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Evaluation of Term Final Examination Questions for Undergraduate Program of Agrotechnology Discipline Based on Bloom's Cognitive Domain

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Abstract

Cognitive skills enable individuals to make precise decisions and solve real-life challenges, which are essential for theadvancement of both the state and society at large. Questions serve as a tool for gathering information, inspiring thought, and redirecting reasoning. In university education, teachers frequently use questions to encourage students to think critically and reason effectively. Term final examination question papers are employed by academics to assess the retention and practical skills of graduates. However, it is hypothesized that, at the university level, questions assessing application skills should increasingly take precedence over questions that assess retention skills, as students' progress to more advanced stages of education. These questions can be categorized into higher-order or lower-order types. The cognitive domain is one of the three learning domains outlined in Bloom's Taxonomy, proposed by Benjamin Bloom in 1956. The objective of this study is to analyze the cognitive levels of students' learning based on Bloom's cognitive domain. Specifically, we examine the term final examination assessment tools for the undergraduate program at Khulna University, Bangladesh, from the 1st year to the 4th year, using Bloom's cognitive stages as a framework. The study analyzes 43 question papers from the 2018-2019 academic years, which were set by instructors for the examinations. A total of 1,222 question items were evaluated. Additionally, three thinking skills-LOTS (Lower-Order Thinking Skills), MOTS (Middle-Order Thinking Skills), and HOTS (Higher-Order Thinking Skills), were also considered. The findings of the study reveal that the majority of the questions are concentrated at the lower cognitive levels (knowledge and comprehension). The results further indicate that academics in the Agrotechnology Discipline predominantly use LOTS rather than HOTS in their term final question papers. Therefore, it is recommended that a balance be maintained between LOTS and HOTS questions across different academic years at Khulna University. Notably, the questions devised by instructors rarely assess students' abilities in innovation and justification. Consequently, there is a need to review and revise the procedures used in designing examination question papers to ensure that students are assessed across a range of cognitive levels. To achieve this, it is essential that the university authorities organize regular and comprehensive pedagogical training for teachers.

Keywords: *Agrotechnology Undergraduate Program, Bloom's Cognitive Domain, Evaluation, Term Final Questions*

INTRODUCTION

Assessments are essential components of any education system, involving the processes of collecting, organizing, evaluating, and communicating information about students' progress and achievements in knowledge, behavior, and competencies. These assessments are used to measure learners' advancement

through various methods (Kaur, 2018), and the appropriate combination of these methods enhances the teaching and learning process (Musa & Zubairi, 2015; Alkharusi, 2012; Benson, 2003; Biggs, 2003), as well as the quality of teaching provided by teachers (Orzolek, 2006). It is important to note that the assessment procedures used by an institution often reflect the quality of the educational programs it offers.

Assessments can be classified as formative or summative based on how their results are used (Dunn & Mulvenon, 2009). Formative assessment happens throughout the teaching process, providing feedback to the teacher during instruction and helping to determine students' actual level of learning attainment. In contrast, summative assessment takes place at the end of an instructional period to grade and document learners' performance (Thote & Gowri, 2020) or to assess the effectiveness of educational programs. This type of evaluation offers a summary of prior learning and predicts future performance.

End-of-program evaluations, including examinations, grades, projects, academic records, and certifications, are highly valued in society (Awoniyi & Fletcher, 2014; Musa & Zubairi, 2015). Globally, examination papers stay a traditional method of evaluation in universities. Educators use examinations to assess the extent of students' understanding in a specific subject, assigning scores based on an informed judgment of the learners' intellectual abilities (Koksal & Ulum, 2018; Kellaghan & Greany, 2020). However, numerous studies highlight the challenging and often theoretical nature of assessment (Brindley, 1998; Donnelly, 2007; Kabombwe, 2019).

