

# Secondary School Teachers Views on Biological Science Textbook of Class IX with Respect to Gender and Experience

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Text-books are the source for providing the necessary prescribed content material to the student of a particular class. (Garte, S.P. and Despande, L.1997). The text-books have to realise the aims and objectives of science instruction and the aims and objectives of the course in general (D. Baker and Piburn M. 1991). The text-books of science have to meet the individual as well as social requirements. Furthermore, research has shown that using well designed textbooks or curriculum material can positively influence teacher beliefs and practices, aiding curriculum implementation (Davis, 2009; Newton and Newton, 2006; Davis, 2003a; Izsak and Sherin, 2003; McKenney, 2001) So, the contents of the science text-books should be such that it can fulfil the social as well as individual needs. Now-a-days our society is suffering severely from environmental problems like 'Air Pollution', 'Water Pollution', 'Radio Active Pollution' etc. Their effect causes 'Global Warming', 'Green House Effect', 'Acid rain', 'Ozone layer depletion' etc. which are dangerous for living as well as non-living bodies

Skills like observational skill, experimental skill, constructional skill, problem solving skill and drawing skill can be taught to students through science teaching. Science teaching through botanical gardens, science parks, science museums are very exciting and challenging. Multichannel television and internet have provided sources of high quality of information and knowledge to students. It is fully justified to include science as one of the compulsory subjects in schools because of its multifarious values such as intellectual value, utilitarian value, vocational value, cultural value, moral value, aesthetic value, value of training in the scientific method, value of inculcation of scientific attitude and psychological value.

The textbook is only a source of potential learning. What the students actually learn from textbooks are mediated by the school context (teacher, peers, instruction, assignments) (Mesa, 2004). In their role as facilitators, textbooks can be used with a wide range of activities, ranging from individual to group activities and from lectures to inquiries (House,2000); from introductory activities to application practice (Franssen, 1989a). The textbook's role as facilitator can extend the learning opportunities from the classroom where the teacher acts as facilitator, to the home where quality printed material can facilitate learning and guide learners through appropriate learning activities (Ogan-Bekiroglu, 2007) and even direct them to resources in their own environments.

Different writers have investigated the advantages and disadvantages of textbooks (Lamie, 1999; Richards, 2001; Richards & Renandya, 2002; Shafiee Nahrkhalaj, 2012; Ur, 1996). In spite of various limitations in this area, textbooks are a very central tool for the teachers in teaching a science. They supply the teachers the opportunity to present more time to other worthwhile pursuits and they can reduce potential professional overwork. Using textbooks has some disadvantages. Teachers become less creative and over use the prescribed textbooks. Although some teachers function well without the use of textbooks, studies worldwide show that textbooks are routinely used in classes (Lemmer, Edwards and Rapule, 2008; Ogan-Bekiroglu, 2007; Pepin and Haggerty, 2003; Kesidou and Roseman, 2002;) and that the majority of teachers use textbooks in their planning and presentation of instruction (Arriassecq and Greca, 2007; Klassen, 2006). Some teachers even use a variety of textbooks to provide them with examples of high-quality teaching strategies, activities and assessment tasks (Newton and Newton, 2006; Henson, 2004; Pepin and Haggerty, 2003; Izsak and Sherin, 2003). A qualified and experienced teacher will use, supplement and discard portions of the textbook according to his or her learners' needs. A very good teacher can use almost any textbook to good advantage. The study is aimed to find out the secondary school teachers views about the physical and academic aspect of biological text book with reference to gender and experience.

### **Methodology**

For the present study quantitative approach is used. The Board of Secondary Education Odisha has divided in to 5 zones namely Cuttack, Sambalpur, Berhampur, Bhubaneswar, Baleshwar. The researcher taken the sample. i.e., science teachers from Cuttack zone only. The researchers being a science teacher and teacher educator it is very helpful to conduct the survey in Cuttack zone only. In the first stage of the study, the document analysis of the class-IX Biology textbook published by the Ministry of National Education was conducted (Yıldırım & Simsek, 2005). In doing so, the textbook was attentively read. The misconceptions, question types, content, visual materials and measurement-assessment techniques that appear on the textbook were evaluated. In the second stage, survey was conducted. A self-made questionnaire having 5-point Likert scale was used in this study. One hundred fifty teachers selected randomly from Cuttack zone for collection of data. Also, the 50 participants form Cuttack municipality, 50 teachers from Dhenkanal district who are teaching biology for class-IX and 50 high school teachers from Kendra Para district who are teaching biology for class-IX were participated in this study. The participants offered their views on the textbook's approach towards learning, its readability, reliability, and all the other criteria. Moreover, the textbook's alignment with the nature of science and its usability in instructional processes was questioned with the participants. A pilot study has been conducted for reliability and validity of the tool.

