ABSTRACT

AN ANALYTICAL STUDY OF THE EXERCISES IN CLASSES VI-X ENGLISH TEXTBOOKS IN MIZORAM WITH REFERENCE TO BLOOM'S TAXONOMY

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

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INTRODUCTION

Teaching and learning is a complex process usually dictated by the interaction between the teacher and the student in relation to the curriculum, instruction and assessments within the boundaries of the school. The demonstration of the curriculum occurs in many forms, one of which is the textbook. According to Ur (2009), textbooks serve as a framework for teachers and learners to help them understand "where they are going and what is coming next" (p.184). Bagh and Esen (2003, as cited in Aslan, 2011) stressed on the importance of well-designed texts and learning tasks as they help the students "to synthesize their own knowledge and experiences with what they learn at school; improve their personal viewpoints and interpretation of a topic; create new fields of questioning in the minds of students, and ensure that the students can use other viewpoints" (p.30). Day & Park (2005) also stated that well-designed questions prompt the students to interact with the text, create and construct meaning and begin to think critically and intelligently. It is therefore useful to examine the content and exercises of textbooks, check on the levels of the exercises in terms of complexity and see how they contribute towards the development of the learners' critical thinking ability.

Among the different existing taxonomies and models for textbook evaluation, Bloom's Taxonomy can be considered one of the most effective tool to assess learning activities and analyze and categorize the levels of questions that are found in the textbooks. The Taxonomy of Educational Objectives (1956), often called Bloom's Taxonomy, is a classification of the different learning objectives in the cognitive, affective and psychomotor domain and are categorised into different levels of complexity and specificity. The Taxonomy was revised by a group of cognitive psychologists, curriculum theorists, instructional researchers, and testing and assessment specialists headed by Bloom's former student, Lorin Anderson. The Revised Taxonomy included several significant changes and was published in 2001 under the title "A Taxonomy for Teaching, Learning, and Assessment: A Revision of Bloom's Taxonomy of Educational Objectives".

The Revised Bloom's Taxonomy (RBT) is a two-dimensional framework which identifies both the kind of knowledge to be learned (knowledge dimension) and the kind of learning expected from students (cognitive processes). The

knowledge dimension was classified into four levels, namely Factual, Conceptual, Procedural, and Meta-Cognitive. The cognitive processes were categorized as Remembering, Understanding, Applying, Analyzing, Evaluating and Creating. The Revised Taxonomy table along with descriptions of the knowledge and cognitive process dimension are shown below:

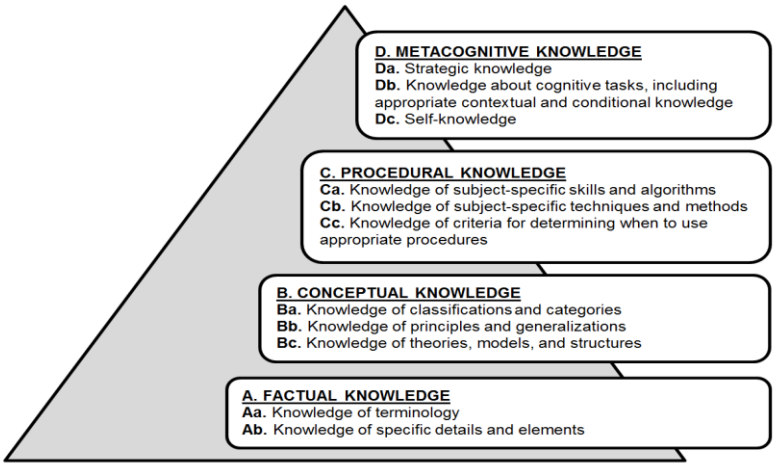
Figure 1

The Revised Bloom's Taxonomy table as proposed by Anderson et al. (2001)

Knowledge Dimension	Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge						
Conceptual Knowledge						
Procedural Knowledge						
Metacognitive Knowledge						

Figure 2

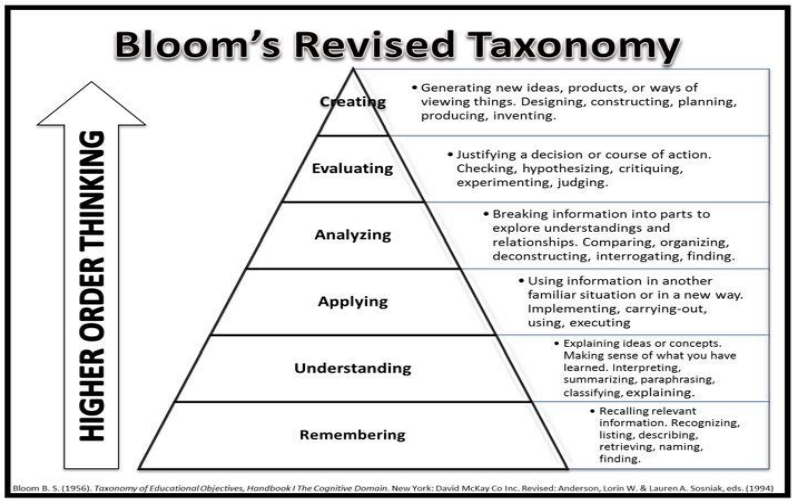
RBT - Knowledge Dimension as presented in Anderson et al. (2001)



Source: http://www.kamts1.kpi.ua/en/node/2422

Figure 3

RBT - Cognitive Domain as proposed by Anderson et al. (2001)



Source: http://discuss.cle.ust.hk/mediawiki/images/4/43/Revised.jpg

The six categories in the cognitive process dimension can be further categorised into three levels of cognitive skills based on their level of difficulty and complexity –

a) Lower Order Cognitive Skills (LOCS) which included exercises in the Remember level

b) Middle Order Cognitive Skills (MOCS) which included exercises in the Understand and Apply levels

c) Higher Order Cognitive (HOCS) which included exercises in the Analyse, Evaluate and Create levels

Anderson et al. (2001) described the Revised Taxonomy as a framework to "plan and deliver appropriate instruction, design valid assessment tasks and strategies, and ensure that instruction and assessment are aligned with the objectives" (p. xxii). Brown (2004) and Amer (2006) also claimed the usefulness of The Taxonomy Table for classification of the tasks and activities used for achievement of the learning objectives; to classify the assessments employed to determine mastery of objectives; to help teachers realize the relationship between assessment and teaching/learning activities and to examine curriculum alignment i.e. alignment of the instruction and materials, objectives or standards and tests, in all subject matters at every grade or school level. This complete alignment, which is

verified when the objective, instructional activities and materials, and assessments all fall into the same cell within The Taxonomy Table is crucial for the realization of efficient and effective student learning.

RATIONALE OF THE STUDY

The NCF 2005 in its position paper "National Focus Group on Teaching of English" (NCERT, 2006), mentions that the objectives of language teaching is not limited to the development the four fundamental skills (listening, speaking, reading, and writing) but also extends to the development of the thinking skills of the students. It states that "Language in education would ideally and ordinarily build on such naturally acquired language ability, enriching it through the development of literacy into an instrument for abstract thought and the acquisition of academic knowledge. We can then speak of a 'cognitive academic linguistic proficiency' (cf. Cummins 1979) as language and thinking skills that build on the basis of a child's spontaneous knowledge of language. This is a goal of language education, and education through language" (p.4).

In order to achieve the objectives thus mentioned, the exercises in the textbooks then become of great importance. The exercises and activities introduced to the learners in the classroom reflects the kind of teaching and learning that takes place in class and helps in identifying the type of knowledge the student gains, how knowledge is being transferred, the cognitive processes involved and the extent to which the educational objectives are realized. Chadwick (2013) views exercises as a fundamental part in teaching children to think critically and creatively. Furthermore, Jones et al. (2009) and Swart (2010) consider exercises as an integral part of the teaching – learning process in order to actively engage the learners for meaningful learning and effective instructions. According to Tofade et al. (2013), questions assist teachers in uncovering what is learned by the student, stimulate higher order thinking, enhance creativity and critical thinking and build confidence. Therefore, investigating the questions in the textbooks and questions used during instruction will show the impact questions have on the students' learning and thinking processes.

English textbooks are usually full of exercises and activities that come either

at the beginning or at the end of each lesson, unit or section; unfortunately however, research has shown that most textbooks do not contain materials, nor do they include exercises that require critical thinking and meta-cognitive processes (Collins et al., 1989). The development of the cognitive, academic, emotional and physical competencies of learners is crucial especially in the twenty-first century (Fasuga et al., 2010, as cited in Zorluoglu, 2020), hence the curriculum and instruction should support the mastering not just the content and skills at the lower level but also for the development both the knowledge and skill at the advanced levels as well. It is therefore essential that the various tasks and activities in the textbooks are framed to develop students' knowledge and cognitive skills, promote and encourage higher thinking processes and develop knowledge not only of general facts, concepts and procedures but also gain awareness and understanding of one's own cognition as well.