In 1956, Benjamin Bloom suggested a classification of learning objectives within the cognitive domain, known as Bloom's Taxonomy, which aims to enhance the intellectual abilities of learners. The cognitive domain comprises of six levels, arranged from simple to complex: knowledge, comprehension, application, analysis, synthesis, and evaluation. Each level corresponds to a set of action verbs that describe the relevant cognitive processes. These levels are illustrated hierarchically in Figure 1. Usually, the first three levels are referred to as lower-order thinking skills (LOTS), while the last three levels are categorized as higher-order thinking skills (HOTS) (Eber & Parker, 2007; Narayanan & Adithan, 2015). The application level can fall into either category depending on the perspective (Narayanan & Adithan, 2015; Abduh, 2020). Kaur (2018) emphasized that as the primary tool for assessing students' abilities, the examination question paper must be both valid and trustworthy. These questions should range from lower to higher-order cognitive levels to accurately measure students' overall progress, intellectual capacity, and achievement of the desired outcomes as prescribed by the relevant authorities (Stoynoff, 2009). Therefore, it is crucial to analyze examination question papers using Bloom's Taxonomy to assess students' cognitive skills. However, selecting the appropriate items for these questions is one of the most challenging and time-consuming aspects of question plan (Paul et al., 2014).

The population structure of Bangladesh is uneven, with more than 65% of its population aged between 15 and 64 years (CIA ,2024). The Government of Bangladesh is committed to improving the quality of tertiary education alongside increasing enrollment numbers to fully realize the potential of this "demographic dividend" (GED, 2020). In line with this goal, the University Grants Commission (UGC) of Bangladesh and the Bangladesh Accreditation Council (BAC) emphasize the modernization of curricula by incorporating higher-quality pedagogical techniques (UGC, 2020; BAC, 2021). Assessment strategies that incorporate higher-order thinking skills (HOTS), and reflect four learning domains- fundamental, social, thinking, and personal, are mandated by the Bangladesh National Qualifications Framework (BNQF) (UGC, 2021).

Globally, numerous investigations have emphasized the importance of evaluating examination questions based on Bloom's Taxonomy (Abirami & Raja, 2020; Köksal & Ulum, 2018; Fayyaz et al., 2019; Khan et al., 2021; Narayanan & Adithan, 2015; Patil, 2017; Mahroof & Saeed, 2021). However, in Bangladesh, there has been limited research on the assessment of examination questions. Hasan et al. (2013) analyzed the use of Bloom's Revised Taxonomy in framing social science questions for the Secondary School Certificate Examination of the Dhaka Education Board, Bangladesh.

Assumed these circumstances, this study aims to examine the extent to which Bloom's Taxonomy is represented in the term final examination questions for the undergraduate program in Agrotechnology at Khulna University, Bangladesh. To achieve this, a critical evaluation of examination question papers was directed to gain a comprehensive understanding of whether they align with the lower or higher levels of Bloom's Taxonomy. The study found that most examination questions are written informally, with few addressing the cognitive processes outlined by Bloom. Moreover, Bloom's

Taxonomy is not systematically utilized in the formation of examination questions.

This research focuses on undergraduate-level questions that mainly target lower-order cognitive abilities. Subsequently, this research identifies a significant limitation: the lack of intellectual progression in the assessment tools. The results of this study are intended to help teachers innovate when designing or revising examination questions to better reflect Bloom's cognitive stages. Lastly, this research may serve as a valuable resource for future studies on assessment practices.

