

ISBN: 978-984-37-0070-4

# Proceedings of the Workshop on Research Project 2023



**Bangladesh Accreditation Council  
Dhaka**

# Proceedings of the Workshop on Research Project 2023

Volume 1

ISBN: 978-984-37-0070-4



**Bangladesh Accreditation Council**  
Dhaka-1000, Bangladesh

Published by:

**Bangladesh Accreditation Council**

BSL Office Complex-2 (2<sup>nd</sup> floor)

1 Minto Road, Ramna, Dhaka-1000, Bangladesh

Phone: +880-2-222224183

Fax: +880-2-222224165

E-mail: bac.gov.bd@gmail.com; info@bac.gov.bd;

Website: <https://www.bac.gov.bd>

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**Printed by:**

Printed at Panir Printers

Cell: 01841 019 691

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## Foreword

Quality assurance (QA) might mean different things depending on the country. Due to the demands of their distinct national contexts, some nations have developed QA models for their higher education systems. However, a common thread unites all quality assurance-related operations worldwide and connects the fundamental ideas. The vocabulary used in quality assurance today, well-known models, and various approaches employed in the field of higher education are all covered in this book.

The government of Bangladesh established the Bangladesh Accreditation Council (BAC) to ensure quality education and to establish the accreditation process in higher education institutions (HEIs) and their academic programs. To this end, BAC has formulated accreditation rules, standards and criteria for accreditation, and other relevant rules and regulations for the process of awarding accreditation. Recently, BAC has received preliminary applications from 21 universities for 159 (2023-2024) academic programs. Three universities have submitted final applications for accreditation of their academic programs.

As a newly established entity, 'Bangladesh Accreditation Council Research Policy 2022' has also been formulated to conduct research projects to gain knowledge on higher education quality assurance and accreditation issues. Realizing the importance of creating a research management framework for the smooth execution and fruitfulness of research activities, this policy has been framed, which is consistent with BAC's vision and mission.

According to the Research Policy of BAC, nine research projects were approved in FY 2022-23. Each research project received up to three lac taka (BDT 300,000.00) and was implemented successfully within the stipulated time. After reviewing the final report and evaluation report, the BAC is going to publish the 'Proceedings of the Workshop on Research Project, 2022-2023'.

At this stage, I would like to express my earnest gratitude to Dr. William R Ward, Senior Fellow, The University of Liverpool, England, Leahurst, Neston CH647TE, and Dr. Timothy J Parkinson, Emeritus Professor, Massey University, New Zealand, Palmerston North 4442. To make this publication more effective, they both thoroughly reviewed the documents.

I sincerely thank the Principal Researcher(s) and their research team for following the instructions of the Bangladesh Accreditation Council and completing their research projects on time. In addition, I would like to thank the members of the 'Research Management Committee' who have helped execute research projects and financial coordination with sincerity, dedication, and integrity.

Finally, I hope that the first publication of 'Proceedings of the Workshop on Research Project, 2022-2023' will contribute to understanding the Bangladesh Accreditation Council's research activities, goals, and objectives.



**Professor Dr. Mesbahuddin Ahmed**  
Chairman  
Bangladesh Accreditation Council

## Preface

With the rapid expansion in the developing world, higher education will change the profile of global concepts. Quality of education and accreditation process will play a role in this expansion because it fulfills the basic quality criterion of being fit for purpose at minimum cost to society. Quality assurance can best do so by helping institutions evolve towards a culture of quality. This implies that the major challenge for quality assurance in the years ahead is capacity building at all levels.

The importance of research is immense in assessing the status of higher education curriculum, teaching process, and learning-teaching activities management system in the higher education institutions (HEIs) of the country and determining what to do to improve its quality. Research on quality assurance and accreditation in the changing context will play a special role in establishing the Council as an internationally recognized body.

According to the 'Bangladesh Accreditation Council Research Policy 2022', research project proposals are invited through the publication of notices in daily newspapers for the first time in the financial year (FY) 2022-23. 169 research project proposals were received within the stipulated time frame. Each research project proposal was evaluated by respected reviewers in a double-blind peer review process. Based on the review report and feedback received from the review workshop, nine research projects were approved in FY 2022-23. Each of the nine research projects received up to three lac taka (BDT 300,000.00) which was implemented within the expected time. The external affairs, research, standards, and publication division of the BAC coordinated and monitored these research projects. Among nine projects, one research project was managed by a private university, one from a national university-affiliated college, and the rest of the seven were managed by public universities. The workshop on 'Final Report Presentation' was held to discuss, and evaluate the reports carried out in the preceding year. Finally, the Bangladesh Accreditation Council is going to publish the 'Proceedings of the Workshop on Research Project, 2022-2023'.

To make the proceedings successful, I would like to take this opportunity to congratulate the Principal Researcher(s), Co-researcher(s), and all other members of various research projects for sharing their research findings and ideas. I express my gratefulness to the honourable reviewers, evaluators, concerned universities, and research cells/directorates who have helped in the implementation of the research projects. I also express my gratitude to the esteemed members of the BAC's 'Research Management Committee', who have provided consistent guidance to the researchers to ensure the successful execution of the research project. My sincere gratitude goes out to the BAC authorities and colleagues who made it possible for the research fund to be disbursed in an accountable and real manner.

I am deeply grateful to Dr. WR Ward, Senior Fellow, The University of Liverpool, England, and Dr. T J Parkinson, Emeritus Professor, Massey University, New Zealand for their help with reviewing and editing the manuscripts to make this publication more effective. Finally, the encouragement and support extended by the honourable Chairman of the Bangladesh Accreditation Council are gratefully acknowledged.



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# The Use of Inquiry-Based Learning in Agricultural Higher Education: Teacher-Student's Perspectives on Integrating Inquiry Pedagogy into the Curriculum

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## Abstract

Inquiry-based learning (IBL) can profoundly enhance the students' critical thinking ability. This study used a mixed-methodology approach to investigate the application of IBL in agricultural science higher education (ASHE) from the viewpoints of teachers and students. Quantitative data were collected from 181 and 538 randomly selected teachers and students from four universities in Bangladesh. Qualitative data were gathered through focus group discussions (FGD), key informant interviews (KII), and observations. The study's findings indicate a low level of awareness about IBL among participants in ASHE, with little use of the IBL methodology. The main IBL methodologies include assignments, presentations, and scientific experiments. The perceived benefits of utilizing IBL in ASHE are enhanced critical thinking skills, memory retention, confidence, and hands-on learning opportunities. The primary hurdles to implementing IBL in ASHE are heavy course load, overlapping course schedules, and inadequate resources such as classrooms, libraries, and journals. Additionally, many students need more motivation, knowledge, and skills to utilize IBL effectively. The large classes and limited time for theory classes further compound these challenges, as does the gap between teaching, assessment, and learning outcomes. This study recommends enhancing the use of group discussion, classroom debate, summary drawing, study tours alongside presentations, assignments, and science experiments; awareness-building workshops, conferences, webinars, and training sessions on IBL; teachers training on IBL methodology; development of classroom, library and research facilities; making IBL mandatory for at least 50% of the course contents; inclusion of assignments, presentations, report writing, summery drawing, degree of participation, and critical-thinking-provoking questions in the assessment system in each university.

**Keywords:** Use; Inquiry-Based Learning; Agriculture; Bangladesh; Pedagogy

## Introduction

Despite substantial progress in increasing student enrolment, reducing the gender gap, and establishing higher education institutions, the quality of higher education in Bangladesh is often questioned for its failure to produce critical thinkers, which

might be a result of teachers' overwhelming emphasis on lower-order cognitive skills rather than facilitating incumbents to use reasoning, understand, communicate, apply knowledge, and solve real-life or workplace problems at all levels of education (Monem & Baniamin, 2010; Aminuzzaman, 2011; Khaled, 2014; Mamun-ur-Rashid, 2023). Against this backdrop, inquiry-based learning (IBL) – a self-directed, question-driven approach to understanding, offers students the opportunity to explore a subject in depth and formulate central questions throughout their exploration. It effectively enhances students' ability to inquire, proficiently research, and solve problems - the top three characteristics employers search for (Coplin, 2012; Rancourt & Archer-Kuhn, 2019). As an added advantage, the students generally enjoy IBL for contributing to greater learner engagement with the learning process (Ural, 2016).

Quality improvement at the university level necessitates introducing inquiry-based pedagogies to enable young men and women to analyse issues, think critically, solve problems, communicate effectively, and take leadership roles (Justice et al., 2009). However, introducing IBL is often interwoven with various university challenges and barriers. The students are encouraged to engage in multiple resources and support to collaborate with their peers and work through the struggles of researching to answer their questions (Anstey et al., 2014). The instructors must also act as facilitators who support and guide students' learning ventures (Spronken-Smith & Walker, 2010). Moreover, the students and instructors can struggle with this dynamic change as it goes against the prevailing norms, wherein the teacher is an authority figure and gatekeeper of new information. Hence, exploring such barriers to change is essential to overcome the challenges in introducing and/or strengthening inquiry-based learning at the tertiary level.

This research aimed to explore the use of IBL in agricultural higher education (ASHE) in Bangladesh. However, the specific objectives encompass:

- i. Level of knowledge of IBL among students and teachers
- ii. Present status of the use of IBL at ASHE in Bangladesh
- iii. Student-teacher's perception of the advantages and challenges of IBL in ASHE
- iv. To explore strategies for incorporating IBL into the ASHE curriculum

Inquiry-based learning is a student-centered pedagogical approach where learners uncover first-hand understandings about subjects, their environment, and themselves (Wang et al., 2010) by formulating questions, investigating problems and drawing evidence-based conclusions while collaborating with others (Melville, 2015). The model starts with student engagement with a topic, formulating questions to explore, determining what information needs to be found, gathering data, synthesizing findings, communicating findings, and evaluating the success. The end of the inquiry leads to new interests and more questions (Justice et al., 2002). Inquiry-based learning (IBL) is very similar to Problem-Based Learning (PBL).

Both approaches begin with a question followed by investigating solutions, creating new knowledge based on gathered information and understanding, sharing discoveries and experiences, and presenting new-found knowledge. The primary difference between IBL and PBL is premised on the tutor's role. In IBL, a tutor is both a facilitator of learning and an information provider. However, in PBL, the tutor assists the process but does not provide information related to the learners – that is the learners' responsibility (Savery, 2006).

Inquiry-based lessons in agriscience classrooms enhanced students' scientific reasoning ability (Thoron & Myers, 2012). Secondary-level students perceived that the use of IBL in agricultural classrooms can enhance the students' community engagement and their critical thinking skills (Baldock & Murphrey, 2020). Moreover, the students taught through IBL activities possess a favourable opinion of agriscience and its importance (Thoron & Burleson, 2014).

A curriculum provides a 'roadmap' or 'guideline' for any discipline. It integrates instructional practices, learning experiences, and student performance assessments designed to highlight and assess the target learning outcomes of a particular course (Delaware University, Newark, Delaware, USA). Therefore, enhancing the use of IBL in ASHE requires its inclusion in the course curriculum. The conceptual framework of this study is shown in Figure 1.

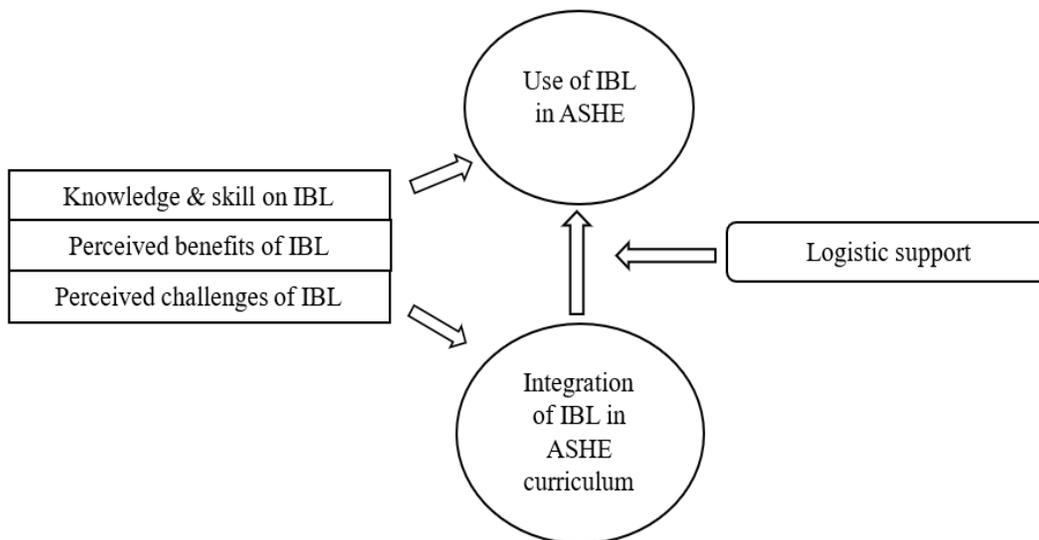


Figure 1: Conceptual framework of the study

Knowledge, perceived benefit, and perceived challenges are vital in integrating and using learning methodology in higher education. For instance, the success of IBL rests profoundly on the knowledge and skills of those implementing them (Good & Brophy, 1986; Barron and Darling-Hammond, 2010). Additionally, science teachers' content knowledge, attitude, and teaching abilities stimulate inquiry-oriented pedagogy (Kim & Tan, 2011). Similarly, Beshears (2012) revealed that teachers

considered lack of background knowledge in content and pedagogy, classroom management, curriculum design, and infrastructure as the major factors hindering the implementation of IBL in the classroom. The faculties and student's perceived benefits also significantly influenced adopting technology-based learning (Hair et al., 2013; Lee & Hsiao, 2014; Tarhini et al., 2014; Dubey & Sahu, 2021). On the contrary, perceived technology challenges can hinder the adoption of technology. Naseer (2020) claimed that perceived technology challenges are among the seven impediments to adopting new technology, whilst Al Senaidi et al. (2009) found that disbelief in the benefits of ICT can act as a barrier to adopting technology for teaching and learning.

IBL is a highly time- and resource-intensive approach that can require high-level logistic support and teacher time and effort. In guiding middle and high school teachers in teaching inquiry science, Walker (2007) posits that educators must develop various written materials and detailed case study research and preparation. He also presented a list of problems teachers perceive with implementing IBL, encompassing the school system, school resources, and the individual teacher. Mugabo & Nsengimana (2020), focusing on the impediments of IBL in Rwanda's lower secondary education and ways of overcoming them, found insufficient teaching time, resources for practical classes, heavy workload, large class size, and relatively long syllabi as significant hindrances in adopting IBL.

## **Methodology**

### ***Study Location***

This study was conducted at four selected universities: Bangladesh Agricultural University (BAU), Sher-e-Bangla Agricultural University (SrAU), Patuakhali Science and Technology University (PSTU), and International University of Business Agriculture and Technology (IUBAT). The selected universities are leaders in offering agricultural science education in the public and private sectors.

### ***Study Design***

This study used a convergent, parallel, mixed method comprising quantitative and qualitative components to achieve the research objectives. The study examined the current practice of IBL through structured survey questionnaires, focus group discussions, key informant interviews, and observations. The quantitative approach includes both teachers' and students' survey questionnaires. Table 2 presents details of teacher and student participants in quantitative data collection.

### ***Data Collecting Instruments: Structured Questionnaire***

Structured questionnaires were used to collect quantitative data. The questionnaire was composed of two parts. The first part contained information related to the characteristics of the respondent. The second part was designed to acquire information about IBL use, advantages, and limitations. The first part of the

questionnaire was different for teachers and students, and the second part was similar for both teachers and students. However, the language of the questions in the second section was adopted for respondent types. The use of IBL was measured based on a five-point rating scale (4 = regularly, 3 = frequently, 2 = moderately, 1 = rarely, and 0 = do not use). A five-point rating scale (5 = very high, 4 = high, 3 = moderate, 2 = low, and 1 = very low) was adopted to measure the advantages and limitations of IBL. The questionnaire was prepared following Justice et al. (2009), Skelton et al. (2018), and Moseley & Connolly (2021). Before the final execution, the questionnaire was pre-tested, and necessary corrections and adjustments were made.

### ***Focus Group Discussion (FGD)***

This study used nine FGDs to reveal the use, advantages, constraints, and strategies required to adopt IBL in ASHE. A detailed list of the participants in FGD from different universities, levels, and faculties is provided in Table 1. The average duration of each focus group session was approximately an hour. Probe questions were utilized to acquaint the participants with the topic of discussion and to ensure that they felt at ease while sharing their views.

### ***Key Informant Interviews (KII)***

This study conducted 33 KIIs in different universities, considering students from different study levels, teachers from different job strata, present and former deans, chairmen of various major departments, and former and existing directors of the Institutional Quality Assurance Cell (IQAC). The key questions used to guide KII were similar to those used in FGD. With the help of research assistants, an expert conducted all the FGDs and KIIs.

### ***Structured Observation***

This research studied the use of IBL, including its advantages and limitations, by structurally observing twelve classes taught by various teachers and attended by students of different levels and subjects. The main focus of the observation was on how teachers began their lectures, the teaching methodology they employed, and the level of engagement between the teacher and students during the teaching and learning process.

### ***Validity, Reliability, and Triangulation***

Qualitative data collection experts moderated all the discussions and interviews to ensure process validity, considering diverse respondents. Moreover, a rapporteur recorded all interviews and discussions electronically and noted them, reducing the possibility of missing important information. To ensure the reliability of qualitative data, it was essential to maintain accuracy in both form and context. This was achieved through constant comparison, as recommended by George & Apter (2004). To ensure accuracy, data from diverse sources were triangulated within the research time frame.

### *Population and Sampling*

A stratified random sampling method was used to select 538 students from different levels of education from each university. For the teachers, 181 faculty members were randomly selected, considering employment strata. This study adopted a purposeful sampling process to secure qualitative information, which helps understand the central phenomenon (Creswell, 2014). Table 1 provides a detailed description of qualitative sampling.

Table 1: A detail of qualitative data collection techniques adopted in this study

Method	Total	University (f)	Faculty coverage	Participants
FGD	9	BAU (3)	AG, FI, ANS, and VM	Students and Teachers
		PSTU (2)	AG, ANS, and VM	Students and Teachers
		SrAU (2)	AG, FI, ANS, and VM	Students and Teachers
		IUBAT (2)	AG	Students
KII	33	BAU (11)	AG, FI, ANS and VM	Professors, associate professors, deans, former deans, former and present directors of IQAC, and Chairman of various departments.
		PSTU (8)	AG, FI, and ANS	Professors, assistant professors, deans, the director of IQAC, and the chairman of different departments
		SrAU (10)	AG, FI, and ANS	Professors, associate professors, assistant professors, and dean
		IUBAT (4)	AG	Students, dean, director of IQAC, assistant professor
Observation	12	BAU (2)	AG	Level 1 and Level 2
		IUBAT (4)	AG	Level-2, Level-3, level-4
		SrAU (4)	AG, VM	Level- 2, Level-3

*Note:* FGD = Focus Group Discussion; KII = Key Informant Interviews; BAU = Bangladesh Agricultural University; PSTU = Patuakhali Science and Technology University; IUBAT = International University of Business Agriculture and Technology; SrAU = Sher-e-Bangla Agricultural University; AG = Agriculture; FI = Fisheries; ANS = Animal Science; VM = Veterinary Medicine; IQAC = Institutional Quality Assurance Cell

### *Data Analysis Procedure*

In the preliminary stage, text and numeric data were analysed individually. Respondent opinions on the open-ended questions were coded into groups, and the frequency of responses from each group was calculated. A descriptive statistical approach, such as percentages, means, and standard deviations, was used to present the numerical data. Data from interviews were analysed by considering the steps of Creswell (2014), such as transcribing, organizing, coding, developing themes,

making connections and interrelations, and developing a larger meaning of the data. SPSS V.24 was used to analyse quantitative data and Nvivo V.12.2 to analyse qualitative data.

### ***Ethical Approval***

The study involves human participants, and ethical clearance was obtained from the International Ethical Committee (IEC) of Patuakhali Science and Technology University (PSTU) before the commencement of the project.

## **Results and Discussion**

### ***Descriptive Characteristics of the Respondents***

The data in Table 2 show that the average age of the teacher respondents was 38.6 (SD: 9.0) years and most (74%) of the respondents were male. Many (36.5%) of the respondents were from BAU and performed their jobs in the faculty of agriculture (64.1%). In rank, 44.8% of respondents were professors, and 77.3% of them received at least one session of training in teaching and learning. The average age of the student respondents was 23 (SD: 1.31) years, and 58.7% were male. The largest number of respondents (32%) were from PSTU, and 33% were from Level 4. Most of the respondents (69%) attended (90–100%) classes, and only 22.7% of students had attended at least one training session in the teaching-learning subject matter. A detailed description of the other characteristics of the teacher and student respondents is displayed in Table 2.

### ***Level of IBL Knowledge among the Respondents***

Very few respondents had heard about the term IBL before.

*'I did not hear about IBL before this interview. However, to me, this type of learning is very important, as the student can learn about recent happenings in relevant subjects by inquiring with the teachers. According to the respondent, an example of IBL is giving students a chance to ask questions.'* (Dean of a University).

*'Some of us heard about problem-based learning but not about IBL.'* (Teachers in an FGD)

Except for one participant, in all five FGDs, the students claimed,

*'We never heard the name IBL. Only one student heard about IBL from television or the internet.'*

*'I do not understand IBL technically, but I use several IBL methodologies.'* (Chairman of a Department)

*'I am not familiar with the term IBL, but I have used some teaching methodology included in IBL. I am familiar with the contents of IBL.'* (An assistant professor at a university).

Almost everyone involved with IQAC interviewed in this research did not know precisely what IBL was. However, a significant proportion of them partially understood IBL and could correctly mention a few to several IBL methodologies.

*'To me, IBL is 'Taking students' feedback'* (A chairman of a department).

Table 2: Descriptive characteristics of the respondents (nt = 181; ns = 538)

Variable	Category	f		%	
		T	S	T	S
Gender	Male	134	316	74.0	58.7
	Female	47	220	26.0	40.9
	Missing	0	2	0	0.40
University	PSTU	54	172	29.8	32.0
	SrAU	50	122	27.6	22.7
	IUBAT	11	119	6.1	22.1
	BAU	66	125	36.5	23.2
Faculty	Agriculture	116	323	64.1	60.0
	Fisheries	22	86	12.2	16.0
	Animal Science	24	42	13.3	7.8
	Veterinary Science	17	80	9.4	14.9
	Missing	2	7	1.1	1.3
Designation/Level	Lecturer /Level-1	15	35	8.3	6.5
	Assistant Prof./Level-2	54	116	29.8	21.6
	Associate Prof./Level-3	25	130	13.8	24.2
	Professor/Level-4	81	178	44.8	33.1
	Missing	6	79	3.3	14.7
Training in teaching and learning/learning	No	41	398	22.7	74.0
	Yes	140	140	77.3	26.0
Class attendance	60-69%	-	3	-	0.6
	70-79%	-	25	-	4.6
	80-89%	-	139	-	25.8
	90-100%	-	371	-	69.0
Overseas experience	No	83	-	45.9	-
	Yes	98	-	54.1	-
Highest education	MS	75	-	41.4	-
	PhD	73	-	40.3	-
	Postdoctoral	33	-	18.2	-
Job/Study satisfaction	Very dissatisfied	0	25	0	4.6
	Dissatisfied	28	51	15.5	9.5
	Slightly dissatisfied	32	114	17.7	21.2
	Neutral	21	48	11.6	8.9
	Slightly satisfied	50	85	27.6	15.8
	Satisfied	50	179	27.6	33.3
	Very satisfied	0	36	0	6.7

Note: f = frequency; T = Teacher; S = Student

Source: Field data, 2023

A misconception regarding IBL also prevailed among a significant proportion of the faculty members. Along with correctly identifying several IBL methodologies, many faculty members thought using PowerPoint (PPT) presentations, taking student feedback, asking questions, and writing class notes were also IBL methodologies. Although there is a significant lack of understanding of the concept of IBL, all the respondents, irrespective of university, explain that IBL is very time-demanding and that most of the learning methodologies used in teaching and learning should encompass IBL. *'IBL is very time-demanding. I have recently visited the Netherlands and had opportunities to work with them. I learned from my experience that their teaching method is similar to IBL. It is a two-way teaching method that includes group discussions, workshops, presentations, or group exercises.'* (A professor at a university).

### ***Use of IBL Methodology in ASHE***

The data displayed in Figure 1 shows that, based on the weighted mean (WM), assignment is the only IBL method frequently used in ASHE. Other moderately to frequently used methodologies were presentation, group discussion, group work, group projects, science experiments, and field trips. Case studies, research projects, summary development, and project development were rarely to moderately used, and classroom debates were used. Supporting quantitative findings, the qualitative data-based word cloud in Figures 2 and 2a shows that assignments, presentations, group discussions, and field trips are frequently used in ASHE. Other important methodologies are project work, internships, summary development, demonstrations, and classroom debate. During class observation, this study also found assignments and group presentations as used in theory classes. However, most of the respondents who participated in the qualitative data collection methodology considered that the use of IBL in ASHE is still low. The majority of the participants thought that at present, 20–30% of teaching and learning in ASHE is inquiry-based.

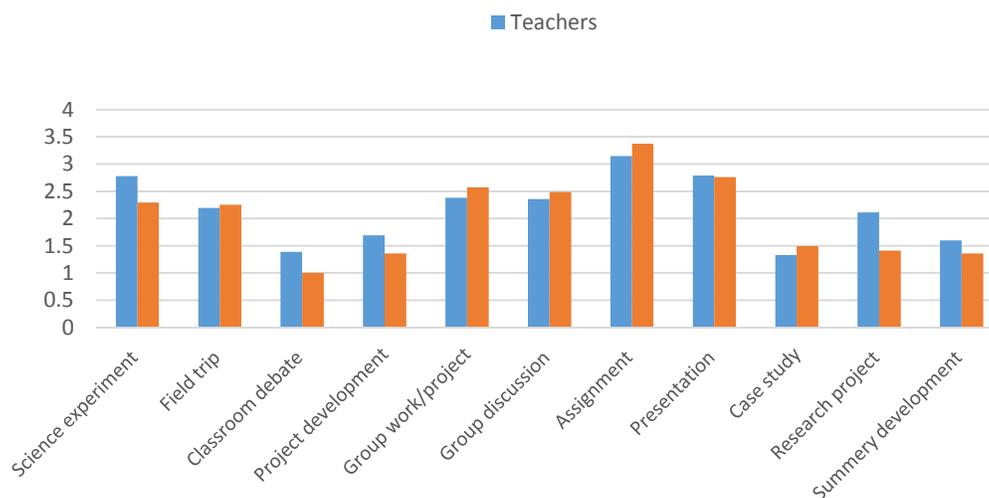


Figure 2: Use of IBL Methodology in post graduate agricultural teaching

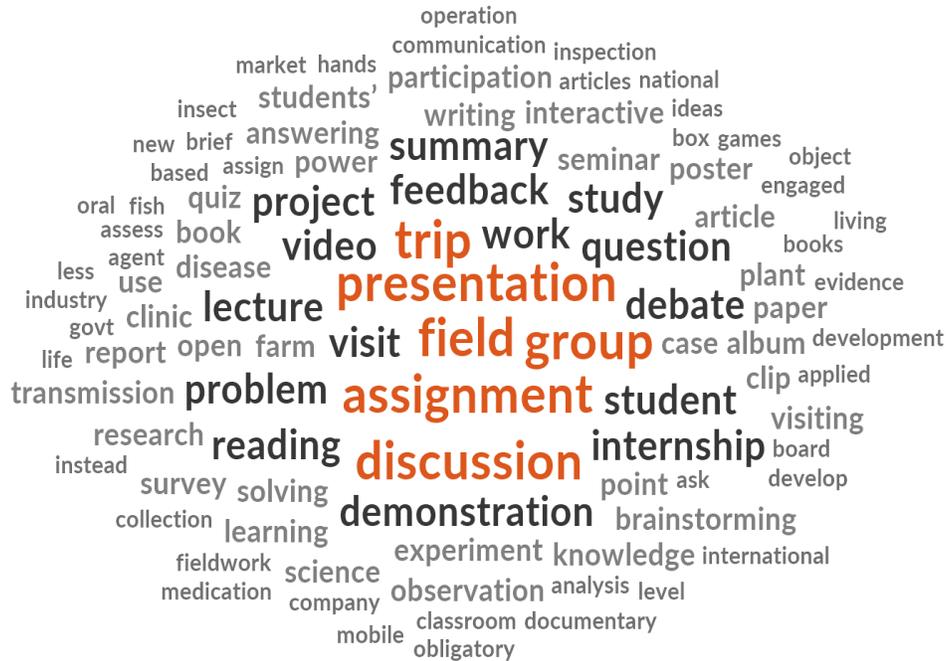


Figure 2a. Word cloud showing the use of IBL in ASHE

Source: Qualitative field study, 2023

### *Perceived Advantages of IBL*

Data in Table 3 shows that, according to the faculty members, the top advantage of IBL was that it could enhance the confidence of the learners (WM = 4.4, followed by the development of critical thinking ability, creativity, and innovativeness of the learner (WM = 4.3), enhance student participation (WM = 4.3), improve retention capacity of the learners (WM = 4.3), and enhance learning by doing (WM = 4.2). For the students, the same table further mirrored the development of critical thinking ability, creativity, and innovativeness of the learner (WM = 4.5), which is the main advantage of IBL, followed by improvement of retention capacity (WM = 4.5), enhancing the confidence of the learners (WM = 4.5), enhancement of the cognitive skills of the learners (WM = 4.4), and inspiration of learning by doing (WM = 4.4). Data from qualitative studies are summarised in a word cloud in Figure 3, which shows that the main advantages of IBL were that it could enhance student thinking ability, interest, confidence, participation, and understanding, the development of skills, real-life problem-solving capacity, and the development of communication skills. Other aspects IBL can address are creating more chances of interaction between teachers and students, enhancing creativity, and increasing retention capacity.

