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Content analysis of activities listed in the science textbook of class-X of Mizoram board of school education

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Abstract

This paper conducts a content analysis of the activities in the Class X Science textbook of Mizoram Board of School Education (MBSE), brought out with the assistance of Bloom's Taxonomy as a reference. The research was conducted in an aim to analyse the number, domains, and levels of activities within the textbook, and how it followed the National Curriculum Framework-2005 and National Curriculum Framework of School Education-2023. The findings showed that the textbook contains 24 activities across 16 chapters, and all the activities cover all domains of Bloom's Taxonomy. These activities were mostly on the cognitive and psychomotor domains, more than the affective domain. Also, it was observed that activities in the MBSE Science textbook were incompletely complied with the recommendations of the National Curriculum Framework. The study suggested that the activities in each chapter should be more balanced and work with individuals and teams should be given equal focus.

Key Words: *Science textbook, Content analysis, Bloom's Taxonomy, MBSE, NCF*

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Introduction

Science education deals with teaching topics of science, scientific concepts, principles, and methods. It is defined as the study of the interrelationship between science as a discipline and the application of educational principles to its understanding, teaching, and learning (Uchenna, nd.). Science plays an important part in our daily lives, influencing many of the decisions we make; also, a cultural emphasis in school science provides a broader lens for humanistic policy and practice (Aikenhead, 2012). It deals with a wide variety of subjects, such as physics, chemistry, biology, earth, and environmental sciences. The science subjects are concerned with the sharing of science content, some social science, and the process of teaching science pedagogy to provide expectations for the development of understanding within the scientific community (Ololube et al., 2015). Science refers to the systematic study of the phenomena and events in our environment. It develops curiosity among the students about the surrounding world and improves their scientific thinking (Education Bureau, 2023).

The science education outcome is directed to the improvement of scientific literacy, critical thinking skills, and in-depth knowledge of the natural world (Klahr et al., 2011). It commonly entails practical application, inquiry-based learning, and application of technology to add more knowledge concerning scientific phenomena. Science education consists of three main dimensions (i) learning, involving the inquiry as well as knowledge growth in concepts and theory; (ii) learning about science, which involves in understanding of how science is and how it works and aware of the complex relationships between science and the society, and (iii) doing science, which entails participation in scientific inquiry and problem-solving (Hodson, 1993). The elements of science education

include content knowledge, critical thinking, inquiry and problem-solving skills. On the conceptual level, science includes content knowledge, which involves the knowledge of the basic scientific principles, concepts and theories in various fields. In contemporary culture, learning science is increasingly pivotal for leading a fulfilling life. Moreover, science should be included in school curricula to further speed up the process of nation building (Senem, 2013).

Textbooks are usually considered a fundamental source for teaching and learning. This is a fact that teachers mostly use to publish textbooks in their careers (Cunningsworth, 1995; Hutchinson & Torres, 1994; Tomlinson, 2003, as cited in Gholampour, 2023). In India, textbooks, syllabi, and instructors' manuals that were created following the guidelines provided by a centrally published curriculum are more frequently used for scripting the types of inquiry and activities that take place in school classes. Textbooks are also perceived as aids to support learning, providing a structured and elaborate map of the curriculum (NCF, 2005). Textbooks serve as a valuable resource for both teachers and students during the teaching and learning process (Awasthi, 2006, as cited in Ramadhana et al., 2019). Science educators are expected to abide by these organized scripts and plans. It is the textbook which makes re-skilling possible instead of de-skilling teachers and learners (Tomlinson, 2003, as cited in Gholampour, 2023). Teachers can think with the help of textbooks and have more time to create effective and interesting classroom activities to introduce the given content of knowledge to learners (Bell and Gower, 1998 & 2011). The content of the textbooks and the precise time allotted to them by these curricula and syllabuses constrain and depend on real scientific classroom activities. Being more interactive, engaging, and concerned with the educational goals, textbooks are the drivers of developing ideas, inspiring creativity and mastering the profound knowledge of complex phenomena in students (NCF, 2005).