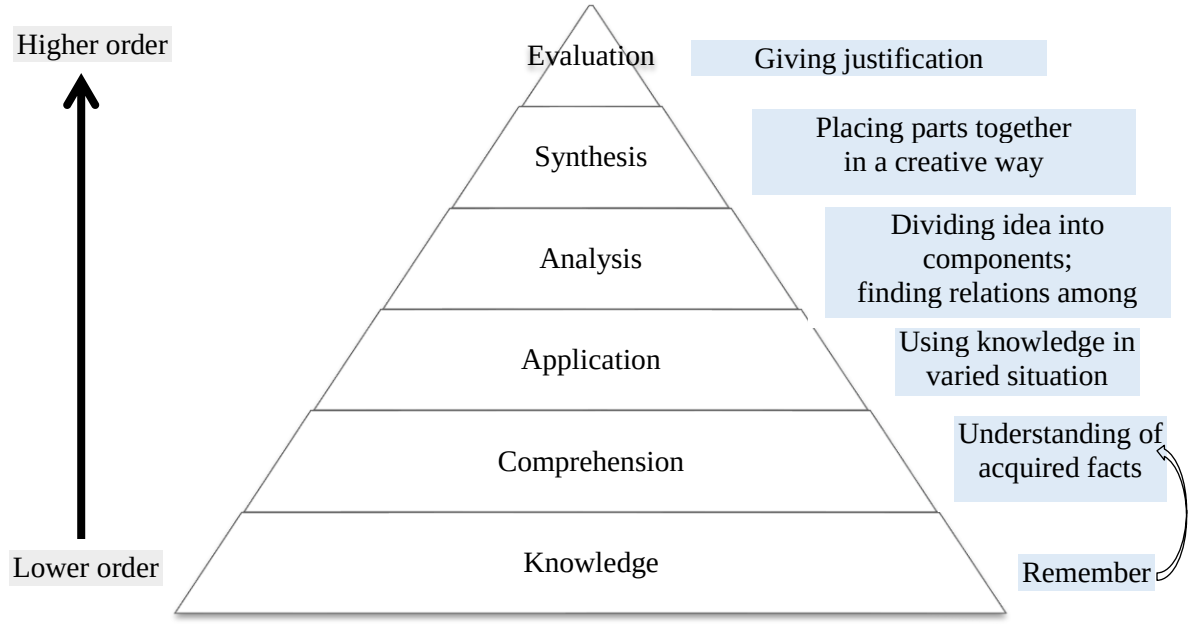

Figure 1. Bloom's Taxonomy of cognitive levels

METHODOLOGY

1. Research Question

This research focuses on assessing the term final examination questions for the undergraduate program in the Agrotechnology Discipline at Khulna University, Bangladesh. The following research questions are addressed:

1. To what extent do the undergraduate term final examination questions in the Agrotechnology Discipline at Khulna University, Bangladesh, reflect the various cognitive levels of Bloom's Taxonomy?
2. Is there a relationship between the cognitive stages represented in the questions and the advancement of education years?

2. Limitations of the Study

This investigation utilizes Bloom's Taxonomy to evaluate the examination questions set during a specific time period within the Agrotechnology Discipline at Khulna University, concentrating exclusively on the undergraduate level. The data collected does not represent programs from other universities, nor does it account for past or future examination questions within the same discipline.

3. Research Design

The study involves an evaluation of the final examination question papers from the 4-year, 8-term undergraduate program in the Agrotechnology Discipline at Khulna University, for a single academic year. A descriptive research design, specifically document analysis, was employed to identify the presence of various levels of Bloom's cognitive domain, ranging from basic to advance.

4. Population of the Study

The study population comprises of the term final examination question papers. A total of 43 question papers from the 2018-2019 academic sessions were collected from the seminar library of the Agrotechnology Discipline. A total of 1,222 question items (as shown in Table 1) were analyzed according to Bloom's educational objectives within the cognitive domain.

Table 1 Composition of examination question paper and questions for all term academic years of the Agrotechnology Discipline's undergraduate program

Year	Term	No. of question papers	No. of questions (items)
1st	1st	6	165
	2nd	6	163
2nd	1st	6	155
	2nd	5	150
3rd	1st	6	165
	2nd	5	155
4th	1st	4	118
	2nd	5	151
Total	8	43	1222

5. Sample Population

All collected question papers were considered as the sample for the study, treated as a small population.