The present study is therefore taken up to analyse and categorize the exercises in the English textbooks adopted by the State and Central Board schools in Mizoram according to the various cognitive processes and knowledge dimensions stated in the Revised Bloom's Taxonomy. Such an analysis will result in assessing not only the product but also the process involved in the development of students' knowledge and cognitive skills. The analysis will also help in determining whether the textbook places emphasis upon higher levels of thinking processes, thereby fulfilling the objectives of teaching English as stated in the position paper of the NCF 2005, or whether the exercises merely encourage lower levels of knowing and thinking. Since no such study has been taken up in the State so far, the analysis will also serve as a tool for future curriculum designers and textbook writers of MBSE and SCERT in determining where the quality of textbooks prepared by the State is standing in comparison to those prepared by the Central Boards and also determine whether the activities in the present textbooks should be saved, changed, or modified in the future.

In relation to the aforementioned reasons, the current study therefore seeks to answer the following research questions:

1. To what extent are the different levels in the cognitive process of the Revised Blooms Taxonomy represented in the exercises of Class VI – Class X English textbooks adopted by the State Board schools in Mizoram?
2. To what extent are the different levels in the cognitive process of the Revised Blooms Taxonomy represented in the exercises of Class VI – Class X English textbooks adopted by the Central Board schools in Mizoram?
3. To what extent are the different categories in the knowledge dimension of the Revised Blooms Taxonomy represented in the exercises of Class VI – Class X English textbooks adopted by the State Board schools in Mizoram?
4. To what extent are the different categories in the knowledge dimension of the Revised Blooms Taxonomy represented in the exercises of Class VI – Class X English textbooks adopted by the Central Board schools in Mizoram?
5. How does the level of complexity of the exercises progress from Class VI - Class X in the Lower, Middle and Higher Order Cognitive Skills in English textbooks adopted by the State and Central Board schools in Mizoram?
6. Are there any significant differences in the distribution of exercises between English textbooks adopted by the State and Central schools in Mizoram at the various levels of the cognitive process dimension?
7. Are there any significant differences in the distribution of exercises between English textbooks adopted by the State and Central schools in Mizoram at the various categories of the knowledge dimension?
8. Is there any significant difference in the progression of exercises from Classes VI to X at the Lower, Middle and Higher Order Cognitive Skills between the textbooks adopted by the State and Central Board schools in Mizoram?

STATEMENT OF THE PROBLEM

The problem under investigation reads as "An Analytical Study of the Exercises in Classes VI-X English Textbooks in Mizoram with reference to Bloom's Taxonomy".

OBJECTIVES OF THE STUDY

1. To analyse and compare the exercises in Class VI – Class X English textbooks adopted by the State and Central Board schools in Mizoram based on the cognitive process dimension of the Revised Bloom's Taxonomy.
2. To analyse and compare the progression of the exercises from Class VI - Class X in the Lower, Middle and Higher Order Cognitive Skills in English textbooks adopted by the State and Central Board schools in Mizoram
3. To analyse and compare the exercises in Class VI – Class X English textbooks adopted by the State and Central Board schools in Mizoram based on the knowledge dimension of the Revised Bloom's Taxonomy.
4. To analyse and compare the exercises in Class VI – Class X English textbooks adopted by the State and Central Board schools in Mizoram based on the cognitive process dimension and the knowledge dimension of the Revised Bloom's Taxonomy

NULL HYPOTHESES:

1. There exists no significant difference in the percentages of exercises given in the English textbooks for Classes VI to X at the Remember, Understand, Apply, Analyse, Evaluate and Create Levels between the textbooks adopted by the State and Central Board schools in Mizoram.
2. There exists no significant difference in the percentages of exercises given in the English textbooks for Classes VI to X at the Lower, Middle and Higher Order Cognitive Skills between the textbooks adopted by the State and Central Board schools in Mizoram.
3. There exists no significant difference in the percentages of exercises given in the English textbooks for Classes VI to X at the Factual, Conceptual, Procedural and Metacognitive knowledge dimensions between the textbooks adopted by the State and Central Board schools in Mizoram.
4. There exists no significant difference in the percentages of exercises given in the English textbooks for Classes VI to X between the textbooks adopted by the State and Central Board schools in Mizoram at the different categories of the cognitive process dimension and knowledge dimensions (A1-F4) of the

Revised Bloom's Taxonomy.

OPERATIONAL DEFINITION OF TERMS

1. **Analytical Study:** In the present study, analytical study refers to analysis and comparison of exercises in English textbooks used by the State and Central schools in Mizoram with reference to Revised Bloom's Taxonomy in the cognitive process dimension and the knowledge dimension.
2. **Exercises:** Exercises refers to the tasks and activities that appear at the beginning, middle or end of every chapter / lesson in the English textbooks. These exercises are framed to develop the students' language skills and also test their knowledge and cognitive abilities.
3. **English Textbooks in Mizoram**: Books written to teach English language in the schools affiliated to the State and Central Boards in Mizoram. This includes the textbooks prescribed by SCERT and MBSE for schools run and recognized by the State government and textbooks prescribed by NCERT for schools affiliated to the CBSE within Mizoram.
4. **Bloom's Taxonomy**: A framework for classifying different objectives and skills that educators set for students (learning objectives), proposed by Bloom (1956) and revised by Anderson et al. (2001). This Revised Bloom's Taxonomy was published in 2001 under the title 'A Taxonomy for Teaching, Learning, and Assessment: A Revision of Bloom's Taxonomy of Educational Objectives'. The present study will be taken up based on the Revised Bloom's Taxonomy in the cognitive process and knowledge dimension.

REVIEW OF RELATED LITERATURE

The investigator reviewed 64 literatures related to the study which were divided into two broad categories - studies related to analysis of language textbooks and studies related to analysis of textbooks of other subjects. All the studies based on Revised Bloom's Taxonomy that have been reviewed were studies conducted abroad and no studies have been found from India. Out of the 64 literatures reviewed, 54 studies were on analysis of language textbooks and only 10 on textbooks for other subjects.

RESEARCH METHOD

The present study is descriptive in nature as it seeks to describe and explain the characteristics and find out the distribution of exercises in Class VI – Class X English textbooks adopted by the State and Central Board schools in Mizoram based on the various levels in the cognitive process dimension and knowledge dimension of Revised Bloom's Taxonomy. The study also intends to find out the progression of exercises from Classes VI to X in the Lower Order Cognitive Skill (LOCS), the Middle Order Cognitive Skill (MOCS) and the Higher Order Cognitive Skill (HOCS) categories. Considering the nature of the objectives of the study, the investigator used both quantitative and qualitative methods for analysis of the data.

SOURCES OF DATA

The data for the present study in the form of 4791 textbook exercises was obtained from Class VI – Class X English textbooks adopted by the State and Central Board schools in Mizoram.

For schools that are affiliated to the Central Board of Secondary Education (CBSE), the English textbooks prescribed for Classes VI - X were published by the National Council of Educational Research and Training (NCERT), New Delhi where there are two (2) textbooks for each class – Coursebook and Supplementary reader. On the other hand, for schools run and recognized by the State government, English textbooks for Classes VI-VIII published by NCERT have been adapted and prescribed by the State Council of Educational Research and Training (SCERT), Mizoram while the textbooks for Classes IX and X were prescribed by the Mizoram Board of School Education (MBSE). There are three textbooks for each class, namely, Coursebook, Workbook and Supplementary/ Literature reader. Details of the exercises are shown in Table No. 1:

Table 1

Details of exercises in Class VI – Class X English Textbooks adopted by the State and Central Board Schools in Mizoram

Class	State	Central	Total
VI	397	314	711
VII	486	391	877
VII	665	545	1210
IX	391	501	892
X	483	618	1101
TOTAL	**2422**	**2369**	**4791**

BASIS FOR CLASSIFICATION OF TEXTBOOK EXERCISES

i. **Revised Bloom's Taxonomy:** The exercises in the selected textbooks were analysed based on the cognitive process and knowledge dimension of the Revised Bloom's Taxonomy (RBT) by Anderson et al. (2001). Many researchers have used the RBT for research analysis which thus establish the validity of the tool.

ii. **The Taxonomical Analysis Table:** The Taxonomical Analysis Table was designed by the investigator based on the two dimensional matrix taxonomy table proposed by Anderson et al (2001). However, for the purpose of the research, the table was redesigned where instead of using the two dimensional matrix, columns were made for entering details of each exercise found in the textbooks mentioning the lesson number, page number, question number and the question followed by the various levels under the cognitive and knowledge dimension of the RBT. After making necessary entries regarding the lesson number, page number, question number and the question, the questions were then labeled against the most appropriate levels in both the cognitive and knowledge dimension of the RBT which were placed in the subsequent columns.

RELIABILITY OF ANALYSIS:

The reliability of the analysis of the exercises in the selected textbooks was established using inter-rater reliability in which a sample of 370 exercises from the textbooks were analysed individually by the researcher and the three analysts based on the various levels in the cognitive process and knowledge dimensions of the Revised Bloom's Taxonomy. The frequency of agreement and disagreement between the analyses of the researcher with each analyst was examined and the reliability coefficient was calculated using Holsti's equation. The average percentage of agreement of the researcher with all the three analysts was above 86.39% and the agreement coefficient was accepted and the reliability of the analysis was thus established.

