

## **Analysis of Science Textbook for Class IX Prescribed by Mizoram Board of School Education**

<sup>1</sup>Cherthangpuii and <sup>\*2</sup>Dr. Lallianzuali Fanai

<sup>1</sup>Research Scholar, Department of Education, Mizoram University, Mizoram, India.

<sup>\*2</sup>Principal, Institute of Advanced Studies in Education, Mizoram, India.

### **Abstract**

The study include analysis of Science textbook prescribed for Class IX by Mizoram Board of School Education. SCIENCE textbook is published by SCERT in accordance with NCF 2005. Analysis is performed on the basis of the physical aspects of the textbooks and in addition to that, content analysis is done with respect to figure and activity, and assessment to see if the objectives of the curriculum are supported by the content of the textbooks.

**Keywords:** Science, textbook, analysis, assessment, activity, figure

### **1. Introduction**

A textbook is developed in accordance with the syllabus and provides the course framework, it is utilized for the study of a subject. It guides the teacher in determining the scope and depth of the material to be covered in class. Cunnings worth (1995) identifies a textbook as a means in presenting the materials and a source to practice and do the activities. Analyzing textbooks is required because it is an essential reference and resource for learning in the educational system. Content analysis helps authors, curriculum planners, and curriculum decision-makers to design effective textbooks that meet the needs of students at different stages of learning. The SCERT Mizoram has always been committed to fulfilling its role as an academic thinker for providing quality education in the state.

Sinha and Tripathy (2005) <sup>[2]</sup> examined the Curriculum Load in Science for Classes IX and X of Bihar, Odisha, and West Bengal. The finding revealed that many of the ideas comprised in the syllabus and textbook were repeated, numerous unimportant materials were included, textbook failed to give children the opportunity of 'learning to learn'.

Liu and Treagust (2013) <sup>[4]</sup> carried out secondary science textbook content analysis of diagram and found that three categories of scientific diagrams (iconic, schematic, charts and graphs) have been identified, the most commonly used diagrammatic type is iconic i.e., 69.63%, however schematic diagrams & charts and graphs used as 24.14% and 6.24%, respectively. The study indicated that iconic pictures are easier to understand for beginners in science learning.

Tron (2016) <sup>[7]</sup> examined the science textbook of secondary school level Meghalaya, the study indicated that the objectives of Science teaching-learning were not stated in Meghalaya's science. The syllabus of Meghalaya was only satisfying the criteria of cognitive validity and lacking in

terms of content, historical, environmental, and ethical validity.

Qasim & Pandey (2017) <sup>[8]</sup> conducted a study based on diagrammatic representations of science textbooks of upper primary level and identify inadequate number of diagrams, and also most of them were of iconic type.

Rachna (2018) <sup>[9]</sup> revealed that Science textbook has a full scope of recognition of values, ideal acts of valuing, and moral and character education.

Analysis of textbooks is essential to know how science is presented and to bring educational reform. In this article, Class IX Science textbook published by SCERT is analysed based on physical aspects, figure and activity and assessment. Class IX Students are generally between the age of 13-14 and are adolescents who are at a critical stage of development. It is pivotal to have age appropriate textbook to cater their needs. In order to ascertain the effectiveness of textbooks, one of the best ways is to examine and evaluate the textbooks based on certain criteria. Textbook analysis helps in finding the gaps and provide suggestion for improvement.

### **2. Objectives**

The study has the three main objectives

1. To analyze the physical aspects of Science textbook prescribed for Class IX by Mizoram Board of School Education.
2. To analyze the content of the textbook with respect to figure and activity.
3. To analyze the content of the textbook with respect to assessment.

### **3. Methodology and Procedure**

- i). **Research Design:** Descriptive and analytical methods were used.

- ii). **Tools Used:** Class IX Science textbooks and Curriculum for High School, each prescribed with the aid of using Mizoram Board of School Education.
- iii). **Data Analysis:** The “Guiding Principles for Quality Textbooks” developed by the Textbook Committee, Education Bureau, and the Government of the Hong Kong Special Administrative Region was used and tailored for evaluation of the textbook.