Science textbooks give students well-structured experiences in science education. Besides explaining different scientific laws, facts, and concepts, such textbooks are essential in making students understand highly challenging scientific concepts. Both the textbooks and the instructors convey explicit and implicit messages about science (NCF, 2005). The overarching goals of science education are to help the learners to develop a broad historical and developmental understanding of science, encouraging them to think of science as a collaborative social enterprise, developing a sense of attachment to nature and artefacts, and ensuring familiarity with the various facts and principles of science and their real-life applications aligned with the learners' cognitive development stage.

The integration of activities in scientific textbooks can help students to relate information to their lives, and it enables them to understand natural occurrences better. Such activities can encourage students to experiment and to fully examine the world around them. In the secondary stage, students should engage in learning science as a comprehensive discipline, utilize hands-on tools to develop more advanced technological modules, and analyse issues related to the environment and health (NCERT, 2006).

The school textbook is one of the most important learning materials among students in any educational system, which is used when studying a given subject formally. Textbook materials play a significant role in meeting learners' educational needs and facilitating the learning process. There has been a specific focus on assessing the use of scientific books in secondary schools to ensure they aid in activity-based learning. Textbooks are essential in the field of science education, especially where they are used in presenting students to scientific phenomena using the activity sections (Isaksen et al., 2025). It is important to engage students in hands-on activities as it contributes greatly towards a solid understanding of complex biological ideas as well as other scientific concepts.

In any educational setting, a textbook can be taken as a basic information and teaching source for students. Therefore, it is imperative to

examine and understand the content of these textbooks thoroughly. Authors, curriculum designers, and decision-makers within the education sector focus on making high-quality textbooks that are effective in fulfilling the various needs of the students in their learning. Content analysis plays a significant and relevant role in achieving this goal.

Content analysis also helps to conduct a broad and systematic assessment of the concepts, demands, reasons, emotions, and other valuable aspects present in the instructional materials. It helps in scientific and practical evaluation of the content so that it is relevant to the goals of education and requirements of the students. In this regard, a study analysed the content of science activities in Class X science books approved by the MBSE.

Rationale of the Study

Activity-based learning is the best way of learning since people can work with several different senses, including touch, sight, and smell. This is a more effective method of learning as it is experiential. As Confucius has so famously said, I hear, and I forget. I see, and I remember. I do, and I understand." This highlights the significance of practical learning in gaining a better understanding of a subject matter. During activity-based learning, the teacher takes the role of a facilitator and leads the students through activities and other tasks that promote better understanding and behavioural change. Science, which includes Physics, Chemistry and Biology, is the subject that can be easily applied in practice. Science must be learned through fine observation, analytical reasoning, experimental research and generalization. As Jean-Jacques Rousseau put it in Émile, "do not teach him science. Let him find it out." Science is a human activity that includes the exploration of the world and the building of a rationalized body of knowledge. This model is in line with the proposal set by the National Science Curriculum of 2023.

The main aim is to perform a detailed study on the instructional activities outlined in the textbook of Class-X Science published by Mizoram Board of School Education. The analysis is very essential because the content of these activities significantly impacts the provision and acceptance of science education. As already mentioned, good science education is true to the child, true to life and true to science (NCF, 2005). Hence, analysing the content of activities can have immense influence on the learning outcomes in science education. By examining the activity content, researchers expect to get an understanding of the ways to effectively customize these activities in order to benefit student-centred learning. This study aims at helping to provide solutions to how activities can be made to be aligned with the needs and learning orientation of students, thereby promoting better understanding and implementation of the theoretical concepts.

Review of related literature

The researcher has carefully reviewed studies published in the period of 2002-2025 that included research from both India and outside of India. The analysis focused mostly on science textbooks that were designed for primary and secondary school students. The key points considered were the content, understanding, application of analogies and the instructional design of the textbooks. This comprehensive review was a way of having an understanding of the quality and effectiveness of science education materials for the learners.

There are several studies concentrated on the effect of images, diagrams, photographs and illustrations on students' learning (Darayseh & Khurma, 2020; Kang & Kim, 2023; Pihta et al., 2013). The importance of using visuals in science learning is always highlighted. Numerous research studies have shown that images and visuals such as diagrams, photographs, and illustrations that are clearly designed, directly related to the text, and contextually relevant help students to understand texts better (Cook, 2008;

Kim et al., 2011; Liu, 2015; Qasim & Pandey, 2017). At the same time, inadequate design or new visuals can lead to misconceptions and conceptual difficulties (Stylianidou, 2002).

