	26
3.	St. Finbarr's College, Akoka	Competitive	Male	34
4.	Fazil-Omar Secondary School, Iwaya	Competitive	Mixed	26
5.	Jubril Martins Secondary School, Iponri	Lecture Lecture	Mixed Mixed	33 20
	TOTAL NO. OF LEARNERS =			**174**

Date: Feb. ⟶ March, 1993

Duration: 4 Weeks

No. of Periods = 15: 5 periods per week; 1st week for Pre-Test and preparation for treatment.

APPENDIX B3: MEANS AND STANDARD DEVIATIONS OF THE HIGH AND LOW COGNITIVE LEVELS

I

	Means and Standard Deviations of Experimentals only		**Conversion to EqualObtainable Data**	
	Mean	**Standard Deviation**	**Mean Deviation**	**Standard**
LCL	13	2.93	23	5.21
HCL	22	4.41	22	4.41

II.

	Means and Standard Dev. of Controls Only		**Conversions to Equal Obt. Data**	
LCL	11	3.21	20	5.71
HCL	17	5.69	17	5.69

BOTH I & II

Cogn. Level Comb	Mean	St. Dev.
LCL	22	5.46
HCL	20	5.05

APPENDIX B4: PRE - PILOT PHASE OF THE STUDY
CALCULATIONS BETWEEN THE LOW & HIGH COGNITIVE LEVELS

A. LCL VS HCL (EXPERIMENTALS + CONTROL)

$$= \frac{22 - 20}{\sqrt{\frac{5.46}{174} + \frac{5.05}{174}}}$$

$$= \frac{20}{\sqrt{.031 + .029}} = \frac{2.0}{.245}$$

t = 8.16

DF = 172

Significant at .001 (3.291)

$\longrightarrow$

B. LCH VS HCL (EXPERIMENTALS ONLY)

$$= \frac{23 - 22}{\sqrt{\frac{5.21}{121} + \frac{4.41}{121}}}$$

$$= .043 + .037 = \frac{1.0}{.283}$$

t = 3.53

DF = 119

Significant at .001 (3.291)

$\longrightarrow$

Mean of LCL (Controls); SD of LCL

$= 311$ $= 3.21$

$$53 \overline{)572} \quad 261$$

$= 10.79 \longrightarrow = 11 \longrightarrow$; SD $= 3.21 \longrightarrow$

Mean of HCL (Controls) ; SD of HCL

$$= \frac{445 + 437}{53} = \frac{882}{53}$$

$= 16.64 \longrightarrow = 17 \longrightarrow$; $= 5.69 \rightarrow SD = 5.69 \longrightarrow$

APPENDIX B5

COMPARISONS AT THE COMBINATIONS OF THE LOW AND HIGH COGNITIVE LEVELS (LCL & HCL RESPECTIVELY) AT THE POST TEST

GROUP, COMBINATION & NO.	T VALUE	DEGREE OF FREEDOM	SIGNIFICANCE LEVEL	REMARK
CP + CM + LC LCL, vs HCL 174	8.16	172	.001	SIGNIFICANT
CP + CM ONLY LCLL VS HCL 121	3.53	119	.001	SIGNIFICANT

APPENDIX B6

RELIABILITY OF PRE - PILOT PHASE (PPP)

No. of Items	Mean	Standard Deviation
50	27.36	8.23

KR21 =

$$\frac{(50)8.23^2 - 27.36\ (50 - 27.36)}{8.23^2(50 - 1)}$$

$$= \frac{50 \times 67.7329 - 27.36 \times 22.64}{67.7329 \times 49}$$

$$= \frac{2767.2146}{3318.9121} = 0.8338$$

$$= 0.834 \longrightarrow$$

APPENDIX B7
RAW DATA OF PRE - PILOT PHASE

PRE - TEST										POST-TEST										
RS	**X2**	**B**	**C**	**D**	**E**	**F**	**G**	**LCL**	**HCL**	**RS**	**X2**	**B**	**C**	**D**	**E**	**F**	**G**	**LCL**	**HCL**	**CUMU-**
50	**100**	**9**	**9**	**7**	**9**	**7**	**9**	**18**	**32**	**50**	**100**	**9**	**9**	**7**	**9**	**7**	**9**	**18**	**32**	**LATIVE**
43	86	9	7	7	8	7	5	16	27	48	96	9	8	7	9	6	9	17	31	001
43	86	8	8	7	8	7	5	16	27	42	84	9	7	6	6	5	9	16	26	002
41	82	7	8	7	5	7	6	15	26	46	92	9	7	6	9	6	9	16	30	003
41	82	6	6	7	8	7	7	12	29	37	74	7	5	7	7	5	6	12	25	004
41	82	8	7	7	8	7	4	15	26	42	84	8	9	6	8	3	8	17	25	005
39	78	6	8	6	8	6	5	14	25	40	80	9	8	5	8	5	5	17	23	006
39	78	5	7	7	7	6	7	12	27	43	86	9	7	7	9	3	8	16	27	007
38	76	5	8	7	7	7	4	13	25	46	92	9	6	7	9	6	9	15	31	008
37	74	6	8	6	7	5	5	14	23	41	82	8	7	6	8	6	9	15	26	009
36	72	7	7	7	7	5	3	14	22	40	80	7	6	5	7	5	9	13	26	010
33	66	6	6	7	7	5	2	12	21	43	86	8	9	5	8	4	9	17	26	011
31	62	6	6	4	6	5	4	12	19	37	74	8	7	6	5	4	7	15	22	012
34	68	6	8	6	5	6	3	14	20	45	90	9	9	7	6	5	9	18	27	013
36	72	5	5	6	8	5	7	10	26	37	74	9	5	6	8	4	5	14	23	014
35	70	6	6	6	7	6	4	12	23	41	82	8	6	7	8	3	9	14	27	015
33	66	5	7	7	6	5	3	12	21	40	80	8	8	6	6	5	7	16	24	016
33	66	6	7	6	8	4	2	13	20	43	84	6	7	7	8	6	8	13	29	017
33	66	3	7	7	8	5	3	10	23	37	74	9	5	5	6	4	8	14	23	018
35	70	4	6	6	7	6	6	10	25	38	76	9	5	1	9	5	9	14	24	019
36	72	6	8	6	7	5	4	14	22	45	90	9	7	7	9	4	9	16	29	020
34	68	7	6	6	7	5	3	13	21	37	74	8	6	6	7	4	6	14	23	021
34	68	6	6	7	7	4	4	12	22	41	82	9	8	7	7	6	4	17	24	022
32	64	7	7	5	6	4	3	14	18	45	90	8	8	6	8	7	8	16	29	023
37	74	7	6	6	9	4	5	13	24	42	84	7	7	7	7	6	8	14	28	024
37	74	6	7	7	7	5	5	13	24	43	86	8	8	7	7	6	7	16	27	025
33	66	6	7	6	6	5	3	13	20	45	90	8	7	7	8	6	9	15	30	026
31	62	7	7	6	4	4	3	14	17	44	88	8	8	6	9	4	9	16	28	027
30	60	5	6	6	6	5	7	11	19	42	84	7	8	6	9	5	7	15	27	028
37	74	8	7	6	7	6	3	15	22	41	82	8	7	6	7	6	7	15	26	029

PRE - TEST										POST-TEST										
RS	X2	B	C	D	E	F	G	LCL	HCL	RS	X2	B	C	D	E	F	G	LCL	HCL	CUMU-
50	100	9	9	7	9	7	9	18	32	50	100	9	9	7	9	7	9	18	32	LATIVE
34	68	6	6	7	5	5	5	12	22	43	86	8	7	7	8	5	8	15	28	030
33	66	4	7	5	7	5	5	11	22	45	90	9	7	7	8	6	8	16	29	031
34	68	6	7	7	6	5	3	13	21	38	76	8	7	4	8	5	7	14	24	032
29	58	4	7	5	4	4	5	11	18	33	66	8	2	7	8	2	6	10	23	033
28	56	5	4	6	5	4	4	09	19	39	78	7	6	6	9	4	7	13	26	034
29	58	4	6	7	5	5	2	10	19	41	82	8	6	7	6	6	8	14	27	035
25	50	2	2	6	6	4	5	64	21	25	50	3	4	4	7	2	5	07	18	036
13	26	31	1	1	2	3	3	04	09	26	52	6	5	1	5	4	5	11	15	037
32	64	3	5	7	7	6	4	08	24	30	60	8	4	6	5	1	6	12	18	038
28	56	5	5	5	4	5	4	10	18	32	64	7	6	6	6	1	5	13	18	039
33	66	5	5	7	6	6	4	10	23	34	68	8	5	5	7	3	5	13	20	040
30	60	3	3	7	7	6	4	06	24	31	62	7	5	5	5	3	6	12	19	041
24	48	3	3	7	5	2	4	06	18	30	60	6	3	5	7	3	6	09	21	042
24	48	3	3	6	4	4	4	06	18	24	48	7	4	3	6	2	2	11	13	043
31	62	3	5	7	6	6	4	08	23	32	64	7	6	5	6	2	6	13	19	044
31	62	5	3	7	6	6	4	08	23	33	66	8	5	6	5	2	7	13	20	045
17	34	3	5	3	2	1	3	08	09	30	60	6	6	4	7	4	2	12	17	046
29	58	3	6	6	6	5	3	09	20	22	44	5	3	5	4	1	4	08	14	047
29	58	3	3	6	7	6	4	06	23	29	58	6	5	4	4	4	6	11	18	048
30	60	3	3	7	7	3	01	06	24	78	56	6	4	5	4	4	5	10	18	049
33	66	4	5	7	6	7	4	09	24	33	66	7	3	5	6	4	7	10	32	050
26	54	4	4	5	5	4	4	08	18	25	50	45	5	5	3	2	6	09	16	051
31	62	3	5	7	6	6	4	08	23	32	64	7	4	6	6	2	7	11	21	052
30	60	3	4	6	7	6	4	07	23	31	62	8	5	6	5	2	6	13	19	053
28	58	3	2	6	7	5	5	05	23	30	60	7	4	5	4	4	5	11	18	054
37	74	6	5	7	8	5	6	11	26	38	76	8	6	6	6	3	9	14	24	055
12	24	2	2	2	2	2	2	04	08	30	62	7	2	4	7	3	7	09	21	056
6	12	1	1	1	1	1	1	02	04	26	52	4	4	3	8	2	6	08	19	057
29	58	3	4	7	7	5	3	07	22	26	52	5	6	2	4	4	5	11	15	058
28	56	4	4	7	5	4	4	08	20	30	60	7	4	5	6	2	6	11	19	059
28	56	4	7	6	4	3	4	11	17	33	66	6	5	5	7	4	6	11	22	060
28	56	5	6	6	3	5	3	11	17	42	84	8	6	7	8	5	8	14	28	061

PRE-TEST										POST-TEST										
RS	X2	B	C	D	E	F	G	LCL	HCL	RS	X2	B	C	D	E	F	G	LCL	HCL	CUMU-
50	100	9	9	7	9	7	9	18	32	50	100	9	9	7	9	7	9	18	32	LATIVE
37	74	6	8	7	5	5	6	14	23	39	78	7	8	7	7	4	6	15	24	062
40	80	6	7	7	7	6	3	13	27	48	96	9	9	7	8	6	9	18	30	063
35	70	6	6	6	7	5	5	12	23	43	86	9	8	6	7	5	8	17	26	064
35	70	5	6	5	9	6	4	11	24	38	76	8	9	7	5	4	5	17	21	065
34	68	6	8	7	6	4	3	14	20	41	82	9	5	6	8	4	9	14	27	066
34	68	5	9	6	5	6	3	14	20	39	78	9	8	6	6	2	8	17	22	067
34	68	5	01	5	5	5	7	12	22	4	82	9	8	6	7	4	7	14	18	068
33	66	5	8	6	7	3	4	13	20	42	84	9	7	6	7	5	8	16	26	069
14	28	2	2	2	5	1	2	04	10	30	60	4	4	4	6	4	8	08	22	070
12	24	2	2	1	2	3	2	04	08	14	28	3	2	1	2	2	4	05	09	071
11	22	2	2	2	1	0	4	04	07	29	58	5	3	5	7	2	7	08	21	072
32	64	5	6	7	6	5	3	11	21	41	82	9	6	6	8	3	9	15	26	073
30	60	3	7	7	7	4	2	10	20	44	88	9	8	7	6	5	9	17	27	074
31	62	5	5	6	6	4	5	10	21	30	12	8	6	7	4	4	7	14	22	075
10	20	3	0	2	2	2	1	03	07	15	30	3	3	2	0	1	6	06	09	076
09	18	1	3	2	1	1	1	04	05	24	48	5	3	4	3	22	7	08	16	077
29	58	4	5	6	5	4	5	09	20	37	74	9	6	5	6	5	6	15	22	078
30	60	7	5	6	5	5	2	12	18	25	50	5	5	4	4	4	3	10	15	079
30	60	4	5	6	4	5	6	09	21	43	86	9	9	6	8	4	7	18	25	080
28	56	3	8	5	3	5	4	11	17	33	66	9	6	6	4	2	6	15	18	081
28	56	4	3	7	5	3	6	07	21	22	54	4	6	4	5	4	4	10	17	082
26	52	4	4	6	3	6	3	08	18	34	68	8	4	6	5	4	7	12	22	083
21	42	4	4	3	4	4	2	08	13	25	50	5	3	5	2	4	6	08	17	084
25	50	3	2	6	4	4	6	05	20	31	62	8	5	6	5	4	3	13	18	085
25	50	3	5	7	6	2	2	08	17	27	54	7	4	6	3	2	5	11	16	086
24	48	4	4	6	3	3	4	08	16	34	68	8	5	6	3	4	8	13	21	087
25	50	2	5	6	4	4	4	07	18	39	78	9	7	5	8	3	7	16	23	088
23	46	4	4	5	4	3	3	08	15	33	66	6	8	5	5	3	6	14	19	089
23	46	3	9	5	3	4	1	10	13	40	80	8	8	7	6	3	8	16	24	090
23	46	3	3	5	6	4	2	06	17	39	78	9	7	7	6	4	6	16	23	091
22	44	5	4	4	3	5	1	09	13	36	72	9	6	6	6	4	5	15	21	092
22	44	2	5	6	2	3	4	9	15	33	66	7	7	6	5	3	5	14	19	093

			PRE - TEST									POST - TEST								
RS	X2	B	C	D	E	F	G	LCL	HCL	RS	X2	B	C	D	E	F	G	LCL	HCL	CUMU-
50	100	9	9	7	9	7	9	18	32	50	100	9	9	7	9	7	9	18	32	LATIVE
21	42	4	6	4	5	0	2	10	11	33	66	9	5	6	6	4	3	14	19	094
21	42	2	2	6	3	4	4	04	17	30	60	8	2	5	7	2	6	10	20	095
42	84	8	8	6	8	7	5	16	26	40	80	7	9	6	5	6	7	16	24	096
34	68	6	7	7	8	4	2	13	21	39	78	6	8	5	5	6	9	14	25	097
33	66	6	6	6	9	4	2	12	21	30	60	5	8	5	3	5	4	13	17	098
33	66	6	6	5	7	5	4	12	21	36	72	7	7	6	5	5	6	14	22	099
33	66	4	8	6	5	7	3	12	21	34	78	7	5	6	5	6	5	12	22	100
34	68	6	8	6	7	4	3	14	20	35	70	7	8	5	3	4	8	15	20	101
31	62	5	6	6	6	5	3	11	20	32	64	6	6	5	4	5	6	12	20	102
29	58	5	5	6	6	5	2	10	19	30	60	5	6	6	3	6	4	11	19	103
22	64	5	5	6	6	3	7	10	22	26	52	5	5	3	4	5	4	10	16	104
27	54	4	7	7	3	1	5	11	16	81	62	6	6	5	2	5	7	12	19	105
27	54	4	7	7	3	3	3	11	16	30	60	5	6	5	3	6	5	11	19	106
27	54	6	7	5	3	3	3	13	14	22	44	6	2	3	4	3	4	08	14	107
23	46	3	4	5	0	7	4	07	16	24	48	5	6	4	3	4	2	11	13	108
22	44	2	3	6	6	4	1	05	17	27	54	4	6	6	3	4	4	10	17	109
28	56	5	4	6	4	3	6	09	19	29	58	6	6	6	5	3	3	12	17	110
22	44	2	5	6	3	2	4	07	15	28	56	5	6	3	6	4	4	11	17	111
20	40	4	4	4	3	4	1	88	12	28	56	6	7	3	4	4	4	13	15	112
20	40	1	4	5	4	4	2	05	15	31	62	4	8	5	4	5	7	10	21	113
19	38	0	4	6	3	4	2	04	15	29	58	5	5	4	6	5	4	10	19	114
15	30	1	1	1	4	6	2	02	13	22	54	4	5	5	7	3	3	09	18	115
20	40	1	5	5	3	2	4	06	14	30	60	6	8	5	3	5	3	14	21	116
16	30	2	3	2	2	3	4	05	11	39	78	7	7	5	6	7	7	14	25	117
16	32	3	3	4	1	3	2	06	10	26	52	5	4	4	5	4	3	09	16	118
14	28	1	3	2	2	2	4	04	10	32	64	5	6	6	5	4	6	11	21	119
18	26	5	5	2	2	2	2	10	08	23	46	2	4	5	4	4	4	06	17	120
11	22	2	1	1	3	0	4	03	08	23	46	6	3	4	4	3	3	09	14	121
31	62	5	5	7	8	3	3	10	21	26	52	6	5	6	3	2	4	11	15	122
30	60	4	7	5	6	4	4	11	19	15	30	4	3	0	6	1	1	07	08	123
37	74	7	8	7	6	5	4	15	22	20	40	3	3	4	3	5	3	06	15	124
24	48	6	5	4	4	2	3	11	13	26	52	6	5	4	4	4	3	11	15	125
29	58	4	6	5	6	2	6	10	19	21	42	5	4	4	1	3	4	09	12	126