### **Findings**

The biology (Science Part- II) textbook for class-IX is JIBA BIGYAN. The book has been authorized as per the syllabus of the Board of Secondary Education, Odisha, It has been written by Prof. Dr Tarini charan Kar, Prof. Pradeep Kumar Mohapatra, Dr Bijaya Kumar

Mohanty. Dr Kishor Chandra Mohanty, Mr. Durga Prasad Das and Dr. Rajkishore Panda. The year of publication was 2016 and printed at Surekha Prints and Laxmi web prints Cuttack.

Analysis stands for process of breaking or separating a thing into its constituent smaller parts. The textbook of biology of class-IX consists of following chapters. Chapter-1- Biodiversity, Chapter-II- Cell and its Organization, Chapter-III- Tissue System, Chapter-IV – Improvement of Food Resources, Chapter-V- Diseases and its Treatment and Chapter-VI is Natural Resources and its pollution.

The name of the Chapter I of this book is bio-diversity. It comprises of introduction, basic issues of scientific naming, International Code of Biological Nomenclature (ICBN), basis of classifications, hierarchy of classifications, five kingdom classifications as Monera, Protista, fungi, plantae and animalia, classifications of plantae, animalia, classification of animalia like non chordate, protochordate, vertebrata, non-vertebrata. Plants are divided into five groups such as thallophytes, bryophytes, pteridophytes, gymnosperm and angiosperms. Animals are divided into ten groups: porifera, coelenterate, Platyhelminthes, nematodes, Annelida, Arthropoda, Mollusca, Echinodermata, protochordate and vertebrata. There is a chart on classification of animalia. Before end of the chapter what we learn and work for you is mentioned in the text book. At the end exercises also given in the biological science text book.

The name of Chapter- II is “cell and its organization”. It comprises a very good introduction with cell is the structural and functional unit of life. What are living organisms made up of? what is a cell made up of and the structural organization of a cell. In this chapter the structure of cell which is encircled by cell membrane inside it there is cytoplasm and nucleus is present. The cell organelles like cell wall, mitochondria, vacuoles, endoplasmic reticulum, Golgi bodies, ribosomes, lysosomes, plastids, chromosomes and nucleus. Difference between prokaryotic cell and eucaryotic cell, plant and animal cell is discussed. most plant cells contain plastids called as chromoplasts and leucoplasts. Chromoplasts contain chlorophyll pigment are called chloroplasts which performs photosynthesis. In plant cells there is cell wall but in animal cell it is not found. at the end the complete overview of chapter is provided. In last parts there are some activities are discussed then questions are designed.

The third chapter of this textbook is “Tissue system”. It describes briefly the introductory part in which tissue is referred as a group of similar cells in structure and performing a single function. In this topic plant tissues are classified into two main types -meristematic and permanent. on the basis of position, it is divided into three types apical meristem, lateral meristem and intercalary meristem. On the basis of size, position and growth, meristem is divided into four times i.e., primary and secondary meristem. In this topic permanent tissue is classified into simple and complex tissue. Simple tissue is classified into parenchyma, collenchyma and sclerenchyma. Complex tissue is divided into xylem and phloem, xylem is comprised of four types, such as tracheid, vessel, xylem parenchyma, and xylem fiber, whereas phloem is classified into four types, such as sieve tube, companion cell, phloem parenchyma, phloem fibre. Then animal tissue is described and classified by four categories, such as epithelial tissue, connective tissue, muscle tissue, nervous tissue. There is a chart is describing types of tissue is given: depending on

shape and function epithelial tissue is categorized as squamous, cuboidal, columnar, ciliated and glandular. Different types of connective tissues in our body which include areolar tissue, adipose tissue, bone, tendon, ligament, cartilages and blood are described vividly. Different types of muscle tissues like striated, unsatiated and cardiac are discussed. Nervous tissue is made of neurons which receive and conduct impulses in our body. Some activities are given in this chapter. The figures of parenchyma, collenchyma, sclerenchyma, and figures of complex tissues are designed, but the figures are small in size, colorful figures and labelling of figures are not provided. Appropriate and interesting activities and experiments are not given for practical purposes. In last part objective and subjective questions are given.