However, most of the aspects related to science textbook organization, content presentation and layout have been examined and reported to be adequate to meet the curriculum requirement and include the required contents (Bhat & Shah, 2021; Erten et al., 2015; Hidayat et al., 2017; Sindhwani, 2019). Nevertheless, there were certain limitations found in some of the studies, such as excessive information, inadequate inquiry-based activities, limited historical and social view, and insufficient attention to students' cognitive development (Indumathi, 2019; Shah et al., 2020; Uyulgan et al., 2010). Though books may be well organized and attractive, there are still areas that could be improved in terms of language, sequencing, physical presentation and learner-centred activities. Based on various studies, it is concluded that the science textbooks prioritize factual content and routine science activities rather than science learning, which is inquiry-based and higher-order scientific reasoning (Ali et al., 2017; Ardianto & Pursitasari, 2017; Bansal, 2014). The way science concepts are presented in textbooks is often descriptive without providing enough conceptual explanations, analogies, and linkages among related science ideas (Omar, 2020; Qadeer, 2013; Sendur et al., 2010). Some textbooks can foster the basic scientific process skills, but opportunities for developing advanced scientific literacy and inquiry skills are limited (Genc & Topcu, 2020; Singh & Singh, 2019).

Nevertheless, textbooks contain activities that encourage motivation, values education, and basic cognitive skills (Shahmohammadi, 2013; Sharma, 2017); they typically lack activities for critical thinking, argumentation, problem solving, science and engineering practices, and active learning (Aldahmash & Omar, 2021; Kayacan & Ozluleci, 2021; Mai et al., 2019; Rayed & Ismael, 2020). Besides, it is noted that the textbooks are not filled with creative and independent activities to make students

interested (Li & Wang, 2024). Activities presented are usually given in a simple manner, with step-by-step procedures being given in detail, which does not stimulate independent thought. However, the focus of scientific textbook analysis in recent years has shifted towards the context of the environment, local context and real-life examples (Ashlan & Firayani, 2025), and there is a variable representation of themes such as disaster risk reduction, environmental education, health education, and ethical issues (Maurya and Rani, 2019; Ghalani et al., 2021; Nurdiyanto et al., 2019; Shah et al., 2021).

After reviewing the existing literature, it has been found that there is a lack of analysis of the MBSE class X science textbook activities based on the Revised Bloom's Taxonomy (RBT). Additionally, no research studies conducted in Mizoram, India, have been identified so far. Therefore, it is essential to conduct a study using RBT to determine the number, domains, and levels of the activities included in the MBSE class X science textbook. The researcher anticipates that this study will be valuable in identifying the number, domains, and levels of activities within the MBSE Class X science textbook. To achieve these, the following objectives were formulated.

Objectives of the study

1. To study the number of activities included in the MBSE Science textbook of class X.
2. To identify the domains and levels of the activities included in the class X science textbook.
3. To analyse the alignment of the activities in the MBSE science textbooks with the guidelines outlined in the National Curriculum Framework.

Methodology of the Study

In this current study, content analysis is being used to analyse the MBSE Science textbook for Class X. The key objective that should be determined is the number of activities, domains, and levels of activities covered by the textbook. Also, the study intends to determine how well the activities in the MBSE Science textbooks follow the recommendations in the National Curriculum Framework-2005. The researcher has opted to utilize qualitative techniques for data analysis, taking into account the specific goals and nature of the study.

Rubrics for Data Analysis

In this study, the activities outlined in the textbook were categorized and analysed diligently as per the revised Bloom's Taxonomy. This taxonomy provides a framework for classifying educational objectives and helps to understand and assess the different levels of cognitive, psychomotor and affective processes involved in the activities. The purpose of the analysis was to offer an insight into how these activities correspond to the different levels described in the Bloom taxonomy to be able to gain a better comprehension of the educational value and influence thereof.

Sources of Data

The data utilized for the current study were gathered from the Science textbooks designed for Class X and approved by the MBSE in Mizoram, India.

