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Stake holders Attitude Towards The Subject Of Biology At Secondary School Level

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ABSTRACT

This study intended to assessthe attitude of stakeholders towards theSubject of Biology at secondary school level.The objective of the study was,to find out the attitude of students towards Biology subject at secondary level. The study was descriptive in nature and was carried out in district Lakki Marwat. The students of the class 10th of Govt. Girls High School of district Lakki Marwat was selected as the samples of the study. The attitude scale was used by the researcher to find out the attitude of students towards biology subject. The students were divided into positive, negative and neutral groups on the basis of mean categorization the mostly students come into positive category, which means that they have positive attitude towards biology subject.

Key words: Biology, stakeholders, attitude, secondary level.

INTRODUCTION

Biology is one of the elective subjects in the Key Learning Area of Science. It will provide a range of balanced learning experiences through which students develop the necessary scientific knowledge and understanding, skills and processes, values and attitudes embedded in the 'Life and Living' strand and other strands of science education for personal development and for contributing towards a scientific and technological world. In order to make the study of biology exciting and relevant, it is suggested to introduce the learning of biology in real life contexts. The adoption of diverse learning and teaching strategies, and assessment practices is intended to stimulate interest and create motivation for learning among students with a range of abilities and aspirations.

Nunly (2002), a biology teacher, carries out brain-based learning researches and curriculum development studies at the University of Utah. However, no meta-analytical study has been done either in our country or in any other country to reveal the effectiveness of brain-based learning on academic achievement from a broader point of view. With regard to learning and teaching, it seems that brain research has a long way to go. When it becomes clearly defined how knowledge is formed, organized, and stored in the brain, it is certain that there will be fundamental changes (Soylu, 2004).

The phrases of brain-based learning are the ones that make learning meaningful and permanent (Hasra, 2007).Relaxed Alertness: It means to create the optimal emotional and social climate for learning. A challenging learning environment with minimal threats should be provided (Gülpınar, 2005) Orchestrated Immersion: It refers to a students' concentration on the contents they encounter. They will have to use their memory to explore the content when wholeness and correlativity are available (Caine & Caine, 2002). Super learning techniques provide a tool for learning new things, and also utilize an integrative approach by incorporating both the left and right hemispheres of the brain because it allows great amounts of information to be retained in a short amount of time. Super learning is a set of a technique which helps to accelerate learning and to obtain best results. Few lessons are based only on suggestopedia, but it did not always show good results. Basically super learning is designed to improve the learning process and to remove the learning barriers by stimulating both hemisphere of brain which is not used in traditional teaching practices. In traditional classroom environment the verbal linguistic and logical mathematical intelligence are given great importance, the researcher focus was to investigate and find out the student's attitude towards the Biology subject at secondary school level.

Statement of the problem

It is very important to know the attitude of students towards any subjects because the interest of the students all most play a pivotal role in the development of any teaching learning process, so in this regard the researcher focus the study to measure the attitude of stakeholders towards the biology subject at secondary level

Research Objective of Study

The main objective of the research study was:
To investigate the attitude of students towards Biology subject at Secondary level.

Research Question of the study

What is the attitude of stakeholders towards biology subjects at secondary level?

Significance of study

1. The study may give the clear picture of the present day situation of the educational interest of students.
2. Result may give a base to our educational planner's and supervisor for future planning's.
3. Study may be helpful for the selection of subject at secondary school level.

LITERATURE REVIEW

What is biology?

Biology is the natural science that studies life and living organisms, including their physical structure, chemical processes, molecular interactions, physiological mechanisms, development and evolution. Despite the complexity of the science, there are certain unifying concepts that consolidate it into a single, coherent field. Biology recognizes the cell as the basic unit of life, genes as the basic unit of heredity, and evolution as the engine that propels the creation and extinction of species. Living organisms are open systems that survive by transforming energy and decreasing their local entropy (Davies, PC; Rieper, E; Tuszynski, JA 2013). To maintain a stable and vital condition defined as homeostasis. (Modell, Harold at all 2015) Sub-disciplines of biology are defined by the research methods employed and the kind of system studied: theoretical biology uses mathematical methods to formulate quantitative models while experimental biology performs empirical experiments to test the validity of proposed theories and understand the mechanisms underlying life and how it appeared and evolved from non-living matter about 4 billion years ago through a gradual increase in the complexity of the system. (Howell, Elizabeth 2014).

