

## Analysis of Question Papers of Physics at Secondary Level in Pakistan in the Light of Revised Bloom's Taxonomy

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### ABSTRACT

The scenario of 21<sup>st</sup> century demands new approaches and practices for evaluation. The teachers, while responding to this dire demand and need, are trying new tools of measurement and evaluation for the improvement of students' comprehension. The purpose of the present study was to analyze the Question Papers of Physics at Secondary Level of the Boards of Intermediate and Secondary Education of Pakistan in the light of Revised Bloom's Taxonomy. It was a descriptive study and primarily based on analysis of documents. The papers of Physics in the previous 05 years of annual examinations (2010-2014) of Federal Board of Intermediate and Secondary Education (F.B.I.S.E) Islamabad and Board of Intermediate and Secondary Education (BISE), Karachi, Lahore, Queta and Mardan (KP) were analyzed. To evaluate the question papers in the cognition (thinking) parameter i.e. cognitive domain of the Bloom's Revised Taxonomy and to suggest recommendations for further improvement in the questions. The questions were carefully analyzed with the help of graphical analysis and the recommendations made at the end. The objective parts of these papers touched only two levels i.e. Remembering and Understanding. The same were also found in the subjective parts of these papers. Only a slight portion of the subjective part was based on applying level. For the maintenance of quality education, it is the dire need to include and accommodate all the six levels of Bloom's Revised Taxonomy in question papers of Physics at Secondary Level in Pakistan.

**KEY WORDS:** Bloom's Revised Taxonomy, Cognitive Domain, Physics, B.I.S.E, Secondary Education

### 1. INTRODUCTION

Questions for examination have a vital role and strong base for effective evaluation and learning. These are the key factors to gear up thinking and reasoning in the learners. Examination papers hold mirror to the comprehension and application skills of learners. There are many models of evaluation or judging the ability to reach students' learning and achievements. Effective evaluation and examination are totally dependent on the appropriateness and reliability of the questions asked in the papers especially of Applied Sciences i.e. Physics. These appropriate questions are not only important for the positive learning of students but also for the development and nourishment of their judging quality and cognition. Bruladi (1988) stated that critical and logical questions lead the students towards the use of the positive power of thinking and creativity. Such questions widen and broaden the thinking horizons of the students. According to Cepri and Azar (1998), those students who face poor and low quality questions in the papers depend upon their rote memory. These types of questions which kills the creativity of the learner should not include in question papers. Written evaluation is the all time popular instrument and with its help the learner achievements are judged in different subjects. Through the specific level of learning, the learners achievements are defined and explained. These written examinations have been judging the cognitive ability of the students. But these examinations are totally dependent upon the questions set in the examination papers. A proper examination paper covers all those difficulty levels, which can accommodate all the various and hidden capacities of students. The standard of questions determines the level of difficulty with the particular reference of their key and basic asking words with the help of which the questions are devised and formed. Question is the basic component of examination. Swart (2010) says that the proper and reasonable questions have always been important helping tool for students positive learning.

Annual papers of Secondary School Certificate Examinations must be given thorough attention to check and cope with all the three domains of learning. It needs proper priority to balance the learners' lower levels sequentially

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with the high levels. Oxford Concise Dictionary defines Taxonomy as (a) “The branch of science concerned with classification” (b) “A scheme of classification”.

Bloom (an educational Psychologist) was totally against memorization and rote learning. Therefore, under his leadership, he founded and formed Taxonomy of learning, which became popular as Bloom’s Taxonomy. This Taxonomy was created in 1956. It was only for promoting better thinking faculty in the process of educating the pupils. These better thinking faculties are those skills which are directly related to analysis and evaluation. Bloom’s Revised Taxonomy stresses on analysis, evaluation and application. In early stage, Bloom’s Revised Taxonomy has got no importance and place for knowledge based questions i.e. knowledge and comprehension. Now Bloom’s Revised Taxonomy is everywhere used in the training and evaluation of both the teachers and students. As described by Forehand, (2008),nearly for half of 20<sup>th</sup> century Bloom’s Taxonomy has modified both the teaching process and evaluation in the whole world. According to Ahmad Kadri Junoh. Et al, (2009) Bloom’s Taxonomy was basically an effort for establishing and developing a system, which could assure the different stages during learning i.e. a proper transition from simple to complex. It means from easy to difficult. A great number of research studies has been conducted for finding out the levels of high and low order thinking. These researches have been conducted under the guidance of Bloom’s Taxonomy. Knowledge and comprehension (understanding); are considered the thinking as its lower order while the analysis (exposure of underlying structure by separation into component parts) i.e. bricking down; synthesis (something formed by mixing i.e. amalgamation), evaluation (criticism are those acquired abilities which consider the thinking on its high order. The skill of application (the act of using) is there in both the thinking orders i.e. high and low. Kastberg, S., (2003).