Table 3: Advantages of IBL ( $n_t = 181$ ;  $n_s = 538$ )

Sl. No.	Subject	Teachers		Students	
		WM	Rn	WM	Rn
1.	IBL can enhance student participation.	4.3	3	4.3	8
2.	IBL can enhance the confidence of the learners.	4.4	1	4.5	3
3.	IBL can develop the learner's critical thinking ability, creativity and innovativeness.	4.3	2	4.5	1
4.	IBL relies on open-ended tasks and practical activities, which can improve the retention capacity of the learners.	4.2	4	4.5	2
5.	IBL inspires learning by doing, which helps the learners design their own learning experience and desired outcomes.	4.2	5	4.4	5
6.	IBL can enhance the motivation of the learners to learn.	4.1	8	4.4	6
7.	Students can understand, convert, explain, establish relationships, find causes, draw conclusions, give examples, and identify important information points through IBL.	4.0	11	4.3	9
8.	In IBL, students can collect, combine, and present information from various sources.	4.1	9	4.3	10
9.	IBL can enhance cognitive skills.	4.2	7	4.4	4
10.	Learners gain the capacity to solve their daily life problems through IBL.	3.9	13	4.2	12
11.	IBL can develop skills and a willingness for lifelong learning.	3.9	14	4.1	14
12.	All students can benefit from IBL.	3.5	15	3.9	15
13.	IBL uses different teaching-learning methodologies, which can help upscaling the skills of both teachers and learners.	4.2	6	4.4	7
14.	IBL uses different types of teaching-learning methodology, which can help drive monotony.	4.1	10	4.3	11
15.	IBL can contribute to soft skills and transferable skills development.	4.0	12	4.2	13
Mean		4.1		4.3	

Note: IBL = Inquiry Based Learning; WM = Weighted mean; Rn = Rank based on WM

Source: Field data, 2023



Qualitative data in Figure 5 shows that the major challenges for teachers encompass a lack of motivation, a high course load, a lack of knowledge and skill in adopting IBL, and insufficient logistic support. *'One main obstacle teacher faces when adopting IBL is a lack of innovation. Additionally, time management can be challenging, as they must balance completing the course on schedule with the workload.'* (FGD, teachers, PSTU) Teachers of BAU in an FGD claimed a lack of training in using IBL was a major challenge for the faculty members in adopting IBL. *'One of the biggest challenges faced by teachers is motivating students. Teachers need to adopt new and innovative teaching approaches to overcome this challenge. While younger teachers are more open to change, some senior teachers may resist trying new methodology.'* (FGD with Teachers, SrAU).

The main issues facing the students are an overwhelming amount of coursework coupled with poor English language skills, a tendency for teacher-centered learning, a preference for job-focused learning over subject-matter knowledge acquisition, and a lack of prior experience with IBL. *'Many students refrain from participating in group work due to a lack of motivation caused by the housing crisis and political influence. Additionally, some students struggle with English language proficiency. Traditional education that relies heavily on worksheets can also dampen the desire to seek out books.'* (Students in an FGD, SrAU).

Table 5: Challenges of IBL (nt = 181; ns = 538)

Sl.	Subject	Teachers		Students	
		WM	Rn	WM	Rn
1.	IBL requires higher-level independent learning, for which many students are not prepared.	3.8	4	3.5	5
2.	Due to a lack of IBL practice, many students feel frustrated in the early stages.	3.8	5	4.0	3
3.	Due to having very low use of IBL in previous learning strata, learners are not habituated to using this kind of learning.	4.0	1	4.0	2
4.	Many students find group work daunting.	3.4	7	3.2	10
5.	Challenging and unfamiliar work can create dissatisfaction among students.	3.3	9	3.3	8
6.	Students can not engage themselves in IBL due to the excessive course load.	4.0	2	4.2	1
7.	Lack of books, internet, journals, reports, transportation, and laboratory facilities for IBL	3.7	6	3.5	6
8.	Lack of importance of IBL in the assessment system	3.9	3	3.7	4
9.	Lack of assistance or coordination with peers	3.3	8	3.3	7
10.	Lack of motivation among the teachers to use IBL	3.2	11	3.2	9
11.	Lack of skill of the teachers in using IBL	3.3	10	3.0	11
Mean		3.6		3.5	

Note: IBL = Inquiry Based Learning; WM = Weighted mean; Rn = Rank based on WM

*'All students will not be interested in IBL; they may feel this daunting because they think it is just a basic degree; they are the warriors of the job'* (Teacher in an FGD, SrAU). *'Many students show great interest in IBL, but the lack of prior experience can be a significant obstacle at the beginning.'* (Student in an FGD at PSTU) *'Students emphasize more job preparation than concentrating on subject-based study'* (Teachers in an FGD at BAU) *'Workload, credit load, and lack of English language proficiency can work as major obstacles for the students to adopt IBL'* (Students in two FGDs at IUBAT). Details of the challenges related to various stakeholders and the curriculum are displayed in Figure 4.

**Proposed Proportion of Inquiry-Based Learning**

According to Figure 5, just over half (51.4%) of the teachers recommended implementing 61-80% IBL in ASHE, while approximately 20% suggested 81-100% IBL. On the other hand, among the students, 85.7% suggested 81-100% IBL, while only 12.3% proposed 61-80% IBL. Hence, it is evident that in ASHE, the students exhibit greater enthusiasm towards IBL than the teachers.

**Strategies for Incorporating IBL into ASHE Pedagogy**

In the qualitative data collection process, the respondents suggested various strategies for including IBL in agricultural higher education. The top ten strategies are arranged in Box 1, ranked by importance.

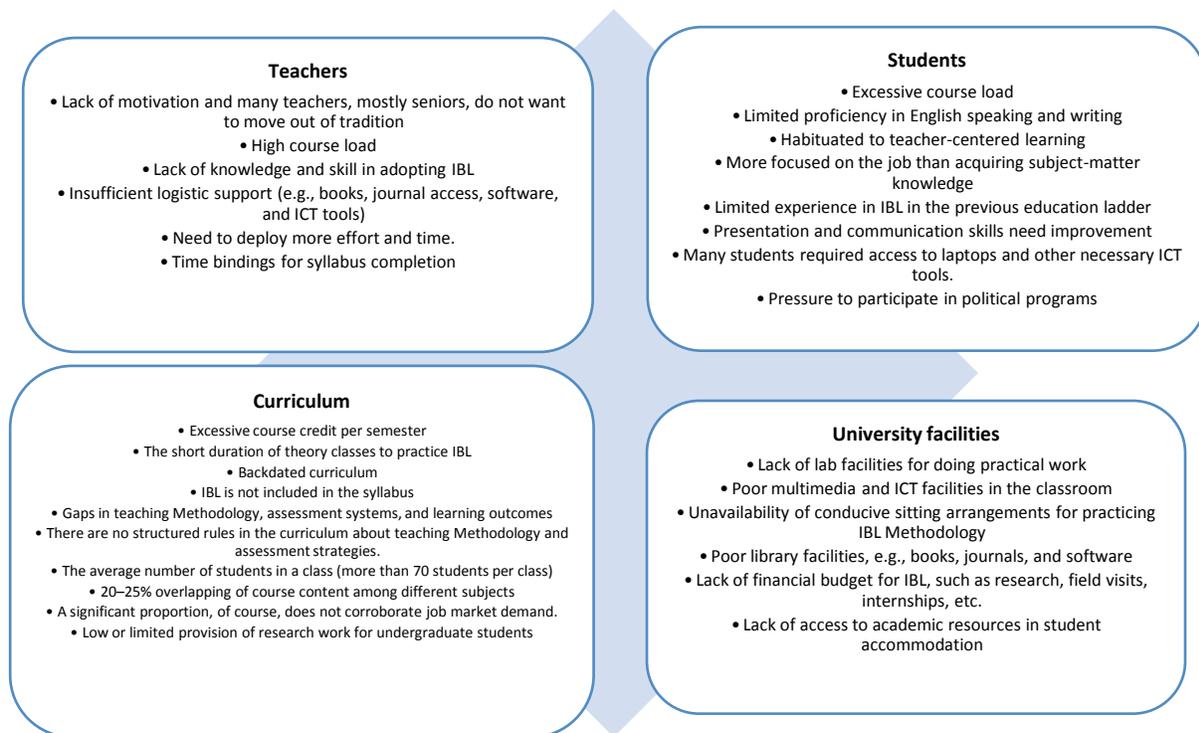


Figure 4: Major challenges of different stakeholders and existing curriculum in adopting IBL

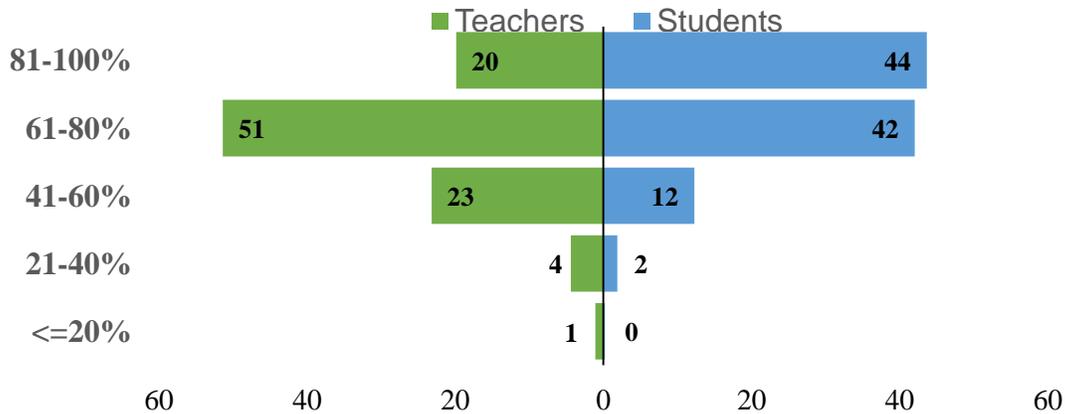


Figure 5: Level of IBL suggested by the respondents

Box 1. Strategies suggested by the respondents for practising IBL in ASHE

- Arranging workshops, conferences, webinars, and training sessions to motivate stakeholders to adopt IBL;
- Development of research facilities;
- Development of library facilities with sufficient updated books and access to journals and other internet-based materials;
- Need-based update of course curriculum every 2-3 years;
- Establish mandatory rules for using IBL to teach at least 50% of the course content in each subject;
- Assessment systems must include assignments, presentations, report writing, degree of participation, and critical thinking-provoking questions;
- Including more provisions for practical work, field visits, internships, and research in the course curriculum;
- Budget allocation to departments for conducting inquiry-based learning;
- Coordination among national and international agricultural universities and other development organizations in research and education;
- maintaining a standard teacher-student ratio in each class.

## Policy Implications

Policy recommendations from this research suggest that, at present, the use of IBL in ASHE is low. Therefore, policymakers and university authorities must adopt various strategies to enhance the use of IBL in ASHE education. More specifically, policies must find pathways to motivate teachers and students in IBL, furnish a need-based curriculum including IBL as an integral part, develop classroom facilities with a conducive sitting arrangement and necessary multimedia, sound system, internet access, and required software, maintain standard class size with sufficient interaction time, development of library facilities with necessary books and access to journals, creating research involvement score for graduate students,

improving laboratory facilities with sufficient equipment and chemicals, releasing coarse load and removing course overlapping to recover time for practising IBL and include IBL outcomes in the assessment system.

### **Implications for BAC**

This research will assist the Bangladesh Accreditation Council (BAC) in conceiving the present status of the use of inquiry-based learning in ASHE, along with its perceived benefits and challenges in Bangladesh. Based on the present findings, BAC can suggest appropriate strategies for proliferating the use of IBL to produce quality graduates in ASHE.

### **Limitations**

In Bangladesh, ten public universities, two private universities, and several other agricultural, veterinary, and fisheries colleges offer agricultural higher education to thousands of students. This research considered only four universities, which calls for caution in generalizing results. The cross-sectional design of this study provides only a snapshot of IBL use at different universities. In contrast, a longitudinal study design could have revealed the cause of the low use of IBL in agricultural higher education.

### **Conclusions**

This study revealed the use, advantages, and limitations of IBL in ASHE in Bangladesh. The findings of this study revealed that despite the high interest of the students and teachers in IBL and its capacity to enhance students' interest, critical thinking ability, participation, self-confidence, and problem-solving skills, the use of IBL in ASHE is still low, and mainly confined to assignments, presentations, and science experiments. The stakeholders perceive various challenges, such as lack of motivation and experience in using IBL, insufficient logistic support, excessive course load and large class size in terms of student number, and lack of students' experience using IBL in the previous education ladder. As crucial strategies to enhance the use of IBL in ASHE, the respondents suggested motivation and skill development campaigns in using IBL, the development of classroom, library, and research facilities, a need-based regular update of course curriculum, and the inclusion of a clear guideline for using IBL in teaching and learning as well as in assessment.

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# Status of the Current Practices and Challenges of Implementing Outcome-Based Education in Selected Universities of Bangladesh

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## Abstract

Due to the potential of outcome-based education (OBE) in global education, the implementation of OBE has been prioritized in the tertiary education system in Bangladesh. The present study was designed to inspect the current implementation of OBE in agricultural education to assess teachers' and students' perceptions of OBE and to identify obstacles to OBE implementation in agricultural universities. Data were collected from the faculties of agriculture of three public universities (Bangladesh Agricultural University, Bangabandhu Sheikh Mujibur Rahman Agricultural University, and Khulna University). A mixed-method technique was used to gather quantitative and qualitative data: 153 teachers (ranging from Lecturer to Professor) and 140 Year 3 students provided information via questionnaire. The teachers had positive attitudes towards OBE and were eager to apply it, despite challenges. Implementing this approach is however not up to the mark. While practicing OBE in the classrooms, the teachers still did not fully prepare their course content based on industrial needs, and they kept only partial records of students' assessments. Additionally, they partially used rubrics and checklists as their assessment tool for quality improvement. There was a lack of training on OBE, a lack of infrastructure, a lack of clear perception of teachers and students about OBE, and a lack of follow-up from the faculty in implementing OBE. This study will assist in developing policies to ensure effective implementation of OBE.

**Keywords:** Outcome-Based Education; Implementation; Current Practise; Challenge; Bangladesh

## Introduction

The conventional teacher-centered approach to education has been giving way to a student-centered approach in recent decades. This alternative strategy focuses on the skills that students should possess at the end of the course or programme, and is referred to as outcome-based education (OBE). OBE empowers learners with future success (Spady, 1998). The OBL paradigm is described as a learning success

paradigm since it ensures learning success for all students. Every academic programme and course should be structured around results (Spady & Marshall, 1991; Spady, 1998).

Many nations, including the USA, New Zealand, the Philippines, South Africa, and Canada have adopted OBE (Malan, 2000). The rest of the world has reacted to OBE in a variety of ways. One of the biggest changes in many nations has been the transition from a teacher-centered model of higher education to a student-centered one (Tam, 2014). Today, a graduate must show aptitude and skill to be hired for employment. OBE is currently being implemented in all of Bangladesh's public universities as part of the country's push to depart from traditional (content-based) education. According to a recent study by Alimyar (2020), adopting OBE has had a positive effect on lecturers' attitudes. They reported feeling responsible when using this approach.

Adoption of OBE in vocational colleges, according to the research of Damit et al. (2021) in Malaysia, mandates that every programme must meet predetermined learning outcomes. They note that while adopting OBE, appropriate OBE practices were still lacking, with teachers failing to comprehend the relationship between Programme Learning Outcomes (PLO) and Course Learning Outcomes (CLO). Katawazai (2021) noted the challenges of OBE implementation in Afghanistan, where teachers were expected to follow the assessment policy, but they found it difficult to do so because of the big class sizes. To successfully implement OBE, teachers must receive adequate training in assessment practices, classroom activities, and task management and be given time for task management, assessment of learning, and new learning resources. OBE demands a comprehensive revision of the curriculum, focusing on "student-centred learning methods and evaluation". Problems arise when a teacher attempts to implement OBE but does not fully comprehend it (Bakar et al., 2018; Erdem, 2019; Evarado, 2020). Some senior teachers oppose OBE (Ortega & Cruz, 2016). OBE is being implemented in Bangladesh, thus universities including those with an agricultural focus have needed to make significant adjustments. The current study has been conducted to achieve the following objectives:

- i. To assess the extent of implementing OBE in selected universities.
- ii. To explore teachers' and students' perceptions towards OBE.
- iii. To investigate the challenges of implementing OBE in the selected universities.

One of the main proponents of OBE, Spady (1998), defined it as the design, development, and documenting of instruction with pre-specified goals and outcomes. He thinks the curriculum should be developed after a school has shown the outcomes that they want their graduates to achieve. According to Giese-Hood (1999), OBE is "an educational strategy" that emphasizes what and how students learn, whose main objective is to prepare graduates for "employability" in the global

market (Mitra & Gupta, 2020). Gurukkal (2020) emphasised that for academic institutions to successfully implement OBE, they must ensure that the outcomes are carefully chosen and the course materials are related to them. Rao (2020) emphasized the importance of determining the kinds of outcomes that are realizable and quantifiable and connected to the three main domains of Bloom's Taxonomy (Affective, Cognitive, and Psychomotor). According to Deepak & Venishri (2018), OBE is an adjusted educational paradigm in which students' integrity is regarded as one of the most crucial criteria for teachers, along with their propensity for personal motivation, and in the process that improves their learning. The introduction of OBE, according to McNeil et al. (2006), has a positive effect on the learning process, with specific attention devoted to graduates' abilities.

Most scenarios in which OBE improves teaching and learning in higher education institutions. Eldeeb & Sharakumari (2013) noted however that despite the benefits of OBE, there are drawbacks, including the fact that since it is closely tied to results, it challenges the principle that education should be open-ended, and therefore is opposed by many academics Mogashoa (2013) found that implementation of the model was problematic, citing a lack of adequate resources, teachers' understanding of the new system, particularly in terms of aligning assessment procedures with the outcomes of the curriculum, and a lack of proper training, has also changed how educational institutions are governed. Insufficient and outdated teaching and learning tools are issues, along with teachers' still lacking management abilities (Erdem, 2019; Evardo, 2020). Additionally, due to inadequate administrative oversight, OBE is often not fully implemented (Mangali et al., 2019).

## **Methodology**

The study was conducted to find out the attitudes of teachers and undergraduate (3<sup>rd</sup> year) students of OBE. Out of 12 public universities of Bangladesh that are either agricultural universities or have a Faculty of Agriculture, three were selected: Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Bangladesh Agricultural University (BAU), and Agrotechnology Discipline of Khulna University (KU). Implementation of OBE in these universities had started 2-3 years before the study.

A mixed-method approach was employed to collect quantitative and qualitative data. Following Creswell (2014) this strategy ensures that the issue is thoroughly investigated. Quantitative data were acquired before qualitative data, giving equal weight to each throughout the interpretation stage.

The number of teachers was 126 in BSMRAU, 193 in BAU, and 26 in KU, a total of 345. Out of these, 45% were selected. The number of lecturers was 25, assistant professors 32, associate professors 38, and professors 58, a total of 153. Teachers chosen had a minimum of two years of teaching experience and consented to work together and exchange data with researchers. Out of 470 students in 3<sup>rd</sup> year, 140

(30%) were surveyed: 45 from BSMRAU, 75 from BAU, and 20 from KU. Teachers' understanding, knowledge, beliefs, and feelings about OBE were assessed by adding together the scores on the individual items in the interview schedule. Multiple regression analysis was used to estimate the contribution of the attributes with significance levels of 0.05, and 0.01. Data were gathered through a questionnaire that contained open-ended and closed questions, as described by Creswell (2014). The questionnaire was modified by published questionnaires (Baguio, 2019; Loreto, 2018). Data were analysed using SPSS (v26.0) software, to determine the descriptive statistics, frequency, tabulations, graphs, and charts.

## Results and Discussion

### *Demographic Information of the Respondents*

Demographic data for the teachers is in Table 1.

Table 1: Demographic Profile of the Teachers

Attributes	Frequency	Percent	Attributes	Frequency	Percent
Educational Qualification			Participation in OBE-related training		
MSc/MS	83	54.2	Yes	96	62.5
PhD	70	45.8	No	57	37.5
Teaching experience (years)			Participation in curriculum training		
1-5	47	30.6	No training	62	40.3
6-15	51	33.3	1-5 training	89	58.3
More than 15	55	36.1	More than 5 training	2	1.4

About 46% of teachers were PhD holders. About 36% of respondents' teaching experience was more than 15 years. Although 62.5% had taken OBE-related training, a significant portion of responders (37.5%) had not. About 40% had not taken part in any curriculum.

### *Teachers Current Practise of Teaching-learning Strategies and Assessment Methodology*

Using student-centered strategies is one of the vital aspects of OBE. For this reason, the success of OBE is highly dependent on the active and appropriate use of the teaching and learning strategies inside and outside of the classrooms. Figure 1 shows that 99.5% of teachers used lectures as the main strategy, while 86.5% used experiments as another important strategy, and demonstrations were used by 82.9%. Figure 2 depicts the assessment techniques employed. All respondents said that they use these methods to gauge their students' cognitive, affective, and psychomotor development.

The teachers also employ assignments (94.4%), class participation (91.7%), and viva voce (94.9%) in assessment. They also regularly use teamwork (83.8%), term papers

and projects (76.4%), observation (70.8%), seminars and presentations (75.9%), rubrics (64.8%), self-assessment (57.4%), and peer evaluation (51.4%).

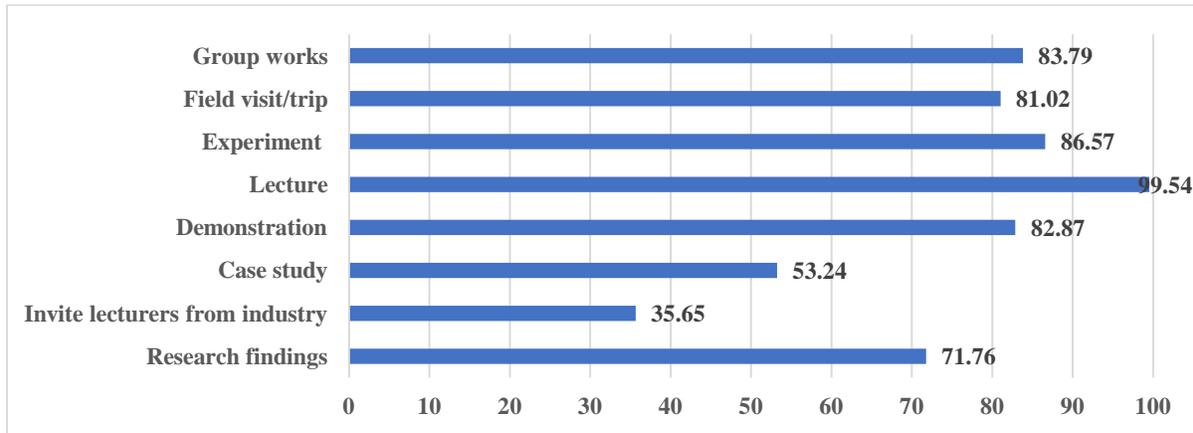


Figure 1: Teachers’ current practises of teaching-learning strategies in the classroom

Inviting lecturers from the industry is an important OBE-related teaching-learning strategy, but only 35.6% of respondents utilize this particular strategy in their classrooms. Assessments aid in identifying the students' competence, skills, and knowledge, and have a vital role in education (Macayan, 2017). Assessment to track learning progress and identify gaps and opportunities for further development. The goal of OBE is to assess each student's proficiency and competencies as a whole. It uses a "holistic approach-" to the student's knowledge, values, and skills using a variety of assessment techniques (Malan, 2000). However, to reach this goal, the academic community must make more efforts to measure technical abilities and non-technical skills (Rajaei et al., 2013).

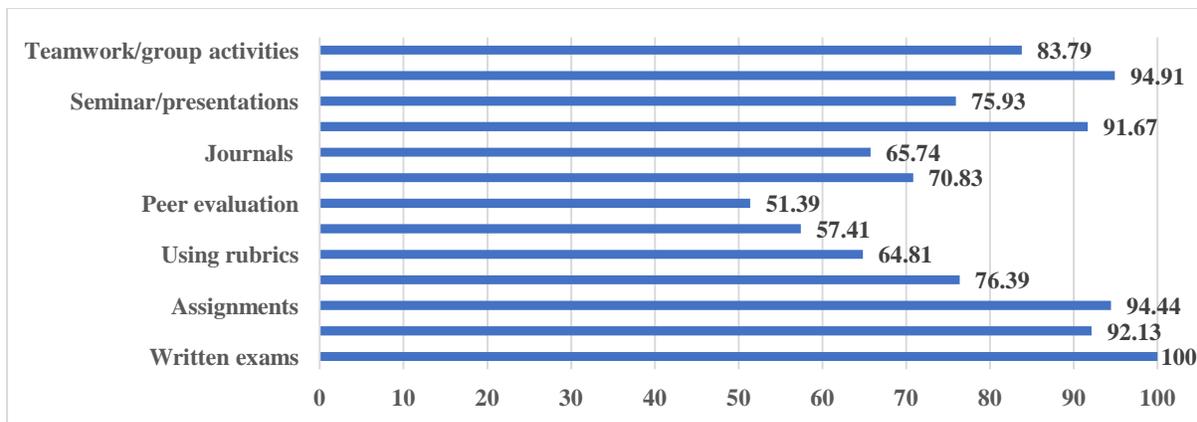


Figure 2: Teachers’ current assessment practices

**Teachers’ Understanding of OBE**

Table 2 identifies the teacher's understanding of OBE which was measured when they were offered five statements. 32.9% agreed strongly and 52.1% agreed with the statement ‘I know clearly what is OBE’. About 68% understood the programme

education objective (PEO) formulation procedure of the Faculty of Agriculture, however, 26% of them didn't know about the procedure. About 74% of the teachers clearly understood Programme Learning Outcome (PLO), Course Learning Outcome (CLO), Programme Education Objective (PEO), and their alignment with the university's vision-mission, but about 22% did not. Designing CLO based on Bloom's Taxonomy is an important part of developing OBE.

