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Difficulties In Teaching Biology Concepts By Science Teachers At Upper Primary Level

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Abstract

The main aim of the study is to examine the difficulties in teaching Biology Concepts by science teachers at upper primary school. The study was descriptive in nature. Sixty (N=60) science teachers of Govt. aided Marathi Medium Schools in Kolhapur City selected by purposive sampling method. The researcher was analyzed the VI, VII & VIII grade science textbook for identification of the biology concepts. To collect the data researcher made questionnaire was used. The results of the study showed that the Science Teachers faces difficulties for Comprehension of the biology concepts like cell, sporogenesis, segmentation, scurvy, anaemia, asexual reproduction etc. at VI, VII & VIII grade. While teaching biology concepts in classroom, the science teachers faced the difficulties like teaching aids are not available, consuming more time for sketching figure on blackboard, sufficient reference material is not available in school, getting less time for teaching, insufficient content in textbook, content level is high according to students grasping level.

Key Words: Difficulties, Biology Concepts, Science Teachers, Teaching, Upper Primary School,

Introduction

Textbook plays an important role in the effective science education. It is common to use textbook as main instructional tool in teaching biology (Kuechle, 1995). Abimbola & Baba (1996) stated that American Biology teachers rely solely on textbooks for use in their instruction. Textbooks are the learning material available and used in most Indian schools. " At all levels of schooling textbooks are often used as the primary organizer of the subject matter that students are expected to master and provide detailed exploitations of topics to be taught" (Chiapetta & Fillman, 2007). Around the world, teachers often used textbooks as manual of instruction or standard books in any branch of study

As per the curriculum development approach, science textbooks are made up of with the integrated approach in which physics, chemistry, biology, general science chapters are included. Upper primary science textbooks content is made up of terms, facts, attributes, categories, concepts, illustrations, figures, principles, theories etc. Science Textbook plays crucial role in teaching the biology concepts in classroom. They can make easier content of the biology with the help of content analysis. In USA, Roseman, Stern & Koppal (2001) studied a method for analyzing the coherence of high school biology textbooks. Chiapetta & Fillman (2007) analyzed the five high school biology textbooks.

Teaching of biology is a challenging work for the biology teachers, while teaching the biology concepts in classroom, teachers' faced many difficulties. Studied examined on research in science education indicate that teachers' qualification, teaching experience and gender may responsible for their perception of the difficulty. Some studies revealed that some biology concepts were abstract and therefore difficult to comprehend for teachers (Abimbola, 1998, Alausa, 2001, Finely, Stewart and Yaroch, 1982). Once Teachers have difficulty in understanding certain biology concepts, he will not be

able to teach such concepts to the students rightly. With this consideration researcher tried to find out answers of following questions.

Research Questions

- 1) Which are the important biology concepts included in VI, VII & VIII grade science textbook?
- 2) Which are the biology concepts difficult to comprehend for upper primary science teachers?
- 3) What are the difficulties faced by the science teachers for teaching biology concepts at upper primary level?

Definitions Of The Terms Used In The Study

Upper Primary School

In this study upper primary school considered are as VI, VII & VIII grades of the Govt. aided Marathi Medium Schools in Kolhapur City

Science Teacher

The Teacher who completed the Teacher Training Programme (B.Ed) & and appointed for teaching science subject at VI, VII & VIII grades of the Govt. aided Marathi Medium Schools in Kolhapur City

Biology Concepts

The concepts which are present in Science Textbook of VI, VII & VIII grades, associated with Biology and related with plants, animals and microorganisms in VI, VII & VIII grades.

Objectives Of The Study

1. To analyze the content of VI, VII & VIII grade Marathi medium science textbooks prepared by Maharashtra State Bureau of Textbook production & Curriculum Research, Pune.
2. To identify the Biology Concepts which are difficult to comprehend for upper primary science teachers
3. To find out difficulties faced by the science teachers for teaching biology concepts at upper primary level.

Assumptions Of The Study

Science teachers faces the difficulties for teaching Biology Concepts

Scope Of The Study

The finding of the study may applicable for science teachers in upper primary schools in Maharashtra.

Delimitations Of The Study

1. The present study was delimited to the responses of the science teachers in upper primary schools in Kolhapur city for the academic year 2010-11
2. The study was delimited only for VI, VII & VIII grades of Marathi medium Govt. aided -schools in Kolhapur city
3. The study is also delimited for Biology concepts in Science Textbook of VI, VII & VIII grade Marathi medium science textbooks prepared by Maharashtra State Bureau of Textbook production & Curriculum Research, Pune.

