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# EFFECT OF ANNOTATED STRATEGY ON THE LEARNING OUTCOMES IN MATHEMATICS

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**Abstract**
The study was designed to examine the effect of annotated strategy on the learning outcomes in mathematics. As an experimental research study, which employed one shot test pretest and posttest analysis, it contained two research questions and four hypotheses at significant level of .50. Population to the study comprised of all the female students in the senior secondary schools II in Ibadan, Nigeria. In four schools sixty students where chosen by simple random sampling technique of fifth student into the two experimental and two control groups. Each experimental group had fifteen students so that the two experimental groups had total of thirty students. The same applied to the other two control groups. Three instruments were adapted, validated and used for the study, and they were students' questionnaires, achievement test in mathematics [r=.63] and annotated strategy package in mathematics [r=.69]. The study lasted for one and half months. Data collected were analyzed through percentage, frequency counts, mean and standard deviation, histogram, t-test and one-way ANOVA. Findings showed that topics on statistics and probability had the majority of occurrence as topic difficult to students with 48% of students in this category. The mean and standard deviation stood at 41% and 1.46, respectively, for the students' performance.
There was significant difference in the posttest means scores of control and experimental group with means scores of 43% and 56% respectively, and significant with t- value = -34,4789, degree of freedom = 58 and p-value = -1.080. Secondly, the experimental groups performed better than control groups over times with means scores of 50% and 41% for the experimental and control groups respectively and it was significant at t-value = -23.8700, degree of freedom = 58 and p-value = - 1.080.
Study, however, concluded that perennial negative attitude towards mathematics and the perennial failure syndrome in the subject as a result of difficult topics encountered could be minimized completely if the annotated strategy package is employed, with other recommendations thus made in the paper.
Key words : Annotated strategy; learning outcomes; mathematics.

**Introduction**

Meaningful development of human and natural resources is synopnymous to modern development as dictated by level of science and technology, which serve as panacea to the problems of poverty, ignorance and disease. The sustenance of science and technology depends on the understanding of Mathematics which serves as the bedrock of sciences that no one could do away with due to its wide application in all areas of human endeavours. There is no aspect of Mathematics that is deficient except that Mathematics teachers do not know the excellent use of the subject.

In order to realize most nation education philosophy and the relevance of Mathematics in all human endeavours, govemments of most countries of the world encourage the teaching and learning of Mathematics. In some countries like Nigeria, Ghana and Gambia just to mention a few, it is compulsory for students to pass, and as a pre-requisite for the admission into higher level of educational advancement. To this end, premium attention is paid to its teaching by government and other stakeholders through the provision of appropriate human and non-human materials relatively to other subjects (NPE, 1998). Apart from that relative frequency of Mathematics in the school timetable positions it,is to an exalted place among other school subjects. In contrast, these considerations have not jusified the observed learning outcome of students in the subject, as their performance remained dismal as corroborated by Ademolekun (2002) and Olowojaiye (2004), showing the dismal performances of students in the West African Schools Certificate Examination in Mathematics for a dcade.

Though dismal performance of students in sciences,Mathematics inclusive, is a global issue according to Obioha (1987) who presented the academic performance of students in science of the Republic of Germany yet the dismal performance ia more pronunced in Mathematics than other science subject. And this has greatly affected the studying of science-related course and technology worldwide. Various studies conducted earlier by different scholars on the dismal performance of students in Mathematics and science in general indicate different reasons on the possible cause. These included Mathematics teacher's qualification (Yee, 1990; Gage,1994; Salami, 2000), effectiveness of teaching by Mathematics teachers (Duyilemi, 1997; Wharton, Pressley and Hampston, 1998), inadequate instructional facilities (Odeyemi, 1995; Akinsola, 1999), perseverance of some topics considered difficult (Oyedeji, 1996), attitude of students towards Mathematics Olowojaiye [2002] and gender (Tijani, 1999; Adesoji, 1999) with considerable solution proffered. Worldwide few females could be observed to have advanced in Mathematics upto the Ph.D. level. According to Olaleye (2004), quoting the first three African American womwn who received Ph.D. in Mathematics from the University of Maryland on December 21st, 2000 titled 3 African American women x 3 Ph.D's=one Rare Achievement in Mathematics, dismal performance was more pronounced among females than males. One of the Woman Inniss believed her ambition to pursue Mathematics up to the Ph.D. level was due to her childhood support of her parents and Mathematics teachers, who developed the interest in her. This phenomenon is also noticeable in Nigeria where few females advanced their study up to the Ph.D. level in Mathematics through reputable females