			PRE - TEST									POST-TEST								
RS	X2	B	C	D	E	F	G	LCL	HCL	RS	X2	B	C	D	E	F	G	LCL	HCL	CUMU-
50	100	9	9	7	9	7	9	18	32	50	100	9	9	7	9	7	9	18	32	LATIVE
34	68	5	7	6	5	7	4	12	22	25	50	4	5	3	4	5	4	09	16	127
22	44	4	5	5	4	3	1	09	13	24	48	5	5	5	3	3	3	10	14	128
39	78	7	7	7	8	5	5	14	25	20	40	6	7	3	1	3	0	13	07	129
26	52	4	6	4	4	3	5	10	16	19	38	1	6	4	5	1	2	07	12	130
38	76	7	6	6	6	7	6	13	25	23	46	4	4	3	4	5	3	08	15	131
27	54	2	5	7	4	6	3	07	20	22	44	2	4	3	7	2	4	06	16	132
38	76	6	7	7	7	6	5	13	25	21	42	6	6	3	2	0	4	12	09	133
32	64	6	6	6	4	6	4	12	20	22	44	3	4	3	4	5	3	07	15	134
28	56	5	6	5	5	2	4	11	16	19	38	4	6	4	1	3	1	10	09	135
33	66	5	6	7	7	6	2	11	22	22	44	3	5	4	2	4	4	08	14	136
36	72	4	7	7	9	6	3	11	25	19	38	2	5	5	1	3	3	09	12	137
33	66	7	7	6	7	4	2	14	19	27	54	7	5	4	4	3	5	12	16	138
28	56	4	6	5	4	4	5	10	18	26	52	6	2	4	4	6	4	08	18	139
31	62	4	4	5	8	5	5	08	23	19	38	5	1	4	3	4	2	06	13	140
38	76	6	9	6	7	6	4	15	23	27	54	6	6	2	4	5	4	12	15	141
38	76	6	8	6	8	6	4	14	24	26	52	7	5	4	2	3	6	12	15	142
33	66	7	5	6	5	5	5	12	21	24	48	6	5	3	2	3	5	11	13	143
40	80	8	7	6	8	7	4	15	25	24	48	6	4	4	2	3	5	10	14	144
43	86	7	8	7	8	7	6	15	28	24	48	6	5	3	2	3	5	11	13	145
31	62	4	6	6	6	6	3	10	21	11	22	0	4	3	1	2	1	04	07	146
35	70	6	7	5	6	6	5	13	22	27	54	6	6	3	3	5	4	12	15	147
32	64	4	7	6	6	3	6	11	21	21	42	4	3	3	3	4	4	07	14	148
34	68	6	6	7	4	6	5	12	22	23	46	6	6	3	3	2	4	12	12	149
34	68	5	5	6	6	6	6	10	24	25	50	6	5	3	4	3	3	11	13	150
39	78	7	8	7	7	6	4	15	24	24	48	4	6	5	2	3	5	10	15	151
26	52	4	5	7	4	4	2	09	17	28	56	5	7	5	3	5	3	12	16	152
33	66	6	6	7	7	2	5	12	21	24	48	4	5	4	5	1	5	09	15	153
33	66	4	6	6	8	5	4	10	23	28	56	4	7	5	3	4	5	11	17	154
19	38	3	2	5	2	4	05	14	36	72	2	6	8	6	6	5	5	14	22	155
33	66	7	6	7	4	5	4	13	20	27	54	6	6	6	5	0	4	12	15	156
27	54	3	5	5	5	5	4	08	19	41	82	8	8	6	7	7	5	16	25	157
14	28	4	2	3	2	1	2	06	08	12	24	5	1	2	1	2	1	06	06	158
27	54	5	5	4	3	5	5	10	17	38	76	6	8	7	6	4	7	14	24	159

PRE - TEST										POST-TEST										
RS	**X2**	**B**	**C**	**D**	**E**	**F**	**G**	**LCL**	**HCL**	**RS**	**X2**	**B**	**C**	**D**	**E**	**F**	**G**	**LCL**	**HCL**	**CUMU-LATIVE**
50	**100**	**9**	**9**	**7**	**9**	**7**	**9**	**18**	**32**	**50**	**100**	**9**	**9**	**7**	**9**	**7**	**9**	**18**	**32**	
38	76	6	8	7	5	6	6	14	24	29	58	8	4	5	2	4	6	12	17	160
30	60	4	5	5	6	6	4	09	21	21	42	2	1	5	5	3	5	03	18	161
23	46	4	6	4	3	4	2	10	13	34	68	7	6	6	4	4	7	13	21	162
30	60	4	4	7	8	4	3	08	22	37	74	8	6	6	4	5	8	14	23	163
28	56	6	4	5	6	5	2	10	18	35	70	8	6	5	5	5	6	14	21	164
33	66	5	8	6	5	6	3	13	20	42	84	7	7	6	7	6	9	14	28	165
29	58	6	7	5	4	4	3	13	16	28	56	5	6	5	3	5	4	11	17	166
34	68	5	6	7	6	5	5	11	23	43	86	8	8	6	7	5	9	16	27	167
36	72	6	6	7	8	6	3	12	24	45	90	8	8	6	8	6	9	16	29	168
32	64	5	6	7	7	3	4	11	21	45	90	8	8	6	7	7	9	16	29	169
18	36	2	5	4	2	1	4	07	11	35	70	8	7	7	5	3	5	15	20	170
31	62	5	6	7	7	3	3	11	20	36	72	7	6	7	5	4	7	13	23	171
30	60	5	3	7	7	5	3	08	20	37	74	7	7	6	5	4	8	14	23	172
28	56	6	5	4	6	4	3	11	17	35	70	7	7	5	6	4	6	14	21	173
33	66	6	7	6	6		3	13	20	42	84	8	6	6	7	7	8	14	28	174

NOTE

1 - 61 = COOPERATIVE STRATEGY (61 CASES/SUBJECTS)
62 - 121 = COMPETIVE STRATEGY (60 CASES/SUBJECTS)
122 - 174 = LECTURE METHOD (53 CASES/SUBJECTS)
TOTAL = 174

KEY																			
PRE - TEST										POST - TEST									
RS	X 2	B	C	D	E	F	G	LCL	HCL	RS	X 2	B	C	D	E	F	G	LCL	HCL
		SCORE AT TEACH										SCORE AT TEACH							
OVER-ALL RAW SCORE	OVER-ALL RAW SCORE MULTIPLIED BY TWO	INFORMATION	COMPREHENSION	APPLICATION	ANALYSIS	SYNTHESIS	EVALUATION	COMBINATION OF THE LOW COGNITIVE LEVELS	COMBINATION OF THE HIGH COGNITIVE LEVELS	OVER-ALL RAW SCORE	OVER-ALL RAW SCORE MULTIPLIED BY TWO	INFORMATION	COMPREHENSION	APPLICATION	ANALYSIS	SYNTHESIS	EVALUATION	COMBINATION OF THE LOW COGNITIVE LEVELS	COMBINATION OF THE HIGH COGNITIVE LEVELS

APPENDIX C

PILOT PHASE OF THE STUDY

APPENDIX C1

APPLICATION TO SCHOOL PRINCIPALS TO ALLOW STUDENT TEACHERS TEACH SOCIAL STUDIES/ ALLOW THE RESEARCHER CARRY OUT AN EXPERIMENT

School of Postgraduate Studies,
Department of Curriculum Studies,
University of Lagos,
Lagos.

24th April, 1993.

The Principal
....
....
....
....

Sir/Madam,

SPECIAL REQUEST

Please allow the bearer ....
to teach JSS II Social Studies; he/she is marked out to play double role during the practice. I shall soon come to explain details to you.

Thanks for cooperating.

Yours faithfully,

J. D. Kukuru

APPENDIX C2

PILOT PHASE OF THE STUDY
DETAILS OF SAMPLE

S/No.	Name of School	Treatment Effected	Type of School By Gender	No. of Learners in Each Class
1.	Igbobi College, Lagos	Cooperative	Male	36
2.	Onike Girls' High School, Onike	Cooperative	Female	37
3.	St. Timothy's College, Onike	Cooperative	Mixed	30
4.	Gbaja Boys' High School, Surulere.	Competitive	Male	31
5.	Eva Adelaja Sec. Schl., Gbagada.	Competitive	Female	39
6.	Iponri Grammar School,	Competitive	Mixed	34
7.	St. Finbarr's College, Akoka.	Lecture	Male	33
8.	Our Lady of Apostles' Sec. School, Yaba.	Lecture	Female	34
9.	Aje Comprehensive High School, Sabo.	Lecture	Mixed	38
	Total No. of Learners		=	**312**

Date: May - June, 1993

No. of Periods = 15:3 periods per week; 1st week for Pre-Test and Preparation for Treatment

APPENDIX C3
PILOT PHASE OF THE STUDY
STATUS OF SCHOOLS

GROUPING CRITERIA

A: Federal Government Colleges, Model Schools, and Unity Schools.

B: Other schools of high standing either due to long history or achievement or both.

C: The common/general type of secondary schools.

GROUPS USED

The sample did not include Group A schools due to time and logistics factors:

A: Nil

B: Igbobi College (Boys'), Igbobi; St. Finbarr's College, Akoka; Our Lady of Apostles' Secondary School, Yaba; St. Timothy's College, Onike.

C: Gbaja Boys' Secondary School, Surulere; Onike Girls' College, Onike; Eva Adelaja Secondary School, Iponri; Aje Comprehensive High School, Sabo.

S/NO. NOMINALS PRE TEST POST TEST

APPENDIX C4 - CODED RESULT OF SAMPLE READY FOR COMPUTER
PILOT PHASE OF THE STUDY

S/NO.	NOMINALS									PRE TEST										POST TEST									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	4	2	1	1	1	1	2	4	6	27	54	2	5	6	7	1	6	7	20	34	68	6	7	6	6	2	7	13	21
2	4	2	1	1	1	1	1	5	6	26	52	3	7	5	5	2	4	10	16	30	60	8	8	4	3	2	5	16	14
3	4	2	1	1	1	1	1	1	4	25	50	3	4	5	7	3	3	7	18	26	52	5	3	1	6	3	8	8	18
4	4	2	1	1	1	1	1	3	6	31	62	4	6	5	7	4	5	10	21	32	64	6	4	5	5	3	9	10	22
5	4	2	1	1	1	1	1	1	4	29	58	4	5	5	8	2	5	9	20	36	72	9	8	5	8	3	3	17	19
6	4	2	1	1	1	1	2	4	6	29	58	3	7	5	4	4	6	10	19	31	62	9	6	3	4	5	4	15	16
7	4	2	1	1	1	1	0	0	0	26	52	4	4	5	7	3	3	8	18	31	62	8	7	3	4	4	5	15	16
8	4	2	1	1	1	1	2	2	6	25	50	3	6	3	5	4	4	9	16	33	66	9	6	3	6	4	5	15	18
9	4	2	1	1	2	1	2	4	6	24	48	2	8	3	7	0	4	10	14	34	68	8	7	4	6	5	4	15	19
10	4	2	1	1	2	1	2	2	1	24	48	1	5	4	5	4	5	6	18	31	62	9	4	4	3	5	6	13	18
11	4	2	1	1	2	1	2	2	4	24	48	1	7	6	4	3	3	8	16	28	56	6	7	1	2	6	6	13	15
12	4	2	1	1	2	1	1	2	6	23	46	4	4	4	5	2	4	8	15	32	64	8	8	5	6	3	2	16	16
13	4	2	1	1	2	1	1	3	6	22	44	3	6	4	4	3	2	9	13	26	52	3	5	2	5	6	5	8	18
14	4	2	1	1	2	1	2	2	1	17	34	4	5	1	1	3	3	9	8	22	44	7	3	4	3	4	1	10	12
15	4	2	1	1	2	1	1	2	4	16	32	5	2	3	4	0	2	7	9	23	46	6	4	2	4	4	3	10	13
16	4	2	1	1	2	1	3	2	4	15	30	2	2	5	3	2	1	4	11	22	44	6	2	3	4	5	2	8	14
17	4	2	1	1	2	1	2	1	4	13	26	2	3	2	3	1	2	5	8	22	44	6	4	2	3	4	3	10	12
18	4	2	1	1	2	1	1	4	6	12	24	4	2	1	2	1	2	6	6	23	46	7	2	3	4	4	3	9	14
19	4	2	1	1	2	1	2	2	1	10	20	0	2	0	3	3	2	2	8	22	44	6	4	3	3	4	2	10	12
20	4	2	1	1	3	1	1	4	6	22	44	4	4	5	3	2	4	8	14	32	64	7	4	2	6	5	8	11	21
21	4	2	1	1	3	1	2	2	6	29	58	4	7	6	4	2	6	11	18	35	70	8	7	5	6	6	3	15	20
22	4	2	1	1	3	1	1	1	4	28	56	2	6	4	6	6	5	8	21	41	82	9	7	3	8	6	8	16	25
23	4	2	1	1	3	1	2	4	6	22	44	2	6	2	6	3	3	8	14	31	62	6	5	5	5	5	5	11	20
24	4	2	1	1	3	1	2	3	6	21	42	1	3	5	3	4	3	4	15	31	62	8	5	3	7	5	3	13	18
25	4	2	1	1	3	1	1	2	1	14	28	2	1	2	3	3	3	3	11	28	56	6	5	3	6	6	2	11	17
26	4	2	1	1	3	1	1	5	6	26	52	3	5	5	3	4	6	8	18	34	68	8	5	3	7	3	8	13	21
27	4	2	1	1	3	1	1	4	6	21	42	4	2	3	6	3	3	6	15	30	60	8	4	3	7	5	3	12	18
28	4	2	1	1	3	1	1	3	6	14	28	3	3	1	3	1	3	6	8	33	66	7	5	4	5	4	8	12	21
29	4	2	1	1	3	1	1	1	4	33	66	4	9	5	7	5	3	13	20	42	84	9	6	6	8	5	8	15	27
30	4	2	1	1	3	1	2	2	6	29	58	2	8	5	6	4	4	10	19	42	84	8	6	4	8	7	0	14	28
31	4	2	1	1	3	1	2	3	6	29	58	7	4	4	6	4	4	11	18	40	80	8	7	6	6	6	7	15	25
32	4	2	1	1	3	1	2	4	6	19	38	2	4	3	7	1	2	6	13	24	48	5	4	2	4	4	5	9	15
33	4	2	1	1	3	1	2	1	1	19	38	2	5	3	3	4	2	7	12	29	58	8	6	2	2	4	7	14	15

S/NO.	NOMINALS									PRE TEST										POST TEST									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
34	4	2	1	1	3	1	1	3	6	17	34	1	4	2	5	1	4	5	12	27	54	7	7	2	1	5	5	14	13
35	4	2	1	1	3	1	2	2	6	10	20	0	2	1	3	1	3	2	8	27	54	7	5	2	3	4	6	12	15
36	4	2	1	1	3	1	1	2	2	9	18	0	2	3	2	1	1	2	7	24	48	3	5	3	3	2	8	8	16
37	3	3	2	1	1	2	2	2	6	27	54	3	5	5	6	2	6	8	19	34	68	8	8	2	6	5	5	16	18
38	3	3	2	1	1	2	2	2	6	26	52	3	6	4	5	3	5	9	17	27	54	6	6	2	5	3	5	12	15
39	3	3	2	1	1	2	2	2	6	25	50	6	5	2	4	3	5	11	14	29	58	7	7	2	4	2	7	14	15
40	3	3	2	1	1	2	1	2	6	25	50	4	4	3	7	4	3	8	17	31	62	7	7	6	3	4	4	14	17
41	3	3	2	1	1	2	2	2	6	25	50	4	5	6	5	2	3	9	16	36	72	8	7	9	3	4	5	15	21
42	3	3	2	1	2	2	2	2	6	21	42	2	4	5	5	2	3	6	15	35	70	8	7	3	4	5	8	15	20
43	3	3	2	1	2	2	2	2	6	21	42	3	3	3	6	3	4	6	16	33	66	6	8	3	6	4	6	14	19
44	3	3	2	1	2	2	2	5	6	21	42	4	4	3	4	1	5	8	13	25	50	6	6	1	6	3	3	12	13
45	3	3	2	1	2	2	2	1	1	20	40	2	4	3	5	3	3	6	14	30	60	5	6	4	7	3	5	11	19
46	3	3	2	1	2	2	2	4	6	19	38	2	4	6	3	3	1	6	13	33	66	8	6	5	5	3	6	14	19
47	3	3	2	1	2	2	2	4	6	20	40	4	4	3	6	1	2	8	12	35	70	7	8	6	5	3	6	15	20
48	3	3	2	1	2	2	1	2	6	19	38	4	2	3	4	2	4	6	13	26	52	8	5	2	4	4	3	13	13
49	3	3	2	1	2	2	3	2	6	12	24	4	0	2	3	2	1	4	8	23	46	7	5	1	3	4	3	12	11
50	3	3	2	1	2	2	2	2	6	11	22	1	2	2	2	2	2	3	8	23	46	6	4	3	5	2	3	10	13
51	3	3	2	1	2	2	2	2	6	12	24	2	2	4	0	1	3	4	8	26	52	8	6	3	4	3	2	14	12
52	3	3	2	1	2	2	2	5	6	24	48	2	4	5	5	3	5	6	18	31	62	5	5	2	6	5	8	10	21
53	3	3	2	1	2	2	2	2	6	24	48	2	6	3	5	3	5	8	16	32	64	8	5	3	5	4	7	13	19
54	3	3	2	1	2	2	2	4	6	18	36	4	2	2	3	2	5	6	12	31	62	7	6	3	5	6	4	13	18
55	3	3	2	1	2	2	1	3	6	18	36	4	2	3	2	3	4	6	12	26	52	5	4	3	3	5	6	9	17
56	3	3	2	1	2	2	1	2	6	17	34	2	2	4	4	2	3	4	13	31	62	8	5	4	6	4	4	13	18
57	3	3	2	1	2	2	2	2	6	22	44	2	5	5	5	1	4	7	15	33	66	9	6	1	4	5	8	15	18
58	3	3	2	1	2	2	2	2	6	16	32	2	4	6	1	3	0	6	10	25	50	6	7	3	5	3	1	13	12
59	3	3	2	1	2	2	2	2	6	16	32	1	2	2	3	4	4	3	13	27	54	7	6	2	7	2	3	13	14
60	3	3	2	1	2	2	2	2	6	16	32	2	3	5	1	3	2	5	11	27	54	6	8	2	6	4	1	14	13
61	3	3	2	1	2	2	1	2	6	16	32	4	2	1	4	1	4	6	10	24	48	5	6	2	2	4	5	11	13
62	3	3	2	1	2	2	1	1	4	16	32	2	1	1	4	3	5	3	13	26	52	6	4	3	4	5	4	10	16
63	3	3	2	1	2	2	2	4	6	14	28	2	2	1	2	3	4	4	10	23	46	6	5	1	5	1	5	11	12
64	3	3	2	1	2	2	3	3	6	14	28	3	4	1	2	3	1	7	7	22	44	6	5	3	2	3	3	11	11
65	3	3	2	1	2	2	3	1	5	13	26	3	2	2	3	1	2	5	8	27	54	4	7	3	4	4	5	11	16
66	3	3	2	1	3	2	2	2	6	28	56	3	5	6	7	4	3	8	20	41	82	7	7	5	8	6	8	14	27
67	3	3	2	1	3	2	1	2	6	22	44	2	6	2	5	3	4	8	14	34	68	6	6	1	7	6	8	12	22
68	3	3	2	1	3	2	2	4	6	22	44	3	3	5	4	3	4	6	16	39	78	8	8	6	6	5	6	16	23
69	3	3	2	1	3	2	1	2	6	22	44	2	6	2	5	3	4	8	14	37	74	7	7	2	7	6	8	14	23
70	3	3	2	1	3	2	3	5	6	20	40	2	3	4	5	4	2	5	15	36	72	8	6	3	7	6	6	14	22

