



# ANALYSIS OF EDUCATION QUESTION PAPERS IN MIZORAM (INDIA) USING THE COGNITIVE LEVELS OF BLOOM'S TAXONOMY OF EDUCATIONAL OBJECTIVES

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**Abstract:** Assessment is the crucial stage in determining students' development and written examination is an important tool to evaluate the student's performance in a subject area. Whether or not the written examination is able to assess the student's ability very much depends on the questions presented in the examination paper. Improving students' conceptual understanding depends on the question types asked by the teachers, whether in the classroom or in examinations. A good and reasonable examination paper must consist of various difficulty levels to accommodate or test the different capabilities of students. This study was undertaken to find out the level of teaching-learning and evaluation existing in the higher educational institutions of Mizoram.

**Key Terms:** Analysis, examination question papers, cognitive, taxonomy, Bloom's Taxonomy

## I. Introduction

One of the most important aim of education is to provide the best quality education so as to produce useful graduates who are intuitive and creative, and who are able to use their cognitive skills when faced with critical problem solving tasks. The ability to reason effectively and to solve problems creatively are higher order cognitive skills which must be acquired through appropriate instruction and training (Gocer, 2011).

Assessment is crucial in determining whether students' conceptual development has reached higher order cognitive skills or not. Written examination is a conventional yet universal tool to evaluate the student's performance in a subject area. Improving students' conceptual understanding depends on the question types asked by the teachers, whether in the classroom or in examinations (Cepni, 2003). The art of skillful questioning is a key to stimulate student's mental activities, thereby engaging students in higher-order thinking. Teachers can provide this type of instruction and training by using a blend of higher, middle and lower order cognitive questions given in Bloom's Taxonomy (Gierl, 1997).

In Bloom's Taxonomy of Educational Objectives, we are provided with six cognitive levels that begin with simple knowledge at the lowest level ranging all the way to evaluation at the highest level. These cognitive levels consist of knowledge, comprehension, application, analysis, synthesis and evaluation (Bloom et al, 1956). These levels have often been depicted as a stairway, leading many teachers to encourage their students to climb to a higher level of thought. It is widely believed that if we can gradually adjust our way of teaching and questioning towards higher order cognitive skills given in Bloom's Taxonomy, it will not only improve the cognitive abilities of students but improve the overall quality of education (Forehand, 2000).

## II. Rationale

While questioning is identified as one of the most effective instructional strategies, research on questioning indicates that the use of questions by teachers is predominantly low level. Teachers tend to ask questions in the knowledge category 80% to 90% of the

time. While these questions are not bad in themselves, using them all the time is not good practice. It is preferable to try to utilize higher order level of questions which require much more brain power and more extensive and elaborate answers (Azar, 2005).

The assumption exist that questions relating to application skills should start to dominate the higher academic levels in education, with a corresponding reduction in questions requiring retention skills. The different cognitive abilities possessed by students should be tested and given equal coverage in the examination questions. One must set good/proper questions where appropriate attention is given to maintaining the correct balance between lower, middle and higher order cognitive questions as given by Bloom's Taxonomy (Gershon, 2015).

Bloom's Taxonomy is a valuable tool in the construction and assessment of question papers. Using Bloom's Taxonomy to help design examinations and analyze the results could greatly improve the quality of assessment in education (Anderson et al, 2001). All these have made the investigator curious to know the level of teaching-learning and evaluation existing in the higher educational institutions of Mizoram, one of the northeastern states in India. Though there are some studies which have looked into the analysis of question papers using Bloom's Taxonomy in various parts of the world, none is there to throw light on the analysis of question papers in Mizoram. By undertaking this study, the investigator hopes that the findings will lead us to know at what level we are examining our students, where we are functioning at present and where we have yet to go. Knowledge of this result will, hopefully, pave the way to work out good training programmes for teachers with new and improved teaching and assessment techniques.

