

Exploring Students' Perceived Difficulties Of Learning Biology.

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Abstract

According to many learners, biology is difficult at the senior high school (SHS) level. This study explored the perceived difficulty in learning biology. The study used 157 learners as the target population. The findings revealed that, biology is overloaded with complicated terminologies which are difficult to understand. It was also found that biology practical lessons should be improved and that, biology should be taught with audio-visuals materials.

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I. Background

A lot of studies or investigations have been conducted to evaluate students' perception of what makes biology difficult to study. These studies are conducted at different places in the World and at different locations within the same country. The study of biology is very important in so many fields of work and also for a better living of the individual. Biology is a requirement to take many careers including medicine, nursing, teaching, genetics, agriculture, horticulture etc. Acquiring these requirements is very important and starts from the senior high school level in Ghana. In Ghana, it is in the senior high school level the learners choose specific programs to equip them with skills into the career-related areas in the tertiary level. Students have expressed several difficulties in the acquisition of these skills in Biology. These challenges expressed by different students vary in relation to cause and effect. These challenges may have negative impact on them to achieve their dreams. There are some specific fields of further studies where biology is a requirement and if students do not possess a qualification in it may prevent them from realizing their dreams to the fullest. Loh

S. L, Pang V and Lajium D (2020). Evaluation of students' perception of biology classroom learning environment cited Khine (2001) noted that, how students learn and achieve their goals depends on the nature of the classroom physical environment and the psychological interaction between them. Khine (2001) further stressed that, the classroom is like a 'miniature society' as students spent most of their time interacting among themselves and the teachers, using various ways and resources in pursuing learning activities.

Problem statement

According to Owolabi P. Adelana, Adeola O. Akinsulure, Musiliu A. Ajose and Adebayo M. Ishola (2023) cited Anaeto et al (2016). Perception of genetics difficulties among science students stated that, advances in science have brought about significant living and long-lasting, richer and more useful lives and have ensured that, more advanced technologies through the application of scientific knowledge are developed for the betterment of mankind. Biology is a subject which needs proficiency in English to understand. Different students have expressed different perception about biology. Most learners have difficulty in understanding certain topics such as: genetics because of poor English background, bad reading habits, learning environment among learners and teachers' factors also have an impact on the understanding of Biology. Majority of students often complained about the complicated nature of biology and how its technical words are difficult to understand. Majority of students offering biology lost interest in learning the subject which they think is killing their ambitions of taking higher fields related to biology. This study has therefore identified these perceptions and proposed solutions to mitigate them.

Research objectives

1. The study examined factors from teachers that influence learners' perception about biology.
2. The study also examined factors from learners' that influence their perception about biology.

3. The study again examined factors from the subject that influence learners' perception about biology.

II. Review Related Literature

According to Sarabi M. K and Abdul Gafoor K (2018), Students positive attitudes towards science subjects change remarkable in the senior high school particularly chemistry and physics. Graber. W (1993). has found reasons for students to feel uneasy in the three sciences namely physics, chemistry and biology. Chemistry is seen the most difficult because of its specialized language, mathematical and abstract conceptual nature and the amount of content to be learned.

Biology is clearly the easiest in comparison to other science disciplines. This does not mean that; it is not a challenge to students. Topics found to be difficult with students like water transport in plants and genetics, Bahar M, Johnstone A.H and Hansell M.H (1999).