few females advanced their study up to the Ph.D. level in Mathematics through reputable females Mathematician like *Professor Grace Alele – Williams and Dr. Helen Udougou* are living witness yet the number is insignificant compare to male counterpart. One wonders what could have been responsible for this perennial syndrome either from mathematics contents or *pedagogical practices.* Cursory look at the contents of Mathematics reveal that there is no aspect of Mathematics that is not relevant to the need of society e.g. Numbers which is integral part of Mathematics make the use of Global System of Telecommunication (GSM) viable, and ensures Information and Communication Technology (ICT) worldwide. On the other hand pedagogical practices refer to the principle through which learners are taught Mathematics by the teacher in the classroom. Within these two areas abound the problems encountered by students. In education practices many instructional modes abound with each having considerable shortcoming. This is why it is recommended that effective teacher should combine two or more methods of this instructional mode to ensure positive learning outcomes. Hence the need to employ the better strategy to enhance learning of mathematics among the students especially the female that are often affected based on their insignificantnumber at the advanced level earlier mentioned. Training of a woman is sine qua non to uplifting one family out of the ignorance and underdevelopment due to her close contact with other member of the family.
Strategy is not synonymous to method of teaching alone but comprehensive and systmatic approach or blue print by which Mathematical knowledge is imparted to students via diverse methods. Two Mathematics teachers in a classroom could adopt different strategies in order to achieve meaningful learning outcome. In another words, strategy is a stepwise discovery of facts about Mathematics problem through the application of fundamental principles towards arriving at solution, which could lead to generalization. To this end, it is imperative to develop annoted discovery approach towards making learning of Mathematics an interesting one because one female trained guaranteed the training of a whole family. Hence, the justification for the study.

**Theoretical framework**

Learning could be exciting whenever the mode of disseminating knowledge is fascinating and interesting. This could be achieved if the teacher in the course of interaction with the students employs the appropriate strategy. Polya (1957) as quoted by Popoola (2002) was of the opinion that four basic principles had to be observed whenever the teaching of Mathematics was to achieve a desirable end. He emphasized the need for understanding the problem, devising a plan, carrying out such plan and making generalization over such plan to similar topic. This schematic procedure is feasible when there is good interaction between the teacher/text-materials and students. It should be emphasized here that there are different social interactions in the classroom during the teaching of Mathematics but one is not sure if the students recognized these interactions to have contributed to the learning of Mathematics. But strategy employed by the teacher made it clear to the students to imbibe with social issues in the course of teaching which directly enhance learning.
Apart from the above-mentioned strategy, Gagne (1975) postulated programmed learning scheme. which could enhance learning between teacher and students in the classroom. He emphasized teacher as knowledge facilitator to fashion out the appropppriate strategy to enrich learning by taking

cognizance of students' level and the available resources.

Arigbagbu (1995) pointed out that the strategy employed by teacher in disseminating knowledge to the students goes along way to facilitate the extent of understanding of the problem on ground. He however submitted six steps towards achieving problem solving skill of a child in Mathematics.
It is of interest to document that the extent of interaction of teacher and students especially in Mathematics facilitates the mastery and understanding of problem at hand. Moschkovic (2001) finding revealed that much knowledge is gained by students whenever there is good interaction between them and the teacher. The inability to carry out any step of strategy to solve a problem leads students to a state of frustration, and that is way the extended postulated strategy of Oladunni (1995) and Popoola (2002) by three steps in the present study is imperative so as to see the effect of the annotated strategy on learning outcome in Mathematics among the female students. And at the same time as an extrapolative study of Moschkovic (2001) in the African setup of higher level.

**Problem**

The study sought for effect of annotated strategy on the learning outcome in Mathematics. It provided answeres to the following questions :

1. What are the pretest mean scores of students in the identified difficult Mathematics topics ?
2. What is the posttest mean scores of the experimental and control groups in the identified difficult Mathematics topics ?

As a result, four hypotheses were generated at $\infty = 0.05$ as:

Ho 1: There is no significant difference in the pretest means score of control and experimental groups in the identified difficult Mathematics topics.