### III. Objectives

The study has the following objectives:

- 1) To analyze selected question papers in Education subject at Higher Secondary, Collegiate and University levels in Mizoram of five consecutive years (2014 – 2018) in terms of the Cognitive domain of Bloom's Taxonomy of Educational Objectives.
- 2) To study the progression of question paper setting from the lower to higher level cognitive objectives in Education subject at Higher Secondary, Collegiate and University levels in Mizoram.
- 3) To provide suggestions for improvement.

### IV. Methodology

The methodology section outline the plan and method of how the study is conducted. The details are as follows:

**Method of study:** The study employed Content Analysis Method to analyze selected question papers in Education at Higher Secondary, Collegiate and University levels in terms of the Cognitive domain of Bloom's Taxonomy (Objective 1) and to study the progression of question paper setting from the lower to the higher level cognitive objectives in Education at Higher Secondary, Collegiate and University levels (Objective 2). Given the nature of data and objectives of the study, frequency distribution and percentages were applied for the analysis and interpretation of data.

**Sample:** Mizoram Board of School Education HSSLC (Arts) Examination question papers in Education, Mizoram University B.A End Semester Examination question papers in Education and Mizoram University M.A End Semester Examination question papers in Education were used as samples.

**Tools Used:** Bloom's Taxonomy Coding Scheme was used as a reference to analyze question papers in Education of Class XII Board Examination, B.A and M.A End Semester Examinations as well as to study the progression of question paper setting from the lower to higher level cognitive objectives. The Coding Scheme basically comprises of the six cognitive levels given by Bloom, viz., Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation. Key words or verbs for each level was compiled to be used as a guide for structuring or framing questions and tasks. Each question was individually analyzed and placed in their proper cognitive levels or categories.

**Data Collection:** Secondary data relating to old examination question papers of Education subject of HSSLC Arts Board Examination, B.A End Semester Examination and M.A End Semester Examination of five consecutive years (2014 – 2018) were collected from Examination Cell of Mizoram Board of School Education and Mizoram University respectively.

### V. Major Findings:

The following are the major findings of the study:

**1. Analysis of Examination Question Papers in Education of Higher Secondary, Collegiate and University levels of five consecutive years i.e., 2014 to 2018 (Objective 1):** The analysis result of HSSLC, B.A and M.A Education question papers are given in the tables below.

**Table 1.1 Analysis of HSSLC (XII) Education Question Papers 2014-2018**

Year	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
2014	41.94%	51.61%	6.45%	-	-	-

2015	53.33%	40%	6.67%	-	-	-
2016	50%	43.33%	6.67%	-	-	-
2017	41.38%	51.72%	6.90%	-	-	-
2018	31.03%	62.07%	6.90%	-	-	-
<b>2014 - 2018</b>	<b>43.54%</b>	<b>49.74%</b>	<b>6.72%</b>	-	-	-

Table 1.2 Analysis of B.A Education Question Papers 2014-2018

Year	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
2014	40.43%	57.12%	0.89%	-	-	1.56%
2015	40.25%	58.19%	1.56%	-	-	-
2016	33.68%	61.98%	1.56%	2.78%	-	-
2017	45.18%	52.22%	0.57%	1.33%	-	0.7%
2018	33.05%	59.89%	-	5.76%	-	1.3%
<b>2014-2018</b>	<b>38.52%</b>	<b>57.88%</b>	<b>0.92%</b>	<b>1.97%</b>	-	<b>0.71%</b>