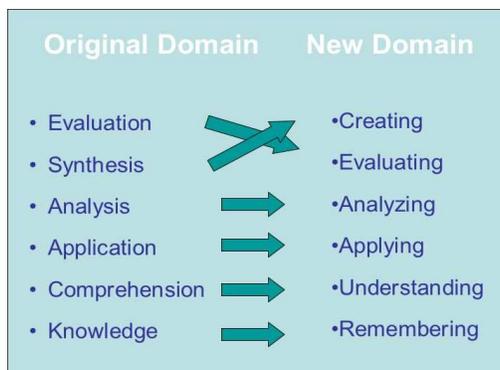
According to Singh, Kumar and Singh (2006) the major and basic purpose of teaching is to nourish the fundamental qualities of the reading skills, writing skills, and simple mathematics so that the students may lead a useful life in their future. Hurd (1998) stated that education prepares the learners for the real life situations and creates in them the high level of confidence. According to Shymansky, Yore & Good (1990) the wider sense the level of secondary education develops in student’s highest thinking faculties, which are based on sound reasoning and these thinking faculties enable them to take the right decisions at the right time in their coming life.

### **The Three Domains / Parameters of Learning**

According to Bloom et al. (1956)there are three parameters of learning, which are (i) thinking (ii) emotional and (iii) bodily dexterities. These are technically termed as cognitive, affective and Psychomotor domains or divisions and parameters.

### **Bloom's Revised Taxonomy**

The old students of Dr. Benjamin Bloom revised the Bloom’s Taxonomy during 1990’s and modified the sphere of cognition i.e. the thinking domain. The well-known of those students were Anderson, Krathwohl, Piitrich, Raths, Wittrock, 2000. They changed and arranged the names in the six classes and groups of Bloom’s Taxonomy represented in the chart below. The main changes were from the forms of nouns into the forms of verbs. They devised new forms and molds which are more result-oriented for better and active learning.



This new taxonomy reflects a more active form of thinking and is perhaps more accurate and correct.

### **Objectives of the Study**

The following was the major objective of this study:

1. To examine the reflection of Bloom’s revised Taxonomy in the Physics questions of Secondary School Certificate Examination

### **Rationale**

In Pakistan, Question-Answer is the widely used method for evaluating students’ performances, open-ended questions (Subjective Part) and MCQs (Objective Part).These two parts constitute the question papers at secondary level in Pakistan. However, Bloom’s revised Taxonomy covers all these levels which are necessary for learning of

students. So it is important to know whether Bloom’s Revised Taxonomy is consulted and touched during the setting of questions in papers especially in the papers of Physics at Secondary Level in Pakistan.

### METHODOLOGY

This study is descriptive in nature. The collected data were analyzed through two main approaches that are qualitative and quantitative. The research study was a desk study i.e. documents’ analysis. The data have been presented through tables and themes after the statistical analysis.

The papers in the subject of Physics of Secondary School Certificate (SSC) level were the central element and a basic part of the study. Physics papers from (2010 to 2014) were taken as the sample of the study. These papers were analyzed in the light of Bloom’s Revised Taxonomy.

#### Analysis and Findings

The chart below presents the items specification in Percentage for five years’ (2010-14) of Objective Part (MCQs)of the Secondary Level Physics Paper of BISE Mardan.