The nature of science itself and its teaching methods are among the reasons for the difficulties in learning science. According to Lazarowitz and Penso (1992), the biological level of organization and the abstract level of the concepts makes learning biology difficult. Overloaded biology curricula and interdisciplinary nature of biological concepts and difficulties are some of the factors preventing students from learning biology effectively. Chiapetta and Fillman (1998) cited by Atilla Cimer (2012), state that, overloaded curricula may not contribute to students' achievement and lead them to learn the material by memorization. This of course does not lead to any better learning. Osborne and Collins (2001) also reported that, students' reducing interest in learning science was due to curriculum content being overloaded and not generally related to real life, the lack of discussions topics of interest, the absence of creative expression opportunities, the alienation of science from society and the prevalence of isolated science subjects. Teacher's style of teaching biology and teaching methods and teaching techniques may also be factors that affect students' learning biology, Cimer A. (2004). According Cimer A. (2012), if students are not happy with the way biology is taught, they may have interest in it and show negative attitudes towards biology and its teaching. According to Cimer A. (2012), what makes Biology topics at the senior high school more difficult for students in learning and understanding, their views of the reasons they have difficulties learning some biological topics and the strategies or methods that can make biology learning more effective. He found out from students about what makes biology learning effective and students suggested various strategies or techniques for making their learning of biology effective. Teaching biology through the use of audio-visual materials, teaching through practical work, reducing the content of biology curriculum, using various study techniques, teaching biology through connecting the topics with real life, making biology teaching interesting will make learning biology easily. A great majority of students suggested that in teaching biology, teachers should use visual materials. As biology includes abstract concepts and phenomena that require observations, the participants suggested that, they should see what they are learning. They therefore stated that in biology, if teachers use various teaching and learning resources and tools such as figures, models, computer simulations, videos, and real-life objects, both the teaching and learning may become more effective, Cimer A. (2007). He made his conclusion from the study that, the reasons why students have difficulties learning biology and the ways students could learn biology more effectively. He said, the five most difficult topics by the students were matter (cycles), endocrine system and hormones, aerobic respiration, cell division and heredity. The students also listed several reasons for having difficulties learning biology. Among these are; nature of the topic, teachers' style of teaching biology, students' learning and studying habits, students' negative feelings and attitudes towards and lack of resources predominated. In order to stop these challenges and make their biology learning effective, participants suggested that, teachers who teach biology should do that through the use of visual materials, conducting practical experiments, connecting the topic with daily life, and making biology teaching more appealing. The participants also suggested that, students should use different learning skills in order to be successful in biology. The students' views reported here seem to have some valuable information for those interested in the biology teaching process, such as teachers, schools, policy makers and researchers. They should consider these views in designing the curricula, textbooks, teaching activities and resources and teacher educational processes.

According to Loh, S. L, Pang, V. and Lajium, D, (2020). biology is a subject of science apart from physics and chemistry and additional science in Malaysian upper secondary school level. They said these subjects serve to prepare significantly inclined students to pursue the study of science at the tertiary level. Teaching to fulfil the examination requirements is the strategy by most school administrators, teachers, students and parents. The tendency of teachers is to finish the syllabus as fast as possible and followed by revisions and preparations for examinations, Loh et al (2020). According to Loh et al (2020), the learning environment, various attempts and strategies employed by the school and teachers in order to improve students' achievement in learning is what matters most. One of them is to ensure the teaching and learning is effective in class. Loh et al (2020) cited Khine (2001) on how students learn and achieve their goals depends on the nature of the classroom physical environment and the psychological interaction between them. This he said is because, the classroom is like a 'miniature society' as students spend most of their time interacting among themselves and the teachers, using various ways and resources in pursuing learning activities. He said, 'the learning

environment of a student in the classroom is important for effective learning to take place'. Loh et al (2020) cited Telli et al (2009) carried out a study on how Turkish students perceive biology classroom environment by using the WIHIC questionnaire. The results showed that, Turkish students perceived lowly in terms of teacher support and high in terms of task orientation in the WIHIC scale. Cluster analysis was then carried out to create a typology of biology classroom learning environment in Turkey which categorized the classroom learning into six profiles: 'the self-directed learning classroom', 'task oriented cooperative learning classroom', 'mainstream classroom', 'task oriented individualized classroom', 'low-effective learning classroom' and 'high-effective learning classroom'. Despite all these studies, students' belief of their learning environment for different subjects in each school is unique. The context of learning environment of various subjects differs from one school to the another, or perhaps differs between classes within the same school. Loh et al (2020) on evaluation of students' perception of biology classroom learning environment concluded that, students have a favorable view on their biology classroom learning environment. They identified some strengths in the biology classroom environment. For instance, there was a favorable level of students' cohesiveness and cooperation in the classroom. They also said, there was no difference between boys and girls in their perception of biology classroom learning environment. They recommended that, teachers can tap on the strength of students' cohesiveness in the biology class to enhance the teaching and learning process. Activities that involve interaction and group work in the class may project students' participation in learning biology. To reduce the difference in perception between boys and girls on the scale of cooperation, teachers may have to take note of the setting of the biology classroom environment.

Milan Kubiak, Gregor Torkar and Lenka Rovnanova (2017), found that, a good and effective teacher possesses a mixture of a good content knowledge, knowledge of students' prior content knowledge and mastery of different teaching strategies and methods. they indicated that, the teaching process is influenced by six factors: the school curriculum, team- work of the class and teacher, a traditional teaching strategy, a constructivist teaching strategy, the school climate and evaluation. An effective teaching process can lead to a positive perception of a subject among students. They also stressed that, the teaching process in biology can vary greatly in terms of teaching approaches and strategies. It can take place in the classroom, in a natural environment, in the laboratory, in a museum etc. Milan et al. (2017) cited George and Kaplan (1998) found that, non-formal learning situations (ie., museums, libraries, zoos, etc.) positively influence students' attitudes towards science subjects. They concluded that, in the present-day study, students' perception of the teacher had an important influence on their attitudes towards biology as a school subject.

