

THE STUDY OF LEARNING DIFFICULTIES IN BIOLOGY SUBJECT

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ABSTRACT

The present study aims to determine the biological topics that students facing learning difficulties in subject, the reasons why higher secondary school students have learning difficulties with biology and to decrease the learning difficulties in Biology. To collect data for these reasons, a self-administered inventory with 5 open ended questions was used. It was given to higher secondary school students. The data was analyzed both qualitatively and quantitatively. The students had difficulties the most with topics such as Endocrine System and hormones, aerobic respiration, cell division and genes and chromosomes. The nature of the information, teachers' teaching techniques, students' learning and studying habits, and students' negativity and attitudes were the reasons of learning difficulties. Various studies were done on it. This paper endeavours to identify the core causes of this by evaluating students and consulting examiners' findings. Pointers develop that can lead to potential solutions.

Keywords: Learning Difficulties, Biology Subject, Qualitative & Quantitative, Teaching Techniques.

Introduction

Education is the entire process of imparting knowledge, training faculties and developing skills. Higher Secondary Schools not only play an important role in educational system, but also serve as a link between the Secondary and University levels of Education.

Biology as a subject is associated with difficulties in Higher Secondary Schools. The poor academic ability of students in biology as shown in NEET and NTI reports, as well as the results of State Common Entrance Examinations, culminated in the persistent public confusion against declining calibre of biology learning.

Science subjects are already having difficulty. This is mainly due to a lack of laboratories and other teaching facilities in proportion to the number of students studying science. Biology is very important subject; it has to be given more priority. It allows one to comprehend oneself and its immediate surroundings. Nonetheless, the knowledge gained in biology is employed in variety of professions such as medicine, biochemistry, pharmacy, microbiology and agriculture among others. For many years, students' performance in biology in the higher secondary certificate exams has been adequate. Scholars have assigned many reasons to this learning difficulties in biology.

This study can help students to come out and acquire knowledge or skills in particular any of various neurodevelopmental conditions affecting learning abilities. The importance of biology has been highlighted particularly by development in the field. Developed nations view biology education as a cultural requirement, and they have carried out to raise the standard of biology learning.

However, the main goal of this research is, "The Study of Learning Difficulties in Biology Subject".

Many scholars have conducted research on academic performance in Biology, learning difficulty in biology subject but only a handful has compared academic performance in different school.

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Studies on Learning Difficulties in Biology

Kablan, Hulya (2004), studied "An analysis of high school students learning difficulties in biology". The purpose of this study was to identify the biology information that students felt was important and difficult to acquire, and to see if there was any correlation between reasoning ability, gender, and perceived significance and difficulty. A total 397 students of Grade 11 and 16 biology teachers participated in the study. A questionnaire was used to find out how significant and challenging concepts were perceived by students and teachers. In order to identify the inherent challenges and sources of challenges, semi-structured interviews with students and teachers were also undertaken. The frequency of difficult, moderate, and simple biology ideas as perceived by students and teachers was determined using descriptive statistics. Biotechnology and genetic engineering, hormones, photosynthesis, genes, Mendelian genetics and respiration were found to be difficult concepts for students to learn. On the other hand, the students select producers, consumers, and decomposers, active transport, diffusion and osmosis as easy topics. In addition, cell, enzyme, cell division, respiratory system in vertebrates, protein synthesis, and reproduction in animals are selected as important topics in the curriculum to be learned. On the contrary, body systems in invertebrates and animal tissues are found to be less important topics to be learned. Students' reasoning ability was assessed by using Group test of Logical Thinking (GALT). While a statistically significant negative correlation was found between reasoning ability and perceived difficulty, no statistically significant relationship between gender and perceived difficulty was found.

Reuven Lazarowitz (2010) studies show the "High school students' difficulties in learning biology concepts". In order to pinpoint the learning challenges associated with biology topics, a study that included low-achieving high school students was conducted. The biological content referred to cells, organelles, organs and physiological processes, hormone regulation, oxygen transport, controlled experiments and the principle of structure and function in relation to cells and other biological components. Teaching difficulties are also covered. Considering the discrepancy between students' cognitive growth and the formal reasoning level requirements of the learning content.

