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Investigating Teaching Methods Employed by Teachers and Learning Styles of Students in Biology at the Senior High School Level in the Cape Coast Metropolis

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Abstract
The study adopted a descriptive survey approach with a total population of 250 first year students from three Senior High Schools. The sample which consisted of a the control group of 30 first year students and an experimental group of 90 first year students was selected using simple random sampling technique. In the experimental group, the Problem-Based Learning (PBL) approach was used while the Traditional Learning Based (TLB) method was used in the control group. The research instrument was a 20-item questionnaire which sought information from the respondents on whether they had their own strategies for studying the subject and which kinds of teaching method they found helpful to them. The findings of the study revealed that students have learning strategies for studying biology. However, due to the nature of the course, these strategies were not effective. It was also revealed that variations in teaching method were helpful in aiding understanding of the subject. Based on the findings of the study, a number of recommendations were made which will go a long way to help policy makers, biology teachers and students work together to get the most out of the subject. Children ask themselves questions and answer the questions to enhance their own understanding of the concept learnt, this statement is further attested by Johnson (2008) that, ask yourself questions to enable you to understand new principles and concepts. The concepts and principles of science cannot be efficiently grasped if wrong study habits are adopted, and the students' learning styles are not considered. Students learning abilities of science could also be strengthened and performance improved if suitable teaching methods and strategies are employed by teachers to teach biology in class.Therefore, the purpose of this study was to find out students' general approach to the study of biology in the Senior High Schools and also investigate methods employed by teachers to teach students in the Cape Coast Metropolis of the Central Region of Ghana.
Keywords: Grasp, personal technique, balloting, oddity, and infirmity.

1. Introduction

Biology is an aspect of pure science which serves as a foundation for students as they study further, hence students' study of this subject at the Senior High School level remains very important. Owing to this fact, all students in Ghana are required to learn some biology irrespective of his/her program of study. However, students consider this important aspect of science (biology), as difficult, and generally abstract and irrelevant to the needs of the society. Many students do not like to offer biology as a course at the Senior High School level and some reasons have been associated to this.

While some blame is attributed to curriculum developers and teachers, others also despise the approach to its teaching and learning but majority say the greatest cause of the problem is the students learning strategies.

The study of science and subsequently of biology is both seen as a product and as a process. The product of science deals with science concepts and conceptual schemes while the process of science talks about the practical and experimental process of science.

Nevertheless, an observation that hold true for most educational systems and in particular, our educational system is that of biological sciences Curriculum Study organized by American Institute of Biological Sciences (AIBSCS). The group observed that, "the students were given a great deal of information, but not necessarily understanding" they concluded that "high school students were learning the words of biology but not its ways" hence, for students to get a grip over understanding biological concepts, an enquiry into the style of learning cannot be overemphasized Dunn & Dunn (1978) psychologies define learning more broadly as a process by which experience of practice results in a relatively permanently change in behavior or potential behavior.

Learning becomes effective if it leads to an increase in knowledge and understanding which will consequently lead to change in behavior. The question is; do students in Senior High Schools' increase in their knowledge and understanding of biology? Are they able to explain processes and concepts based on the understanding they have in biology? Do they remain superstitious and local in their thinking? Is learning thought as a process of problem solving, a way of thinking, creating, and synthesizing? The point of view that learning is much more than acquisition of skills is made explicit by Brownell (1949) who writes that solving attitude, an inquiring and questioning mind, is a desirable educational outcome which is a possible development.

The attitude is continued experience in solving real problems, one consequence which is however inherent

in this method is that the learner comes to expect new problems and to look for them. Some authors suggest that promoting awareness of and reflection on one's own learning style could improve the learning process and foster self-regulated learning of biology at the SHS.

According to Feldman (2000), learning styles reflect one's manner of acquiring, using and thinking about knowledge. These styles or strategies are not abilities, but types of learning. They represent the ways we approach tasks. We do not all learn in the same ways, each of us has preferred ways of learning approaches that work best for us, and our success in the academia is not just dependent on learning but how well we learn (Ferret; 2003).

Education: is a process of self-realization, it is the animal instincts in man and shows him the ways to realize his latent powers. It thus, makes explicit what is explicit in us and therefore development from within and not an accretion from without (Gorden; 1996). It modifies the behavior of the educated. Gorden points out. "Education emancipates us from our oddities and infirmities". It is also a process of sublimating instinct.

