

**Bloom's Taxonomy:
Improving Assessment and Teaching-Learning Process**

Muhammad Tufail Chandio₁

University of Sindh
mtufail@usindh.edu.pk

Saima Murtaza Pandhiani₂

University of Sindh
saimajafri1@gmail.com

Rabia Iqbal₃

University of Sindh
rabia.iqbal766@gmail.com

Abstract

This research study critically analyzes the scope and contribution of Bloom's Taxonomy in both assessment and teaching-learning process. Bloom's Taxonomy consists of six stages, namely; remembering, understanding, applying, analyzing, evaluating and creating and moves from lower degree to the higher degree. The study applies Bloom's Taxonomy to the prevailing assessment system at the level of secondary education in Sindh. The data are collected from the last five years' question papers used by the Board of Intermediate and Secondary Education (BISE), Karachi, Hyderabad Sukkur at secondary level for the subject of English. The questions asked in these papers are classified and analyzed from the vintage point of Bloom's Taxonomy to determine whether the present assessment system focuses on the lower degrees of learning like remembering, understanding, applying or it transcends to the

higher degrees such as analyzing, evaluating and creating. The data are quantitative hence SPSS. 20 is used to analyze and draw conclusions and results. The findings of this study will help to improve both assessment and teaching-learning process, which will hopefully uplift the learner from the sheer practices of description, rote-learning and memorization to the profound level of analysis, evaluation and creativity.

Keywords: assessment; Bloom's Taxonomy, boards of intermediate and secondary education, teaching-learning process

Introduction

The indigenous education system of the undivided Indian subcontinent was based on Maktabas, Madrasas and Dharamshalas, in which Arabic, Persian and Sanskrit were the medium of instruction. Later in 1829, Urdu was also added as a medium of instruction. With the advent of the British rule, the western education system based on European scientific knowledge and literature with English as a medium of instruction was introduced. Subsequently, Macaulay's Minutes of 1835, Wood's Dispatch 1854, Hunter Commission 1882, Saddler Commission 1917, Hartog Committee 1929, Abbot and Wood Report 1937 and Sargent Report 1944 emphasized the superiority of occidental over oriental system of education. The present-day public sector educational system of Pakistan is predominantly based on the British educational system introduced in the undivided Indian subcontinent during the rule of the East India Company (1757 to 1857) and British rule (1858 to 1947). Initially, it adopted a two-year teaching-learning process followed by a comprehensive examination of both subjective and objective nature. With later developments, it shifted to an annual examination

system, which is prevalent in the public sector schools and colleges. Nevertheless, there is a shift from annual to the semester or quarterly education system at the higher education level. Jadoon, Jabeen and Zeba (2008) maintain that both annual and semester system, with their unique characteristics, are prevalent in Pakistan monitored by the secondary and higher secondary boards as well as the Higher Education Commission of Pakistan.

The public sector schools and colleges of Sindh have devised local examination system up to grade/class VIII, in which question papers are set at district level and dispatched to all middle schools, whereas from grade/class IX to XII (intermediate) the papers are conducted at central level under the supervision of various Boards of Intermediate and Secondary Education of Sindh. Grade/class IX and X is called Secondary School Certificate (SSC) and grade/class XI and XII is known as Higher Secondary Certificate (HSC).

Since Bloom's Taxonomy is the benchmark for developing tests and assessments; therefore, there is a need to conduct a meticulous survey of these subjective and objective question papers to evaluate the degree of Blooms Taxonomy incorporated in them. These question papers do not systematically assess the gradual stages of learning proposed in Bloom's Taxonomy leading from the lower degrees like remembering, understanding, applying, to the higher degree such as analyzing, evaluating and creating. Hence, the undertaken study critically analyzes the prevailing assessment practices by employing Bloom's Taxonomy for suggesting reforms in the teaching-learning process with the help of improving assessment patterns. As it is an established fact that teachers teach keeping the final examination pattern in views,

and students also learn and prepare accordingly; therefore, it would be a justified endeavor to make sure that the examination system is scientific, which ultimately would reinforce the teaching-learning process manifold.