Atilla Çimer (2011) had studied "What makes biology learning difficult and effective: Students' views". The current study aims to identify the biological concept that students have difficulties learning, the reasons why secondary school students have difficulties in learning biology, and strategies to enhance students' biology learning efficiency. The data was collected for these reasons using a self-administered questionnaire with three open-ended questions. It was given to 207 students in the 11th grade in the Turkish district of Rize. Both qualitatively and quantitatively analyses of the data were done. There were five topics that the students had the most difficulties learning: Matter cycles, endocrine system and hormones, aerobic respiration, cell division, and genes and chromosomes. The topics nature, teachers' teaching methods, students' study habits, their attitudes and learning styles, their negative feelings and attitudes about the subject, and a lack of resources were the main causes of learning difficulties. The participants suggested a number of strategies to address these issues and improve the effectiveness of their biology learning, including teaching biology using visual materials, teaching through practical work, reducing the amount of biology content in the curriculum, using different study techniques, teaching biology through connecting the topics with daily life, making biology learning interesting, and increasing the number of biology questions in the university entrance examination. The findings were discussed in relation to the relevant literature. The findings of the study are organized according to the research questions: the biology topics that the students have difficulties learning; reasons the students have difficulties learning those topics; and the students' views of the strategies that make their learning in biology effective.

Taner Ozcan (Balikesir University), (2014), "Identifying and Comparing the Degree of Difficulties in Biology Subject in Elementary and Secondary Education", The goal of this study was to find out eighth-grade students in elementary schools and twelve-year-old students in secondary schools thought they had trouble understanding Biology subjects, and whether they still had difficulties in this hardly learnt subjects when they came from the elementary school to high school. The findings revealed that "Controller and Organizer Systems", in elementary school and "Photosynthesis", in secondary school in Turkey were more difficult for the participants in our study to comprehend than other biology subjects.

A. Benjamin Etobro and O. Emmanuel Fabinu (2017), "Students' perceptions of difficult concepts in biology in senior secondary schools in Lagos state". The study set out to find the biological topics in the National Curriculum that students in Senior Secondary School Two (SSII) have difficulties in learning, the reasons why students have difficulties in learning such topics in biology, and to suggest for

the ways to enhance the efficiency of the teaching learning process of biological topics. In order to collect data for these goals, a questionnaire with both closed and open-ended questions are given to the students. 400 SS II students in some selected secondary schools in Lagos State's Education District V received the test. Both qualitative and quantitative analyzed data were collected. The findings indicated that regardless of whether they studied Science, Commerce or Arts, perceptions of difficult biology topics were not significantly different. Further research found that five main themes are where students learning difficulties. These included the natural cycle of nutrients, ecological management, and conservation of natural resources, pests and diseases of crops as well as reproductive system in plants. However, teaching strategies, students' attitude, inadequate learning resources and students' learning habits were the reasons added by students of the perceived difficult topics. In remedying the problem, the students suggested the use of varied strategies that would involve appropriate instructional materials, use of hands-on and minds-on strategy, integrating biological concepts to daily life and provision of adequate and functional resources.

G. Hadiprayitno (2019) "Problems in learning biology for senior high schools in Lombok Island". This purpose of this survey was to analyse the student's difficulties in higher secondary school for learning particular topics in Biology as well as the problems in the learning process. The survey was conducted in higher secondary school all around the Lombok Island by using questionnaire and surveying 568 students and 24 biology teachers, and data was then analyzed using qualitative and quantitative statistics. This survey includes the different topics such as bacteria and viruses (18.64%), endocrine system (10.63%), cell structure (8.81%), genetics (8.41%), and nervous system (8.28%). The student's biggest learning difficulties in the topics include the use of the scientific name, the complexity of the topics, and the students' learning habits. The survey also includes the teacher's problems in the teaching process in the planning stage (23.27%), implementation stage (48.63%) and evaluation stage (28.10%).