Ho 2: There is no significant differerce in the posttest means score of control and experimental groups in the identified difficult Mathematics topics.

Ho 3: There is no significant difference in the pre and posttest means score of students in th identified difficult Mathematics topics.

Ho 4: There is no significant difference within the means score of control and experimental groups in the identified difficult Mathematics topics.

**Methodology**

**Research Design**

As a Quasi-experimental research design the study employed one shot test of pre-test and post-test analysis.

**Population**

All female students of the senior secondary schools II and their Mathematics teachers in Ibadan. Nigeria were involved in the study.

**Sample and sampling technique**

Four female public secondary school were selected using simple but purposive random sampling techniques in Ibadan, Oyo State of Nigeria. The rationale behind this was due to logistic reason and the intimacy with their mathematics teachers to execute the prescribed package. Two of these schools were experimental groups and the other two were control groups in order to prevent interference among the students if selected within the same area. In both experimental schools a simple random sampling of every fifth student in their register totaled thirty SSII females students were drawn as sample so that in the four schools chosen sixty students were selected.

**Instrument**

Three instruments were adapted, validated and used for the study. These included students' questionnaires, which classify the mathematics topics at the senior secondary school level into difficult and most difficult topic for students to learn. Students werw required to state that of the identified topics were difficult or most difficult to learn. The achievement test consisted of adapted questions on probability and statistics of the West African School Certificate Examination (1982) while the annotated strategy package was an adapted instrument of Oladunni (1995) and Popoola (2002) with modification to make teaching and learning of Mathematics exciting and ensure positive learning outcome.

**Validation of instrument**

An expert in evaluation assisted in carrying out the content validity of the students' questionnaires and annotated strategy approach while senior colleagues in Mahtematics did content validity of the achievement test in Mathematics before administered to some students outside the scope of study.

**Reliability of instrument**

The test-retest of the achievement test in Mathematic showed KR-value of 0.63 while equivalent form of test was done on annotated strategy approach with two teachers of mathematics scored independently by senior colleague in evaluation for using the instruments. The peer scoring of 0.69 was obtained and this was considered high for the study.

**Procedure**

Two hundred questionnaires were administered via the student teachers on the teaching practice to female students of five secondary schools (forty in each school) to elicit the topic considered difficult to learn (See Appendix A)

It was discovered that inequality and probability were considered difficult and most difficult to learn

Keys to flow chart of annotated/stepwise discovery approach

1. Previous knowledge and present problem matches for first hand understanding.

=> What is the nature of problem, relationship with previous knowledge via previous prtoblem solved, and find how to arrange involved variable to solved the problem.

2. Proper guidence and Operation for approaching the problems from the teachers :

=> What branches has the problem, which of these is most most accurate and simplest, what are the hidden variables to look-for and those ones already identified, otherwise go to step 1.

3. Giving students ample opportunuty to translate the problem into explicit of their languages :

=> Learners translate the problem into their language of understanding, separating known facts from unknown and adopt a definite approach to the problem otherwise go to step 2 again.

4. Give room for different approaches to solve the problem :

=> Students may be encourage to group themselves with each group approaching the problem from different angles, compare which one of the group's approaches get the solution faster. Alternatively, individualistic approach could be employed otherwise go to step 3.

5. Intuitive knowledge from students is welcome :

=> Intuitive knowledge of solution to the problem make possible the use of other alternative approaches in order to confirm the efficacy of the best solution without stress otherwise go to step 4.

6. Use of another approach to the problem :

=> The use of another distinct approach will make the problem's solution become easier to solve ; and it should be in line with the scope of the problem. Relationship of new approach to old one should be compared and the extent of accessible otherwise goes to step 5.

7. Scrutinizing the facts in the problem : All the steps (1-6) and the main problem should be re-examined and scrutinize to ensure that no loophole in the solutions, and different approach solution compared otherwise go to step 6.

8. Studying different approaches :

=> The result of each approach should be injected into the problem to crosscheck the solution in order to identify the most appropriate one.

=> Select the best approach to solve similar problems to order to know its limitation. Where it is limited in scope try anothjer approach until the appropriate one is arrived at. otherwise go to step 7.