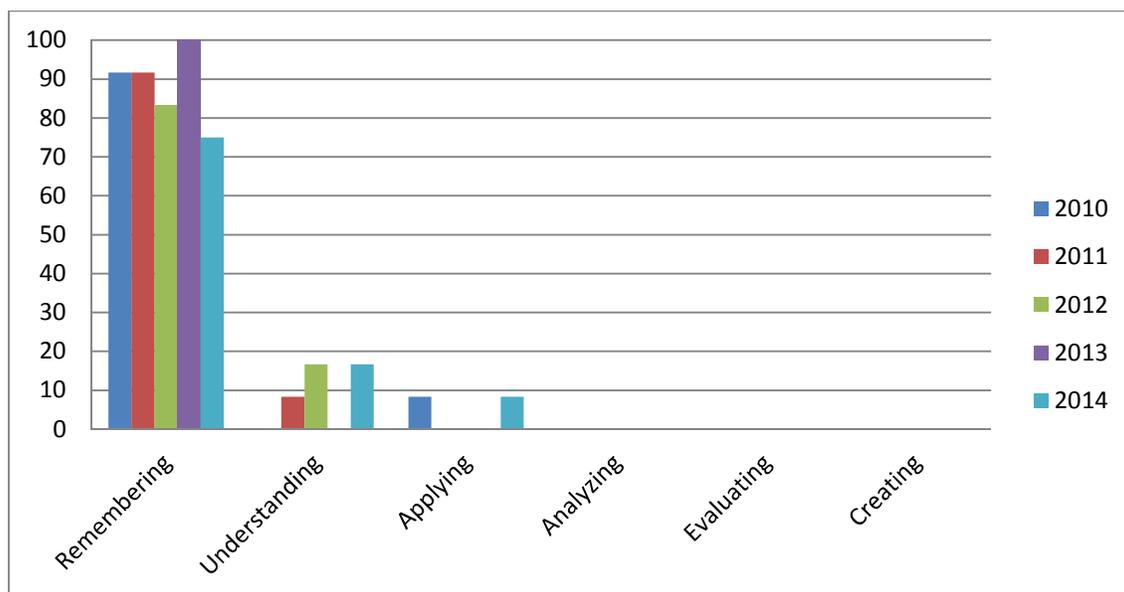


Figure 1: Percentage of item specification of Objective Questions (MCQs)

The chart below presents the items specification in Percentage for five years (2010-14) of Subjective Questions of the Secondary Level paper of Physics of Board of Intermediate and Secondary Education (BISE) Mardan.

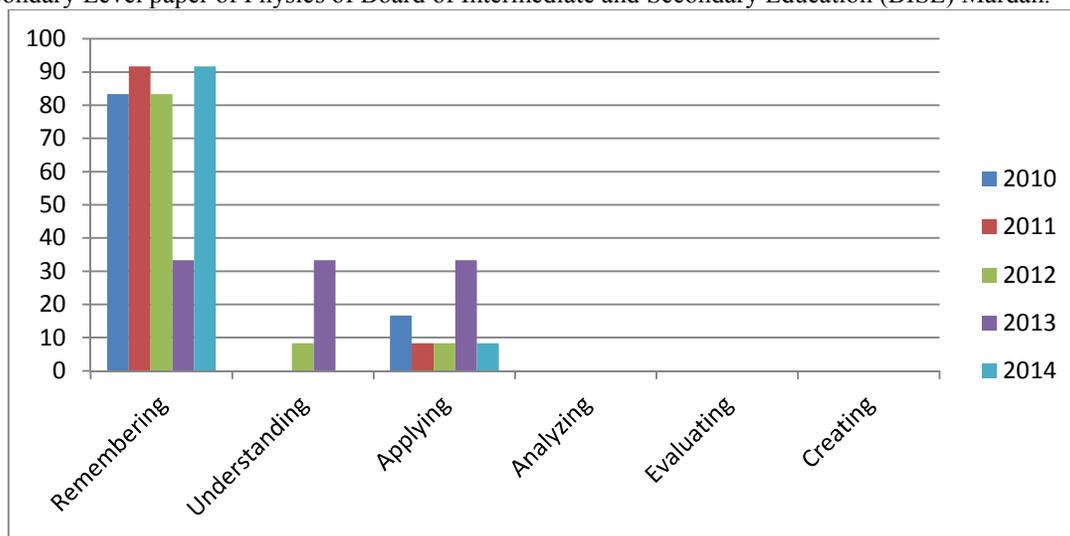


Figure 2: Percentage of item specification of Subjective Questions

The chart below presents the items specification in Percentage for five years (2010-14) of Objective Questions of the Secondary Level paper of Physics of BISE Lahore.