6. Data Collection Tool

We developed a data collection template (Table 2) to evaluate the 43 assessment tools. The template categorized the question items according to the various levels of Bloom's cognitive domain. Bloom's Taxonomy, recognized as a valuable framework for assessing learning outcomes and instructional resources (Zareian et al., 2015), and was used as the basis for a descriptive analysis of the cognitive levels present in the questions. Each question was critically evaluated with Bloom's action verbs for each cognitive level.

7. Data Analysis

The questions from the examination papers were manually analyzed using Bloom's cognitive domain action verbs. Each question item was treated as a unit of analysis. The frequency and proportion of each cognitive level, as per Bloom's Taxonomy, were calculated to quantify the results. Additionally, the cognitive skills were classified into lower-order (knowledge and comprehension), middle-order (application and analysis), and higher-order (synthesis and evaluation) categories, following Thote & Gowri (2020). For clarity, the data was presented in tabular form, showing the frequency and percentage of each cognitive level. The arithmetic mean and standard deviation (SD) for each stage were also calculated and included in the tables. A simple regression analysis was conducted to establish a relationship between cognitive levels and the progression of students through the undergraduate program. A Student's t-test was used to determine the significance level of the regression coefficient.

RESULTS

The primary objective of this study was to assess the levels of Bloom's cognitive stages represented in the term final examination questions across different years in the Agrotechnology Discipline at Khulna University, Bangladesh. Table 3 displays the distribution of 1st term final examination questions across the four years, categorized according to Bloom's cognitive levels.

The data indicates that the majority of 1st term questions focused on the comprehension level, followed by knowledge-based items, across all years except the 4th year. In the 4th year, the proportion

of questions at the knowledge level equaled those at the comprehension level. The distribution of questions across the remaining four cognitive levels did not follow any consistent pattern and showed variability across terms and years (Table 3).

The arithmetic means for the various cognitive stages were also calculated. The mean percentage for comprehension questions was notably higher at 37.78%, followed by knowledge-level questions at 24.72%. The higher standard deviation (SD) values for comprehension (7.07%) and knowledge (5.07%) questions indicate a wider variation in these types of questions across different terms and years.

Table 2 Template for cataloging of examination questions based on cognitive domain of Bloom's Taxonomy

Year	**Term**	**No. of questions (items)**	**No. in each Bloom's cognitive level**					
			Knowledge	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
1st	1st							
	2nd							
2nd	1st							
	2nd							
3rd	1st							
	2nd							
4th	1st							
	2nd							
Total			-					

The results suggest that most questions were concentrated at the lower levels of Bloom's taxonomy, which may not effectively assess the higher-order thinking skills of students. The mean percentage for analysis-level questions was slightly higher (13.24%) than for application-level questions (11.60%). The percentages for synthesis (6.47%) and evaluation (6.14%) levels were almost identical and surprisingly low (Table 3). However, this does indicate that there were at least some questions that required higher-order thinking. When considering the overall distribution, a similar pattern was observed: comprehension-type questions dominated (38.09%), followed by recall-type questions (24.29%), with creative (6.58%) and evaluation type (6.27%) questions appearing least frequently.

Table 4 presents the frequency and percentage of questions from the 2nd term examinations across different years, categorized according to Bloom's Taxonomy. The data reveals that most of the 2nd term questions focused on the comprehension level, followed by the recall stage in the 1st and 3rd years. However, in the 4th year, knowledge-level questions (26.17%) outnumbered comprehension-level questions (22.15%). In the 2nd year, the proportion of knowledge and comprehension questions was equal (27.78%). Analysis-level questions ranked third, trailed by application-level questions across all years (Table 4). Synthesis-level questions were more frequent than evaluation-level questions, except in the 3rd year, where synthesis-level questions were less common.