VALIDITY OF ANALYTICAL METHOD:

In order to ensure method validity of the classification and analysis of the textbook exercises, Six (6) experts were presented with a model of the analytical method adopted by the researcher for analysis of the textbook exercises. The experts were then asked to validate the method applied by the researcher for analysis of the textbook exercises. 100 % of the experts agreed on the accuracy of the analytical method applied by the researcher in classification of the textbook exercises in both the cognitive process and knowledge dimension of the Revised Bloom's Taxonomy and 83.33% agreed on the adequacy of the exercises given at the end of each lesson from all the prescribed textbooks **(4791 Nos.)** for the analysis based on of the Revised Bloom's Taxonomy. The analytical method was accepted and its validity was thus established.

PROCEDURES ADOPTED FOR DATA ANALYSIS

i. **Content Analysis:** The researcher initially performed a content analysis for all the textbooks selected for the purpose of the study. All 4791 exercises were analysed based on the cognitive process and knowledge dimensions of the Revised Bloom's Taxonomy where each question was marked under the respective column in the Taxonomical Analysis Table.

ii. **Descriptive Statistics Measures:** A total of 4791 exercises were analysed and classified into the appropriate cognitive process and knowledge dimension. The frequencies and percentages of occurrence of the exercises at each level of the cognitive process and knowledge dimensions were then calculated to find out the nature of their distribution.

iii. **Test of significance of difference between percentages:**

The difference in the percentage of occurrence of exercises at each level of the cognitive process and knowledge dimensions between the textbooks adopted by the State and Central Board were tested for significant difference by applying the percentage t-test.

MAJOR FINDINGS

1. Distribution of exercises based on the cognitive process dimension of the Revised Bloom's Taxonomy.

a. Distribution of exercises in Class VI – Class X English textbooks adopted by the State and the Central Board schools:

i. Class VI - The highest percentage of exercises in both the State and Central Board textbooks was found in Understand level followed by Remember, Apply, Evaluate, Create and Analyse levels respectively. No significant differences were found between the percentages of the exercises of both the State and Central Board school textbooks in any of the levels of the cognitive process dimension.

ii. Class VII - The highest percentage of exercises in both the State and Central Board textbooks was found in the Understand level followed by Remember, Apply, Evaluate, Analyse and Create levels respectively. No significant differences were found between the percentages of the exercises of both the State and Central Board school textbooks in any of the levels of the cognitive process dimension.

iii. Class VIII - The highest percentage of exercises in the State Board textbooks was found in Understand level followed by Remember, Apply, Analyse, Evaluate and Create levels. In the textbooks adopted by the Central Board schools, the majority of the exercises were found in Understand level

followed by Remember, Analyse, Evaluate, Apply and Create levels. No significant differences were found between the percentages of the exercises of both the State and Central Board school textbooks in any of the levels of the cognitive process dimension.

iv. **Class IX** - The highest percentage of exercises in the State Board textbooks was found in the Understand level which was followed by Apply, Remember, Analyse, Evaluate and Create levels. On the other hand, the majority of the exercises in the Central Board textbooks were found in the Understand level followed by Remember, Apply, Evaluate, Analyse and Create levels. No significant differences were found between the percentages of the exercises of both the State and Central Board School textbooks in the Understand, Analyse, Evaluate and Create levels. However, a significant difference was seen in the percentage of exercises in Remember and Apply levels between the State and Central Board School textbooks for Class IX.

v. **Class X** – Majority of the exercises in the textbooks adopted by the State Board schools were found in Understand level followed by Apply, Remember, Evaluate, Analyse and Create levels. In the exercises of Central Board textbooks, the highest occurrence was found in Understand level followed by Remember, Analyse, Create, Evaluate and Apply levels. Further analysis found no significant differences in the percentage of occurrence of the exercises in Remember, Analyse, Evaluate and Create levels between the textbooks adopted by the State and Central Board schools. However, significant difference was found in the percentage of occurrence of exercises at Understand and Apply levels between the State and Central Board school textbooks for Class X.

vi. **Overall** (**Class VI - Class X)** - Majority of the exercises in the State Board textbooks were found in Understand level followed by Apply, Remember, Evaluate, Analyse and Create levels. The highest occurrence in the exercises of the Central Board textbooks was found in Understand level followed by Remember level, Apply and Evaluate levels with equal percentage, Analyse level and lastly the Create level. No significant difference was found in the percentage of occurrence of exercises at the Analyse, Evaluate and Create

levels between the State and Central Board textbooks. However, the percentage of occurrence of exercises in the State and Central Board English textbooks were found to be significantly different at Remember, Understand and Apply levels

Discussion:

The study revealed that the highest percentage of exercises in all the English textbooks from Class VI – Class X adopted by both the State and the Central Board Schools were found in the Understand Level.

On the other hand, the least number of exercises were found at the Analyse level in Class VI English textbooks (both State and Central Board); the Create level in the English textbooks for Classes VII– X (State Board) and Classes VII – IX (Central Board); and the Apply level in Class X textbooks adopted by the Central Board schools.

Comparison of the distribution of exercises at the different levels in the cognitive dimension between the textbooks adopted by the State and Central Board schools found a significant difference in the percentage of exercises at the Remember and Apply level in Class IX and at the Understand and Apply level in Class X English textbooks. The reason behind the percentage of exercises in Class IX being significantly different at the Remember and Apply level and at the Understand and Apply level in Class X English textbooks could be due to the addition of Workbooks as one of the textbooks in Class IX and Class X English textbooks adopted by the State Board schools. Workbooks include lots of exercises and activities for practice and application of language rules which will significantly increase the number of exercises in the Apply level for the mentioned classes. This increase in the percentage of Apply level exercises in the State Board textbooks led to the reduction of Remember level exercises in Class IX textbooks and Understand level exercises in Class X textbooks compared to the Central Board textbooks that still contained a good percentage of its exercises at the Remember and Understand level in Class IX and Class X textbooks respectively.

b. Class-wise distribution of exercises (State and Central Board textbooks combined):

i. **Class VI** - Out of a total of 711 exercises, the highest percentage was found in Understand Level followed by Remember, Apply, Evaluate, Create and Analyse levels respectively.

ii. **Class VII** - Out of a total of 877 exercises, the highest percentage was found in Understand level followed by Remember, Apply, Evaluate, Analyse and Create levels.

iii. **Class VIII** - Out of a total of 1210 exercises, the highest percentage was found in Understand level followed by Remember, Apply, Analyse, Evaluate level and Create levels respectively.

iv. **Class IX** - Out of a total of 892 exercises, the highest percentage was found in Understand level, followed Remember, Apply, Evaluate, Analyse and Create levels.

v. **Class X** - Out of a total of 1101 exercises, the highest percentage was found in Understand level followed by Remember, Apply, Analyse, Evaluate and Create levels respectively.

vi. **Overall** (**Class VI - Class X)** - Out of a total of 4791 exercises, the highest percentage was found in Understand level followed by Remember, Apply, Evaluate, Analyse and Create levels.

Discussion:

The study found the highest percentage of exercises in the Understand level in the textbooks for each class i.e. Class VI – Class X. On the other hand, the English textbooks for Class VI had the least number of its exercises in the Analyse level and Class VII - Class X in the Create level. Analysis of all the exercises from Class VI – X textbooks combined (4791 nos.) found the highest percentage in the Understand level and the least percentage in the Create level.

The fact that all the textbooks from Classes VI-X had the highest percentage of its exercises in the Understand level may be addressed. Although it may be reasonable to focus more on the exercises testing the learners' understanding of the content and thereby aim to develop the comprehension skill of the students in textbooks at the elementary stage i.e. Class VI – VIII, it may be advisable to shift the

focus to the higher levels i.e. Analyse, Evaluate and Create in the exercises of textbooks for higher classes i.e. Class IX and X. The textbooks may be designed in such a way that as the class / grade advances, the level of complexity of the exercises in terms of the various levels in the cognitive dimension may also be gradually increased. That is, the number of exercises at the Remember level may gradually decrease and the number of Create level exercises may gradually increase as the grades advances where by Class X, the exercises in the textbooks may be highly concentrated with Evaluate and/or Create level exercises and only a few exercises from the lower levels of the cognitive dimension. This will be in concordance with the abilities and needs of the learners where they are expected to be able to deal with and are also in need of practice of more complex tasks as their grade advances for further development of their cognitive skills.

c. Level-wise distribution of exercises from highest to lowest percentage (State and Central Board textbooks combined):

i. **Remember level** - Class VI (31.79%), Class VII (28.16%), Class IX (25.00%), Class VIII (23.88%) and Class X (21.43%).

ii. **Understand level** - Class VIII (45.12%), Class X (44.78%), Class IX (43.16%), Classes VII (39.79%) and Class VI (37.37%).

iii. **Apply level** - Class VI (17.58%), Class VII (16.99%), Class IX (16.48%), Class X (14.71%) and Class VIII (12.31%).

iv. **Analyse level** - Classes VIII (8.10%), Class X (7.81%), Class IX (5.27%), Class VII (4.56%) and Class VI (2.67%).

v. **Evaluate level** - Class VI (7.59%), Class VIII (6.94%), Class VII (6.73%), Class X (6.54%) and Class IX (5.72%).

vi. **Create level** - Class X (4.72%) Class IX (4.37%), Class VII (3.76%), Class VIII (3.64%) and Class VI (3.09%).