Branches of Biology

- Botany: It deals with the study of plants.
- Zoology: It deals with the study of animals.
- Microbiology: It deals with the study of micro-organisms.
- Taxonomy: It deals with the identification nomenclature and classification of the living organisms.
- Morphology: It deals with the study of external structure and form of living organisms.
- Anatomy: It deals with the study of the gross internal structure of living organisms with naked eyes.
- Histology: It deals with the study of the minute structures of the tissue with the help of microscopes.
- Cytology: It deals with the study of form and detailed structure of individual cells.
- Physiology: It deals with functioning of the organisms E.g. Digestion, excretion, growth etc.
- Embryology: It deals with the study of changes or events leading to fertilization and development of embryo.
- Ecology: It deals with the study of changes or events on environment that influences the living organisms.
- Evolution: It deals with the study of modern form of organisms from primitive and simpler forms.
- Genetics: It deals with the study of heredity and variation in living organisms.
- Paleontology: It deals with the study of life at it exists in the past, based on the fossil remains of prehistoric organisms.
- Anthropology: It deals with the study of origin, development, cultural and social condition and customs of present and past races of mankind.
- Exobiology: It deals with the study of possibility of life in outer space.
- Cryobiology: It deals with the study of effects of life at very low temperature.
- Phylogeny: It deals with the evolution of an organism.
- Ontogeny: It deals with the study of organism's course of development starting from the embryo.
- Molecular Biology: It deals with the study of nature and arrangement of molecules and their interactions that control and bring about various activities of protoplasm E.g. structure and functions of DNA and RNA.
- Karyology: It deals with the study of Nucleus.

Importance of Biology

Biology is one of the elective subjects in the Key Learning Area (KLA) of Science. It will provide a range of balanced learning experiences through which students develop the necessary scientific knowledge and understanding, skills and processes, values and attitudes embedded in the 'Life and Living' strand and other strands of science education for personal development and for contributing towards a scientific and technological world. In order to meet these challenges, the Biology Curriculum, like other science electives, will provide a platform for developing scientific literacy and building up essential scientific knowledge and skills for life-long learning in science and technology. Through the learning of biology, students will acquire relevant procedural and conceptual knowledge to help them to understand many of today's contemporary issues, and they will become aware of the interconnections between science, technology and society. In addition, students will develop a respect for the living world, an attitude of responsible citizenship and a commitment to promote personal and community health.. Biology is a rapidly advancing science with huge amounts of information about living organisms. It is always confused as a subject of memorizing numerous unrelated facts. In this curriculum, it is hoped that students will acquire a limited body of facts and at the same time develop a broad, general understanding of biology principles and concepts. In order to make the study of biology exciting and relevant, it is suggested to introduce the learning of biology in real life contexts. The adoption of diverse learning and teaching strategies, and assessment practices is intended to stimulate interest and create motivation for learning among students with a range of abilities and aspirations.

Biological classification (taxonomy)

Biological classification (taxonomy) aims to simplify and order the immense diversity of life into coherent units called taxa that have widely accepted names and whose members share important properties. It synthesizes information concerning a great variety of characters (e.g., morphological; molecular: genes, metagenome, and metabolome; etho-ecological). There is currently no consensus among the world's taxonomists concerning which classification scheme to use for the overall hierarchy of life, in part because of the confusion resulting from Hennig's redefinition of previous terminology of classification, which has not been universally accepted; the separate goals of clarification and classification and conflicting or unresolved evidence for phylogenetic relationships. The continuing advances in the use of specialized analytical tools from many different fields and their resulting conclusions and assumptions require regular updates as advances in knowledge are made.
Biological classification can integrate diverse, character-based data in a phylogenetic framework, which allows a broad user community to utilize the disparate knowledge of shared biological properties of taxa. Phylogeny is, therefore, the basis for these biological classifications but there is still strong debate over their accounting for evolutionary divergence or information content other than the branching pattern (Haq, Syed2009).