Table 3 Bloom's cognitive levels identified in 1st term final questions for different years of Agrotechnology Discipline

Cognitive levels	1st Year 1st Term		2nd Year 1st Term		3rd Year 1st Term		4th Year 1st Term		Mean		Total	
	No.	%	No.	%	No.	%	No.	%	No. ± SD	% ± SD	No.	%
Knowledge	47	27.01	34	20.73	34	19.65	40	31.50	38.75 ± 5.35	24.72 ± 5.07	155	24.29
Comprehension	54	31.03	79	48.17	70	40.46	40	31.50	60.75 ± 14.95	37.78 ± 7.07	243	38.09
Application	29	16.67	09	05.48	27	15.61	11	08.66	19.00 ± 9.05	11.60 ± 4.68	76	11.91
Analysis	20	11.49	14	08.54	23	13.29	25	19.69	20.50 ± 4.15	13.24 ± 4.08	82	12.85
Synthesis	14	08.05	14	08.54	08	04.62	06	04.72	10.50 ± 3.57	6.47 ± 1.81	42	06.58
Evaluation	10	05.75	14	08.54	11	06.36	05	03.93	10.00 ± 3.24	6.14 ± 1.64	40	06.27
Total	174	100	164	100	173	100	127	100	-		638	100

Table 4 Bloom's cognitive levels identified in 1st term final questions for different years of Agrotechnology Discipline

Name	1st Year 2nd Term		2nd Year 2nd Term		3rd Year 2nd Term		4th Year 2nd Term		Mean		Total	
	No.	%	No.	%	No.	%	No.	%	No. ± SD	% ± SD	No.	%
Knowledge	40	25.32	40	27.78	26	19.55	39	26.17	36.25± 5.90	24.68± 3.00	145	24.83
Comprehension	53	33.54	40	27.78	54	40.60	33	22.15	45 ± 8.86	31.01± 6.82	180	30.84
Application	10	06.32	22	15.28	15	11.29	14	09.40	15.25± 4.30	10.54± 3.24	61	10.44
Analysis	31	19.62	25	17.36	28	21.05	34	22.82	29.53± 0.35	20.20± 1.99	118	20.20
Synthesis	14	08.86	09	06.25	04	03.00	17	11.41	114 ± 0.94	07.37 ± 3.11	44	07.53
Evaluation	10	06.32	08	05.55	06	04.51	12	08.05	09 ± 2.23	06.10 ± 1.29	36	06.16
Total	158	100	144	100	133	100	149	100	-		584	100

When comparing the arithmetic means across the various categories, comprehension-level questions (31.01%) were most prevalent, followed by knowledge (24.68%), analysis (20.20%), and application levels (10.54%). These results indicate that most questions targeted the lower levels of learning, which may not effectively assess students' creativity and innovative thinking. The mean percentage for synthesis-level questions (7.37%) slightly exceeded that of evaluation-level questions (6.10%), suggesting that there were some higher-order learning questions included. The overall distribution of questions followed a similar pattern, with comprehension-level items occupying the

highest percentage (30.84%) and evaluation-level items the lowest (6.16%).

Table 5 shows the distribution of questions across different years. As expected, comprehension-level questions dominated, followed by knowledge, analysis, application, synthesis, and evaluation levels, except in the 4th year, where remember-type questions were most frequent. A similar trend was detected when comparing the averages across categories: comprehension questions ranked highest (34.45%), followed by knowledge (24.61%), analysis (16.5%), and application (11.14%) levels.

Synthesis (7.03%) and evaluation (6.21%) questions was the least common, indicating that these levels were often overlooked by instructors when designing assessment tools. This pattern was also evident in the overall distribution, where comprehension-level questions again ranked highest (34.62%) and evaluation-oriented questions the lowest (6.22%). These findings suggest that the examination questions for the undergraduate program in the Agrotechnology Discipline primarily assess memorization and comprehension skills, while neglecting to evaluate problem-solving, creativity, innovation, and critical thinking abilities.