Discussion:

The study found that no systematic pattern was followed in the distribution of the exercises in each level of the cognitive dimension as grades advances from Class VI to Class X.

The highest percentage of exercises in the Remember level was found in Class VI textbooks and the lowest percentage of exercises was found in Class X

textbooks. Since exercises at the Remember level are responded only from memory using previous knowledge, having a lot of exercises in this level may no longer be required at the higher grades as students need to be challenged with more complex questions that demand the use of more complex and critical thinking abilities. Hence the reduction of the number of exercises in this level as the grades advances is quite justified.

In the Understand level, the highest percentage of exercises was found in Class VIII textbooks and the lowest percentage of exercises was found in Class VI textbooks. As the exercises in this level requires the ability to construct meaning by explaining, clarifying, summarizing, extrapolating, illustrating and/or generalizing the message contained in the given text, the increase in such exercises at the higher classes i.e. Class VIII – X and the highest concentration being in Class VIII textbooks was found to be very befitting as the skill to perform cognitive tasks of such level ought to be developed as students reach the higher grades/classes.

Exercises in the Apply level involve the skill to carry out or use a learnt procedure in either familiar or unfamiliar situations. Class VI textbooks was found with the highest percentage of Apply level exercises while Class VIII textbooks were found with the least percentage of exercises in this level. A separate look at the textbooks in the Elementary level i.e. Class VI-VIII found a gradual decrease in the number of exercises that tests the application skills of the learners. However, the numbers again increased at the Secondary level with more Apply level exercises than that which is found in Class VIII textbooks. This irregular distribution of Apply level exercises may be addressed by either increasing or decreasing the number of Apply level exercises in a systematic and regular manner as the grades move up from Class VI to Class X.

The Analyse level exercises involves the ability to differentiate and distinguish between parts and then find coherence by determining how the parts relate to one another and to an overall structure or purpose. The distribution of the Analyse level exercises where the highest percentage was found in Class VIII textbooks and the lowest percentage in Class VI textbooks may be quite appropriate as students in Class VIII are at the final stage of their Elementary School and more focus needs to be given on the development of their ability to analyse texts in order

to prepare them for the tasks they may need to perform as they advance to the higher classes. Therefore, considering the needs and abilities of the learners in the different grades i.e. Class VI-X, having the highest concentration of Analyse level exercises in Class VIII is found to be suitable and appropriate.

Exercises at the Evaluate level requires learners to respond by making judgments and determining the consistencies and appropriateness of a procedure based on criteria and standards. Therefore, having the highest percentage of exercises in Class VI textbooks and the lowest percentage of exercises in Class IX textbooks may not be appropriate as students in Class VI standards may not yet possess higher critical thinking skills in order to make reasonable and objective judgments. Exercises at the Evaluate Level may be distributed in such a way that majority may be found in the secondary school textbooks instead of the elementary school textbooks as students in Class IX and X are now capable to perform such tasks and their abilities to evaluate and make judgments may be further enhanced by providing such type of exercises for practice in their textbooks.

As the Create level is at the highest level in the cognitive dimension and exercises in this level requires students to possess the ability to generate, plan and produce something new based on the knowledge and skill that has been acquired, having the highest percentage of exercises in Class X textbooks and the lowest percentage of exercises in Class VI textbooks is found to be quite appropriate. By the time they reach Class X, students may have gathered enough knowledge and skill needed for dealing with more number of Create level exercises. Further, challenging the students with more Create level exercises in the higher classes may also be very beneficial as it would increasingly contribute towards the development of the more complex cognitive skills.

2. Progression of the exercises from Class VI - Class X in the Lower, Middle and Higher Order Cognitive Skills in English Textbooks adopted by the State and Central Board schools in Mizoram.

The six categories in the cognitive process dimension of the Revised Bloom's Taxonomy were categorised into three levels - the Lower Order Cognitive Skill (LOCS), Middle Order Cognitive Skill (MOCS) and Higher -

Order Cognitive Skill (HOCS), based on their level of difficulty and complexity:

i. The Lower – Order Cognitive Skill (LOCS) - which include exercises in the ***Remember*** level and are intended to promote retention and are responded by recalling and retrieving information from memory.

ii. The Middle – Order Cognitive Skill (MOCS) - which include exercises in the ***Understand and Apply*** levels and are responded by using the learnt information to make inferences and apply them in new situations, thus forming a bridge between the lower and higher order cognitive skills.

iii. The Higher – Order Cognitive Skill (HOCS) – which include exercises in the ***Analyse, Evaluate and Create*** levels and are meant for transferring and use of prior knowledge to solve problems and form new knowledge. It involves breaking down complex information into parts, explain their relationships, arrive at a reasoned judgment and then combine the parts together to form a new whole pattern or structure.

The findings with regard to the progression of the exercises from Class VI - Class X in the LOCS, MOCS and HOCS in the English Textbooks adopted by the State and Central Board schools in Mizoram are presented in the following paragraphs.

a. Progression of exercises in English textbooks adopted by the State Board schools

i. In the LOCS exercises, there was a gradual decrease in the percentage of exercises from Class VI to Class X with 28.46% in Class VI, 26.34% in Class VII, 21.80% in Class VIII and 15.86% in Class IX. Although the percentage of exercises slightly rose in Class X with 21.32% compared to Class IX, it was still lower in percentage compared to that of Class VI, VII and VIII.

ii. In the MOCS exercises, there was a gradual increase in percentage from 59.45% in Class VI, 59.88% in Class VII, 60.90% in Class VIII and 70.90% in Class IX. Although the percentage of exercises was reduced in Class X with 64.39%, it was still higher in percentage compared to that of Class VI, VII and VIII.

iii. In the HOCS exercises, the percentage of occurrence of HOCS exercises increased as the grades move to higher classes. It was found that there were 12.09% HOCS exercises in Class VI progressing to 13.78% in Class VII, 17.30% in Class VIII, a slight decline in Class IX with 14.07% which rose 14.29% in Class X.

Discussion:

Tracing the progression of exercises at the various levels in the cognitive skill, it has been observed that the percentage of LOCS exercises have decreased as grades advance from Class VI to Class X. Contrary to this, there is an increase of percentage in the MOCS as well as HOCS exercises as the grades advance from Class VI to Class X.

This rate of progression where there is a decrease of LOCS exercises and an increase of MOCS and HOCS exercises as the grades/class advances is believed to be psychologically appropriate as the cognitive ability of the students and their ability to deal with more complex exercises are expected to grow and develop with the advancement in age and grade. Interestingly, majority of the exercises in the textbooks of all classes were found in MOCS category. This implies that the exercises in the textbooks will mainly focus on the development of the ability to comprehend and apply learnt items. It is believed that for students in the Elementary stage, particularly at the Middle School level, the focus on MOCS exercises seems quite appropriate as they are in a stage where they need ample practice for the development and mastery of their ability to understand and apply learnt items. However, for secondary school students, more HOCS exercises may be given in their textbooks since they have reached the age and grade where their ability to critically deal with situations and procedures and also explore their creative abilities needs to be developed and enhanced. Therefore, the Secondary school level textbooks should shift their focus by decreasing the number of MOTS exercises and increasing the number of HOTS exercises.

Another interesting finding is that the highest percentage of HOCS exercises was found in Class VIII textbooks which are still at an elementary stage and not in Class X textbook which is the highest grade at the Secondary stage. This reflects the lack of systematic distribution of the exercises based on the level of difficulty of the

cognitive skills.

b. Progression of exercises in English textbooks adopted by the Central Board schools

i. In the LOCS exercises, there was a gradual decrease in the percentage from Class VI to Class X with 35.98% in Class VI, 30.44% in Class VII and 26.42% in Class VIII. However there was a rise in the percentage in Class IX with 32.13% which again decreased to 21.52% in Class X.

ii. In the MOCS exercises, there was a gradual increase in percentage from 49.04% in Class VI, 52.94% in Class VII and 53.21% in Class VIII. However there was a fall in the percentage in Class IX with 51.50% which again increased to 55.66% in Class X

iii. A similar pattern found in the progression of MOCS exercises was also observed in the progression of exercises identified under HOCS i.e. an increase in percentage from 14.98% in Class VI, 16.62% in Class VII and 20.37% in Class VIII. However there was a fall in the percentage in Class IX with 16.37% which again increased to 22.82% in Class X.

Discussion:

Tracing the progression of exercises in the English textbooks adopted by the Central Board schools at the various levels in the cognitive skill, it has been observed that the percentage of LOCS exercises have decreased as grades advance from Class VI to Class X. Contrary to this, there is an increase of percentage in the MOCS as well as HOCS exercises as the grades advance from Class VI to Class X.