The study primarily deals with the scope and implication of Bloom's Taxonomy and applies six stages of the theory to the prevailing examination pattern adopted by the Boards of Intermediate and Secondary Education, Sindh. It generates a discourse to ascertain the extent to which the prevailing assessment system is focused on the lower and higher degrees of teaching-learning process. This study thus has the following objectives:

1. To analyze the prevailing assessment system by employing Bloom's Taxonomy to determine the degrees of learning.
2. To suggest reforms in the assessment system— where gaps in assessment process leading to the gaps in teaching and learning process exist.

Literature Review

Bloom's Taxonomy

In 1956, Dr. Benjamin Bloom, an educational psychologist, in collaboration with Max Englehart, Edward Furst, Walter Hill and David Krathwohl put forward a theory to upgrade the teaching learning process from the lower level of rote-learning and memorization to the higher level of analysis, evaluation, creativity and problem-solving approach. Bloom's Taxonomy comprises three domains of academic learning: cognitive, affective and psychomotor. The cognitive domain includes mental skills to

produce knowledge, the affective domain adds gradual emotional development of attitude/self, whereas, the psychomotor domain encompasses physical skills. Hence, it is abbreviated as KSA (knowledge [cognitive], skills [psychomotor] and attitude [affective]). Originally, the cognitive domain was based on these six stages: knowledge, comprehension, application, analysis, synthesis and evaluation (Bloom, 1956).

During the mid-nineties, Lorin Anderson, who was Bloom's student, along with David Krathwohl revised the cognitive domain with a new approach and added three changes (see Figure 1). They rearranged the categories, changed their names from noun to verb form and created a process and a level of knowledge matrix (Anderson, Krathwohl & Blooms, 2001).

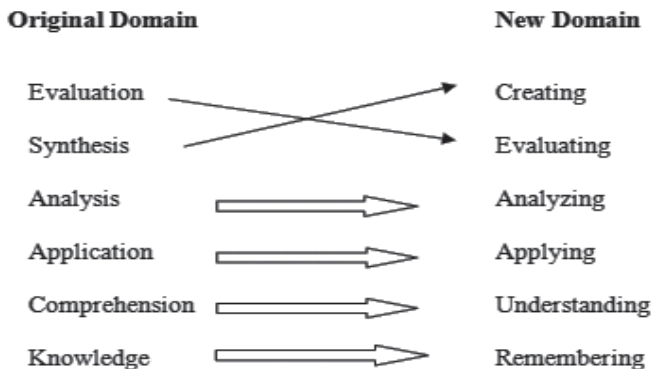


Figure 1: New Bloom's Taxonomy (Anderson, Krathwohl & Blooms, 2001)

Role of examination system in teaching-learning process

The public sector examinations are conducted across the globe and they play an important role in determining the course of teaching and learning process in a classroom. What and how teachers

teach and students learn in a classroom are significantly influenced by the ways and means used by an examination system to assess students. (Assessment Reform Group, 1999; Black, 1998; Gipps, 1994 & 1996; Greaney & Hasan 1998; Kellaghan & Greaney 2001; Mirza, 1999). Gipps (1994) adds that the basic objective of assessment system is to enhance and improve the teaching-learning process, but certain types of assessment hinder the course of learning and cast adverse impact (Rehmani, 2000). Various studies; however, add that if the forms of assessment emphasize the critical and analytical aspect of learning, students would also develop comprehensive and consolidated approaches while learning, and would mould in accordance with the forms and patterns of the assessment in vogue (Marton, Dalla'Alba & Beaty, 1993; Marton & Saljo, 1984).