Methodology

Research Method- The study was descriptive survey type. The sample was school teachers so, School survey method used by the researcher. The population consists of science teachers in VI, VII & VIII grades of Marathi medium Science curriculum.

Sampling Method- For this study researcher was selected 20 out of 68 Marathi medium Govt. aided schools in Kolhapur city by random sampling lottery method. In this 20 Marathi medium Govt. aided schools VI, VII & VIII each grades Twenty science teachers (N=20*3=60) were selected by purposive sampling method.

Population and Sample – The population is considered as all the teachers teaching at VI, VII & VIII grades of Marathi medium Govt. aided schools in Kolhapur city and sample is the 60 Science teachers (N=60) teaching at VI, VII & VIII grades of Marathi medium Govt. aided schools in Kolhapur city .

Tool for data collection- To determine the difficulties faced by science teachers for teaching Biology concepts at upper primary school, science textbook was examined and Biology concepts was identified through content analysis method. To study the difficulty of these biology concepts during comprehension 3 point rating scale were used. In the next part science teachers asked to explain reasons behind their difficulties by using questionnaire.

Data Analysis

The sixty (60) science teachers completed the questionnaire and the obtained data were analyzed through the descriptive statistics frequency and percentage.

Results**Table No.1**

Content Analysis of VI, VII & VIII grade Science Textbook with reference to Important Biology Concepts

Grade	Name of the Chapters	Concepts
VI	Characteristics of Living things	Cell, Responsiveness to stimuli, Growth, Respiration, Excretion, Reproduction, Excrete, Death.
	Classification of Living things	Classification, Fungi, Mould, Mushrooms, Fern, Shrubs, Climber, Herb, Perennials, Biennials, Annuals, Domestic, Wild, Unicellular, Multicellular, Terrestrial, Aquatic, Amphibious, Vertebrate, Invertebrate, Scales, Oviparous, Viviparous.
	Parts of Plant and their Structure	Radicle, plumule, Root hair, Root Cap, Stem, Node, Internode, Axil, Bud, Axillary bud, Leaf, Leaf blade, Leaf margin, Leaf Apex, Petiole, Leaf base, Leaf stipule. Vein, Veinlets, Flower, Thallamus, Calyx, Carolla, Androecium, Gynoecium, Bud, Stamen, Pistil, Whorl, Fruit, Seed.
	Organ System	Organ, Organ System, Digestive system, glands, Respiratory System, Alveolus, Diaphragm.
	The organization of the Living Things	Organization, Tissue, Organ, Population, Ecosystem
	Reproduction in	Asexual reproduction, Sexual reproduction, Vegetative reproduction,

VII	Living Things	Budding, Yeast, Parent Cell, Sporogenesis, Segmentation.
	Circulation of Blood	Blood circulation, Life process, Hormones, Blood donation, Blood group, Dialysis.
	Food and Nutrition	Autotrophs, Heterotrophs, Assimilation, Photosynthesis, Osmosis, Resins.
	Food and Protection of Food	Carbohydrates, Proteins, Fats, Fatty Acids, Cellulose, DNA, RNA, Gamma rays, Pasteurization, Chemical preservatives.
	Health and Disease	Balanced diet, Scurvy, Cod liver oil, Anaemia, Goitre, Tar, Nicotine
VIII	Biological diversity	Biodiversity, Plant, Animal, Micro-organism, Ecosystem Environment, Habitat, pollution, Seed bank, Biotechnology
	The Structure of a Cell and Micro-organisms	Living, cytology, Cell, Plant, Animal, Compound microscope, Life Process, Cell organelles, Plastids, Virus, Bacteria, Fungus, Yeast cells, Protozoa, leguminous plants, Nitrogen Fixation.
	Diseases	Disease, Incubation period, Rabies, Fever, tuberculosis, Dehydration, Vaccination, AIDS, Typhoid.