Table 2: Teachers' attitude regarding understanding of OBE

Sl.	Understanding level	Agreement (%)				
		SA	A	DNK	DA	SDA
1.	I know clearly what is OBE	32.9	52.1	8.2	4.1	2.7
2.	I am aware of how the Faculty's PEOs were developed	20.7	47.9	26	2.7	2.7
3.	I understand clearly what is PLO, CLO, PEO, and the alignment of these with the vision-mission of my university.	34.3	39.7	21.9	2.7	1.4
4.	I understand how CLOs were developed using Bloom's Taxonomy	28.8	45.2	23.3	--	2.7
5.	I have a clear understanding of performance indicators, teaching-learning activities, and different assessment tools	27.4	56.2	9.6	5.4	1.4

Note: SA = Strongly Agree; A = Agree; DNK = Do not Know; DA = Disagree; SDA = Strongly Disagree

### Teachers' Attitude Towards Readiness on OBE Implementation

Teachers' attitudes to adjusting to the new OBE system are in Figure 3.

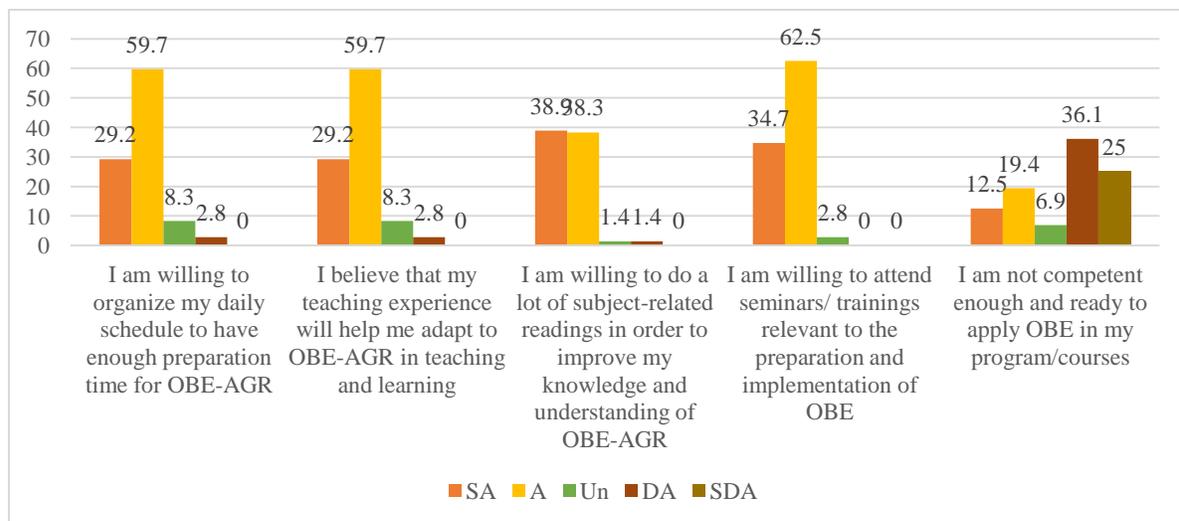


Figure 3: Teachers' attitude regarding the readiness of OBE

Note: SA = Strongly Agree; A = Agree; Un =Undecided; DA = Disagree; SDA = Strongly Disagree

Almost 60% of teachers agreed and 29% strongly agreed that they were willing to organize daily schedules so that they could get more time to prepare OBE. About 97% were interested in attending training to improve their knowledge and skills on OBE. These findings emphasize the need for training about OBE. However, 68% of teachers thought that they were not competent enough to implement the OBE at the undergraduate programs.

### *Current Practices of OBE*

The teachers were asked about their current practices of OBE. The findings are in Table 3. About 60% of teachers discuss the OBE syllabus format with the students only partially or not at all. The students are the main implementers of OBE, so they need a clear concept of the OBE syllabus format. About 82% of teachers use different instructional materials aligned with the teaching-learning activities. About 83% of teachers explained adequately about the learning outcomes to the students before the start of class discussion, but about 17% did not. About 80% give different activities, term papers, and assignments to the students that are aligned with the outcomes, but about 20% do not. Keeping records about the assessment of the students is of the utmost importance. About 66% of teachers keep adequate records of assessment. Meanwhile, 40.3% of respondents sufficiently prepare their course contents following stakeholder needs but 43% do not. Preparing the students according to the stakeholder needs requires a shift from the traditional curriculum to OBE. A total of 56.9% of teachers consistently provide feedback and show the examination script in response to student demand, while 26.4% of them do so to a lesser extent: 13.9% of them, however, only partially adhere to this culture.

### *Challenges of Implementing OBE*

Every programme run under the OBE model in agricultural education must meet the predetermined learning outcomes. According to several earlier studies (Erdem, 2019), the application of OBE in the educational system is problematic and fraught with difficulties because it requires significant modifications to the curriculum and the workplace. The two groups of problems in adopting OBE are explained below.

#### *Planning-Related Challenges of Implementing OBE*

While implementing OBE, the findings of planning-related challenges identified by the respondents are in Figure 4. About 68% of teachers agreed, and 24% strongly agreed, that more effort is required when designing and developing OBE courses. Meanwhile, 41.7% of the respondents strongly agreed and 37.5% agreed that they lack the proper mindset to practice OBE at the moment. About 54% of teachers strongly agree or agree that there is a lack of senior teachers' attitude to accept and implement OBE. More than half of the respondents (51.4%) agree that the reformation of the OBE curriculum from the traditional system is difficult. On the other hand, about 83% of respondents strongly agree or agree that inadequate

training on OBE makes it difficult to fully comprehend it. It is necessary to arrange longer training to fully comprehend.

Table 3: Trends of current practices of OBE

Sl.	Current practice items	Practice (%)			
		Fully practiced	Practiced	Partially practiced	Not practiced at all
1.	I go over the OBE syllabus structure with my students	15.3	25	40.3	19.4
2.	I use different instructional materials aligned with the teaching-learning activities	26.4	55.6	13.9	4.2
3.	I instruct in a subject that is related to the performance indicators and student outcomes	30.6	47.2	19.4	2.8
4.	I explain learning outcomes to my students before the start of my class discussion	38.9	44.4	13.9	2.8
5.	I give activities, term papers, and assignments to my students aligned with the outcomes	50.0	41.7	6.9	1.4
6.	I maintain track of my student's OBE results	22.2	44.4	27.8	5.6
7.	I give my students opportunities to work as a group to develop collaborative learning	37.5	43.1	18.1	1.4
8.	I review the course contents regularly	47.2	36.1	15.3	1.4
9.	I prepare the course contents following industrial needs	16.7	40.3	30.6	12.5
10.	I always give feedback/show the exam script as per the demands of the students	56.9	26.4%	13.9	2.8

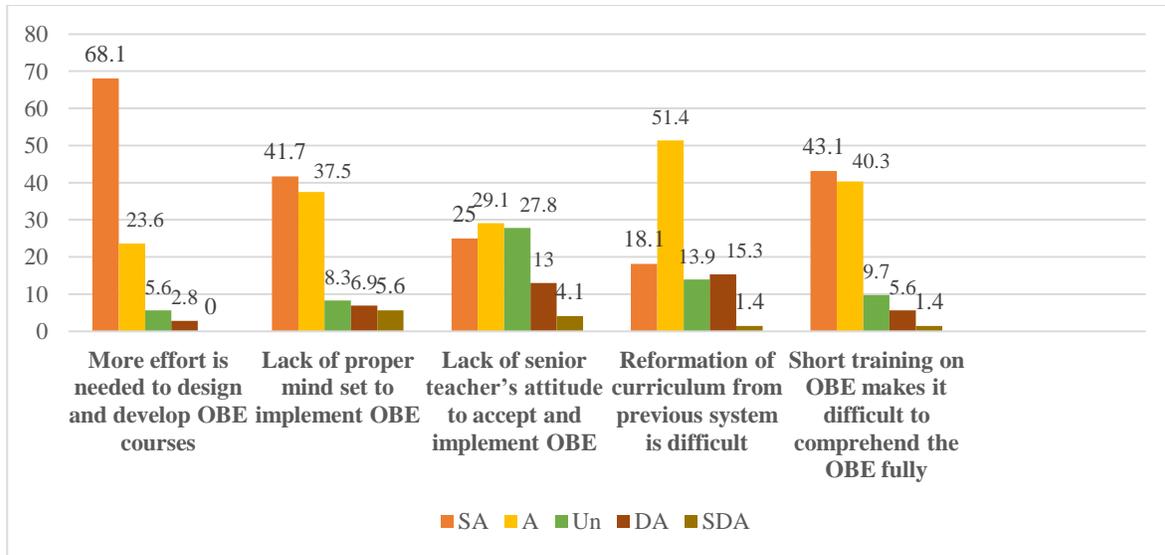


Figure 4: Planning-related challenges of implementing OBE

Note: SA = Strongly Agree; A = Agree; Un = Undecided; DA = Disagree; SDA = Strongly Disagree

**Monitoring and Assessment-Related Challenges of Implementing OBE**

The teachers also face problems related to monitoring and assessment issues while implementing OBE Figure 5: 34.7% of the agreed that the assessment strategy is complex as it needs to follow Bloom’s taxonomy. On the other hand, 29% of them agreed that students’ resistance to accepting change OBE is a great problem, but 40% disagreed. About 32% strongly agreed and 39% of the respondents agreed that there is a lack of follow-up.

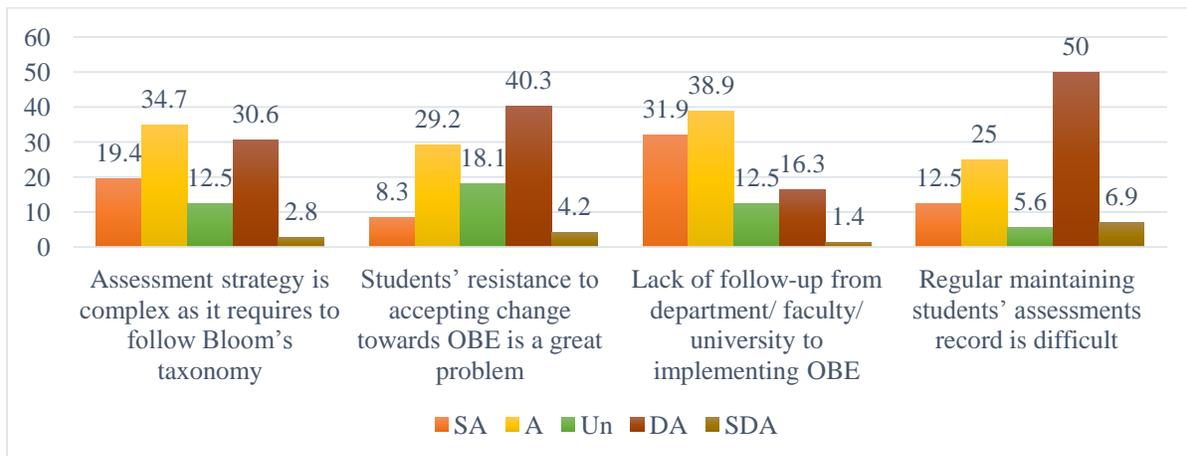


Figure 5: Monitoring and assessment-related challenges of implementing OBE

**Students’ Perception of OBE**

OBE aims to educate students to be qualified in the field in which they will work. The OBE system bases its curriculum or programme on the outputs that students should have attained by the end of the course, in terms of their professional

knowledge, skills, abilities, values, and attitudes. The OBE approach gives students the freedom to learn the course material, however they feel most comfortable. In OBE, the major content should first be identified, followed by the method of learning (Borsoto et al., 2014). OBE serves as a foundation for programme evaluation and assessment (McNeil, 2006). The main difficulty in putting the system into place was that different educators had different perspectives on how objectives, goals, or learning outcomes relate to instructional design (Bolander et al., 2006).

### *Current Challenges of Implementing OBE Faced by the Students*

The students identified several challenges while undertaking OBE. Table 4 shows that 63% of them agreed that they had very little understanding of OBE. This encourages a negative attitude toward OBE. The students were asked whether the content of the current courses was relevant to real-world applications, 48% of students disagreed and 13% strongly disagreed. Meanwhile, 45% of students disagreed and 18% of them strongly disagreed with the statement that achieving expected outcomes was harder for them. On the other hand, 52% of students disagreed and 13% strongly disagreed with the statement that difficulty in understanding course objectives was a challenge to them 46% of them disagreed and 28% of them strongly disagreed with the statement “Students overall evaluation system is difficult”. In addition to assisting teachers in directing their teaching and learning process in the desired direction, the learning outcomes for each class also encourage other stakeholders, such as parents and the community, to take responsibility for and be aware of their roles in ensuring quality education (Mahajan & Singh, 2017).

Table 4: Challenges faced by the students in implementing OBE

Sl.	Challenges of OBE items	Agreement (%)				
		SA	A	DNK	DA	SDA
1.	I've very little understanding of OBE	3	24	4	63	6
2.	The course objectives of OBE are very clear to me	7	43	5	41	4
3.	I think the relevance of course content to real-world applications	4	20	15	48	13
4.	Recently I've seen changes in teaching-learning after the implementation of OBE	6	24	16	49	5
5.	Achieving the expected outcomes is harder for me	6	21	10	45	18
6.	Difficulty in understanding course objectives is a challenge for me	5	29	1	52	13
7.	Students' overall evaluation system is difficult	3	13	10	46	28

Note: SA = Strongly Agree; A = Agree; DNK = Don't Know DA = Disagree; SDA = Strongly Disagree

## Implications

- The findings from the teachers revealed that good administrative support can enhance OBE implementation. For example, teachers can improve the record-keeping facility with the help of IT.
- Attitudes of the teachers should be improved through structured training carried out by experienced individuals.
- The attitude of the students to OBE is not always positive. Therefore, the teachers must explain learning outcomes and assessment methods to the students.

## Limitations

- For this current study, 153 teachers and 140 students (3<sup>rd</sup> year) were taken as samples. To obtain more robust results, the size of samples should be increased. Due to the non-availability of time and funding, it was not possible to conduct discussions with the Vice Chancellors, Deans of faculty, and directors of the Institutional Quality Assurance Cell and Planning & Development about the implementation of OBE.
- For this study, two Focus Group Discussions (FGDs) were conducted. More FGDs with different stakeholders would be more fruitful.

## Conclusions

The current study set out to look into the current state of OBE implementation in three Bangladeshi universities that specialise in agricultural sciences. About 63% and 60% respectively of teachers took part in training related to OBE and curriculum development, meaning that many did not. The teachers depended more on lectures (99.5%) and experiments (86.6%) as teaching methods: invited speakers from industries/stakeholders (35.7%) and case studies (53.2%) were not much practiced. The respondents still depended too much on written examinations (100%), viva voce (94.9%), and assignments (94.4%) as the most important assessment methods. Peer evaluation (51.4%), self-evaluation (57.4%), and using rubrics (64.8%) were considered less important. The teachers' understanding, knowledge, and belief in OBE was encouraging and they tended to implement OBE, but some problems existed. Only 68% of respondents understood the PEO formulation procedure of their Faculty of Agriculture. Moreover, 22% of them had no clear understanding of PLO, CLO, and PEO. Hence, universities need to develop some facilities to support the implementation of OBE. Around 68% of the teachers found OBE to be a challenging approach to fully understand and practice, and 97% were interested in attending OBE-related training. The universities should organize training on OBE for the teachers (especially for the younger teachers). However, senior teaching staff (deans, department chairs, etc.) have occasionally made things difficult for the targeted applicants.

Out of the many challenges of implementing OBE, the teachers' attitude towards OBE is important. However, about 54% of teachers thought that there was a lack of senior teachers' attitude to accept and implement OBE. Additionally, about 51% said that reformation of OBE curriculum from the traditional system was hard and 70% of them opined that the number of students made it difficult to assess them properly. About 85% of them wanted more administrative support (including IT) to help implement OBE. Among students, 78% were somewhat familiar with OBE. The students identified several challenges in implementing OBE including a lack of understanding (63%) of OBE, feeling that the course content was not relevant to the real world (61%), and courses were not useful in developing skills and knowledge (68%). Hence, the teachers and authorities should consider adapting course content to more practical situations that can help students enhance their knowledge and skills.

### Recommendations

To implement OBE properly, it is important to arrange regular workshops with the teachers and students. The Bangladesh Accreditation Council (BAC), the University Grants Commission (UGC) of Bangladesh, and each university also should address this issue. To popularise this new concept of OBE, an "OBE day" could be observed each year throughout the tertiary educational institutions of Bangladesh when seminars, workshops, symposia, or conferences can be held. Bangladesh Accreditation Council (BAC) could publicize OBE through a variety of media. Curriculum for higher education should be outcome-driven, to close the skills gap between the supply and demand of competent graduates in the labour market. This study highlights the challenges of using OBE in agricultural education. The Bangladesh Accreditation Council (BAC) can improve future policy by taking into account the findings of this project.

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# Status of Implementation of Outcome-Based Education in Selected Agricultural Universities in Bangladesh

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## Abstract

Implementation status and usefulness of Outcome-Based Education (OBE) in three agricultural universities: Bangladesh Agricultural University (BAU), Sher-e-Bangla Agricultural University (SrAU), and Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU) were studied with a group of faculty and students. Respondents' responses to an academic environment, students' behaviour during and after instruction; and changes in curriculum planning, served as tools for monitoring the educational benefits of OBE. The composite mean (CM) of OBE practice was 3.5, 3.8, and 4.1 for BAU, SrAU, and BSMRAU, respectively, indicating that OBE practices were implemented moderately at BAU and SrAU and to a greater extent in BSMRAU. The environment for OBE implementation was moderate at BAU (CM: 3.0), SrAU (CM: 3.4), and a high degree of a positive environment for BSMRAU (CM- 3.7). OBEs are useful for academic quality, attitude, and instruction, but their impact varies among the universities. The students' attitude toward OBE was moderately useful during (exceptionally useful in SrAU) and after instruction in all three agricultural universities. BAU and SrAU students responded well to curriculum planning for its usefulness. However, BSMRAU students believed that OBE was moderately useful in curriculum development. It is suggested that OBE is useful in generating generic skills across three agricultural universities. OBE can potentially enhance quality education by generating knowledge and skills. Alumni, industry collaboration, guardians' involvement, and stakeholders' participation are important in developing the OBE curriculum.

**Keywords:** OBE; BAU; SrAU; BSMRAU; Curriculum; Attitude; Generic skills

## Introduction

Tertiary education is pivotal to the development of the economy in Bangladesh, both in terms of the number of university places and the relevance and quality of the education that students receive in those universities. In terms of capacity, there is a serious shortfall in Bangladesh, as shown by its tertiary gross enrolment ratio (GER) in 2017 of 17.6% in 2015 (UNESCO, 2024) (i.e., there were 17 applicants in each

public university place: Trines, 2019). Overall capacity has increased since then, such that by 2022, there were 54 publics and 108 private universities, offering undergraduate degree programmes in various fields (UGC, Bangladesh).

In terms of the quality of tertiary education, a high standard of tertiary education is crucial for Bangladesh to be able to take advantage of global opportunities to advance its economy. Hence, the primary purposes of tertiary education are to provide knowledge and expertise to students which will develop their abilities and competencies, and provide them with positive values and attitudes. At present, however, higher education curricula are not well aligned with stakeholders' needs, such that many Bangladeshi companies prefer to employ foreign graduates over local graduates, considering them to be better trained. In consequence, unemployment rates among the graduates of Bangladesh universities are high: in 2017, about 16% of university graduates were unemployed (Bangladesh Employment and Labour Market Watch (2018), 2017). To meet global standards, tertiary education is looking for new models of learning to enhance the education system and provide graduates with professional knowledge and attributes that are appropriate to the challenges of the 21st century. Industry partners value graduates' technical skills, with relevant knowledge in research, communication skills, computer skills, and leadership skills (Laguador & Ramos, 2014). However, graduates' final grades do not correspond strongly with the assessments of their competence and employability by their first employers (Chavez, 2014). Hence, students' competencies and academic performance would benefit from academic-industry partnerships that provide industry/commercial experience, such that students are trained and educated in workplace-related skills before they graduate.

Universities worldwide have had to respond to the challenge posed by the need for graduates to not only have an appropriate corpus of declarative knowledge but also to be able to apply that knowledge to workplace situations; as well as to have the appropriate technical, interpersonal, and problem-solving skills that are expected in the workplace. One of the most widespread solutions to these challenges is Outcome Based Education (OBE: Spady, 1994). In principle, OBE focuses on what 'students learn rather than what they were taught' (Rao, 2020) in a system of education that prioritises accomplishments and results over content and assessment. Curriculum, assessment, and instruction are determined by the intended learning outcomes of the programme, which, in turn, are determined by the competencies (across all domains of learning) that graduates are expected to display after completing the programme. OBE is therefore different from the traditional tertiary educational system since it focuses instruction on measuring student performance through student outcomes. It does not define or mandate a specific type of learning or teaching but, rather, it encompasses many pedagogical concepts and ideas whose focus is for students to demonstrate the skills and content they have learned.

Implementing OBE is often challenging for tertiary institutions that have traditional curricula and pedagogy. It requires a lot of changes in the way the institution works, how it works, how it structures itself, how faculty think, and how students who have come out of traditional high-school curricula regard their tertiary learning.

Considering these various advantages and challenges of OBE implementation, the purpose of this study was to evaluate how OBE instruction impacts the respondents in practices and environment, how students behave during instruction; how students perform after instruction; and how the study changes the curriculum planning. The outcome of this study will serve as a tool for monitoring the status of OBE implementation in three selected agricultural universities.

## **Methodology**

Three of the public agricultural universities in Bangladesh were selected to participate in this study: Bangladesh Agricultural University (BAU), Sher-e-Bangla Agricultural University (SrAU), and Bangabandhu Shaikh Mujibur Rahman Agricultural University (BSMRAU). They were selected as being representative of the programmes provided across the spectrum of 16 public and 10 private universities in the country, with degrees in various domains of agricultural sciences. The study tool was a self-designed, pre-tested questionnaire. Primary development of the questionnaire was undertaken at a workshop with academic staff and students, which was held at the Graduate Training Institute (GTI) of BAU. The questionnaire was initially developed, with input from relevant experts, to collect responses from faculty (academic staff) and students on their knowledge of different processes and terms associated with OBE. Following feedback on the draft questions from relevant stakeholders, a further workshop was held at GTI to finalize the questionnaire. The first part of the questionnaire asked about age and gender demographics. The second part included the progress towards OBE implementation in those three universities. The third part was the usefulness of OBE from the perspectives of academics, attitude, instruction, and student awareness. Questions in Parts 2 and 3 used a five-point Likert Scale, where 1 was the lowest and 5 was the highest. A stratified random sampling method was used to select at least 30 students and 30 faculty members from each of the three agricultural universities.

## ***Data Collection and Analysis***

Questionnaires were hand-delivered to SrAU, BAU, and BSMRAU faculty members. The investigator explained the contents of the questionnaires and specified that the responses would be handled with privacy and only applied to this study. The data collection was done personally by the investigators. About 100% retrieval of the completed surveys was achieved. Questionnaires were similarly disseminated and collected from participating students. Data were entered into Microsoft Excel spreadsheets. The weighted means (WM) were calculated for each question. Composite mean (CM) was used as the overall mean of the responses for each section of the questionnaire. The ranking was based on the highest and lowest points of the weighted means for the set of perceptions and determinants for OBE. The calculated mean ratings were used to create a Value Index (VI), which was assessed using the following interval scale: 4.5-5.0: very useful (VU)/very great extent (VGE), 3.5-4.5: useful (U)/great extent (GE), 2.5-3.5: moderately useful (MU)/moderate extent (ME), 1.5-2.5: less useful (LU)/less extent (LE), 1.0-1.5: not useful (NU)/no extent (NE).

## Results and Discussion

### *Status of OBE Implementation*

Implementation and practice of OBE from the perspective of faculty and students is shown in Table 1. Composite means for all indicators were all  $\geq 3.0$ . The highest overall CM (4.0) was achieved by the equation 'To what extent does OBE provide well-defined assessment criteria?' All the WM were higher at BSMRAU (3.6), followed by SrAU (3.4) and BAU (3.0). Of the 10 parameters, only three achieved GE scores at BAU compared with all 10 at the two other institutions.

Table 1: Status of OBE Implementation in Terms of Practices

Criterion	WM			VI			Rank		
	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU
1. To what extent OBE can ensure that the learners are focused on learning outcomes in terms of subject-specific knowledge and skill?	3.5	3.8	4.0	GE	GE	GE	3	6	6.0
2. To what extent OBE provides well-defined assessment criteria?	3.6	4.1	4.3	GE	GE	GE	2	1	1.5
3. To what extent does OBE ensure more impartiality and fairness in the application of the established criteria?	3.4	3.9	4.1	ME	GE	GE	7=	5	3.5
4. To what extent does OBE offer students the opportunity to take corrective or other remedial measures for learning purposes?	3.4	4.0	3.87	ME	GE	GE	7=	2	10
5. To what degree does OBE require students to include their tests and work in their portfolio for review?	3.3	3.5	4.0	ME	GE	GE	9	9=	6.0
6. To what extent OBE can ensure group work and teamwork?	3.5	3.9	4.3	ME	GE	GE	4=	3	1.5
7. To what extent OBE has been keeping learners focused on the activity	3.5	3.9	4.0	ME	GE	GE	4=	4	6.0
8. To what extent does OBE ensure direct and indirect assessment?	3.4	3.5	3.9	ME	GE	GE	8	9=	9.0
9. To what extent OBE can assess learning outcomes with different tools and techniques?	3.4	3.6	4.1	ME	GE	GE	7=	8.0	3.5
10. To what extent does OBE ensure different teaching strategies?	3.8	3.8	4.0	GE	GE	GE	1	7.0	8.0
Composite Mean	3.5	3.8	4.1	ME	GE	GE			

Note: WM: weighted mean, VI: value index. The = sign in rank denotes that the criteria within an institution are tied for rank.

These results illustrated that OBE is more advanced in practice at BSMRAU and SrAU compared to BAU. This reflects implementation in terms of making sure that appropriate teaching strategies are in place, having clear assessment criteria, and making sure that groups and teams of students are working together. OBE requires students to keep all their tests and activities in portfolios for analysis, which they can compare with the expectations of the unit standards, which gives them a chance to take corrective or other steps to learn. It has clear assessment criteria that make it easy for assessors and students to determine the outcomes of assessments, as reflected in the high scores given to this criterion.

The university provides a supportive learning environment for students to develop as future professionals. However, students did not appear to be aware of the support of their education by stakeholders and role players due to a lack of orientation and seminars. Respondents appeared to believe that OBE can provide a learning environment that helps students improve their expertise and personality building as imminent experts. University administrators need to ensure that all the resources and amenities are available and constantly accessible, sufficient, and in a satisfactory condition to foster an academic environment. Physical and environmental factors play a major role in the learning process of students. Therefore, environmental factors have a more significant influence on their learning. Students in their first year are adjusting to their new surroundings. Instructors should allow students appropriate and reasonable time to prepare for examinations and submit projects and other tasks (Laguador, 2013c).

Table 2 depicts the current state of OBE deployment in terms of the environment in the three institutions. This suggests that the environment was more conducive for the implementation of OBE in BSMRAU (CM: 3.6) than in SrAU (CM: 3.4) or BAU (CM: 3.0). The overall score for support for OBE among all stakeholders across all institutions (overall mean: 3.1) is skewed by a low score at BAU (2.6) compared to scores of 3.4 at the SrAU and BSMRAU. Likewise, the score for the question *'To what extent does OBE foster a better integration between University-Industry collaboration'* was relatively low (overall mean: 3.0), indicating only a moderate level of implementation across all schools.