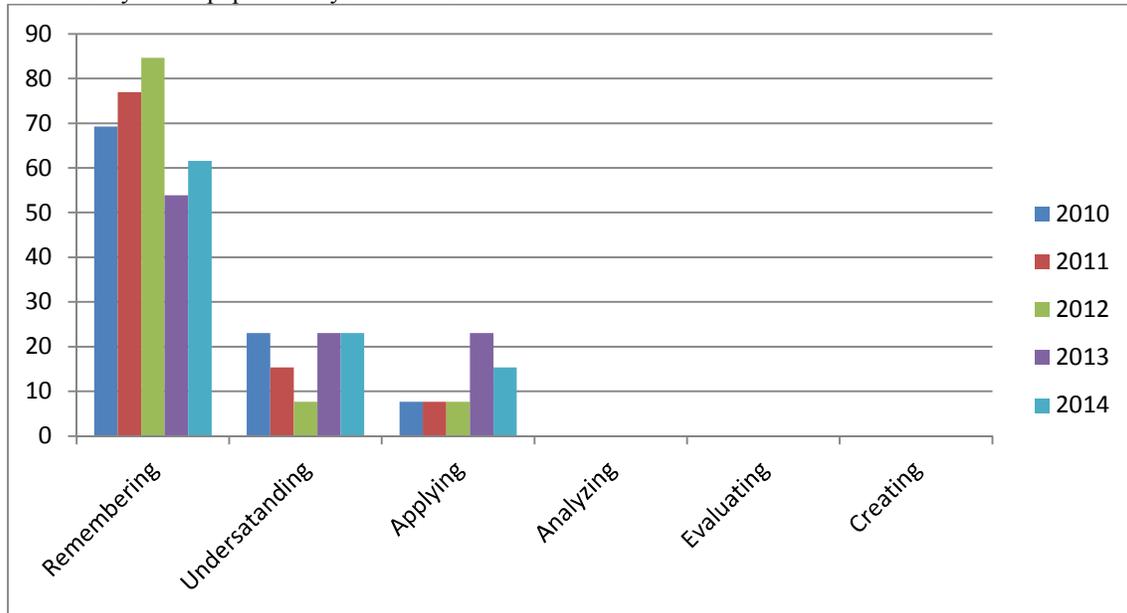


Figure 3: Percentage of item specification of Objective Questions (MCQs)

The chart below presents the items specification in Percentage for five years' (2010-14) of Subjective Questions of the Secondary Level paper of Physics of BISE Lahore.

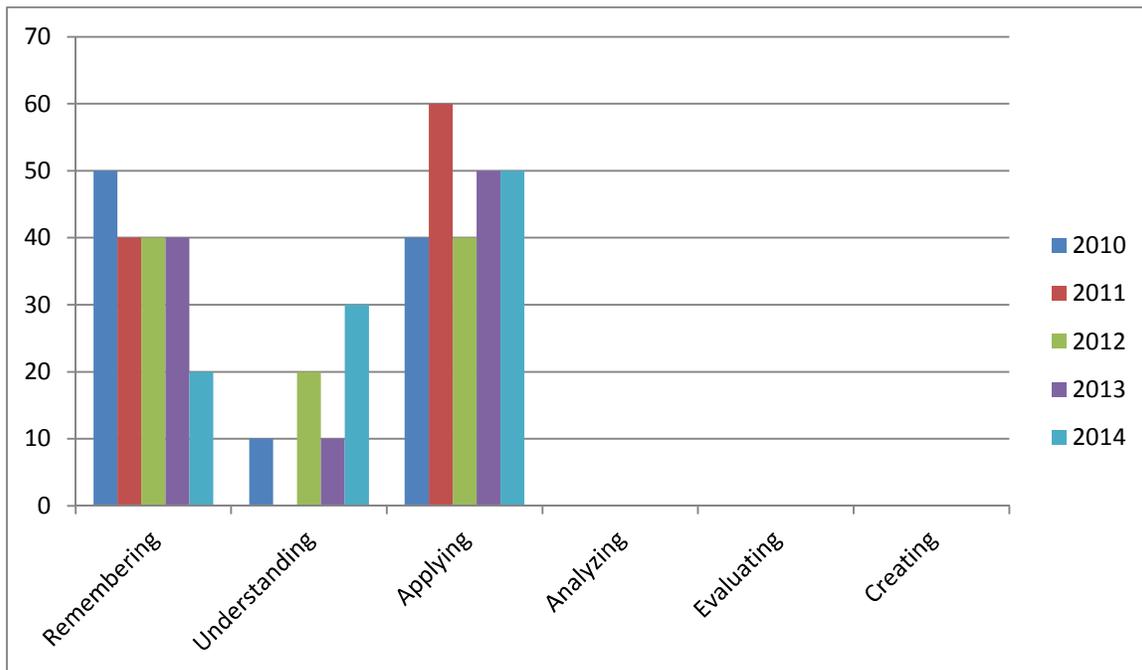


Figure 4: Percentage of item specification of Subjective Questions

The chart below presents the items specification in Percentage for five years (2010-14) of Objective Questions of the Secondary Level paper of Physics of BISE Karachi.

