

## **Effects of Mentoring on Low-Performing Secondary School Students of Biology in South-west, Nigeria.**

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**Abstract:** *This study investigated the effect of mentoring on the low performing Biology students. Its main purpose was to improve performance in low-performing Biology students by means of mentoring approach. It is believed that this will assist in developing individual potentials to becoming better citizens of the society. The study employed the quasi-experimental design which utilizes non-randomized pre-test, post-test, experimental-control group system. The population of the study was made up of senior secondary school students in South West Nigeria. The sample consisted of 180 Biology students selected from six secondary schools. The sampling techniques used were random sampling, multi stage, and purposive sampling techniques. The instrument used in the study was Biology Concept Test (BCT). The instrument was validated and its reliability was ascertained using test-retest method. Reliability coefficient of 0.72 was obtained. The BCT was administered as both pre-test and post-test, Mentoring with the aid of Supplementary instruction Learning Model (SILM) was used for treatment. Data collected were analyzed using Analysis of Covariance (ANCOVA) and Multiple Classification Analysis (MCA). Descriptive analysis was used to provide answer to the general question. The findings from the study indicated an improved performance on the mentored low-performing secondary school Biology students. Based on the findings of the study, recommendations were made. Among which was that mentoring should be used by teachers as an adjunct to normal classroom teaching for bringing up slow and poor students to improved level of performance.*

**Keywords:** *Effect, mentoring, low-performing secondary school students, biology.*

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### **I. Introduction**

Qualitative science education with focus on the development of scientists, capable of inventive science has been marked as a pedestal for growth and advancement of a country (Osokoya, 2002). The aim of science learning in a nation is to maximize benefits derivable from science towards her technology development. The problem of how to cope with the high national expectations from science discipline has been to evolve and fashion out instructional strategies that will enable science educators to achieve the high societal expectations. Different methods of teaching have been used to disseminate science knowledge from the onset of formal education in Nigeria but there have always been a drift of students from the sciences to other disciplines (Aghenta in Eloebhose, 2006). This according to students is as a result of mass failure in sciences which is termed “difficult to understand” thus creating a negative attitude leading to lack of interest and commitment to science subjects. This may, according to Olu-Ajayi (2013) be due to inadequacies in the teaching strategies used to disseminate science knowledge to these students. The teaching method of instruction has been suggested by Adebayo (2000) as a main factor affecting students learning outcome. Since science learning is activity filled, and interactive demanding, it is thought that complimenting the age long lecture method with modern teaching strategies like mentoring as discovered by Olu-Ajayi (2013) could improve students’ attitude towards science learning, as importance of science learning in national development cannot be over emphasized. The development of a mentoring relationship between teacher/student was believed by Olu-Ajayi (2013) to reinforce the students’ confidence in his ability to learn as it reduces the teacher student barrier.

It was recorded by Rhodes, Jean & Nancy (2000) that positive perceptions of teacher-student relationships are consistently associated with increase in motivation, academic competence and achievements, school engagements, school value, and behavioural adjustment. Similarly, the mentoring relationship may contribute either directly or indirectly to the child’s success in school. Mentoring is a supportive relationship established between two individuals where knowledge, skills and experience are shared. It is an interaction with another that facilitates the process of cognition, achieving more than each could achieve alone. As well explained by Clutterback, (2004) mentoring refers to a developmental relationship between a more experienced person referred to as mentor, and a less experienced partner, referred to as a protégé. Two main Mentoring models as stated by Scandura & Pellegrini (2007) are; Sponsorship mentoring, which is predominantly recognized in countries such as USA, Australia and Germany and focuses on carrier sponsorship by the mentor. The agenda is set by the mentee, with the mentor providing support and guidance to prepare them for future roles. However, coaching revolves more around developing the mentee professionally, and Developmental Mentoring, which places greater emphasis on learning and development as well as the growth of the mentee,

where the learner takes responsibility for his own learning. Developmental mentoring should also be a mentee driven relationship. Mentoring according to Merrick (2007) occurs when a person such as a teacher, coach or an employer willingly invests time in the development of a person such as a student athlete or an employee, when a trusting relationship forms and the need and interest of the protégé, (mentee) are met. Mentoring is a power free, two – way mutually beneficial learning situation where the mentor provides advice, shares knowledge and experiences, and teaches using a low pressure, adult learning versus teacher-to-student model and, being willing to not just question for self - discovery, but also freely sharing their own experience and skills with the protégé. In school system, adult – student mentoring programme provides an opportunity for students to form a close relationship with an adult connected with the school who can be a teacher, counselor and administrator ( Hamilton & Hamilton 1992). Complementing the age long lecture method with modern teaching technique like mentoring could improve students’ performance in science learning.