Basis of Classification of Science Textbook Activities

Revised Bloom's Taxonomy developed by Anderson et al. (2001) was used by the investigator to analysed the activities listed in the Class X Science textbook adopted by the Mizoram Board of School Education. Several researchers have utilized the RBT for study analysis, demonstrating its validity.

The investigator created an activity analysis table with rows for recording information on each activity specified in the Class X Science textbook, including the lesson number, page number, and activity name and number. For the research, the activity table was designed to avoid confusion

and for better arrangement while analysing the activities according to the domains in the RBT.

Data analysis and interpretation

The researcher conducted a content analysis of all the activities listed in the MBSE Class X Science textbook. A table for analysis was prepared, and each activity was transcribed into a row to enter activity details. Following transcription, each activity was classified and analysed according to the RBT and marked in the corresponding sections of the analysis table.

Findings

Objective-1: Findings related to the number of activities included in the MBSE Science textbook of class X.

Chapter Number	Name of the Chapter	Number of Activities	Page No.
1	Light-Reflection and Refraction	1	30
2	The Human Eye and the Colourful World	1	56
3	Electricity	-	-
4	Magnetic Effects of Electric Current	4	98,100,106,110
5	Sources of Energy	-	-
6	Periodic Classification of Elements	-	-
7	Chemical Reactions and Equations	1	179
8	Metals and Non-metals	-	-
9	Acids, Bases and Salts	4	228,229,239,241
10	Carbon and its Compounds	6	287,290,291,295
11	Life Processes	2	319,334

12	Control and Coordination	1	347
13	How Do Organisms Reproduce?	2	366,368
14	Heredity and Evolution	-	-
15	Our Environment	2	417,419
16	Management of Natural Resources	-	-

Table 1 shows that there were 24 activities spread over the 16 chapters of the textbook. Out of the total 16 chapters, 10 had activities, while the other 6 had no activities. In addition, 6 of the ten chapters consisted of more than one activity.

Objective-2: Findings related to the domains and levels of the activities included in the science textbook of class X.

Table 3: Domains and levels of the activities included in chapter 1, 'Light-Reflection and Refraction' of the science textbook of class X.

Chapter Number	**Name of the Chapter**	**Name of the Activities**	**Name of Domain**	**Level of Domain**
1	Light-Reflection and Refraction	To locate focus and focal length of a convex lens.	Cognitive	Analysing
			Affective	Responding to Phenomena
			Psychomotor	Guided Response

Table 2.1 indicates that the activity encompassed all aspects of Bloom's Taxonomy, including the cognitive, affective, and psychomotor domains. Specifically, the activity involved the analysis level of the cognitive domain, the responding to phenomena level of the affective domain, and the guided response level of the psychomotor domain.

Table 4: Domains and levels of the activities included in chapter 2, 'The Human Eye and the Colourful World' of the science textbook of class X.

Chapte	**Name of**	**Name of**	**Name of Domain**	**Level of Domain**

r Number	the Chapter	the Activities		
2	The Human Eye and the Colourful World	To see how light rays get refracted through a triangular glass prism.	Cognitive	Evaluating
			Affective	-
			Psychomotor	Mechanism

Table 2.2 shows that only two domains of Bloom's Taxonomy, the cognitive and psychomotor domains, were encompassed in the given activity. The domain levels presented in the activity were 'evaluating level' from the cognitive domain and mechanisms from the psychomotor domain of Bloom's Taxonomy.

Table 2.3: Domains and levels of the activities included in chapter 4, 'Magnetics Effects of Electric Current' of the science textbook of class X.

Chapter Number	Name of the Chapter	Name of the Activities	Name of Domain	Level of Domain
4	Magnetic Effects of Electric Current	Activity 1: To observe the magnetic field.	Cognitive	Analysing
			Affective	-
			Psychomotor	Guided Response
		Activity 2: To observe the magnetic field due to a current-carrying conductor.	Cognitive	Analysing
			Affective	-
			Psychomotor	Guided Response
		Activity 3: To demonstrate that a force is experienced by a current-carrying conductor when placed in a magnetic field.	Cognitive	Evaluating
			Affective	-
			Psychomotor	Adaptation
		Activity 4: To observe	Cognitive	Evaluating

		that electricity can be generated in a coil by moving a magnet towards or away from the coil/loop.	Affective	-
			Psychomotor	Adaptation

Table 2.3 reveals that 'Activity-1' encompassed the analysing level of the cognitive domain and the guided response level of the psychomotor domain. Similarly, 'Activity-2' also involved two domains: the applying level of the cognitive domain and the guided response level of the psychomotor domain. 'Activity-3' featured the evaluating level of the cognitive domain and the adaptation level of the psychomotor domain. Likewise, 'Activity-4' contained the evaluating level of the cognitive domain and adaptation level of the psychomotor domain of Bloom's Taxonomy.