9. Applying induction approach :

=> Through induction approach arrived step 8 the solution could be generalized on similar and related problems in order to arrive at a generalized statement which could lead to an acceptable principle of solving such a related problems otherwise go to step 8.

**Mathematics teacher's application guide on annotated approach**

**Solve the inequality equation for a if $3(5-4x)+6 \leq 6-5x$ and interpret on number line**

1. Problem is presented as above with previous knowledge of "=" equality sign so that "≤" means less than or equal to sign satisfying two conditions. The only unknwn variable is x. then open the bracket so that inequality becomes $15-12x+6 \leq 6-5x$.

2. Proper guidence and operation from teachers :
Here all the unknown terms are gathered on one side so that unknown terms "x" is gathered on another side : $15+6-12x+12x-6 \leq 6-5x-6+12x$.
=> $21-6 \leq 12x-5x$
From here $15 \leq 7x$

3. Students interpretation into explicit language :
=>students could say digit fifteen is less than or equal to 7 unknown value x, and from here the problem that remains is what is the value of x alone.

4. Some students can divided both sides by 7 to get the value of "x" straight away. Others could do the same to get proper fraction while some get improper fraction. In all cases the inequality sign must be obeyed. With problem $15 \leq 7x$, this could be in form $7x \geq 15$ and by carrying-out division $x \geq 15/7$.

5. Intuitively the solution comes out as $x \geq 2\ 1/7$ which means that unknown "x" is greater than or equal to 2 1/7. Confirmation of other group approaches is sought-for in order to establish the efficacy of the solution of the problem.

6. In case of contradiction another approach may be employed but in this case the solution obtained in 5 in acceptable and in line with the rule of inequality.

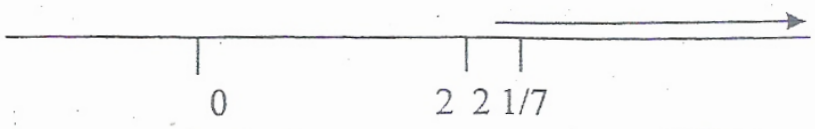
7. By scrutinize the steps (1–6) and the main problem one can say that since $x \geq 2\ 1/7$, the appropriate number greater than 2 1/7 is 3, while equal numbers remain 2 1/7.

3. With all the approaches identified one may put 3 into original equation in order to validate the principle of inequality i.e. putting x=3 (case one): 3(5–4.3)+6≤6–5.3 3(5–12)+6≤6–15 or 3(-7)+6≤-9.

9. Since one of the conditions or both is desirable and base on number line system (-15) is less than (-9) satisfying the equation.

Now the interpretation of solution on number line goes as follows:

$x \geq 2\ 1/7$




Through this approach a similar problem of the form - 3(12+5x)≥5+9x is posed for the students to solve.

10. With the above stepwise-guided discovery approach coupled with the solution of new problem given to the students to solve the result of new problem could be generalized towards a difinite principle of solving a linear inequality of one variable. This process is a linear type and not a branching form, which is outside the scope of the annotated strategy and difficult topic in Mathematics under consideration.

This strategy could be employed to solve different problem in Mathematics as it takes cognizance of the students' interest more important than any other thing. In fact most of the difficult concept in Mathematics could be approached via this strategy in order to reduce Mathsphobia and make the teaching and learning of Mathematics a friendly approach.

The achievement tests in mathematics on the difficult topics were administered to the selected students of four public schools in the beginning and at the end of the study respectively, which lasted for weeks.

**Data collection and scoring**

The correct answer attracted one mark while wrong answer attracted zero mark. Percentages, frequency-count, histogram, means, standard deviations, t-test and one-way analysis of variance at significant level of 0.05

**Finding and Discussion**

**Table 1: Difficult topics classification by students**

| Topics | N & N | A.P | M | T | S & P | V & T in a plane | Total |
|---|---|---|---|---|---|---|---|
| Students | 15 | 30 | 18 | 19 | 96 | 22 | 200 |
| Percentage | 7.5% | 15% | 9% | 9.5% | 48% | 11% | 100 |