### ***Level of Usefulness of OBE***

The level of usefulness of OBE, as determined by faculty, is shown in Table 3. All criteria, except *'Utilising the student-centered approach'* had mean scores  $\geq 4.0$ , whilst CM scores were high (BSMRAU: 4.3, SrAU: 4.0, and BAU: 3.7) across all institutions. The greatest disparity of results between institutions was for the question *'How useful was OBE for maintaining an academic calendar'*, to which responses varied from 3.4 (BAU) to 4.3 (BSMRAU). Interestingly, there were few differences between institutions for questions relating to students' study habits, growth and development, academic accountability ability to self-assess. Overall, the results showed that OBE was beneficial in assisting students in measuring their academic

outcomes and making a routine of their study. It helped make the activities more responsive toward improving students' academic performance and reinforcing their knowledge and skills. The CM scores of 3.7, 4.0, and 4.3 at BAU, SrAU, and BSMRAU signify that the students in all three institutions had a clear idea of the usefulness of the OBE in their academic fields. Students thought that OBE helped them measure their performance and develop study habits, as a consequence of obligatory assessments and portfolio evaluations. Students were aware that OBE enhances the student-centered approach and promotes the accountability of students' academic performance due to a clear perception of OBE in their minds.

Table 2: Status of OBE Implementation in Terms of Environment

Environment	WM			VI			Rank		
	BAU	SrAU	BRAU	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU
1. How much assistance do all OBE role-players provide?	2.6	3.4	3.4	ME	ME	ME	6	5	6
2. To what extent does OBE foster a better integration between University-Industry Collaboration (UIC)?	2.9	2.9	3.1	ME	ME	ME	5	7	7
3. How much of a healthy & conducive learning environment exists to address OBE?	3.0	3.5	3.6	ME	ME	GE	3=	3	4=
4. To what extent does OBE support the development of values and desirable characteristics across different employment contexts?	3.0	3.4	3.6	ME	ME	GE	3=	4	4=
5. To what extent does OBE provide a more effective way of delivering lessons through relevant pedagogy and classroom management?	3.4	3.9	4.0	ME	GE	GE	2	1	1
6. To what extent does OBE ensure to maintenance of class size & teacher-student ratio?	2.6	3.0	3.7	ME	ME	GE	7	6	3
7. How much are Internship/project/dissertation/Fieldwork/work-able to integrate learning opportunities?	3.5	3.6	3.9	GE	GE	GE	1	2	2
Composite Mean	3.0	3.4	3.6	ME	ME	GE			

Note: WM: weighted mean, VI: value index, The = sign in rank denotes that the criteria within an institution are tied for rank

Students' views of the usefulness of OBE in terms of their attitude to study are summarized in Table 4. The overall mean for all criteria was 3.7, with only small differences in CM between institutions (BAU: 3.5, SrAU: 3.9, BSMRAU: 3.8), and only three items scored <3.5. Out of 13 questions, most of the parameters were considered 'useful' in all three agricultural universities, although five items (*'motivating the students for their independency', 'pursuing career plans', 'developing higher-order thinking skills', 'developing social responsibility and community service', and 'inspiring students to apply knowledge in real-life situations'*) were considered only 'moderately useful' at BAU. Two items (*'pursuing a career plan', and 'developing social responsibility and community service'*) were 'moderately useful' at BAU.

Table 3: Usefulness of OBE

OBE is beneficial in the following areas	WM			VI			Rank		
	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU
1. Assisting students in self-assessment.	4.1	4.2	4.2	U	U	U	1	1	2=
2. Promoting the accountability of students' academic performance	4.0	4.0	4.2	U	U	U	3=	3=	5
3. The Study Habits of Students	4.0	3.9	4.2	U	U	U	3=	5	2=
4. Helping students grow and develop their skills and competencies	4.0	4.0	4.2	U	U	U	2	3=	2=
5. Utilizing the student-centered approach	3.7	3.7	4.1	U	U	U	5	6	6
6. Maintaining an academic calendar	3.4	4.1	4.6	MU	U	VU	6	2	1
Composite Mean	3.7	4.0	4.3	U	U	U			

Note: WM: weighted mean, VI: value index. The = sign in rank denotes that the criteria within an institution are tied for rank.

Two items were 'moderately useful' at BSMRAU (*'pursuing a career plan', and developing social responsibilities and community service'*), and one (*'emphasizing lifelong learning'*) at SrAU. These results indicated that OBE can assist students to embrace the accountability of their education, as well as challenge learners to evolve into more collaboration. Subsequently, to the completion of their education, OBE can additionally be beneficial in pushing students to be self-sufficient, developing a mentality regarding a certain learning goal, and practicing teamwork rather than competition.

Students' views of the usefulness of OBE in terms of their attitude to study are summarized in Table 4. The overall mean for all criteria was 3.7, with only small

differences in CM between institutions (BAU: 3.5, BSMRAU: 3.8, SrAU: 3.9), and only three items scored <3.5. Out of 13 questions, most of the parameters were considered 'useful' in all three agricultural universities, although five items ('*motivating the students for their independency*', '*pursuing career plans*', '*developing higher-order thinking skills*', '*developing social responsibility and community service*', and '*inspiring students to apply knowledge in real-life situations*') were considered only 'moderately useful' at BAU. Two items ('*pursuing a career plan*', and '*developing social responsibility and community service*') were 'moderately useful' at BAU. Two items were 'moderately useful' at BSMRAU ('*pursuing a career plan*', and '*developing social responsibilities and community service*'), and one ('*emphasizing lifelong learning*') at SrAU. These results indicated that OBE can assist students to embrace the accountability of their education, as well as challenge learners to evolve into more collaboration. Subsequently, to the completion of their education, OBE can additionally be beneficial in pushing students to be self-sufficient, developing a mentality regarding a certain learning goal, and practicing teamwork rather than competition.

Table 4: Usefulness of OBE in terms of attitude

OBE is beneficial in the following areas:	WM			VI			Rank		
	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU
1. Developing the students to face the challenges	3.7	4.1	4.0	U	U	U	2	1	2=
2. Practicing collaboration rather than competition	3.6	4.0	3.9	U	U	U	4=	2=	5
3. Developing a mindset toward a well-defined learning path	3.8	4.0	4.1	U	U	U	1	2=	1
4. Motivating the students to be independent	3.4	3.9	3.7	MU	U	U	11=	6	8=
5. Helping students take ownership of their learning because they're now at the heart of their learning	3.7	3.9	4.0	U	U	U	3	5	2=
6. Pursuing a career plan	3.4	4.0	3.4	MU	U	MU	11=	4	12
7. Catering to learners' attitudes and values	3.6	3.7	3.9	U	U	U	6	12	6
8. Emphasizing lifelong learning	3.6	3.5	3.7	U	MU	U	4=	13	11
9. Developing higher-order thinking skills (HOTS)	3.5	3.8	3.7	MU	U	U	9=	9=	8=
10. Developing critical thinking	3.5	3.8	4.0	U	U	U	7=	9=	2=
11. Developing social responsibility and community service	3.1	3.9	3.3	MU	U	MU	13	7=	13
12. Inspiring Students to Put Their Knowledge to Work in Real Life	3.5	3.9	3.7	MU	U	U	9=	7=	10
13. Developing entrepreneurship skill	3.5	3.8	3.8	U	U	U	7=	9=	7
Composite Mean	3.5	3.9	3.8	U	U	U			

Note: WM: weighted mean, VI: value index. The = sign in rank denotes that the criteria within an institution are tied for rank.

### *Impact of OBE*

Students' opinions on the effect of OBE on their behaviour are shown in Table 6. The CM of 3.4-3.5 was relatively low, but indicated the extent of the value students perceived of OBE to their studies. These results are therefore of importance for the proponents of OBE instruction within an institution, since students must understand the significance and goals of acquiring knowledge, skills, and attitudes that will be beneficial to their future employment (Laguador, 2013a, b). The parameter '*how well I listened to the instructor*' received the highest score (3.8). Also well-regarded were the parameters '*to what extent I had become cooperative in discussion*' and '*to what degree I established a good rapport with others*' were regarded as useful in two of the institutions. However, the parameters '*to what extent I started to think critically*' were only regarded as moderately useful.

Table 5: Faculty views on the usefulness of OBE in terms of instruction

OBE is helpful in the following areas:	WM			VI			Rank		
	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU
1. Ensuring that faculty members are in control of the teaching material being taught.	4.0	4.1	4.2	U	U	U	1	1	1
2. Making lessons easier to learn	3.8	4.0	4.0	U	U	U	6	3	4
3. Asking teachers to act as facilitators rather than lecturers	3.8	3.8	3.9	U	U	U	5	4=	5
4. Create an environment conducive to learning and teaching	3.9	3.8	3.8	U	U	U	2=	4=	6
5. The Importance of Implanting Learning Skills Necessary for the Industry	3.4	3.8	3.7	MU	U	U	7	7.0	7
6. Active participation in learning activities	3.9	4.0	4.1	U	U	U	2=	2	2
7. Searching information for learners	3.9	3.8	4.1	U	U	U	2=	4=	3
Composite Mean	3.8	3.9	4.0	U	U	U			

Note: WM: weighted mean, VI: value index. The = sign in rank denotes that the criteria within an institution are tied for rank.

Taken together, these results suggest that OBE instruction has captured the respondents' interest and attention with a moderate degree of success. However, respondents expressed a high level of engagement by building a good rapport with others as well as by listening to the instructor in BAU and SrAU, which are good signs of the acceptability of OBE instruction. Indeed, when the students begin to think critically and they complete exercises quickly and accurately, they feel moderately satisfied.

Table 6: Faculty views on the usefulness of OBE in terms of instruction

Behaviour During Instruction	WM			VI			Rank		
	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU
1. To what extent do I listen attentively to the instructor?	3.7	3.8	3.9	U	U	U	1=	1	1
2. To what extent I had become cooperative in discussions?	3.4	3.6	3.6	MU	U	U	3	4	2
3. To what extent I can accomplish exercises fast and accurately?	3.3	3.4	3	MU	MU	MU	4=	5	6
4. To what degree have I established a good rapport with others?	3.7	3.6	3.1	U	U	MU	1=	2=	5
5. To what extent have I become satisfied?	3.3	3.6	3.4	MU	U	MU	4=	2=	3
6. To what extent did I begin to think critically?	3.2	3.2	3.2	MU	MU	MU	6	6	4
Composite Mean	3.4	3.5	3.4	MU	U	MU			

Note: WM: weighted mean, VI: value index. The = sign in rank denotes that the criteria within an institution are tied for rank.

The objective of OBE is to have a positive impact on the students after the instruction. The impact of OBE on the respondent's performance after the instruction is shown in Table 7. The CM for all attributes was relatively low, at 3.3-to 3.4, with individual parameter means varying from 3.1-to 3.6. None were deemed as 'useful' or 'moderately useful' across all three institutions, but 'to what extent I received good grades' and 'to what extent I can make better outcomes' were regarded as useful in 2/3 (BAU and SrAU) universities. The results show that students consider OBE instruction to be moderately useful in improving their performance. Respondents said that they applied what they had learned, spoke their ideas, and put their ideas into writing demonstrating a moderate extent. Students' attitudes and perspectives had changed towards their learning, albeit only to a moderate extent.

Table 7: The Effect of OBE Instruction on the Respondents' Behaviour During Instruction

Behaviour During Instruction	WM			VI			Rank		
	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU
1. To what extent do I receive good grades?	3.6	3.6	3.1	U	U	MU	2	1	6
2. To what degree I can speak my ideas?	3.6	3.2	3.4	U	MU	MU	1	4	2
3. To what extent I can apply what I have learned?	3.3	3.1	3.5	MU	MU	MU	5	5	1
4. To what extent I can put my ideas into writing?	3.4	3.4	3.2	MU	MU	MU	4	3	4=
5. To what extent I can make better outcomes?	3.5	3.5	3.2	U	U	MU	3	2	4=
6. To what degree do I get timely feedback on all formative/ continuous assessments?	3.1	3.1	3.3	MU	MU	MU	6	6	3
Composite Mean	3.4	3.3	3.3	MU	MU	MU			

Note: WM: weighted mean, VI: value index. The = sign in rank denotes that the criteria within an institution are tied for rank.

The implications of the study from a curriculum planning perspective are shown in Table 8. The composite means were again relatively low, at 3.5-3.6. The highest criterion score (3.9) was for *'my communication skills have gotten better'*, which was also deemed to be *'useful'* at all three universities. However, respondents from 2/3 institutions also considered that *'lessons become more interesting to me'* (BAU, SrAU) and *'it's easy for me to understand what you're talking about'* (SrAU, BSMRAU), whilst in all three universities, *'I experienced a lot of fun while learning'* was only considered to be *'moderately useful'*. The highest weighted average of 3.9 indicates improved competence in communication skills. These data indicate that students' interest in learning was enhanced by using OBE instruction, but show only a moderate level of growth in their skills as leaders and their capability to easily absorb what is being delivered. This was due to students' inability to adjust quickly to the new schedule, since they remained in the transition period because OBE instruction was a new pedagogical curriculum; and, presumably, they will eventually learn to adjust to it. If students are to learn intended outcomes effectively, the teacher's primary responsibility would be to actively involve students in learning activities (Caguimbal et al., 2013). On the other hand, the data show relatively limited concordance between institutions, which may indicate difficulties in assessing these aspects of students' learning.

Table 8: The Effect of OBE on Curriculum

Behaviour During Instruction	WM			VI			Rank		
	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU
1. Lessons become more interesting to me.	3.6	3.6	3.4	U	U	MU	3.0	3.0	3.5
2. It's easy for me to understand what you're talking about.	3.3	3.8	3.6	MU	U	U	4.0	1.0	1.0
3. My communication skills have gotten better.	3.9	3.8	3.5	U	U	U	1.0	2.0	2.0
4. I experienced a lot of fun while learning.	3.3	3.4	3.2	MU	MU	MU	5.0	5.0	5.0
5. I've learned how to lead.	3.7	3.4	3.4	U	MU	MU	2.0	4.0	3.5
Composite Mean	3.5	3.6	3.5	U	U	MU			

Note: WM: weighted mean, VI: value index. The = sign in rank denotes that the criteria within an institution are tied for rank.

The findings of the Generic Skills section are shown in Table 9. Overall CM was again relatively low, at 3.5-3.7. Remarkably, the height mean score (4.3) for individual criteria was for *'well-mannered/polite;'* and even more remarkably, the lowest score was given to *'computer skills'* (3.1) and *'complex problem solving'* (3.2). In terms of being *'useful,' 'communication skills,' 'teamwork skills' 'interpersonal skills'* and *'motivation and initiative'* were well regarded at each institution. These data suggest that, despite the general benefit of OBE in developing problem-solving and analytical skills, the method had been no more than moderately successful in these areas in the universities in this study. OBE provides a learning environment that should cater to the development of students as future professionals, so its ability to develop interpersonal skills reflects the success of the method. However, the lower scores for computer skills and complex problem-solving also clearly represent areas in which the OBE curricula need to be strengthened to meet the expectations of employers. Hence, institutions will need to ensure better ways of delivering instruction through appropriate teaching methodology and classroom management in these areas.

Table 9: Impact of OBE study on generic skills

Implications	WM			VI			Rank		
	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU	BAU	SrAU	BSMRAU
1. Communication skills	3.9	3.8	3.7	U	U	U	2	4	3
2. Teamwork skills	3.9	3.8	3.7	U	U	U	3	3	4
3. Interpersonal skills	3.6	3.7	3.8	U	U	U	5	5=	2
4. Motivation and initiative	3.5	3.7	3.6	U	U	U	6	5=	5
5. Analytical skills	3.1	3.3	3.4	MU	MU	MU	9	9=	10
6. Computer skills	2.7	3.1	3.5	MU	MU	U	11	11	8
7. Self-confidence	3.6	3.9	3.4	U	U	MU	4	2	9
8. Well-mannered/polite	4.6	4.3	4.1	VU	U	U	1	1	1
9. Creativity	3.2	3.6	3.6	MU	U	U	8	8	6=
10. Complex problem solving	2.9	3.3	3.3	MU	MU	MU	10	9=	11
11. Resilience, stress tolerance and flexibility	3.5	3.6	3.6	MU	U	U	7	7	6=
Composite Mean	3.5	3.7	3.6	U	U	U			

*Note:* WM: weighted mean, VI: value index. The = sign in rank denotes that the criteria within an institution are tied for rank.

## Conclusions

This survey was the first in-depth study of the responses of faculty and students to the implementation of OBE in three agricultural universities in Bangladesh. Taken together, the results indicate different levels of implementation of OBE curricula across the three institutions and, hence, different levels of success (i.e. appreciation by faculty and students) between institutions. Despite these detailed differences between institutions, however, there is clear evidence of a successful pedagogical shift away from traditional, didactic, teaching methods toward more student-centered, constructivist methods across all three programmes. There appear to be areas within each institution that have been developed particularly strongly and different areas that would benefit from further development. The data from this survey should enable programme managers in each institution to identify the areas that most require attention. For the agricultural universities that were not part of the study, the results of the present study should provide strong indicators for the directions in which programmes could be improved. Of particular note and concern were the limited benefits that OBE, as presently implemented, has had upon students' ability to solve complex problems. Conversely, the benefits of OBE in terms of interpersonal working relationships between students represent a strong area of success.

## Recommendations

Universities should keep a close eye on how OBE is being implemented by using a database system to keep track of it. They should continuously monitor the curriculum to keep it up to date in line with the needs of industry and employers, to ensure that graduates are appropriately prepared for the workplace. Faculty and students should attend seminars/conferences/workshops regularly to learn about the planning, delivery, and implementation of OBE. Parents should be involved and attend meetings and seminars to help the university to understand what an OBE is, and how it affects students' performance. A study on the relationship between OBE and different programmes will help the university authority to figure out if they need to make any changes or improvements to the curriculum. Interviewing students will give a better idea of what is taking place inside the classroom, helping them to understand the academic dilemma better.

## Acknowledgments

The authors would like to acknowledge and gratitude to the Bangladesh Accreditation Council, Dhaka for funding (2022-2023). We must appreciate those reviewers who spent their valuable time correcting the manuscript with valuable comments.

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# Ensuring Quality Education of Universities in Sylhet, Bangladesh: Faculty Resources Perspective

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## Abstract

This study assessed the quality of university teachers and identified the barriers to quality education. It evaluated the factors affecting the quality of education in the context of faculty resources at Shahjalal University of Science and Technology (SUST) and Leading University (LU) using logistic regression analysis. It administered a structured questionnaire and interviewed 411 individuals from SUST and 105 from LU. There were 83.3% male teachers, 16.7% female, 72% male students, and 28% female from SUST, while 80% male teachers, 20% female, 60% male students, and 40% female from LU. About 15% of teachers and 756% of students from SUST, 62.9% of teachers, and 51.4% of students from LU were not involved in the research. About 67.9% of students in SUST and 25.7% in LU were not happy with teachers' presentation. They were poorly satisfied with the research facilities and had no access to them. Existing faculty resources were enough to ensure quality education in SUST and LU. In logistic regression, the teaching experience, average number of articles published per year, academic qualification, conducting research projects, and art of teaching were positively associated with the teachers' quality. Good laboratory and research facilities existed at SUST, but LU had none. From the students' perspective, the research facilities, and art of teaching by their teachers were satisfactory, and these were positively associated with quality education at SUST. The logistic regression model of the Hosmer-Lemeshow test was used for goodness of fit. Based on the Key Informant Interview (KII), the majority of SUST faculty members have had good experience, and pedagogy skills are satisfactory to ensure quality education at SUST. According to Focus Group Discussion (FGD), it is suggested that newly-appointed teachers should receive adequate training. SUST has sufficient competency skills of their academic staff to achieve the Sustainable Development Goal-4 (SDG-4). According to the LU's FGD, international standards should be set for enhancing quality education by hiring foreign expatriates. Evaluating the service quality of higher education institutes needs to be done through the SERVQUAL model even though the authorities have taken the initiative to face the challenges of ensuring quality education at the tertiary level.

**Keywords:** Quality Education, Faculty Resources, Shahjalal University of Science and Technology, Leading University, Sylhet

## **Introduction**

Higher education in Bangladesh has been facing challenges due to a lack of good governance. The absence of pedagogy training for the teachers and the adverse teacher-student ratios at HEIs hinder quality education (Solaiman, 2018). The University Grants Commission (UGC) and Bangladesh Accreditation Council (BAC) have been charged with responsibility for ensuring quality education in public and private universities (Alam et al., 2007). Quality education has adopted quantitative frameworks in universities in Bangladesh (Sarkar, Rana & Zitu, 2013; Sengand Ling, 2013; Akareem & Hossain, 2016; Rashid & Rahman, 2017; Sarbabidya & Rashid, 2018; Ullah, 2020). These findings have contributed much to quality improvements in higher education. This study was designed to evaluate the quality of education and the challenges to improving it in SUST and LU.

## **Methodology**

### *Research Design*

The study administered questionnaires to elicit information from students, teachers, and directors, Institute Quality Assurance Cell (IQAC), academic heads, and institutional directors.

### *Survey Area*

One public (SUST) and one private university (LU) were selected. A total of 552 and 10,922 students participated. There are four schools, 10 departments, one Centre, and about 5,000 students. It has around 159 academic staff in LU. Faculty resources were considered as independent variables for explaining the dependent variable of quality of education. Various categories of faculties were selected for their research activities.

### *Data Collection Procedures*

**Sources of Data.** Data were obtained from the students and teachers of 12 departments from SUST and four from LU.

**Primary Data.** Characteristics of the faculty members and the challenges to quality education were measured.

**Data Collection Tools.** The survey questionnaire was used in 12 departments at SUST and 4 at LU. Separate questionnaires were for teachers and students. Interviews were conducted at SUST and LU with deans, senior faculty members, class representatives, final-year students, and MS students. Group discussions were conducted at SUST and LU with the IQAC directors, academic and institutional heads, and students. Theoretic sample sizes were estimated according to the method of (Lemeshow et al., 1990) for SSUT as 306 participants. The actual numbers were 246 students and 60 teachers. At LU, the actual numbers were 70 students and 35 teachers. The total numbers were therefore 411 participants.

### *Sampling Design for Quantitative and Qualitative Component*

Three schools: The School of Applied Sciences and Technology, the School of Physical Sciences, and the School of Social Sciences were selected purposively from SUST as they are comparatively old and big. Five departments were selected randomly from nine departments of Applied Sciences and Technology, three departments were chosen randomly from six departments of Physical Sciences, and four departments were selected randomly from eight departments of Social Sciences. Five faculty members were selected from each department, a total of 60 teachers from SUST. Twenty students were randomly selected from each of the 12 departments of SUST and another six students were selected randomly from twelve different departments. Three schools: Faculty of Business Administration, Faculty of Social Science, and Faculty of Modern Science were selected from LU. One department was selected randomly from two in the Faculty of Business Administration, one was selected randomly from two in the Faculty of Social Science, and two were selected randomly from four in the Faculty of Modern Science. Nine faculty members were randomly selected from each department, a total of 36. About 17 students were randomly selected from each department and another two students were selected randomly from four different departments making a total of 70 students

The qualitative study was done during the period in March and May 2023 in SUST and LU. One group discussion and one interview were completed with stakeholders.

### *Analytical Framework*

The conceptual framework was used to investigate the quality of teachers and the barriers, which the framework was described in Figure 1.

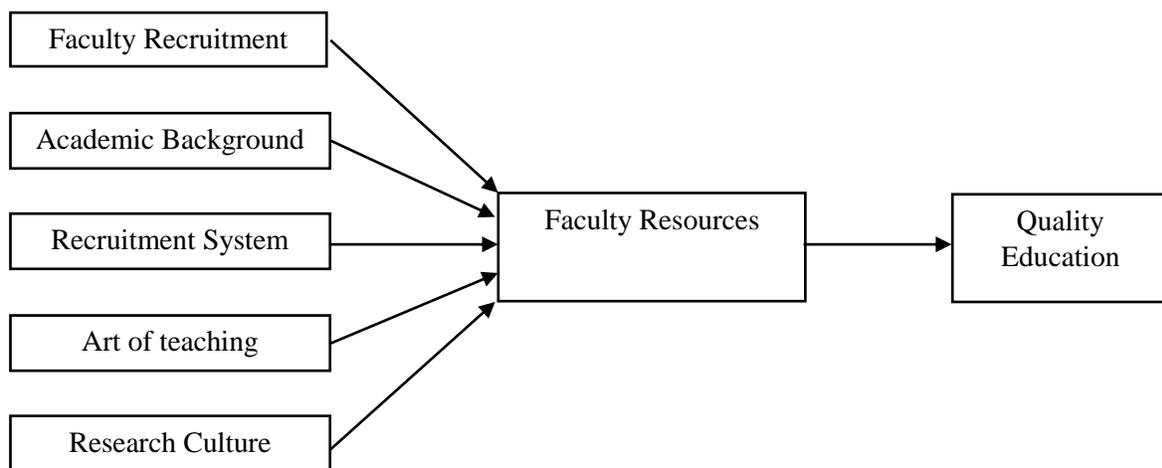


Figure 1: Framework of the Study

## Data Analysis

Likert Scale data were converted to mean scores. These were compared with the ranges in Table 1 (Grainger, 2005; Alonazi et al., 2019) to provide descriptive equivalents. Logistic regression analyses were used to identify factors associated with faculty perspectives. The goodness of fit was assessed with the Hosmer-Lemeshow test. Qualitative data were assessed according to the analysis framework in Figure 1.

Table 1: *Weighted Likert mean score range and its Descriptive equivalent*

Weighted Likert mean score range	Descriptive equivalent
4.21-5.00	Strongly Satisfied
3.41-4.20	Satisfied
2.61-3.40	Fair
1.81-2.60	Dissatisfied
1.00-1.80	Strongly Dissatisfied

## Results and Discussion

### *Results of Socio-demographic and Socioeconomic Characteristics*

Table 2 shows the characteristics of the people. In SUST, 83.3% of teachers were male and 16.7% female, 72% of students were male and 28% female. In LU, 60% of students were male and 40% female. In SUST faculty members, 51.7% were professors, 18.3% were associate professors, 28.3% were assistant professors, and 1.7% were lecturers, while in LU 11.4% were associate professors, 40% were assistant professors, and 48.6% were lecturers. In SUST, 63.3% of teachers had PhD, 28.3% Master's, and 8.3% Bachelor's degrees, whereas, in LU, 17.1% had PhD, 62.9% Masters, and 20% Bachelor's degrees. In SUST, 38.3% of teachers, and in LU 65.7% had no higher degree from foreign universities. In SUST, 15% of academics, and LU 62.9% were doing no research. In SUST, 67.9% of students, and in LU 25.7% of students were not satisfied with lectures. In SUST, 75.6% and in LU 1.4% of students had no chance to participate in any project research.

### *Results on the Barriers Affecting the Quality Education in Sylhet*

Table 3 shows that the mean score of satisfaction regarding the salary package for teachers of SUST was 3.2 out of 5.0, which indicates that the teachers were fair with their salaries. In detail, 43.3% were satisfied 21.7% were fairly satisfied, and 28.3% were dissatisfied. In LU, the mean score was 3.4, which indicates that they were satisfied with their salary. 42.9% were satisfied; 34.3% were fairly satisfied, and 8.6% were dissatisfied. Table 4 shows that in SUST, the mean score for satisfaction with research facilities was 3.0 out of 5.0, meaning that teachers were moderately satisfied. The mean score from SUST students was low, at 2.6 out of 5.0, which

means that the students were less satisfied with the research support: 75.6% of students had no chance to participate in research.