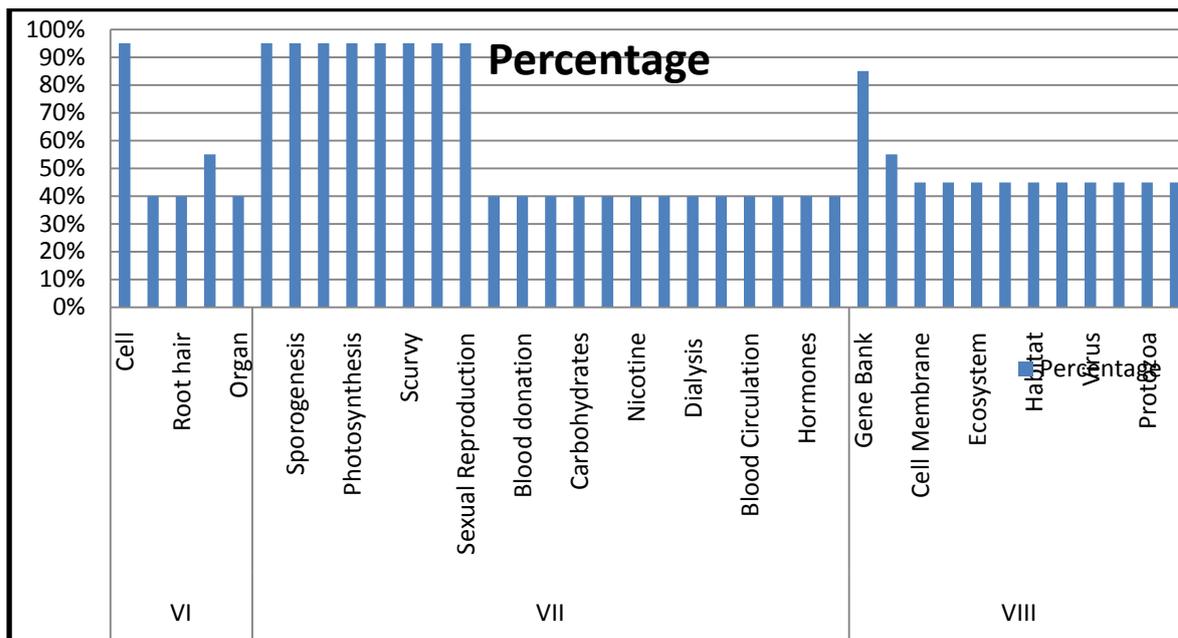
From the above table No.1 it showed that VI, VII & VIII grade Science textbooks biology contents chapters are selected and content analysis was made and important biology concepts were identified.

- 1. Identified important Biology Concepts for VI grade are:** Cell, Responsiveness to stimuli, Growth, Respiration, Excretion, Reproduction, Excrete, Death, Classification, Fungi, Mould, Mushrooms, Fern, Shrubs, Climber, Herb, Perennials, Biennials, Annuals, Domestic, Wild, Unicellular, Multicellular, Terrestrial, Aquatic, Amphibious, Vertebrate, Invertebrate, Scales, Oviparous, Viviparous, Radicle, plumule, Root hair, Root Cap, Stem, Node, Internode, Axil, Bud, Axillary bud, Leaf, Leaf blade, Leaf margin, Leaf Apex, Petiole, Leaf base, Leaf stipule. Vein, Veinlets, Flower, Thallamus, Calyx, Carolla, Androecium, Gynoecium, Bud, Stamen, Pistil, Whorl, Fruit, Seed, Organ, Organ System, Digestive system, glands, Respiratory System, Alveolus, Diaphragm.
- 2. Identified important Biology Concepts for VII grade are:** Organization, Tissue, Organ, Population, Ecosystem, Asexual reproduction, Sexual reproduction, Vegetative reproduction, Budding, Yeast, Parent Cell, Sporogenesis, Segmentation, Blood circulation, Life process, Hormones, Blood donation, Blood group, Dialysis, Autotrophs, Heterotrophs, Assimilation, Photosynthesis, Osmosis, Resins, Carbohydrates, Proteins, Fats, Fatty Acids, Cellulose, DNA, RNA, Gamma rays, Pasteurization, Chemical preservatives, Balanced diet, Scurvy, Cod liver oil, Anaemia, Goitre, Tar, Nicotine
- 3. Identified important Biology Concepts for VIII grade are:** Biodiversity, Plant, Animal, Micro-organism, Ecosystem Environment, Habitat, pollution, Seed bank, Biotechnology, Living, cytology, Cell, Plant, Animal, Compound microscope, Life Process, Cell organelles, Plastids, Virus, Bacteria, Fungus, Yeast cells, Protozoa, leguminous plants, Nitrogen Fixation, Disease, Incubation period, Rabies, Fever, tuberculosis, Dehydration, Vaccination, AIDS, Typhoid.

