



# Level of Cognitive Domain Addressed in SAQs of Undergraduate 1<sup>st</sup> Professional Anatomy Written Examinations

Bilkis Akhter

Assistant Professor, Department of Anatomy, Enam Medical College and Hospital. Savar-1340, Dhaka, Bangladesh.

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## ABSTRACT

Short answer questions (SAQs) are one of the popular accepted means of evaluation in medical education. Importance of understanding approach towards Anatomy is beyond doubt. The level of cognitive domain in SAQs should be addressed recall (60%), understanding (20%) and application (10%) is mentioned in the new BMDC curriculum 2012. To observe the SAQs of '3-years' 1<sup>st</sup> professional undergraduate Anatomy written examinations regarding the addressed level of cognitive domain. Study was conducted at the department of Anatomy, Enam medical College, Savar, Dhaka. Twelve (12) Anatomy written SAQ papers from May 2015 to November 2017 of Dhaka University were collected and grouped according to the addressed level of cognitive domain. (76.48%), (74.03 %) of the SAQs of paper-I and paper-II addressed recall, (23.52%), (25.91%) understanding level respectively. There was no application type of question in both papers. No significance difference was observed in between two papers, but significance difference ( $p < 0.001$ ) was found with the curriculum. Keeping the importance of SAQs in mind as assessment tool, should focus for achieving the proposed level of cognitive domain according to the curriculum.

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## Introduction

Short answer questions are the open ended questions that require students to generate an answer rather than to select from a fixed number of options (Wardy, 2010). An SAQ asks the examinee clearly to select relevant facts, concepts and attitudes from memory/understanding and integrate them into a coherent written response (Codone 2011, p.1). 'Definition' type, 'unique answer type', as well as 'draw and label' type SAQs are to measure the 'recall' level of cognitive domain, where as SAQ with the action verbs 'explain', 'describe', 'differentiate' can able to achieve the understanding level of cognitive domain. For long term retention of knowledge, learning should be accompanied by understanding, and it is essential for all doctors (Turney 2007, p.104). Application of anatomical knowledge to clinical problem solving can be assessed by using one or more SAQs for a problem. In undergraduate examinees they give the real life feeling through the solving of the problem (Vuma & Sa, 2015).

In Bangladesh assessments in Anatomy consists of all the three methods: written, oral and practical examination. According to BMDC new curriculum, 2012 there were two (2) exams per year. The summative written assessment consists of paper-I and paper-II. Each of the paper comprised of SAQ (70 marks), MCQ (20 marks) and formative (10 marks). Each paper of the SAQ contains two (2) groups A and B and contains total 14 questions (7 for each group). According to the BMDC curriculum, 6:3:1 (recall, understanding and application proportion of level of cognitive domain should be addressed (Manara, 2012). The aim of the study was to assess the addressed level of cognitive domain in the SAQs of undergraduate 1<sup>st</sup> professional Anatomy examinations.

## Methods

The present research was a set of observational study and conducted at the department of Anatomy of Enam Medical College. Total twelve (12) paper-I and paper-II, Anatomy SAQ questions of the six (6) first professional examinations of Dhaka University (DU) from May 2015 to November 2017 were collected and fully checked. There were 2 examinations per year, so the question paper of twelve (12) exams were analysed. There were 14 questions per paper, so that (14\*6) eighty four (84) questions for each paper and total 168 were analysed. The numbered components (1a, 1b, 2a, etc) were identified as 'parts' and each 'item' present in that part was identified as 'segment'. There were 84 questions, 169 parts, 241 segments in paper-I and 84 questions, 167 parts and 258 segments in paper-II. The questions were identified as 'recall', 'understanding' and 'application' level of cognitive domain they addressed according to the Modified Blooms taxonomy. The total number of each type of question was regarded as data and calculated.

## Analyses of the Data

The data were analysed using statistical programme for social science (SPSS) version-20. Data were expressed as mean%  $\pm$  SD and percentage (%) frequency. Appropriate statistical test was performed to evaluate the statistical difference between two papers as applicable.  $P < 0.05$  was considered as the level of significance.

## Results

The table-I illustrates examples of the SAQs from the question papers of the First Professional MBBS Examinations of Dhaka University of Bangladesh (May 2015 and November 2017).

**Table I. Examples of SAQs from the question papers of the First Professional MBBS Examinations of Dhaka University (May 2015 and November 2017).**

Example*	Paper	Examination	Level of cognitive domain addressed
Name the muscles of the iris with their nerve supply.	Paper-1	May 2015	Recall
Explain anatomically: why kidney changes its developmental position.	Paper-2	November 2017	Understanding

\* The language of the questions has been kept as it was in the question papers.

The distribution of the recall based questions included in the 1<sup>st</sup> professional examination of various years has shown in table-II. Here the number of segments and there frequency % is shown separately for the paper-I and paper-II. The mean % of the frequency  $\pm$ SD for the P-I and P-II is  $76.48 \pm 5.39$  and  $74.09 \pm 4.29$  respectively. Significance difference observed ( $p < 0.002$ ) in the both paper with the curriculum proposed to level of domain addressed.