From the above allusion, it is clear that learning depends heavily on the strategies teachers employ as well as the way the presentation of the information is made to the learner. It is therefore necessary to investigate students learning strategies so as to consider ways of making the syllabus adaptable to these styles for the benefit of the general student populations across the nation.

1.1 Statement of the Problem

Generally, students fear learning biology at all levels of the educational ladder simply because they see it to be difficult and abstract. In finding out strategies of learning biology, it is assumed that the student's inability to repeat concepts learnt or correct use of biological terminologies write them out correctly, and checking to see if the learnt concepts and terminologies can be remembered and told to someone else in their own words is as a result of ineffective strategies that students employ in their attempts to study biology at the Senior High School level.

The objectives of the present study were therefore: to examine the relationship between students learning styles and their performance as well as to assess the relationship between students learning styles and methods employed by their teachers against their performance.

The study was guided by the following research questions: Research question 1: Is there any relationship between students learning style and academic performance in biology at the senior high school?

Research question 2: Is there any significant relationship between students learning style `and teachers teaching methods in biology?

1.2 Significance of the Study

This study was carried out in some selected Senior High Schools in the central region specifically, and hence the data validity could be affected even though the schools and the student respondents were selected at random. In addition to this limitation, the researcher was hard pressed for time; as the research was undertaken alongside his usual courses of study in the university.

Response to questionnaires by students was very short in time, and reliability could also be affected since the time taken to study the respondent was a little longer. Another factor that served as a limitation was financial constraint, since the student researcher could not afford all that was needed financially to carry out the research.

1.3 Delimitation of the study

This study concerns itself with the learning strategies used by students in studying biology in three (3) selected Senior High Schools in the Cape Coast metropolis. Out of a total of two hundred and fifty students (250) ninety students (90) were sampled for the study. Though, the total students population could have been used for the study the writer used only ninety of the students instead to make findings valid and reliable.

1.4 Limitation of the study

This study was carried out in some selected Senior High Schools in the central region. Specifically, three schools were used for the study; hence the data's validity could be affected even though the school and the student respondents were selected at random. In addition to this limitation, the researcher was hard pressed for time; as the researcher will be taken alongside his usual courses of study in the university. Time period for responds of questionnaires will have to unfortunately be short; hence reliability could also be affected. The study was also limited by lack of adequate financial resources.

2. METHODOLOGY

The type of study carried out for this research was the survey study. It is very accurate for carrying out this study because it is an example of a descriptive research which seek to clarify a phenomenon, object or event, where some kind of appropriate information is missing.

Again, it gives direction to the description of events, phenomenon or objects. The study was conducted on ninety (90) biology students (experimental sample) and thirty for control experiment in three Senior High Schools in the Cape Coast Metropolis in the Central Region. Questionnaires were used to carry out this study; this is because questionnaires are suitable instruments used for collecting all kinds of data during research. It is also widely used in educational research to obtain information about certain conditions and practices and to enquire options and attitude of an individual or a group.

In an attempt to collect data for this research a visit was made to the various Senior High Schools and then permission was sought from the Heads of the schools as well as the biology teachers. Biology students were then selected at random using the balloting sampling procedure.

After the ninety students were randomly selected and an illustration made, the questionnaires were then administered to them. Appropriate time was given to them to respond to the options on the questionnaire, after which they were collected. The scores of each respondent were summed up to obtain a raw attitude score data which were subsequently analyzed into frequencies and percentages using IBM Statistical Product Service Solution (S.P.S.S.) product software.

3. Results and Discussion.

Research question 1: What is the relationship between students learning styles and academic performance in biology at the Senior High School?

Respondents' views on students learning styles and academic performance in biology at some Senior High Schools within Cape Coast Metropolis were sought. Their responses are presented in Tables 1-6:

Table 1. Students view on whether they are able to learn biology better when resting on their bed.

Response	Frequency	Percentage %
Strongly Agree	9	10.00
Agree	34	37
Disagree	32	35.60
Strongly Disagree	15	16.70

Source: field survey (2009)

Out of 90 biology students sampled, approximately 47.80% agree with the statement while 52.30% of the students disagree with the statement. It seems students on learning while resting on bed is diverging whether it enhances better learning of biology or not. But a close study of the percentage proportions of responses obtained from the respondents, it is obvious that those who disagree with the statement are slightly ahead by 4.50%.