| Treatment | N | Pre-test | | Post-test | | Differences | |
|---|---|---|---|---|---|---|---|
| | | Mean | Std.D | Mean | Std.D | Mean | Std.D |
| Control I | 15 | 43% | 1.46 | 43% | 1.88 | 0 | 0.42 |
| Control II | 15 | 39% | 1.49 | 43% | 1.94 | 4 | 0.45 |
| Sub-total | 30 | 41% | 1.43 | 43% | 1.85 | 2 | 0.42 |
| Experiment I | 15 | 52% | 1.55 | 54% | 2.03 | 2 | 0.48 |
| Experiment II | 15 | 32% | 1.35 | 58% | 2.21 | 26 | 0.86 |
| Sub-total | 30 | 42% | 1.49 | 56% | 2.06 | 14 | 0.57 |
| Grand total | 60 | 41% | 1.46 | 50% | 2.06 | 9 | 0.60 |
| | | | | | | | |

**Keys:**

N & N – Numbers and Numeration, A.P – Algebraic Processes, M – Mensuration, T – Trigonometry.
S & P – Statistics and Probability, V & T – Vectors and Transformation.

**Histogrsm**

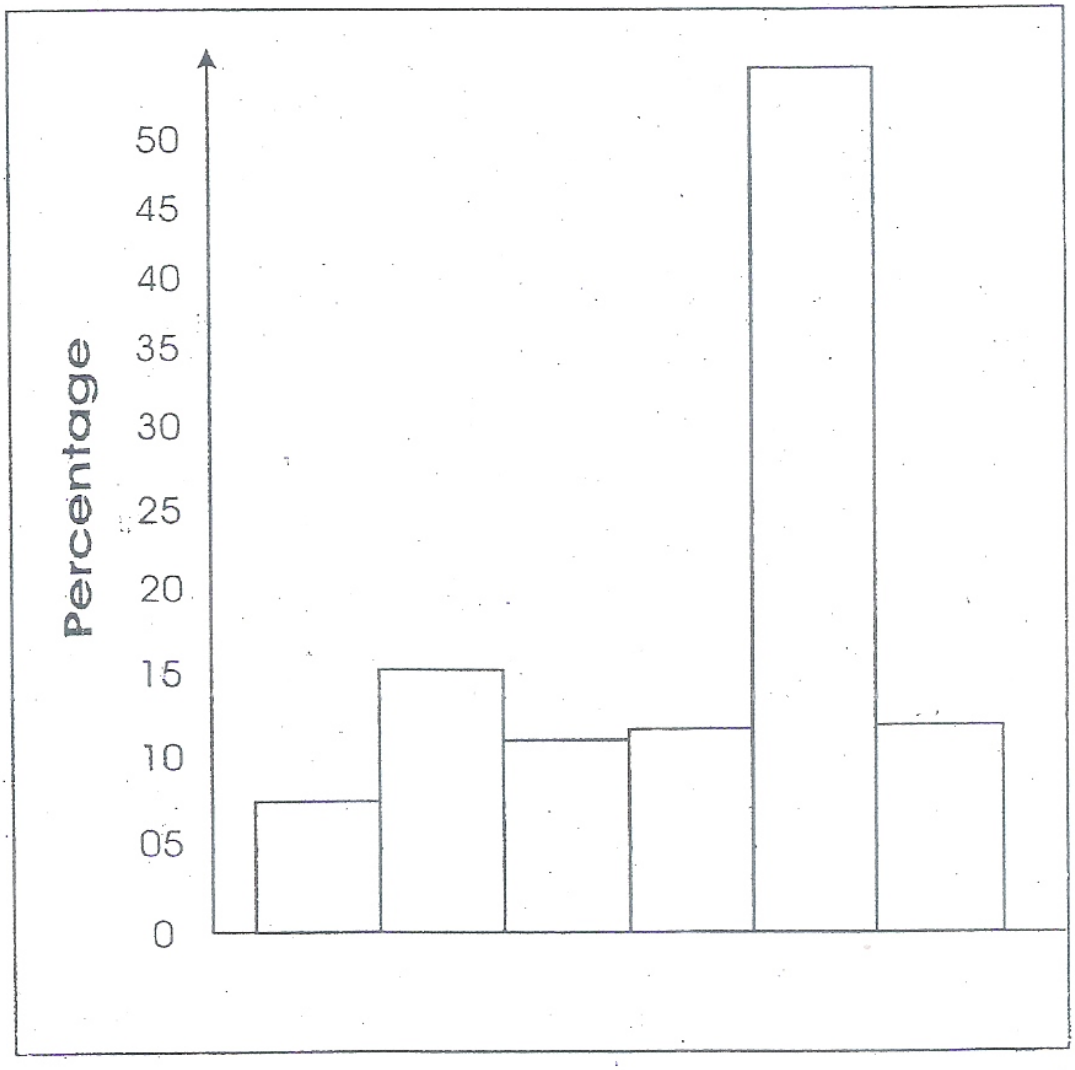


Fig. 1

**Table 3: Test of difference between groups in pre test scores**

| Treatment | Means | | t-statistics | Df | P-value |
|---|---|---|---|---|---|
| | Control | Experiment | | 58 | |
| Scores | 41 | 42 | -0.1768 | | -1.080 |

**Table 4: Test of difference between groups inposttest scores**

| Treatment | Means | | t-statistics | Df | P-value |
|---|---|---|---|---|---|
| | Control | Experiment | | 58 | |
| Scores | 43 | 56 | -34.4789* | | -1.080 |

*Significant at p<.05

**Table 5: Test of difference between groups inposttest scores**

| Treatment | Means | | t-statistics | Df | P-value |
|---|---|---|---|---|---|
| | Control | Experiment | | 58 | |
| Scores | 41 | 50 | -23.8700* | | -1.080 |

*Significant at p<.05

**Table 6:ANNOVA Table**

| Source | Df | SS | MS | F-Statistics | P-value |
|---|---|---|---|---|---|
| Between | 3 | 25.35 | 8.45 | 2.07 | 2.76 |
| Within | 56 | 229.50 | | | |
| Total | 59 | | | | |

Table 1 showed the different levels of students' difficult topics in mathematics with statistics and probability as the most difficult topic and number and numeration as the least difficult topic in terms of students 'response'. These responses were represented by the histogram in fig. 1 with statistics and probability having 48%, and number and numeration having 7.5%. The implication of this is that students tend to run away from mathematics in general due to these topics found to be difficult to learn. Since mathematics cut-across all human endeavours the difficult experienced in the aspect of mathematics might minimize the contribution of students to the nation educational goal as a result of these constraints. Apart from this it has demonstrated that one of the factors to the dismal performance in Mathematics was difficult topics encountered by students without headway.