Table 5 Year-wise cognitive levels of examination questions according to Bloom's Taxonomy

Cognitive level	**Year**								**Mean**		**Total**	
	1st		**2nd**		**3rd**		**4th**					
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No. ± SD**	**% ± SD**	**No.**	**%**
Knowledge	87	26.21	74	24.03	60	19.61	79	28.62	75 ± 9.8	24.61 ± 3.31	300	24.55
Comprehension	107	32.23	119	38.63	124	40.52	73	26.45	105.75 ± 19.89	34.45 ± 5.92	423	34.62
Application	39	11.75	31	10.06	42	13.73	25	09.06	34.25 ± 6.68	11.14 ± 1.76	137	11.21
Analysis	51	15.36	39	12.66	51	16.67	59	21.38	50 ± 7.14	16.5 ± 3.15	200	16.37
Synthesis	28	08.43	23	07.46	12	03.92	23	08.33	21.5 ± 5.85	7.03 ± 1.83	86	07.03
Evaluation	20	06.02	22	07.14	17	05.55	17	06.16	19 ± 2.12	6.21 ± 0.57	76	06.22
Total	332	100	308	100	306	100	276	100	-		1222	100

Table 6 presents an analysis of questions across three cognitive domains- lower-order, middle-order, and higher-order thinking skills, throughout the four academic years of the Agrotechnology undergraduate program. Overall, the results indicate that most questions were concentrated in the lower-order thinking skills (LOTS), specifically knowledge and comprehension, with percentages ranging from 55.07% to 62.66% across the years.

Questions targeting middle-order thinking skills (MOTS) fell between LOTS and higher-order thinking skills (HOTS), with proportions ranging from 22.73% to 30.44%. Finally, questions designed to assess higher-order thinking skills were the least frequent, varying between 9.48% and 14.61% (Table 6). Notably, there was a decline in HOTS questions, with only 9.08% in the third year. The overall distribution of questions was 59.16% for LOTS, 27.58% for MOTS, and 13.26% for HOTS (Table 6). The findings of this study highlight that over 85% of the examination questions in the Agrotechnology undergraduate program were aimed at lower levels of Bloom's cognitive domain. This suggests that there is an insufficient focus on HOTS questions to effectively challenge students beyond basic knowledge and comprehension.

The relationship between different levels of thinking skills and the academic progression of students was also tested (Figure 2). A significant ($p < 0.05$) but negative association was found between

LOTS questions and students' advancement (y = -1.273x + 62.245, R^2 = 0.2636). Conversely, MOTS questions showed a significant ($p < 0.05$) and positive relationship with students' progression (y = 1.765x + 23.255, R^2 = 0.3915). However, no significant ($p > 0.05$) correlation was observed between HOTS questions and students' academic years (y = -0.504x + 14.52, R^2 = 0.0666) (Figure 2).

Table 6 Complexity (thinking skills) of examination questions based on Bloom's cognitive level

Thinking skills	Cognitive levels	No. of questions (items)				Total
		1st Year	2nd Year	3rd Year	4th Year	
LOTS	Knowledge	87	74	60	79	300
	Comprehension	107	119	124	73	423
Sub-total LOTS		194 *(58.43%)*	193 *(62.66%)*	184 *(60.13%)*	152 *(55.07%)*	723 *(59.16%)*
MOTS	Application	39	31	42	25	137
	Analysis	51	39	51	59	200
Sub-total MOTS		90 *(27.11%)*	70 *(22.73%)*	93 *(30.39%)*	84 *(30.44%)*	337 *(27.58%)*
HOTS	Synthesis	28	23	12	23	86
	Evaluation	20	22	17	17	76
Sub-total HOTS		*48 (14.46%)*	*45 (14.61%)*	*29 (09.48%)*	*40 (14.49%)*	162 *(13.26%)*
Total		**332**	**308**	**306**	**276**	**1222 (100%)**