III. Methodology

The study employed exploratory mixed method design to investigate the research topic. The study employed qualitative method to explore participants views on the topic and the outcome was used to analyze the data quantitatively. The target population consist of 153 students. Stratified sample was used to select participant from S.H.S two and three students from both science and home economic programs. The form three science class had 27 students of which 2 were boys and 25 were girls and the form three home economics students were also 52 of which 11 were boys and 41 were girls. The form two science class had 17 students of which 11 were boys and 6 were girls and the home economics class had 57 students of which 17 were boys and 40 were girls. Simple random sample was used to select 66 participants of which 25 were boys and 41 were girls with balloting method. The form one's students are not part because they have not started classes at the time of the study.

The instruments for data collection were the Likert scale type questionnaire which were adapted from Loh et al (2020) WIHIC type questionnaire with an acceptable reliability coefficient because of its widely use in research. The questionnaire covers three areas as:

1. Teachers'-controlled factors.
2. Students'-controlled factors.
3. Course controlled-factors.

The instrument was further checked for its validity by experienced persons in science education. Direct observations were also employed as a tool for data collection. Permission was granted from the school before data were collected. The study put all participants together and administered the questionnaire directly. Data were analyzed using tables and percentages.

Data Presentation, Analysis and Discussion.

Data were grouped into three as teachers-controlled factors, learners-controlled factors and course-controlled factors.

teachers-controlled factors that learners' perception of Biology is analyzed below;

Table 1: the teacher takes interest in learners' success.

	Number of participants	Percentage (%)
Strongly agreed	48	72.73
Agreed	14	21.21
Strongly disagreed	4	6.06
Disagreed	0	
Total	66	100

Source: field data.

According to table 1, it shows that, 72.73% strongly agreed, 21.21% agreed, and 6.06% strongly disagreed that, the teacher takes interest in the success of learners. From the results, about 93.94% of the population affirmed positively in response of the teacher towards the success of learners. The teacher should always try to let learners know what they need to do succeed academically.

Table 2: the teacher considers learners emotional needs.

	Number of participants	Percentage (%)
Strongly agreed	29	43.94
Agreed	15	22.72
Strongly disagreed	19	28.79
Disagreed	3	4.55
Total	66	100

Source: field data.

The findings from table 1, shows 43.94% strongly agreed, 22.72% agreed, 28.79% strongly disagreed and 4.55% disagreed that, the teacher considers learners emotional needs. The findings demonstrate that, about 66.66% of the population affirmed that, the teacher considers the emotional needs of learners. The emotional needs of learners are paramount which should be addressed.

Table 3: the teacher treats all learners equally.

	Number of participants	Percentage (%)
Strongly agreed	37	56.06
Agreed	22	33.33
Strongly disagreed	7	10.61
Disagreed	0	
Total	66	100

Source: field data.

The results from table 3 shows 65.06% strongly agreed, 33.33% agreed and 10.61 strongly disagreed that, the teacher treats all learners equally. The findings show that, about 89.39% of the population affirmed that, the teacher treats all learners equally. when a learner feels the teacher does not like him\her, it reduces their interest in the subject.

Table 4: the teacher often takes learners through practical sessions.

	Number of participants	Percentage (%)
Strongly agreed	11	16.67
Agreed	7	10.61
Strongly disagreed	17	25.76
Disagreed	31	46.96
Total	66	100

Source: field data.

The results from table 4 shows 16.67% strongly agreed, 10.61 agreed, 25.76% strongly disagreed and 46.96% disagreed that, the often takes learners through practical lesson. From the findings, about 72.72% of the population shows that, they have not been given enough practical lessons. the teacher is not doing enough I the practical lessons and must therefore improve in the number of practical lessons.

Table 5: the teacher always gives assignments like homework and exercises.

	Number of participants	Percentage (%)
Strongly agreed	29	43.94
Agreed	37	56.06
Strongly disagreed	0	
Disagreed	0	
Total	66	100

Source: field data.