Table 2 showed the summary scores of pre and post test scores with group I and II of control groups having at means and standard deviation [x, $\sigma$] of [43%, 1.46] and [39%, 1.49] respectively.

Experimental groups I and II had the means and standard deviation [x, $\sigma$] of [52%, 1.55] and [32%, 1.35] rerspectively. Within the groups, group I of control and of experomental group performed better than their groups II counterparts. On the whole the control and experimental groups had the means and standard deviation [x, $\sigma$] of [41%, 1,43] and [42%, 1.49] respectively. The scored that showed the experimental group performed slightly well than the control group. The implication of these scores showed that students' found the identified topics difficult to learn and this might have been contributory factor to the perennial failure syndrome in mathematics particularly when these topics constituted the questions in examinations.

Furthermore, top of these nature create fear in the mind of students on the possible ways of succeeding in ma natics not to talk of science related courses that have difficult topics. There was no significan. lference within the means scores of all the four groups that comprised two controls and two experimental groups. Table 6 showed one way ANOVA with F -statistics =2.07, df =59 and p -values = 2.76 leading to the acceptance of hypothesis 4. This was feasible as there was variation in the means score of control and experimental groups.

**Conclusion and Recommendations**

The study has demonstrated that thre was no deficient in any aspect of mathematics except is that teachers of mathematics have not employed the excellent use of appropriate strategy to consolidate and enrich students learning.

Most of the topics considered difficult to learn in mathematics by students are pedagogically biased. This invariable makes students to do, in most cases, non-science based discipline. The situation which affect the nation manpower needs in science and technology; an index of modern development.

The posttest means and standard deviation [x,o] of control groups I and II were [43%, 1.88] and [43%, 1.94] respectively, while that of experimental groups I and II were [54%, 2.03] and [58%, 2.21] respectively.