Table 2: Descriptive Statistics of Socio-demographic and Characteristics for Survey Respondents

		SUST				LU			
		Teachers		Students		Teachers		Students	
		N	%	N	%	N	%	N	%
Gender	Male	50	83.3	177	72.0	28	80.0	42	60.0
	Female	10	16.7	69	28.0	7	20.0	28	40.0
Designation	Professor	31	51.7			0	0		
	Associate professor	11	18.3			4	11.4		
	Assistant Professor	17	28.3			14	40.0		
	Lecturer	1	1.7			17	48.6		
Education	Bachelor	5	8.3			7	20.0		
	Masters	17	28.3			22	62.9		
	PhD	38	63.3			6	17.1		
Comment about Course Curriculum and Content	Updated/Yes	24	40.0	72	29.3	28	80.0	37	52.9
	Average/No	29	48.3	34	13.8	6	17.1	6	8.6
	Not updated/Need more changes	7	11.7	140	56.9	1	2.9	27	38.6
Foreign Degree	Yes	37	61.7			12	34.3		
	No	23	38.3			23	65.7		
Satisfied with teachers' art of teaching (Pedagogy)	Yes			79	32.1			52	74.3
	No			167	67.9			18	25.7
Level of satisfaction with teachers' working conditions and the art of teaching	High	1	3.7	9	11.4	2	9.1	16	30.8
	Up to the mark	19	70.4	53	67.1	17	77.3	33	63.4
	Low	7	25.7	17	21.5	3	13.6	3	5.8
Get research facilities as per requirement.	Yes			60	24.4			34	48.6
	No			186	75.6			36	51.4

Table 3: Satisfaction Levels of Salary Package in SUST & LU

Satisfaction Levels	SUST			LU		
	Teacher's Opinion			Teacher's Opinion		
	Respondents	(%)	Score	Respondent	(%)	Score
Strongly Satisfied	2	3.3	10	3	8.6	15
Satisfied	26	43.3	104	15	42.9	60
Fair	13	21.7	39	12	34.3	36
Dissatisfied	17	28.3	34	3	8.6	6
Strongly Dissatisfied	2	3.3	2	2	5.7	2
Total	60	100.0	189	35	100.0	119
Mean			3.2			3.4

Table 4: Satisfaction Levels of Research Facilities in SUST & LU

Satisfaction Levels	Comment	SUST						LU					
		Student's Opinion			Teacher's Opinion			Student's Opinion			Teacher's Opinion		
		Respondent	Percent	Score									
Strongly Satisfied		5	2.0	25	0	0	0	2	2.9	10	3	8.6	15
Satisfied		37	15.0	148	21	35	84	28	40	112	12	34.3	48
Fair		78	31.7	234	22	36.7	66	21	30	63	11	31.4	33
Dissatisfied		98	39.8	196	15	25	30	13	18.6	26	5	14.3	10
Strongly dissatisfied		28	11.4	28	2	3.3	2	6	8.6	6	4	11.4	4
Total		246	100	631	60	100	182	70	100	217	35	100	110
Mean				2.57			3.0			3.1			3.14
Statement: Do you get research facilities as per requirements	Yes	60	24.4					35	50				
	No	186	75.6					35	50				

Students have a mean satisfaction score of 3.1, indicating that they are only moderately satisfied. The split is clear: 50% of students feel they do not receive adequate research facilities, highlighting a significant gap in meeting their needs. Teachers show an almost identical mean satisfaction score of 3.1, suggesting they are also only moderately satisfied with the research facilities. Moreover, there is still a notable portion of dissatisfied teachers, indicating room for improvement. Table 5 shows that SUST students gave a mean score of 4.0 for laboratory facilities, while students of LU gave a mean score of 3.3. The laboratory facilities were not up to the mark for all the departments.

Table 5: Satisfaction Levels of Lab Facilities in SUST & LU

Satisfaction Levels	SUST			LU		
	Student's Opinion			Student's Opinion		
	Respondent	Percent	Score	Respondent	Percent	Score
Strongly Satisfied	20	8.1	100	3	4.3	15
Satisfied	64	26.0	256	37	52.9	148
Fair	75	30.5	225	13	18.6	39
Dissatisfied	62	25.2	124	15	21.4	30
Strongly dissatisfied	25	10.2	25	2	2.9	2
Total	246	100	730	70	100.0	234
Mean			2.97			3.34

### ***Results on Assessing the Teachers' Quality of SUST and LU***

Table 6a shows that in SUST the mean score for teachers' quality according to students was low at 2.7, which means that teaching is not satisfactory. The mean score in LU was 3.6, which means that the teaching in LU is also not satisfactory.

Table 6a: Assessment of the Teachers' Quality in SUST &amp; LU

Satisfaction Levels	SUST			LU		
	Student's Opinion			Student's Opinion		
	Respondent	Percent	Score	Respondent	Percent	Score
Strongly Satisfied	5	2.0	25	10	14.3	50
Satisfied	40	16.3	160	26	37.1	104
Fair	94	38.2	282	28	40.0	84
Dissatisfied	84	34.1	168	5	7.1	10
Strongly Dissatisfied	23	9.3	23	1	1.4	1
Total	246	100	658	70	100	249
Mean			2.67			3.56

Table 6b shows that, in SUST, 60% of the teachers considered that the existing teacher quality was enough to ensure quality education, while only 31.3% of students agreed with this statement. In SUST, 67.9% of students were not satisfied with the teacher's art of teaching. It is noted that 61.7% of teachers have higher degrees abroad and 85% of teachers are engaged in research, which could help to disseminate innovative ideas to improve their teaching quality. In LU, 45.7% of teachers think that teaching is enough to ensure quality education, while only 57.1% of students agreed. About 74.3% of students were not satisfied with the teacher's delivery of lectures. It is noted that 65.7% of teachers do not have foreign degrees and 62.9% of teachers are not engaged in research, which could worsen teachers' quality.

### *Results on Assessment of Teachers' Quality of SUST and LU*

Table 7 shows that, at SUST, none of the variables show significant effects on the quality of teachers. Teaching experience, average articles published, academic qualifications, conducting research projects, and the art of teaching all have positive associations with teachers' quality but are not statistically significant. The model has a reasonable fit, explaining about 25% to 33% of the variability in quality education. In LU, the analysis reveals that teaching experience is a significant factor affecting the quality of teachers. Each additional unit of teaching experience increases the odds of higher teacher quality by approximately 1.3 times, highlighting the importance of experience in determining teacher quality. This finding is statistically significant, underscoring that more experienced teachers are significantly more likely to be of higher quality. Other factors, such as the average number of articles published per year, academic qualifications, conducting research projects, and the art of teaching, show positive associations with teacher quality but do not reach statistical significance. The fit of the model is robust, with the Hosmer & Lemeshow test showing a chi-square value of 7.488 ( $p = 0.380$ ), indicating that the model fits the

data well. The model explains between 38% and 51% of the variability in teacher quality, as reflected by the Cox and Snell R<sup>2</sup> and Nagelkerke R<sup>2</sup> values.

Table 6b: Assessment of the Teachers' Quality in SUST & LU

LU					Statement	SUST				
Student's Opinion		Teacher's Opinion				Teacher's Opinion			Student's Opinion	
Percent	Respondent	Comment	Percent	Respondent		Respondent	Percent	Comment	Respondent	Percent
57.1	40	Yes	45.7	16	Existing teacher quality is enough to ensure quality education	36	60.0	Yes	77	31.3
42.9	30	No	54.3	19		24	40.0	No	169	68.7
		Yes	34.3	12	Do you have a foreign degree?	37	61.7	Yes		
		No	65.7	23		23	38.3	No		
		Yes	37.1	13	Do you conduct any research project?	51	85.0	Yes		
		No	62.9	22		9	15.0	No		
74.3	52	Yes	Satisfied with teacher's art of teaching (Pedagogy)					Yes	79	32.1
25.7	18	No						No	167	67.9

Table 7: Assessment of Teacher Quality in SUST & LU through Logistic Regression Model (Dummy Dependent variable: Quality of teachers)

		SUST		LU	
Variables		CE	Odds Ratio	CE	Odds Ratio
Constant		-2.63	0.07	-3.82	0.02
Teaching Experience		0.02	1.02	0.25**	1.28
Average Articles published per year		0.31	1.37	0.55	1.74
Academic Qualification	Undergraduate <sup>R</sup>				
	Master	0.69	2.00	0.80	2.22
	PhD	1.99	7.33	0.96	2.63
Conduct Research Project	No <sup>R</sup>				
	Yes	0.25	1.29	1.16	3.21
Art of Teaching	No <sup>R</sup>				
	Yes	0.90	2.46	0.75	2.12
Hosmer & Lemeshow	Chi-square	12.65 (df =8) p = 0.12		7.48 (df = 7) p = 0.38	
Model Summary	Likelihood Ratio	63.74		31.39	
	Cox and Snell R <sup>2</sup>	0.247		0.382	
	Nagelkerke R <sup>2</sup>	0.334		0.511	

Note: CE = Coefficient, \*\*indicates significant at the 0.05 level

### *Evaluation of the Quality Education with Faculty Resources of SUST & LU*

Table 8 shows the results of the factors that affect faculty resources for quality education in SUST. Dummy dependent quality education and categorical variables were: teaching experience, academic qualifications, authority interventions, satisfactory recruitment system, good laboratory and research facilities, involvement of teachers in politics, and other activities. 'Authority Manipulates' is highly significant at the 1% level, indicating a strong relationship with quality education. When authority manipulation is present, the odds of achieving quality education are approximately 0.3 times less likely (or about 1/3 lower) compared to when there is no authority manipulation.

The presence of authority manipulation is a substantial negative factor, making it much harder to achieve quality education at SUST. 'Satisfied with the Recruitment System' is significant at the 5% level. When teachers are satisfied with the recruitment system, the odds of achieving quality education are about 4.9 times higher than when they are not satisfied. Satisfaction with the recruitment system greatly enhances the likelihood of achieving quality education, making it one of the most positive factors in this model. 'Teacher Politics' is significant at the 5% level. The presence of teacher politics reduces the odds of achieving quality education by about 0.3 times (or roughly 1/4 times), indicating a strong negative effect. Teacher politics is another significant negative factor, decreasing the chances of attaining quality education. Teaching Experience is the only variable that was significant at the 5% level in LU. Each additional unit (years) of teaching experience increases the odds of achieving quality education by about 1.3 times, meaning that more experienced teachers are more likely to contribute to quality education. Teaching experience positively influences quality education at LU, making it a crucial factor in improving educational outcomes.

Quality education at SUST is therefore significantly impacted by three key factors: Authority Manipulation and Teacher Politics both significantly reduce the likelihood of achieving quality education. Satisfaction with the Recruitment System greatly increases the likelihood of quality education. At LU, Teaching Experience is the only significant factor, positively influencing quality education. More experienced teachers are key to improving educational outcomes at this university.

Table 8: Evaluating the Faculty Resources' Quality Education in SUST&amp; LU through Logistic Regression Model (Dummy Dependent variable: Ensuring Quality Education)

Variables		SUST		LU	
		CE	Odds Ratio	CE	Odds Ratio
Constant		-2.31	0.09	-3.09	0.04
Teaching Experience		-0.01	0.98	0.25**	1.28
Academic Qualifications	Bachelor <sup>R</sup>				
	Master	2.12	8.38	0.78	2.19
	PhD	2.26	9.60	1.13	3.10
Authority manipulates	No <sup>R</sup>				
	Yes	-1.23*	0.29		
Involvement of teachers in other activities	No <sup>R</sup>				
	Yes			0.36	1.43
Satisfied with the Recruitment System	No <sup>R</sup>				
	Yes	1.58**	4.85		
Satisfied with Recruitment policies					
				1.04	2.84
Enough laboratory and research facilities	No <sup>R</sup>				
	Yes	1.20	3.35	0.17	1.18
Teacher politics	No <sup>R</sup>				
	Yes	-1.34**	0.26		
Hosmer and Lemeshow	Chi-square	8.451 (df = 8) p = 0.391		3.259 (df = 7) p = 0.860	
Model Summary	Likelihood Ratio	63.128		38.403	
	Cox and Snell R <sup>2</sup>	0.281		0.331	
	Nagelkerke R <sup>2</sup>	0.375		0.442	

Note: CE = Coefficient \*indicates significant at the 0.10 level, \*\*indicates significant at the 0.05 level

## Implications

### *Implications for Shahjalal University of Science & Technology*

#### 1. Addressing Authority Manipulation:

*Policy Development:* There is a strong negative relationship between authority manipulation and the quality of education. SUST should therefore develop and implement policies that minimize the influence of authority manipulation. This could include creating more transparent and accountable decision-making processes and ensuring that authority figures do not interfere in academic matters in ways that could affect educational outcomes.

## 2. *Improving Recruitment Systems:*

*Enhancement of Recruitment Practices:* Satisfaction with the recruitment system significantly impacts the likelihood of achieving quality education. SUST should focus on refining and enhancing their recruitment processes to ensure they are fair, transparent, and aligned with the institution's goals. This could involve regular reviews of recruitment practices, soliciting feedback from faculty, and implementing best practices to ensure a high-quality academic staff.

## 3. *Mitigating Teacher Politics:*

*Promoting a Collaborative Environment:* Teacher politics has a significant negative impact on quality education. Efforts should be made to foster a collaborative and supportive academic environment where faculty members can work together effectively without political interference. This might include promoting a culture of teamwork and establishing clear guidelines for faculty interactions and conflict resolution.

## ***Implications for Leading University***

### 1. *Emphasizing the Role of Teaching Experience:*

*Professional Development:* The significant positive impact of teaching experience on teacher quality at LU suggests that more experienced teachers contribute significantly to educational outcomes. LU should invest in professional development opportunities that help newer faculty members gain experience and expertise. Additionally, creating mentorship programmes where experienced faculty can guide less experienced colleagues may further enhance teaching quality.

### 2. *Evaluation and Support for Faculty:*

*Support Systems:* Since teaching experience is the only significant factor affecting teacher quality at LU, it is important to provide support systems that help faculty members gain valuable experience. This could include offering opportunities for faculty to engage in research, participate in teaching workshops, and collaborate on academic projects to build their experience and skills. By focusing on these implications, both SUST and LU can work towards enhancing their educational quality and ensuring that their faculty resources are optimally utilized to support student success.

## **Conclusions**

An assessment was done for the quality of academic staff and factors affecting the quality of education at SUST and LU. In SUST, 20% of faculty members were satisfied with the recruitment policy and in LU 53.3%. In SUST, 28.3% and in LU 8.6% of teachers were not happy with salary. Research facilities at SUST were satisfactory but the students were not happy. LU teachers were satisfied with the existing research facilities, whereas students were poorly satisfied. The logistic

regression analysis showed that the teaching experience was significantly and positively associated with the teachers' quality of education in SUST. The recruitment policy was followed meticulously in SUST compared to other counterparts, where it was positive and significantly associated with quality education. The teachers' satisfaction with working workplace was significant and positively associated with the quality of education compared to the others. Logistic regression analysis showed that the teaching and research experiences were significantly positive and were associated with the teachers' quality of LU. Based on KII, the majority of SUST faculty members had good experience, while most of the LU faculty members were not trained with higher degrees abroad. The pedagogy training facilities are poor in SUST. One-third of LU teachers were dissatisfied with their salaries, recruitment policies, and research facilities. Based on the FGD, the quality of education should be improved with the elapse of time following the Bangladesh National Qualifications Framework (BNQF) and the Standards and Criteria of the BAC. SUST has sufficient competencies and skills to achieve SDG-4, but exchange programmes for internships at home and abroad need to be developed. Facilities for need-based and basic research should be encouraged in SUST and LU in collaboration with the industries and companies. To facilitate the distribution of workload at LU, the authority should recruit highly trained faculties.

### **Recommendations**

A similar study needs to be done in different universities in Bangladesh to provide a substantial piece of proof about quality education in the context of faculty resources. Laboratory facilities, modules, and classrooms should be increased in SUST and LU. LU should appoint faculties with higher degrees and the teacher-student ratio LU should be maintained to ensure quality education. The concerned authorities should allocate sufficient research funds with the encouragement of academic staff to conduct need-based and basic research. Teacher training facilities for the academic staff of the universities need to be implemented. BAC should take the initiative to implement BNQF in each university to encourage academicians to facilitate outcome-based education.

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# Exploring Stakeholder's Perspectives on the Professional Skills of Veterinarians who Graduated from Bangladesh Agricultural University

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## Abstract

The research project was conducted to get information about stakeholder's perspectives on veterinary professional skills and to guide accreditors and policymakers, in aligning outcomes towards the capabilities most important to professional success and satisfaction. A survey of veterinarians involved in a variety of professional activities, animal owners, and employers in Bangladesh was performed to determine the perceived value of abilities necessary for professional veterinary practice. The study highlights the importance of understanding and addressing the diverse competencies in the veterinary field. It suggests that more research on teachers, students, and clients could help guide the future of veterinary education. It emphasizes the need for professional skills instruction and assessment in veterinary education, as it can help reduce lawsuit risk, meet client needs, and improve working conditions. The congruency between the stakeholder's opinions is the key finding of this study.

**Keywords:** *Professional Skill; Veterinary; Employability; Qualitative research; Bangladesh Agricultural University*

## Introduction

The veterinary profession helps to promote animal and human health by fostering research, preventing and combating zoonotic illnesses, and improving the health of the environment. Veterinarians play a crucial role in maintaining the safety of their food supply, in addition to animal health and welfare. Veterinarians face challenges in staying current in a rapidly evolving field. The knowledge, attitudes, values, and behaviours that define veterinary professionalism are due to societal expectations. Veterinarians must balance multiple responsibilities including medical knowledge, animal welfare, communication, business acumen, and statutory obligations (Armitage-Chan et al. 2016). The veterinary curriculum should include communication, emotional intelligence, cultural sensitivity, cooperation, conflict-resolution techniques, understanding community, and advocacy for health and welfare (Hilton and Southgate, 2007; Cake et al., 2016). Professionalism includes moral behaviour, self-awareness, and respect for clients.

As both herd numbers and size are increasing, veterinarians are being asked to work with herd health programmes, instead of treating individual cows. Consequently, veterinary professionals must focus on commercial skills and leadership (Mossop, 2012). The profession is becoming more sensitive to expert opinions and requires effective coordination among team members when dealing with dangerous species in zoos (OOQ, 2000). A professional education programme within veterinary curricula is currently being prioritized. The courses offered by veterinary institutions must meet the requirements of the Bangladesh Veterinary Council (BVC). Veterinarians who wish to practice must be registered by BVC in Bangladesh (section 2-1 of Bangladesh Veterinary Practitioners' Ordinance, 1982 (Bangladesh Veterinary Council ACT, 2019). According to the Day-One competencies of the BVC, Doctor of Veterinary Medicine (DVM) graduates will have practical skills in animal health, disease diagnosis, surgical interventions, livestock welfare, hygienic management, livestock production, reproduction, reproductive disorders, inspections, disease investigation, and research projects.

In 2017, the Faculty of Veterinary Science (FVS) at Bangladesh Agricultural University (BAU) gathered feedback on DVM graduates' Day-One skills, identifying four employers' expectations: knowledge, communication, interpersonal, and job skills. BAU's veterinary curricula must students develop these attributes. FVS found a gap between the employers' expectations and observed competencies (Parkinson et al., 2017). Students need to be equipped to balance competing stakeholder requirements (Armitage-Chan and Whiting, 2016). The veterinary industry is concurrently undergoing significant transformation due to corporate mergers, practice expansion, telemedicine, digitalization, pet care services growth, veterinary attrition, burnout, and feminization (Roca & McCarthy, 2019; Pyatt et al., 2020).

To assess student performance and education value in these changing contexts, stakeholders must reconsider the veterinary education system. However, there is little study on clients' perceptions of veterinary professionalism in Bangladesh. The research project was conducted to get information about perspectives and expectations of the veterinary profession from veterinarians, employers, clients, and employees. The study aimed to guide accreditors and policymakers, in helping students develop the capabilities most important to professional success.

## **Methodology**

The study was conducted in the Department of Surgery and Obstetrics, Bangladesh Agricultural University from September 2022 to June 2023.

### ***Participants***

The study involved 67 recent graduates, 52 veterinary practitioners from Bangladesh Agricultural University, 81 veterinarians who graduated from other veterinary

academic institutions, 106 farm clients, 32 pet and zoo animal clients, 18 veterinary employers, and 37 academics from various departments of the Faculty of Veterinary Science. Stakeholders were selected according to the role defined by Bell et al. (2018).

### *Development of Questionnaire*

Professional skills used in this survey were formulated from a combination of the Day-One competencies described by the BVC (Bangladesh Veterinary Council Act, 2019), the World Organization of Animal Health (WOAH) (OIE, 2013), and the Royal Veterinary College (BVA, 2015). Two group discussions (one with veterinarians, and another with course teachers) were arranged to validate the questionnaire. Level of Competency (the perceived significance of the competencies), Level of Importance at the Workplace (perceived significance of the competencies) Level of Improvement at Work, and Level of Satisfaction were included.

### *Data Collection*

Participation in the survey was voluntary. The respondents were asked for their graduation year and employment status. There was an assurance of confidentiality. The survey targeted veterinarians working in clinical practices government facilities, industry, universities, and research centres. The questionnaire could be accessed online and disseminated through email. If no responses came after two weeks, follow-up invitations were issued. A Bengali translation of the questionnaire was provided.

### *Statistical Analysis*

Data were summarised as a proportion (percentage) of responses. Chi<sup>2</sup>-testing was done and when the P value was less <0.05, the difference was regarded as significant. All the statistical analyses were done using the SPSS 22.0 version software programme.

## **Results and Discussion**

Table 1 (a, b, c) shows that the highest percentage of new graduates found that veterinary clinical knowledge and analytical skills, communication with colleagues, and adaptability were highly important. Most new graduates responded that they were reasonably competent in most of these attributes. Table 2 shows that veterinary practitioners, at graduation, were adequately competent in every area and considered every ability to be extremely significant, except cultural sensitivity. They said that most of their talents had significantly improved at the workplace.

Table 1a: New veterinary graduates' (N=67) perspectives on professional qualities (% respondents)

Veterinary capabilities	Level of importance		Level of competence	
	High	Reasonably	High	Reasonably
Veterinary clinical knowledge	68.7	25.4	49.3	44.8
Knowledge of vet public health/zoonotic issues	60.6		50.8	
Knowledge of veterinary legislation	65.7			47.8
Ethical awareness, Animal Health, and welfare advocacy	56.7			61.2
Farm management	62.7			50.0
Biosecurity and waste management				
Analytical skills	68.7			67.2
Critical thinking and problem-solving		55.2		62.1
Decision making	58.2			53.7
Report writing and record-keeping skills	63.6			53.7
Flexibility in adapting to new situations	59.1			50.8
IT/computer literacy	50.0			68.2

Table 1b: New veterinary graduate's (N = 67) perspectives on Professional Commitment (% respondents)

Professional commitment	Level of importance		Level of competent	
	High	Reasonable	High	Reasonable
Professional attitude	53.7			64.2
Communication with farmers, colleagues, and others	64.1			67.2
Interpersonal and teamwork skills	57.1			56.9
Collaboration skills	61.2			50.0
Organizing skills	61.2			50.0
Leadership skills	54.6			58.8
Listening skills	62.7			55.2
Time management skills	58.2	38.8	37.3	58.2
Empathy and bond recognition		58.5		53.9
Presentation skills	55.2		53.0	
Financial management and transparency	48.5			61.2
Information and evidence-based approach	47.8			62.7
Sensitive to Cultural diversity	52.2		57.6	
Thinking creatively and independently				
Negotiation skills		52.2	39.4	46.9
Official communication skills	48.5			60.6
Continuing education		57.8		69.2

Table 1c: New veterinary graduate's (N=67) perspectives on Psychological Resources (% respondents)

Psychological Resources	Level of importance		Level of competence	
	High	Reasonably	High	Reasonably
Ability to cope with pressure and to handle difficult situations	70.6			52.2
Adaptability	55.2			50.8
Capacity for self-audit		50.8		56.7
Confidence	61.5		46.15	
Decisiveness	47.8			53.7
IQ and self-awareness	52.2			55.2
Recognising own limitations & knowing when to seek advice		49.3	44.78	
Work-life balance		49.3		51.5

Table 2 (a): Veterinary Practitioners' responses on Skills under Veterinary Capabilities (% respondents)

Veterinary Capabilities	Competency at graduation	Level of Importance in the Workplace-		Level of improvement at work	
	Adequate	Highly important	Important	High level	Moderate
Veterinary clinical knowledge	55.3		49.5		51.5
Knowledge of public health/zoonotic issues	65.0		49.5		50.5
Knowledge of veterinary legislation	47.6		52.4		55.3
Ethical awareness, Animal Health, and welfare advocacy	52.4		53.4		51.5
Farm management	48.5	61.2		51.5	36.9
Biosecurity and waste management	48.5	54.4			44.7
Analytical skills	56.3	43.7		45.6	
Critical thinking and problem-solving	56.3		49.5		45.6
Decision making	51.5	53.4		54.4	
Report writing and record-keeping skills	45.6	50.5		51.5	
Flexibility in adapting to new situations	53.4	57.3		52.4	
IT/computer literacy	40.8	55.3		50.5	

Table 2(b): Veterinary practitioner's responses on Skills under professional commitment (% respondents)

Professional commitment	Competency level at graduation		Level of Importance in the Workplace-		Level of improvement at work	
	High	Adequate	High	Important	High	Moderate
Professional attitude		40.8	68.00		63.1	
Communication with farmers, colleagues, and others		49.5	63.1		62.1	
Interpersonal and teamwork skills		51.5	50.5			48.5
Collaboration skills		48.5	55.3		56.3	
Organizing skills		45.6	57.3		46.6	
Leadership skills		46.6	56.3		57.3	
Listening skills	50.5		62.1		53.4	
Time management skills		41.7	62.1		61.2	
Empathy, appreciation, and recognition skills	44.7		59.2		55.3	
Presentation skills		51.5	61.2		50.5	
Financial management and transparency		34.0	58.3		53.4	
Information and evidence-based approach		49.5	58.3			47.6
Sensitive to Cultural diversity		50.5		53.4		55.3
Thinking creatively and independently	40.8		52.4		47.6	
Negotiation skills	43.7		64.1		57.3	
Official communication skills		41.7	60.2		59.2	
Continuing education		40.8	52.4		47.6	

Figure 1 presents the satisfaction levels of veterinary practitioners from five veterinary faculties (BAU, Chattogram Veterinary and Animal Sciences University (CVASU), Sylhet Agricultural University (SAU), Patuakhali Science and Technology University (PSTU), Hajee Mohammad Danesh Science and Technology University (HSTU)). BAU veterinary graduates were moderately satisfied with their academic activities, particularly theoretical knowledge, and 85% were satisfied with their laboratory-based practical performance.

Table 2(c): Veterinary practitioner's responses on Skills under psychological characteristics (% respondents)

Professional commitment	Competency level at graduation		Level of Importance in the Workplace-	Level of improvement at work
	High	Adequate	Highly	High
Adaptability	43.7		64.1	61.2
Ability to handle difficult situations		44.7	64.1	53.4
Capacity for self-audit		38.8	53.4	53.4
Confidence	41.7		62.1	62.1
Decisiveness		51.5	47.6	45.6
IQ and self-awareness)		42.7	62.1	55.3
Morality	66.0		72.8	64.1
Recognizing own limitations & knowing when to seek advice	44.7		61.2	58.3
Work-life balance		48.5	52.4	48.5

CVASU veterinary practitioners were highly and significantly ( $p < 0.05$ ) satisfied with their clinical and internship (92.3%) activities during the undergraduate programmes. The differences between institutions found in this study may suggest that veterinary institutions in Bangladesh should establish a core curriculum to prepare future veterinary graduates to be omnicompetent.