The teaching-learning process in public sector schools and colleges of Sindh in particular and Pakistan in general is teacher-centered; syllabi are beyond the cognitive level; hence, the students are compelled to rote-learn and memorize (Farooq, 1996; Hayes, 1987; National Education Policy, 1992; Report on National Textbook Conference, 1994; Warwick & Reimers, 1995). In addition, the public sector examination system employs the forms of assessment which do not transcend beyond the lower degrees of learning. Accordingly, a number of research studies have criticized the existing assessment practices in Pakistan regulated under the Boards of Intermediate and Secondary Education (Bhatti, 1987; Greaney & Hasan 1998; Mirza, 1999; Warwick & Reimers, 1995) countrywide.

It can thus be safely concluded that the Pakistani examination

system promotes low level of teaching and learning. The examination system itself is a cause of hindrance in a more dynamic teaching and learning; therefore, a study needs to be conducted to analyze the prevailing examination system through Bloom's Taxonomy.

Methodology

The nature of the undertaken study falls in the realm of Applied Research. Best and Kahn (1998) maintain that the purpose of this type of research is to improve "A product or a process – testing theoretical concepts in actual problem situations" (p. 21). They further add "such research attempts to develop generalizations about teaching-learning process, instructional materials, the behavior of children and way to modify it" (p. 21).

The study adopts a quantitative framework and the data have been collected from the five year question papers designed for the subject of English of grade IX by the Boards of Intermediate and Secondary Education (BISE), Karachi, Hyderabad and Sukkur. All objective and subjective questions given in these papers are analyzed, categorized and counted in accordance with the six stages of Blooms Taxonomy. As the collected data are in quantitative form, therefore, SPSS Statistics 20 software has been used to draw conclusions and make generalizations.

Data Collection and Analysis

All question papers designed by the Boards of Intermediate and Secondary Education, Karachi, Hyderabad and Sukkur, consist of two parts: namely objective and subjective. There are fifteen multiple choice questions in the objective section, whereas the descriptive section is based on short and detailed answers ranging

from 17 to 22 questions per paper. The data collected through the document analysis from the objective and subjective sections of the last five-year question papers are presented in both tabular and graph forms. The tables show the percentage of each domain, whereas the graphs show the frequency of the domain.