The findings from table 5 shows 43.94% strongly agreed and 56.06 agreed that, the teacher always give assignments like home work and class exercise to learners. The findings show that, about 100% of the population agreed that, the teacher always provide assignments for learners. Teachers should always give exercises to learners engage them all the time.

Table 6: teacher is friendly to all learners.

	Number of participants	Percentage (%)
Strongly agreed	30	45.45
Agreed	28	42.42
Strongly disagreed	4	6.06
Disagreed	4	6.06
Total	66	100

Source: field data.

The findings from table 6 shows 45.45% strongly agreed, 42.42% agreed, 6.06% strongly disagreed and 6.06% disagreed that, the teacher is friendly to all learners irrespective of gender. From the findings, about 87.87% of the population affirmed that, the teacher is friendly to all learners. Learners must see that, there are equal opportunities for all to benefit from.

learners-controlled factors that affect learning of Biology are analyzed below: Table 7: I always make contribution in class during discussions.

	Number of Participants	Percentage (%)
Strongly disagreed	52	78.79
Disagreed	11	16.67
Strongly disagreed	3	4.54
Disagreed	0	
Total	66	100

Source: field data.

From table 7, 78.79% strongly agreed, 16.67% agreed and 4.54% strongly disagreed that, leaners always make contribution during class discussions. From the above, it shows about 95.46% of the population agreed that, learners always participate or get involved in class.

Table 8: I always do all my assignments and corrections.

	Number of participants	Percentage (%)
Strongly agreed	59	89.39
Agreed	2	3.03
Strongly disagreed	5	7.58
Agreed	0	
Total	66	100

Source: field data.

From table 8, 89.39% strongly agreed, 3.03% agreed and 7.58% strongly disagreed that, learners always do their assignments and corrections. This shows that, about 92.42% of the population affirmed that learners always do assignments and corrections. Assignments and corrections put learners on track to achieve academic excellence.

Table 9: I always read my notes and other text books.

	Number of participants	Percentage (%)

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Strongly disagreed	26	39.39
Agreed	39	59.09
Strongly disagreed	1	1.52
Disagreed	0	
Total	66	100

Source: field data.

From table 9, 39.39% strongly agreed, 59.09% agreed and 1.52% strongly disagreed that, learners read their notes and other learning materials. The results show that, about 98.48% of the population affirmed that, learners read their notes and other learning materials. This is a positive response that will promote learners understanding of the concept.

Table 10: I am always punctual and regular to class.

	Number of participants	Percentage (%)
Strongly agreed	40	60.61
Agreed	21	31.82
Strongly disagreed	5	7.56
Agreed	0	
Total	66	100

Source: field data.

From table 10, 60.61% strongly agreed, 31.82% agreed and 7.56% strongly disagreed that, learners are always punctual and regular to class. From the above, the findings shows that about 92.43% of the population affirmed that, learners are always punctual and regular to class. This is a positive response that will promote a sense of hard work in learners.

Table 11: I don't like Biology.

	Number of participants	Percentage (%)
Strongly agreed	15	22.73
Agreed	0	
Strongly disagreed	10	15.15
Agreed	41	62.12
Total	66	100

Source: field data.

From table11, 22.73% strongly agreed, 15.15% strongly disagreed and 62.12% disagreed that, learners don't like Biology. The findings show that, about 77.27% of learners disagreed that, learners don't like biology. This is a positive response which will help learners put much efforts to do better in biology.

3) subject-controlled factors that influence learners' perception of Biology. Table 12: biology is overloaded and involve a lot of reading.

	Number of participants	Percentage (%)
Strongly agreed	64	96.96
Agreed	1	1.52
Strongly disagreed	1	1.52
Agreed	0	
Total	66	100

Source: field data.

From table 12, 96.96% strongly agreed, 1.52% agreed and 1.52% strongly disagreed that, biology is overloaded and involve a lot of reading. The findings show that, about 98.48% of the population agreed that, Biology is overloaded and involve a lot of reading. This will involve a lot of effort to understand the concept.

Table 13: biology has too complicated/technical words which are difficult to understand.

	Number of participants	Percentage (%)
Strongly agreed	38	57.57
Agreed	21	31.82

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Strongly disagreed	7	10.61
Disagreed	0	
Total	66	100

Source: field data.

From table 13, 57.57% strongly agreed, 31.82% agreed and 10.61% strongly disagreed that, biology has too complicated/technical words which are difficult to understand. The findings show that, about 98.39% of the population affirmed that biology has too complicated/technical words which is difficult to understand. This means a lot of learning to become familiar with the terms.