Bangladesh Accreditation Council (BAC) oversees quality assurance in Bangladesh's higher education system and is the authority for implementing the Bangladesh National Qualifications Framework (BNFQ) (Bangladesh Accreditation Council Act, 2017) which promotes quality, uniformity, and openness in the education and training systems. It restructures existing qualifications and defines new ones based on student learning outcomes. The Bangladesh Veterinary Council Act, 2019 mandates registration for new veterinarians, and without their recognition none of the institutions can introduce veterinary degree programmes. It would therefore seem imperative that the BVC formulate its standards to align with those of the BNQF, which is crucial for the undergraduate veterinary curriculum in Bangladesh.

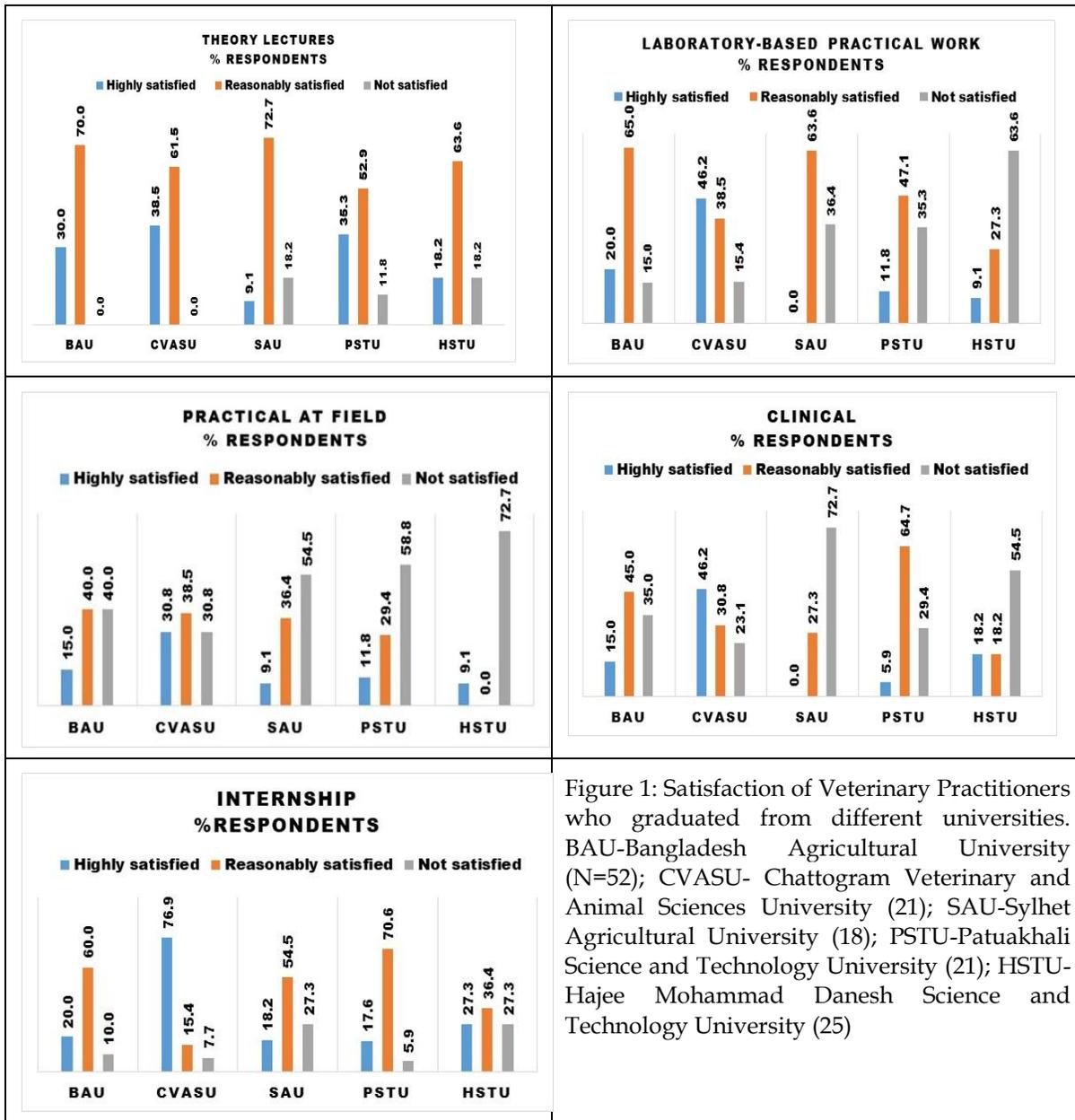


Figure 1: Satisfaction of Veterinary Practitioners who graduated from different universities. BAU-Bangladesh Agricultural University (N=52); CVASU- Chattogram Veterinary and Animal Sciences University (21); SAU-Sylhet Agricultural University (18); PSTU-Patuakhali Science and Technology University (21); HSTU-Hajee Mohammad Danesh Science and Technology University (25)

The study compares the perspectives of veterinary practitioners and academic course teachers on veterinary science academic activities (Table 3). The teachers found all skills highly important and were satisfied with their current curriculum, except for organizing and communication skills, official communication skills, and information and evidence-based approach (Tables 4a, b, c). Academics must improve teaching in these areas.

Table 3: Perspectives of veterinary practitioners (VP) and course teachers (CT) regarding academic activities (% respondents)

Academic activities	Highly satisfied		Moderately satisfied		Slightly satisfied		Not satisfied	
	VP	CT	VP	CT	VP	CT	VP	CT
Theory lecture	30	21.1	70	68.4	0	5.3	0	5.3
Laboratory-based practical work	20	5.3	65	52.6	15	36.8	0	5.3
Practical at field	15	5.3	40	31.6	40	36.8	5	26.3
Clinical	15	5.3	45	47.4	35	31.6	5	15.8
Internship	20	5.9	60	47.1	10	35.3	10	11.8

Table 4 (a): Perspectives of course teachers on Veterinary capabilities (% respondents)

Veterinary capabilities	Level of Importance in the Workplace	Level of satisfaction	
	Highly important	Moderate	Low
Veterinary clinical knowledge	73.7	63.2	31.6
Knowledge of public health/zoonotic issues	84.2	42.1	36.8
Knowledge of veterinary legislation	78.9	31.6	31.6
Ethical awareness, Animal Health, and welfare advocacy	84.2	57.9	15.8
Farm management	84.2	26.3	47.4
Biosecurity and waste management	84.2	21.1	42.1
Analytical skills	57.9	52.6	
Critical thinking and problem-solving	68.4	47.4	
Decision making	84.2	42.1	
Report writing and record-keeping skills	73.7	47.4	
Flexibility in adapting to new situations	63.2	36.8	
IT/computer literacy	78.9	47.4	

Table 4 (b): Perspectives of course teachers on professional commitment (% respondents)

Professional commitment	Level of Importance in the Workplace	Level of satisfaction	
	Highly important	Moderate	Low
Professional attitude	84.2	52.6	
Communication with farmers, colleagues, and others	84.2	68.4	
Interpersonal and teamwork skills	84.2	52.6	
Collaboration skills	89.5		36.8
Organizing skills	73.7		52.6
Leadership skills	78.9		42.1
Listening skills	78.9	52.6	
Time management skills	73.7	63.2	
Empathy, appreciation, and recognition skills	68.4	47.4	
Presentation skills	84.2	42.1	
Financial management and transparency	84.2	47.4	
Information and evidence-based approach	73.7		47.4
Sensitive to Cultural diversity	47.4	57.9	
Thinking creatively and independently	63.2	63.2	
Negotiation skills	68.4	42.1	
Official communication skills	68.4		42.1
Continuing education	73.7	52.6	

Table 4(c): Perspectives of course teachers on psychological characters (% respondents)

Psychological characters	Level of Importance in the Workplace	Level of satisfaction
	Highly important	Moderate
Adaptability	73.7	36.8
Ability to handle difficult situations	78.9	52.6
Capacity for self-audit	63.2	52.6
Confidence	84.2	68.4
Decisiveness	63.2	63.2
IQ and self-awareness	63.2	57.9
Morality	78.9	36.8
Recognizing own limitations & knowing when to seek advice	68.4	47.4
Work-life balance	73.7	42.1

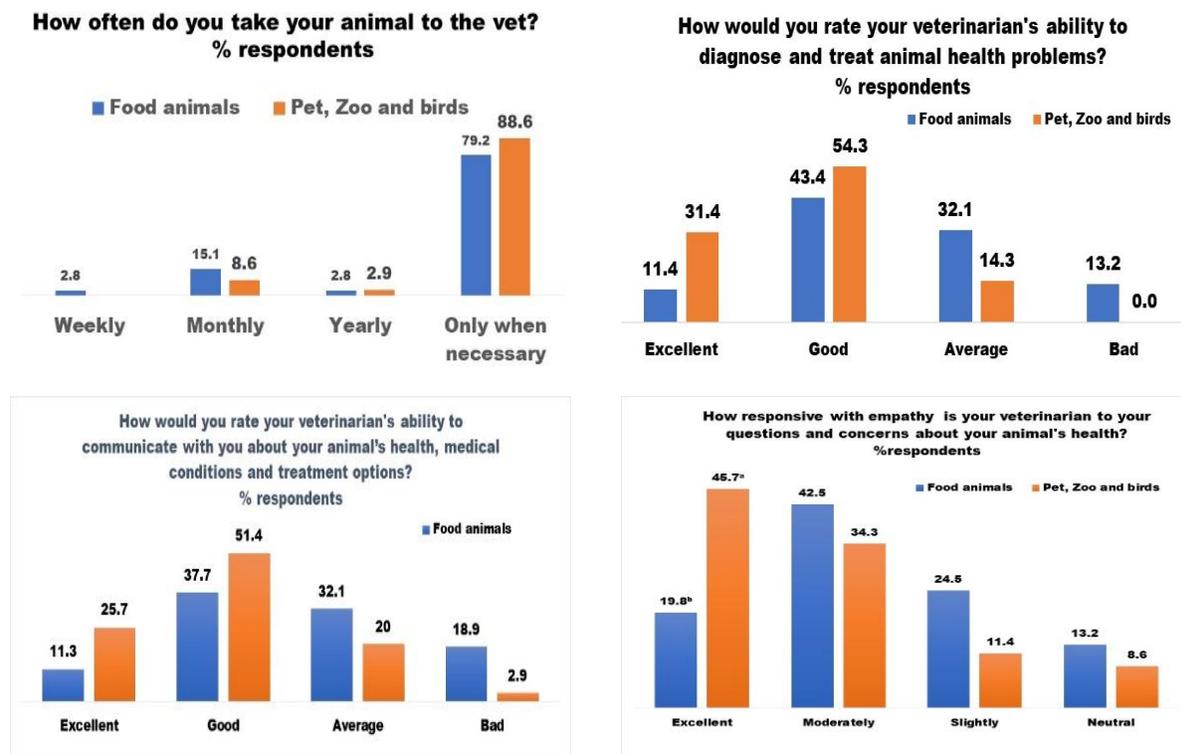
Table 5 shows that veterinary graduates from BAU were viewed by employers as non-judgmental, open-minded, flexible, adaptable, and trustworthy, but unskilled in compassionate animal handling, practical diagnosis, specialized knowledge, providing quality care, and addressing veterinary problems in Bangladesh and globally.

Table 5: % of Employer's (N = 18) perspectives on the professional skills of practitioners (% respondents)

Skills and Attribute	Proficient	Not Proficient
Communicate effectively with clients, professional colleagues, and authorities	33.3	33.3
Confidently discusses difficult issues, financial aspects of work, and persistent	22.2	44.4
Inspires confidence through practical skills	22.2	66.7
Evaluates evidence in support of clinical reasoning and problem-solving	43.8	31.3
Can make decisions despite incomplete information	27.8	50.0
Is self-organised in work and can manage priorities independently	25.0	50.0
manages priorities and uses time efficiently and productively	37.5	37.5
Is keen to learn, strives for improvement	66.7	11.1
Is committed to the veterinary mission	37.5	50.0
Comply with the code of ethics of veterinary practices	38.9	33.3
Is hard-working, persistent, reliable	37.5	43.8
Sustains and balances an energetic connection with their work	56.3	37.5
Refreshes their interest, passion, and enthusiasm for work with other needs	33.3	60.0
Be able to use IT efficiently	41.2	35.3
Fits into and supports an effective veterinary team	23.5	64.7
Works with others collaboratively toward shared goals	64.7	23.5
Is friendly and personable	53.3	20.0
Builds trust through honesty, transparency, integrity	64.7	17.6
Is attentive to others' feelings and perspectives	61.5	30.8
Is non-judgemental and open-minded	75.0	0.0
Respect the human-animal bond	44.4	50.0
Finds motivation and purpose in their work	38.9	61.1
Deals with pressure and adversity	56.3	25.0
Draws on personal and contextual resources	30.8	53.8
Utilises strategies to navigate challenges	38.9	55.6
Is flexible in dealing with change, uncertainty, and shifting priorities	66.7	27.8
Is self-aware of emotional responses and behaviours and is self-sustaining	55.6	27.8
Remains calm, is aware of their strength	35.3	47.1
Has positive self-esteem and self-belief	33.3	44.4

Animal owners' perspectives on the professional skills of graduates from BAU are presented in Figure 2. Most of the pet owners found BAU graduates extremely responsive with empathy, and they were very likely to recommend their veterinarian to others. Both pet and food animal owners rated their ability to diagnose and treat as good. Most of the owners recognized continued education and training as extremely important.

The study surveyed 138 food and pet animal owners, revealing that 62.3% of them gave suggestions to improve veterinary professionalism. Table 6 shows the professionalism attributes identified by animal owners. 42.0% of owners gave importance to veterinary clinical knowledge, which was followed by communication with clients and the public, critical thinking and problem-solving, and professional behaviour. Animal owners expect professionalism, competence, and humanity from their veterinarians (Hughes et al., 2018). Clients believe clinical practice is influenced by emotional intelligence and professional qualities. Veterinary professionalism encompasses attitudes, values, and behaviors. As an important non-technical skill relating to contact with clients and co-workers (Rhind et al., 2011), communication skills are well-integrated into veterinary courses in Europe and America.



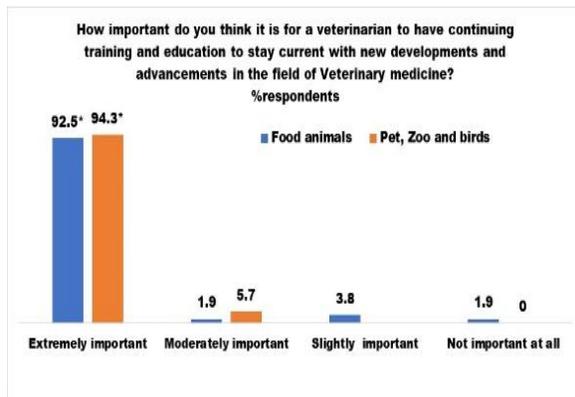
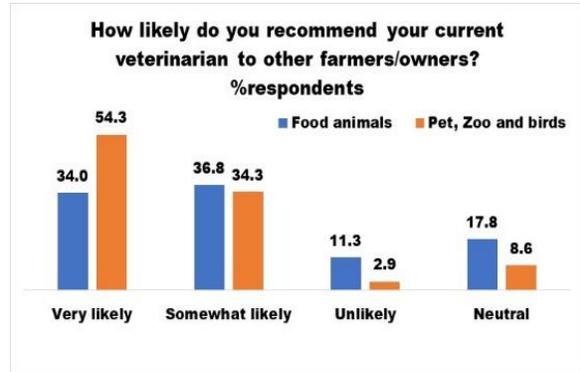
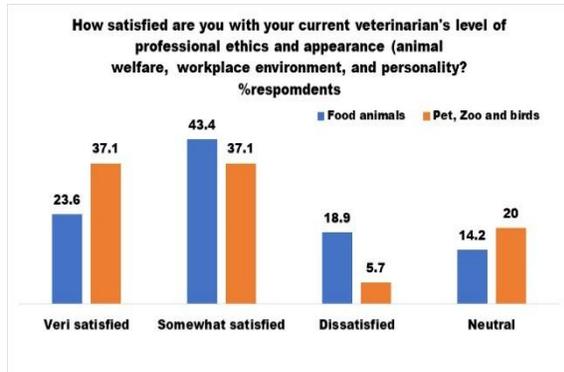


Figure 2: Animal owner's responses. \*Significant (p<0.05) difference among responses of pet and food animal owners.

Table 6: Top ten attributes considered more important to (food and pet animal owners) summarized from their comments

Food and pet animal owners	% Owners who gave comments (n)	Attributes	% Respondents (n)
N = 138	62.3% (n = 86)	Veterinary clinical knowledge	42.0 (56)
		Communication with clients and the public	36.0 (31)
		Critical thinking and problem-solving	34.0 (29)
		Professional behavior	34.0 (29)
		Analytical skills	24.0 (21)
		Decision making	24.0 (21)
		Practical skills	21.0 (18)
		Time management skills	21.0 (18)
		Commitment to CPD	21.0 (18)
		Thinking creatively and independently	19.0 (16)

## Implications

This study should help veterinary schools identify strengths and weaknesses in the curriculum, and make recommendations.

## Conclusions

This study highlights the importance of understanding and addressing the diverse competencies in the veterinary field. It suggests that more research on teachers, students, and clients could help guide the future of veterinary education. It emphasizes the need for professional skills instruction and assessment in veterinary education, as it can help reduce lawsuit risk, meet client needs, and improve working conditions.

## Recommendations

The Bangladesh Veterinary Council should develop its standards for the smart undergraduate veterinary curriculum based on the Bangladesh National Qualifications Framework and Bangladesh Accreditation Council standards and criteria that incorporate current teaching techniques, technology innovations, and quality assurance.

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# Quality Assurance Assessment and Higher Education Framework: A Mixed Methods Study on National University Affiliated Colleges in Bangladesh

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## Abstract

Quality assurance (QA) is a comprehensive approach that embraces all higher education institutions (HEIs) processes to provide services to stakeholders that meet or exceed expected quality standards. There is a shortage of research addressing quality assurance at National University (NU)-Affiliated Colleges in Bangladesh. This study aims to gain critical insight into the NU-affiliated colleges to evaluate quality assurance mechanisms and practices of quality service in the HEIs. The service quality model of Higher Education is extended by new latent factors mediated through stakeholder satisfaction ensuring QA. The study was undertaken using qualitative and quantitative methods through three on-site studies. The overall findings of the qualitative analysis revealed a shallow level of service quality of NU-affiliated colleges. Participants strongly believed that staff development was a critical prerequisite for raising employees' quality for quality services. The relationships between environmental and physical facilities and teacher's competence versus stakeholder satisfaction were not statistically significant. Conversely, a negative relationship was identified between administrative quality and stakeholder satisfaction. However, teacher awareness, self-efficacy, and stakeholder satisfaction influence HEIs quality assurance. It is suggested that comprehensive approaches with improved physical facilities and service delivery, together with enhanced competency of academic staff, should be addressed.

**Keywords:** Higher Education Institution; Quality Assurance; National University; Stakeholder; Satisfaction; Service Quality;

## Introduction

As one of the world's most densely populated countries, Bangladesh is home to nearly 170 million people (World Meter, 2023). In the past few years, the country has experienced strong and steady gross domestic product growth rates above 6% (7.0% in 2021) (Macrotrends, 2023), most of which have been generated by the service sector and manufacturing industries. The government of Bangladesh increasingly

views the growing impact of Higher Education Institutions (HEIs) in knowledge creation through research and innovation and recognizes the necessity of strengthening its HEI sectors to facilitate the transformation of a knowledgeable and up-skilled workforce that will move the country forward. At present, the academic standards and quality of HEIs in Bangladesh largely remain unsatisfactory in terms of their ability either to compete in the global higher education community or to meet the needs of the labour market in their homeland. Recognising these issues, the government of Bangladesh has undertaken several initiatives to ensure quality assurance of education at HEIs to be well-fitted to fulfil social responsibility (Ahmed et al., 2021).

Quality assurance (QA) is a comprehensive approach that embraces all of the processes of a HEI to provide services to students/stakeholders that at least meet minimum quality standards (Rahnuma, 2020). QA in HEIs is important, not only in the direct sense of ensuring educational standards but also since it promotes social mobility and a high standard of living for society's general well-being. The success or failure of a QA system depends on internal factors (i.e. those quality assurance policies and practices that are developed within individual HEIs) and external factors (i.e. those quality assurance policies and practices that are applied outside HEIs); so, while all HEIs operate under national policy structures that have been designed by the government to ensure that they adhere to educational standards (Abad-Segura & González-Zamar, 2021), HEIs are also expected to have effective internal mechanisms to ensure that these overarching policies and the unique characteristics of the individual institution are implemented (Steinhardt et al., 2017). The HEIs themselves are aware of these challenges and have theorized about the changes that are needed to unlock potential at all levels of society. Further, they have identified the need to understand the specific internal and external factors that determine higher education outcomes in Bangladesh. Some prior research has been focused on the significance of QA factors in improving higher education quality (Prakash, 2018), but the impact of these factors on the adoption of QA systems in individual higher education institutions remains unexplored.

Reflecting these contexts, the National University (NU) of Bangladesh is having to address significant challenges in ensuring quality education. Preparing to develop a strategic plan for tertiary education for the next 15 years is a demanding initiative and, to adequately address it, the NU has had to grasp the importance of QA, and manage the implementation of QA systems across its educational programs. The present study, therefore, aimed to determine the most significant factors affecting QA at the NU and its affiliated colleges and to measure service quality in HEIs from the stakeholders' perspective. It also aims to explain how service quality indicators affect stakeholder satisfaction.

This study seeks to identify concrete steps to manage the long-standing problems encountered by colleges and proposes an integrated framework of Higher Education Service Quality (HESQUAL) based on the findings of the study (Fig: 1). A

HESQUAL (Teeroovengadum et al., 2016) context was used to examine the aspects of administrative quality, educational quality, physical environment quality, teacher's awareness, competence, and self-efficacy that were most effective in determining QA dimensions. It employed a mixed methods approach to combine qualitative and quantitative components (Johnson & Onwuegbuzie, 2004). The research model follows the Bangladesh National Qualification Framework (BNQF) to assess all aspects of the QA process. Consequently, the present study aims to identify a new dimensional framework of quality assurance revolving around the following questions:

**RQ1:** To what extent do the functional services (e.g., governance system and teaching quality) correspond to stakeholders' expectations of quality education?

**RQ2:** How does stakeholders' satisfaction affect quality assurance measures in higher education institutions (HEIs)? Conceptual Framework

Considering students, teachers, and administrators as stakeholders in the context of the National University of Bangladesh, the study aimed to categorise service quality (SQ) attributes from the stakeholders' interview findings and prepare a comprehensive instrument for determining SQ. Based on the higher educational service quality (HESQUAL) framework, it covers the operational as well as technical aspects of SQ by following a holistic approach, which has been examined in a developed country context (Teeroovengadum et al., 2019; Al-Tkhayneh et al., 2023;). The proposed instrument was subjected to different SQ functional quality themes: administrative quality, educational quality, physical environment quality, teachers' awareness, competence and self-efficacy, and stakeholder satisfaction.

#### *Governance System: Administrative Quality*

Administrative quality concepts originated in industrial practice to improve learning quality to achieve stakeholder satisfaction and continuously improve competitiveness (Tasopoulou & Tsiotras, 2017). Quality in HEIs is contextual and is operationalized through multidimensional, multi-level, and dynamic techniques (Vlasceanu et al., 2004). Prior studies have pointed out a dearth of infrastructural facilities and a lack of skilled administrative staff, producing quality research outputs, besides issues of profit orientation among many Bangladeshi private HEIs (Rahnuma, 2020). A recent study (Parvin, 2019) specifically examined the challenges in QA in HEIs through the lens of managerial leadership and dissatisfaction, considering the case of a public university. According to the discussion, the following hypotheses have been proposed:

**Hypothesis 1:** Administrative quality positively affects stakeholder satisfaction.

#### *Governance System: Educational Quality*

Educational quality, as well as teaching processes, also affects stakeholders' perceptions (João Rosa et al., 2006). Consequently, defining, measuring, and

assuring quality are significant concerns among HEIs. Academic resources, including teaching staff, pedagogy, curriculum, and library resources, can affect these (Alam et al., 2014). At the subject level, assessments focus on curriculum development and content, learning resources, teaching-learning and evaluation, student progression, student support, and quality standards (Laughton, 2003). As part of universities' governance and quality management, the QA of teaching and learning has become a significant subject worldwide in higher education and higher education politics. Hence, the following hypothesis was formulated:

**Hypothesis 2:** Educational quality positively affects stakeholder satisfaction.

***Governance System: Physical Environment Quality***

The physical environment quality refers to the overall environment and logistic parameters that support staff members carrying out their specific responsibilities to advance QA. According to Shank et al. (1995), the three elements of excellence in higher education are a professor's knowledge, respect for students, and a university's physical environment. Hill (1995) has acknowledged that course content, teaching, teaching methods, teaching quality, personal contact with academic staff, student involvement, feedback, joint consultation, library service, work experience (placements), accommodation service, financial service, students' union, computing facilities university bookshop, catering service, health service, career counselling/general welfare, physical education, and travel agency are important apparatuses of service quality in higher education. Stone (2005) stated that, in a highly competitive environment, students have become more discriminating in their selection and more demanding of the colleges and universities they choose. The nature and the quality of the relationships developed during the service encounter are also influenced by the physical environment (Bitner, 1990). Therefore, institutes need to understand their expectations:

**Hypothesis 3:** Physical environment quality positively affects stakeholder satisfaction

***Teachers' Quality: Awareness***

Situational awareness refers to teachers' knowledge of what is happening in real-time in the classroom, implying knowledge gained through immediate, sensory perception as well as the stored episodic knowledge acquired through experience working in classrooms (Weller, 2007). Teachers' situational awareness unifies perceptions and interpretations of events, supporting their ability to research how events will unfold and decide whether to take action in teaching situations (Toquero, 2021). This compiles the overall satisfaction of teachers and students and enhances their quality performance. Accordingly, the hypothesis proposed:

**Hypothesis 4:** Teachers' awareness quality positively affects stakeholder satisfaction.

***Teachers' Quality: Competence***

Teachers' competence has been a vital issue for QA in HEIs. Teachers play an important role in equipping students with the knowledge and skills that are essential for their future. Determining the conditions of effective and efficient teaching activities should be associated with competence. The widespread call for testing teacher competence in basic skills is always based on the assumption that they will not be able to teach unless the teachers are competent in these skills. A number of the studies stated that teachers' competency has a strong relationship with satisfaction toward QA (Griffin, 2008). Thus, the following hypothesis has been proposed:

**Hypothesis 5:** Teachers' competence positively affects stakeholder's satisfaction.

***Teachers' Quality: Self-efficacy***

Teachers' self-efficacy has gradually gained prominence in school psychology research due to its implications for teaching effectiveness, instructional practices, and students' academic achievement (Klassen & Tze, 2014). It refers to a teacher's belief in their ability to successfully cope with tasks, obligations, and challenges related to their professional roles (e.g., didactical tasks, managing discipline problems in the class) (Caprara et al., 2006). Self-efficacy as a teacher is now one of the most extensively researched characteristics influencing teachers' commitment, student accomplishment, satisfaction, and willingness to adopt and implement reform activities. According to the discussion, this study proposed the following hypothesis:

**Hypothesis 6:** Teachers' self-efficacy positively affects stakeholder's satisfaction.

***Stakeholder Satisfaction and Quality Assurance in HEIs***

The term "QA" in higher education refers to the practices that maintain and improve the academic standards achieved by graduates (Caprara et al., 2006). Consequently, the new practices of external quality assurance also seek to respond to public concerns that HEIs provide educational value for money toward stakeholders' satisfaction. Consequently, the new practices of external quality assurance also seek to respond to public concerns that institutions provide educational value for money toward stakeholder satisfaction. Thus, the following research question and hypothesis have been proposed:

**Hypothesis 7:** Stakeholder satisfaction positively affects quality assurance in HEIs. Proposed research model is given below (Figure 1).