The chapter-IV named improvement of food resources, Introduction about food resources is described briefly: crop yields and their improvements is given much importance. In this chapter crop variety improvements, sources of nutrient supply, manures and fertilizer are the main sources of nutrients supply to crop are focused. Detail description of fertilizer and manure are discussed: It gives emphasized on organic firming, tissue culture, mixed firming, inter cropping and crop rotation. Disease control of plant varietal improvement is required for higher yield, good quality, shortening the maturity duration and wider adoptability is discussed. Animal husbandry mainly focused on firm animal's new proper care and management like breeding, shelter, feeding and in this chapter disease control is stressed much. Diary on account of animal husbandry described, though the figures of various cows are given but it is blurred and not colorful so it does arouse interest of student. For the enrichment poultry firming is done to increase the production of domestic fowls. It includes both egg and broiler for poultry meat. For the better production of egg and poultry meat cross breeding is done between Indian and exotic breeds for hybrid fowl. Pisciculture is described briefly, how it enhance production of fish and they can be cultured in both marine and inland echo system of aquaculture is also discussed. Marine fish is Captured by fishing net which is guided by latest technology like echo-sounder and satellite. Now a days for enhancement OF pisciculture, composite fish culture system is given highest importance. A brief discussion on done bee- keeping which is used to get honey and wax. Activities for the students is given in the books are not arousing interest in the mind of the student. Then summary is described briefly and in the last part various types of question are given as per the mental label of the student. Before the end the summary is discussed in detail. The chapter is too large, which can be distributed as two units, so that students can easily cover it.

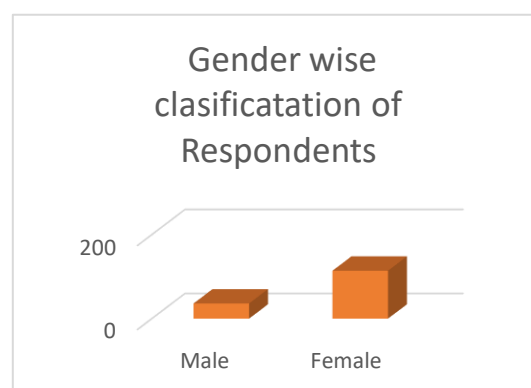
Chapter- V comprises the chapter disease and its treatment, The introductory part is discussed health and how we maintain good health. And the significance of heath is focused both personal and community health are described and distinction between healthy and disease free is out lined. Diseases and its causes are focused. What do you mean by acute and chronic disease and what is the cause of infectious and not-infectious causes? What are the agents, means of spread and principles of prevention measures are taken for infectious diseases? Principles of prevention for healthy life is better than successful treatment. Communicable diseases can be prevented by using immunization through vaccine or any other means. It is discussed that effective prevention of contagious diseases in the comm unity regards that everyone should have access public

hygiene and immunization in the last part of this topic, there are few communicable diseases like typhoid, diarrhea, malaria, hepatitis, rabies, aids, tuberculosis, and polio are given with reference to its cause symptoms, treatment and how to eradicate the disease is discussed in this chapter. In this chapter only seven pictures are provided which are small in size, blurred, and black and white in color. before the end of the chapter what is learnt by the students is given. There should be a few objective questions arranged in each part of sub-topics.

The name of Chapter-VI is natural resources and its pollution. Introduction is described on natural resources. The classification of natural resources as renewable resources and non-renewable resources are defined in this chapter. In this topic life on the earth depends on resources like air, soil, water and energy from the sun. The air, role of atmosphere, the movement of the air, transpiration, rain, water, soil and its types are described in this chapter. The pollution of air, water and soil is focused. Detailed description of greenhouse effect is discussed in this chapter. How depletion of ozone layer occurs and all the biogeochemical cycles such as water cycle, oxygen cycle, carbon cycle and nitrogen cycle with detailed descriptions of charts are described but the students confused to study so many cycles at one time. No useful activities or experiments are not provided for the purpose of practical. In this chapter a number of projects are provided for the practical knowledge of students. What is learnt from the chapter is minutely discussed. Lastly various type of questions are set for testing the knowledge of students