S/NO.	NOMINALS									PRE TEST										POST TEST									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
71	3	3	2	1	3	2	2	2	6	19	38	4	3	3	2	4	3	7	12	35	70	9	7	2	6	5	6	16	19
72	3	3	2	1	3	2	1	2	6	11	22	1	2	0	2	2	4	3	8	29	58	6	5	2	3	5	8	11	18
73	3	3	2	1	3	2	1	2	6	15	30	2	4	1	2	3	3	6	9	30	60	8	5	2	5	6	4	13	17
74	4	2	3	1	1	3	2	5	6	32	64	7	6	5	7	4	3	13	19	38	76	7	7	5	6	6	7	14	24
75	4	2	3	1	1	3	2	3	6	28	56	4	8	4	6	3	3	12	16	33	66	6	5	3	6	6	7	11	22
76	4	2	3	1	1	3	2	3	6	25	50	4	6	5	5	3	2	10	15	31	62	5	6	5	4	5	6	11	20
77	4	2	3	1	1	3	2	5	6	25	50	3	4	4	7	5	2	7	18	38	76	9	7	4	6	6	6	16	22
78	4	2	3	1	1	3	2	2	6	25	50	4	4	4	7	3	3	8	17	35	70	6	5	5	7	5	7	11	24
79	4	2	3	1	2	3	2	2	6	19	38	2	5	3	4	3	2	7	12	30	60	7	6	2	6	6	4	13	18
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S/NO.	NOMINALS									PRE TEST										POST TEST									
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128	5	3	1	2	3	1	2	5	6	28	56	4	4	6	6	5	3	8	20	38	76	6	7	6	6	5	8	13	25
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S/NO.	NOMINALS									PRE TEST										POST TEST									
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S/NO.	NOMINALS									PRE TEST										POST TEST									
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202	4	3	3	2	3	3	2	1	4	27	54	4	6	5	6	2	4	10	17	31	62	6	5	5	5	3	7	11	20
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206	4	3	3	2	3	3	2	1	5	20	40	2	4	3	4	3	4	6	14	24	48	2	3	3	6	4	6	5	19
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208	3	2	1	3	1	1	2	4	6	27	54	3	4	6	4	4	6	7	20	25	50	7	4	5	5	3	6	11	19
209	3	2	1	3	1	1	1	2	6	25	50	1	6	4	6	5	3	7	18	28	56	6	5	4	3	4	6	11	17
210	3	2	1	3	1	1	1	1	4	25	50	4	6	6	4	3	2	10	15	22	44	7	4	5	5	1	5	11	16
211	3	2	1	3	1	1	2	1	4	25	50	5	7	4	4	1	4	12	13	26	52	7	5	3	5	2	4	12	14
212	3	2	1	3	1	1	2	4	6	25	50	5	4	3	4	3	6	9	16	25	50	6	2	3	5	4	5	8	17
213	3	2	1	3	2	1	1	1	4	24	48	3	4	5	6	2	4	7	17	21	42	6	3	4	2	2	4	9	12
214	3	2	1	3	2	1	1	5	6	23	46	4	6	3	3	4	3	10	13	21	42	7	3	1	4	3	3	10	11
215	3	2	1	3	2	1	1	1	4	23	46	4	4	2	5	4	4	8	15	24	48	6	3	5	2	4	4	9	15
216	3	2	1	3	2	1	2	2	6	22	44	3	6	3	4	1	5	9	13	21	42	4	4	3	5	1	4	8	13
217	3	2	1	3	2	1	2	3	4	21	42	3	6	5	3	2	2	9	12	20	40	4	4	4	3	2	3	8	12
218	3	2	1	3	2	1	1	1	4	21	42	1	4	6	5	3	2	5	26	21	42	7	5	4	3	2	5	12	14

S/NO.				NOMINALS										PRE TEST										POST TEST					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
219	3	2	1	3	2	1	2	3	6	21	42	5	5	2	5	3	1	10	11	19	38	5	3	5	1	2	3	8	11
220	3	2	1	3	2	1	1	5	6	21	42	2	6	2	6	2	3	8	13	24	48	6	5	3	5	1	4	11	13
221	3	2	1	3	2	1	2	1	4	21	42	6	4	3	3	4	1	10	11	24	48	5	5	4	5	1	4	10	14
222	3	2	1	3	2	1	3	1	4	21	42	4	6	4	4	1	2	10	11	19	38	6	5	4	1	1	2	11	8
223	3	2	1	3	2	1	2	2	4	19	38	2	5	3	5	1	3	7	12	21	42	7	3	4	0	4	3	10	11
224	3	2	1	3	2	1	2	3	4	19	38	4	6	3	2	3	1	10	9	14	28	4	4	4	0	1	1	8	6
225	3	2	1	3	2	1	2	5	6	19	38	3	5	6	2	2	1	8	11	19	38	6	4	5	2	1	1	10	9
226	3	2	1	3	2	1	2	2	4	19	38	2	4	3	5	2	3	6	13	18	36	5	3	5	3	1	1	8	10
227	3	2	1	3	2	1	2	2	4	19	38	2	3	3	7	1	3	5	14	17	34	4	2	3	3	1	4	6	11
228	3	2	1	3	2	1	2	2	4	18	36	2	7	2	4	1	2	9	9	17	34	4	5	3	2	1	2	9	8
229	3	2	1	3	2	1	2	3	6	17	34	3	2	4	2	5	1	5	12	14	28	3	4	4	1	1	1	7	7
230	3	2	1	3	2	1	2	2	6	17	34	0	5	2	3	4	3	5	12	14	28	4	2	3	2	1	2	6	8
231	3	2	1	3	2	1	2	2	4	16	32	3	4	2	2	1	4	7	9	14	28	3	4	2	2	1	2	7	7
232	3	2	1	3	2	1	2	3	4	16	32	2	3	4	2	4	1	5	11	19	38	5	5	3	3	0	3	10	9
233	3	2	1	3	2	1	2	2	6	15	30	1	6	3	2	0	3	7	8	17	34	6	6	3	1	0	1	12	5
234	3	2	1	3	2	1	1	2	6	15	30	1	3	4	3	2	2	4	11	15	30	1	4	3	2	3	2	5	10
235	3	2	1	3	3	1	2	2	2	25	50	5	3	4	6	2	5	8	17	25	50	7	4	1	5	2	6	11	14
236	3	2	1	3	3	1	2	2	6	25	50	3	6	5	6	4	1	9	16	27	54	6	6	3	4	3	5	12	15
237	3	2	1	3	3	1	4	1	1	22	44	5	6	5	4	1	1	11	11	26	52	9	5	3	3	2	4	14	12
238	3	2	1	3	3	1	2	3	6	24	48	4	5	3	6	2	4	9	15	27	54	7	5	3	4	3	5	12	15
239	3	2	1	3	3	1	2	2	4	22	44	4	6	3	3	4	1	10	11	26	52	7	5	4	5	1	4	12	14
240	3	2	1	3	3	1	2	3	6	22	44	2	3	4	4	3	6	5	17	20	40	4	3	3	5	1	4	7	13
241	5	2	2	3	1	2	1	0	4	26	52	3	3	4	6	4	6	6	20	37	74	8	7	6	5	5	6	15	22
242	5	2	2	3	1	2	1	5	6	27	54	2	6	8	5	2	4	8	19	37	74	6	7	5	6	5	5	13	21
243	5	2	2	3	1	2	2	0	4	28	56	2	6	7	7	1	5	8	20	15	30	6	5	1	1	0	1	11	3
244	5	2	2	3	1	2	2	0	4	25	50	3	5	5	5	1	6	8	17	31	62	6	6	4	4	4	4	12	16
245	5	2	2	3	1	2	1	5	6	29	58	4	5	4	6	5	5	9	20	32	64	7	5	6	5	3	6	12	20
246	5	2	2	3	1	2	1	1	6	29	58	4	6	7	4	1	7	10	19	30	60	5	4	4	7	5	5	9	21
247	5	2	2	3	1	2	1	5	4	29	58	3	5	5	6	3	7	8	21	30	60	7	7	4	4	4	4	14	16
248	5	2	2	3	1	2	1	3	6	30	60	1	8	6	7	3	5	9	21	30	60	5	5	5	6	3	6	10	20
249	5	2	2	3	1	2	1	0	4	32	64	3	9	6	4	5	5	12	20	32	64	6	7	6	3	4	6	13	19
250	5	2	2	3	1	2	1	3	6	41	82	6	8	7	8	6	6	14	27	35	70	8	7	4	5	3	8	15	20
251	5	2	2	3	1	2	1	3	6	39	78	6	7	7	7	5	7	13	26	34	68	8	6	5	6	5	4	14	20
252	5	2	2	3	1	2	1	5	6	36	72	5	9	7	4	5	6	14	22	30	60	6	6	4	5	4	5	12	18
253	5	2	2	3	1	2	1	5	6	34	68	4	9	6	4	5	6	13	21	33	66	7	7	5	5	5	4	14	19
254	5	2	2	3	2	2	2	5	6	19	38	1	7	3	3	2	3	8	11	23	46	4	7	4	3	2	3	11	12
255	5	2	2	3	2	2	2	3	6	19	38	2	5	3	5	0	4	7	12	34	68	8	7	3	6	5	5	15	19

S/NO.				NOMINALS										PRE TEST										POST TEST					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
256	5	2	2	3	2	2	1	3	6	19	38	3	1	4	4	2	5	4	15	25	50	7	6	2	3	3	4	13	12
257	5	2	2	3	2	2	1	5	6	18	36	3	3	3	3	1	5	6	12	32	64	7	7	4	5	4	5	14	18
258	5	2	2	3	2	2	3	1	4	20	40	1	3	3	3	6	4	4	16	23	46	6	5	3	5	2	2	11	12
259	5	2	2	3	2	2	3	2	4	20	40	2	4	3	3	2	7	6	15	28	56	7	5	3	4	3	6	12	16
260	5	2	2	3	2	2	1	1	4	15	30	3	6	2	2	1	1	9	6	18	36	6	3	1	3	3	2	9	9
261	5	2	2	3	2	2	1	3	6	21	42	2	6	5	3	1	4	8	13	29	58	8	5	5	3	1	7	13	16
262	5	2	2	3	2	2	1	1	1	23	46	5	1	5	3	2	7	6	17	30	60	8	7	3	4	4	4	15	15
263	5	2	2	3	3	2	1	5	4	25	50	3	5	6	4	1	6	8	17	31	62	7	4	4	6	5	5	11	20
264	5	2	2	3	3	2	1	1	4	25	50	2	7	4	4	3	5	9	16	31	62	9	7	3	4	4	4	16	15
265	5	2	2	3	3	2	1	1	1	26	52	4	6	4	4	1	7	10	16	21	42	5	4	2	4	3	3	9	12
266	5	2	2	3	3	2	1	1	4	24	48	3	4	3	7	4	3	7	17	31	62	7	6	3	6	5	4	13	18
267	5	2	2	3	3	2	1	1	2	22	44	2	6	5	1	3	5	8	14	22	44	4	5	4	5	2	2	9	13
268	5	2	2	3	3	2	1	2	2	30	60	4	8	5	3	5	5	12	18	29	58	5	5	6	3	4	6	10	19
269	5	2	2	3	3	2	1	1	4	24	48	3	6	5	3	2	5	9	15	23	46	6	3	3	4	3	4	9	14
270	5	2	2	3	3	2	1	2	6	24	48	2	4	3	5	5	5	6	18	14	28	7	7	0	0	0	0	14	0
271	5	2	2	3	3	2	1	5	6	21	42	3	5	6	3	1	3	8	13	31	62	9	6	3	3	2	8	15	16
272	5	2	2	3	3	2	1	5	2	37	74	5	9	7	5	5	6	14	23	34	68	7	7	5	4	4	7	14	20
273	5	2	2	3	3	2	1	5	6	34	68	3	8	6	7	4	6	11	23	36	72	9	7	5	6	5	4	16	20
274	5	2	2	3	3	2	1	5	6	33	66	4	8	6	6	4	5	12	21	32	64	6	8	4	4	4	6	14	18
275	3	3	3	3	1	3	1	4	6	32	64	5	6	5	6	3	6	11	20	35	70	9	7	6	6	4	3	16	19
276	3	3	3	3	1	3	2	5	6	29	58	4	5	5	6	4	5	9	20	35	70	8	6	5	6	3	7	14	21
277	3	3	3	3	1	3	2	3	4	28	56	5	5	5	5	2	4	10	16	36	72	9	7	3	6	5	6	16	20
278	3	3	3	3	1	3	1	2	1	28	56	4	6	5	4	5	4	10	18	26	52	5	7	2	5	2	5	12	14
279	3	3	3	3	1	3	2	3	6	28	56	4	7	6	6	2	3	11	17	36	72	9	7	5	4	5	6	16	20
280	3	3	3	3	1	3	1	3	6	28	56	4	6	2	5	4	7	10	18	35	70	7	6	5	6	4	7	13	22
281	3	3	3	3	1	3	1	5	6	27	54	4	6	2	5	5	3	10	15	37	74	9	7	5	4	4	7	16	20
282	3	3	3	3	1	3	2	2	6	27	54	6	3	3	6	4	5	9	18	34	68	9	8	3	4	3	7	17	17
283	3	3	3	3	1	3	1	3	6	27	54	4	7	5	3	3	5	11	16	26	52	8	6	2	2	2	6	14	12
284	3	3	3	3	1	3	2	4	6	27	54	4	5	5	3	6	4	9	18	19	38	6	6	1	3	2	3	12	9
285	3	3	3	3	1	3	2	3	4	27	54	5	6	4	5	4	3	11	16	30	60	7	6	2	6	3	6	13	17
286	3	3	3	3	2	3	2	4	6	21	42	2	4	6	3	4	2	6	15	20	40	6	4	3	3	3	1	10	10
287	3	3	3	3	2	3	2	5	6	20	40	4	1	3	4	4	4	5	15	15	30	5	4	1	2	0	3	9	6
288	3	3	3	3	2	3	2	2	4	20	40	2	3	2	3	4	6	5	15	29	58	8	6	1	4	4	6	14	15
289	3	3	3	3	2	3	3	4	6	20	40	4	3	4	5	3	1	7	13	25	50	6	7	3	3	1	5	13	12
290	3	3	3	3	2	3	3	3	6	19	38	3	2	5	5	1	3	5	14	18	36	5	4	2	2	2	3	9	9
291	3	3	3	3	2	3	2	2	1	18	36	2	1	5	5	3	2	3	15	14	28	3	2	2	4	1	2	5	9
292	3	3	3	3	2	3	1	3	6	15	30	1	1	2	5	3	3	2	13	23	46	7	6	0	1	4	5	13	10

S/NO.	NOMINALS									PRE TEST										POST TEST									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
293	3	3	3	3	2	3	2	3	6	15	30	2	3	4	1	2	3	5	10	22	44	6	6	5	1	3	1	12	10
294	3	3	3	3	2	3	1	2	1	13	26	0	2	5	2	1	3	2	11	20	40	6	4	2	4	1	3	10	10
295	3	3	3	3	2	3	1	4	6	12	24	2	2	5	3	0	0	4	8	23	46	6	5	1	1	2	2	11	6
296	3	3	3	3	2	3	3	4	0	24	48	4	5	4	5	5	3	9	17	27	54	8	7	4	4	3	1	15	12
297	3	3	3	3	2	3	2	4	6	24	48	4	3	4	2	6	5	7	17	17	34	8	2	2	2	1	2	10	7
298	3	3	3	3	2	3	1	3	6	24	48	4	5	6	4	3	2	9	15	27	54	8	7	3	1	3	4	15	11
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301	3	3	3	3	2	3	2	4	6	24	48	3	5	6	3	4	3	8	16	30	60	8	6	5	6	2	3	14	16
302	3	3	3	3	2	3	3	2	2	24	48	3	5	5	5	2	4	8	16	11	22	5	1	0	1	2	2	6	5
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305	3	3	3	3	2	3	2	2	2	24	48	3	3	4	5	3	6	6	18	21	42	5	5	4	3	2	2	10	11
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309	3	3	3	3	3	3	2	4	6	25	50	3	6	5	3	4	4	9	16	20	40	5	6	2	4	2	1	11	9
310	3	3	3	3	3	3	2	4	6	19	38	3	1	3	3	3	6	4	15	21	42	5	8	4	2	1	1	13	8
311	3	3	3	3	3	3	3	2	4	19	38	3	2	5	4	2	3	5	14	16	32	4	3	4	1	2	2	7	9
312	3	3	3	3	3	3	1	5	6	18	36	4	4	5	3	0	2	8	10	18	36	5	3	1	6	0	3	8	10

NOTE:-

001 - 103 (103 CASES) DATA FOR COOPERATIVE STRATEGY: EXPERIMENT I
104 - 207 (104 CASES) DATA FOR COMPETITIVE STRATEGY: EXPERIMENT II
208-312 (105 CASES) DATA FOR LECTURE METHOD: CONTROL
FOR MORE DETAILS ON VARIABLES (1 - 29: HORIZONTAL)
PLEASE SEE APPENDICES C5 & C6.

APPENDIX C5 : KEY OF RAW DATA COLLECTED

Section	No.		Variable	No.
POST - TEST	29		COMBINATION OF THE HIGH COGNITIVE LEVELS	29
	28		COMBINATION OF THE LOW COGNITIVE LEVELS	28
	27	SCORE AT EACH COGNITIVE LEVEL	EVALUATION	27
	26		SYNTHESIS	26
	25		ANALYSIS	25
	24		APPLICATION	24
	23		COMPRENSION	23
	22		INFORMATION	22
	21		OVER-ALL SCORE X 2	21
	20		OVER-ALL SCORE	20
PRE - TEST	19		COMBINATION OF THE HIGH COGNITIVE LEVELS	19
	18		COMBINATION OF THE LOW COGNITIVE LEVELS	18
	17	SCORE AT EACH COGNITIVE LEVEL	EVALUATION	17
	16		SYNTHESIS	16
	15		ANALYSIS	15
	14		APPLICATION	14
	13		COMPRENSION	13
	12		INFORMATION	12
	11		OVER-ALL SCORE X 2	11
	10		OVER-ALL SCORE	10
NOMINALS	9		OCCUPATION OF PARENTS	9
	8		QUALIFICATION OF PARENTS	8
	7		AGE OF STUDENT	7
	6		GENDER OF STUDENT	6
	5		ABILITY GROUPS USED	5
	4		TYPE OF TREATMENT	4
	3		TYPE OF SCHOOL BY GENDER	3
	2		STATUS OF SCHOOL	2
	1		TEACHING PRACTICE SCORES OF PARTICIPATING TEACHERS	1

APPENDIX C6

NOMINAL VARIABLES AND VALUE ATTACHED TO EACH

No of Variable	Variable	Divisions or Break-down of Variable	Value Attached to each
1	Teaching Practice Scores of Participating Teachers	50 - 54	1
		55 - 59	2
		60 - 64	3
		65 - 69	4
		70 - 74	5
		75 - 79	6
		80 and above	7
2.	Status of School	A	1
		B	2
		C	3
3.	Type of School by Gender	Male	1
		Female	2
		Mixed	3
4.	Type of Treatment	Cooperative	1
		Competitive	2
		Lecture	3
5.	Ability Groups Used	High Ability	1
		Low Ability	2
		Mixed Ability	3
6.	Gender of Student	Male	1
		Female	2
		Mixed	3
7.	Age of Student	12 - 13	1
		14 - 15	2
		16 - 17	3
		Above 17	4
8.	Qualification of Parents	Below SC	1
		SC / GD II	2
		NCE/A. Level	3
		First Degree	4
		Post Graduate	5
9.	Occupation of Parents	Arts and Craft	1
		Military, Para Military & Self Employed	2
		Daily Paid Workers	3
		Trading/Business	4
		Farming	5
		Professionals including Teachers	6

VARIABLE 6 WAS A MERE REPETITION OF VARIABLE 3

APPENDIX C7

MEANS AND STANDARD DEVIATIONS OF THE THREE TREATMENT GROUPS: COOPERATIVE, COMPETITIVE AND LECTURE (CP, CM & LC RESPECTIVELY) AT PRE AND POST TESTS

VARIABLE & NO.		PRE TEST		POST TEST	
		MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
CP 103	LCL	7.06	2.40	12.79	2.27
	HCL	13.60	3.74	18.02	3.86
CM 104	LCL	7.48	2.44	11.76	3.13
	HCL	13.96	4.96	18.46	4.44
LC 105	LCL	8.25	2.60	11.55	2.76
	HCL	15.30	3.91	13.56	4.71

COMPARISONS

1	A	CP & CM	(LCL)
	B	CP & CM	(HCL)
2	A	CP & LC	(LCL)
	B	CP & LC	(HCL)
3	A	CM & LC	(LCL)
	B	CM & LC	(HCL)

NOTE

LC L = Combination of the Low Cognitive Levels

HCL = Combination of the High Cognitive Levels

APPENDIX C8

COMPARISONS OF THE THREE TREATMENT GROUPS AT PRE TEST ONLY TO SHOW EQUIVALENCE OR OTHERWISE OF THE GROUPS AT THE BEGINNING OF THE EXPERIMENT

GROUP & NUMBER			T VALUE	DEGREE OF FREEDOM	SIGNIFICANCE LEVEL	REMARK
CP vs CM LCL	CP CM	103 104	1.94	205	NS	Not Significant
HCL	CP CM	103 104	1.24	205	NS	Not Significant
CP vs LC LCL	CP LC	103 105	5.43	206	.001	Significant in favour of control
HCL	CP LC	103 105	6.3	206	.001	Significant in favour of control
CM vs LC LCL	CM LC	104 105	3.5	207	.001	Significant in favour of control
HCL	CM LC	104 105	4.59	207	.001	Significant in favour of control

CONCLUSIONS FROM THE EQUIVALENCE TEST

1. There was no significant differene between the experimental groups at both the Low and High Cognitive Levels (LCL & HCL respectively) at pretest.
2. There was significant difference between either of the experimental groups: Cooperative or Competitive and the Lecture group in favour of the latter at Pretest both at Low and High Cognitive Levels.