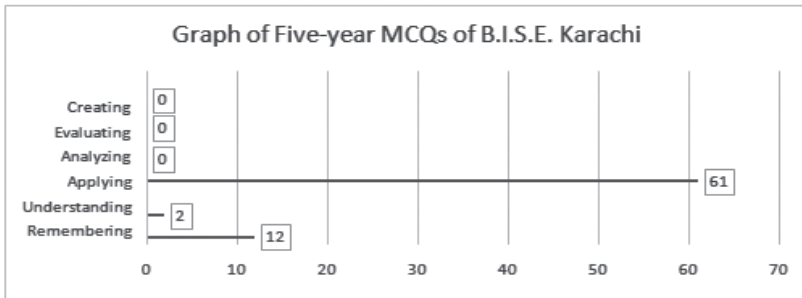


Figure 2. Analysis of Five Year MCQs BISE, Karachi

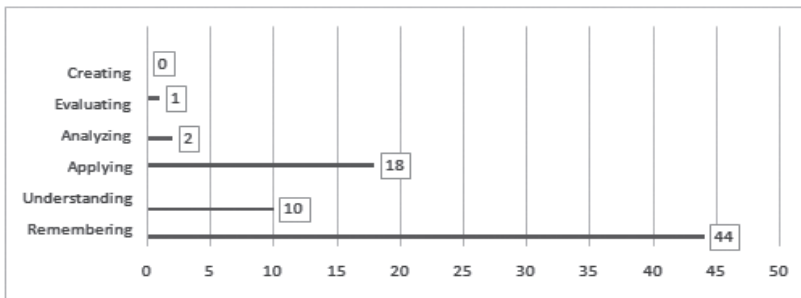


Figure 3. Analysis of Five Year MCQs BISE, Hyderabad

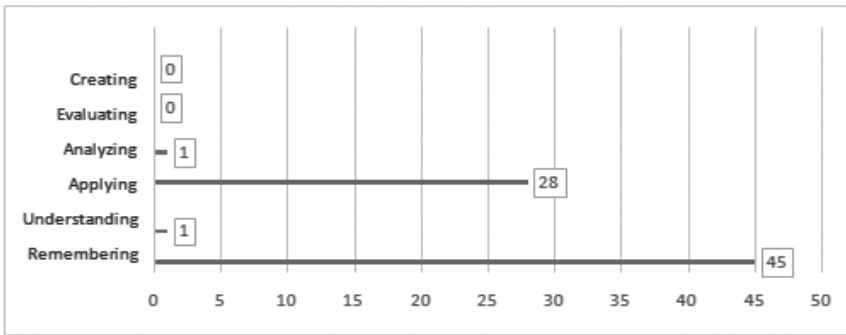


Figure 3: Analysis of Five Year MCQs BISE, Sukkur

Table 1 Percentage of Each Domain of Bloom's Taxonomy in five year MCQs

Board	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Karachi	16%	2.6%	81.4%	0%	0%	0%
Hyderabad	58.6%	13.4%	24%	2.7%	1.4%	0%
Sukkur	60%	1.3%	37.4%	1.3%	0%	0%

The data show that B.I.S.E. Karachi is highly focused in the domain of applying which is 81.4%, whereas the other domains remain disproportionately underrated; moreover, the higher degrees of learning are altogether ignored.

With reference to the Hyderabad board, the data show that the domain of remembering is more focused, which inculcate the trend of rote-learning and memorization among students while the higher domains of learning are less focused.

The data show that Sukkur board has significant tilt towards remembering and applying, whereas the higher domains of learning

remain excluded from the mainstream assessment process. As a result, they also remain less focused during teaching-learning activities.