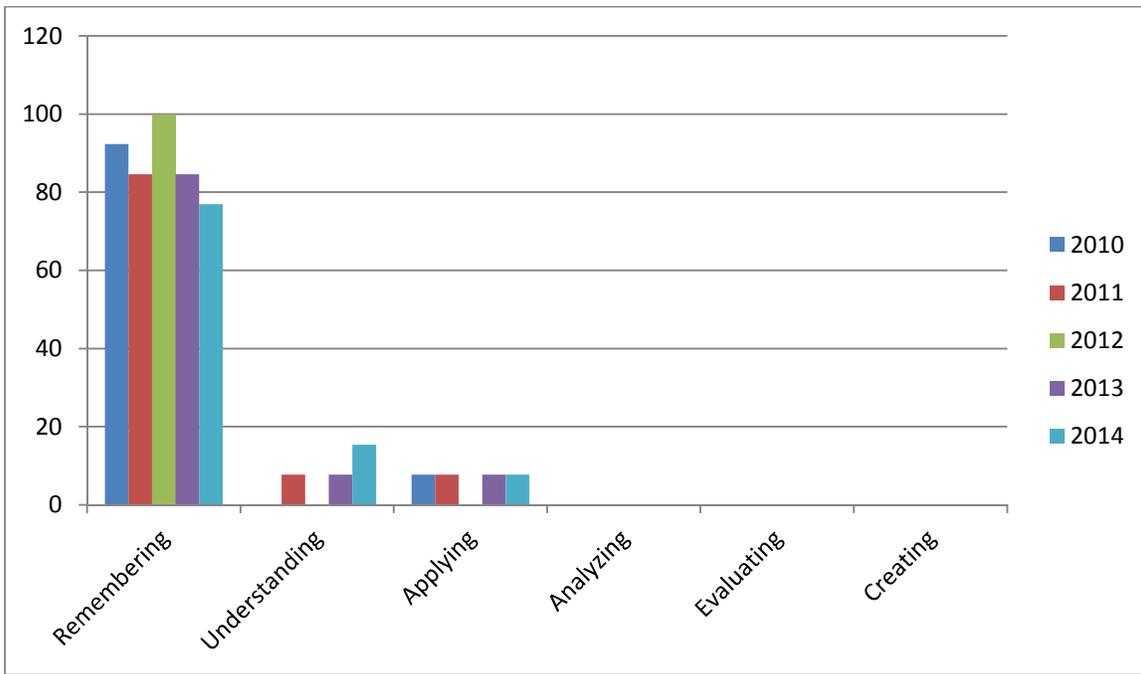


Figure 5: Percentage of item specification of Objective Questions (MCQs)

The chart below presents the items specification in Percentage for five years' (2010-14) of Subjective Questions of the Secondary Level paper of Physics of BISE Karachi.