MAJOR IMPLICATIONS

1. The Control group (Lecture method) was not at disadvantage, rather at advantage in relation to learners' capabilities at the beginning of the experiment.
2. If gains accrued to the Experimental groups at Post test significantly, against the Control group, much of the gains would be attributable to the treatments introduced.
3. The instrument for data analysis (other conditions/variables being constant) should be Analysis of Covariance (ANCOVA) to adjust for initial differences.

APPENDIX C9

MEANS AND STANDARD DEVIATIONS OF THE THREE TREATMENT GROUPS COMBINED: COOPERATIVE, COMPETITIVE AND LECTURE (CP, CM, & LC RESPECTIVELY) AT POST TEST

COGNITIVE LEVELS' COMBINATION	POST TEST		CONVERSION TO EQUAL OBTAINABLE SCORE	
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
LCL	12.03	2.79	21.39	4.96
HCL	16.67	4.87	16.67	4.87

APPENDIX C10

THE COGNITIVE LEVELS' COMBINATION MEANS AND STANDARD DEVIATIONS OF THE EXPERIMENTAL GROUPS ONLY: COOPERATIVE AND COMPETITIVE AT THE POST TEST ONLY

COGNITIVE LEVELS' COMBINATION	COOPERATIVE GROUPS (CP)		COMPETITIVE GROUP (CM)		COMBINATION OF CP & CM		CONVERSION TO EQUAL OBTAINABLE SCORE	
	MEAN	STAND. DEV.	MEAN	STAND DEV.	MEAN	STAND DEV.	MEAN	STAND. DEV.
LCL	12.79	2.27	11.76	3.13	12.28	2.7	21.83	4.8
HCL	18.02	3.86	18.46	4.44	18.24	4.15	18.24	4.15

APPENDIX C11

COMPARISONS AT THE COMBINATIONS OF THE LOW AND HIGH COGNITIVE LEVELS (LCL & HCL RESPECTIVELY) AT THE POST TEST ONLY

GROUP, COMBINATION, & NO.	T VALUE	DEGREE OF FREEDOM	SIGNIFICANCE LEVEL	REMARK
CP + CM + CT LCL vs HCL 312	26.37	310	.001	Highly Significant in favour of LCL or Vice Versa
CP + CM only LCL vs HCL 207	12.17	205	.001	Highly Significant in favour of LCL or Vice Versa

MAJOR IMPLICATIONS OF THE COMPARISONS

1. The Low Cognitive Levels (LCL) are hereby proved actually lower/simpler than the High Cognitive Levels (HCL) in either treatment groups' combination: CP + CM + LC or CP + CM only.

2. The instrument as well as its administration are basically proved valid.

3. The experiment was worthwhile.

APPENDIX C12

RELIABILITY

No. of Items	Mean	Standard Deviation
50	28.70	6.67

KR 21

$$= \frac{(50)6.67^2 - 28.70\ (50 - 28.70)}{6.672\ (50 - 1)}$$

$$= \frac{50 \times 44.49 - 28.70 \times 21.3}{44.49 \times 49}$$

$$= \frac{2224.5 - 611.3}{44.49 \times 49} \qquad = \frac{1613.2}{2180.01}$$

$$= 0.74$$

APPENDIX C13

CALCULATIONS OF TREATMENTS' COMPARISONS USING T - TEST: PRE TEST ONLY FOR EQUIVALENCE TEST

FORM.

$$= \frac{\overline{XA} - \overline{XB}}{\sqrt{\frac{StdA}{NA} + \frac{StdB}{NB}}} \qquad DF = (NA + NB) - 2 \longrightarrow$$

1. CP & CM

A (LCL)

$$= \frac{7.06 - 7.48}{\sqrt{\frac{2.40}{103} + \frac{2.44}{104}}}$$

$$= .023 + .024 = \frac{.42}{.217}$$

$$t = 1.94 \longrightarrow$$

$$DF = (103 + 104) - 2 = 205 \longrightarrow \text{Not Significant at .05 (1.960)} \longrightarrow$$

B. HCL

$$= \frac{13.60 - 13.96}{\sqrt{\frac{3.74}{103} + \frac{4.96}{104}}}$$

$$= .036 + .048 = \frac{.36}{.290}$$

$$t = 1.24$$

$$DF = 205, \text{ Not Significant at .05 (1.960)} \longrightarrow$$

2. CP & LC

A. LCL

$$= \frac{7.06 - 8.25}{\sqrt{\frac{2.40}{103} + \frac{2.60}{105}}}$$

$$= .023 + .025 = \frac{1.19}{.219}$$

t = 5.43

DF = 205 (103 + 105 - 2

Significant at .001 (3.291).

$\longrightarrow$

B. HCL

$$= \frac{13.60 - 15.30}{\sqrt{\frac{3.74}{103} + \frac{3.91}{105}}}$$

$$= .036 + .037 = \frac{1.7}{.270}$$

t = 6.3

$\longrightarrow$

DF = 206

Significant at .001 (3.291).

$\longrightarrow$

3. CM & LC

A. LCL

$$= \frac{7.48 - 8.25}{\sqrt{\frac{2.44}{104} + \frac{2.60}{105}}}$$

$$= .024 + .025 = \frac{.77}{.22}$$

t = 3.5

$\longrightarrow$

DF = 207 (104 + 105) - 2

Significant at .001 (3.291)

$\longrightarrow$

B. HCL

$$= \frac{13.96 - 15.30}{\sqrt{\frac{4.96}{104} + \frac{3.91}{105}}}$$

$$= .048 + .037 = \frac{1.34}{.292}$$

t = 4.59

$\longrightarrow$

DF = 207

Significant at .001 (3.291).

$\longrightarrow$

APPENDIX C14

CALCULATIONS ON THE COMBINATIONS OF THE LOW & HIGH COGNITIVE LEVELS TO ASCERTAIN THAT LOW COGNITIVE LEVELS WERE ACTUALLY LOW AND THAT HIGH COGNITIVE LEVELS WERE ACTUALLY HIGH (POST TEST ONLY)

A. LCL VS HCL (CP + CM + LC)

$$= \frac{21.39 - 16.67}{\sqrt{\frac{4.96}{312} + \frac{4.87}{312}}}$$

$$= .016 + 0.16 = \frac{4.72}{.179}$$

$t = 26.37$

$\longrightarrow$

DF = 310

Significant at .001 (3.291).

B. LCL vs HCL (CP + CM ONLY)

$$= \frac{21.83 - 18.24}{\sqrt{\frac{4.8}{103} + \frac{4.15}{104}}}$$

$$= .047 + .040 = \frac{3.59}{.295}$$

$t = 12.17$

DF = 205

Significant at .001 (3.291)

$\longrightarrow$

APPENDIX C15

PILOT PHASE OF THE STUDY
TEACHING PRACTICE SCORES OF PARTICIPATING TEACHERS AND VALUE ATTACHED TO EACH SCORE

Serial Number	Before Moderation	After Moderation	Value for Final Score	Type of School Used		Type of Treatment Used
				Status	Value Attached	
1.	64	65	4	B	2	EXP.
2.	65	70	5	C	3	EXP.
3.	63	64	3	CT B	2	CT.
4.	65	61	3	C	3	EXP.
5.	63	64	3	C	3	EXP.
6.	70	71	5	CT B	2	CT.
7.	65	66	4	B	2	EXP.
8.	68	66	4	C	3	EXP.
9.	65	64	3	CT C	3	CT.

KEY

50 - 54	=	1
55 - 59	=	2
60 - 64	=	3
65 - 69	=	4
70 - 74	=	5
75 - 79	=	6
80 and above	=	7

EXP = Exprimental Treatment
CT = Control

APPENDIX C16

PILOT PHASE OF THE STUDY
ALL RESULTS OF EXPERIMENTAL GROUPS TEACHERS

SERIAL NUMBER	THEORY: END OF TRAINING TEST	PRACTICE: BEFORE MODERATION	PRACTICE: AFTER MODERATION	MEAN OF THEORY & PRACTICE AFTER MODERATION
1	73	64	65	69
2	62	65	70	66
3	77	65	61	69
4	78	63	64	71
5	83	65	66	75
6	86	68	66	76

APPENDIX C17

SUMMARY OF THREE OBSERVERS' RATINGS OF THE PARTICIPATING TEACHERS (CONSTRUCT VALIDITY)

S/NO.		OBSERVER A	OBSERVER B	OBSERVER C
1		68	65	69
2		70	68	67
3	Control	67 (40)	64 (43)	65 (42)
4		78	75	74
5		68	67	69
6	Control	77 (45)	76 (46)	78 (44)
7		80	82	78
8		75	75	77
9	Control	68 (35)	69 (38)	66 (44)

A & B OF OBSERVERS' RATINGS (PILOT) APPENDIX C18I

S/NO.	X	Y	X^2	Y^2	XY
1	68	64	4624	4225	4420
2	70	68	4900	4624	4760
3	67	64	4489	4096	4288
4	78	75	6084	5625	5850
5	68	67	4624	4489	4556
6	77	76	5929	5776	5852
7	80	82	6400	6724	6560
8	75	75	5625	5625	5625
9	68	69	4624	4761	4692
ΣN	ΣX	ΣY	ΣX^2	ΣY^2	ΣXY
9	651	641	47,299	45,945	46,603

$$r = \frac{46{,}603 - \frac{(651)\ (641)}{9}}{(47{,}299 - \frac{(651)^2)}{9})\ (45{,}945 - \frac{641)^2)}{9})}$$

$$= \frac{246}{\sqrt{210 \ \mathrm{x} \ 291.6}} = \frac{246}{247.459} = 0.99$$

APPENDIX C18II

A & C OF OBSERVERS' RATINGS (PILOT)

S/NO.	X	Y	X^2	Y^2	XY
1	68	69	4624	4761	4692
2	70	67	4900	4489	4690
3	67	65	4489	4225	4355
4	78	74	6084	5476	5772
5	68	69	4624	4761	4692
6	77	78	5929	6084	6006
7	80	78	6400	6084	6240
8	75	77	5625	5925	5775
9	68	66	4624	4356	4488
ΣN	ΣX	ΣY	ΣX^2	ΣY^2	ΣXY
9	651	643	47,299	46,161	46,710

$$r = \frac{46{,}710 - \dfrac{(651)\ (643)}{9}}{\left(47{,}299 - \dfrac{(651)^2}{9}\right)\left(45{,}945 - \dfrac{643)^2}{9}\right)}$$

$$= \frac{199.7}{\sqrt{210 \times 222.3}} = \frac{199.7}{216.06} = 0.92$$

Average of both $= 0.99 + 0.92 \div 2 = 0.955$ i.e. Observers' Agreement.

APPENDIX C19

PRESENTATION OF RESULTS
(PILOT PHASE)

Problem 1

The problem was to identify teaching strategies which are capable of improving learners' performance at the high cognitive levels.

An Analysis of Covariance (ANCOVA) test was conducted on the learners performances in a pre-post treatment experimental design. In the test, the learners were divided into two experimental groups (Cooperative and Competitive) and a control group (Lecture). The tests were broadly divided into Low Cognitive Levels and High Cognitive Levels. The result of this analysis is presented on Table 1AI.

TABLE 1AI: ANALYSIS OF COVARIANCE TEST BY THREE TREATMENT GROUPS: COOPERATIVE, COMPETITIVE AND LECTURE

GROUP + NO.	VARIABLE	SCORE OBTAINABLE	GRAND MEAN	SUM OF SQUARES	DEGREE OF FREEDOM	MEAN SQUARE	F RATIO	SIGNIFICANCE OF F
	LCL	18	12.029					
103 CP								
104 CP								
105 LC								
	COVARIATES			292.225	1	292.225	45.901	.000
	MAIN EFFECTS			161.659	2	80.829	12.696	0.0
	EXPLAINED			453.884	3	151.295	23.764	0.0
	RESIDUAL			1960.857	308	6.366		
	TOTAL			2414.740	311	7.764		
	HCL	32	16.667					
CP								
CM								
LC								
	COVARIATES			1718.195	1	1718.195	151.836	.000
	MAIN EFFECTS			2181.780	2	1090.890	96.402	0.0
	EXPLAINED			3899.975	3	1299.992	114.880	0.0
	RESIDUAL			3485.358	308	11.316		
	TOTAL			7385.333	311	23.747		

NOTE:

CP = COOPERATIVE STRATEGY

CM = COMPETITIVE STRATEGY

LC = LECTURE METHOD

TABLE 1AI: MULTIPLE CLASSIFICATION ANALYSIS

GROUP	UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEP ENDENTS + COVARIATES DEVIATION	BETA
LCL				
103 CP	.76		.99	
104 CM	-.27		-.22	
105 LC	-.48		-.76	
		.19		..26
			R^2	.188
			R	.434
HCL				
CP	1.35		1.80	
CM	1.79		2.01	
LC	-3.10		-3.76	
		.46		.55
			R^2	.528
			R	.727

It can be seen from table 1AI that at the Low Cognitive Levels (LCL), the Cooperative strategy is the most appropriate among the three treatments followed by Competitive strategy while the Lecture method is the least effective.

At the High Cognitive Levels (HCL), it seems that both experimental treatments significantly performed better than the control method. This suspicion was tested by understaking a Pair-wise Analysis of Covariance (ANCOVA) test between the experimental treatments and the control method. The result of this analysis is presented on Table 1AII.

TABLE 1AII: PAIR-WISE ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BETWEEN THE EXPERIEMENTAL TREATMENTS AND CONTROL METHOD

MAIN COMP-ARISONS	PAIR	NO. IN PAIR	F RATIO OF PAIR	SIGNI-FICANCE LEVEL	DF	ADJUSTED MCA VALUES	SIGN. IN FAVOUR OF
CP & LC	CP & CL	103 105	86.134	.000	1	2.83 -2.77	CP
CM & LC	CM & LC	104 105	100.039	.000	1	2.90 -2.87	CM

It can be seen from Table 1AII that both experimental treatmentssignificantly out-performed the control method with reference to their abilities to improve the learners' performances.

One problem arose from our observation of the High Cognitive Levels performance of the learners, namely, the extent of differences in the effectiveness between the two experimental treatments. This problem was investigated by undertaking a comparison of both Cooperative and Competitive strategies using the Analysis of Covariance test. The result of this analysis is presented on Table 1BI.

TABLE 1BI: ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES UNDER THE EXPERIMENTAL STRATEGIES: COOPERATIVE AND COMPETITIVE. (CP AND CM RESPECTIVELY)

GROUP + NO.	VARIABLE	SCORE OBTAINABLE	GRAND MEAN	CELL MEAN	SUM OF SQUARES	DEGREE OF FREEDOM	MEAN SQUARE	F RATIO	SIGNIFICANCE OF F
	LCL	18	12.27						
103 CP				12.79					
104 CM				11.76					
COVARIATES					227.124	1	227.124	36.045	.000
MAIN EFFECTS					76.301	1	76.301	12.109	0.01
EXPLAINED					303.425	2	151.712	24.077	0.0
RESIDUAL					1285.425	204	6.301		
TOTAL					1588.850	206	7.713		
	HCL	32	18.24						
CP				18.02					
CM				18.46					
COVARIATES					16.23.962	1	1623.962	171.863	.000
MAIN EFFECTS					2.332	1	2.332	.247	.620
EXPLAINED					1626.294	2	813.147	86.035	0.0
RESIDUAL					1927.628	204	9.449		
TOTAL					3553.923	206	17.252		

TABLE 1BI: MULTIPLE CLASSIFICATION ANALYSIS

GROUP	UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS + COVARIATES DEVIATION	BETA
LCL				
103 CP	.52		.61	
104 CM	-.51		-.61	
		.19		.22
			R2	.191
			R	.437
HCL				
CP	-.22		-.11	
	.22		.11	
		0.5		.03
			R2	.458
			R	.676

It can be seen from Table 1BI that, at the Low Cognitive Levels, the Cooperative strategy significantly improved the performances of the learners under it more than the extent of improvement effected by the Competitive strategy, for the learners under it.

At the High Cognitive Levels, although there is a reverse situation with reference to more appropriateness in favour of the Competitive strategy, the difference is not significant (Main Effects' F = 0.247 at .620 level of significance; beta weight = .03).

Table 1AII also provides the test of hypothesis 1A, which states that there will be no significant difference between the performances of the experimental and control groups of the learners at the high cognitive levels. The evidence from this table is that at the .05 level of significance with one degree of freedom for each comparison, both experimental treatments significantly improved the performances of the learners under them more than the improvement effected by the control method for the learners under it. Hypothesis 1A is therefore rejected.

Table 1BI, on its part, also provides the test of hypothesis 1B which states that there will be no significant difference between the performances of the learners under Cooperative and Competitive teaching strategies at the high cognitive levels. Since the evidence from this table agrees with the projection, hypothesis 1B is accepted.

Problem 2

The next problem was to ascertain whether the learners' performances would vary by gender at the high cognitive levels.

An ACOVA test was conducted on learners' performances which were grouped under Cooperative, Competitive, and Lecture treatments. Other major design aspects like the structure of the test and the number of times the test was administered were the same as reported under Problem 1. The analysis under Problem 2 is presented on Table 2AI.