Table 2.4: Domains and levels of the activities included in Chapter 7, 'Chemical Reactions and Equations,' of the science textbook of Class X.

Chapter Number	**Name of the Chapter**	**Name of the Activities**	**Name of Domain**	**Level of Domain**
7	Chemical Reactions and Equations	To study the nature of the reaction between calcium oxide and water.	Cognitive	Creating
			Affective	Responding to phenomena
			Psychomotor	Mechanism (basic proficiency)

The above table shows that all three domains of Bloom's Taxonomy- the creating level of the cognitive domain, the responding to phenomena level of the affective domain, and the mechanism (basic proficiency) level of the psychomotor domain are included in the activity.

Table 2.5: Domains and levels of the activities included in chapter 9, 'Acids, Bases, and Salts' of the science textbook of class X.

Chapter Number	**Name of the**	**Name of the Activities**	**Name of Domain**	**Level of Domain**

	Chapter			
9	Acids, Bases and Salts	Activity 1: To study the neutralization reaction between HCl (acid) and NaOH (base).	Cognitive	Evaluating
			Affective	-
			Psychomotor	Guided Response
		Activity 2: To show that heat is produced when an acid is dissolved in water.	Cognitive	Analysing
			Affective	-
			Psychomotor	Mechanism
		Activity 3: To find out the pH value of some given solutions using pH paper.	Cognitive	Evaluating
			Affective	-
			Psychomotor	Mechanism
		Activity 4: To check the pH of the given sample of the soil.	Cognitive	Analysing
			Affective	-
			Psychomotor	Mechanism (basic proficiency)

The above table shows that: In 'Activity-1,' it was observed that only the evaluating level of the cognitive domain and guided response level of the psychomotor domain of Bloom's Taxonomy were present. Similarly, in 'Activity-2,' it was found that the analysing level of the cognitive domain and mechanism level of the psychomotor domain of Bloom's Taxonomy were evident. Furthermore, 'Activity-3' revealed that the evaluating level of the cognitive domain and mechanism level of the psychomotor domain of Bloom's Taxonomy were present. Likewise, in 'Activity-4,' the analysing level of the cognitive domain and the mechanism (basic proficiency) level of the psychomotor domain were identified in it.

Table 2.6: Domains and levels of the activities included in chapter 10, 'Carbon and its Compounds' of the science textbook of class X.

Chapter Number	**Name of the Chapter**	**Name of the Activities**	**Name of Domain**	**Level of Domain**
10	Carbon and	Activity 1: To observe	Cognitive	Analysing

	its Compounds	the reaction of ethanol and sodium.	Affective	Responding to Phenomena
			Psychomotor	Guided Response
		Activity 2: To prepare ester from ethanol and ethanoic acid	Cognitive	Creating
			Affective	Receiving Phenomena
			Psychomotor	Mechanism
		Activity 3: Litmus test.	Cognitive	Evaluating
			Affective	-
			Psychomotor	Guided Response
		Activity 4: Sodium bicarbonate test.	Cognitive	Evaluating
			Affective	-
			Psychomotor	Guided Response
		Activity 5: Ester test.	Cognitive	Evaluating
			Affective	-
			Psychomotor	Guided Response
		Activity 6: To observe the action of soap on soft and hard water.	Cognitive	Evaluating
			Affective	-
			Psychomotor	Mechanism