The interesting discovery at this level was this groups I and II of control groups maintained the approximated means scores of 43 % though an improvement in the means scores of group II of control group over what it was obtained in the mean score of pretest. In particular within this group they had deficient standard deviation. On the other hand experimental groups I and II had an improved means score compared to what it was obtained in the pretest scores, and more importantly was the group II of the experimental group that improved significantly compare to the means score of the pretest score. the posttest scores of control and experimental groups had the means and standard deviation [x,$\sigma$] of [43%, 1.94] and [56%, 2.06] respectively. This is a indication of total improvement in the means scores of the experimental groups over what it was obtained in the pretest scores, and at the same time confirmed that experimental group performed better than control groups due to their exposure to the annotated strategy package. On the level of significance of means score of pretest table three showed the pretest means scores of control and experimental

groups as 41% and 42% respectively with t-value = -0. 1768, degree of freedom [d f] = 58 probability value [p-value] = -1.080.

This translates to the acceptance of the first hypothesis with conclusion that there was no significant difference in the pretest means scores of the control and experimental groups. The inference is that students found these topics difficult to learn as shown in their responses of questionnaires. At this level there was no difference in their means scores meaning that these topics were actually difficult to pass and if these questions are set in any public examination like W.A.E.C. and others. it is most likely that majority of them would fail mathematics.

Table 4 showed test difference between control and experimental groups in posttest scores with means scours of 43 % and 56 %, respectively, t - value = - 34, 4789, df = 58 and p-value = -1.080 and it was significant at .05. The conclusion is that there was significant difference in the posttest means scores of the control and experimental groups and this lead our carlier hypothesis two rejected. The implication is that experimental groups performed better and significant than the control group after their exposure to the annotated strategy package.

Table 5 showed test diffierences in treatment changes over time with the means scores at the pretest and posttest stages to be 41% and 50% respectively, and t-value = - 23.8700, df = 58 and p -value = -1.080. This indicated that the hypothesis is hereby rejected. There was significant difference in the pre and post tests means scores of students in the identified difficult topics in mathematics. There is an improvement in the means scores of the experimental groups in the posttest scores due to their exposure to the annotated strategy package. This had reduced difficult processes of understanding such identified topics via pedagogical practice of the teacher for the students. As in line with the study of Moschkovich [2001] at the junior secondary school level the study upheld that meaningful hearing and difficult overcome could be attained whenever there is a meaningful interaction between the teacher and the students, unlike one way flow of information / teaching. Also it is obvious that annotated in the teaching of Mathematics allowed students to have favourable learning outcome in the subject. This confirmed with the studies of Oladunni (1995), Aremu (1998) and Popoola (200) that strategy employed by the teacher encouraged the learning of subject matter of any concept and enhanced mastery learning of the topic under discussion. As a result it is hereby recommended that mass drift of female student into non-scientific field due to Mathematics could be minimized through the application of stepwise discovery guide used in teaching the identified difficult topic in Mathematics as shown in the study.

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## Appendix A

**List of mathematics topics for the senior secondary schools consider difficult and most difficult topic to learn.**

| TOPICS | DIFFICULT | MOST DIFFICULT |
|---|---|---|
| **Number and numeration** | | |
| Number Bases | | |
| Fractions, decimals and approximation | | |
| Indices and logarithms | | |
| Sequences | | |
| Sets | | |
| Logical reasoning | | |
| Positive and Negative integers | | |
| Surds | | |
| Ratio, Proportion and rates | | |
| Variation | | |
| Percentages | | |
| **Algebraic Processes** | | |
| Algebraic Expressions | | |
| Simple operation on Algebraic Expression | | |

| | | |
|---|---|---|
| Solution of Linear equation | | |
| Change of subject of formula | | |
| Quadratic equation | | |
| Graphs of linear and Qudratic Equation | | |
| Linear inequalities | | |
| Relations and functions | | |
| Algebraic functions | | |
| **Mensuration** | | |
| Length and perimeter | | |
| Areas of solid object | | |
| Volume of solid object | | |
| Plane geometry | | |
| Angles at point | | |
| Angles and intercepts on parallel line | | |
| Triangles and other polygons | | |
| Circles | | |
| Constructions | | |
| Loci | | |
| **Trigonometry** | | |
| Sin, cosine and tangent of angles | | |
| Angles of elevation and dep. | | |
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| **Statistics and Probability** | | |
| Statistics | | |
| Probabilities | | |
| **Vectors and Transformation in a plane** | | |
| Vectors in a plane | | |
| Transformation in the Cartesian coordinate. Plane | | |