**Table-1**

Sl No	Profile		No	%
1	Gender	Male	36	24
		Female	114	76
2	Educational Qualification	B.Sc. B.Ed.	95	63
		B.Sc M.Ed.	12	08
		M.Sc. B.Ed.	31	21
		M.Sc. M.Ed.	04	03
		M.Phil., M.Ed.	07	04
		Ph.D.	01	01
3	Experience	Above 10 years	68	45
		Below 10 Years	82	55



**Gender-wise Comparison of Teachers' Opinions about Physical aspects of biological Science Text Book of Class -IX**

<b>Secondary School Science teachers</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>t-Value</b>	<b>p-value</b>
Male	36	154.78	16.57	-1.681	.131
Female	114	136.23	14.43		

The got p-value for Teachers' Opinions about printing quality of biological science text book of female and male teachers of Odisha is actually ( $p > .05$ ) larger compared to the .05 degree of significance. Hence, there's no noteworthy difference between the teachers' opinions about physical aspects of biological science text book of Class -IX of male ( $M = 154.78$ ,  $SD = 16.57$ ) and female ( $M = 136.23$ ,  $SD = 14.43$ ) secondary school teachers of Odisha at .05 amount of significance,  $t(148) = -1.681$ ,  $p = .131$ . Hence the hypothesis -1 is rejected with respect to Physical aspect of class-IX text book.

**Table- Teaching Experience-wise Comparison of Teachers' Opinions about Physical aspects of Science Text Book of Class -IX**

<b>Teaching Experience</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>t-Value</b>	<b>p-value</b>
Below 10 years	68	133.68	12.05	-1.063	.273
Above 10 years	82	142.13	19.27		

The above-mentioned table shows that the acquired p-value for under ten years or even more ten years teaching experience secondary school science teachers of Odisha is actually ( $p > .05$ ) larger compared to the .05 degree of significance. Hence, there's no big difference between the teachers' opinions about physical aspects of biological science text Book of Class -IX of BSE Odisha of under ten years teaching experience ( $M = 133.68$ ,  $SD = 12.05$ ) or even more ten years teaching experience ( $M = 142.13$ ,  $SD = 19.27$ ) secondary school science teachers of Odisha at .05 level of significance,  $t(148) = -1.063$ ,  $p = .273$ . Hence the hypothesis -2 is rejected with respect to Physical aspect of class-IX text book.

**Gender-wise Comparison of Teachers' Opinions about Printing Quality**

<b>Secondary School Science teachers</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>t-Value</b>	<b>p-value</b>
Male	36	137.59	17.75	-1.582	.103
Female	114	123.33	13.45		

The got p-value for Teachers' Opinions about printing quality of biological science text book of female and male teachers of Odisha is actually ( $p > .05$ ) larger compared to the .05 degree of significance. Hence, there's no noteworthy difference between the teachers' opinions about printing quality of male ( $M = 137.59$ ,  $SD = 17.75$ ) and female ( $M = 123.33$ ,  $SD = 13.45$ ) secondary school teachers of Odisha at .05 amount of significance,  $t(148) =$

- 1.582,  $p = .103$ . . Hence the hypothesis -1 is rejected with respect to printing quality of class-IX biological science text book.

**Table- Teaching Experience-wise Comparison of Teachers' Opinions about Printing Quality of biological science Text book**

Teaching Experience	N	Mean	SD	t-Value	p-value
Below 10 years	68	134.75	13.05	-1.003	.265
Above 10 years	82	152.23	14.27		

The above-mentioned table shows that the acquired p-value for under ten years or even more ten years teaching experience secondary school science teachers of Odisha is actually ( $p > .05$ ) larger compared to the .05 degree of significance. Hence, there's no big difference between the teachers' opinions about printing quality of biological science text book of Class-IX of BSE Odisha of under ten years teaching experience ( $M = 134.75$ ,  $SD = 13.05$ ) or even more ten years teaching experience ( $M = 152.23$ ,  $SD = 14.27$ ) secondary school science teachers of Odisha at .05 level of significance, 't (148) = - 1.003,  $p = .265$ . Hence the hypothesis -2 is rejected with respect to printing quality of class-IX biological science text book.