Dr. Dilip Sawarkar, Dr. Sarita Deshpande (2020) had studied Learning Difficulties in Senior Secondary Students: A Case Study of S.F.S. College, Nagpur. Through education, a person develops into a thinking, feeling and acting individual. The National curriculum for School Education, earlier includes subjects like, languages, Mathematics, Science and social science. In primary school, science should be studied as an integrated subject. At higher level, it is divided into Physics, Chemistry and Biology. One of these was Biology, which was formerly studied as a descriptive subject with no connection to society. It was considered as a secondary subject; however, with the researches carried out in the middle of nineteenth century, and its coherence with the natural sciences was acknowledged did biology, begin to take center stage in the curriculum. The researchers were concerned about how less and fewer students were choosing biology as the main subject. The potential cause of this fact were attempted to be studied, and one of them was focused through this action study to arrive at a result using the normal class set aside for teaching with 50 students constituting a purposive sample.

Mascardo, Maria Jida C., Lasala, Paula Belle S., Lazarte, Renaire Francis A. (2020), studied "Senior High School Students' Conception of Learning Biology in Relation to Self-Regulated Learning Strategies: Their Impact on Students' Academic Performance". This study aims to find out the relationship between the students' self-regulated learning practices and their idea of learning biology in grade 12 higher secondary school, as well as the effects of these variables on the students' academic achievement. Students in the various public secondary schools in Cebu City that offered the Science, Technology, Engineering and Mathematics (STEM) strand in the Senior High School curriculum were given the Conception of Learning Biology questionnaire and Self-Regulated Learning Strategies questionnaire. Data analysis for the study was done using exploratory factor analysis. The findings show a substantial positive association between all the variables in senior high school students' self-regulated learning practices and their conceptions of learning biology. The data show a significant positive correlation between one of the self-regulated learning strategies and the academic performance of the students. The study's findings have effects on the teaching of biology, particularly in terms of how to better comprehend students' self-regulated learning strategies and conceptions of learning. It is suggested that teachers take appropriate steps to help students build higher order self-regulated learning mechanisms and advanced order conceptions of learning, which will help in their achievement of excellent academic performance.

Lissa (2020), "Learning Difficulties for Retarded Students: Case Studies on Biology Subjects in High School" - in this paper, we examine the internal and external factors that cause learning difficulties for students with mental retardation. 7 mentally retarded students served as the research participants for

this study, which also included questionnaires for teachers and students as well as interview sheets for students, teachers and parents. The findings showed that while internal factors like motivation and interest, as well as for readiness and attention, had the external factor like the school and family environment, performed. Therefore, it may be said that outside circumstances are what have an impact on retarded pupils' difficulty understanding biology.

Halima Haruna (2021), "Perception of Difficult Concepts in Biology among Senior Secondary School Students' in Kano State". The aim of the study was to identify the biology concepts that students in Kano state's senior secondary school two (SS II) found to be the most difficult. 400 SS II students from few selected senior secondary schools in Kano State, Nigeria, were given a questionnaire. Both qualitative and quantitative analyses of the data collected were done. The findings showed that there was no significant difference in the perception of students on difficult topics in Biology on the basis of their subject areas - Science, Commerce or Arts. Moreover, findings also shows that students usually have difficulties in five major topics. These were nutrient cycling in nature, ecological management, and conservation of natural resources, pests and diseases of crops as well as reproductive system in plants. However, teaching strategies, students' attitude, inadequate learning resources and students' learning habits were the reasons given by students for the perceived difficulty of the topics. According to the survey, SS II students perceived that some biological topics were difficult and some were not. It was suggested that integrating biological concepts applied in daily life and provision of adequate and functional resources should be made available. The finding also supports Ivowi (2009) who discovered that sex didn't significantly affects the understanding of physics concepts. The findings of this study disagree with those of Njoku (2004) and Isa (2005) who found that there exist gender differences in science achievement in the schools. According to the findings of the study, students provided some reasons for their assessment of difficult Biology topics. They attributed the perceived difficulty of the topics to abstractness, complexity, misconception of topics, unavailable instructional materials, bad attitude of teachers towards teaching, lack of practical classes and poor students study habits. This finding is in consistent with the findings of Zeidan, (2010); which cited the nature of science and its teaching techniques, as well as the biological level of organization and the abstract level of the concepts as causes for difficulty in learning biology.