Table No.2

Science Teachers faces difficulties for Comprehension of the Biology Concepts at VI, VII & VIII grade

Grade	Concepts	Total Number of Science Teachers faces difficulties for Comprehension of the Biology Concepts (out of 20)	Percentage
VI	<i>Cell</i>	19	95%
	<i>Mould</i>	08	40%
	<i>Root hair</i>	08	40%
	<i>Respiratory System</i>	11	55%
	<i>Organ</i>	08	40%
VII	<i>Pasteurization</i>	19	95%
	<i>Sporogenesis</i>	19	95%
	<i>Segmentation</i>	19	95%
	<i>Photosynthesis</i>	18	90%
	<i>Asexual reproduction</i>	18	90%
	<i>Scurvy</i>	17	85%
	<i>Anaemia</i>	16	80%
	<i>Sexual Reproduction</i>	16	80%
	<i>Organization</i>	09	45%
	<i>Blood donation</i>	08	40%
	<i>Osmosis</i>	08	40%
	<i>Carbohydrates</i>	08	40%
	<i>Proteins</i>	08	40%
	<i>Growth</i>	08	40%
	<i>Dialysis</i>	08	40%
	<i>Life Process</i>	08	40%
	<i>Blood Circulation</i>	07	35%
	<i>Ecosystem</i>	07	35%
	<i>Yeast</i>	04	20%
<i>Nicotine</i>	03	15%	
<i>Hormones</i>	03	15%	
VIII	<i>Gene Bank</i>	19	95%
	<i>Seed bank</i>	19	95%
	<i>Cell Membrane</i>	18	90 %
	<i>Algae</i>	16	80 %
	<i>Ecosystem</i>	09	45 %
	<i>Environment</i>	09	45 %
	<i>Habitat</i>	08	40 %
	<i>AIDS</i>	08	40 %
	<i>Virus</i>	07	35 %
	<i>Yeast</i>	02	10 %
	<i>Protozoa</i>	02	10 %
	<i>Sterilization</i>	01	05 %



Graph No.1 Science Teachers faces difficulties for Comprehension of the Biology Concepts at VI, VII & VIII grade

Based on above table No.2 & Graph No.1 observed & interpreted that, at the VI grade, Majority (95%) of the Science teachers responded that 'cell' concept is difficult to comprehend than other identified concepts. Near to half numbers (55%) science teachers responded that 'Respiratory System' concept is difficulty to comprehend than other identified concepts.

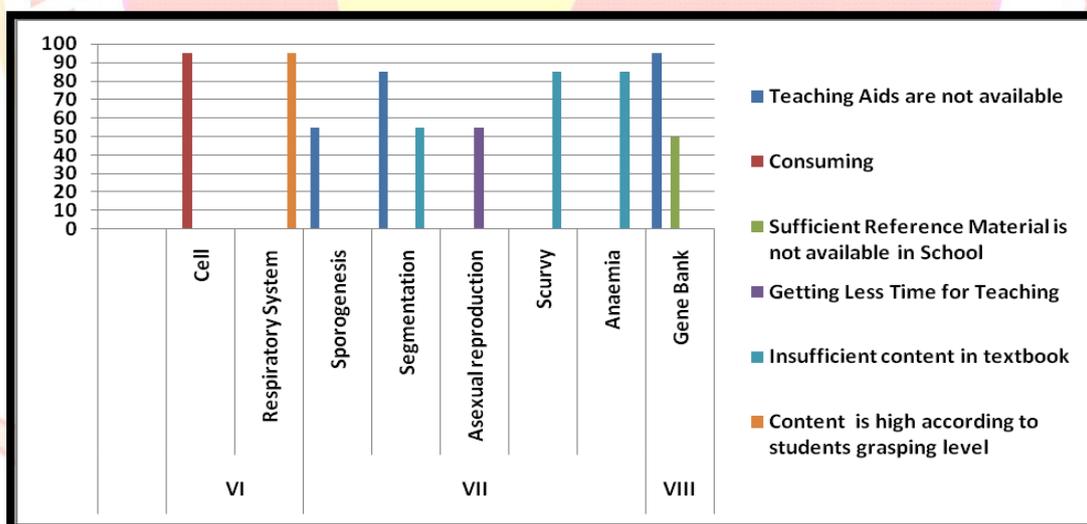
In VII grade, Majority (80 % to 95%) of the science teachers responded that, 'Sexual Reproduction', 'Anaemia', 'Scurvy', 'Asexual reproduction', 'Photosynthesis', 'Sporogenesis', 'Segmentation', 'Pasteurization' concepts are difficult to comprehend than other identified concepts. Few (35 % to 45%) of the Science teachers responded that, 'Ecosystem', 'Blood circulation', 'Life process', 'Dialysis', 'Growth', 'Proteins', 'Carbohydrates', 'Osmosis', 'Blood donation', 'Organization' concepts are difficult to comprehend for comprehend than other identified concepts. Very Few (15 % to 20%) of the science teachers responded that 'Hormones', 'Nicotine', 'Yeast' concepts are difficult to comprehend than the other identified concepts.