While the type of classification to be used to support further exploration and analysis of any biological scenario may be important, it is not the subject of this paper. The proposed classification does not address detailed phylogenetic questions and, while hierarchical and reflective of phylogeny, is not itself a phylogenetic tree. The aim of this classification is to be a pragmatic means of managing the ever-increasing knowledge of the diversity of life, its relationships, characteristics, and properties. Indeed, the past two decades have witnessed an explosion in biodiversity research and informatics, emphasizing the need for a quality list of accepted scientific names of the more than 1.9 million described living species (Huff, Toby 2007). And for greater consensus to classify them at higher taxonomic ranks. Since 2001, Species 2000 and the Integrated Taxonomic Information System (ITIS) have worked with their respective contributors to complete a comprehensive species list, called the Catalogue of Life (CoL). The CoL Annual Checklist already contains more than 1.6 million valid or accepted species names provided by more than 140 taxonomic databases involving more than 3,000 taxonomists (Zaghloul El-Naggar2007) More than 82% of the global species databases are provided at the rank of class or below (includes 1.3 million species), and more than 63% are provided at the rank of order or below (includes 1.0 million species). Owing to the heterogeneity in higher level classification among the contributed databases, the CoL managers sought a practical and coherent hierarchical classification that could serve as a framework for data integration. Here we explain the rationale behind the consensus higher level classification that we propose for CoL use.

Our goal, therefore, is to provide a hierarchical classification for the CoL and its contributors that (a) is ranked to encompass ordinal-level taxa to facilitate a seamless import of contributing databases; (b) serves the needs of the diverse public-domain user community, most of whom are familiar with the Linnaean conceptual system of ordering taxon relationships; and (c) is likely to be more or less stable for the next five years. Such a modern comprehensive hierarchy did not previously exist at this level of specificity. In this sense it summarizes overarching aspects of the tree of life, including both paraphyletic and monophyletic groups, both being important in facilitating meaningful communication among scientists and between the scientific community and society.

The most recent higher level classification to this level was published more than 30 years ago, before the advent of modern molecular analysis (Hoodbhoy, Perez 2006). Beyond the immediate use for CoL, the hierarchy is valuable as a reference for taxonomic and biodiversity research, as a tool for societal communication, and as a stable classificatory "backbone" for biodiversity databases, museum collections, libraries, and textbooks, to name a few applications.

Approach Biological classification

When Linnaeus introduced his novel "system of nature" in the mid-18th century, he recognized three kingdoms of nature: Regnum Vegetabile (plants), Regnum Animale (animals), and Regnum Lapideum (minerals) that has long since been abandoned. However, as is evident from the title of his work, he introduced lower level taxonomic categories (named class, order, genus, and species), each successively nested within higher ranked categories. Linnaeus' system has proven to be robust for more than 250 years (see the comprehensive discussion and suggestions for dealing with potential conflicts in (Vences M 2013), In modern-day classifications, the starting point for botanical names is Linnaeus' Species Plantarum (Granta 2002), and for zoological names it is the tenth edition of the SystemaNaturae(Pitock, Todd 2007). Since Linnaeus, the expansion of knowledge and the increase in the number of described species has required an expansion of the number of hierarchical levels (ranks) within the system. The categories of family and phylum (or division) were introduced in the early 19th century and many intermediate categories have been added since. There is currently little agreement about the general names for categories above that of kingdom; here we use super kingdom rather than empire or domain. In addition, there are three separate codes that govern the assignment and use of scientific names, each with different requirements and terminology and consequences for their classifications. For algae, fungi, and plants (ICN: International Code of Nomenclature for algae, fungi, and plants), the principle of priority does not apply above rank of family; for animals (ICZN: International Code of Zoological Nomenclature), priority does not apply above the family-group ranks; and for prokaryotes other than Cyanobacteria (ICNB: International Code of Nomenclature of Bacteria), only the categories ranked as class and below are covered by the code. A recent paper by the International Committee on Bionomenclature compares terminology among six current nomenclatural codes and makes recommendations for their use in improving communication