Table 1.3 Analysis of M.A Education Question Papers 2014-2018

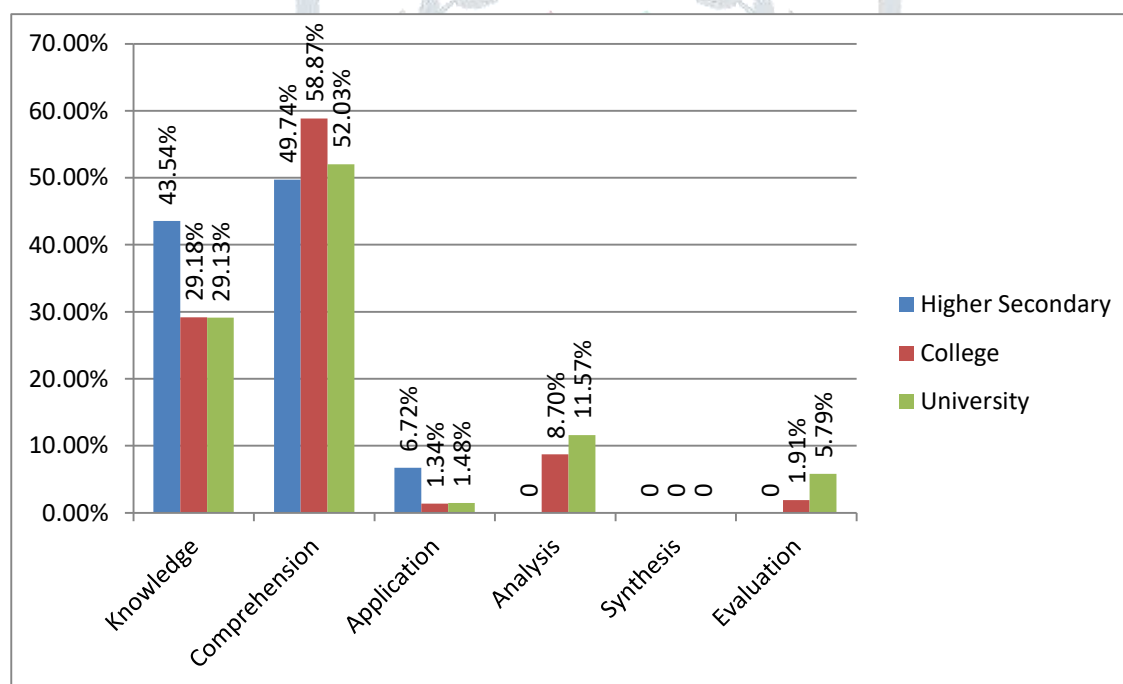
Year	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
2014	30.66%	51.04%	1.30%	12.52%	-	4.48%
2015	29.17%	53.55%	1.21%	11.57%	-	4.50%
2016	28.83%	52.17%	0.82%	12.06%	-	6.12%
2017	26.85%	54.45%	0.98%	11.68%	-	6.04%
2018	30.13%	48.93%	3.11%	10.03%	-	7.80%
<b>2014-2018</b>	<b>29.13%</b>	<b>52.03%</b>	<b>1.48%</b>	<b>11.57%</b>	-	<b>5.79%</b>

The consolidated picture from the analysis result of HSSLC (XII), B.A and M.A Education question papers of five consecutive years, i.e. from 2014 to 2018 are given in the table below:

Table 1.4: Consolidated Analysis Result of HSSLC (XII), B.A and M.A Education Question Papers 2014 - 2018

Taxonomy Levels	Higher Secondary	College	University
Knowledge	43.54%	29.18%	29.13%
Comprehension	49.74%	58.87%	52.03%
Application	6.72%	1.34%	1.48%
Analysis	-	8.7%	11.57%
Synthesis	-	-	-
Evaluation	-	1.91%	5.79%
Total	100%	100%	100%

Fig 1: Consolidated Picture of Question Paper Analysis at Higher Secondary, Collegiate and University levels



The study found that Education question papers of Class XII, B.A and M.A final examination concentrated largely on testing the Comprehension skills of students (49.74% in Class XII, 57.88% in BA & 52.03% in MA). This was followed by Knowledge questions in all three stages (43.54% in Class XII, 38.52% in BA & 29.13% in MA) and then by Application level questions (6.72% in Class XII, 0.92% in BA and 1.48% in M.A). The Higher Secondary School Education question papers concentrated solely on the three lower cognitive domains and no questions were asked from the three higher cognitive domains. The BA Education questions papers concentrated largely on the three lower cognitive domains, with a small percentage of questions coming from the higher three domains. Likewise, the M.A Education papers also concentrated more on the three lower domains although there were more questions from the higher three domains compared to the Higher Secondary and B.A Education question papers.