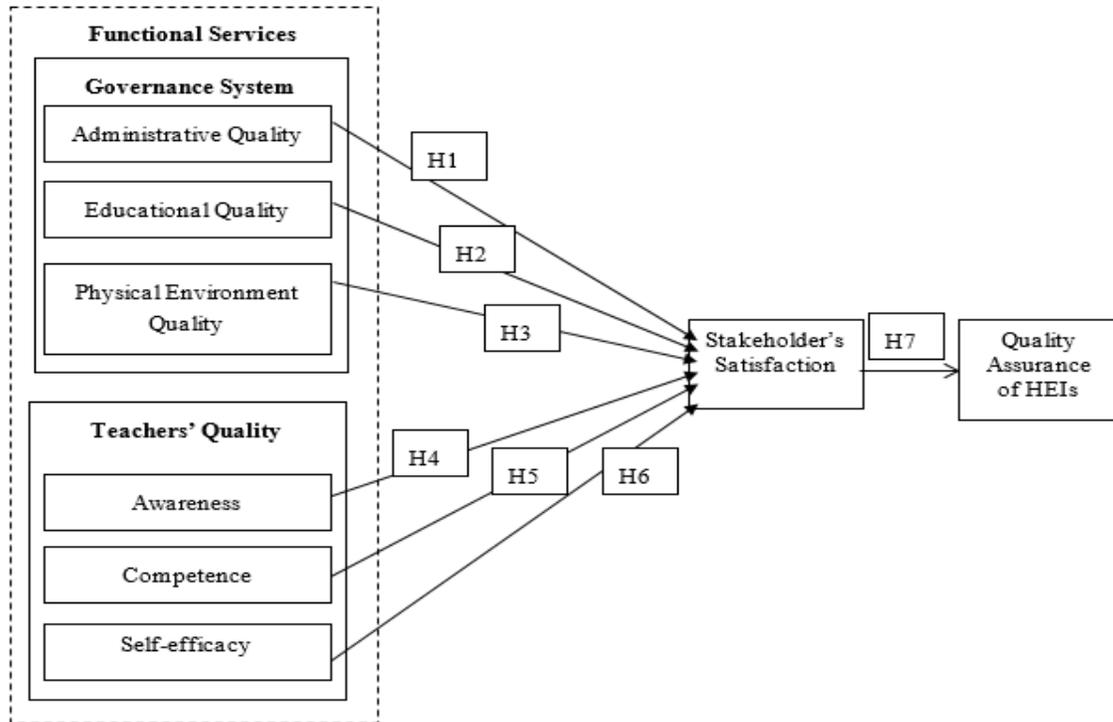


Figure 1: Proposed Research Model

## Methodology

### *Sample Site and Research Design*

The National University (NU) Bangladesh has 2378 affiliated colleges (National University, 2023) spread across all rural and urban regions of the country. The affiliated colleges offer a wide range of undergraduate and graduate programs in subjects that span the humanities, sciences, business, and social sciences. Colleges in Dhaka (Government Music College, Tejgaon College, Tejgaon Mohila College, Mohammadpur Kendriya College, Mirpur College), Chattogram (Government City College, Chittagong College, Government Hazi Muhammad Mohsin College, Islamiya Degree College, Omar Gani MES College), Sylhet (Moinuddin Adarsha Mohila College, Madan Mohan College, Murari Chand College), and Khulna (Azam Khan Government Commerce College, Khulna Government Girls' College, Islamia Degree College) were selected to participate in the study.

### *Research Design: Mixed-Methods*

This study employed a mixed method to combine qualitative and quantitative components while improving and contributing new findings (Johnson & Onwuegbuzie, 2004). According to the qualitative findings, an integrated HESQUAL model has examined the most effective aspects in determining quality assurance dimensions (e.g., administrative quality, educational quality, physical environment quality, teacher awareness, competence, and self-efficacy). There is a scarcity of

literature on the HESQUAL model to measure the quality education (Teeroovengadum et al., 2016). However, this study uses extensive interviews with various stakeholders' opinions to evaluate the relationship between variables, justifying the findings using statistical approaches.

### ***Data Collection***

The study was conducted in three parts: i) face-to-face interviews with staff ( $n = 31$ ), ii) a survey questionnaire with teachers ( $n = 177$ ), and iii) a survey questionnaire with students ( $n = 298$ : bachelor and masters). The number of participants was determined using the recommendations of Hair et al. (2014) of a 10:1 ratio sample. Hence, the quantitative survey consisted of 41 scale items for eight constructs, indicating a minimum requirement of a sample size of 410. Studies two and three employed a combination of multistage clusters and simple random sampling techniques for data collection.

### ***Research Tools (Questionnaire)***

In the qualitative study (Study 1), face-to-face interviews were conducted among government and non-government college administrators, policymakers, and teachers. This study aimed to find recent quality assurance practices of National University-affiliated colleges. Interviews were undertaken on a one-to-one basis between the participant and the author. Each interview lasted for 25-30 mins. The QA-related attributes were inspected by asking the respondents to explain why the issue was important to them. In the quantitative part (Studies 2 and 3), participants completed a 41-measuring item, Likert-scale-based questionnaire. The target population for Study 2 was a subset of Study 3 to assess the appropriateness of the questionnaire. For Study 3, the target population was the stakeholders of HEIs (bachelor's, master's students, and teachers) of the selected institutions.

### ***Data Analysis***

Qualitative data were categorized through thematic coding and categorical attributes. Quantitative data were analysed using descriptive statistical analysis, validity and reliability test, confirmatory factor analysis (CFA), and structural equation modelling (SEM) (Hair et al., 2014). These statistical analyses were combined (students' and teachers' responses) using SPSS version 22 and AMOS version 24. SPSS has been used for cleaning, coding, factor analysis, and assumption-checking, while AMOS was used to assess the measurement model's goodness of fit indices, reliability, and validity. Finally, the suggested hypothetical relationship was evaluated using Structural Equation Modelling (SEM) analysis.

## **Results and Discussion**

### **Study 1: Qualitative findings**

The participants spelled out various important attributes, consequences, and perceived QA-related cues derived from different aspects of QA. Several distinct

aspects of QA status and features were exposed. Notably, most interviewees held that staff members should be extrinsically motivated by a training and accreditation system that is linked to their personal development and job satisfaction. They should be intrinsically motivated by a desire to teach and improve teaching through continuous research as a source of satisfaction. However, the interviewees considered the lack of proactive management and discussion among administrative, academic, and senior management may be primarily responsible for the absence of a continuous monitoring QA process. Therefore, the participants reemphasized the importance of establishing the appropriate awareness, attitude, and policy for communication between senior, mid-level, and entry-level personnel to share quality assurance best practices measures.

### Studies 2 and 3: Quantitative findings

#### *Demographic Data*

Data for gender, age, institution, faculty, and educational level of staff and students are summarised in Table 1.

Table 1: Demographic characteristics of staff and student participants in the QA survey questionnaire

Characteristics	Category	Staff (n=177)		Students (n=298)	
		Frequency	%	Frequency	%
Gender	Male	105	59.3	163	54.7
	Female	72	40.7	135	45.3
Age (years)	18-20			19	6.4
	21-23			191	64.1
	24-26			88	29.5
	27-29				
	30-35	27	15.3		
	36-40	105	59.3		
	41-45	23	13		
	45-50	17	9.6		
	50+ years	5	2.8		
Type of Institute	Government	90	50.8	165	55.4
	Non-Government	87	49.2	133	44.6
Type of Faculty	Science	43	24.3	71	23.8
	Humanities	57	32.2	84	28.2
	Social Science	35	19.8	67	22.5
	Business Studies	42	23.7	76	25.5
Education	Bachelor degree			176	59.1
	Master's degree	170	96	122	40.9
	Doctoral Degree	7	4		

### Structural Model Estimation

Before the SEM execution, the Measurement Model (MM) was applied, according to the method of Gerbing & Anderson (1988), to assess the measured variables that signify the concepts in the research model. Estimates are shown in Figure 2.

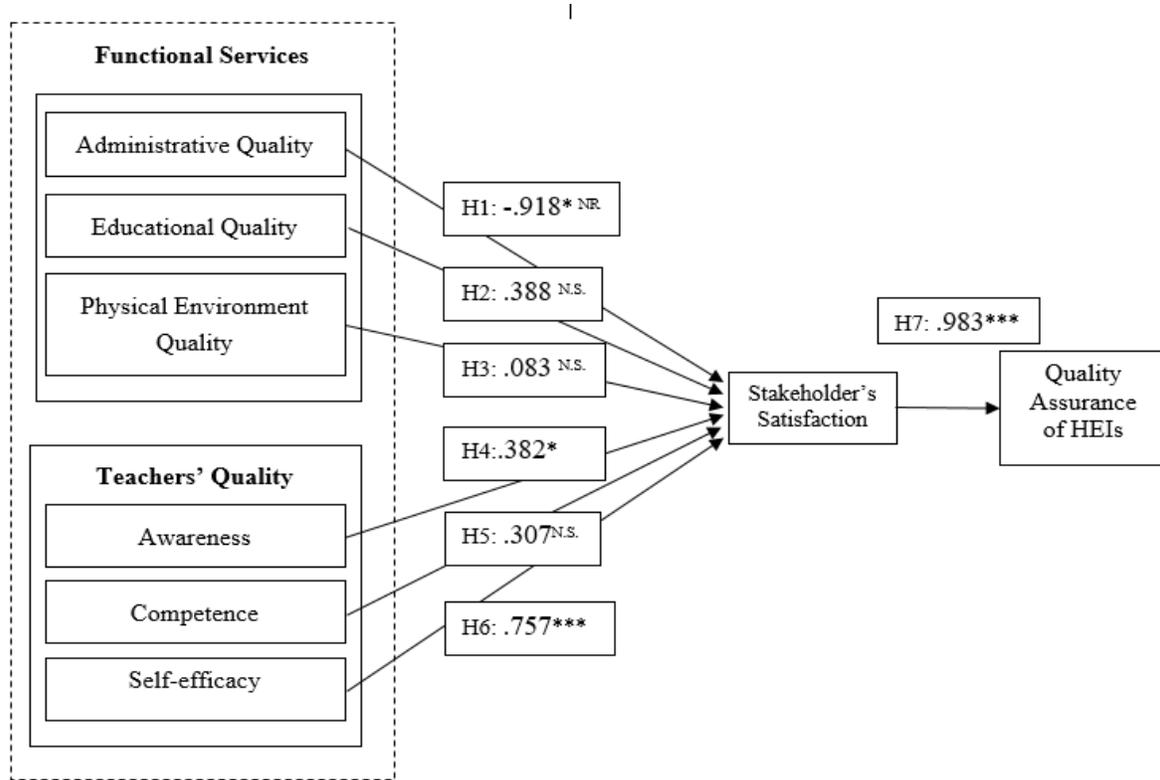


Figure 2: Structural Model Estimation

Note: \*\*\* $p < 0.001$ , \* $p < 0.05$ , NS = Not Significant, NR = Negative Relation

### Hypotheses Testing

The hypothetical result indicates a significant difference in all considerations toward stakeholder satisfaction and quality assurance in higher education. Teacher awareness, self-efficacy, and stakeholder (students and teachers) satisfaction positively influence quality assurance. On the other hand, educational quality, physical environmental quality, and teachers' competence have a lower impact on the current situation. However, administrative quality negatively correlated with stakeholder satisfaction. The model's hypothesized relationships are shown in Table 2.

Table 2: Summary of the hypotheses' testing results (Study 3)

Hypothesis	Path	$\beta$	t Value	Decision
H1	AQ $\rightarrow$ SS	-0.918	-1.967	Negatively Correlated
H2	EQ $\rightarrow$ SS	0.388	0.949	Not Supported
H3	PEQ $\rightarrow$ SS	0.083	0.114	Not Supported
H4	TA $\rightarrow$ SS	0.382	2.094*	Supported
H5	TC $\rightarrow$ SS	0.307	0.765	Not Supported
H6	TSE $\rightarrow$ SS	0.757	4.364***	Supported
H7	SS $\rightarrow$ QA	0.983	13.069***	Supported

$\beta$  = Standardized Regression or Path Coefficient; t=C.R.=Critical Ratios, \*\*\* p < 0.001, \* p < 0.05.  
 AQ: Administrative quality, EQ: Educational quality, PEQ: Physical environment quality, TA: Teachers' awareness, TC: Teachers' competence, TSE: teachers' self-efficacy, SS: Stakeholder satisfaction

## Implications

### *Theoretical Implications*

The study has substantial theoretical implications for future studies on the quality of higher education services. This study verifies the HESQUAL scale, a comprehensive measurement tool used to assess service quality in higher education. Furthermore, as far as the author is aware, no studies in higher education have yet created an integrated HESQUAL model of functional service quality construct mediated by stakeholder satisfaction to quantify quality assurance. The study reveals that functional service quality influences stakeholder satisfaction to improve QA. Another interesting conclusion of the study was that functional service quality predicts QA through stakeholder satisfaction as an effective mediator. Notably, the results show that concentrating on the underlying transformative service quality component is dominated by stakeholder satisfaction with a quality education from a theoretical approach. The educational sector might investigate the proposed HESQUEL framework to improve the institution's quality.

### *Implications for Management*

The study identified several crucial domains for enhancing the administrative quality and overall Service Quality (SQ) of colleges associated with NU. First, there is a significant lack of administrative leadership and management, with academics primarily focused on classroom instruction, resulting in a culture of ignorance towards responsibility. Comprehensive administrative reform and collaboration with the Ministry of Education and the Bangladesh Accreditation Council are recommended. Second, improving service quality through better internal processes, including technical features, curriculum development, and establishing an institutional quality assurance unit, is crucial for enhancing stakeholder satisfaction

and ensuring graduates' personal and academic development. Third, participants recommended hiring teachers with solid industry expertise is advantageous because they have an up-to-date comprehension of the industry and can incorporate their industrial experience into their students' education. Fourth, interactions between staff and students' impact SQ, emphasizing the need for well-organized administrative procedures and skilled support personnel. Fifth, HEIs need to ensure students are equipped to meet employer demands by hiring instructors with industry experience for future employability. Sixth, enhancing the transparency of evaluation processes through independent accreditation and streamlined administrative procedures is vital for accountability. Seventh, improving service quality should be a top priority for National University Bangladesh. The university should invest in staff training programs focused on customer service, effective communication, and problem-solving skills. Eighth, NU needs to ensure the inadequate infrastructure, outdated classrooms, and limited resources of the affiliated colleges. Allocating sufficient funds to renovate existing facilities, create modern learning spaces, and upgrade laboratories and libraries would significantly enhance the overall educational experience and attract talented students and faculty. Ninth, promoting a research-oriented culture through funding and collaboration opportunities would encourage innovation. Finally, prepare a yearly plan for extracurricular activities which are crucial for students' personal development, helping them build leadership skills and confidence, which are important for their future employability.

### *Limitations and Direction for Future Research*

Regardless of the scientific approach used in this investigation, the findings should be taken in light of the study's limitations. This study relied on data collected entirely from students and stakeholders from the affiliated colleges of the National University Bangladesh. This study does not include other stakeholders (e.g., office staff, technicians, and support staff). Furthermore, this study relied on data acquired at a single time. Stakeholders' impressions of their institutions may shift as they advance through their studies and experiences. The current study uses an interview and survey method. Researchers may use focus group discussions and longitudinal studies for more detailed outcomes in future studies. On the other hand, the findings from a large number of colleges affiliated with a large tertiary education provider are likely to be widely generalisable across the HE sectors in Bangladesh.

### **Conclusions**

Quality assurance has long been considered essential to effective education in HEIs. The overall findings of this study revealed a shallow level of quality assurance among NU-affiliated colleges. Although a robust QA environment is not actively practiced, all stakeholders in the educational process are concerned about the requirement for QA. This study has provided insight into NU-affiliated colleges' QA situations, expectations, and challenges. The findings of the study emphasise the crucial need for significant reforms in administrative and academic management at

National University-affiliated colleges. These institutions can significantly improve their educational standards by concentrating on infrastructure, curriculum development, and staff training, to increase leadership, accountability, and service quality. Furthermore, developing a research-oriented culture and encouraging extracurricular activities will help students enhance their skills and competence, ensuring they are well-prepared to meet the requirements of the modern job market. These changes are critical for connecting higher education institutions with national goals and keeping them relevant in a competitive global environment.

### **Recommendations for BAC**

According to the Qualitative and Quantitative findings, the BAC should consider the following recommendations:

1. Supervise the function of the Institutional Quality Assurance Cell (IQAC) at the NU;
2. Motivate and supervise the establishment of IQACs at NU-affiliated colleges;
3. Organize a tailored training program for teachers, officials, and staff of the NU and affiliated colleges;
4. Organize motivational workshops on QA standards and criteria for the NU and affiliated colleges;
5. Implement awareness campaigns to disseminate the significance of accreditation to the NU and affiliated colleges;
6. Provide a time frame to implement the QA and accreditation for the NU-affiliated colleges;
7. Provide a time frame for the teachers to implement an Outcome-Based Curriculum, teaching-learning, and assessment processes;
8. Provide a timeline to the NU to develop its infrastructure (e.g., e-library/journal/research facilities/laboratory/academic and administrative building/garden) with the collaboration of the Ministry of Education (MoE), Directorate of Secondary and Higher Education (DSHE), and affiliated colleges.
9. Influence the NU to establish an annual research grant to develop a collaborative research environment with affiliated colleges;
10. Create expert officials (e.g., through mentorship initiatives) or teams to implement the QA and accreditation for the NU and affiliated colleges.

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# Quality Assurance for Higher Education in the Context of the Fourth Industrial Revolution: An Assessment Based on University Students' Preparedness in Bangladesh

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## Abstract

The Fourth Industrial Revolution (4IR) has impacted the quality assurance (QA) system in higher education. An investigation was undertaken to determine the preparedness of graduates for the 4IR and to identify the areas where curriculum revisions are needed to address competency gaps. A survey of 404 students and 67 Academic staff members revealed that students are marginally prepared with relevant technical and soft skills. Nearly 60% of students were not happy with the existing courses and quality assurance practices effectively to prepare them for the upcoming job markets. Changes in curriculum following the Bangladesh National Qualifications Framework (BNQF), teaching-learning processes, and assessment strategies can help to produce 4IR-ready graduates. A comprehensive QA re-evaluation and feedback loops from stakeholders are recommended to address the 4IR skills gap.

**Keywords:** Higher Education; Quality Assurance; Fourth Industrial Revolution; Students' Preparedness; Bangladesh

## Introduction

Achieving academic excellence through QA in higher education institutes (HEIs) in Bangladesh is pivotal for achieving the Sustainable Development Goal-4 (SDG-4) identified by UNESCO (UNESCO, 2015). Accreditation agencies evaluate the efficacy and quality of higher education by evaluating the conformance of certain standards and criteria through the process of accreditation. Quality in higher education is challenging to define, with two schools of thought; namely, conforming to requirements *versus* fitness for use. Accreditation agencies evaluate the efficacy and quality of higher education by evaluating the conformance to standards and criteria set by the Bangladesh Accreditation Council (BAC) through the process of quality assurance (QA). The Fourth Industrial Revolution (4IR) has made QA in higher education competitive and rigorous. Digital technologies have led to unprecedented changes in daily life, production, and consumption patterns, changing the knowledge and skills required of workforces. Education must adapt to this fast-changing environment, improving efficiency in each sector, especially

education and training to prepare graduates for the future labour market. Quality assurance systems, incorporating outcomes-based curricula, teaching-learning strategies, and assessment methodologies therefore need to evolve to unlock individual students' potential.

The short shelf-life of skills in the current environment necessitates continuous development and exposure to new technologies and industries. In the globalization era, quality competition is high, and HEIs must produce quality graduates to compete with others for jobs. The development of 4IR technologies necessitates changes in teaching content, methodology, Academic staff roles, and standard testing (Nwoso et al., 2023). HEIs must identify skills required for the 4IR context to craft academic plans, curricula and programs, and QA structures. The evolution of the QA systems is crucial to ensure relevance and realism in the 4IR environment. Therefore, the objective of the study was to investigate the preparedness of the graduates to face challenges for the 4IR and identify the QA areas where revisions are required to elucidate the competency gaps.

The current 4IR revolution is defined by a shift from hierarchical automation to self-organizing cyber-physical production and is characterized by the advancement of information and communication technologies (ICT), automation, robotics, internet of things (IoT), and artificial intelligence (AI). This revolution is transforming the economy, business models, government, and society. HEIs should prepare students and curricula for the future workplace by developing hard and soft skills. Life-long learning should continue to evolve to ensure graduates can face the challenges in the workplace. HEIs should prepare students for the future workplace by developing both hard and soft skills. Life-long learning should continue to evolve to ensure that graduates can effectively face workplace challenges.

The 4IR revolution is transforming the global economy and creating new challenges and opportunities for workers. The revolution of 4IR has created new job markets where various skills are required. Workers who are adaptable and have a broad range of skills are in high demand in the coming years. The skills required for work in the 4iR environments can be classified into two major groups: Hard Skills involve intellectual abilities related to subjects, while Soft Skills are non-technical abilities that enhance human performance. The World Economic Forum (WEF, 2018) released a list of the top 10 absolute skills that workers need to deal with changes in the 4IR are shown in Table 1. The competencies required for graduates to thrive in a 4IR environment are built on both knowledge and skills, extending beyond core subject expertise. These competencies are outlined in Table 2.

The 4IR is expected to shift skill-set requirements, and that creates competency gaps where 65% of students are expected to join in jobs that do not currently exist, and 47% are predicted to be automated in the coming decade. HEIs play a crucial role in preparing students for the challenges and opportunities of the 4IR by providing education that meets and exceeds certain standards.

Table 1: Soft Skills Requirements for 4IR

1. Complex Problem Solving	6. Emotional Intelligence
2. Critical Thinking	7. Judgment and Decision Making
3. Creativity	8. Service Orientation
4. People Management	9. Negotiation
5. Coordinating with Others	10. Cognitive Flexibility

*Source:* World Economic Forum Report, 2018

Table 2: Fourth Industrial Revolution Requirements for Labour Market

Knowledge / Skills	Research
Knowledge of ICT	Schwab (2016), Tran & Do (2016), Tran & Do (2019), Beyza (2018), Ahmad et al. (2019), Ali (2021), Ramli et al. (2022), Maisiri et al. (2019)
Ability to work with Cyber-Physical Systems	Schwab (2016), Tran & Do (2016), Kergroach (2017), Beyza (2018), Maisiri et al. (2019)
Ability to communicate in English	Tran & Do (2016), Nguyen et al. (2017), Ali (2021),
Soft Skills	Schwab (2016), Tran & Do (2016), Nguyen et al. (2017), Ahmad et al. (2019), Ngoc et al. (2022), Ramli et al. (2022)

*Source:* Tran and Dong (2019)

To prepare students for lifelong learning, 21st-century curricula should incorporate content that is related to innovation skills, digital literacy, knowledge, innovation and thinking framework, and real-life experience. A learner-centered curriculum design should be grounded in the learners' entitlement to comprehensive knowledge, incorporating relevant content into outcome-based higher education curricula. Rather than offering separate courses, integrating soft skills and emotional intelligence—such as communication, teamwork, leadership, and conflict resolution—within knowledge-based content can help prevent students from marginalizing these critical competencies.

Interdisciplinary and transdisciplinary approaches are suggested to align with 21st-century 4IR skills. Higher education curricula should establish industry partnerships and experiential learning opportunities, bridging the gap between academia and industry. Education therefore must evolve from Academic staff-centric to learner-centric approaches, fostering critical thinking, problem-solving skills, and adaptability. HEIs should adopt new pedagogical approaches to improve access to content and enhance learning quality.

Inquiry-based learning encourages students to ask questions, explore real-world problems, and experiment, fostering critical thinking, problem-solving skills, and adaptability. Problem-based learning promotes collaboration and problem-solving, while project-based learning involves students working on long-term projects. The flipped classroom model allows students to engage with 4IR-related concepts at their own pace. Flexibility and personalized learning empower students to take ownership of their learning as active learners. Technology-enhanced learning, such as virtual reality, augmented reality, and artificial intelligence, enhances student engagement and promotes digital literacy (Cevikbas & Gabriele, 2022; Baig & Yadegaridehkordi, 2023; Zharmukhanbetov & Singh, 2023; Sanabria-ZJ & Olivo PG, 2024). The 4IR framework emphasizes the importance of a shift in assessment strategies to align with the learning outcomes and expectations of the future workplace. Self-assessment and reflection allow students to evaluate their learning progress, skills, and knowledge through critical thinking, self-reflection, and feedback. Authentic assessments provide students with real-world contexts to apply higher-order skills related to new concepts and technologies (Penprase, 2018; Tsiligiris & Bowyer, 2021).

The present study aimed to understand undergraduates' readiness for the 4IR workplace through a mixed method of quantitative and qualitative methodology. The quantitative method involved data testing hypotheses or answering questions about people's opinions on a topic or issue, while the qualitative method focused on understanding concepts, thoughts, and experiences.

## **Methodology**

The study was designed to solicit the opinions of students and academic staff of universities in Bangladesh on their preparedness for employment in 4IR workplaces. A combination of quantitative and qualitative methodologies, with two sets of self-designed, pretested structured questionnaires was used to elicit responses. In-depth interviews with academic staff were conducted to identify areas of QA practices that need to be addressed to ensure the production of 4IR-ready graduates. The qualitative methods, which included a literature review, report, and case studies, were used to develop a description of the system of implementing QA at undergraduate levels in HEIs. It was intended that the sample size for the study would be ~400 current students and ~70 Academic staff

The study followed four steps: (i) description of respondents; (ii) validity and reliability tests; (iii) descriptive analysis of data; and (iv) content and process analysis of theories and practices. The validity of the instrument was assessed through the Pearson Product Moment Correlation formula. Reliability was assessed

using Cronbach's alpha value. Graduates' preparedness for employment in a 4IR workplace was assessed by assigning ordinal values to each of the questionnaire items. The average value of the question items was compared with the range values of an Information Literacy Education Implementation Readiness scale (Table 3) (Sahu et al., 2021).

The study measured satisfaction using (i) a Student Satisfaction Score (SSS) and (ii) an Educational Net Promoter Score (eNPS) resembling customer satisfaction measurement following the methods of Hill (1995), Elliott & Shin (2002), Douglas et al. (2006) and Phillips & Galloway (2015). SSS assesses students' satisfaction levels with their academic experience, focusing on aspects such as curriculum, teaching-learning quality, assessment, and relevance to 4IR competencies. eNPS helps understand the likelihood of graduates recommending their institution, based on how well it prepared them for the 4IR workplace. Table 4 presents the benchmark and decision rules for the SSS and eNPS scores, respectively. Additionally, the study used (iii) Learning Effort Scores, which evaluate the student's ability to access and engage with 4IR-related learning materials and experiences (Chen & Jang, 2010; Kitsantas & Dabbagh, 2010); and (iv) Average Academic Ratings, which offer a broader view of the overall academic experience, specifically focusing on 4IR readiness (Marsh & Roche, 1997; Richardson, 2005; Morris & McCarthy, 2015). Finally, it used (v) Retention Rate to provide insight into the long-term engagement of students in programmes tailored towards 4IR education (Tinto, 1993; Carr, 2000).