In 2005, on behalf of the International Society of Protistologists, presented a nested eukaryote-only cladification that used the names of six supergroups—Amoebozoa, Opisthokonta, Rhizaria, Excavata, Chromalveolata, and Archaeplastida (= Plantae)(NidhalGuessoum 2010)as the highest ranked eukaryote groups. Their schema was updated in 2012 with Rhizobia and

Chromalveolata replaced by SAR plus four small hacrobian groups. Although these taxa are nested, and ranked by a "bulleted" system, the researchers avoided the use of Linnaean higher category names (phylum, class, order, family) that would have more usefully denoted rank. Insofar as the nested groups comprise a mix of taxon names based on priority (i.e., according to the year of introduction of the name), many individual genera as well as traditional taxon names (family through class) end up having the same rank in the hierarchy, while at the same time having different suffixes or none at all. The ranks assigned therein often seem to reflect our present partial ignorance of relationships more than careful assessment of relative phenotypic disparity as in Linnaean taxonomy. This is very confusing when these "group names" (genus to kingdom) are used in isolation without regard to phylogenetic relativity. Two of the great benefits of Linnaean-ranked categories and their standardized suffixes are that they instantly relativize taxa that are otherwise unknown to the non-specialist and also indicate the relative degree of phenotypic distinctiveness amongst groups. Therefore, uses the standard formal categories, as it is intended to be simultaneously pragmatic and informative of both evolutionary relatedness and relative phylogenetic subordination. A classification should be biologically well-grounded and widely useful. In its simplicity, it provides less detail about relationships than a complete phylogeny but is still congruent with it Our classification is not intended to compete with a clarification such as both are valid ways of ordering the living world—but we would argue that their's is less comprehensible to many in the public-domain user communities.

These actual complexities of phylogenetic history emphasize that classification is a practical human enterprise where compromises must be made We have therefore named only groups generally considered to have had a monophyletic origin, even though some of them may be paraphyletic (i.e., do not include all descendants of their last common ancestor) and others, e.g., Euglenozoa, Rhizaria, Cercozoa, include subgroups (such as Euglenophyceae, Chlorarachnea, and Paulinella) that evolved by the symbiogenetic merger of two fundamentally different lineages (NidhalGuessoum 2010) while others have had infusions of genes from elsewhere (NidhalGuessoum 2010) and therefore do not conform to any purely formal definition of monophyly. We have not adopted the view that one should never accept paraphyletic groups in a classification but rather have evaluated each case of paraphyly on its practicability and usage. In some cases (e.g., classical bryophytes) we accepted the splitting of paraphyletic taxa into holophyletic groups (groups with a monophyletic origin that also include all descendants of their last common ancestor, i.e., clades). In others we retained ancestral (paraphyletic) taxa when it seemed beneficial to do so (e.g., Prokaryota, Protozoa, Crustacea, Sarcopterygii, Reptilia). For practical purposes we treat Proteobacteria and Cyanobacteria as holophyletic phyla even though both exclude their mitochondrial and chloroplast descendants, neither of which is now a bacterium but an evolutionarily chimaeric cell organelle. We have conservatively retained several groups where evidence for paraphyly or holophyly is contradictory, such as Archaea (Archaebacteria).

A panel of experts representing the major taxonomic disciplines was convened to review, revise, and update the existing incomplete CoL hierarchy. These authors consulted more than 200 sources most of which were from recent taxonomic publications and websites. The product is a current and practical classification that meets the panel's established goal. In achieving a consensus, the panel was required to make some compromises that may require future revision as the related issues are resolved. While all of these individuals made contributions to the hierarchy, not all necessarily endorse every aspect of it. The CoL classification will undergo review and revision at five-year intervals to consider changes as necessary.

RESEARCH METHODOLOGY

Design of The study was descriptive in nature; the researcher was used self-madequestionnaire tocollect the data from the stakeholders.The Study Population was

10th class science group students. Only 60 students from science group of class 10th were randomly selected the sample of the study.