Table 2. Students views on whether reviewing what is taught in the classroom after resting for an hour enhances their understanding of biology.

Response	Frequency	Percentage%
Strongly Agree	19	21.10
Agree	49	54.40
Disagree	21	23.30
Strongly Disagree	1	1.10

Source: field survey (2009)

From table 2 above it is observed that majority of the sample population review what is learnt in class right after an hour rest constituted 75.50% while the percentages of those who for one reason or the other do not review sum up to 24.40%. From the computed figures displayed on the table it is overwhelmingly clear that review of notes taken after a lesson is a good practice to ensure that students remember concept learnt in class.

Table 3. Teaching colleague students in the delivery of biological text improve their grasp of biology concepts.

Response	Frequency	Percentage%
Strongly Agree	25	27.80
Agree	47	52.20
Disagree	9	10.00
Strongly Disagree	7	7.80
Missing system	2	2.20

Source: field survey (2009)

Most students adding up to 80.00% in response agreed with the statement as indicated in 3 above. In presentation, the students will have to prepare by reading the topic in question very well, taking note of key points in order to improve their understanding of biology. Nonetheless, 17.00% of the students disagreed with the statement and 2.20% missing.

Table 4. When students review what is taught in the classroom after resting for an hour it helps them enhance their understanding of biology.

Response	Frequency	Percentage%
Strongly Agree	19	21.10
Agree	49	54.40
Disagree	21	23.30
Strongly Disagree	1	1.10

Source: field survey (2009)

From the table above it is observed that majority of the sample population review what is learnt in class right after an hour rest constitute 75.50%. The percentages of those who for one reason or the other do not review add up to 24.40%.

Table 5. Students view whether jotting of main points of biology notes helps them understand biology better.

Response	Frequency	Percentage%
Strongly Agree	43	47.80
Agree	39	43.30
Disagree	4	4.40
Strongly Disagree	4	4.40

Source: field survey (2009)

Analyzing this data, it is observed that majority of the respondents making up 91.10% of the total agree with the statement while 8.80% disagree with the statement.

This may be realized due to the fact that students take note of relevant point in biology when teaching is in progress.

Table 6. Reading key points and revising them regularly makes learning of biology very effective.

Response	Frequency	Percentage%
Strongly Agree	43	35.60
Agree	47	52.20
Disagree	8	3.30
Strongly Disagree	3	3.30

Source: field survey (2009)

From table 6, most students take note of the essential points in their biology lessons when learning; therefore students are able to capture salient points in their mind. This explains the reason why 88.90% agreed with the statement where as 11.10% disagreed.

In summing up, Table 1 sought the views of students who learn biology when resting on their bed and it emerged from 90 biology students sampled that approximately 47.80% agree with the statement while 52.30% of the students disagree with the statement.

Besides, from table 2 above it is observed that 75.50% of the sample population review what is learnt in class right after an hour rest while the percentages of those who for one reason or the other do not review sum up to 24.40%.

Furthermore, majority of students adding up to 80.00% in response agreed with the statement that, in presentation the students will have to prepare by reading the topic in question very well, taking note of key points in order to improve their understanding of biology as indicated in table 3 above. Nonetheless, 17.00% of the students disagreed with the statement and 2.20% missing.

From the table 4, it is observed that majority of the sampled population review what is learnt in class right after an hour rest and they constituted 75.50%. The percentages of those who for one reason or the other do not review add up to 24.40%.

Analyzing this data, it is observed that majority of the respondents making up 91.10% of the total agree with the statement while 8.80% disagree with the statement.

This may be obtained due to the fact that students take note of relevant points in biology when teaching is in progress.

From table 6, most students take note of the essential points in their biology notes when learning; therefore students are able to fix the salient points in the mind. This explains the reason why 88.90% agreed with the statement where as 11.10% disagreed.

Students need to adapt effective learning styles in order to perform well in biology depending on the topic and the time available.

Research question 2: Is there any significant relationship between students learning styles and teachers teaching methods in biology?

Respondent's views were sought on the relationship between students learning styles and teachers teaching methods in biology in some schools in the Cape Coast metropolis.

The data collected using the research questions have been put into tabular forms according to the research questions which included systematic presentation of biology, performing practical's systematically and using discussion method to teach. The results are presented in table 1-6.

Table 1. Organized and systematic presentation of biology lesson make students understand better.