This rate of progression where there is a decrease of LOCS exercises and an increase of MOCS and HOCS exercises as the grades/class advances is believed to be psychologically appropriate as the cognitive ability of the students and their ability to deal with more complex exercises are expected to grow and develop with the advancement in age and grade. Interestingly, majority of the exercises in the textbooks of all classes were found in MOCS category. This implies that the exercises in the textbooks mainly focused on the development of the ability to comprehend and apply learnt items. Since tasks that require analytical, evaluative and creative abilities will develop with age and maturity, the increase in the number of HOCS exercises as the grades advance and having the highest percentage in the

highest grade i.e. Class X is found to be very appropriate. However the progression of HOCS exercises may be made more systematic where there may be a gradual addition of HOCS exercise in the textbooks of each class as they advance to the next higher grade and the textbooks of each class will have more number of HOCS exercises than the textbooks of the preceding class. This will ensure gradual and steady progress in terms of practice and development of higher order cognitive skills as the students' progress from one class to the next.

c. Comparison of the progression of exercises between State and Central Board English textbooks in Lower, Middle and Higher Order Cognitive Skills

i. Progression of exercises from lowest to highest percentage of occurrence in State and Central Board English textbooks in LOCS category:

a) State Board textbooks – Class IX (15.86%), Class X (21.32%), Class VIII (21.80%), Class VII (26.34%), Class VI (28.46%).

b) Central Board textbooks – Class X (21.52%), Class VIII (26.42%), Class VII (30.44%), Class IX (32.13%), Class VI (35.98%).

Discussion:

The percentage of LOCS exercises in the Central Board textbooks ranged between 21.52% and 35.98% while the percentage of exercises in the State Board textbooks ranged between 15.86% and 28.46%. It was observed that as the grades move up to higher classes, there was a gradual decrease in the percentage of exercises in both the Central and the State Board textbooks. The highest percentage was found in Class VI textbooks in both the Central and State Board textbooks while the lowest percentage was found in Class IX for State Board and Class X for the Central Board textbooks. Based on the frequency and percentage of occurrence of exercises in each class, the study revealed that greater stress is given to the LOCS exercises by the Central Board compared to the State Board in all the textbooks from Class VI - Class X.

ii. Progression of exercises from lowest to highest percentage of occurrence in State and Central Board English textbooks in MOCS category:

a) State Board textbooks – Class VI (59.45%), Class VII (59.88%), Class VIII (60.90%), Class X (64.39%), Class IX (70.07%).

b) Central Board textbooks – Class VI (49.04%), Class IX (51.50%), Class VII (52.94%), Class VIII (53.21%), Class X (55.66%).

Discussion:

The percentage of MOCS exercises in the State Board textbooks ranged between 59.45% and 70.07% while exercises in the Central Board textbooks ranged between 49.04% and 55.66%. There was a gradual increase in the percentage of exercises in both the Central and the State Board textbooks as the grades move up to higher classes. The lowest percentage was found in Class VI textbooks in both the Central and State Board textbooks while the highest percentage was found in Class IX for State Board and Class X for the Central Board textbooks. Based on the frequency and percentage of occurrence of exercises in each class, the study revealed that greater stress is given to the MOCS exercises by the State Board compared to the Central Board in all the textbooks from Class VI – Class X. This suggests that the State Board textbooks would provide more opportunities and practice for development of the skills of understanding and applying of given task compared to the Central Board textbooks.

iii. Progression of exercises from lowest to highest percentage of occurrence in State and Central Board English textbooks in HOCS category:

a) State Board textbooks – Class VI (12.09%), Class VII (13.78%), Class IX (14.07%), Class X (14.29%), Class VIII (17.30%).

b) Central Board textbooks – Class VI (14.98%), Class IX (16.37%), Class VII (16.62%), Class VIII (20.37%), Class X (22.82%).

Discussion:

The percentage of HOCS exercises in the State Board textbooks ranged between 12.09% and 17.30% while exercises in the Central Board textbooks ranged between 14.98% and 22.82%.There was an increase in the percentage of exercises in both the Central and the State Board textbooks as the grades move up to higher classes. The lowest percentage was found in Class VI textbooks in both the Central and State Board textbooks. Interestingly, the highest percentage of HOCS exercises in the State Board textbooks was found in Class VIII which is still at the elementary stage whereas in the Central Board textbooks, the highest percentage of HOCS exercises was found in Class X which seems more appropriate as students in Class X

are expected to be more capable of dealing with exercises that demand the use of higher order cognitive skills. Based on the frequency and percentage of occurrence of exercises in each class, the study revealed that greater stress is given to the HOCS exercises by the Central Board compared to the State Board in all the textbooks from Class VI – Class X. This finding suggests that Central Board textbooks would provide better opportunity for development of the ability to analyse, evaluate and create compared to the State Board textbooks.

d. Progression of exercises from Class VI - Class X English textbooks (State and Central Board textbooks combined) in Lower, Middle and Higher Order Cognitive Skills:

i. In the LOCS exercises, there was a gradual decrease in the percentage of exercises from Class VI to Class X with 31.79% in Class VI, 28.16% in Class VII and 23.88% in Class VIII. However there was a rise in the percentage in Class IX with 25.00% which again decreased to 21.44% in Class X.

ii. In the MOCS exercises, there was a gradual increase in the percentage of exercises from Class VI to Class IX with 54.85% in Class VI, 56.79% in Class VII, 57.44% in Class VIII, 59.64% in Class IX. Although the percentage of exercises was reduced in Class X with 59.49% compared to Class IX, it was still higher in percentage compared to that of Class VI, VII and VIII.

iii. In the HOCS exercises, there was a gradual increase in the percentage of exercises as the grades move to higher classes with 13.36% in Class VI progressing to 15.05% in Class VII, 18.68% in Class VIII, a slight decline in Class IX with 15.36% which again increased to 19.07% in Class X.

Discussion:

Tracing the progression of exercises by looking at the difference between the percentage of exercises in Class VI and Class X English textbooks adopted by both the State and Central Board Schools combined, it has been observed that the percentage of LOCS exercises have decreased while there is an increase of percentage in the MOCS and HOCS exercises. This rate of progression where there is a decrease of exercises in LOCS and an increase of MOCS and HOCS exercises as

the grades/class advances is known to be psychologically and academically sound based on the fact that students promoted to a higher class/grade have better and higher cognitive ability and critical thinking skills and are therefore capable of dealing with more advanced tasks in terms of difficulty and complexity. Also as the students advance to higher classes, they need to be provided with more complex and challenging tasks that would provide them with more opportunities for the growth and development of their ability to critically deal with situations and procedures.

e. Comparative study of the distribution of exercises between the State and Central Board textbooks:

i. Out of a total of 4791 exercises (state and central), 25.48% were identified under LOCS, 57.82% under MOCS and 16.70% under HOCS.

ii. Out of 2422 exercises in the textbooks adopted by the State Board schools, 22.75% were identified under LOCS, 62.63% under MOCS and 14.62% under HOCS.

iii. Out of 2369 exercises in the Central Board textbooks, 28.28% of its exercises were identified under LOCS, 52.89% under MOCS and 18.83% under HOCS.

iv. Comparing the differences in the distribution of exercises between the English textbooks adopted the State and Central Board Schools, significant differences were found in the percentages of exercises under LOCS and MOCS category whereas no significant difference was found in the percentages of HOCS exercises.

Discussion:

A comparative study of the distribution of exercises between the State and Central Board textbooks along with the overall score showed that within exercises categorised under LOCS, a significant difference was found between percentage of exercises in textbooks adopted by the State Board which had 22.75% of its exercises in this level and the textbooks adopted by the Central Board which had 28.28% of their exercises in this level. The percentage of exercises under LOCS category in the State Board textbooks was lower than the overall percentage of 25.48%, while that of the Central Board textbooks were found to be higher than the percentage of exercises found in overall score.

Significant difference was also found in the percentage of exercises under MOCS category between the textbooks adopted by the State Board and the Central Board schools. 62.63% of the exercises in the State Board textbooks were found in this level which is higher than the overall percentage (57.82%), whereas the textbooks adopted by the Central Board had 52.89% of their exercises in this level which is lower than the percentage of exercises found in overall score.

The difference in the percentage of exercises between the textbooks adopted by the State Board and the Central Board schools under HOCS category were not found to be significant where textbooks adopted by the State Board had 14.62% of its exercises in this level which is lower than the overall percentage (16.70%), whereas the textbooks adopted by the Central Board had 18.83% of their exercises in this level which is higher than the percentage of exercises found in overall score.

With the State Board textbooks having higher percentage of exercises in MOCS category than the Central Board textbooks, they would provide better opportunity for development of the skills of comprehension and application. On the other hand, since the Central Board textbooks have higher percentage of exercises in LOCS and HOCS category they would provide more exercises to test the retention of learnt items and also offer better opportunities for the development of the ability to analyse, evaluate and create compared to the State Board textbooks.