TABLE 2AI: ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY GENDER (MALE, FEMALE, MIXED) UNDER COOPERATIVE, COMPETITIVE AND LECTURE TREATMENTS

GROUP + NO.	VARIABLE	SCORE OBTAINABLE	GRAND MEAN	CELL MEAN	SUM OF SQUARES	DEGREE OF FREEDOM	MEAN SQUARE	F RATIO	SIGNIFICANCE OF F
	LCL	18	12.029						
36 CP ML									
37 FL									
30 MX									
31 CMML									
39 FL									
34 MX									
33 LC ML									
34 FL									
38 MX									
	MAIN EFFECTS				400.132	8	50.017	8.858	0.0
	COVARIATES				309.353	1	309.353	54.786	.000
	EXPLAINED				709.486	9	78.832	13.961	0.0
	RESIDUAL				1705.255	302	5.647		
	TOTAL				2414.740	311	7.764		
	HCL	32	16.667	18.02					
CP ML									
FL									
MX									
CM ML									
FL									
LC ML									
FL									
MX									
	MAIN EFFECTS				2022.519	8	265.315	24.011	0.0
	COVARIATES				1925.857	1	1925.857	174.293	.000
	EXPLAINED				4048.377	9	449.820	40.709	0.0
	RESIDUAL				3336.957	302	11.058		
	TOTAL				735.333	311	23.747		

TABLE 2AI: MULTIPLE CLASSIFICATION ANALYSIS (MCA)

GROUP	UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS + COVARIATES DEVIATION	BETA
LCL				
36 CP ML	.36		.46	
37 FL	.89		1.48	
30 MX	1.07		1.00	
31 CMML	-0.3		.30	
39 FL	.74		.38	
34 MX	-1.65		-1.38	
33 LC ML	-2.48		-2.61	
34 FL	.53		-.03	
38 MX	.37		.23	
		.41		.42
			R^2	.294
			R	.54
HCL				
CP ML	1.17		1.18	
FL	.39		1.25	
MX	2.77		3.21	
CM ML	1.27		2.22	
FL	3.23		1.80	
MX	.63		2.05	
LC ML	-4.91		-4.10	
FL	-.52		2.66	
MX	-3.85		-4.42	
		.54		.57
			R^2	.548
			R	.740

An examination of Table 2A1 shows that, at the Low Cognitive Levels, the learners' performances significantly varied by gender as indicated by Main Effects' F = 8.858 at 0.0 level of significance. Moreover, most of the differences seem to be in favour of the experimental strategies treatments with regards to male and female learners' performances.

At the High Cognitive Levels; it could be observed that the variation of the learners' performances by gender is higher with Main Effects F as 24.011 at 0.0 level of significance.

The need for precise measurement regarding the significance or otherwise of the differences made the researcher to undertake a Pair-wise ANCOVA test between each of the experimental and the control variables. The result of this analysis is presented on Table 2AII.

TABLE 2AII: PAIR-WISE ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY GENDER BETWEEN THE EXPERIMENTAL TREATMENTS AND CONTROL METHOD

MAIN COMP-ARISONS	PAIR	NOS IN PAIR	F RATIO OF PAIR	SIGN LEVEL	DF	ADJUSTED MCA VALUES	SIGN. IN FAVOUR OF
CPG & LCG	CPML & LCML	36 33	84.230	.000	1	2.49 -2.72	CPML
	CPFL & LCFL	37 34	0.956	.332	1	1.74 .16	NS
	CPMX & LCMX	30 38	61.592	.000	1	4.25 -.3.35	CPMX
CMG & LCG	CM ML & LC ML	31 33	66.869	.000	1	3.26 -3.06	CMML
	CMFL & LC FL	39 34	19.308	.000	1	2.00 -2.30	CMFL
	CM MX & LC MX	34 38	24.706	.000	1	3.55 -3.17	CMMX

It can be seen from Table 2AII that while male and mixed (gender) learners' performances under Cooperative strategy significantly improved more than male and mixed learners' performances under Lecture method, all the three gender learners' (male, female, mixed) performanes under the Competitive strategy significantly improved more than all the three gender learners' performances under the Lecture method.

One problem arose from our observation of the High Cognitive Levels performance of the learners: the extent of differences in the effectiveness between the two experimental treatments. This problem was investigated by undertaking a comparison of both Cooperative and Competitive strategies using the ANCOVA test. The result of this analysis is presented on Table 2BI.

TABLE 2BI: ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY GENDER (MALE, FEMALE, MIXED) UNDER THE EXPERIMENTAL STRATEGIES: COOPERATIVE AND COMPETITIVE

GROUP NO.	VARIABLE	SCORE OBTAINABLE	GRAND MEAN	SUM OF SQUARES	DEGREE OF FREEDOM	MEAN SQUARE	F RATIO	SIGNIFICANCE OF F
	LCL	18	12.271					
CP								
36 ML								
37 FL								
30 MX								
CM								
31 ML								
39 FL								
34 MX								
MAIN EFFECTS				169.885	5	33.977	5.670	.000
COVARIATES				220.464	1	220.464	36.790	.000
EXPLAINED				390.350	6	65.058	10.857	0.0
RESIDUAL				1198.500	200	5.993		
TOTAL				1588.850	206	7.713		
	HCL	32	18.242					
CP								
ML								
FL								
MX								
CM								
ML								
FL								
MX								
MAIN EFFECTS				241.145	5	48.229	5.244	.000
COVARIATES				1473.578	1	1473.518	160.229	.000
EXPLAINED				1714.663	6	285.777	31.075	0.0
RESIDUAL				1839.260	200	9.196		
TOTAL				3553.923	206	17.252		

TABLE 2BI: MULTIPLE CLASSIFICATION ANALYSIS (MCA)

GROUP + NO.	UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS + COVARIATES DEVIATION	BETA
LCL				
CP				
36 ML	.12		.08	
37 FL	.65		1.13	
30 MX	.83		.61	
CM				
31 ML	-.27		-.06	
39 FL	.50		-.04	
34 MX	-1.89		-1.75	
		.33		.32
			R^2	.246
			R	.496
HCL				
CP				
ML	-.41		-.73	
FL	-1.19		-.65	
MX	1.19		1.31	
CM				
ML	-31		.33	
FL	1.66		-.13	
MX	-.95		.17	
		.26		.16
			R^2	.482
			R	.695

It can be seen from Table 2BI that at the Low Cognitive Levels, the Cooperative strategy improved the learners' performances under it more than the improvement effected by the Competitive strategy among all the gender learners under it.

At the High Cognitive Levels, it could be observed thatthe situation is not as straight-forward as seen at the Low Cognitive Levels. Firstly, we note that there are significant differences in the learners' performances by gender (Main Effects' F = 5.244 at 0.0 level of significance; beta weight = .16). Secondly, whereas the Competitive strategy proved more effective among male and female learners, the Cooperative strategy proved more appropriate among mixed (gender) learners.

The search for precision about which of these differences would be significant or not, led the researcher to conduct a Pair-wise ANCOVA test between and within the experimental treatments. The result of this further analysis is presented on Table 2BII.

TABLE 2BII: PAIR-WISE ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY GENDER BETWEEN AND WITHIN THE EXPERIEMENTAL TREATMENTS

MAIN COMP-ARISONS	PAIR	NOS IN PAIR	F RATIO OF PAIR	SIGN LEVEL	DF	ADJUSTED MCA VALUES	SIGN. IN FAVOUR OF
CPG & CMG	CPML & CMML	36 31	0.015	.901	1	-.43 .50	NS
	CPFL & CMFL	37 39	19.622	.000	1	-.17 .16	CMFL
	CPMX & CM MX	30 34	8.335	.005	1	.57 -.50	CPMX
WITHIN CPG	ML & FL	36 37	1.163	.285	1	-.07 .06	NS
	ML & MX	36 30	5.459	.023	1	-.91 1.09	MX
	FL & MX	37 30	12.523	.001	1	-.86 1.06	MX
WITHIN CMG	ML & FL	31 39	7.146	.009	1	.03 -.02	ML
	ML & MX	31 34	0.531 0.531	.469 .469	1 1	.08 -.07	NS
	FL & MX	39 34	13.778	.000	1	-.23 .26	MX

NS = NOT SIGNIFICANT

It can be seen from Table 2BII that female learners' performances under Competitive Strategy significantly improved more than female learners' performances under Cooperative strategy. Conversely, mixed (gender) learners' performances under Cooperative strategy significantly improved more than mixed (gender) learners' performances under Competitive strategy.

Within each experimental treatment, there are significant differences. Under Cooperative strategy, mixed (gender) learners' performances significantly improved more than male and female learners' performances. Under Competitive strategy, while male and mixed learners' performances significantly improved more than female learners' performances, mixed and male learners' performances were not significantly different from one another.

Table 2AII also provides the test of hypothesis 2A which states that there will be no significant gender variations among the performances of the experimental and control groups of the learners at the high cognitive levels. The evidence from this Table is that at the 95% confidence level (.05) with one degree of freedom for each comparison, while male and mixed learners' performances under Cooperative strategy significantly improved more than male and mixed learners' performances under Lecture method, all the three gender learners' (male, female, mixed) performances under the Competitive strategy significantly improved more than all the three gender learners' performances under the Lecture method.

Hypothesis 2A is consequently rejected.

Table 2BII, on its part, also provides the test of hypothesis 2B which states that there will be no significant gender variations among the performances of the learners under the experimental strategies at the high cognitive levels. The evidence from this table is that at the 95% confidence level (.05) with one degree of freedom for each comparison whereas mixed (gender) learners' performances significantly improved more than male and female learners' performances under Cooperative strategy, male and mixed learners' performances significantly improved more than female learners' performances under Competitive strategy. Hypothesis 2B is accordingly rejected.

Problem 3

The next problem was to measure the distribution of the learners along ability levels at the high cognitive levels, gender homogenized.

An ANCOVA test was conducted on the performances of learners which were grouped under Cooperative, Competitive, and Lecture treatments. Other major design conditions such as the structure of the test and the number of times the test was administered, were the same as stated under Problem 1. The result of the analysis on Problem 3 is presented on Table 3AI.

TABLE 3A1: ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY ABILITY GROUPS (HIGH, LOW, MIXED) 'GENDER HOMOGENIZED', UNDER COOPERATIVE, COMPETITIVE AND LECTURE TREATMENTS

GROUP + NO.	VARIABLE	SCORE OBTAINABLE	GRAND MEAN	SUM OF SQUARES	DEGREE OF FREEDOM	MEAN SQUARE	F RATIO	SIGNIFICANCE OF F
	LCL	18	12.029					
CP GD								
18 AHA								
46 ALA								
39 AMA								
CM GD								
23 AHA								
53 ALA								
28 AMA								
LC GD								
29 AHA								
52 ALA								
24 AMA								
MAIN EFFECTS				413.735	8	51.717	8.438	0.0
COVARIATES				150.055	1	150.055	24.483	.000
EXPLAINED				563.789	9	62.643	10.221	0.0
RESIDUAL				1850.951	302	6.129		
TOTAL				2414.740	311	7.764		
	HCL	32						
CP GD								
AHA								
ALA								
AMA								
CM GD								
AHA								
ALA								
AMA								
LC GD								
AHA								
ALA								
AMA								
MAIN EFFECTS				3238.030	8	404.754	39.861	0.0
COVARIATES				1080.721	1	1080.721	106.430	.000
EXPLAINED				4318.750	9	497.861	47.257	0.0
RESIDUAL				3066.583	302	10.154		
TOTAL				9385.333	311	23.747		

TABLE 3A1: MULTIPLE CLASSIFICATION ANALYSIS (MCA)

GROUP + NO.	UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS + COVARIATES DEVIATION	BETA
CP GD				
18 AHA	1.47		.96	
46 ALA	-.05		.38	
39 AMA	1.39		1.58	
CM GD				
23 AHA	1.93		1.18	
53 ALA	-1.33		-.91	
28 AMA	-.06		-.10	
LC GD				
29 AHA	.94		.18	
52 ALA	-1.34		-1.15	
24 AMA	-.32		-.74	
		.41		.34
			R^2	.233
			R	.483
CP GD				
AHA	2.33		.52	
ALA	-.80		.48	
AMA	3.44		3.78	
CM GD				
AHA	5.51		3.06	
ALA	-.33		1.39	
AMA	2.76		2.21	
LC GD				
AHA	.89		1.69	
ALA	-5.34		-4.59	
AMA	-3.08		4.05	
		.66		.59
			R^2	.585
			R	.765

It can be seen from Table 3 AI that at the Low Cognitive Levels, all the Ability groups of learners under the two experimental treatments out-performed all the Ability groups of learners under the control method.

At the High Cognitive Levels, it could be observed that the situation at the Low Cognitive Levels is repeated.

The desire for precision especially in relation to significance level concerning the differences led the researcher to conduct a Pair-wise ANCOVA test between the experimental treatments and control method. The result of this analysis is presented on Table 3 AII.

TABLE 3A2: PAIR-WISE ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY ABILITY GROUPS (HIGH, LOW, MIXED) 'GENDER HOMOGENIZED' BETWEEN THE EXPERIMENTAL TREATMENTS AND CONTROL METHOD

MAIN COMP-ARISONS	PAIR	NOS IN PAIR	F RATIO OF PAIR	SIGN LEVEL	DF	ADJUSTED MCA VALUES	SIGN. IN FAVOUR OF
CPGD/AAG & LCGD/AAG	CPGD/AHA & LCGD/AHA	18 29	1.707	.198	1	1.21 -.75	NS
	CPGD/AHA & LCGD/ALA	46 52	60.544	.000	1	2.70 -2.39	CPG.ALA
	CPGD/AMA & LCGD/AMA	39 24	56.675	.000	1	3.06 -4.97	CPGD/AMA
CMGD/AAG & LCGD/AAG	CMGD/AHA & LCGD/AHA	23 29	22.639	.000	1	2.64 -2.09	CMGD/AMA
	CMGD/AHA & LCGD/AHA	53 52	52.941	.000	1	2.90 -2.96	CMGD/ALA
	CMGD/AMA & LCGD/AMA	28 24	40.324	.000	1	2.91 -3.39	CMGD/AMA

It can be seen from Table 3 AII that only one comparison: that between Cooperative strategy and Lecture method for High Ability group of learners which is insignificant although the learners' performances under Cooperative strategy are still higher. All other comparisons (five) are perfectly significant in favour of the learners under the experimental treatments' Ability groups of learners' performances.

One problem arose from our observation of the High Cognitive Levels performance of the learners, namely, the extent of differences in the effectiveness between the experimental treatments. This problem was investigated by undertaking a compasion of both Cooperative and Competitive strategies using the ANCOVA test. The result of the analysis is presented on Table 3 B1.

TABLE 3B1: ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY ABILITY GROUPS (HIGH, LOW, MIXED) 'GENDER HOMOGENIZED', UNDER THE EXPERIMENTAL STRATEGIES: COOPERATIVE & COMPETITIVE

GROUP + NO.	VARI-ABLE	SCORE OBTAIN-ABLE	GRAND MEAN	SUM OF SQUARES	DEGREE OF FREEDOM	MEAN SQUARE	F RATIO	SIGNIFI-CANCE OF F
	LCL	18	12.27					
CP GD								
18 AHA								
46 ALA								
39 AMA								
CM GD								
23 AHA								
53 ALA								
28 AMA								
	MAIN EFFECTS			280.845	5	56.169	9.325	.000
	COVARIATES			103.273	1	103.273	17.145	.000
	EXPLAINED			384.119	6	64.020	10.628	0.0
	RESIDUAL			1204.731	200	6.024		
	TOTAL			1588.830	206	7.713		
	HCL	32						
CP GD								
AHA								
ALA								
AMA								
CM GD								
AHA								
ALA								
AMA								
	MAIN EFFECTS			991.067	5	198.213	24.163	0.0
	COVARIATES			922.197	1	922.197	112.418	.000
	EXPLAINED			1913.265	6	318.877	38.872	0.0
	RESIDUAL			1640.658	200	8.203		
	TOTAL			3553.923	206	17.252		

TABLE 3B1: MULTIPLE CLASSIFICATION ANALYSIS (MCA)

GROUP + NO.	UNADJUSTED DEVIATION	ETA	ADJUSTED FOR INDEPENDENTS + COVARIATES DEVIATION	BETA
LCL				
CP GD				
18 AHA	1.23		.58	
46 ALA	-.29		.05	
39 AMA	1.14		1.23	
CM GD				
23 AHA	1.69		.78	
53 ALA	-1.57		-1.24	
28 AMA	-.31		-.46	
		.42		.32
			R^2	.242
			R	.492
HCL				
CP GD				
AHA	.76		-1.49	
ALA	-2.37		-1.31	
AMA	1.86		1.93	
CM GD				
AHA	3.93		1.00	
ALA	-1.90		-.37	
AMA	1.19		.29	
		.53		.29
			R^2	..538
			R	.734

It can be seen from Table 3 BI that, at the Low Cognitive Levels, whereas High Ability group of learners' performances under Competitive strategy improved more than High Ability group of learners' performances under Cooperative strategy, Low and Mixed Ability groups of learners' performances under Cooperative strategy improved more than Low and Mixed Ability groups of learners' performances under Competitive strategy.

At the High Cognitive Levels, it could be observed that while High and Low Ability groups of learners' performances improved more than High and Low Ability groups of learners' performances under Competitive strategy, Mixed Ability group of learners' performances under Cooperative strategy improved more than Mixed Ability group of learners' performances under Competitive strategy.

The desire to remove doubts in relation to which of these differences is significant led the researcher to conduct a Pair-wise ANCOVA test on the learners' performances under the two experimental treatments. The result of this analysis is presented on Table 3 BII.

TABLE 3BII: PAIR-WISE ANALYSIS OF COVARIANCE TEST ON LEARNERS' PERFORMANCES BY ABILITY GROUPS (HIGH, LOW, MIXED) 'GENDER HOMOGENIZED', BETWEEN AND WITHIN THE EXPERIEMENTAL TREATMENTS

MAIN COMP-ARISONS	PAIR	NOS IN PAIR	F RATIO OF PAIR	SIGN LEVEL	DF	ADJUSTED MCA VALUES	SIGN. IN FAVOUR OF
CPGD/AAG & CMGD/AAG	CPGD/AHA & CMGD/AHA	18 23	13.206	.001	1	-1.41 1.10	CMGD/AHA
	CPGD/ALA & CMGD/ALA	46 53	0.539	.465	1	-.49 .43	NS
	CPGD/AMA & CMGD/AMA	39 28	1.268	.264	1	.73 -1.01	NS
WITHIN CPGD/AAG	AHA & ALA	18 46	20.065	.000	1	-.53 .21	ALA
	AHA & AMA	18 39	1.988	.164	1	-2.49 1.15	NS
	ALA & AMA	46 39	64.317	.000	1	-1.41 1.66	AMA
WITHIN CMGD/AAG	AHA & ALA	23 53	45.977	.000	1	1.33 -.58	AHA
	AHA & AMA	23 28	17.536	.000	1	.35 -.29	AHA
	ALA & AMA	53 28	16.035	.000	1	-.32 .61	AMA

It can be seen from Table 3 B2 that it is only the comparison between the two experimental treatments for High Ability group of learners' performances which is significant in favour of the Competitive strategy.

Within Cooperative strategy, Low and Mixed Ability groups of learners significantly out-performed High Ability group of learners. Under Competitive strategy, High and Mixed Ability groups of learners significantly out-performed Low Ability group of learners.

Table 3AII also provides the test of hypothesis 3A which states that there will be no significant variations among the performances of the experimental and control groups of the gender homogenized learners along ability levels, at the high cognitive levels. The evidence from this table is that at the .05 level of significance with one degree of freedom for each comparison, one comparison only: the one between Cooperative strategy and Lecture method for High Ability group of learners, is not significant. All other (five) comparisons are significant in favour of the experimental treatments' Ability groups of learners' performances. Hypothesis 3A is rejected as a result.