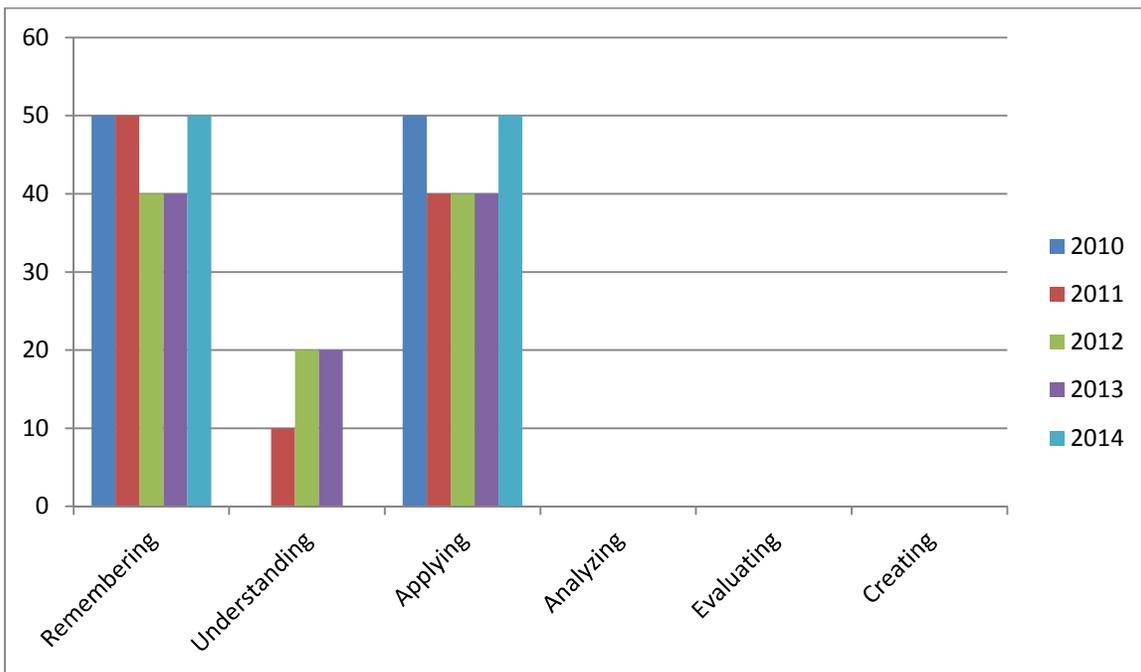


Figure 6: Percentage of item specification of Subjective Questions

The chart below presents the items specification in Percentage for five years (2010-14) of Objective Questions of the Secondary Level paper of Physics of BISE Quetta.

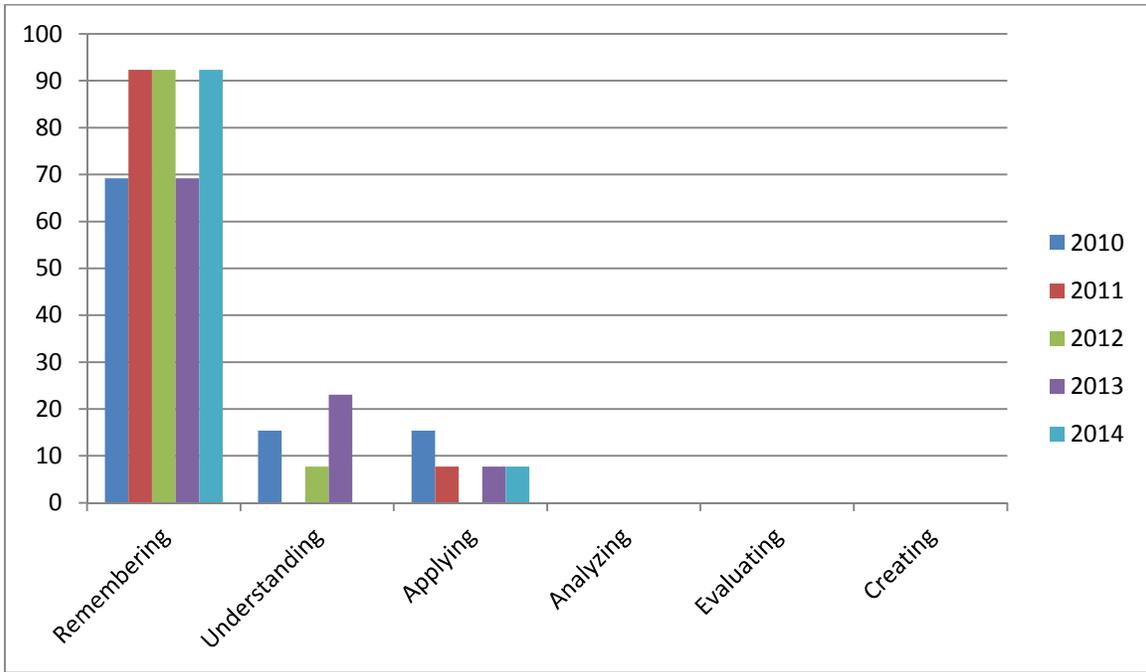


Figure 7: Percentage of item specification of Objective Questions (MCQs)

The chart below presents the items specification in Percentage for five years (2010-14) of Subjective Questions of the Secondary Level paper of Physics of BISE Quetta.