3. Distribution of exercises based on the knowledge dimension of the Revised Bloom's Taxonomy.

a. Distribution of exercises in Class VI – Class X English textbooks adopted by the State and Central Board schools:

i. Class VI - Majority of the exercises in the State Board textbooks were found in Factual knowledge dimension followed by Procedural Knowledge Dimension, Conceptual knowledge dimension and Metacognitive knowledge dimension. In the textbooks adopted by the Central Board schools, the highest number of exercises was found in Factual knowledge dimension, followed by Procedural knowledge dimension, Metacognitive knowledge dimension and Conceptual knowledge dimension. Comparison of the percentages of exercises between the State and Central Board textbooks

found no significant difference in Conceptual, Procedural and Metacognitive knowledge dimensions but a significant difference was found at the Factual knowledge dimension.

ii. **Class VII** - Majority of the exercises in the State Board textbooks were found in Factual knowledge dimension followed by Procedural knowledge dimension, Metacognitive knowledge dimension and Conceptual knowledge dimension. In the textbooks adopted by the Central Board schools, the highest number of exercises was found in Factual knowledge dimension, followed by Metacognitive Knowledge Dimension, Procedural knowledge dimension and Conceptual knowledge dimension. Comparison of the percentages of exercises between the State and Central Board textbooks found no significant difference in Conceptual, Procedural and Metacognitive knowledge dimensions but a significant difference was found at the Factual knowledge dimension.

iii. **Class VIII** - The highest percentage of occurrence of the exercises in the State Board textbooks was found in the Factual knowledge dimension followed by the Procedural knowledge dimension, Conceptual knowledge dimension and lastly the Metacognitive knowledge dimension. In the textbooks adopted by the Central Board schools, highest percentage of occurrence was found in Factual knowledge dimension followed by Conceptual knowledge dimension, Metacognitive knowledge dimension and Procedural knowledge dimension. Comparison of the percentages of exercises between the State and Central Board textbooks found no significant difference in Conceptual, Procedural and Metacognitive knowledge dimensions but a significant difference was found at the Factual knowledge dimension.

iv. **Class IX** -The highest percentage of occurrence of the exercises in the State Board textbooks was found in the Factual knowledge dimension followed by the Procedural knowledge dimension, Conceptual knowledge dimension and lastly the Metacognitive knowledge dimension. In the textbooks adopted by the Central Board schools, highest percentage of occurrence was found in Factual knowledge dimension followed by Conceptual knowledge

dimension, Metacognitive knowledge dimension and Procedural knowledge dimension. Further comparison of the percentages of exercises between the State and Central Board textbooks found no significant difference in Conceptual, and Metacognitive knowledge dimensions but a significant difference was found in the Factual and Procedural knowledge dimensions.

v. **Class X** - The highest percentage of occurrence of the exercises in the State Board textbooks was found in the Factual knowledge dimension followed by the Procedural knowledge dimension, Conceptual knowledge dimension and lastly the Metacognitive knowledge dimension. In the textbooks adopted by the Central Board schools, highest percentage of occurrence was found in Factual knowledge dimension followed by Metacognitive knowledge dimension, Conceptual knowledge dimension, and Procedural knowledge dimension. Further comparison of the percentages of exercises between the State and Central Board textbooks found no significant difference in Conceptual, and Metacognitive knowledge dimensions. However, significant difference was found in the in the Factual and Procedural knowledge dimensions in the percentages of exercises between the Class X English textbooks adopted by the State and Central Board schools.

vi. **Overall** (**Class VI - Class X)** – The highest percentage of occurrence of the exercises in the State Board textbooks was found in the Factual knowledge dimension followed by the Procedural knowledge dimension, Conceptual knowledge dimension and lastly the Metacognitive knowledge dimension. In the textbooks adopted by the Central Board schools, highest percentage of occurrence was found in Factual knowledge dimension followed by Conceptual knowledge dimension, Metacognitive knowledge dimension and Procedural knowledge dimension. Further comparison of the percentages of exercises between the State and Central Board textbooks found no significant difference in Conceptual, and Metacognitive knowledge dimensions but a significant difference was found in the Factual and Procedural knowledge dimensions.

Discussion:

The study revealed that the highest percentage of exercises in all the

textbooks selected for the study (Class VI – Class X English textbooks adopted by both the State and the Central Board schools) were found in the Factual knowledge dimension. Among the English textbooks adopted by the State Board Schools, Class VI – Class X textbooks had the least number of exercises in the Metacognitive knowledge dimension while Classes VIII English textbook found the least number of its exercises in the Conceptual knowledge dimension. The English textbooks adopted by the Central Board schools had the least number of their exercises in the Conceptual knowledge dimension in Class VI and VII textbooks and Procedural knowledge dimension in Class VIII - X English textbooks.

Comparison of the distribution of exercises at the different knowledge dimensions between the textbooks adopted by the State and Central Board schools found a significant difference in the percentage of exercises at the Factual knowledge dimension in Classes VI and VII textbooks in which the Central Board textbooks were found with a higher percentage than the State Board textbooks. Significant difference was also found in Factual and Procedural knowledge dimension in Classes IX and X textbooks. Similar result was found in the analysis of the total number of exercises in Class VI – Class X English textbooks combined with a significant difference between the State and Central Board textbooks in Factual and Procedural knowledge dimension. The probable reason for finding significantly different results in the percentages of exercises between the State and Central Board textbooks in Factual and Procedural knowledge dimension may be that the Central Board textbooks still put a lot of focus on exercises in the Factual knowledge dimension whereas the State Board textbooks reduced the number of exercises testing factual knowledge and contained more exercises in Procedural knowledge dimension through the inclusion of Workbooks thereby having a much higher percentage of its exercises in this dimension compared to the Central Board textbooks.

b. Class-wise distribution of exercises (State and Central Board textbooks combined):

i. Class VI - Out of a total of 711 exercises, the highest number was found in Factual knowledge dimension followed by Procedural knowledge dimension, Metacognitive Knowledge Dimension and Conceptual knowledge dimension respectively.

ii. **Class VII** - Out of a total of 877 exercises, the order of frequency of occurrence from the highest to the least number of exercises is Factual, Procedural, Metacognitive and Conceptual knowledge.

iii. **Class VIII** - Out of a total of 1210 exercises, the highest percentage of exercises was found in the Factual knowledge dimension followed by Conceptual, Metacognitive and Procedural knowledge dimensions.

iv. **Class IX** - Out of a total of 892 exercises, the highest percentage of exercises was found in Factual knowledge dimension, followed by Conceptual knowledge dimension, Procedural knowledge dimension and Metacognitive knowledge dimension.

v. **Class X** - Out of a total of 1101, the highest percentage of exercises was found in Factual knowledge dimension followed by Procedural knowledge dimension, Conceptual knowledge dimension and Metacognitive knowledge dimension.

vi. **Overall** (**Class VI - Class X)** - Out of a total of 4791 exercises, the highest occurrence was found in Factual knowledge dimension followed by Procedural knowledge dimension, Conceptual knowledge dimension and Metacognition knowledge dimension.

Discussion:

In all the textbooks from Class VI - Class X, the highest percentage of exercises was in found in the Factual knowledge dimension. On the other hand, textbooks for Class VI and VII had the least number of their exercises in the Conceptual knowledge dimension, Class VIII in the Procedural knowledge dimension and Class IX and X in Metacognitive knowledge dimension. Analysis of all the exercises from Class VI – Class X textbooks combined found the highest percentage in the Factual knowledge dimension and the least percentage in the Metacognitive knowledge dimension.

The fact that all the textbooks from Class VI - Class X had the highest percentage of its exercises in the Factual knowledge dimension may be addressed. Since exercises in the Factual knowledge dimension expects students to respond from their knowledge of the basic elements of the discipline or subject of study, it may be advisable to shift the focus to the other dimensions i.e. Conceptual,

Procedural and Metacognitive knowledge dimension in the exercises of textbooks for higher classes. The textbooks may be designed in such a way that as the class/ grade advances, the level of complexity of the exercises in terms of the various levels in the knowledge dimension may also be gradually increased. Since exercises in the Factual knowledge dimension requires only basic and specific knowledge of the subject, the number of exercises may gradually be decreased and the number of Metacognitive knowledge dimension exercises which requires an awareness and knowledge of the abstract may be gradually increased as the grades advances. This will be in concordance with the abilities and needs of the learners where they are expected to be aware of and learn about the more complex and abstract information as their grade advances.

c. Level-wise distribution of exercises (State and Central Board textbooks combined):

The distribution of exercises at the different levels of the Knowledge Dimension from highest to lowest percentage is as shown below:

i. **Factual knowledge dimension** - Class VII (62.71%), Class VI (60.76%), Class X (54.86%), Class VIII (50.66%) and Class IX (45.07%).

ii. **Conceptual knowledge dimension** - Class IX (22.64%), Class VIII (18.92%), Class X (16.17%), Class VI (9.82%) and Class VII (7.41%).

iii. **Procedural knowledge dimension** - Class IX (19.51%), Class VI (18.99%), Class VII (17.56%), Class X (16.80%) and Class VIII (14.88%).

iv. **Metacognitive knowledge dimension** - Classes VIII (15.54%), Class IX (12.78), Class VII (12.31%), Class X (12.17%) and Class VI (10.97%) respectively

Discussion:

The study found that no systematic pattern was followed in the distribution of the exercises in each level of the knowledge dimension as grades advances from Class VI to Class X.