Table 3BII, in its case, also provides the test of hypothesis 3B which states that there will be no significant ability group variations among the performances of the gender homogenized learners under the experimental strategies, at the high cognitive levels. The evidence from this table is that at the .05 level of significance with one degree of freedom for each comparison, within Cooperative strategy, Low and Mixed Ability groups of learners significantly out-performed High Ability group of learners while High and Mixed Ability groups of learners significantly out-performed Low Ability group of learners under Competitive strategy. Hypothesis 3B is rejected accordingly.

APPENDIX D

MAIN PHASE OF THE STUDY

APPENDIX D1

APPLICATION TO SCHOOL PRINCIPALS FOR EXPERIMENT

School of Post-Graduate Studies,
Department of Curriculum Studies,
University of Lagos,
Lagos.
3rd January 1994.

The Principal,

....

....

....

....

Sir/Madam,

REQUEST TO USE YOUR SCHOOL FOR EXPERIMENT

I am a Post-Graduate student of the above named Department in the University of Lagos. I shall be very grateful if you allow me to use your school for the purpose of research between January 24 and March 4 1994. The class that would be involved is JSS II and the subject is Social Studies.

Thank you for your anticipated cooperation.

Yours faithfully,

J.D. Kukuru.

APPENDIX D2

MAIN PHASE OF STUDY: DETAILS OF SAMPLE

S/NO	NAME OF SCHOOL	TREATMENT EFFECTED	TYPE OF SCHOOL BY GENDER	NO. OF LEARNERS IN EACH CLASS
1	Ajayi Crowther Memorial Grammar School, Bariga.	Cooperative	Male	51
2	Methodist Girls High School, Yaba.	Cooperative	Female	75
3	Lagos City College, Sabo.	Cooperative	Mixed	70
4	Baptist Academy, Obanikoro.	Competitive	Male	73
5	Reagan Memorial Bapitst Secondary School, Sabo.	Competitive	Female	51
6	National College, Gbagada.	Competitive	Mixed	69
7	C.M.S. Boys Grammar School, Bariga.	Lecture	Male	51
8	Igbobi Girls High School, Igbobi.	Lecture	Female	73
9	Morocco Comprehensive High School, Igbobi.	Lecture	Mixed	75
Total No. of Learners =				588

Date : January -- March, 1994

Duration : 6 Weeks

No of Periods = 20 : 4 Periods Per Week

1st Week for Pre - Test and Preparation for Treatement.

APPENDIX D3

MAIN PHASE OF THE STUDY:STATUS OF SCHOOLS

GROUPING CRITERIA

A : Federal Government Colleges, Model Schools, and Unity Schools

B : Other Schools of high standing either due to long history or achievenment or both

C : The common / general type of Secondary Schools.

GROUPS USED

The sample did not include Group A Schools due to time and logistics factors:

A : Nil

B : Baptist Academy, Obainkoro;
C.M.S Boys' Grammar School, Yaba;
Reagan Memorial Baptist Secondary School, Sabo;
National College, Gbagada.

C : Ajayi Crowther Memorial College, Bariga;
Igbobi Girls College, Somolu;
Lagos City College Sabo;
Morocco Comprehensive High School, Somolu.

APPENDIX D4

TEACTHING PRACTICE SCORES OF PARTICIPATING TEACHERS AND VALUE ATTACHED TO EACH SCORE

S/NO	BEFORE MODE RATION	AFTER MODE RATION	VALUE FOR FINAL SCORE	SCHOOL STATUS	VALUE	TREATMENT EFFECTED
1	66	62	3	C	3	EXP
2	69	70	5	B	2	EXP
3	63	64	3	B	2	CT
4	6 9	65	4	B	2	EXP
5	63	62	3	B	2	EXP
6	65	65	4	C	3	CT
7.	63	64	3	C	3	EXP
8.	68	70	5	B	2	EXP
9.	65	66	4	C	3	CT

KEY

50	-	54	= 1
55	-	59	= 2
60	-	64	= 3
65	-	69	= 4
70	-	74	= 5
75	-	79	= 6
80	And above		= 7

EXP = Experimental group

CT = Control group

APPENDIX D5

ALL RESULTS OF EXPERIMENTAL GROUPS TEACHERS

NO	THEORY/END OF TRAINING TEST	PRACTICE BEFORE MODERATION	PRACTICE AFTER MODERATION	MEAN OF THEORY& PRACTICE AFTER MODERATION
1	63	66	62	63
2	80	69	70	75
3	88	69	65	77
4	85	63	64	74
5	79	63	64	72
6	85	68	70	78

APPENDIX D6

SUMMARY OF THE THREE OBSERVERS' RATINGS OF THE PARTICIPATING TEACHERS (CONSTRUCT VALIDITY)

S/NO.		OBSERVER A	OBSERVER B	OBSERVER C
1		65	67	62
2		78	79	75
3	Control	64 (43)	63 (41)	66 (41)
4		85	86	87
5		65	63	62
6	Control	68 (39)	69 (38)	65 (42)
7.		68	66	65
8.		83	82	85
9.	Control	80 (35)	78 (34)	81 (31)

NOTE: The scores in parenthesis are those that would have been awarded the Control Group Teachers purely based on the Rating Scale becuase Lecture method concentrated on Low Cognitive Levels with limited interaction. On the other hand, the Control Group Teachers strictly took to instruction hence performed well. Thus the high scores are the appropriate ones for them.

APPENDIX D7I

A & B OF OBSERVERS' RATINGS

S/NO.	X	Y	X^2	Y^2	XY
1.	65	67	4225	4489	4355
2.	78	78	6084	6241	6162
3.	64	63	4096	3969	4032
4.	84	86	7225	7396	7310
5.	65	63	4225	3969	4095
6.	68	69	4624	4761	4692
7.	68	66	4624	4356	4488
8.	83	82	6889	6724	6806
9.	80	78	6400	6084	6240
$\sum N = 9$	$\sum X = 656$	$\sum Y = 653$	$\sum X^2 = 48{,}392$	$\sum Y^2 = 47{,}989$	$\sum XY = 48{,}180$

$$r = \frac{48{,}180 - \frac{(656)(653)}{9}}{\sqrt{\left(48{,}392 - \frac{(656)^2}{9}\right)\left(47{,}989 - \frac{(653)^2}{9}\right)}}$$

$$= \frac{583}{\sqrt{576.9 \times 610.3}}$$

$$= \frac{583.6}{593.365}$$

$$= \underline{0.98}$$

APPENDIX D7II

A & C OF OBSERVERS' RATINGS

S/NO.	X	Y	X^2	Y^2	XY
1.	65	62	4225	3844	4030
2.	78	75	6084	5625	5850
3.	64	66	4096	4356	4224
4.	85	87	7225	7569	7395
5.	65	62	4225	3844	4030
6.	68	65	4624	4225	4420
7.	68	65	4624	4225	4420
8.	83	85	6889	7225	7055
9.	80	81	6400	6561	6480
$\sum N = 9$	$\sum X = 656$	$\sum Y = 648$	$\sum X^2 = 48{,}392$	$\sum Y^2 = 47{,}474$	$\sum XY = 47{,}904$

r =

$$\frac{47{,}904 - \frac{(656)(648)}{9}}{\sqrt{(48{,}392 - (\frac{656}{9})^2)(47{,}474 - (\frac{648}{9})^2)}}$$

$$= \frac{672}{\sqrt{567.9 \text{ X } 818}}$$

$$= \frac{672}{681.573}$$

$$= 0.98$$

Aversge of both computations $= 0.98 + 0.98 \div 2$

$=0.98$ **(Observers' Agreement)**

S/NO NOMINALS PRE TEST POST TEST

APPENDIX D8 - CODED RESULT OF SAMPLE READY FOR COMPUTER
MAIN PHASE OF THE SYUDY

S/NO	NOMINALS									PRE TEST										POST TEST									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	3	3	1	1	1	1	2	1	4	26	52	3	5	3	7	3	5	8	18	38	76	9	8	5	5	5	6	17	21
2	3	3	1	1	1	1	1	3	2	27	54	3	4	4	5	6	5	7	20	36	72	9	8	2	8	5	5	17	20
3	3	3	1	1	1	1	3	1	4	27	54	3	9	5	5	2	3	12	15	36	72	9	7	6	6	4	4	16	20
4	3	3	1	1	1	1	2	1	4	27	54	5	6	5	5	3	3	11	16	32	64	9	6	5	4	4	4	15	17
5	3	3	1	1	1	1	2	2	6	25	50	2	5	4	6	3	5	7	18	40	80	9	7	7	5	6	6	16	24
6	3	3	1	1	1	1	2	3	6	25	50	2	5	6	5	4	3	7	18	35	70	5	7	5	7	5	6	12	23
7	3	3	1	1	2	1	2	2	6	22	44	2	4	5	5	3	3	6	16	32	64	8	6	2	7	5	4	14	18
8	3	3	1	1	2	1	2	1	4	21	42	2	5	4	5	4	1	7	14	24	48	7	6	0	4	4	3	13	11
9	3	3	1	1	2	1	2	2	6	20	40	2	3	3	5	2	5	5	15	25	50	5	6	3	5	2	4	11	14
10	3	3	1	1	2	1	2	1	4	23	46	3	3	4	5	3	5	6	17	30	60	9	6	6	4	4	1	15	15
11	3	3	1	1	2	1	2	3	6	17	34	1	1	3	5	2	5	2	15	31	62	5	5	3	5	6	7	10	21
12	3	3	1	1	2	1	2	1	4	19	38	3	4	2	3	3	4	7	12	29	58	7	6	4	5	3	4	13	16
13	3	3	1	1	2	1	2	4	6	19	38	1	4	5	4	3	2	5	14	32	64	8	5	3	4	3	9	13	19
14	3	3	1	1	2	1	2	1	4	23	46	3	4	5	4	3	4	7	16	37	74	6	7	5	6	6	7	13	24
15	3	3	1	1	2	1	1	3	6	23	46	4	7	4	5	0	3	11	12	30	60	6	7	4	6	5	2	13	17
16	3	3	1	1	2	1	2	3	6	23	46	3	4	4	5	4	3	7	16	27	54	5	3	1	5	6	7	8	19
17	3	3	1	1	2	1	2	3	1	19	38	2	4	5	3	3	2	6	13	25	50	9	5	3	4	3	1	14	11
18	3	3	1	1	2	1	2	1	5	18	36	6	2	2	1	1	6	8	10	30	60	9	7	0	5	6	3	16	14
19	3	3	1	1	2	1	2	3	6	11	22	1	2	2	3	2	1	3	8	26	52	6	4	4	3	3	6	10	16
20	3	3	1	1	2	1	2	3	4	17	34	2	3	4	4	3	1	5	12	25	50	6	4	3	3	3	6	10	15
21	3	3	1	1	2	1	1	1	4	17	34	6	2	2	1	1	5	8	9	23	46	5	6	2	5	2	3	11	12
22	3	3	1	1	2	1	1	3	4	24	48	3	5	4	5	3	4	8	16	28	56	9	5	5	3	3	3	14	14
23	3	3	1	1	2	1	2	1	4	21	42	4	5	5	3	2	2	9	12	27	54	6	6	4	5	2	4	12	15
24	3	3	1	1	2	1	2	2	6	20	40	2	5	2	3	4	4	7	13	22	44	5	5	2	2	4	4	10	12
25	3	3	1	1	2	1	2	2	6	16	32	3	1	3	2	3	4	4	12	31	62	8	7	3	4	4	5	15	16
26	3	3	1	1	2	1	2	2	6	15	30	3	2	4	2	3	1	5	10	19	38	5	4	0	6	1	3	9	10
27	3	3	1	1	2	1	2	2	6	13	26	3	3	2	2	0	3	6	7	26	52	7	3	3	5	4	4	10	16
28	3	3	1	1	2	1	3	2	6	13	26	2	1	2	5	2	1	3	10	24	48	5	5	2	5	3	4	10	14
29	3	3	1	1	2	1	2	2	6	13	26	1	2	3	3	4	1	3	11	19	38	2	4	2	5	2	4	6	13
30	3	3	1	1	2	1	1	2	6	17	34	3	2	2	5	2	3	5	12	27	54	7	7	1	4	3	5	14	13
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S/NO	NOMINALS									PRE TEST										POST TEST									
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37	3	3	1	1	3	1	1	1	6	27	54	2	6	5	5	4	5	8	19	38	76	8	7	4	7	3	9	15	23
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S/NO	NOMINALS									PRE TEST										POST TEST									
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S/NO	NOMINALS									PRE TEST										POST TEST									
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S/NO	NOMINALS									PRE TEST										POST TEST									
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S/NO	NOMINALS									PRE TEST										POST TEST									
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183	3	3	3	1	3	3	1	3	6	34	68	5	8	5	7	5	4	13	21	41	82	9	7	6	7	4	8	16	25
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185	3	3	3	1	3	3	2	5	6	27	54	5	5	4	5	4	4	10	17	36	72	7	7	3	6	4	9	14	22
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S/NO	NOMINALS													PRE TEST											POST TEST				
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226	5	2	1	2	2	1	2	3	6	14	28	3	3	1	1	4	2	6	8	32	64	6	4	3	7	5	7	10	22
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S/NO	NOMINALS									PRE TEST										POST TEST									
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S/NO	NOMINALS													PRE TEST										POST TEST					
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S/NO	NOMINALS													PRE TEST										POST TEST					
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S/NO	NOMINALS									PRE TEST										POST TEST									
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S/NO	NOMINALS									PRE TEST										POST TEST									
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S/NO	NOMINALS												PRE TEST										POST TEST						
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S/NO	NOMINALS									PRE TEST										POST TEST									
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480	4	3	2	3	2	2	1	2	1	19	38	3	3	3	4	3	3	6	13	17	34	5	3	3	1	2	3	8	9
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S/NO	NOMINALS									PRE TEST										POST TEST									
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537	4	3	3	3	1	3	2	2	6	29	58	4	7	4	6	2	6	11	18	38	76	9	8	5	6	3	7	17	21
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539	4	3	3	3	2	3	1	5	6	24	48	2	5	3	5	3	6	7	17	14	28	5	1	1	4	1	2	6	8
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542	4	3	3	3	2	3	2	2	6	23	46	2	5	4	5	2	5	7	16	16	32	5	5	2	2	2	0	10	6
543	4	3	3	3	2	3	2	5	6	23	46	2	5	3	5	2	6	7	16	20	40	6	4	3	3	1	3	10	10
544	4	3	3	3	2	3	2	2	1	23	46	4	7	2	6	0	4	11	12	13	26	3	2	4	2	1	1	5	8
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546	4	3	3	3	2	3	2	2	4	22	44	2	6	4	4	2	4	8	14	13	26	2	3	1	0	3	4	5	8
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550	4	3	3	3	2	3	2	2	4	21	42	3	6	2	4	4	2	9	12	29	58	9	6	3	5	2	4	15	14
551	4	3	3	3	2	3	2	3	6	21	42	2	6	3	1	6	3	8	13	30	60	8	5	2	6	5	4	13	17

S/NO	NOMINALS									PRE TEST										POST TEST									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
552	4	3	3	3	2	3	1	2	4	20	40	3	4	2	4	3	4	7	13	17	34	5	4	1	2	1	4	9	8
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555	4	3	3	3	2	3	2	1	4	20	40	4	4	1	3	2	6	8	12	36	72	8	5	8	6	3	6	13	23
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568	4	3	3	3	2	3	2	5	6	12	24	1	3	2	2	0	4	4	8	30	60	4	4	3	6	6	7	8	22
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S/NO	NOMINALS	PRE TEST

NOTE:

001 - 196 (196 CASES): DATA FOR COOPERATIVE STRATEGY : EXPERIMENT I

197 - 389 (193 CASES): DATA FOR COMPETITIVE STRATEGY : EXPERIMENT II

390 - 588 (199 CASES): DATA FOR LECTURE METHOD : CONTROL

1 - 29 (HORIZONTAL) = VARIABLES: PLEASE SEE APPENDICES C5 & C6

APPENDIX D9

THE COGNITIVE LEVELS COMBINATIONS MEANS AND STANDARD DEVIATIONS OF THE THREE TREATMENT GROUPS: COOPERATIVE, COMPETITIVE, AND LECTURE (CP, CM, & LC RESPECTIVELY) AT THE POST TEST .

COGNITIVE LEVELS COMBINATION	COOPERATIVE GROUP (CP)		COMPETITIVE GROUP (CM)		LECTURE GROUP (LC)		COMBINATION OF CP,CM,& LC.	
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
LCL	12.63	2.54	13.05	2.74	10.79	2.96	12.16	2.75
HCL	18.32	4.64	18.25	4.36	14.13	5.01	16.90	4.67

NOTE:Data Column One: Combination of Low Cognitive Levels (LCL)
Data Column Two: Combination of High Cognitive Levels (HCL)

APPENDIX D10

THE COGNITIVE LEVELS COMBINATIONS' MEANS AND STANDARD DEVIATIONS OF THE EXPERIMENTAL GROUPS: COOPERATIVE AND COMPETITIVE AT THE POST TEST.

COGNITIVE LEVELS COMBINATION	COOPERATIVE GROUP (CP)		COMPETITIVE GROUP (CM)		COMBINATION OF CP& CM	
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
LCL	12.63	2.54	13.05	2.74	12.84	2.64
HCL	18.32	4.64	18.25	4.36	18.29	4.50

APPENDIX D11

AVERAGE MEANS AND STANDARD DEVIATIONS OF ALL THE THREE TREATMENT GROUPS AT THE COMBINATIONS OF THE COGNITIVE LEVELS.

COGNITIVE LEVELS COMBINATION	POST TEST		CONVERSION TO EQUAL OBTAINABLE SCORE.	
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
LCL	12.16	2.75	21.62	4.89
HCL	16.90	4.67	16.90	4.67

APPENDIX D12

AVERAGE MEANS AND STANDAND DEVIATIONS OF THE COMBINED EXPERIMENTAL GROUPS AT THE COMBINATIONS OF THE COGNITIVE LEVELS.

COGNITIVE LEVELS	POST TEST		CONVERSION TO EQUAL OBTAINABLE SCORES	
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
LCL	12.84	2.64	22.83	4.69
HCL	18.29	4.50	12.29	4.50

APPENDIX D 13

COMPARISONS AT THE COMBINATIONS OF THE LOW AN D HIGH COGNITIVE LEVELS (LCL& HCL RESPECTIVELY) AT THE POST TEST.

GROUP COMBINATION &NO	T VALUE	DEGREE OF FREEDOM	SIGNFICANCE LEVEL	REMARK
CP +CM +LC LCL VS HCL 588	36.88	586	.OO1	HIGHLY SIGNIFICANT IN FAVVOUR OF LCL OR VICE VERSA
CP +CM ONLY LCL VS HCL 389	20.92	387	.001	HIGHLY SIGNIFICANT IN FAVOUR OF LCL OR VICE VERSA

MAJOR IMPLICATIONS

1. TheLow CognitiveLevels (LCL) are hereby proved actually lower/simpler than the High Cognitive Levels (HCL) in either treatment group's combination : CP + CM +LC or CP + CM only.