Table of Sample:

Respondents	Frequency
110TH CLASS SCIENCE GROUP STUDENTS	60

To investigate the student's attitudes towards the subject of Biology the self-structured questionnaire was used which was on five point Likert scale comprises of 20 items. The validity of the questionnaire was done through subject experts after checking the content of the items wording phrases then the researcher was made required modifications in the items in the light of expert's suggestions. Reliability of the instruments was done through statistical procedure than the Crone Bach alpha was used to know the consistency of the items, so the value of Crone Bach alpha was less than 0.85 the items were deleted.The researcher distributed the questionnaire among the students himself and duly filled questionnaire return back by the students. The investigator used the SPSS 22.0 software for analyzing and organizing the data, the data counting expressed through Number of respondent's percentage and measurement data were expressed through mean and standard deviation.

RESEARCH RESULTS

Table#1Item wise Analysis of student'sattitudetowards Biology subject through Percentage

Statement	Level (frequency, percentage)					Mean	S.D
	SDA	DA	UD	A	SA		
Mathematics is useful in other subjects	1 (1.6)	0 (0)	1 (1.6)	3 (4.7)	55 (85.9)	4.8	0.605
Understanding mathematics is important to me	2 (3.1)	7 (10.9)	0 (0.0)	29 (45.3)	22 (34.3)	4.03	1.07
Mathematics is boring	35 (54.7)	5 (7.8)	3 (4.7)	7 (10.9)	10 (15.6)	2.20	1.61
I can usually manage the mathematics	4 (6.3)	13 (20.3)	4 (6.3)	34 (53.1)	5 (7.8)	3.38	1.12
Mathematics is useful in a different place	2 (3.1)	0	2 (3.1)	28 (43.8)	28 (43.8)	4.33	0.837
I like learning mathematics	1 (1.6)	6 (9.4)	7 (10.9)	7 (10.9)	39 (60.9)	4.28	1.12
I find mathematics difficult	14 (21.9)	17 (26.6)	7 (10.9)	15 (23.9)	7 (10.9)	2.73	1.37
do about mathematics after school	1 (1.6)	2 (3.1)	6 (9.4)	32 (50.0)	19 (29.7)	4.10	0.83
Mathematics' subject is relevant to today life.	3 (4.7)	1 (1.6)	2 (2.1)	20 (31.3)	43 (53.1)	4.35	1.00
I look forward to doing mathematics'	1 (1.6)	11 (17.2)	5 (7.8)	16 (25.0)	27 (42,2)	3.95	1.19
I am good in mathematics	1 (1.6)	2 (3.1)	4 (6.3)	17 (26.6)	36 (56.3)	4.41	0.88
I will avoid mathematics' once I leave school	23 (35.9)	5 (7.8)	10 (15.6)	7 (10.9)	15 (23.4)	2.76	1.65
I can learn mathematics' well	12	22	4 (6.3)	6 (9.4)	16 (25.0)	2.86	1.53

without really understanding it	(18.0)	(34.4)					
I find mathematics interesting	4 (6.3)	2 (3.1)	2 (3.1)	19 (29.7)	33 (51.6)	4.25	1.12
I can do my mathematics work	10 (15.6)	6 (9.4)	6 (9.4)	29 (45.3)	9 (14.1)	3.35	1.32
I plan to continue studying mathematics	9 (14.1)	6 (9.4)	6 (9.4)	27 (42.2)	12 (18.8)	3.45	1.33
I want to make sense of what I'm learning in mathematics	4 (6.3)	5 (7.8)	6 (9.4)	15 (23.4)	30 (46.9)	4.03	1.24
Learning mathematics is important for getting a job in the future	4 (6.3)	1 (1.6)	1 (1.6)	25 (39.1)	29 (45.3)	4.23	1.06
I enjoy studying mathematics	2 (3.1)	4 (6.3)	1 (1.6)	11 (17.2)	42 (65.6)	4.45	1.04
I could manage with a harder mathematics course	5 (7.8)	7 (10.9)	1 (1.6)	26 (40.6)	21 (32.8)	3.85	1.25