Loujane Gray Yutting Radaza - (Mero Caraga State University, 2022), "Development of Content and Language Integrated Learning-Based Instructional Material in Cell Biology". The purpose of the study was to develop content and language integrated learning Based instructional material in cell biology. Specifically, this paper aimed to determine the least learned competencies in cell biology, language difficulties used in science, instructional materials based in CLIL designed for teaching Cell Biology in Primary Schools, and a significant difference between the scores of the students before and after the implementation of the instructional materials. One Hundred Eighty primary schools, grade 7 students were randomly chosen as the participants from the 3 participating schools. Descriptive Statistics such as frequency, percentage, and weighted mean were employed in the data analysis. The result shows that among of the least learned competencies Cell Function has the lowest mean of 5.55 with a standard deviation of 1.53, Cell Organelles with a mean of 5.55 with standard deviation 1.70 and Cell Structure has the highest mean of 6.05 with standard deviation of 1.435 respectively. 96% of the respondents who were questioned about their language difficulties to learning science believed that vocabulary was a issue. On the other hand, 65% believed that dialect differences made it difficult for them to learn science. While 52 % believe in no clear speech as a factor contributing to the difficulties in learning science. The mean of 8.04 of the students' scores recorded after the implementation of the instructional materials contrast to the mean of 5.82 before its implementation. It could be observed that the mean score after the implementation of the instructional materials is higher by 2.22. This would suggest that after using the instructional material, the students' results improved. Hence, there is a significant difference between the scores of the students before and after the implementation of the instructional material. It could be implied that instructional materials potentially help the students understand the science cell biology topic.

Chotirose Srithep, Thasuk Junprasert, Kun Silprasit, Chanyah Dahsah, "High School Science Students' Difficulties In Constructing Scientific Explanations In Biology", the objectives of science classrooms are to assist students in developing their scientific literacy as citizens and to encourage greater public knowledge in a world that is reliable on science-and-technology. Students must be able to analyze the evidence and proof offered in news articles, e-magazines, and other contents in order to be scientifically literate citizens, especially in the age of the 21st century. In addition, to communicate and

persuade others, students should also be able to create their own scientific explanations with suitable claims and reasons. Especially for science stream students, constructing scientific explanations becomes an essential practice to scientific inquiry. This study used an open-ended test to examine how high school science students developed their scientific studies. The students were expected to submit scientific data for the test items, which contained information regarding energy flow in various ecosystems, and were asked to write scientific explanations using data as evidence, to support their explanation with relevant scientific reasoning that they acquired in biology class to support their answer. In this study, 72 students from two sciences for grade 10- 29 female and 43 male students were involved. According to the finding, students faced difficulties in constructing scientific explanations in two issues. Firstly, the students could not provide appropriate and sufficient evidence to support their claims. Secondly, they did not support their claims with scientific reasoning, but they often used their opinions to support the claims. The findings showed that science schools should assist students in making effective use of evidence and reasoning if they are to succeed in improving their practice of providing scientific explanations. According to the results, 70% of the students were able to present a convincing argument. However, majority of the students faced difficulties in supporting the claims with evidence; only about 19% could provide appropriate and sufficient evidence to support their claims. Scientific reasoning was the most challenging component in writing scientific explanation for the students; most of them, 82% were unable to provide reasoning that indicates connection between evidence and claim. In general, most students failed to develop an effective scientific justification, which is in line with other findings. The study also found that the students often used their previous experience or opinions to support their claims without using the evidence given in the prompt. The findings of this research showed that science in order to improve students' practice with scientific explanation, classrooms should place more emphasis on supporting students use of suitable and supported evidence as well as scientific reasoning when making inferences from their studies or readings. This paper is a part of the Ph.D. dissertations, The development of the inquiry cooperative learning incorporates with scaffolding scientific explanation activity, of the first author.

Conclusion

From the review of the previous studies, it is clear that work in the field learning difficulties in biology has been done in India as well as abroad. It can be concluded from the previous studies that students perceived some topics as difficult. Moreover, hands-on and mind-on strategy, integrating biological concepts to daily life of students is suggested. Also, self-regulated learning strategies that would help them to attain high academic performance.

The findings of the studies also organized the research questions related to the biology topics that the students have difficulties learning, reasons the students have difficulties learning those topics.

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