#### 4. Analysis and Interpretation

There are 15 chapters and 360 pages included in Class IX Science textbook of SCERT Mizoram. The researcher analyzed every chapter regarding the content of the textbook with respect to the physical aspect, the content of the textbook with respect to figure and activity and, the content of the textbook with respect to assessment. In order to meet the research objectives, below are the details explanation of findings related to objective 1, 2, and 3.

##### 4.1. To Analyse the Physical Aspects of Science Textbook Prescribed for Class IX by Mizoram Board of School Education

The 1<sup>st</sup> objective was to analyse the physical aspects of Science textbook prescribed for Class IX by Mizoram Board of School Education. Here the textbook cover design, foreword, quality of paper, printing and layout, font size, illustrations, content and prize were analysed.

##### Textbook Cover Design

The cover page of the textbook is called ‘Secondary Science’ it depicts a picture of a microscope and pendulum in the front and an aquatic ecosystem on the back cover which shows the importance of sustainable development and development of scientific attitude among students. The pictures are both printed on the background which is blueish-yellow in colour. The words printed on the cover are yellow, white and blue. The illustration featured on the cover is appropriate. The color is found to be pleasant and appealing for the students. The overall look of the book cover is found to be adequate.

##### Foreword

The cover page is followed by “Foreword” to the book, written by MBSE personnel (textbook sub-committee members, the textbook writers and editors). The recommendations of NCF, 2005 is followed in the process of textbook design. It focuses on child-centred system of education. The textbook is designed to connect the child’s knowledge to life outside school thereby enhancing the child’s problem-solving skills in day-to-day life.

##### Quality of the Paper

The paper thickness as per MBSE guidelines is “58 gsm cream wove”. NCERT prints their books on 80 gsm papers which is considered to be of good quality and is likely to last for one academic session. The price and weight of the book are based on the paper quality. Given this, the quality of the paper used is greatly appreciated, and the price is also acceptable. The book's weight does not make it difficult to handle.

##### Printing and Layout

The printing and layout are observed to be quite appropriate as there are clear distinctions between topics, units and headings.

##### Font Size

Times New Roman with thirteen (13) fonts is employed in the texts, which is considered appropriate and convenient for most students, however, it may not be appropriate for visually challenged. The headings are printed in larger fonts to distinguish them from the texts and is found to be convenient.

##### Illustrations

The textbook provided picture, diagram, chart and figure in a well meaningful sequence, it was found to be helpful in providing deep understanding.

##### Content

The content sequence is appropriate and logical. Keywords and further information are identified and highlighted to provide better knowledge. The structure and organisation of the content is made clear by means of functional devices including chapter titles, headings, tables and outlines.

##### Price

The textbook consists of 360 pages, including the foreward, contents, etc. and is priced at Rs. 176. The price is considered to be reasonable.

##### 4.2. To Analyze the Content of the Textbook with Respect to Figure and Activity

The 2<sup>nd</sup> objective was to analyze the content of the textbook with respect to content organisation. Here, the activities and figures provided in every chapter were analyzed, figures in the textbooks influence the learning process. Students often see figures before reading the text and can enhance the power of imagination of the students and can increase students creativity. The use of images for educational intention and learning is vital.

**Table 1:** Overall representation of figure, activity, in-text, numerical and exercise

S. No.	Chapter	Figure	Activity	In-Text	Numerical	Exercise
1	1	11		6	15	49
2	2	20	2	13	6	46
3	3	10	2	16	4	36
4	4	27	1	7	14	45
5	5	26	3	9	7	36
6	6	4	5	3	1	34
7	7	12	9	9	2	37
8	8	3		23	6	47
9	9	10		4	5	44
10	10	10	1	9		29
11	11	17		15		38
12	12	27	1	20		45
13	13	1	3	14		43
14	14		4	26		42
15	15	8		46		33
Total		186	28	220	60	604

There are 28 activities provided in Class IX Science textbook which were sufficient in numbers to provoke the thinking ability as well as improve the awareness related to the topic. But regarding the individual differences and the time period of the session the activities provided were too much to complete in 1 year. There are 186 meaningful figures were included, which enhance the power of imagination of the

student and influence the learning process. Figures are the best means to speak massive quantities of complicated information. Many readers will only look at picture display items before reading the main text of your manuscript. Therefore, it is the fastest way communicate well with readers. The researcher found that the number of figures and activities provided in the textbook were sufficient to provide a better understanding.