Within the Factual knowledge dimension, the highest percentage of exercises was found in Class VII textbooks and the lowest percentage of exercises was found in Class IX textbooks. Since exercises at the Factual knowledge dimension requires basic and specific knowledge of the subject/discipline, having a lot of exercises in

this level may no longer be required at the higher grades as students need to be challenged with more complex questions that tests the students' knowledge of things beyond the facts. Hence the reduction of the number of exercises in this dimension as the grades advances is quite justified.

In the Conceptual knowledge dimension, the highest percentage of exercises was found in Class IX textbooks and the lowest percentage of exercises was found in Class VII textbooks. As the exercises in this dimension requires knowledge of the interrelationships among the basic elements within a larger structure such as classifications, principles, theories, models, and structure of concepts, the increase in such exercises at the higher classes i.e. Class VIII - X and the highest concentration being in Class IX textbooks was found to be very befitting as the ability to know and understand concepts ought to be developed as students reach the higher grades/classes.

Exercises in the Procedural knowledge dimension involve the knowledge of the methods, techniques and criteria involved in performing a task. Class IX textbooks were found with the highest percentage of exercises while Class VIII textbooks were found with the least percentage of exercises in this dimension. A separate look at the textbooks in the Elementary level i.e. Class VI-VIII found a gradual decrease in the number of exercises that tests the procedural knowledge of the learners. However, the numbers again increased at the Secondary level with the highest percentage in Class IX which again decreased in Class X. The fact that the least percentage is found in Class VIII which then spiked to its highest in the next Class i.e. Class IX may not be very desirable. Instead, the number of exercises may gradually be increased up to Class VIII and then lessened in the higher classes so that students may have a systematic practice of procedural knowledge exercises in their elementary stage after which they may shift to focus on the other knowledge dimensions still giving enough exercises in Classes IX and X textbooks for practice of the procedural knowledge.

The Metacognitive knowledge dimension exercises involve knowledge about cognitive tasks, including appropriate contextual and conditional knowledge as well as awareness and knowledge of one's own cognition. The distribution of exercises in the Metacognitive knowledge dimension finds the highest percentage in Class VIII

textbooks and the lowest percentage in Class VI textbooks. This finding may not be very sound as the knowledge of one's own cognition and the awareness of the self (metacognitive ability) is expected to improve significantly with age particularly during adolescence (Weil et al.,2012) and therefore more exercises for testing of metacognitive knowledge may be distributed in such a way that majority may be found in the secondary school textbooks instead of the elementary school textbooks as students in Class IX and X are now capable to perform such tasks and their abilities may be further enhanced by providing such type of exercises for practice in their textbooks.

4. Distribution of exercises based on the cognitive process dimension and the knowledge dimension of the Revised Bloom's Taxonomy.

For analysis of the distribution of exercises in the cognitive process dimension and the knowledge dimension of the Revised Bloom's Taxonomy, a two dimensional framework was framed as shown in Table No. 3 and Table No. 4. The cognitive process dimension consisted of six (6) categories namely: A) Remember B) Understand C) Apply D) Analyze E) Evaluate and F) Create and the knowledge dimension comprised of four (4) knowledge dimensions namely: 1) Factual knowledge 2) Conceptual knowledge 3) Procedural knowledge and 4) Metacognitive knowledge.

Table 2

Coding scheme based on Revised Bloom's Taxonomy

Knowledge Dimension	**Cognitive Process Dimension**					
	Remember (A)	**Understand (B)**	**Apply (C)**	**Analyse (D)**	**Evaluate (E)**	**Create (F)**
Factual Knowledge (1)	A1	B1	C1	D1	E1	F1
Conceptual Knowledge (2)	A2	B2	C2	D2	E2	F2
Procedural Knowledge (3)	A3	B3	C3	D3	E3	F3
Metacognitive Knowledge (4)	A4	B4	C4	D4	E4	F4

Table 3

Description of codes

Code Name	Description	Code Name	Description
A1	Remember Factual Knowledge	**D1**	Analyse Factual Knowledge
A2	Remember Conceptual Knowledge	**D2**	Analyse Conceptual Knowledge
A3	Remember Procedural Knowledge	**D3**	Analyse Procedural Knowledge
A4	Remember Metacognition Knowledge	**D4**	Analyse Metacognition Knowledge
B1	Understand Factual Knowledge	**E1**	Evaluate Factual Knowledge
B2	Understand Conceptual Knowledge	**E2**	Evaluate Conceptual Knowledge
B3	Understand Procedural Knowledge	**E3**	Evaluate Procedural Knowledge
B4	Understand Metacognition Knowledge	**E4**	Evaluate Metacognition Knowledge
C1	Apply Factual Knowledge	**F1**	Create Factual Knowledge
C2	Apply Conceptual Knowledge	**F2**	Create Conceptual Knowledge
C3	Apply Procedural Knowledge	**F3**	Create Procedural Knowledge
C4	Apply Metacognition Knowledge	**F4**	Create Metacognition Knowledge

Using the coding scheme, a descriptive analysis of the exercises in Classes VI – Class X English textbooks adopted by the State and Central Board schools in Mizoram was done to find out their distribution in the cognitive process and the knowledge dimension combined. The investigator also made an attempt to find out the difference in the percentage of the exercises between the textbooks adopted by the State and Central Board schools. The findings with regard to this analysis are presented in the following paragraphs.

a. Distribution of exercises in Class VI – Class X English textbooks adopted by the State and Central Board schools

i. **Classes VI** - The three highest frequencies in the exercises of both the State and Central Board textbooks were seen in categories A1 (Remember Factual knowledge), followed by category B1 (Understand Factual knowledge) and category C3 (Apply Procedural knowledge).

ii. **Classes VII** - The three highest frequencies in the exercises of both the State and Central Board textbooks were seen in categories B1 (Understand Factual

knowledge) followed by level A1 (Remember Factual knowledge) and category C3 (Apply Procedural knowledge).

iii. **Class VIII** - The three highest frequencies in the exercises of the State Board textbooks were in categories B1 (Understand Factual knowledge), A1 (Remember Factual knowledge), and C3 (Apply Procedural knowledge). In the Central Board textbooks, the most frequent category was B1 (Understand Factual knowledge), followed by A1 (Remember Factual knowledge), and B2 (Understand Conceptual knowledge).

iv. **Classes IX** - The three highest occurrences in the exercises of the State Board textbooks was seen in categories C3 (Apply Procedural knowledge), B2 (Understand Conceptual knowledge) and B1 (Understand Factual knowledge). However, the order of frequency in the Central Board textbooks are A1 (Remember Factual knowledge) followed by B1 (Understand Factual knowledge) and B2 (Understand Conceptual knowledge).

v. **Classes X** - The three highest frequencies in the exercises of the State Board textbooks were seen in categories C3 (Apply Procedural knowledge), A1 (Remember Factual knowledge) and B1 (Understand Factual knowledge). The order of frequency in the Central Board textbooks are B1 (Understand Factual knowledge) followed by A1 (Remember Factual knowledge) and B2 (Understand Conceptual knowledge).

vi. **Overall (Class VI – Class X) -** The three highest frequencies in the exercises of the State Board textbooks were seen in categories B1 (Understand Factual knowledge), C3 (Apply Procedural knowledge) and A1 (Remember Factual knowledge). The order of frequency in the Central Board textbooks were B1 (Understand Factual knowledge), A1 (Remember Factual knowledge) and B2 (Understand Conceptual knowledge).

The overall result of analysis of 4791 exercises from Class VI to Class X English textbooks adopted by both the State and Central Board schools found the three most frequent exercises from categories B1 (Understand Factual knowledge), A1 (Remember Factual knowledge) and C3 (Apply Procedural knowledge).

Discussion:

Analysis of the exercises in the English textbooks adopted by the State Board schools reveals that in Class VI, VII and VIII English textbooks, the first three categories with the most number of exercises were A1 (Remember Factual knowledge), B1 (Understand Factual knowledge) and C3 (Apply Procedural Knowledge). Exercises from categories B1 (Understand Factual knowledge), B2 (Understand Conceptual knowledge) and C3 (Apply Procedural Knowledge) were the first three categories with the most number of exercises in Class IX English textbooks. In Class X textbooks, A1 (Remember Factual knowledge), B1 (Understand Factual Knowledge) and B2 (Understand Conceptual knowledge) were the first three categories with the most number of exercises.

Analysis of the exercises in the English textbooks adopted by the Central Board Schools reveals that in Class VI and VII English textbooks, the first three categories with the most number of exercises were A1 (Remember Factual knowledge), B1 (Understand Factual knowledge) and C3 (Apply Procedural Knowledge). Exercises from categories A1 (Remember Factual knowledge), B1 (Understand Factual knowledge), B2 (Understand Conceptual knowledge) were the first three categories with the most number of exercises in Class VIII - X English textbooks.