**Gender-wise Comparison of Teachers' Opinions about Organization of Content**

Secondary School Science teachers	N	Mean	SD	t-Value	p-value
Male	36	139.68	18.73	-1.573	.102
Female	114	127.53	14.56		

The got p-value for Teachers' opinions about organization of content of biological science text book of female and male teachers of Odisha is actually ( $p > .05$ ) larger compared to the .05 degree of significance. Hence, there's no noteworthy difference between the teachers' opinions about the organization of content of male ( $M = 139.68$ ,  $SD = 18.73$ ) and female ( $M = 127.53$ ,  $SD = 14.56$ ) secondary school teachers of Odisha at .05 amount of significance, 't (148) = - 1.573,  $p = .102$ . Hence the hypothesis -1 is rejected with respect to organization of content of class-IX biological science text book

**Table- Teaching Experience-wise Comparison of Teachers' Opinions about Organization of Content of biological science Text book**

Secondary school Teachers	N	Mean	SD	t-Value	p-value
Below 10 Years Teaching Experience Teachers	68	163.82	17.50	-3.090	.003
Above 10 Years Teaching Experience Teachers	82	175.00	17.74		

The obtained p-value for mean scores of teachers' opinions about organization of content of biological science text book of under ten years and above ten years teaching experience

of science teachers is actually ( $p < .05$ ) under the .05 level of significance. Hence, there's a tremendous distinction between the opinions about organization of content of biological science text book of under ten years teaching experience ( $M = 163.82$ ,  $SD = 17.50$ ) and above ten years teaching experience ( $M = 175.00$ ,  $SD = 17.74$ ) science teachers of Odisha at .05 level of significance,  $t$  (ninety-eight) = 3.090,  $p = .033$ . The hostile gain scores favor previously ten years teaching experience teachers. Hence the hypothesis -2 is accepted with respect to organization of content of class-IX biological science text book. Therefore, the opinion of above ten years' science teachers found to be differ with compare to the under ten years teaching the experience of science co teachers with respect to about organization of content of biological science text book of class-IX.

### Gender-wise Comparison of Teachers' Opinions about Opinions about Figures, Graphs and Tables

Secondary School Science teachers	N	Mean	SD	t-Value	p-value
Male	36	127.64	19.71	-1.482	.132
Female	114	129.63	15.46		

The got p-value for Teachers' opinions about Opinions about Figures, Graphs and Tables in biological science text book of female and male teachers of Odisha is actually ( $p > .05$ ) larger compared to the .05 degree of significance. Hence, there's no noteworthy difference between the teachers' opinions about the organization of content of male and female secondary school teachers of Odisha at .05 amount of significance,  $t$  (148) = - 1.482,  $p = .132$ . Hence the hypothesis -1 is rejected with respect to opinions of teachers about figures, graphs and tables of class-IX biological science text book

### Table- Teaching Experience-wise Comparison of Teachers' Opinions about Figures, Graphs and Tables of biological science Text book

Secondary school Teachers	N	Mean	SD	t-Value	p-value
Below 10 Years Teaching Experience	68	154.75	18.50	-3.189	.007
Above 10 Years Teaching Experience	82	178.00	18.74		

The obtained p-value for mean scores of teachers' opinions about opinions about figures, graphs and tables biological science text book of under ten years and above ten years teaching experience of science teachers is actually ( $p < .05$ ) under the .05 level of significance. Hence, there's a tremendous distinction between the opinions about organization of content of biological science text book of under ten years teaching experience and above ten years teaching experience of science teachers of Odisha at .05 level of significance,  $t$  (ninety-eight) = 3.189,  $p = .007$ . The hostile gain scores favor previously ten years teaching experience teachers. Hence the hypothesis -2 is accepted with respect to opinions about figures, graphs and tables of class-IX biological science text book. Therefore, the opinion of above ten years' science teachers found to be differ



with compare to the under ten years teaching the experience of science teachers with respect to figures, graphs and tables of biological science text book of class-IX.

### Conclusion

Textbooks play a particularly important role in teaching and learning, and it is all the more important to evaluate their quality systematically. In this study, the investigator has evaluated Science textbooks for class IX & X, as prescribed by BSE, Odisha in terms of organization, content & its presentation, accuracy, readability, adaptability, illustrations, layout & design, activities, skills and exercises. The findings revealed that, the overall organization of the textbook and the themes included were satisfactory. However, few problematic areas were detected. The content of textbooks are not challenging & motivating and the activities given in the textbooks do not promote creative, original and independent thinking. The evaluation conducted in this study will provide a model for the future evaluation of other textbooks in this series because of the choice of the framework for the evaluation in this study. Finally, the investigator opines that textbooks by their nature cannot cater to all contexts and all purposes, and for this reason teachers need to be trained to use textbooks flexibly, supplementing them where necessary with alternative resources.

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