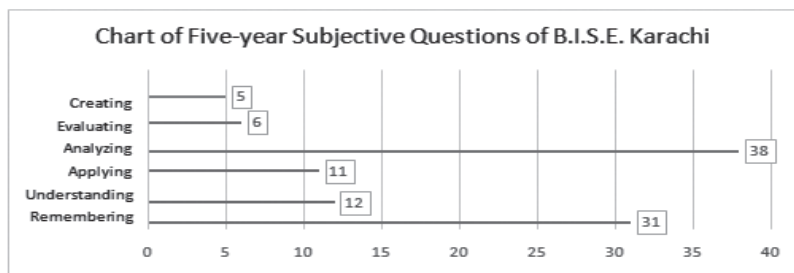


Figure 5. Analysis of Five Year Subjective Questions of BISE, Karachi

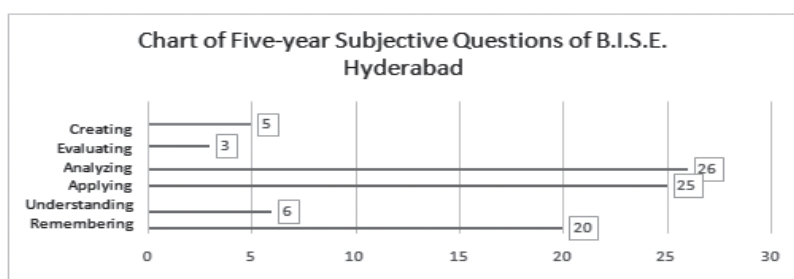


Figure 6: Analysis of Five Year Subjective Questions of BISE, Hyderabad

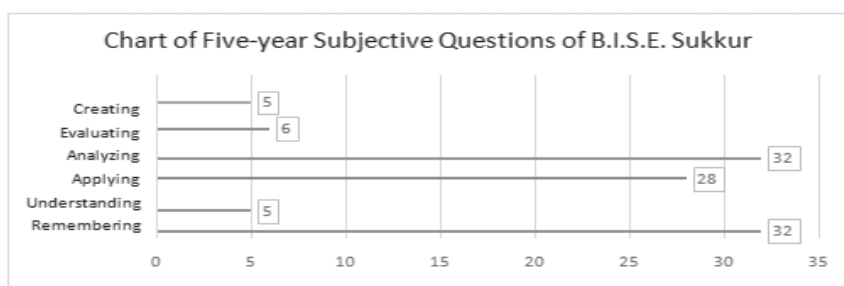


Figure 7: Analysis of Five Year Subjective Questions of BISE, Sukkur

Table 2. Percentage of Each Domain of Bloom's Taxonomy in five year subjective questions

Board	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Karachi	30%	11.7%	10.7%	36.9%	5.8%	4.9%
Hyderabad	23.5%	7.05%	29.4%	30.6%	3.5%	5.9%
Sukkur	29.6%	4.6%	25.9%	29.6%	5.6%	4.6%

The data show that Karachi board has included the lower and higher domains of learning in subjective sections of the papers; however, about 42% of the questions fall under the domain of remembering and understanding, which if had been used for the higher domains of learning, it would have been more productive.

The data collected from the subjective sections of the papers of B.I.S.E. Hyderabad manifest that the domains of applying and analyzing are reasonably focused, whereas the superior domains like evaluating and creating are still underrated. However, the category of remembering seems disproportionately emphasized, which could have been reserved for higher domains of learning.

The data of Sukkur board show that the domains of applying and analyzing are justified, whereas, the percentage of remembering is high. However, the higher domains of evaluating and creating need serious consideration and priority.

Comparative analysis of all three boards

The comparative analysis has been carried out to estimate the existing state of each board and its controlling domain preferences

during assessment process. The comparative percentage charts of objective and subjective sections of all boards areas follows:

The data show that all three boards are largely focused on the lower domains of learning, whereas the higher domains of learning are less focused. Karachi board is disproportionately inclined towards applying, whereas, Hyderabad and Sukkur remain enticed with the lowest degree of learning that is, remembering. Such papers only promote rote-learning and memorization, by ignoring conceptual, analytical, evaluative and creative levels of learning.

The data analysis of the subjective questions show that all boards have reasonably focused on the domains of applying and analyzing, whereas the higher domains of evaluating and creating are less focused as compared to the lower domains of remembering.

Discussion

The public examination system of Pakistan has been criticized in different studies. (Bhatti, 1987; Greaney & Hasan 1998; Mirza 1999; Warwick & Reimers, 1995), since the exams remain superficial in type and content. They do not instill deep learning, critical thinking, analytical and evaluative skills among students. Teachers remain focused on the completion of syllabi, and students prepare in accordance with the prevailing examination patterns. The examination system is curriculum-focused, but it does not employ to assess the achievements of learners. According to Gipps (1996), “Assessments carried out for such purposes are likely to be more superficial and need to be more objective or reliable” (p. 251).

Hayes (1987) reiterates that the concepts in the prescribed

books are beyond the cognitive level of the students. As a result, they get involved in rote learning. Moreover, the current study adds that the public examination system, which could have instilled analytical and critical learning practices among students and teachers, further aggravate the situation by encouraging memorization and cramming. It is obvious from the data that Hyderabad and Sukkur boards cater 58.6 % and 60% respectively to the domain of remembering in the objective type of papers, whereas in the subjective type of papers the domain's percentage of Karachi, Hyderabad and Sukkur boards is 30%, 23.5 % and 29.6% respectively.

One reason for instilling low level thinking domains could be that the paper setters are not trained and they do not incorporate modern and updated approaches of assessment while setting papers; albeit, they should be well-qualified and experienced in order to carry out this important exercise. Another reason may be that the due amount of time is not given to the paper setters and hence most of them set a paper in a short period consisting of one to two hours only (Mirza, 1999). It is because of this trend that the boards have tilted towards a particular domain; for example, Karachi board has excessively included questions relating to the domain of applying to the extent of 81.4% in the objective type papers. Consequently, the other domains remain un-assessed; therefore, teachers and students would also tend to pay little heed to them during teaching and learning process.