The study showed that the State Board textbooks were dominated by exercises for testing of the abilities to understand factual knowledge, apply procedural knowledge and remember factual knowledge while exercises in the Central Board textbook were concentrated mostly on testing the abilities to understand factual knowledge, remember factual knowledge and understand conceptual knowledge. The overall result of analysis of 4791 exercises finds that exercises in the English textbooks from Class VI to Class X gave a lot of stress on testing the abilities to understand factual knowledge, remembering factual knowledge and applying procedural knowledge. This suggests that the English textbooks adopted by both the State and Central Board schools for Class VI-X still focuses a lot of its exercises on the lower levels of thinking and knowing. Exercises that requires higher levels of cognitive skills such as analytical, evaluative and creative abilities as well as exercises testing conceptual and metacognitive

knowledge needs to be given more importance so as to develop the thinking skills, creativity and knowledge of the learners to their optimum level.

b. C**omparison of exercises between Class VI – X English textbooks adopted by the State and Central Board schools**

i. **Class VI** - No significant differences were found between the percentages of exercises in the State and Central school textbooks in categories A1, A2, B1-4, C3, D1-2, D4, E1-2, E4 and F3-4 categories. However, no statistical treatment could be generated for A3, A4, C1-2, C4, D3, E3, F1 and F2 to find out the significant differences since exercises were absent in the State and/or Central Board textbooks in these categories.

ii. **Class VII** - No significant differences were found between the percentages of exercises in the State and Central school textbooks in categories A1, A4, B1-4, C1, C3-4, D1-2, D4, E2, E4 and F3-4 categories. However, since no exercises were found in the State and/or Central Board textbooks for the remaining categories i.e. A2-3, C2, D3, E1, E3, F1-2, no statistical treatment could be generated to find out the significant differences.

iii. **Class VIII** - No significant differences were found between the percentages of exercises in the State and Central school textbooks in categories A1-2, B1-4, C3, D1- 4, E1-2, E4 and F3-4. However, since no exercises were found in the State and/or Central Board textbook in categories A3-4, C1-2, C4, E3, F1 and F2, no statistical treatment could be generated to find out the significant differences.

iv. **Class IX** - Significant differences were found between the percentages of exercises in the State and Central school textbooks in categories A1 and C3. On the other hand, in categories A2, A4, B1-2, B4, D2, D4, E4, F3 and F4, no significant differences were found in the percentages of exercises between the State and Central Board textbooks in these categories. However, since no exercises were found in the State and/or Central Board textbooks for categories A3, B3, C1-2, C4, D1, D3, E1-3, F1 and F2 categories, no statistical treatment could be generated to find out the significant differences.

v. **Class X** - Significant differences were found between the percentages of exercises in the State and Central school textbooks in categories B1 and C3.

On the other hand, no significant differences were found in categories A1, B2-4, C1, D1-2, D4, E1-2, E4, F1 and F3-4. However, since no exercises were found in the State and/or Central Board textbooks in categories A2-4, C2, C4, D3, E3 and F2, no statistical treatment could be generated to find out the significant differences.

vi. **Overall** (**Class VI - Class X)** - Significant differences were found between the percentages of exercises in the State and Central school textbooks categories A1, B1 and C3. However, no significant differences were found in categories A2, A4, B2-B4, C1, C4, D1-D4, E1-2, E4, F1 and F3-F4. Since no exercises were found in the State and/or Central Board textbook in A3, C2, E3 and F2 categories, no statistical treatment could be generated to find out the significant differences.

Discussion:

Comparison of the percentage of exercises between the State and Central Board textbooks in each class i.e. Class VI - Class X, in the various categories found significant differences in categories A1 (Remember Factual knowledge) and C3 (Apply Procedural knowledge) in Class IX textbooks where the Central Board textbooks had significantly higher percentage of exercises in A1 and the State Board textbooks had a significantly higher percentage of exercises in C3. Also, significant differences were found in categories B1 (Understand Factual knowledge) and C3 (Apply Procedural knowledge) in Class X textbooks where the Central Board textbooks had significantly higher percentage of exercises in B1 and the State Board textbooks had a significantly higher percentage of exercises in C3.

Analysis and comparison of all the exercises in the State and Central board textbooks (Class VI – Class X combined) found significant difference between the percentage of exercises in categories A1 (Remember Factual knowledge, B1 (Understand Factual knowledge) and C3 (Apply Procedural knowledge) where the Central Board textbooks had significantly higher percentage of exercises in A1 and B1 and the State Board textbooks had a significantly higher percentage of exercises in C3.

This finding reveals a great difference in the focus of the English textbooks at the Secondary level where the exercises in the Central Board textbooks are still

concentrated with exercises testing factual knowledge to be responded through memory or understanding of the text while a shift is seen in the exercises of the State Board Schools that gave more focus on testing of procedural knowledge that would be responded by executing and/or implementing the knowledge in given situations. On the other hand, no significant differences were found in the distribution of exercises at the various categories in the elementary level textbooks i.e. Class VI-VIII which implies that students are exposed to more or less similar level of exercises in terms of complexity and difficulty in both the cognitive process and knowledge dimensions.

RECOMMENDATIONS

a. For MBSE, SCERT, CBSE and NCERT:

i. Reviewing and revision of the curriculum to include a more complete range of educational objectives which involves the various levels in the cognitive processes and knowledge dimension of the RBT.

ii. Review and revision of the content of the textbooks by enriching it with more exercises to practice and develop the higher order thinking and reflective skills.

iii. 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 and testing of the higher order cognitive abilities of the students.

iv. Workshops and conferences should be organised for curriculum developers to create awareness on Bloom's Taxonomy and its implications in assessment of curriculum standards, designing and development of curriculum, formulating instructional objectives, preparation of textbooks and learning materials, evaluation of teachers' performance, assessment of learning, etc.

v. Provision of extension services and mentoring to teachers on pedagogical strategies, skill improvement, textbook analysis and evaluation, question setting, designing activities, etc. for development of critical thinking and reflective skills of students.

b. For textbook writers:

i. Textbook writers should consider the balanced proportion of exercises from each level of the Cognitive Dimension in the textbooks for each class. This will enable students to experience all the six thinking levels that can lead them to be more creative and critical in thinking.

ii. Textbook writers should also consider the balance proportion of exercises from each level of the Knowledge Dimension in the textbooks for each class. This will help the students' in the development of their knowledge at not just the factual or conceptual level but also in becoming better problem solvers and reflective learners.

iii. Textbook writers should try to devise exercises and activities that include more tasks which require the students to employ their analytical, evaluative creative and reflective skills. Incorporating more complex cognitive activities, however, should be in accordance with the students' level of proficiency.

iv. Selection and gradation of the exercises should be done where the difficulty and complexity of the exercises in terms of cognitive skills and knowledge dimensions may be gradually increased as the grades advances and the less complex exercises may be decreased as students move to the higher classes.

v. Workbooks are important tools for students to practice learnt knowledge and skills independently. Textbook writers may therefore design workbooks with exercises that would incorporate all the levels in the cognitive and knowledge dimension. This may be implemented for all classes in both the State and Central Boards.

vi. Educators with expertise in formulating questions should be involved in writing textbooks. Also, more than one author should be assigned in writing of textbooks in order to provide variety in thinking and formulating questions.

c. For teachers:

i. Teachers should also evaluate the content and exercises of the textbooks and check whether the materials and the exercises are appropriate for the students' needs and abilities.

ii. Teachers should not rely only on the content and exercises presented in the prescribed textbooks. They may device 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 cognitive and knowledge dimensions.

iii. Since the proportions of HOCS exercises were found to be very less, teachers may introduce more HOCS exercises in the classrooms. Similarly, more exercises to develop the problem solving and reflective skills may also be introduced by the teacher through writing and oral activities in the classroom.

iv. Sensitization programmes on the importance of Revised Bloom's Taxonomy for textbook evaluation, framing of instructional objectives, teaching and evaluation, etc. may be organised for teachers.

SUGGESTION FOR FURTHER STUDIES:

1. Comparative analysis of exercises in Elementary, Secondary and Higher Secondary English textbooks adopted by MBSE, CBSE and ICSE based on the Revised Blooms Taxonomy
2. Content analysis of the Elementary, Secondary and Higher Secondary School English textbooks on various aspects such as its physical attributes, adequacy and correspondence with the curriculum, learner centredness of the activities, structure and organisation of content for development of language skills, etc.
3. Evaluation of exercises in Elementary, Secondary and Higher Secondary School English textbooks in relation to the learning outcomes developed by NCERT.
4. A study on types of questions in teacher – made tests used in teaching and evaluation of learning in English language classrooms.

5. Analytical study of the type of questions in Class X and XII Board Examinations conducted by MBSE and CBSE based on the Revised Blooms Taxonomy
6. Analysis of questions at the collegiate and university level examinations based on the Revised Blooms Taxonomy.
7. Analysis of exercises in textbooks of other school subjects in the Elementary, Secondary and Higher Secondary School levels based on the Revised Blooms Taxonomy
8. A study on the awareness of school teachers, textbook writers and curriculum developers towards the Revised Blooms Taxonomy

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