Table 2.6 reveals that there were six activities in Chapter 10, ‘Carbon and its Compounds.’ 'Activity 1' consisted of all three domains of Bloom's Taxonomy: the cognitive domain included the analysing level, the affective domain included the responding to phenomena level, and the psychomotor domain involved the guided response level. Similarly, 'Activity-2' also encompassed all three domains, with the creating level of the cognitive domain, the receiving phenomena level of the affective domain and the mechanism level of the psychomotor domain. Whereas 'Activity-3' exhibited two domains of Bloom’s Taxonomy, with the cognitive domain at the evaluating level and the psychomotor domain at the guided response level. Similarly, in 'Activity-4,' two domains were present,

with the cognitive domain at the evaluating level and the psychomotor domain at the guided response level. 'Activity-5' also reflected two domains, with the cognitive domain at the evaluating level and the psychomotor domain at the guided response level. Also, 'Activity 6' incorporated two domains, with the cognitive domain at the evaluating level and the psychomotor domain at the mechanism level.

Table 2.7: Domains and levels of the activities included in chapter 11, 'Life Processes' of the science textbook of class X.

Chapter Number	**Name of the Chapter**	**Name of the Activities**	**Name of Domain**	**Level of Domain**
11	Life Processes	Activity 1: To compare the rate of breathing of an aquatic organism with that of human beings.	Cognitive	Evaluating
			Affective	Receiving Phenomena
			Psychomotor	Set
		Activity 2: To observe transpiration in plants.	Cognitive	Analysing
			Affective	Receiving Phenomena
			Psychomotor	Set

In Table 2.7, it was observed that both in 'Activity 1' and 'Activity 2,' all the domains of Bloom's Taxonomy were effectively integrated. Specifically, in 'Activity 1,' the cognitive domain was represented at the evaluating level, the affective domain at the receiving phenomena level, and the psychomotor domain at the set level. Similarly, in 'Activity 2,' the cognitive domain was demonstrated at the analysing level, the affective domain at the receiving phenomena level, and the psychomotor domain at the set level.

Table 2.8: Domains and levels of the activities included in Chapter 12, 'Control and Coordination' of the science textbook of class X.

Chapter Number	**Name of the Chapter**	**Name of the Activities**	**Name of Domain**	**Level of Domain**
12	Control and	To taste the food by	Cognitive	Evaluating

	Coordination	blocking the nose	Affective	-
			Psychomotor	Guided Response

Table 2.8 shows that the activity effectively incorporated only two domains of Bloom's Taxonomy. The evaluating level of the cognitive domain and the guided response level of the psychomotor domain were covered.

Table 2.9: Domains and levels of the activities included in chapter 13, 'How Do Organisms Reproduce?' of the science textbook of class X.

Chapter Number	**Name of the Chapter**	**Name of the Activities**	**Name of Domain**	**Level of Domain**
13	How Do Organisms Reproduce?	Activity 1: To observe spores of Rhizopus on moist bread.	Cognitive	Evaluating
			Affective	-
			Psychomotor	Guided Response
		Activity 2: To study vegetative propagation by potato stem.	Cognitive	Evaluating
			Affective	-
			Psychomotor	Guided Response

Table 2.9 shows that both 'Activity-1' and 'Activity-2 ' consisted of only two domains of Bloom's Taxonomy. The levels of domains included in the activity were the evaluating level of the cognitive domain and the guided response level of the psychomotor domain.

Table 2.10: Domains and levels of the activities included in chapter 15, 'Our Environment' of the science textbook of class X.

Chapter Number	**Name of the Chapter**	**Name of the Activities**	**Name of Domain**	**Level of Domain**
15	Our Environment	Activity 1: To study the amount and type of waste generated around us.	Cognitive	Evaluating
			Affective	Internalizing Values
			Psychomotor	Mechanism
		Activity 2: Biodegradable and non-biodegradable	Cognitive	Evaluating
			Affective	Receiving Phenomena

		waste.	Psychomotor	Mechanism

Table 2.10 indicates that 'Activity-1' and 'Activity-2' incorporated all domains of Bloom's Taxonomy. In 'Activity-1', the cognitive domain encompassed the evaluating level, the affective domain integrated the internalizing values level, and the psychomotor domain involved the mechanism level. Similarly, in 'Activity-2 ', the cognitive domain covered the evaluating level, the affective domain included the receiving phenomena level, and the psychomotor domain involved the mechanism level of Bloom's taxonomy.

3. Findings related to the extent of the activities included in the MBSE science textbooks of class X are in line with the recommendations of the National Curriculum Framework.