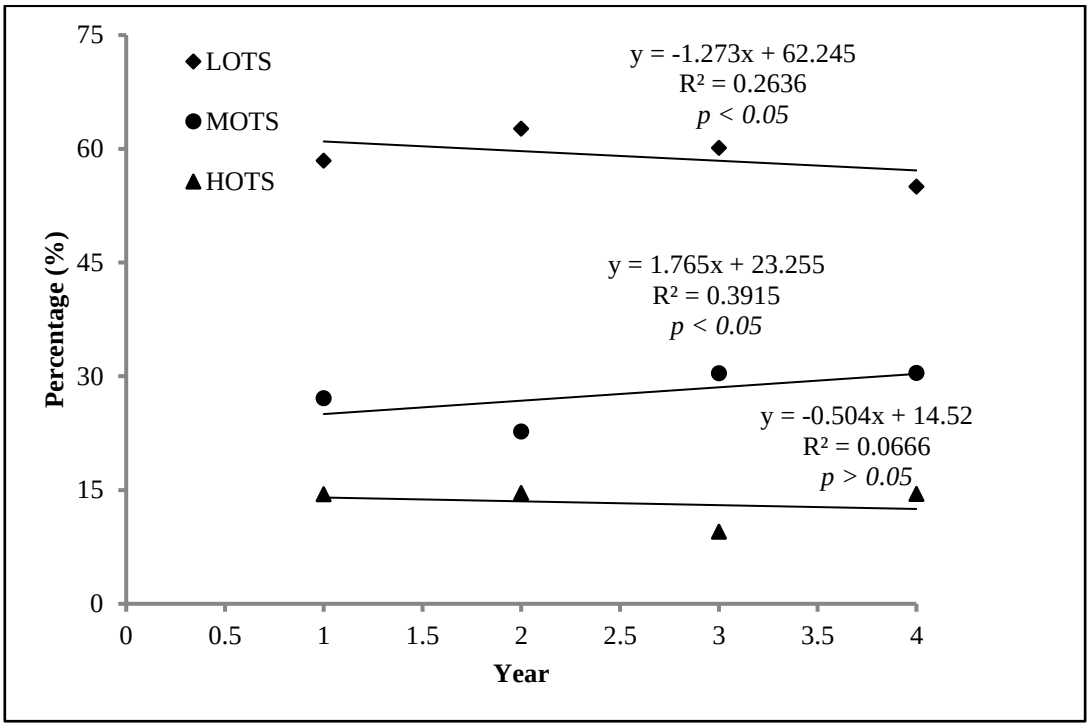

Figure 2 Relationship between complexity and increases level of year; where, 1 stands for1st year; 2 stands for 2nd year; 3 stands for 3rd year; and 4 stands for 4th year

DISCUSSION

We employed Bloom's Taxonomy in our study because it serves as a standard for evaluating pedagogical practices through its six levels of the cognitive domain. This framework ensures proper alignment between assessments and educational standards, providing solid guidelines to gauge students' learning outcomes and program effectiveness in helping students achieve those standards (Herman &

Webb, 2007; Kabombwe et al., 2021). The findings of our study reveal that most term-final examination questions in the undergraduate program at Khulna University are designed primarily around the lower levels of Bloom's cognitive domain, specifically knowledge and comprehension, rather than the more advanced cognitive stages (Tables 3, 4, and 5). Among these, comprehension-type questions slightly outnumber memory-oriented items. Our study suggests that the exam papers analyzed lack sufficient importance on higher-order cognitive skills as defined by Bloom's taxonomy.

These results align with those of Fayyaz et al. (2019), who analyzed six years (2012-2017) of MA English question papers (Part I & Part II) from Punjab University, Pakistan. They found that comprehension-level questions were the most prevalent, even reaching 100% in Part II papers. Similar findings were described by Azar (2005) and Cepni (2003), who documented that most questions in their research were at thelower levels of Bloom's taxonomy. The conclusions of Mohnot (2006), Alzu'bi (2011), and Sufiana (2012) also support our results. Mohnot (2006) examined Indian Certificate of Secondary Examination (ICSE) English Literature questions and found that 90% of the questions were at the knowledge and comprehension levels. Alzu'bi (2011) analyzed Community College Associate Degree examination questions and observed an increase in memory-based items, with about 90% of the questions falling into the bottom two levels of Bloom's taxonomy. Sufiana (2012) evaluated the Pakistan Studies course for secondary level students and reported that the majority of questions focused on the lower two levels, with little to no emphasis on the other four categories.