#### 4.3. To Analyze the Content of the Textbook with Respect to Assessment

The 3<sup>rd</sup> objective was to analyze the content of the textbook with respect to assessment. Each chapter in the textbook contain exercise, here different types of questions are included for example: multiple choice question, very short answer question, short answer question type I, very short answer question type II and long answer question etc. which seems to be of knowledge, understanding, and application level for the students. The total number of questions in the exercise is 604 which is sufficient for assessing the content given in the chapter, at the same time various amount of questions seems to be a burden for the students, it can reduce their motivation and it can lessen their interest in Science study. The textbook included 220 in-text questions which ask students cognitive level of understanding, and 60 solved numerical problems. Apart from the exercise, there are extended learning activities in each chapter, which are appropriate in terms of promoting scientific creativity and application to daily life.

#### Conclusion and Suggestion

Textbook occupies the most important place and plays an important role in the process of teaching and learning. The physical aspect of the textbook seems to be satisfactory and the price is also believed to be affordable. Regarding the content inside the chapter, the content provided seems to be accurate, satisfactory in promoting deep understanding among the students. After analyzing the content of SCERT Class IX Secondary Science textbook, it has revealed that the input of in-text question, solved numericals and exercise were too vast to be completed within the time period of 1 year session. The content provided in the chapter figures, activities, and assessment are very relevant to daily life. The activities provided in each chapter are individual and group work. This seems to be good in promoting learners centered as well as useful in promoting scientific creativity and seems to be appropriate in promoting inventiveness among them. Regarding the content related to assessment 824 questions i.e., in-text questions and exercises questions were asked from 15 chapters, in this case student may hardly give attention to many questions, however, this textbook seems to promote scientific attitude among the students. If the content provided in the textbook is reduced at the same not excluding the important message it will promote joyful learning, because psychologists claim the typical students attention span is about 10-15minutes long. So if the content provided are reduced still helpful and useful it will be good in promoting interest and motivation among the students.

#### References

1. Cunningsworth A. Choosing your coursebook. Macmillan: Heinemann, 1995.
2. Sinha MP, Tripathy HH. A Study of Correlation of the Curriculum Load in Science for Classes IX and X. *Indian Educational Review*, 2005, 41.
3. *High School Curriculum* w.e.f. 2009 Mizoram Board Of School Education <https://www.mbse.edu.in/syllabus-sr-secondary-schools>
4. Liu Y, Treagust DF. Content analysis of diagrams in secondary 73 school science textbooks. In *Critical analysis of science textbooks*, 2013, 287-300. Springer, Dordrecht. Retrieved 22 May 2021 from [https://www.researchgate.net/publication/300496618\\_Content\\_Analysis\\_of\\_Diagrams\\_in\\_Secondary\\_School\\_Science\\_Textbooks](https://www.researchgate.net/publication/300496618_Content_Analysis_of_Diagrams_in_Secondary_School_Science_Textbooks)
5. Alagha F, Farajollahi M, Shahmohammadi N. The Content Analysis of the Experimental Science Book of Second Grade of Guidance School based on the Amount of Attention to the Areas of Creativity and Implementing with Guilford's Mental Exercise. *Procedia-Social and Behavioral Sciences*. 2014; 114:148-153. Retrieved 2 June 2021 from <https://www.sciencedirect.com/science/article/pii/S1877042813053147>
6. Guiding principles for quality textbooks, 2016. Education Bureau. <https://www.edb.gov.hk>
7. Tron B. A study of science education in the secondary schools of Meghalaya. *South-Asian Journal of Multidisciplinary Studies*. 2016; 4(6):2349-7858. Retrieved 1 June 2021 from <https://shodhganga.inflibnet.ac.in/handle/10603/253601>
8. Qasim SH, Pandey SS. Content Analysis of Diagrammatic Representations in Upper Primary Science Textbooks. *International Journal of Research-Granthaalayah*. 2017; 5(7):474-479. <https://doi.org/10.5281/zenodo.838939>.
9. Rachna S. Content analysis of 6th grade NCERT Science Textbook to study the scope of desirable values in students, *Scholarly Research Journal for Humanity Science & English Language*. 2018; 6(30):2348-3083. Retrieved 2 June 2021 from <http://oaji.net/articles/2017/1201-1546068903.pdf>.