The investigator found that the activities outlined in the MBSE science textbooks aligned reasonably well with the recommendations of the National Curriculum Framework 2005 in the physics and chemistry sections. However, there was a notable lack of alignment with the recommendations in the biology section, as students were not encouraged to delve deeper into scientific concepts or apply them in practical scenarios.

In light of these findings, the MBSE must reevaluate its textbooks and included activities and make substantial revisions. By aligning more closely with the NCERT guidelines, the MBSE can improve the relevance and efficacy of science education, ultimately fostering a healthier scientific literacy among students.

Recommendation

The following are the recommendations based on the study:

1. Policymakers and curriculum designers should consider the educational purposes that science education can best provide for students as they move through the stages of schooling and should work with teachers to

select the content, activities and methods of teaching and learning, and assessment modes that are most likely to achieve.

2. Workshops and conferences should be organized for textbook writers and teachers on how to formulate exercises and activities that would provide opportunities for the development of cognitive, affective and psychomotor abilities of the students.
3. Textbook writers should consider the balanced proportion of exercises from each level of the Cognitive, Affective and Psychomotor domain in the textbooks. This will enable students to experience all the domains of Bloom's Taxonomy.
4. Teachers should not rely only on the content and exercises presented in the prescribed textbooks. They should utilized supplementary materials and provide additional exercises to give more opportunities to students for the practice and development of their abilities at the various levels of the domains of Bloom's Taxonomy.

Discussion and Conclusion

The purpose of the study was to measure the number of activities in the MBSE Science textbook for Class X and identify the domains and levels of activities. It also sought to determine whether the activities align with the National Curriculum Framework recommendations. The study found 24 activities across 16 chapters, with 10 chapters containing activities and six chapters having none.

Additionally, six of the ten chapters included more than one activity. Most of the activities were in Chapter 10, "Carbon and its Compounds" (6 activities), while Chapter 4, "Magnetic Effects of Electric Current," and Chapter 9, "Acids, Bases, and Salts," had 4 activities each. Chapter 11, 'Life Processes', Chapter 13, 'How Do Organisms Reproduce?' and Chapter 15, 'Our Environment', had two activities each. Activities were also included

in chapters 1, 2, 7 and 12. There were no activities mentioned in six chapters.

All 24 activities incorporated all domains of Bloom's Taxonomy, with more emphasis on the cognitive and psychomotor domains than on the affective domain. Activities that took place in the cognitive domain were mainly in the form of analysing, applying, evaluating and creating. The affective domain activities focused on receiving the phenomena level, responding to phenomena, and internalizing the value level, with a greater emphasis on responding to the phenomena level. The psychomotor domain activities included a set level, guided response level, mechanism level, and adaptation level, with a higher emphasis on the guided response level.

The findings of the study indicate that the activities listed in the MBSE science textbook of class X place more emphasis on group work than individual work. The activities in the textbook were found to be related to all three domains of Bloom's Taxonomy. Further analysis reveals that most of the activities were based on the lower levels of the domains of Bloom's Taxonomy. Through the analysis, it was clearly seen that the activities in the cognitive domain belonged to the higher-order level of the domain, while the activities in the psychomotor domain belonged to the middle level of the domain, while the activities in the affective domain belonged to the lower-order level of the domain. The study also revealed that the activities in the MBSE science textbooks somewhat followed the recommendations of the National Curriculum Framework, consisting of more group activities and fewer individual tasks.

Analysis of the Class X science textbook ultimately led the investigators to conclude that the number of activities included in the textbook was unsatisfactory, as some chapters lacked any activities at all. It is therefore advisable for content writers and the MBSE to consider including activities in these chapters when rewriting or revising the textbook to better facilitate students' understanding of the concepts. Furthermore, there were only a few activities that involve individual task

completion, so it is essential to include both types of activities in the textbook to strike a proper balance so that students can develop equal capacity for both individual and group work.

Textbooks need to be developed with activities that incorporate an interdisciplinary science teaching methodology, balance individual and group activities, incorporate technology, and foster a deeper understanding of scientific concepts through a commitment to cross-formative student and educator evaluation. This way, we can inspire the next generation of thinkers and innovators who will help develop society and solve the tough challenges of the future.

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