Response	Frequency	Percentage%
Strongly agree	32	35.60
Agree	48	53.30
Disagree	6	6.70
Strongly Disagree	4	4.40

Source: field survey (2009)

One could infer from the analyzed table 1 that 88.90% agree with statement and 11.10% disagree with the statement. Asafo-Adjei (2001) pointed out that no matter what kind of instructional methodology that is adopted by the teacher there must be a preparation for handling it. He added that though teaching of science topic may include using more than one method, with proper planning by the teacher he/she will be in better position to structure the implementation strategy to suit students' ability level and his own.

Table 2. Performing practical's systematically makes learners understand biology concepts better.

Response	Frequency	Percentage (%)
Strongly agree	45	52.20
Agree	37	41.10
Disagree	5	5.60
Strongly disagree	1	1.10

Source: field survey (2009)

From table 2, 93.33% of the students studying biology stated that, through practical lesson, they learn with the real life situation while 6.70% of them did not agree to the statement. The facts are that many respondents feel that practical lessons are helpful especially when it is carried out systematically, 2.20% were missing.

Table 3. Discussion method helps students understand biology better.

Response	Frequency	Percentage%
Strongly agree	26	33.30
Agree	44	53.30
Disagree	18	10.10
Strongly Disagree	2	5.60

Source: field survey (2009)

Student respondents, according to table 3, enjoy the discussion method in learning biology. More than two thirds of the sample population 86.60% agreed to the statement and 13.30% disagreed.

Table 4. Students understanding of biology is enhanced when the teacher goes over the main points of the lesson taught.

Response	Frequency	Percentage%
Strongly agree	37	41.10
Agree	43	47.80
Disagree	8	8.90%
Strongly Disagree	2	2.20%

Source: field survey (2009)

In analyzing the data, 88.90% of the respondents agree with the statement. When teacher emphasized on a point students pay particular attention to it and try to read over remember it. Notwithstanding, 11.10% of the sample size disagree with statement.

Table 5. Students opinion whether learning of biology is enhanced when the teacher use inquiry method.

Response	Frequency	Percentage%
Strongly agree	14	15.60
Agree	50	55.60
Disagree	19	21.10
Strongly Disagree	7	7.80

Source: field survey (2009)

Here, it is observed that 71.10% agreed with the statement. According to Feldman (2000), inquiry teaching technique do not only provides intrinsic motivation for learning biology concepts, but it also has persistent effect on student's analytic behavior. The clearly indicates that only 29.80% of the sample size disagrees with the statement. Having gone through the analysis, it was obvious from the table 4, where 88.90% of the biology students agreed that a well-planned and systematic presentation of biology lesson make them understand better.

Analyzing the data, 88.90% of the biology students also agree that their understanding of biology is

enhanced when the teacher emphasized on the main points. Table 4 and 5 therefore, indicates that there is significant relationship between students learning style and teachers teaching methods in biology.

Table 6. Students view whether task cards and other tactual resources make the learning of biology easy.

Response	Frequency	Percentage%
Strongly agree	18	20.00
Agree	40	44.40
Disagree	26	28.90
Strongly Disagree	6	6.70

Source: field survey (2009)

In analyzing the data, 64.40% of the respondents agree with the statement, when teacher emphasized on a point whether task cards and other tactual resources make the learning of biology easy for students. Notwithstanding, 35.60% of the sample size disagree with statement.

Boulind (1958) stated that students cannot be made to think solely or even mainly, by talking to them, and that any science course needs to be firmly rooted in practical a means of solving problems.

Student's preference of learning materials in biology is, therefore, well founded when 64.40% agreed with the statement while 35.60% disagreed.

4. Conclusion

The study sought to examine the relationship between students learning styles and their performance as well as to assess the relationship between students learning style and teachers teaching methods.

In summary, the study revealed that to achieve good grade in biology, there must be a collaborative effort by the two parties involved, that is, the teacher must teach the students the concept and the students must equally be able to use their personal techniques that will suits their own personality. Some of these study skills are planning, test-taking strategy, researching strategies, and group discussion, and efficient use of libraries and reviewing concepts after resting for about an hour.

Dispensing knowledge and aiding students understanding at the Senior High Schools. From the control experiment, students' performance was not as good as observed in the actual experiment.

In sum, it was clear that the students use some study skills unknowingly, therefore, there is the need to encourage them to discuss and use these techniques better.

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