### Statement of the Problem

A critical issue that becomes a focus in the recent development is the issue of the ability of the regular classroom lessons to meet the learning requirement of some low- performing students who are always passive during science subjects’ lessons due to the derogatory social and academic stigma attached to their ability level.

### Purpose of the study

The main purpose of this study was to encourage the participation, and gradually improve the performance of low-performing students in science classes especially in Biology subject through mentoring approach. It is now thought that complimenting the classroom lessons with mentoring may help them in learning and would bridge the gap their academic incompetency have created in their performances.

### Hypothesis

The only hypothesis tested in this study is:

There will be no significant difference in the performance of low-performing Biology students exposed to only normal classroom teaching and those mentored

### Design

The study employed quasi-experimental design which utilizes non randomized pre – test post - test experimental and control group system. Intact classes were involved as mentoring was used as a complimentary strategy to lecture method of teaching. The population consisted of all secondary schools Biology students in South-West, Nigeria. Sample size was 180. These were made up of senior secondary two students selected from three states in South-West, Nigeria. These states were selected by random sampling from South-West Nigeria. Multi-stage sampling technique was used to group the Schools in the 16, 18 and 20 Local Governments of Ekiti, Ondo and Ogun states according to senatorial districts. Each of the states used for the study has three senatorial districts. Purposive sampling was then used to select schools having the same Biology teacher from senior secondary school one till date that have been used to the students to, be able to relate information (behavior and academic) about each student to the researcher. Finally, two schools were selected from each state making six schools in all.

**Table 1: Sampling detail**

State	No of Local Govts	Senatorial Districts	No of schools chosen	Experimental group	Control group	Sample size
Ondo	18	3	2	32	28	60
Ogun	20	3	2	30	30	60
Ekiti	16	3	2	28	32	60
Total	54	9	6	90	90	180

Table 1 shows the sampling detail

As required of quasi-experimental design, the researcher assigned the mentoring strategy.

This is symbolically represented thus:

O1 X O2

O1 - O2

O1 represents pre-test observation for the mentored and non mentored low performing Biology students of South West Nigerian secondary schools

O2 represents post-test observation for the mentored and non-mentored low performing Biology students of South West Nigerian secondary schools

X represents experimental treatment (mentoring)

- represents control treatment

**Instrument**

The instruments used in this study include; Biology Concept Test (BCT) and a mentoring package involving, Supplementary Instruction Learning Models; (SILM). The instrument BCT consisting of 60 items was validated by specialists in the field Science Education and Tests and Measurements and its reliability ascertained using test retest method. A reliability coefficient of 0.72 was obtained. Likewise the mentoring package was validated by experts in Science Education. The BCT was used as both pre-test and post-test. As pre-test, it was administered with the help of research assistants (Biology teachers) located in the schools used for the study, before treatment. Pre-test was used to determine the student’s initial knowledge on some aspects of Biology before treatment. The procedure involved two stages;

- The process of identifying low performing students
- Mentoring intervention

Process of identifying low performing students - The Biology teachers in the chosen schools worked with the researcher to identify the low performing students by finding the average score of each student in the school examination and the BCT administered as pre-test. Every student who did not score up to 50 marks on the average was noted. These students, who as well have not performed up to average in their continuous assessment, compared to their mates are referred to as “low-performers’ and were pulled out for mentoring intervention. These students constituted the experimental group for this study. Mentoring intervention- The treatment (experimental and control) lasted for six weeks of the secondary school Biology study period. A mentoring package involving, counseling and use of Supplementary Instruction Learning Models (SILM). This is a specially produced learning kit. It consisting of electronic aided instructional guidance (video and audio) discs into which the senior secondary school Biology topic used for this study, “Tissues and supporting system” had been taught in a comprehensive way by an experienced and skilled teacher using charts and models to enhance learning in students. The researcher, and or research assistant were physically available during the video lessons, to discuss with and answer mentees’ questions on the topic being taught for the study. The researcher motivated the students to wait after the school hours for the watching of the VCD supplementary instruction model. The mentee were given opportunities to call at anytime on phone or meet with the mentor when around to discuss, share experiences on how well they are fairing, ask questions on Biology and other things. Treatment lasted for six weeks after which post-test were administered on the subjects for the study. The results of the pre-test and post-test were recorded and used for analysis.