This research also finds that most of the questions are repeated after the second or the third year, which instils the approach among students of preparing from the last five or ten years question

papers. Rehmani (2003) adds, “There are model papers or guess paper guides available in the market with readymade answers based on the past five year papers” (p. 4). This trend gets strengthened if questions are repeated in examinations, which is a very dangerous trend as it gives rise to rote learning. The reason being, that even if the questions belong to higher order thinking domain and are repeated, the repetition will cause students to memorize the answers to such questions. With the help of analytical approach, question papers can be set with variety, reliability and validity.

Assessments have profound impact on both teaching and learning (Gipps, 1994; 1996; Black, 1998; Assessment Reform Group 1999). If assessment approaches transcend beyond close-ended memory-testing based questions to more open-ended analytical questions, it can also direct and lead the teaching and learning process from simple Traditional instructional theory and building block pedagogical approaches to the higher skills of knowledge construction and meaning making level (Rehmani, 2003). This study substantiates that the prevailing assessment system involves teachers and students in remembering factual knowledge given in the prescribed syllabi. Harlen and James (1997) as cited in Rehmani (2003) state, “Real or deep learning only takes place when it enhances students understanding, enabling them to interpret and apply it in a totally different context than in which it was learnt” (p. 7).

It can be concluded that Pakistan’s secondary boards need a paradigm shift where there is a dire need of expert and experienced examiners to induct more questions catering to the higher order thinking skills of Bloom’s Taxonomy while setting examination papers. Also, more time should be given to the examiners and it

should be made sure that the questions are not repeated.

Conclusion

Assessment system can play a significant role in improving the process of teaching-learning at school and college level. Bloom's Taxonomy has succinctly propounded six stages/domains of learning, beginning from the lower degrees of learning that is, remembering, understanding and applying to the higher domains of learning that is, analyzing, evaluating and creating, which if incorporated, profoundly improve both teaching-learning process and assessment practices. In addition, an assessment system itself can mold the teaching practices in the public sector schools and colleges of Sindh. The present study reveals that the question papers, either objective or subjective, designed by the BISE Karachi, Hyderabad and Sukkur have disproportionate tilt towards the lower domains which promote cramming and memorization; while there is less focus on the higher domains of learning comprising analysis, evaluation and creativity. Most of the questions are repeated; therefore, the practice of preparing from modal paper, guess paper and solved paper or guides is in vogue. As it is an established fact that teachers teach in accordance with the examination patterns; students too, prepare accordingly. Therefore by transcending the examination/assessment pattern from the lower level domains of remembering, understanding and applying to the higher domains of analyzing, evaluating and creating, the teaching-learning process in public sector schools and colleges of Sindh can be improved to profound degree and level.

Assessment is not only a means for promotion, selection, tabulation, grading and award of degree; it can also improve the

teaching-learning process in classrooms. The former use of assessment has been employed to some extent, but the latter objective/role of assessment has not been explored yet to its fullest. It is therefore, hightime to use assessment as an effective means to discourage practices of rote-learning and memorization in classrooms and discourage the trend of reproducing factual knowledge in examinations, which ultimately would inculcate critically analytical and problem-solving approach among students and teachers, and it would also mold teaching pedagogy.

The following recommendations are made from the results of the study:

1. Bloom's Taxonomy should be incorporated in both teaching-learning process and assessment practices
2. Assessment approaches should include both lower and higher domains of learning
3. Critical, analytical and problem-solving approaches should be added to assessment system to positively improve and uplift teaching-learning process from simple memorization, rote-learning and production of factual knowledge
4. Examination system may be used as a powerful means of reforming teaching-learning process
5. Questions should not be repeated frequently
6. Expert and experienced examiners should be inducted
7. More time should be allotted to examiners to develop exam papers.

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