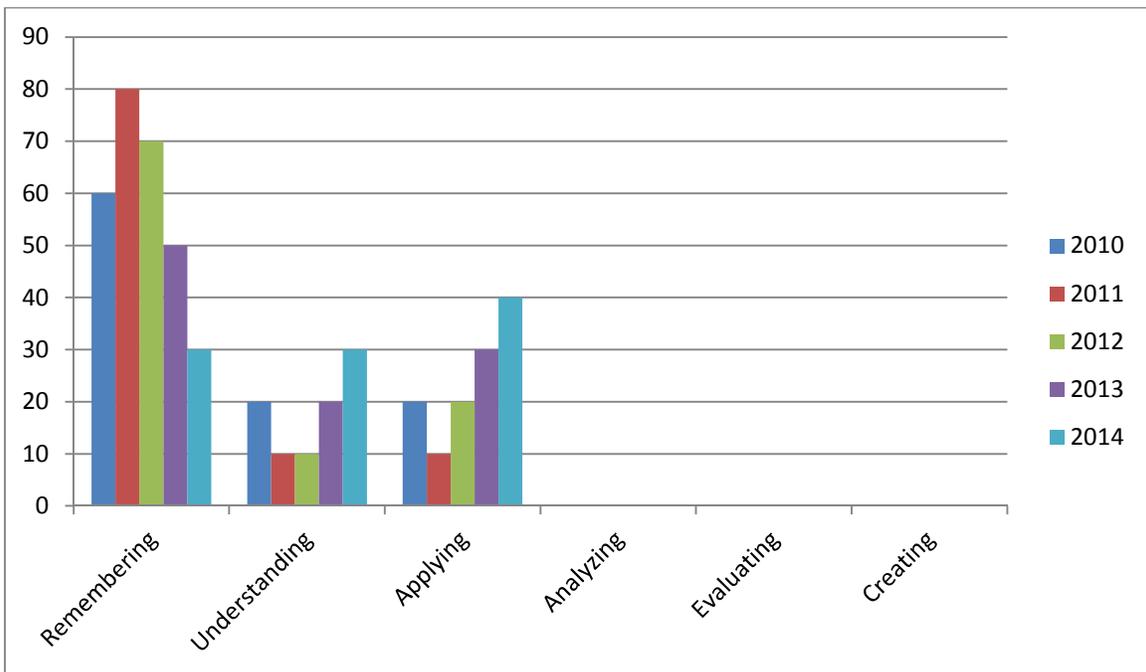


Figure 8: Percentage of item specification of Subjective Questions

The chart below presents the items specification in Percentage for five years (2010-14) of Objective Questions of the Secondary Level paper of Physics of BISE Islamabad.

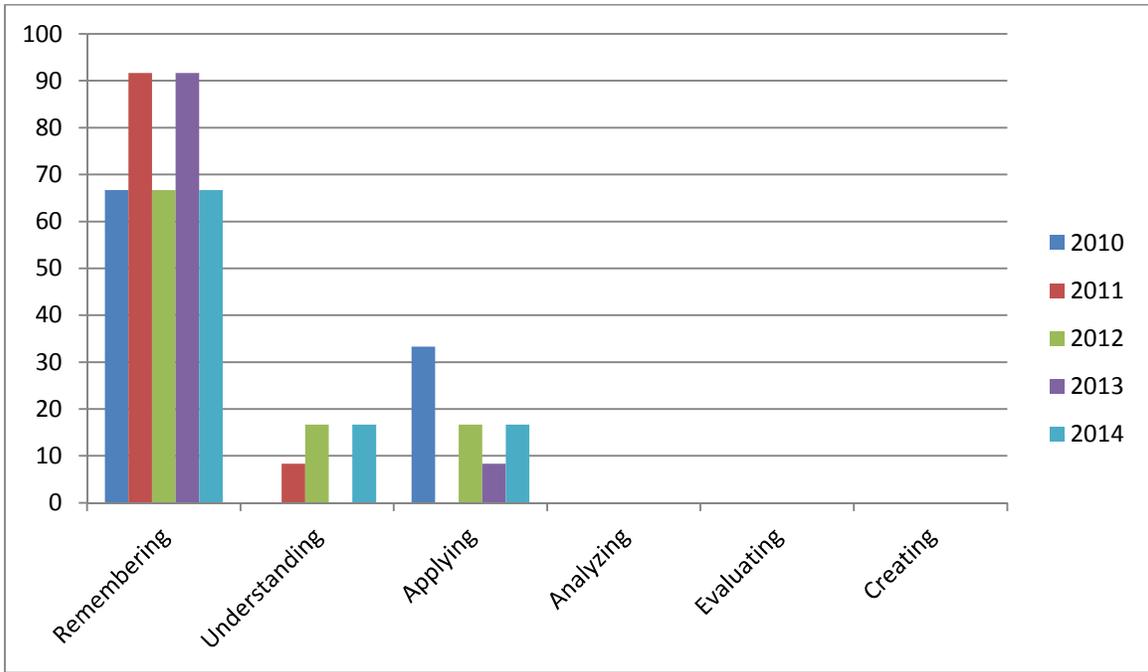


Figure 9: Percentage of item specification of Objective Questions (MCQs)

The chart below presents the items specification in Percentage for five years (2010-14) of Subjective Questions of the Secondary Level paper of Physics of BISE Islamabad.