In VIII grade Biology Concepts, Majority (80 % to 95%) of the Science teachers responded that 'Algae', 'Cell membrane', 'Seed Bank', 'Gene Bank' concepts are difficult to comprehend than the other identified concept. Few (35 % to 45%) of the Science teachers responded that Virus, AIDS, Habitat, Environment, Ecosystem concepts are difficult to comprehend than the other identified concepts. Very Few (05 % to 10%) of the Science teachers responded that Sterilization, Protozoa and Yeast concepts are difficult to comprehend than the other identified concepts.

Table No.3

Difficulties faced by the science teachers while teaching biology concepts at VI, VII & VIII grade classrooms.

Grade	Concepts	Difficulties faced by the science teachers in classroom teaching of biology concepts					
		Teaching Aids are not available	Consuming More Time for sketching Figure on Blackboard	Sufficient Reference Material is not available in School	Getting Less Time for Teaching	Insufficient content in textbook	Content is high according to students grasping level
VI	Cell		19 (95%)				
	Respiratory System						19 (95%)
VII	Sporogenesis	11(55%)					
	Segmentation	17 (85%)				11(55%)	
	Asexual reproduction				11(55%)		
	Scurvy					17 (85%)	
	Anaemia					17 (85%)	
VIII	Gene Bank	19 (95%)		10 (50%)			



Graph No.2. Difficulties faced by the science teachers while teaching biology concepts at VI, VII & VIII grade classrooms.

Based on Table No.3. and Graph No.2 for **VI grade-** It is found that,

- 1) While teaching the 'cell' concept majority (95%) of the science teacher having difficulty is related to consuming more time for sketching figure on blackboard.
- 2) while teaching 'respiratory system' concept majority (95%) of the science teachers having difficulty related to 'content level is high according to students grasping level'.

VII grade-

- 3) While teaching ' Anaemia', Scurvy' concepts majority (85%) of the science teachers have difficulties are related to 'insufficient content in science textbook'.
- 4) While teaching 'Sporogenesis', 'segmentation', ' Asexual reproduction' concept more than half numbers (55%) of the science teachers having difficulties are related to ' teaching aids are not available in school' , ' insufficient content in science textbook' & ' getting less time for teaching the concept'.

VIII grade-

- 5) While teaching ' Gene Bank' concept Majority (85%) of the science teachers having difficulty is related to ' teaching aids are not available in school'.
- 6) While teaching 'Gene Bank' concept half numbers (50%) of the science teachers having difficulties are related to 'sufficient reference material is not available in school'.

Conclusions And Discussions

The outcome of the study revealed that science textbook content enriched with important concepts like cell, respiration, photosynthesis, blood circulation etc. Also upper primary teachers has difficulties for Comprehension of the Biology Concepts. Difficulties faced by science teachers while teaching biology concepts in the classroom are related to unavailability of teaching aids, time consumption, and insufficient reference material, unavailability of the time for teaching and level of comprehension etc. These conclusions are also supported by Bahar, M., Johnstone, A. H. and Hanseli, M. H. (1999), Tekkaya,C., Özlem Ö. And Sungur, S.(2001), Reuven Lazarowitz & Sofia Penso (2010), Deshmukh, N. D.(2013), Reinaldo Lucas Cajaiba (2014), Chavan, R. L. (2013).

Teachers had difficulties in teaching some biology concepts. There is necessity for making the content analysis of the biology textbook for easy comprehension of the biology concepts to teachers and students.

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