2. The instrument as well as its administration are basically proved valid.

3. The experiment was worthwhile.

APPENDIX D14

CALCULATIONS ON THE COMBINATIONS OF THE LOW AND HIGH COGNITIVE LEVELS(LCL &HCL RESPECTIVELY) TO ASCERTAIN THAT LOWCOGNITIVE LEVELS WERE ACTUALLY LOW AND THAT HIGH COGNITIVE LEVELS WERE ACTUALLY HIGH USING T -TEST AT THE POST TEST

A. LCL VS HCL (CP+CM+LC)

$$= \frac{21.62 - 16.90}{\sqrt{\frac{4.89}{588} + \frac{4.67}{588}}}$$

$$= .0083 + .0080 = \frac{4.72}{.128}$$

T =36.88
DF =586
Significant at .001 (3.291)

B. LCL VS HCL (CP +CM +ONLY)

$$= \frac{22.83 - 18.29}{\sqrt{\frac{4.69}{196} + \frac{4.50}{193}}}$$

$$.024 + .023 = \frac{4.54}{.217}$$

T = 20.92
DF =387
Significant at .001 (3.291)

APPENDIX D15

CALCULATION OF RELIABILITY USING KR21 FORMULA

No. of Items	Mean	Standard Deviation
50	29.06	6.51

KR21 =

$$\frac{(50)\ 6.51^2 - 29.06\ (50-29.6)}{6.51^2\ (50-1)}$$

$$= \frac{50 \times 42.3801 - 29.06 \times 20.94}{42.3801 \times 49}$$

$$= \frac{1510.505}{2076.6249}$$

$$= 0.73.$$

APPENDIX E

THE DEVELOPED AND VALIDATED TEACHER TRAINING PACKAGE

1.0 INTRODUCTION

1A. NEED FOR THE DEVELOPMENT OF THE TRAINING PACKAGE

Consideration of two points made it imperative for the researcher to develop his training programme for the experiment, which was originally in outline form (for his personal consumption). These points were:

(i) significant results were found from the experiment not only at the Main Study stage but from the Pilot Study;

(ii) the study area: high cognitive levels teaching processes in the classroom, is relatively novel in Ph.D kind of research.

Based on these reasons, the development of the Training Package was viewed as a necessary additional contribution of the researcher geared toward the improvement of Teacher Training in education with regards to high cognitive levels teaching processes *not only in social studies but also in any subject area.*

1B. MAIN GUIDING PRINCIPLES FOR DEVELOPMENT OF THE TRAINING PACKAGE

The Training Package was developed through the search-light of curriculum principles. The major components of a curriculum are: objectives, content, methodology, and evaluation (Tyler 1949: 1 – 2; Aisiku 1987: 1; Brady 1983:144 and 148). Accordingly, each training phase systematically took cognizance of all the components of a curriculum, in line with the demands of the field of research and Department of the researcher.

1C. BASES FOR VALIDATION OF THE TRAINING PACKAGE

The experts who validated the instruments of this study before the Pre-Pilot phase and during the review after the Pre-Pilot phase, validated the development of the Training Package. They considered the following criteria among others:

(i) the objectives and content of each phase (week) of training, compared to the corresponding outline (of content) which was used for the experiment: there should be congruence between the two unit groups;

(ii) over-all duration of practical training and that of the developed Package: there should be agreement between the two unit groups;

(iii) adequacy of objectives and content in line with duration per week: there should be reasonable (sufficient) work to engage the trainer and trainees weekly;

(iv) methodology under each week: suitability and comprehensiveness: systematic organization of learning experiences in relation to objectives and content;

(v) evaluation: how are the questions in agreement with the objectives to content and presentation of objectives under methodology?

(vi) focus of the training: how to ensure the high cognitive levels in the classroom: was this centre well articulated in relation to objectives, content, methodology, and evaluation?

2. OUT-LINE OF THE TRAINING PACKAGE

Since the out-line of the Training Package is the raw material for the production of the Training Package, it is hereby presented in its original form before the systematic development of the Package.

(i) Meaning of Cooperative teaching

(ii) Meaning of Competitive teaching

(iii) Distinction between Cooperative and Competitive teaching

(iv) How to ensure Cooperation in class

(v) How to ensure Competition in class

(vi) What ability groups of learners are

(vii) How to group learners into high, low, and mixed abilities

(viii) Identifying the major parts of good quality instruction

(ix) Describing the major parts of good quality instruction

(x) Aisiku's view of teaching as interaction involving the teacher, learner, and subject matter

(xi) Twelve implication of Aisiku's view; notable among them are:

  (a) Teaching cannot be rushed

  (b) Feedback is vital in teaching

(c) Learners possess the potential to learn

(xii) Three developments on the cognitive levels: Bloom et.al. (1956); Tanner and Tanner (1980); and Yoloye (1986); these developments have six, eight, and three cognitive levels respectively.

(xiii) How to practically ensure: Comprehension, Application, Analysis, Synthesis, and Evaluation in the classroom. This section was the core of the training; the differences between Cooperative and Competitive teaching processes were therefore secondary.

(xiv) (a) The main parts of a good Lesson Note: objectives, content, methodology, and evaluation, which correspond to a curriculum.

(b) The whole Lesson Note being based on objectives.

(c) The number of objectives that should be formulated in a number of minutes class e.g. not more than four objectives in a 40 minute class.

(d) High cognitive levels objectives to dominate the cognitive domain objectives.

(xv) Terminal Test (End of Training/Competence Test) to ensure that no would - be teacher (trainee) scored below 60% otherwise he/she would be disqualified.

(xvi) Revision of the Test with the trainees and effecting necessary corrections.

(xvii) How to administer the Pre and Post tests: need to space out learners very well because the questions were objective.

(xviii) Giving to each participating teacher an Instruction Booklet which contained summaries of some technical parts of the training.

3.0 SYSTEMATIC DEVELOPMENT OF THE TRAINING PACKAGE: SIX WEEKS DURATION

A. WEEK ONE: FIVE DAYS (FIVE HOURS)

1. BEHAVIOURAL OBJECTIVES

At the end of the first week, the trainees should be able to:

(i) explain Cooperative teaching process;

(ii) explain Competitive teaching process;

(iii) distinguish between Cooperative and Competitive teaching processes;

(iv) practically demonstrate how to ensure Cooperation in class;

(v) practically demonstrate how to ensure Competition in class.

2. CONTENT

In a Cooperative teaching situation, the learners are divided into small groups of not more than twelve. Members in each group are allowed to cooperate: discuss with each other. If a question is posed to a member of the group, one member only, answers for all members of the group. If there is assignment, all members in a group submit one script only.

Teachers in Cooperative teaching situation mark less number of scripts on assignment but they face the task of ensuring that each group member practically works with others as a team.

In this study, there was an inbuilt variable: Ability Groups of learners. The learners were divided into High, Low, and Mixed Ability Groups based on their pretest scores.

In an individualized Competitive teaching situation, each learner studies apart and struggles to beat the other learners, refusing to disclose information either in or outside school. Each learner submits separate assignment.

Teachers in individualized Competitive teaching situation mark as many papers as the number of learners in each class, on assignment.

The inbuilt variable: Ability Groups of learners, was also in this strategy as in Cooperative strategy above.

Cooperative and Competitive teaching strategies differ in the following forms:

(i) the learners assist one another in Cooperative teaching situation but the learners do not assist each other in an individualized Competitive teaching situation;

(ii) one assignment only, is submitted in a Cooperative teaching situation whereas the number of assignments to be submitted in a Competitive situation is equal to the number of learners in a class.

(iii) learners are academically free with each other in a Cooperative situation, learners are not free with each other academically in an individualized Competitive situation;

(iv) the teacher has more practical work to do in the classroom in terms of organization in a Cooperative teaching environment, the teacher has less job to do in terms of classroom management, in a Competitive teaching environment;

(v) whereas the teacher has less answer scripts to mark in a Cooperative situation, the teacher has more answer scripts to mark in a Competitive teaching situation.

Cooperation can be ensured in the classroom if learners in each group are made to sit around themselves, talk to each other, give one answer to represent all members, while the teacher instructs the learners to be free and contribute.

Competition can be ensured by the teacher through the following processes among others:

(i) inform the learners that there are prizes for the best learners;
(ii) they should keep their ideas to themselves;
(iii) they should avoid exposing what they are writing;
(iv) ensure that sitting arrangement remains unadjusted;
(v) each learner submits assignment individually;
(vi) after marking assignments, exposing any learners suspected of cooperating;
(vii) punishing (at least mildly) any learners suspected of cooperating.

(Okebukola 1984; Peterson 1982; Okebukola and Jegede 1990).

3. METHODOLOGY

(i) The trainer should present each objective to the trainees for one hour each day, for the sake of distributed practice/learning advantage (Meyer 1982 : 1047).

(ii) Objectives I, II, & III are more philosophical/abstract. The trainer should make provision for good dictionary use in the presentation of these objectives.

(iii) Objectives IV & V demand double behaviour: both theoretical and practical. The trainees were made to experiment on how to ensure both Cooperation and Competition in turn.

This study did not separate the trainees into Cooperative and Competitive classes due to the following reasons.

(a) empirical studies have shown that either of the two strategies could be more effective implying in another sense that either strategy is not necessarily superior (Olubukola 1984);

(b) the study stresses high cognitive levels more than the effectiveness or otherwise of teaching strategies;

(c) based on the last point, effective teaching (BPS : Weil and Murphy 1982 Aisiku 1967 cited by Adeyoyin 1981) is the common ground for both Cooperative and Competitive strategies;

(d) Cooperative and Competitive strategies were consequently coats for sound teaching.

(v) The main techniques employed by the trainer were questioning and discussion (Aisiku 1967 referred to by Adeyoyin 1981; Weil and Murphy 1982).

4. **EVALUATION**

Theoretically, each class has one major objective hence one main evaluation question:

(i) Explain Cooperative teaching.

(ii) Give the meaning of Competitive teaching.

(iii) How is Cooperative teaching situation different from that of Competitive teaching situation?

(iv) How would you ensure Cooperation among learners in class?

(v) How would you ensure Competition among learners in class?

Correct answers to these questions in each sitting besides the numerous sub-questions convinced the trainer that the trainees followed each presentation and so proceeded to the next phase of the training.

B. **WEEK TWO: FIVE DAYS (FIVE HOURS)**

1. **BEHAVIOURAL OBJECTIVES**

At the end of second week, the trainees should be able to:

(i) state what ability groups of learners are;

(ii) explain how to group learners into high, low, and mixed abilities;

(iii) identify the major parts of good quality instruction;

(iv) describe in four statements, the major parts of good quality instruction.

2. **CONTENT**

Ability groups of learners are the divisions of the learners into academic competence groups by the teachers.

In this study, we used three ability groups of learners: the learners that scored 60% and above were considered High Ability group while all the learners that scored below 60% were considered Low Ability group. A third group was created through the two groups mentioned above, called Mixed Ability group.

The above structure can be illustrated as follows:

(a) 6 High }

(b) 6 Low } first complete grouping in a school.

(c) 6 Mixed }

Other complete groupings followed till the learners in a school were exhausted.

Literature says that small groups range between 02 and 12. This study used 06 in view of the average number of learners in a class: about 36. So, two complete groupings were expected in a class of 36 learners although this calculation was merely theoretical (rough) because High Ability group of learners are usually of less number in most classes/schools.

The major parts of good quality instruction are:

(a) a competent teacher;

(b) relevant and adequate teaching/instructional materials.

A competent teacher possesses/demonstrates the following characteristics:

(a) scientific skill: systematic/logical plan for teaching: Lesson Plan and Lesson Note preparation;

(b) mastery and interesting presentation of subject matter to the learners which is crowned by resourcefulness / creativity (Weil and Murphy 1982; Aisiku 1967 referred to by Adeyoyin 1981):

    (i) uses questioning and discussion as the main techniques;

    (ii) distributes questions democratically;

    (iii) takes care of hidden curriculum;

    (iv) does not rush teaching;

    (v) humane, humorous, and pleasant;

    (vi) uses teaching materials only when they are needed and removes them immediately after use.

Relevant and adequate teaching materials imply type, quality, availability, and suitability. Some conditions include:

(i) simplicity, boldness, and clarity;

(ii) the use of local and familiar materials;

(iii) projected and electronic media provision where they are unavoidably needed. (Erickson and Curl 1972; Kukuru 1983; also see more details in Instruction Booklet) (APPENDIX A8)

3. METHODOLOGY

The trainer presented the four objectives in the following order:

Objectives I & II = 2 days (2 hours)

Objectives III & IV = 3 days (3 hours)

Objectives I & II are naturally intertwined as well as objectives III & IV.

While objective one (I) took a moderate time using both general and professional dictionaries, Objective two (II): how to practicalize the grouping of the learners into High, Low, and Mixed Abilities was technical and so demanded more time. Several trainees at each period asked probing questions before they felt satisfied.

For Objectives III and IV, III alone took us almost one hour and IV which demanded many details practically took two hours (two days). The trainees began to see themselves better in the light of the newly acquired knowledge. Resourcefulness/Creativity both in the preparation and presentation of teaching materials was stressed.

The distinction between 'teaching materials' and 'instructional materials' in relation to student teachers was made and the trainees were convinced that 'teaching materials' as opposed to 'instructional materials' was the appropriate name for their case as it is human beings that are being trained and hence expected to possess skills and competences in the process (Weil and Murphy 1982).

The main techniques employed by the trainer were questioning, discussion, and application of subject matter to life situations which resulted in shared meaning of subject matter (Aisiku 1967 referred to by Adeyoyin 1981).

4. EVALUATION

The following major questions were asked to assess the extent of success of the week's objectives.

(i) What are Ability groups of learners?

(ii) How would you group your learners into High, Low, and Mixed Abilities?

(iii) What are the major parts of good quality instruction?

(iv) Summarise in four statements, the major parts of good quality instruction.

Correct answers to these questions in each sitting besides the numerous sub-questions convinced the trainer that the trainees followed each class. The trainer therefore proceeded to the next phase of the training.

WEEK THREE: FIVE DAYS (FIVE HOURS)

1. BEHAVIOURAL OBJECTIVES

At the end of the third week, the trainees should be able to:

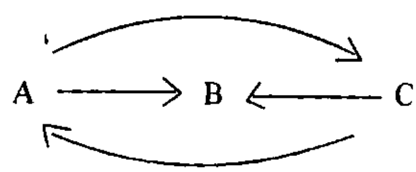
(i) explain Aisiku's view of teaching;

(ii) discuss twelve implications of Aisiku's definition of teaching;

(iii) discuss three developments on cognitive levels of knowledge.

2. CONTENT

According to Aisiku, teaching involves a triadic process among three elements: the teacher, learner, and subject matter. It is a dynamic process which culminates in shared meaning of subject matter. This logic can be illustrated as follows:



A	=	Teacher
B	=	Subject Matter
C	=	Learner

A talks to C about B; C also talks to A about B. This process continues and at the point A and C agree on B, teaching and learning take place. Accordingly, without agreement between A and C on B, nothing occurs (neither teaching nor learning).

Twelve implications on Aisiku's view of teaching as deduced by Kukuru in 1993 are:

(i) The evidence that a teacher has taught is the taking place of teaching: agreement between A and C.

(ii) The teacher is a facilitator of learning.

(iii) Learners have the potential to learn.

(iv) The degree of learners' performances considerably depends on the teacher's competence.

(v) A competent teacher requires both professional and academic competence/ knowledge.

(vi) If we are allowed to make discrimination, competence in academic ability seems superior to professional competence but the teacher that combines equal proportions at every stage, would excel, all things being equal.

(vii) Teaching is sharing of ideas or the teacher guiding a discussion, not telling (not lecture).

(viii) The learners must be allowed to air their views on every point (feedback is necessary in teaching).

(ix) At each appropriate juncture, concrete materials (teaching materials) can be brought in:

(x) Teaching cannot be rushed.

(xi) A maximum of four objectives should be stated within a 40 minute lesson following point number (x) above.

(xii) Aisiku's definition stresses a situation where a real human being actually interacts with learners, not just instructional materials hence it is a definition which most precisely suits Teacher Training Colleges/Teacher Education Departments in Universities.

Three developments on cognitive levels of knowledge are:

(a) Bloom et.al. (1956) who suggested six levels:

(i) Knowledge
(ii) Comprehension
(iii) Application
(iv) Analysis
(v) Synthesis
(vi) Evaluation.

(b) Tanner and Tanner (1980) who suggested eight levels as follows:

(i) Information
(ii) Comprehension
(iii) Application
(iv) Analysis

(v) Synthesis

(vi) Evaluation

(vii) Problem-Solving

(viii) Creation.

(c) Yoloye (1986) suggested three level only:

(i) Remembering (Knowledge)

(ii) Understanding (Comprehension, Application)

(iii) Thinking (Analysis, Synthesis, Evaluation).

Each group developed on the prece-ding stage: whereas Tanner and Tanner replaced Knowledge of Bloom et al. with Information and increased the number of levels by two: Problem - Solving and Creation, Yoloye compressed the six levels of Bloom et al. into half the number, based on practical experiences.

3. METHODOLOGY

The trainer presented the three Objectives in the following order:

Objective I : One day (one hour)

Objective II : Two days (two hours)

Objective III : Two days (two hours)

It is hereby re-stated that the trainer was guided by the advantages of distributed teaching / learning (Meyer 1982). Above all, these objectives form the heart of the study; in effect, maximum care was demanded.

Aisiku's view of teaching was presented with considerable competence. The trainer was Aisiku's direct student and disciple. The basic philosophy behind Aisiku's view with all illustrations as stated under content were demonstrated. This section is virtually an emphasis / expansion of good quality instruction in a more philosophical and practical manner. In the whole training period, the presentation of this objective was one of the most interesting.

The twelve implications of Aisiku's view on teaching were basically the trainer's creations. Consequently, they were presented in a most interesting fashion. Truly, the trainees were quite fascinated by the deductions. Although apparently the deductions were abstract, their originality and the vigour with which the trainer presented them made the deductions quite vivid to the trainees who imbibed them.

A cardinal point underscored by the trainer was that a study on cognitive levels possesses universal and life-long utility even for them (the trainees). They were quite appreciative of their involvement.

A major out-growth of the last paragraph was education/enlightenment of the trainees by the trainer which facilitated the formers` interests: a philosophical methodology.

The three developments on cognitive levels of knowledge are largely theoretical. They were, however, vividly presented to the trainees with appropriate theoretical and practical illustrations and sketches. Several of the trainees tended to over-blow Yoloye's contribution apparently due to sentiment but were checked. This section of the training was also markedly interesting.

The central techniques of the trainer were questions leading to discussions which ended in shared meaning of subject matter between the trainer and trainees. The latter were practically prepared for what they would do in the experiment.

4. EVALUATION

The following main questions were asked to determine the extent of attainment of the third week's objectives.

(i) Clearly state Aisiku's view on teaching.

(ii) Discuss twelve implications of Aisiku's definition of teaching.

(iii) Discuss three developments on cognitive levels of knowledge.

Correct answers to these questions in each sitting besides` the unaccountable minor questions which gave birth to shared meaning of subject matter, convinced the trainer that the trainees imbibed the expected meanings. As a result, the trainer proceeded to the next phase of the training.

WEEK FOUR: FIVE DAYS (FIVE HOURS)

1. BEHAVIOURAL OBJECTIVES.

At the end of the fourth week, the trainees should be able to: demonstrate how to ensure

(i) Comprehension

(ii) Application

(iii) Analysis

(iv) Synthesis

(v) Evaluation in the classroom

2. CONTENT

Comprehension: summarily, this concept means explanations in personal words.