Table 14: biology should be taught with audio-visual materials like videos to have a direct feel of what is learned.

	Number of participants	Percentage (%)
Strongly agreed	33	50.00
Agreed	25	37.88
Strongly disagreed	3	4.54
Disagreed	5	7.58
Total	66	100

Source: field data.

From table 14, 50.00% strongly agreed, 37.88% agreed, 4.54%strongly disagreed and 7.58% disagreed that, biology should be taught with audio-visual materials like videos to have a direct feel of what is learned. The findings show that, about 87.88% of the population responded in the affirmative. This means that, biology should be taught with audio-visuals to better explain the concept to learner.

Table 15: we have never seen some the organisms we learned.

	Number of participants	Percentage (%)
Strongly agreed	49	74.24
Agreed	9	13.64
Strongly disagreed	5	7.57
Disagreed	3	4.55
Total	66	100

Source: field data.

From table 15, 74.24% strongly agreed, 13.64% agreed 7.57% strongly disagreed and 4.55% disagreed that, learners never saw some of the organisms learned. The findings show that, about 87.88% of the population affirmed they never saw some of the organisms they learned. This means that, learners learn some concepts abstractly which does not facilitate understanding.

Table 16: biology studies life which is very complicated.

	Number of participants	Percentage (%)
Strongly agreed	59	89.39
Agreed	6	9.09
Strongly disagree	0	
Disagreed	1	1.52
Total	66	100

Source; field data.

From table 16, 89.39% strongly agreed, 9.09% agreed and 1.52% disagreed that, biology studies life which is very complicated. The findings show that, about 98.48% of the population responded in the affirmative. Biology studied all living thing and require effort to learn and know more about them.

IV. Discussions Of The Findings

From the teachers-controlled factors, about 100% of the population responded in the affirmative that, the teacher always gives assignments to learners and about 66.66% of the population affirmed that, the teacher always considers the emotional needs of learners.

From the students-controlled factors, about 98.48% of the population agreed that, they always read their notes books and other reading materials. Also, about 77.27% of the population disagreed that they don't like biology.

From the subject-controlled factors, about 98.48% of the population affirmed that, biology is overloaded and studied life which is complicated. These findings showed a variety of factors influencing learners' perception about biology. The findings indicated that, teachers and learners are doing well in some areas. The biggest problem for learners came from the subject-controlled factors ranging from overloaded curriculum to complicated terms associated with the subject. According to the findings, biology should always be taught with audio-visual materials to enable appreciate and learners have direct connection with the concepts.

V. Conclusion

There are several factors affecting learners in understanding biology ranging from teachers, learners and subject related. These factors affect learners in different ways. From the findings, learners will find studying biology easily if these factors properly addressed.

Since learners are most likely to learn biology easily if the three factors are properly addressed or managed, they will find biology interesting with audio-visuals. Topics like transport and cell division should be taught with audio-visual materials.

References

- [1] Astilla Cimer. (2007). Effective Teaching In Science. *Journal Of Turkish Science Education*, 7(1), 20-40.
- [2] Bahar.M, And Johnstoene. A. (1999). Riving Learning Difficulties In Biology. *Journal Of Biological Education*, 33(2), 84-86.
- [3] Astilla Cimer. (2012). What Make Biology Learning Difficult And Effective. *Educational Journal Of Research And Reviews*, 7(3), 61-71.
- [4] Astilla Cimer. (2004). A Study Of Turkish Biology Teachers' And Students' Views Of Effective In Schools And Teacher Education. Edd Dissertation, Universty Of Nottingham, Uk.
- [5] Sarabi.M.K And Abdul Gafoor.K. (2018). Students Perception On Nature Of Subjects. *Innovation And Researches In Education*, 8(1), 42-55.
- [6] Kapla.D,And George. R. (1998). A Structural Model Of Parent And Teacher Influence On Science Attitudeof Eighth Graders. *Nels:88, Science Education*, 82(1), 93-109.
- [7] Loh.S.L, P. V. (2020). Evaluation O Students Perception Of Biology Classroom Learning Environment. *International Journal Of Education, Psychology And Counseling*, 5(36), 94-113.
- [8] Milan .K, George. T. And Lenka. R (2017). The Teacher As One Of The Factors Influencing Students' Perception Of Biology As A School Subject. *Ceps Journal*, 7(2), 127-140.
- [10] Lazaraowitz, R. And Penso. S. (1992). High School Students' Learning Difficulties In Learning Biology Concepts. *Educational Journsl Of Biological Eduction*, 26(3), 215-224.