



ADAPTING THE QUESTIONS FROM PERSPECTIVE OF BLOOMS TAXONOMY

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ABSTRACT

Current education system is changing dynamically to bring out various skills of students/ learners. To make sure the learner learn what they ought to, Outcome based education is being adopted in higher education institutions. Educationalists suggest that assessment must be in such a way to evaluate different cognitive level of the students as proposed by Bloom. But still some gap prevails on how to set questions to check different cognitive levels of the students. This paper is intended to study how the question papers are set, taking "Computer Programming Course" as example and suggest few modifications that may be brought into the question papers to assess higher order thinking level of students. Study is made on the questions collected from question papers of different educational institutions and technical examinations. Analysis were made on how the questions are distributed based on the Blooms Taxonomy and the keywords used for constructing the questions. Findings reveal that the questions are not distributed well on the Blooms Taxonomy. Most of the questions fall in the lower order thinking categories. Higher order thinking levels are very much ignored especially in descriptive type questions. Based on the findings few improvements in the question setting were suggested.

Keywords: Outcome Based Education, Blooms Taxonomy, Question setting, Programming language, C-Programming

I. INTRODUCTION

Outcome based teaching and learning is a pedagogical approach that gives importance to the learning outcomes. The learning outcomes are fixed based on the experience of the teacher or expert in that field. Curriculum/Syllabus is designed in such a way to achieve the required learning outcome. Outcome Based Education (OBE), offers a powerful and appealing way of reforming and managing engineering education. In the tradition method teaching process was considered most important, whereas in Outcome Based Education the product that is produced is given importance. It gives importance to the quality of graduates produced; the graduates need to demonstrate the required knowledge, skill and attitude. Industry needs graduate who are qualified to work from day one.

Based on the direction given by NBA and other experts, in the recent past, the buzz word in all Engineering Institutions and Universities in India is “Outcome Based Education and Accreditation”. To ensure the students are gaining proper knowledge, skill and attitude, NBA insist/ guide the institutions to practice the three learning domain the teaching learning process viz., cognitive, psychomotor and affective. This paper intend to analyze the question setting patterns, whether it is based on the recommendation of Blooms taxonomy and the quality of keywords used in the questions. The paper is organized as follows, section II introduces Blooms taxonomy and explains the suggestive questions under various revised Blooms taxonomy. Section III describes the analysis done on the question collection and various patterns observed in question settings. Section IV summarizes the findings and suggests improvements in the questions settings.

II. BLOOMS TAXONOMY

Cognitive domain of Bloom's Taxonomy is one of the three domains that were introduced by Benjamin Bloom in 1950s. This domain is designed to verify a student's cognitive quality during written examination. The famous Bloom's taxonomy consists of six levels i.e. knowledge, comprehension, application, analysis, synthesis and evaluation. Later Anderson and revised Bloom's taxonomy to fit the more outcome-focused modern education objectives. Revised Bloom's taxonomy includes remembering, understanding, applying, analyzing, evaluating, and creating.

The following are the describe each levels of revised Bloom's Taxonomy:

Remembering

Students are expected to exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. This level serves as the lower level or the beginning level of the hierarchy. Questions of this category include the facts/syntax they study in the programming language lessons.

Understanding

Students are expected to understand the concept and able to reproduce in their own way. The questions for programming in this category could be translating the algorithm.

Applying

Students are expected to understand the concept and able to apply it in a program given. Questions may be given to use the data type, data structure and control statements appropriately.

Analyzing

Students are able to examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Students will be able to understand the working of individual component, relationships between the statements, how the codes work together and bring the output expected.

Evaluating



Students are able to arrive at some conclusion from the given facts, present and defend their opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.

Creating

Students are able to integrate the concepts by rearranging components into a new whole (a product, plan, pattern or proposal).

III. QUESTION ANALYSIS

With so much of work already published, is there any change in the mindset of question paper setter? This paper intended to verify the following:

1. Which cognitive level the questions are targeting?
2. Whether all the cognitive levels are covered?
3. What are the keywords used for different levels? Whether it matches with the question keyword suggested in blooms taxonomy?

To answer the first question, analysis is done with hundred and three questions collected from question banks of various universities and technical exam. Questions collection includes both descriptive and objective type. The questions collected are related to “C- Programming”.

All the questions were categorized manually. Here the questions categorized under “applying” are the questions ask the students/learners to write programs for doing simple and direct tasks, the questions categorized under “create” are the questions ask the students/learners to write programs for bit complicated tasks. Table 1 shows some of the sample questions collected.

We can observe from the sample questions the quality of objective questions is better than the quality of descriptive questions, even though the cognitive levels tested are same.

Table 1. Sample question from the course “C-Programming”

S.No	Questions	Cognitive level
1	Define C Storages Classes?	Remembering
2	What are C operators? Discuss about types of Operators?	Understanding
3	What is Arrays? Also define types of arrays?	Understanding
4	What are Pointers? How to use Pointers?	Understanding
5	Write Programs to Calculate sum of 5 Subject and find	Applying

	Percentage?	
6	Explicit type conversion is known as A] conversion B] disjunction C] separation D] casting	Understanding
7	Study the following C program void main () { Int a=0; a++; printf(“%d”,a); } What will be the value of the variable a, on the execution of the above program A] I B] 0 C] -1 D] None of these	Analyzing
8	The meaning of arrow operator in a->b A] (*a).b B] a.(*b) C] a.b D)None	Understanding
9	What will be the value of x after executing the program? void main () { int x; x = printf(“I See, Se”); printf(“\n x= %d” , x); } A] x= 15 B] x=2 C] Garbage value D] Error	Analyzing
10	Which pair of functions below are used for single character I/O? A] getchar() and putchar() B] scanf() and printf() C] input() and output() D] None of these	Remembering

IV.DISCUSSION AND SUGGESTION

To do that the examination question paper must have questions of different types using different this section suggests few modifications that can be used in the questions based on the verbs of blooms digital taxonomy

Analysis of question collection shows that 58% of the questions are asked to check the understanding of the students and the questions for checking the evaluation skill is nil. We could see very well that the coverage of all cognitive level is missing. Questions for higher order thinking is also very less in the question papers. Usage of keyword is also very similar

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