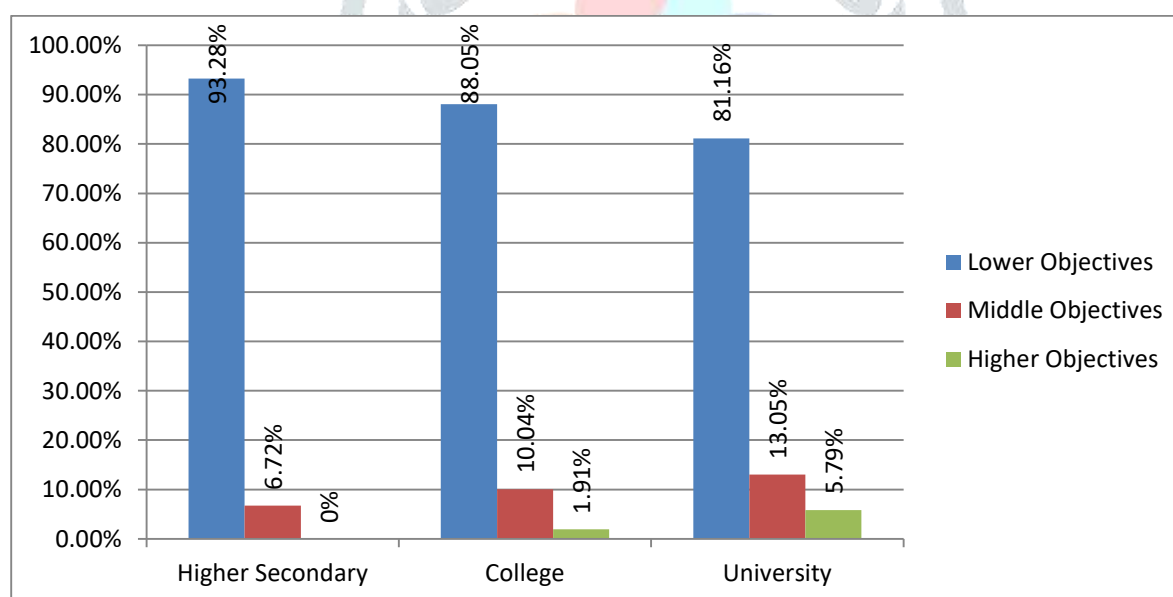
These findings clearly reveal that the quality of question papers in Education subject of Higher Secondary, Collegiate and University stages have concentrated largely on testing the Knowledge and Comprehension skills of students. These stages are considered as lower cognitive levels. There were very few questions to test and develop the higher cognitive skills of students.

**2. Progression of Question Paper Setting from the Lower to Higher level Cognitive objectives in Education at Higher Secondary, Collegiate and University levels (Objective 2):** Education question papers of Class XII, B.A and M.A of five consecutive years (2014-2018) were analyzed, categorized and tabulated on the basis of Bloom's Taxonomy Coding Scheme. The results of this analysis clearly reveal the progression of question-paper setting from the lower to higher order cognitive objectives of Bloom's Taxonomy during the five years selected for analysis.

**Table 2.1: Consolidated Result of Progression of Question Setting at Higher Secondary, Collegiate and University Levels 2014 - 2018**

Classification of Objectives	Cognitive Level	Stages of Education					
		Higher Secondary		College		University	
Lower level objectives	Knowledge	43.54%	93.28%	29.18%	88.05%	29.13%	81.16%
	Comprehension	49.74%		58.87%		52.03%	
Middle level objectives	Application	6.72%	6.72%	1.34%	10.04%	1.48%	13.05%
	Analysis	-		8.7%		11.57%	
Higher level objectives	Synthesis	-	0%	-	1.91%	-	5.79%
	Evaluation	-		1.91%		5.79%	

**Fig 2. Consolidated Picture of Progression of Question Setting at Higher Secondary, Collegiate and University Levels (2014-2018)**



As shown in the above table and figure, at Higher Secondary level 93.28% of the questions during 2014 to 2018 were from the first two levels of Bloom's Taxonomy, i.e., Knowledge and Comprehension, which are considered to be lower level objectives of the Cognitive domain of Bloom's Taxonomy. However, this percentage reduced to 88.05% at Collegiate level and 81.16% at University levels.