**II. Results and Discussion**

Descriptive analysis was used to provide answer to the general question raised on this study and the answer is diagrammatically represented in column charts:

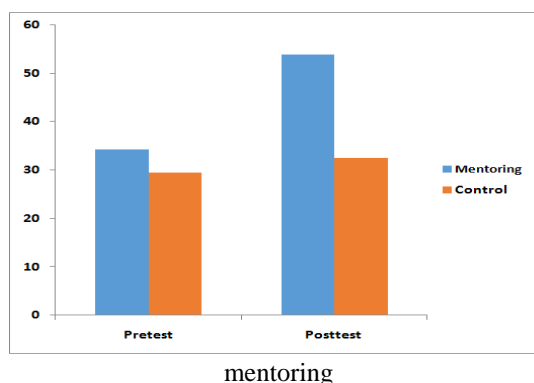
**Question**

What are the effects of mentoring activities on Biology students’ performances in secondary schools? In order to answer this question, pre-test and post-test achievement mean scores of low-performing Biology students exposed to mentoring activities and those in the control group were computed. The results are presented in Table 2 and figure 1

**Table 2:** Descriptive Analysis showing Performance of low- performing Biology students exposed to Mentoring and the control group in Biology

Group	N	Pre-test		Post-test		Remark
		Mean	SD	Mean	SD	
Experimental	90	34.20	8.96	53.77	6.48	Effective
Control	90	29.37	8.60	32.48	9.58	

**Performance**



**Figure 1:** Chart showing the effect of mentoring activities on the performances of low-performing Biology students in South-West Nigerian secondary schools

Table 2 and figure 1 present the Biology achievement mean scores of students in mentoring and control groups before and after treatment. To test the hypothesis, achievement mean scores of subjects exposed to mentoring activities and those in the control group were compared for statistical significance using Analysis of Covariance (ANCOVA) at 0.05 level of significance. The result is presented in Table 1

**Table 3:** ANCOVA showing achievement mean scores in Biology of low-performing students in experimental and control groups

Source	SS	Df	MS	F cal	F table
Corrected Model	21585.419	2	10792.709	178.236	2.99
Covariate(pretest)	1190.663	1	1190.663	19.663	3.84
Group	16496.024	1	16496.024	272.423	3.84
Error	10717.892	177	60.553		
Corrected Total	32303.311	179			
Total	367018.000	180			

Table 3 presents the achievement mean scores of low-performing students exposed to mentoring activities and those in the control group. The result shows that F-cal (272.423) is greater than F- table (3.84) at 0.05 level of significance. The null hypothesis is rejected. This means there is significant difference in the performances of students exposed to only normal classroom teaching and those involved in mentoring. In order to test the effect of treatment on students' achievement in Biology, Multiple Classification Analysis (MCA) was used. The result is presented in Table 4

**Table4:** Multiple Classification Analysis showing the Achievement Mean Scores of Students in Mentoring and Control Groups.

Grand Mean= 43.12					
Variable+ Category	N	Unadjusted Devn'	Eta	Adjusted for independent + Covariate	Beta
Mentoring	90	10.65	.59	9.23	.40
Control	90	-10.64		-9.23	
Multiple R <sup>2</sup>					.158
Multiple R					.397

Table 4 presents the effect of treatment on adjusted post-test mean scores of students in experimental and control groups. The result shows that, with a grand mean score of 43.12, students exposed to mentoring had an adjusted post-test mean score of 52.35(43.12+9.23) while those in the control group was 33.89(43.12+(-9.23)). This implies that mentoring constitutes a veritable instructional strategy for enhancing better performance of students in Biology compared with conventional method.

### III. Discussion

From the result, a significant difference was discovered in the achievement of low-performing students exposed to mentoring when compared with those exposed to normal classroom teaching alone. This result is in support of Rhodes & Nancy (2000) who discovered that development of mentoring relationships reinforces the protégé's confidence in their ability to learn and may support risk-taking and innovation. This also agrees with the work of Lankau & Scandura (2002) who believed that good mentoring will break the teacher-student barrier and enable student's confidence in recognizing their abilities and limitations. Low-performing students may require personalized attention, encouragements and advice to measure up with their classmates, but no student is permanently dull.

### IV. Conclusion and Recommendations

Based on the findings of this study, mentoring is an improved way of imparting science knowledge to students. Mentoring has the potency of improving students achievement in Biology Also, it was discovered that complimenting normal classroom teaching with mentoring will help slow- learning students learn faster and perform better. It was evident from this study that, teaching method accounted for students' poor performance in Biology. The normal classroom teaching alone may not be adequate to ensure learning or good performance especially in poor and slow students, but complementing normal classroom teaching with mentoring seem best for good performance in low-performing students.

Based on the findings of this study, the researcher recommend that;

1. Mentoring relationships should be encouraged in secondary school system amongst teachers and students, to effect general good performance of students.

2. Mentoring should be used by teachers as an adjunct to normal classroom teaching for bringing up slow and poor students to improved level of performance.
3. Low-performing students in science classes especially Biology which is a popular science subject in senior secondary schools, should be engaged in Mentoring relationships to remove the derogatory social and academic stigma attached to their ability level.

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