Table#1 includes the item wise analysis of the interest attitude scale which was developed by researcher to find out the attitude of the learners towards the biology subject at secondary level. It was observed that out of total respondents most of the respondents were of the view that they are more attached to biology as compared to other subjects, because the mean value is 4.733 and standard deviation is 0.778. Results also explaining that out of total respondents 96% have the positive attitude towards the subject. Majority of the respondents learn things quickly in biology subject because, the mean value is 4.250 and standard deviation of 1.322. Results also explaining that out of total respondents 86% have the positive attitude towards the statement. respondents were feel that nature and biology is not strange for them because, the percentage difference of disagreed respondents is 48.4and agreed respondents is 24.7 with this statement results also shows that mean score value is 2.583 and standard deviation is 1.587. Out of total respondents 46.7% of the respondents were of the view that Biology lessons are not difficult for them. The results of the mean score 2.700 and standard deviation is 1.54. positive answer to the statement 'Biology helps in development of my conceptual skills' because, 70% respondents were agreed with this statement the mean value is 3.91 and standard deviation is 1.16. It is found that respondents were like to have biology lessons more often because, more of the respondents 90% are agreed and strongly agree with this statement, and the results of mean score is 4.45 and standard deviation is .981. Most of the respondents like learning biology because, mean value is 4.56 and standard deviation 1.14. So the total percentage 87.7%, mean categorization students have positive attitude towards biology subject for learning. Good numbers of the respondents were show negative response to the statement I find biology difficult because, the negative percentage of this statement is 60% and mean score is 2.3 and standard deviation is 1.51. Large amount of the respondents was of the view that they were not bored during biology lessons, because the mean value is 1.95 and standard deviation is 1.40. the percentage difference of this statement is strongly agree 73.3% and 16.7% are agree, which shows that biology subject is not boring for students. Out of total respondents more of the respondents were of the view that progress of biology improves the quality of their lives because, the results shows that mean value is 4.28 and standard deviation is 1.26. Results also explaining that out of total respondents 83.7% have the positive attitude towards the statement. 80% were of the opinion that biology can help in solving many environmental problems because Mean value is 3.96 and standard deviation is 1.19 it means that most of the students were show positive attitude for this statement. Respondent were not agreeing with the statement thatBiology is not important in comparison with other courses because, the 56.7% respondents were not agreeing with and the statement results also explaining that mean value is 2.40 and standard deviation is 1.48 respectively. 48.3% respondents are disagreeing with the statement I make many efforts to understand biology.Therefore,On the bases of percentage and mean score 2.70 and standard deviation 1.53 we can have concluded that biology subject is easy to understand. Most of the respondents were in favor of the statement because, the results of percentage are shows that most of the respondents 73.3% were agree that Biology is important part of our lives. Results also elaborating that the value of mean is 3.80 and standard deviation is 1.53. Some of the respondents are hate biology subject because, they were agreeing with the statement "I hate biology lessons" according to the result mean is 2.06 and standard deviation is 1.54. Results also elaborating that 20% respondents were agreeing and 13.3% were disagree. Mostly respondents find biological processes very interesting. The interest of respondents in biological processes is clear from the mean score is 4.08 and standard deviation is 1.29 and the percentage is 80.6% which explain that biological processes is very interesting. biology subject is one of the easiest courses for mostly respondents because, results shows that out of the total 83% respondents were agree with the statement results also shows that the mean value is 4.26 and standard deviation is 1.10. Table 4.1 also explains that majority of respondents 81.6% were have the opinion that "they are good at biology" the results of mean score is 4.151and standard deviation is 1.00. large amount respondents were thought that "they enjoy studying biology" because the results also reflect that 91.6% respondents were in the favor of this statement the mean score is 4.55 and standard deviation is .964. And majority of the respondents were in the favor that answer of the biological question is easy, because the percentage of agreed respondents is 85%. The results show that mean score is 4.10 and standard deviation is 1.33.

CONCLUSIONS:

The following conclusions were drawn from the findings of the study:
Item wise analysis of the attitude scale, the researcher finds out the attitude of students towards biology subject, the students were divided into positive, negative and neutral groups on the basis of mean categorization. Mostly students come into positive category, which means that they have positive attitude towards biology subject.

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