Analysis of the data in the same table depicts that 6.72% of the questions in Higher Secondary level came from the middle level objectives, i.e., Application and Analysis. This percentage increased to 10.04% at Collegiate level and 13.05% at University level.

Further analysis of the data depicts that there were no questions relating to the two highest cognitive objectives, i.e., Synthesis and Evaluation, at Higher Secondary level during 2011 to 2015, whereas the percentage of such questions at Collegiate and University levels were 1.91% and 5.79% respectively.

From these findings, it can be concluded that with the movement of students from lower to higher stages of education, the percentage of questions in the lower domain have reduced and the percentage of questions in the middle and higher domains have increased, although not to a desirable extent.

## VI. Suggestions for Improvement:

- 1) The findings of the study reveal the low quality of question paper setting in Education at higher secondary, collegiate and university levels in Mizoram. Efforts should be made in future to include more questions testing the higher cognitive abilities of students, especially at the college and university stages.
- 2) Teachers need to be made aware of Bloom's Taxonomy and its relevance in the field of education, particularly in question paper setting. It may be made an integral part of the curriculum in teacher training programmes.
- 3) Teacher Training Programmes/Workshops/Seminars on Question Paper Setting should be periodically conducted by the concerned authorities.
- 4) The study revealed that the higher secondary, collegiate and university students have very poor application and synthesis skills. Therefore, teaching - learning methods and activities that will develop and promote the higher cognitive abilities of students need to be applied in the classroom.
- 5) Due to pressure to produce good examination results with high scoring students among educational institutions, teachers tend to feel hesitant and fearful of setting too many questions from the higher cognitive levels which results in majority of questions belonging to the lower cognitive levels. This has done more harm than good and it is high time to remove this fear and hesitation among teachers and more questions from the higher cognitive levels need to be included in future.
- 6) Question banks comprising of model questions belonging to different cognitive levels should be developed by the proper authorities to be used as guides by teachers while framing or setting question papers.

## VII. Conclusion:

The study clearly revealed that the students of Higher Secondary, Collegiate and University stages mainly function at the two lower levels of the Cognitive domain. They all show poor application, synthesis and evaluative abilities. However, it was found that the dominance of lower cognitive abilities slightly decrease as the students mature in age and progress to higher classes. Though Knowledge level dominates at the Higher Secondary stage, it decreases slightly at the College stage and by University stage, it is overtaken by Comprehension level. This shows that there is growth in the cognitive levels. It can also be seen that there is development of higher cognitive abilities like Application, Analysis and Evaluation at the University level, though not to a large extent. The absence of Synthesis level questions in all groups of students reveal that the development and promotion of the creative and constructive abilities of students is greatly neglected in our education system.

The findings indicate that both the teachers and students are functioning at the lower cognitive levels. Teachers and students alike need to be given more awareness regarding the cognitive levels and how to develop these higher cognitive abilities. Teachers need to design their instructional objectives and teaching-learning activities in such a way as to promote and develop the reasoning, constructive and problem solving skills of students. They need to be made aware of the importance of developing and functioning at the higher cognitive levels, how to plan teaching objectives and learning activities to promote higher cognitive thinking, what innovative pedagogical techniques to apply in the classroom, how to frame questions to test and challenge the higher thinking skills of students, how to engage and nurture these higher cognitive abilities and so on. Rote memorization and bookish knowledge should be done away with as much as possible. Less dependence on lecture method and more emphasis on interactive methods like discussions, feedback, debates, etc will surely improve the teaching – learning process. If we can gradually adjust our way of teaching and questioning towards higher order cognitive skills according to Bloom's Taxonomy and use it to help design examinations and analyze the results, it will greatly improve the quality of assessment.

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