According to Tanner and Tanner (1980) learners cannot proceed to other cognitive levels if they do not comprehend; comprehension is therefore the key to the subsequent levels.

Application: using related and familiar things, objects; putting theory to practice.

Analysis: comprehensive discussions, comparisons, contrasts, discriminations, components' identification, rigorous touch of every detail on an issue.

Synthesis: linking related parts to form a meaningful whole, clear descriptions, ability to summarize.

Evaluation: judgemental discussions; reason for considering something good or acceptable needs to be well understood by a considerable percentage of the learners in a class.

3. METHODOLOGY

This section was the heart of heart of the study: the melting pot of both Cooperative and Competitive strategies and so the common skills arena for all participating teachers (experimental). It is also the expected product of the BPS and Aisiku's view on teaching.

The trainer presented this most central section in five days:

(a) the five levels: two days (two hours)

(b) try-out by trainees: two days (two hours)

(c) revision: general questions and answers: one day (one hour).

(i) Presentation

(a) Techniques and teaching materials vital for each cognitive level:

Comprehension: dictionary use, use of precise words by trainer.

Application: textbooks, models, symbols and real objects, vivid illustrations.

Analysis: dictionary use, effective choice of words, precision, relevant teaching materials' use.

Synthesis: vivid illustrations, effective use of eyes, brain and words; sketches, models, textbooks, real objects.

Evaluation: thinking that is mature, comprehensive and balanced, relevant teaching materials even by using learners desks, seats, school, environment and any other related material.

(b) Question types that led to discussions and shared meaning identical to each cognitive level were as follows:

Comprehension	:	how?
Application	:	how?
Analysis }		
Synthesis }	:	how and why?
Evaluation	:	value type of why?

Reasoning and critical thinking were the two related cognitive processes that were typical of this section and which the trainees were asked to carry along to the experiment.

(ii) **Try-out by trainees: two days (two hours)**

Each trainee was made to attempt how to ensure each of the above levels in class. The trainer guided each trainee's attempt at each level. Except a trainee performed creditably well at each level, he/she was not allowed to proceed to the next level. There was no rushing as deduced from Aisiku's view on teaching. Both conditions under I(a) and (b) were practicalized in this II.

(iii) **General Questions and Answers/Discussion: One day (One hour)**

Room was given to the trainees to ask any question on how to ensure the high cognitive levels in class. Other trainees were normally made to attempt answers to questions of their colleagues; the trainer clarified ideas and underscored necessary points e.g. the vitality of Comprehension to other levels. Comprehension seems to be the key to Application while it is also a stepping stone to Analysis; a thorough grasp of Analysis is the key to Synthesis and Evaluation.

4. EVALUATION

The following major question was asked to determine the degree of attainment of the fourth week's objective.

Demonstrate how you would ensure the following cognitive levels in the classroom:

Comprehension
Application
Analysis
Synthesis
Evaluation.

Stages II and III that were performance activities of the trainees ensured acquisition of the desired skills by each trainee. As a result, the trainer proceeded to the next phase of the training.

WEEK FIVE: FIVE DAYS (FIVE HOURS)

1. BEHAVIOURAL OBJECTIVES

At the end of the fifth week, the trainees should be able to:

(i) identify the main parts of a good Lesson Note;

(ii) identify the part on which the whole Lesson Note depends;

(iii) state the maximum number of objectives realizable within a given number of minutes lesson;

(iv) ascertain verbally, that high cognitive levels objectives should dominate the cognitive domain objectives.

2. CONTENT

There are seven main parts in a good Lesson Note:

(i) **Specifics:** These are definite pieces of information about the teacher, school, learners, subject taught, class taught, duration, topic, teaching/ instructional materials including references. These specifics are needed because they enable us to check/evaluate all the other main parts. For example, there are limited number of objectives that are realizable in a given minutes class; the qualification of a teacher enables us to judge whether a teacher is competent to teach a subject and a particular class or not.

(ii) **Objectives:** These are the statements which show intents of an educational programme and they determine all the remaining parts of the Lesson Note. Certain conditions guiding the stating of objectives are:

(a) stating them in behavioural/measurable terms;

(b) strong action words control the stated objective;

(c) one idea only for one objective;

(d) limited objectives for a limited time;

(e) as much as possible, objectives should cover the three domains in education: cognitive, affective, and psycho-motor domains;

(f) the cognitive domain objectives should cover high and low levels. (Tyler 1949; Cangelosi 1990; Perrot 1992).

(iii) **Content:** This is organization of subject matter. In simple terms, it is supplying details on each objective precisely and adequately. Although adequacy and comprehensiveness are vital in the organization of subject matter, moderation is essential. The write- up should follow the order of the objectives.

(iv) **Methodology:** This is the practical aspect of the Lesson Note .Two main phases and a general demand should be stressed if it would be scientific (objective).

(a) The number of steps that should be involved:

The number of steps should be equal to the number of objectives but if entry behaviour is included (it forms a step: the first step), the number of steps will be equal to the number of objectives plus one.

(b) In the presentation of each objective, the following points should be stated:

(1) certain extracts from the aspect of content for that objective;

(2) teacher's actions;

(3) learners' actions;

(4) conclusion: shared meaning between teacher and learners;

(5) teaching material(s) and how it/they should be used.

(c) Class management processes (general phase)

The teacher should take care of the processes below, to control the class:

(1) ensure that the class is neat and tidy;

(2) all seats and desks should be well arranged;

(3) disallow noise-making;

(4) extroverts should be checked and introverts should be encouraged to participate;

(5) distribute questions democratically;

(6) be humane, mature and humorous;

(7) check hidden curriculum by disallowing day- dreaming or other psychological disturbances.

(Erickson and Curl 1972; Kukuru 1983).

Everything should be clear in methodology, as in other parts, to the last part: Assignment, to make the Lesson Note objective (scientific). Related to this point is the fact that if a teacher is not available, another teacher can pick up the Lesson Note and teach the lesson equally effectively.

(v) **Evaluation:** It is assessing the degree of success of the lesson. The scientific approach to this exercise is turning the stated objectives to questions orderly. This process determines the extent to which the stated objectives have been attained.

(vi) **Chalkboard Summary:** There are various forms of writing summary. Therefore, to make the summary scientific, we use the answers to the evaluation questions. The method ensures precision and objectivity.

(vii) **Assignment:** This condition enables the learners to individually practice what has been learnt or explore related knowledge about the topic discussed. It should be clearly stated whether an assignment should be done in class or at home. It seems reasonable to alternate the two types.

Main parts two to five correspond to a curriculum: Objectives, Content, Methodology, and Evaluation.

The whole Lesson Note depends on objectives. The reason is that Content is details of Objectives; Methodology is presentation of the Objectives; Evaluation is an attempt to ascertain how far the stated Objectives, have been realised; Chalkboard Summary is a condensed form of Content while Assignment is practice/exploration based on the Objectives presented and evaluated.

Limited number of objectives only, are realizable within a given time. The reason is that teaching cannot be rushed. Practice suggests that effective presentation of one objective takes about ten minutes.

Accordingly, in a 40 minutes class, not more than four objectives can be stated .In an 80 minutes lesson, about six objectives are advisable considering the law of diminishing returns.

Generally, cognitive domain objectives should not be limited to low cognitive level so that the learners are not dwarfed in reasoning and critical thinking.

This study underscored high cognitive levels; thus high cognitive levels objectives dominated the cognitive domain objectives. If there were six objectives in an 80 minutes class, up to three of them were of high cognitive levels, one each for affective (high objective virtually) and psycho-motor, while one only would be for low cognitive level. The emphasis of the study was reflected in the formulation of objectives.

3. METHODOLOGY

The trainer presented this section in the following order:

(a) Objectives I & II : four days (four hours)

(b) Objectives III & IV : one day (one hour)

This section was another practical of practicals: the whole skills acquired in the preceding weeks were condensed into the Lesson Note.

The main techniques were as those in the preceding weeks: questions and discussions leading to shared meaning of subject matter; illustrations, real objects; Scheme of Work, narrowing down to Lesson Plan and Lesson Note being the details of each Lesson Plan, in an objective/scientific fashion.

4. EVALUATION

The questions below were asked to ascertain the degree of attainment of the fifth week's objectives.

(i) What are the main parts of a good Lesson Note?

(ii) Which of the main parts of a good Lesson Note does the whole Lesson Note depend upon?

(iii) What is the maximum number of objectives that can be realized in a 40 minutes lesson/class?

(iv) Why should high cognitive levels objectives take a good proportion of the cognitive domain objectives?

Correct answers to these questions in each sitting besides the numerous minor questions which culminated in shared meaning convinced the trainer that the trainees followed him. He therefore proceeded to the last phase of the training.

WEEK SIX: FIVE DAYS (FIVE HOURS)

1. BEHAVIOURAL OBJECTIVES

At the end of the sixth week, the trainees should be able to:

(i) write the competence/terminal test;

(ii) revise the test through the guidance of the trainer;

(iii) note necessary corrections in the test;

(iv) state how to administer the achievement test;

(v) each receive Instruction Booklet from the trainer.

2. CONTENT

The end of theoretical training test/competence test (Tittle 1982) for participating teachers was as follows:

(i) Explain Cooperative teaching process.

(ii) Explain Competitive teaching process.

(iii) Distinguish between Cooperative and Competitive teaching processes.

(iv) How can we ensure Cooperation in class?

(v) How can we ensure Competition in class?

(vi) How many ability groups did we promise to use and how shall we arrive at each?

(vii) What are the main parts of good quality instruction?

(viii) Clearly define teaching according to Aisiku's view point.

(ix) We discussed twelve implications of Aisiku's definition of teaching: state five of them and attempt a summary of the rest in not more than two simple statements.

(x) Briefly discuss three developments on cognitive levels of knowledge (Hint: Bloom et al. 1956; Tanner and Tanner 1980; Yoloye 1986).

(xi) How can we practically ensure comprehension, application, analysis, synthesis, and evaluation in the classroom? (spend time on this question more than any other; be very clear).

(xii) (a) What are the main parts of a good Lesson Note and which of them correspond to a curriculum?

(b) The whole Lesson Note is based on what part of it and why?

(c) What is the maximum number of objectives that you would state in a 40 minute lesson/class and how would you spread them to cover the three domains in education?

(xiii) What were our notable conclusions? (There were five of them).

The duration of the test was two hours and every question was compulsory. For Objectives II & III, the model answers to the test seem appropriate here.

(i) Cooperative teaching process is a situation whereby the learners think together, study together, put ideas together, submit one assignment; anything done either singly or collectively, represents all members of the group.

(ii) Competitive teaching situation encourages learners to work hard to outperform one another; they do not assist one another, assignments are done independently and submitted independently.

(iii) Cooperative teaching process is different from Competitive teaching process as follows:

(a) Learners assist each other in Cooperative teaching situation, learners do not assist each other in Competitive teaching process.

(b) One assignment only, is submitted in a Cooperative situation whereas the number of assignments submitted in a Competitive teaching situation is equal to the number of learners in the situation (class).

(c) Learners are academically free with each other in a Cooperative situation, learners are not free with each other in an individualized Competitive teaching situation.

(d) The teacher has more work to do practically in the classroom in terms of organization in a Cooperative teaching situation, the teacher has less job to do in terms of organization of classroom in a Competitive teaching situation.

(e) The teacher has less scripts to mark in a Cooperative situation, the teacher has more scripts to mark in a Competitive situation.

(iv) Cooperation can be ensured in class by the teacher allowing learners in groups sit around themselves, talk to each other, give one answer to represent all members in a group.

(v) Competition can be ensured when learners are told by the teacher that there are prizes for the best learners, that they should keep their ideas to themselves, should not expose what they are writing to others, sitting arrangement is not changed, each learner submits his/her own assignment.(10 marks).

(vi) (a) We agreed to use three ability groups.

(b) We agreed to form the Ability groups thus:

(1) High Ability: 6 students that score 60% and above.

(2) Low Ability: 6 students that score below 60%.

(3) Mixed Ability: 6 students: 3 each from High and Low Abilies.

(vii) The major parts of good quality instruction centre on:

(a) a competent teacher

(b) relevant and adequate teaching/instructional materials (10 marks).

(viii) According to Aisiku, teaching is a triadic process involving three elements: the teacher, learner, and subject matter culminating in shared meaning thus:

$$\begin{tikzcd} A \arrow[r] \arrow[rr, bend left] & B & C \arrow[l] \arrow[ll, bend left] \end{tikzcd} \quad \} \text{ shared meaning results .}$$

A talks to C about B, C also talks to A about B. At the point A and C agree on B, teaching and learning take place.

(ix) Twelve implications of Aisiku's definition of teaching as deduced by Kukuru (1993) are:

(1) The evidence that a teacher has taught is occurrence of teaching: agreement between teacher and learners on subject matter .

(2) The teacher is a facilitator of learning .

(3) Learners have the potential to learn .

(4) The degree of learners' performance considerably depends upon the teacher's competence .

(5) A competent teacher requires both professional and academic excellence / knowledge .

(6) If we should make distinction, competence in academic ability

seems superior to professional competence but a teacher that combines equal proportions of both at every stage, would excel, all things being equal.

(7) Teaching is discussion/sharing of ideas; not telling.

(8) The learners must be allowed to air their views on every point.

(9) At every appropriate juncture, concrete materials (teaching materials) can be used.

(10) Teaching cannot be rushed.

(11) A maximum of four objectives should be stated for a 40 minute lesson/class.

(12) This definition underscores a situation where a real human being actually inter-acts with learners, not just instructional materials hence it is a definition that most precisely suits a Teacher Training College/Teacher Education Programme in a University. (10 marks).

(x) Three developments on cognitive levels of knowledge are:

(a) Bloom et al. (1956) who gave six levels:

(1) Knowledge
(2) Comprehension
(3) Application
(4) Analysis
(5) Synthesis
(6) Evaluation

(b) Tanner and Tanner (1980) who identified eight levels:

(1) Information
(2) Comprehension
(3) Application
(4) Analysis
(5) Synthesis
(6) Evaluation
(7) Problem-solving
(8) Creation

(c) Yoloye (1986) who suggested three levels:

(1) Remembering : Knowledge

(2) Understanding : Comprehension, Application.

(3) Thinking : Analysis, Synthesis, Evaluation.

Each group (a, b, c) did something useful: developed something or built on the preceding ones. (10 marks).

(xi) The following is how to practically ensure Comprehension to Evaluation in the classroom:

Comprehension: make learners to explain in personal words.

Application: encourage learners to use related and familiar things, objects, materials, put theory to practice.

Analysis: make learners to engage in comprehensive discussions, comparisons, contrasts, discriminations, components, rigorously touch every detail on an issue.

Synthesis: ensure that learners link related parts of an issue to form a meaningful whole, attempt clear descriptions and summaries.

Evaluation: groom learners to practise judgemental discussions; reason for considering something good or acceptable needs to be given and well understood by all learners; patience is required on the part of the teacher.

It should be noted that there are techniques and appropriate teaching materials for each level. Question types stressed are those of how? how and why? and value type of why? (20 marks).

(xii) (a) There are seven main parts in a good Lesson Note:

(a) Specifics

(b) Objectives

(c) Content

(d) Methodology

(e) Evaluation

(f) Chalkboard Summary

(g) Assignment

(b) The whole Lesson Note is based on Objectives. The reason is that Objectives form the foundation of a Lesson Note as in curriculum development. A deviation from them would mean non-commitment to them and purposelessness consequently.

(c) In a 40 minute Lesson, a maximum of four objectives should be stated; the four objectives should cover the three domains by having one low and one high cognitive objectives (=two); the remaining two objectives should be one each for affective and psychomotor domains. (10 marks).

(xiii) Our notable conclusions in the training were:

(a) High cognitive levels learning should stress Comprehension and Analysis and the goal would be attained.

(b) The usefulness of Analysis in learning generally and in relation to participating teachers: it ensures deeper understanding hence likely high performance.

(c) The vitality of questioning technique in our experiment: it is the central technique that we shall employ because our emphasis is to train the learners to think.

(d) Examples of action words which will dominate our objectives are:

Comprehension	: explain
Application	: apply, state, touch
Analysis	: discuss, identify, compare, contrast
Synthesis	: describe, summarise, arrange
Evaluation	: judge, evaluate, give reason why.

(e) The necessity of feedback in teaching: it provides evidence of what the learners have grasped; without feedback, there is no evidence hence teaching is anti-one way. (10 marks).

For administration of the Achievement tests, please see second section of Instruction Booklet (APPENDIX A8).

For the Instruction Booklet, please turn to it: it contains certain general/ basic technical aspects of the experiment.

3. METHODOLOGY

This rounding up phase started with the administration of the Terminal/ Competence test. The trainees were singly spaced out in a large hall such that there was no room for anyone to talk to the other. The serious spacing partly taught the trainees on how to scatter their learners when administering the tests especially the Pre and Post.

The Instruction on the Test was 'Answer all questions'. There was no choice implying that each trainee was expected to imbibe every main idea discussed in each class.

Provision of model answers and revision with the trainees corrected certain misconceptions. Furthermore, provision of the Instruction Booklet encouraged the trainees in relation to the final preparation for the experiment.

4. EVALUATION

Over-all assessment was effected for the trainees in this sixth week. The least score was 62% for Pilot Study trainees and 63% for Main Study trainees.

CONCLUDING REMARKS

(i) The Instruction Booklet is an extract of certain technical aspects of the training. Materials in it should not be seen as repetitions therefore. After the training and commencement of the experiment, it was the Instruction Booklet that served as a handbook and reminder for the teachers.

(ii) Although the researcher reviewed literature on Observational research/ techniques as indicated in the bibliography, he worked with an expert and another Ph.D student. The three of them used a Rating Scale on: Cognitive Levels and How to Ensure them in the Classroom (CLHEC). Tersely, there was no need for training Observers.

(iii) This Training Package can be adapted for any subject area. It would be noted that there is no mention of the researcher's subject area in the outline of the content as well as in other main aspects. It is therefore amenable to any subject area: general applicability/utility.

(iv) References for the training Package are included in the General Bibliography and Post Graduate Students Theses.

AN EMPHASIS
EXPANSION OF FIRST PARAGRAPH IN IC

TRIAL TESTING OF THE TRAINING PACKAGE SEEMED A NON-ISSUE (IN THIS CONTEXT)

1. This was not a validation study; rather, it was experimental. Its major concern was practical testing of a problem which it did three times. ***These times far exceed*** trial testing. The Pre-Pilot study is actually called Trial Testing by the researcher.

2. The Training Package is mainly a development of the summary content which the researcher used. This content, was validated by experts and researchers before it was used.

3. The effectiveness of the Training Package was tested in pre-pilot, pilot, and main studies. ***The significant differences obtained in the results are the proof of its effectiveness;*** besides, the results are consistent at the pilot and main study phases.

4. Additional validation work required was for experts and researchers to ensure that the summary content (out-line) which was used for the training (prior to the practical experiment) is what is represented in this Package, to avoid deviation, and to ensure that the write-up is qualitatively presented to make it understandable by any reader.

APPROVAL OF THE DEVELOPED TEACHER TRAINING PACKAGE

After critically assessing this package based on relevant academic and professional criteria, some of which are specified at the beginning of the Package, the validators approved it:

(i) it was adequately (and qualitatively) presented;

(ii) it required no further (empirical) validation.