**Table II. Frequencies of recall level of domain addressed in Anatomy p-I & p-II, SAQ question papers of the First Professional Examinations\*.**

Examination	Overall % frequency of segments addressing recall level of cognitive domain	
	Paper-1 (n=185)	Paper-2 (n=191)
May 2015	27 (69.20%)	29 (76.31%)
November 2015	31 (75.62%)	30 (71.42%)
May 2016	28 (75.67%)	31 (70.45%)
November 2016	38 (82.60%)	33 (71.73%)
May 2017	34 (82.92%)	36 (81.81%)
November 2017	27 (72.97%)	32 (72.72%)

Mean  $\pm$ SD: paper-I:  $76.48 \pm 5.39$ , paper-II:  $74.03 \pm 4.29$   
 paper-I vs paper-II:  $p > 0.05$

p-I vs Curriculum:  $p < 0.002$ , p-II vs curriculum:  $p < 0.002$

\* May 2015 to September 2017 (6 examinations held)

n: Total number of segments analysed in each paper

**Table III. Frequencies of understanding level of domain addressed in 12 Anatomy p-I & P-II SAQ question paper of the First Professional Examinations\*.**

Examination	% frequency of segments addressing understanding level of cognitive domain	
	Paper-1 (n=56)	Paper-2 (n=67)
May 2015	12 (30.76%)	9 (23.68%)
November 2015	10 (24.39%)	12 (28.57%)
May 2016	9 (24.32%)	13 (29.54%)
November 2016	8 (17.40%)	13 (28.26%)
May 2017	7 (17.07%)	8 (18.18%)
November 2017	10 (27.23%)	12 (27.27%)

Mean  $\pm$ SD: paper-I:  $23.52 \pm 5.41$ , paper-II:  $25.91 \pm 4.23$   
 paper-I vs paper-II:  $p > 0.05$

p-I vs Curriculum:  $p < 0.02$ , p-II vs curriculum:  $p < 0.01$

\* May 2015 to September 2017 (6 examinations held)

n: Total number of segments analysed in each paper

The distribution of the understanding based questions for both papers shown in table-III. The mean % of the frequency  $\pm$ SD for the P-I was  $23.52 \pm 5.41$  and for p-II was  $25.91 \pm 4.23$ . Significance difference observed ( $p < 0.001$ ) in between two papers with the curriculum proposed to level of domain. Segments of the question addressing the application level of cognitive domain were not found.

## Discussion

Measurement of a learner's knowledge is an important step in the educational process that should be afforded the same attention given to the development and implementation of curricula and the results of measurements of learning are used in establishing future learning goals, which completes the continuous cycle of learning (Collins, 2006). Assessments able to discriminate effectively between good and poor candidates. A study on student perceptions of medical anatomy education by Whelan et al. (2016, p. 41) observed that students invested most time studying anatomy at the beginning of medical school and had a high regard for the clinical value of anatomical knowledge. In different parts of the world, SAQs are the choice of many faculty members as a tool for their major exams (University of Arkansas 2015, p. 1) as well as in Bangladesh a great majority of written assessment in both undergraduate and postgraduate examinations are depend on the SAQs.

In the present study, it is observed that the mean % of the frequency  $\pm$ SD for the recall type questions for P-I and P-II is  $76.48 \pm 5.39$  and  $74.09 \pm 4.29$  and questions addressing understanding level is P-I is  $23.52 \pm 5.41$  and for p-II is  $25.91 \pm 4.23$  respectively. No significance difference were found among the papers whereas, significance difference observed ( $p < 0.002$ ), ( $p < 0.001$ ) between both papers with the curriculum proposed for the level of domain should be addressed. A study in Bangladesh by Akhter (2018), on the SAQs of the 'Neuroanatomy' book by R. Snell found that 97.74% of the item segments addressed the recall level and only 2.36% addressed understanding level of domain.

No question addressing the application level was found. Similar results were also found by the author Manara (2012), where analyses were done with the question paper from Bangladesh University of Professional and the University of Dhaka. Problem-based questions help to integrate the preclinical and paraclinical subjects with clinical curriculum, motivate and inspire the examinees, and finally help them to identify their learning issues and set their own learning goals (Bhunsule et al. 2015, p. 91). Medical skills that are most important for treating patients are problem-solving skills rather than memorising skills (Turney 2007, p.106). Here an examinee learns about a subject through the experience of solving an open-ended problem. Poorly constructed SAQs measure the recall of facts, but if SAQs are constructed properly they will be able to measure understanding, application and even the analysis level of cognitive domain. If there is difficulty in implementation of the curriculum, reviewing of the curriculum was proposed by the author (Manara, 2012). The author of the present research agreed with the proposal.

This study is done with the smaller sample size. However, further research can be done with a larger sample size in the other disciplines of the medical science also. To increase the effectiveness of the assessment more attention should be given in the construction of SAQs addressing

higher order of cognitive domain (understanding level, application level) as advised by the BMDC curriculum.

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