In the assessment process, the lower stages of Bloom's taxonomy are significant because they serve as a foundation for achieving higher levels of cognitive development (Patil, 2017). It is recommended that a well-balanced question paper includes items from various cognitive levels to capture the diverse capabilities of learners (Jones et al., 2009). In our study, we also examined the complexity of the question items, classified into LOTS (Lower-Order Thinking Skills), MOTS (Middle-Order Thinking Skills), and HOTS (Higher-Order Thinking Skills) (Table 6 and Figure 6). As expected, most of the questions fell into the LOTS category, followed by MOTS and HOTS. Our findings are consistent with those of Patil (2017) and Köksal and Ulum (2018). Patil (2017) evaluated basic mechanical engineering course question papers and found that 86% of the questions assessed lower-order cognitive skills (LOCS), with only 14% focusing on higher-order cognitive skills (HOCS). Köksal and Ulum (2018) analyzed approximately 5000 General English course examination questions and revealed that all the questions (100%) targeted LOTS, with a complete absence of HOTS questions.

LOTS questions typically focus on simple recall, memorization, understanding, explanation, and conceptualization. MOTS questions involve applying previously acquired knowledge in novel situations, while HOTS questions target problem-solving, critical thinking, and innovation. A well-designed question paper should include items from LOTS to HOTS, as lower-order cognitive questions help students acquire foundational knowledge and pave the way for developing advanced skills. HOTS are crucial tools for stimulating intellectual growth and enhancing various cognitive abilities (Freahat & Smadi, 2014).

The results of our bivariate analysis are presented in Figure 2. LOTS questions showed a significant ($p < 0.05$) but negative correlation with students' academic progression. This suggests a trend where LOTS questions decrease as students advance in their academic years. This finding is consistent with the recommendations of Swart (2010), who advised reducing the proportion of LOTS questions and gradually increasing HOTS questions in the lower levels (I and II) of engineering education. MOTS questions exhibited a significant ($p < 0.05$) and positive linear relationship with academic progression. However, HOTS questions displayed a non-significant, negative linear correlation with academic progression ($p > 0.05$), indicating a decline in HOTS questions as students' progress. Our results differ from Swart's (2010) recommendations, which suggest that the proportion of LOTS questions should decrease while HOTS questions should increase by approximately 20% in final examination papers at levels III and IV. Such a shift would promote deeper learning, leading to more well-rounded learners capable of critical thinking and innovative problem-solving. Higher education institutions must encourage graduates to critically apply, analyze, synthesize, and evaluate their knowledge to make meaningful contributions in real-world settings (Swart, 2010).

CONCLUSION

This study investigates the cognitive levels of questions set in term final examinations for the undergraduate program in the Agrotechnology Discipline at Khulna University, Bangladesh, in relation to Bloom's Taxonomy. The results of this study clearly show that the examination question papers primarily emphasized lower-order thinking skills (LOTS), with limited focus on evaluating students' abilities in innovation and justification. The findings also disclose that understanding-type questions were the most common, followed by recall, analysis, and application questions. Innovative-type questions, however, ranked the lowest. The overall assessment of the examination questions suggests that items designed to evaluate synthesis abilities should be enhanced, while those assessing abstraction should be reduced. However, it is crucial to strike an appropriate balance between LOTS and HOTS across different academic years in higher education. Achieving this balance will lead to a more accurate assessment of agricultural students, who are future skilled agriculturists. In summary, this study can assist curriculum planners in refining educational programs and guide assessors in improving assessment tools.

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DATA AVAILABILITY STATEMENT

Data will be made available on request.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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