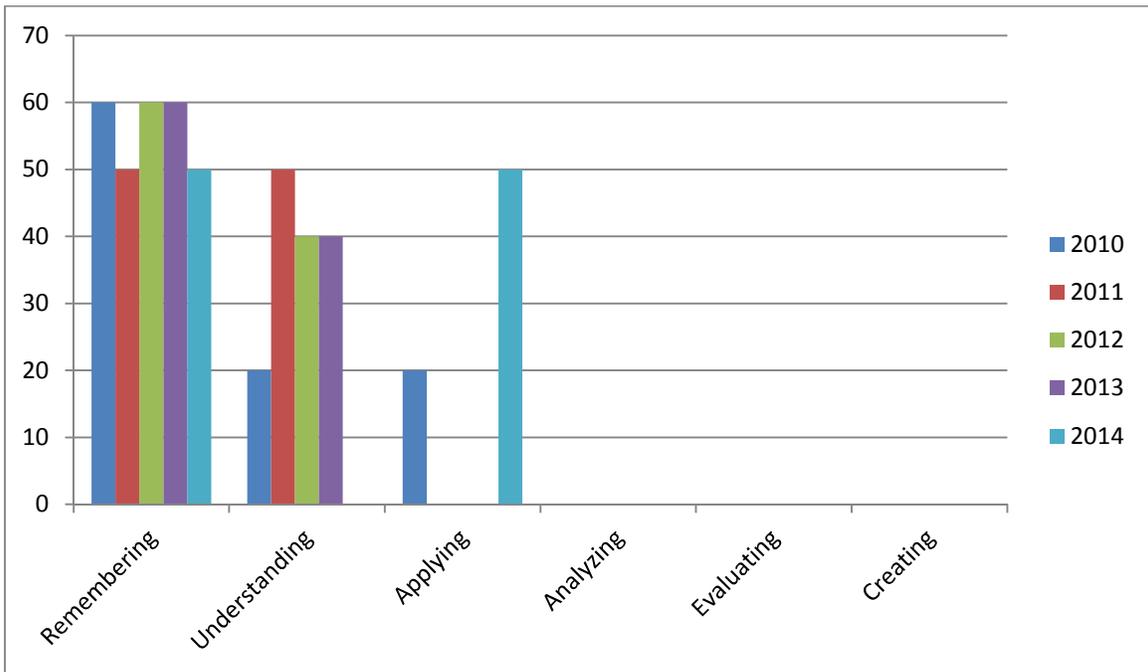


Figure 10: Percentage of item specification of Subjective Questions

### Analysis of OQ (Objective Type Questions)

In the analysis of objective type questions, a totally different and separate approach, has been found. All the set questions in this portion of Objective type Questions were based on knowledge. However, in some papers the sub-domain of applying has also been touched. But like the Subjective type Questions of the papers, the objective type questions did not have the questions of creating and evaluating sub-domains and the reason is obvious i.e. poor measuring / evaluating procedure of the creating and evaluating sub-domains through MCQ's.

### Analysis of SQ (Subjective Type Questions)

The analysis of the data revealed that most of the set questions in the papers of Physics at Secondary Level of all the BISEs (Provincial and Federal) of Pakistan, have touched mostly the areas of remembering (knowledge) and understanding. The other sub-domains of Bloom's Revised Taxonomy have been ignored partially or completely. These sub-domains are applying, analyzing, evaluating and creating. Due to poor measuring procedure the sub-domain of creating has totally been ignored. But now applying questions are included in the Physics papers at Secondary Level but this sub-domain has no great significance.

### Recommendations

The study recommended the following points for the improvement of the quality of examination questions at the Secondary School Level in the subject of Physics:

1. All the Physics Teachers should use the scientific procedure in the preparation of questions in both parts of the papers i.e. Objective and Subjective Parts respectively. They are further advised to give up the traditional ways and methods of setting the questions in the papers in Physics.
2. All the Teachers at the Secondary School Level in the subject of Physics should be provided opportunities of professional growth by concerned departments and authorities. Due to poor training they are unable to deal with the problems related to assessment such as making and formulating questions according to the Bloom's Revised Taxonomy. They must be provided opportunities of refresher courses. The Continuous Professional Growth (CPG) opportunity must be provided to all the teachers in general and Physics teachers in particular.
3. As it has become a burning issue that Bloom's Revised Taxonomy is not brought under practice while setting the questions in the papers especially in Physics at the Secondary Level, therefore the study has recommended further large scale research studies in the field.

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