Table 3: Information Literacy Education Implementation Preparedness Scale

Mean Scores	Preparedness
1.00 - 2.99	Developing Preparedness
3.00 - 3.99	Approaching Preparedness
4.00 - 5.00	Prepared

Source: Sahu et al. (2021)

Table 4: Benchmark and Decision Rules for (a) Student Satisfaction Scores (SSS) and (b) Educational Net Promoter Scores

Ranges	Interpretation	Decision Rules
(a) SSS score		
0% to 40%	Unsatisfactory	Critical review is required. Implement changes to improve the educational experience significantly.
41% to 60%	Fair	It is acceptable but needs improvement. Identify specific areas of concern and address them.
61% to 80%	Good	Solid performance, but strategies should be considered to enhance satisfaction further.
81% to 100%	Excellent	High level of satisfaction. Focus on maintaining and subtly improving these areas.
b) eNPS score		
-100 to 0	Poor	Immediate improvement is needed. Evaluate and address fundamental issues in educational delivery and content.
1 to 30	Good	Satisfactory, but room for improvement. Focus on areas that can enhance student experience and engagement.
31 to 70	Excellent	Strong performance. Maintain quality and identify best practices for further improvement.
71 to 100	World-class	Exceptional educational experience. Aim to sustain and innovate on these high standards.

*Note:* Butt & Rehman (2010); Law & Meyer (2011); Gómez-Bravo & Sendra-Pons (2019)

## Results and Discussion

Data were collected from students ( $n = 404$ ) and academic staff ( $n = 67$ ), using structured questionnaires. The distribution of responses was based on the type of HEIs and the academic level of the students. The survey includes Academic staff members: 70% from public universities. The contingent validity was assessed using Pearson's Product Moment Correlation formula, revealing a total correlation of all items greater than the  $r$ -table value at the 5% level of significance. The instrument reliability test revealed a Cronbach's alpha coefficient of 0.744, indicating good consistency whereas four classes of questions had more than 0.8. It indicates good reliability; therefore, the unobserved concepts were excluded from the questionnaire (Table 5).

Table 5: Student's level of technical skills required for 4IR

Students' level of skills in using the following Technologies:	Mean	SD	Level
Word processing and handling PowerPoint presentations	3.3	1.2	Approaching Preparedness
Accessing spreadsheets to key in data and data analysis	3.1	1.2	Approaching Preparedness
Running software /program(s)/coding	2.8	1.3	Developing Preparedness
Access to Internet applications or software that is required for documentation or searching information	3.6	1.2	Approaching Preparedness
Use of collaborative and sharing applications like Google Drive, Dropbox, etc.	3.5	1.3	Approaching Preparedness
Know how to manage a website, wiki or blog	2.9	1.3	Developing Preparedness
Overall technical skill preparedness level	3.2	1.0	Approaching Preparedness
Communication skills in English	3.0	1.3	Developing Preparedness

Note: SD = Standard Deviation

### Students' Level of Skills Required for 4th Industrial Revolution

The preparedness of students for four information literacy (IL) subjects was based on their self-reported skills. The preparedness scale was used to compare students' preparedness for six hard and technical skills. The mean and standard deviation (SD) of students' hard and soft skills are presented in Tables 6 and 7. The student's level of preparedness for four skills was at an initial level of '*approaching preparedness*', where the highest score was 3.6 and the lowest was 3.3. The overall preparedness level was at an initial level of '*approaching preparedness*' with an average score of 3.3 and a dispersion of 1.0.

The opinions of an Academic staff regarding the development of students' 'soft skills' are summarised in Table 7. The survey revealed that 64.9% believed that students' knowledge and skills of ICT were good at the time of entry at the undergraduate level, while 21.6% believed that it has greatly increased with the elapse of time. A majority (64.9%) of staff believed that students' oral and written communication in English skills slightly increased from the time of entry at the university. Students' perceptions of the improvement of their 'soft' skills are shown in Table 8.

Table 6: Student's level of soft skills required for 4IR

To what extent do students consider themselves to the following competencies:	SSS	SD	Level
Ability to recognize alternate routes in meeting objectives (Problem-Solving)	3.0	1.1	Approaching Preparedness
Capability to recognize possible results to make the route easy when dealing with uncertain issues (Creativity)	3.2	1.0	Approaching Preparedness
Adapt to different situations that occur during any transformation (Adaptability)	3.3	1.0	Approaching Preparedness
Hold the capacity to hand over work to peers and actively work together (Coordinating with Others)	3.6	1.0	Approaching Preparedness
Aware of own emotions and able to control the same to have a better interpersonal relationship (Emotional Intelligence)	3.5	1.0	Approaching Preparedness
Overall Soft- Skill Preparedness level	3.3	0.9	Approaching Preparedness

Note: SD= Standard Deviation

Table 7: Students' growth of soft skills from the entry at the undergraduate level

	Percentage (%)					Score	
	Greatly Decrease	Decrease Somewhat	Stay about the same	Somewhat Increase	Greatly Increase	SSS (Out of 5)	eNPS (%)
How do academic staff rate the growth of most of the student's demonstration of the following skills from university entry at under graduation							
Ability to recognize alternate routes in meeting objectives (Problem-Solving)	-	2.7	10.8	78.4	5.4	4.2	2.7
Capability to recognize possible results to make the route easy when dealing with uncertain issues (Creativity)	2.7	2.7	16.2	64.9	8.1	3.7	2.7
Adapt to different situations that occur during any transformation (Adaptability)	-	8.1	8.1	54.1	29.7	4.2	21.6
Hold the capacity to hand over work to peers and actively work together (Coordinating with Others)	-	2.7	16.2	35.1	43.2	3.9	40.5
Aware of own emotions and able to control the same to have a better interpersonal relationship (Emotional Intelligence)	-	5.4	27.0	56.8	10.8	3.4	5.4
Soft Skill Level (Average)						3.9	14.6

Students (Table 9) considered themselves moderately competent with all five soft skills, with the highest score at 3.6 on coordinating with others followed by emotional intelligence (score of 3.5) and marginally on problem-solving (score of 3.0). The academic staff survey supported students' opinion that with elapse to time as a student in the university gathered experiences in soft skills.

Table 8: Students level Awareness of the Challenges and Strategy to Develop Skills required for 4IR

Students Aware of the following impacts of 4IR:	Percentage of Students				
	not at all aware	not aware	some-what aware	aware	very aware
The 4IR is going to change how one work	6.6	3.8	16.5	52.2	20.9
The 4IR is a challenge for students facing strict employment with the sophistication of technology	6.6	7.7	25.8	39.6	20.3
New knowledge is required for employees to continue to be employable in the 4IR era	6.6	3.8	18.1	46.2	25.3
Understand the challenges of the 4 <sup>th</sup> Industrial Revolution.	5.5	10.4	29.7	41.8	12.6
Overall Awareness	6.3	6.4	22.5	45.0	19.8

Table 9: Level of Courses/Contents contribution in preparing Students' 4IR Skills

Courses/ Contents contribution in developing -	Percentage					Score	
	not at all	not that much	Somewhat	Enough	Adequate	SSS	eNPS (%)
Introducing 4IR Technologies	32.4	25.8	28.6	11.0	2.2	2.3	-45
Knowledge of Information Technology	16.5	17.6	31.9	22.5	11.5	3.0	0
Ability to work with cyber-physical system	18.5	30.1	19.6	20.8	11.0	2.7	-16.8
Ability to communicate in English	7.3	11.7	21.4	39.7	19.9	3.7	40.6
Soft Skills	8.9	11.7	29.3	27.4	22.7	3.5	29.5
Knowledge of the studying field	6.1	11.0	24.7	36.8	21.4	3.5	41.1
Overall Contribution (Average)	15.0	18.0	26.0	26.4	14.8	2.9	8.2

The findings indicate a significant gap in the preparedness of university students for the 4IR workplaces in terms of technical and soft skills. The identified deficiencies in digital literacy and English communication skills highlighted the areas that require

immediate attention. Addressing these gaps is crucial for graduates to be equipped with the technical skills necessary for 4IR workplaces.

### Contribution of Academic Courses or Content to Develop 4IR Skills

The study revealed that existing courses and their content are not adequately preparing students for the skills required for the 4IR workplace (Table 10). The mean contribution of existing courses is below average with a score of 2.9. The majority of students believed that there are gaps in curricula, and are inadequate to prepare them for the 4IR job market. The low mean score for course contributions suggests a need for a thorough review and improvement of course materials. It reveals that engineering and technology majors were the only disciplines contributing to 4IR preparation, highlighting a disciplinary disparity. This finding emphasizes the need for a more inclusive approach; ensuring diverse academic programmes incorporating relevant 4IR-related content to equip students across various fields. The impact of 4IR on Education and QA Practices is shown in Table 11.

Table 10: Role of Existing QA Practice

Students' Opinion of QA Factors	Percentage (%)					Score	
	not at all	not that much	Somewhat	Enough	Adequate	Mean	Std. Dev
The existing Curriculum is good enough to prepare you for the required knowledge of the 4th Industrial Revolution era	14.3	22.0	29.7	25.3	8.8	2.9	1.2
Existing Teaching Learning methods can prepare students with skills of the future workplace well.	17.6	12.6	28.6	29.1	12.1	3.1	1.3
The existing Assessment System of your university helps evaluate students' performance	13.2	15.9	24.2	31.9	14.8	3.1	1.3
Overall QA Status	15.4	21.4	32.4	25.8	4.9	3.1	1.1

Table 11: Impact of 4IR on Education and QA Practices:

Questions to Academic staff		
<i>4IR impact on Education:</i>	Mean	SD
To what extent do you believe that Industry 4.0 will really become true in some years, and hence transform the landscape of higher education?	4.1	0.6
To what extent do you believe that Industry 4.0 is a challenge for students facing strict employment with the requirements of new knowledge and skills?	3.9	1.0
How important is it to incorporate 4IR-related concepts or technologies into the curriculum of higher education institutions?	4.4	0.7
<i>QA Practices:</i>		
The Outcome-based Education (OBE) curriculum structure followed by the Bangladesh National Qualifications Framework (BNQF) will be able to prepare graduates for the demands of the future workplace.	3.7	1.1
To what extent do you believe that the 4IR is transforming the landscape of Higher Education (HE) and impacting teaching and learning practices?	3.6	0.7
To what extent do you think that the current assessment strategies are effective in aligning with the learning outcomes and expectations?	2.7	0.8

### Effectiveness of Existing Quality Assurance Practices

The study examined the effectiveness of existing QA practices in preparing students for the future job skills required for the 4IR. Students' opinions on the effectiveness of QA practices are shown in Table 10. The existing curricula were considered generally weak for developing students' 4IR skills, with a mean score of 2.9. The teaching-learning method and assessment system are marginally above average, with a mean score of 3.1 and 3.6, respectively. Academic staff members (Table 12) believe that the upcoming 4IR will be a challenge for students facing employment, and is important to incorporate 4IR-related concepts or technologies into higher education curriculums.

Table 12: Students' Opinion Regarding Effectiveness of Alternative Teaching- Learning Approaches

	Percentage (%)					Score	
	not at all helpful	not that helpful	Somewhat helpful	Helpful	Very helpful	Mean	SD
New QA Practices							
Use of digital media and computer-based tools for teaching-learning (Technology based teaching-learning)	4.4	6.0	11.5	45.6	32.4	4.0	1.0
Blended learning in physical and online classes (Blended Learning)	3.3	11.5	22.5	38.5	24.2	3.7	1.1
Technology-integrated courses combining different academic fields, and combining different disciplinary fields in a programme curriculum structure (Interdisciplinary curriculum)	4.4	5.5	15.9	43.4	30.7	4.0	1.0
Giving students activities to be done at home and higher-level learning (hands-on activities) in the classroom. (Flip Classroom)	2.2	9.3	15.9	37.9	34.6	4.0	1.0
Engaging students in active tasks such as writing papers, problem-based projects, and experiential exercises of their choice (Active Learning)	3.3	6.0	13.7	34.6	42.3	4.1	1.1
Rather than assessing students' performance once alone, fast delivery of the feedback on the tests taken, and allow them to retake the tests before the final grade.	1.7	8.2	18.1	41.2	30.8	4.0	1.0

SD= Standard Deviation

The study also highlighted the importance of a comprehensive re-evaluation of the existing QA approaches with the revision of current course contents, teaching-learning methodologies, and assessment strategies, and to incorporate a well-rounded set of competencies that aligns with the requirements of the 4IR work environment. This should foster student engagement and satisfaction. The survey also revealed that students considered that changes in QA practices were necessary to prepare them for facing challenges in 4IR workplace environments. Students' views (Table 12) on approaches to interdisciplinary curriculum, teaching-learning processes, blended learning, flip classroom, active learning approach, and feedback-based authentic assessment strategies were very helpful in highlighting specific

concerns. Academic staff members' opinions on new teaching-learning approaches were influenced by various factors. They advocated for content designed on thinking methodologies, innovation framework, entrepreneurship, and ethics (Figure 1), but few of them showed interest in digital literacy and humanities (Figure 2). Academic staff members preferred problem-based learning and collaborative learning, flexible and personalized learning, peer instruction, and role play. Assessment strategies (Figure 3) focused on problem-solving were preferred by the academicians. The suggested modifications for the era of 4IR would be to foster an interdisciplinary curriculum with content on design thinking, innovation, entrepreneurship, ethics, and industry partnerships. This shift would be required essential for dynamic and interactive teaching-learning process and to prepare students to cope with the future workplace.

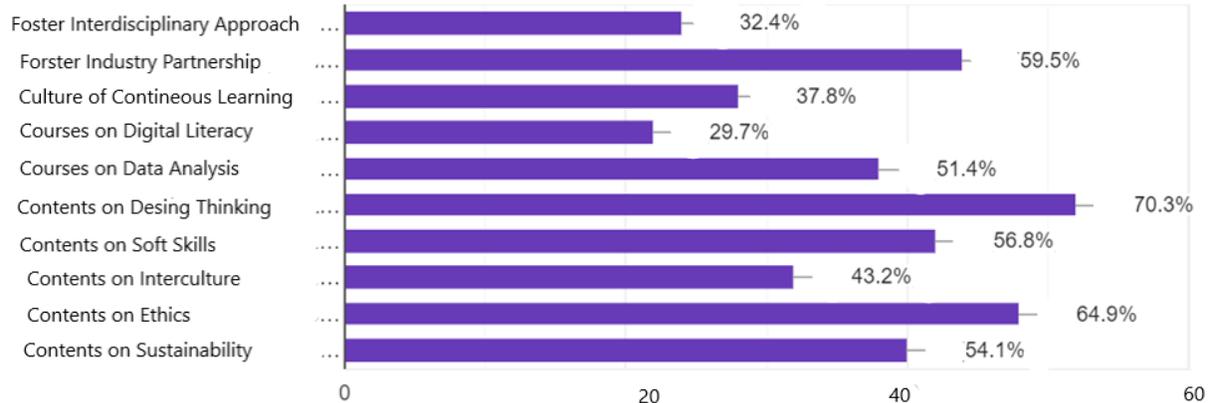


Figure 1: The Opinions of Academic Regarding Curriculum Development and Structure

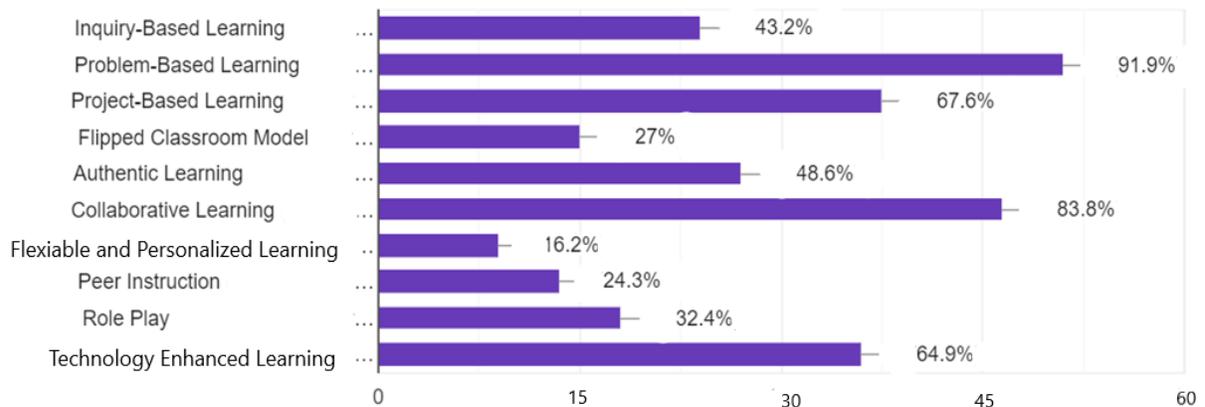


Figure 2: The Opinions of Academic Staff Regarding New Pedagogical Approaches

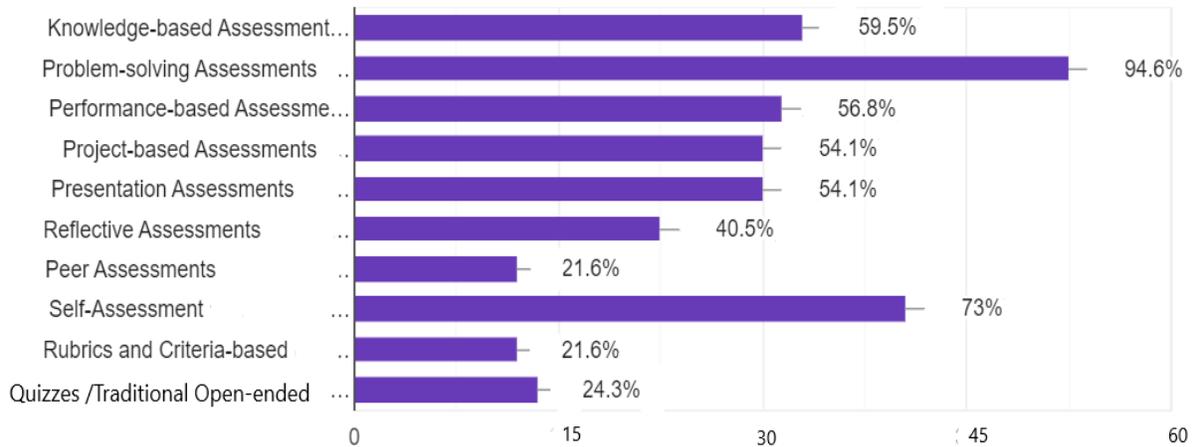


Figure 3: The Opinions of Academic Staff on Assessment Strategies

### Challenges and Pre-requisites to Follow Alternative QA Approaches

In the globalized economy, integrating 4IR concepts and technologies into teaching and learning practices is challenging due to limited resources, infrastructure, and lack of professional training and skills (Figure 4). The study highlights the need for improvements in curriculum design, teaching-learning methodologies, and assessment strategies within the quality assurance framework. Key requirements for professional development (Figure 5) include institutional support, opportunities to engage in professional learning communities, and pedagogical training. Collaborative efforts across the HEIs are very much essential to bridge the gap between traditional educational practices and the evolving demands of the 4IR landscape. The alignment between students' surveys and Academic staff's findings highlights the need for collaborative efforts among academicians and institutions to address these deficiencies effectively. This suggests a need for a comprehensive review and enhancement of the current academic programmes, particularly curriculum adjustments that have to be well aligned with the evolving requirements of the job market.

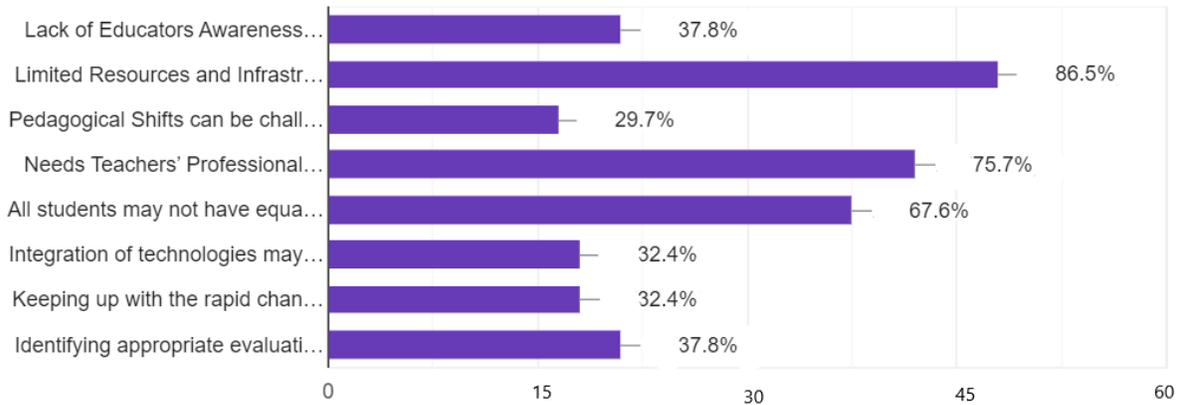


Figure 4: Barriers and Challenges encountered in Integrating 4IR Concepts & technologies in teaching-learning

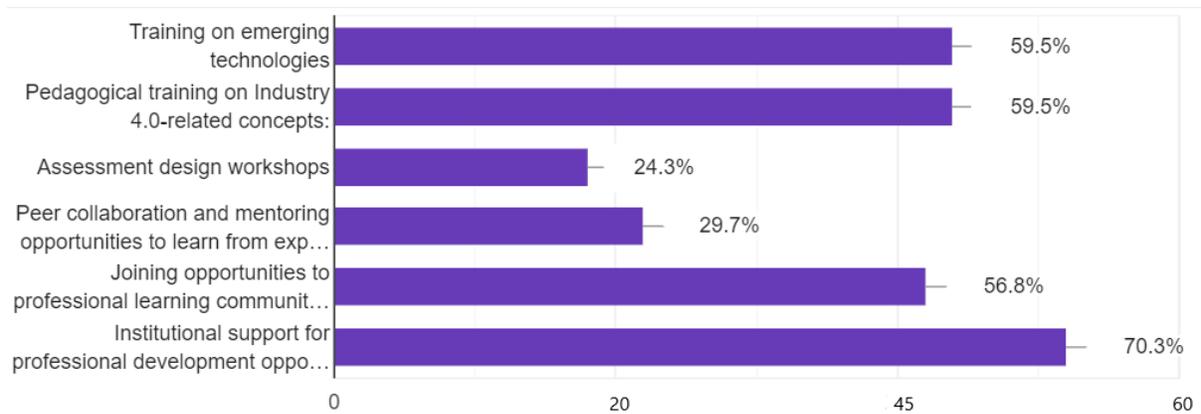


Figure 5: Pre-requisites for Alternative QA Approaches to be followed

### Conclusions

The measurement scores in this study provide a comprehensive overview of the effectiveness of higher education in preparing graduates for the evolving challenges and opportunities presented by the 4IR. The study contributes significantly to the discourse on the role of higher education in preparing future generations for the complexities of the 4IR in the 21st century and provides actionable insights for policymakers, educators, and institutions to enhance their quality assurance mechanisms.

4IR has significantly impacted higher education worldwide. The education sector has been playing a crucial role in preparing graduates for the future workplace, but has also been playing 'catch-up' as the pace of technical advancement in the workplace outpaces the rate of change that has been feasible within HIEs. Assessment of the preparedness of graduates for the 4IR and identifying the areas for improvement in QA should reduce these competency gaps, and identify HEIs where critical changes are needed. A significant gap in students' preparedness was identified, particularly in technical and soft skills, and with deficiencies in digital

literacy and English communication skills. Students perceived themselves as only moderately competent in core five soft skills, suggesting a need for further emphasis on problem-solving capacities. Existing course curricula are insufficient in business studies and biological sciences.

The study therefore highlights the need for a comprehensive re-evaluation of the current QA framework, and for revisiting course content, teaching-learning methodologies, and assessment strategies. Students and academic staff advocated for alternative QA practices, including technology-integrated courses, learning-centered approaches, and assessment strategies. Limited resources, lack of professional knowledge of academic staff, and poor access to technologies hinder implementation.

In general, this study highlights a need for HEI to reformulate policies to produce 4IR-ready graduates, by following the BNQF and the Standards and Criteria of the Bangladesh Accreditation Council. It is suggested that a comprehensive QA re-evaluation is needed to address graduates' skills gap and incorporate feedback from stakeholders. Curriculum enhancement and interdisciplinary collaboration and to incorporation of technical and soft skills are therefore also necessary for the preparation of graduates for 4IR workplaces.

### **Recommendations**

- 1) Establish English communication and digital literacy skills as critical components of HE courses.
- 2) Introduce diversified assessment for future-ready skills, and incorporate evaluation strategies to ensure future-ready skills.
- 3) Processes for continuous monitoring and feedback to track the progress of graduates through their courses and after their entry into the workplace should be introduced.
- 4) Lack of professional knowledge and awareness among academic staff should be addressed. It is suggested that training sessions for the teaching staff on emerging technologies, and 4IR-related pedagogical and assessment approaches, fostering collaboration among academicians, industry professionals, and institutions, promoting equal access to technologies, and establishing industry-academic partnerships
- 5) Structured programmes to guide students in creating personalized strategies for future workplace readiness should be introduced

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# Adopting the Accreditation in Higher Education: A mixed-methods Study among Private and Public Universities

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## Abstract

This study focuses on the perceptions of teachers, graduates, and students regarding the impact of accreditation on quality assurance in higher education, the factors influencing these perceptions in public and private universities, and willingness to adopt accreditation for quality assurance (QA). Quantitative and qualitative methodology was used in four public and private universities in Bangladesh, and data were collected from students (n = 335), alumni (n = 175), and teachers (n = 90) via a structured questionnaire. Quantitative results were summarized using descriptive statistics, and reflexive thematic analysis was employed to examine open-text replies. Logistic regression models were used to investigate the determinants of perception among teachers, graduates, and students regarding knowledge of accreditation. Key findings were a lack of competent and qualified academics, weak evaluation and monitoring systems, high student-to-teacher ratios, and a lack of updates to match scientific and economic needs in affiliated institutions. Standards and criteria for programme accreditation were formulated by the Bangladesh Accreditation Council (BAC) according to international benchmarks and best practices in tertiary education. Several areas for improvement in the educational system were identified, including the need for improved training opportunities and research incentives for teachers, revisions to the curriculum to reflect industry demands and university objectives, and improved teacher-student ratios. The study found that understanding of the accreditation system was affected by factors such as years of service and was related to Key Performance Indicators (KPIs) evaluation for teachers, research activities and curriculum satisfaction for graduates, and seminar attendance and willingness to pay for students. Through the adoption of an accreditation system, these findings can help universities develop strategies to enhance educational quality and allocate resources more efficiently. The study findings could guide policymakers in ensuring quality higher education through the implementation of the accreditation system in Bangladesh.

**Keywords:** Curriculum; Leadership; Perception; Quality assurance; Willingness to pay

## Introduction

Due to a generalized lack of high-quality tertiary education in Bangladesh, the higher education sector in Bangladesh is facing several problems. In the context of the global economy, a significant obstacle that any nation confronts pertains to enhancing the calibre of its human resources and higher education institutions (HEIs) are crucial for the development of a knowledge-driven society, particularly via the provision of education to adults. Several financial, political, and cultural constraints impede the advancement of educational quality in Bangladesh (Alam, 2013), so, in response to the challenges of enhancing the quality of higher education, the government of Bangladesh has evolved a system of accreditation of academic programmes and HEIs through the implementation of the Bangladesh Accreditation Council Act, 2017. This requires institutions to ensure that students achieve worthwhile learning goals, and that there is good course design, effective teaching strategies, competent teachers, and an environment conducive to learning. Accreditation is the result of a process in which an accreditation agency evaluates the quality of a higher education institution as a whole or as a programme to formally recognize it as having met certain predetermined criteria or standards and award a quality label (Sanyal et al., 2007). Accreditation is conferred to an institution or programme for fulfilling minimum quality standards (Ryan, 2015).

There is a deficiency in the ability of HEIs to strategize and regulate the essential elements required for the maintenance and optimal functioning (Chickering, 2004). The skills and competency of new graduates from HEIs are unable to meet stakeholders' expectations (The Economist Intelligence Unit, 2019) largely due to faulty curriculum design, high student: academic staff ratios, the presence of duplication, repetition and redundancy in academic programmes, and inefficient utilization of resources (Koch & Fisher, 1998). The goal of the accreditation system is to evaluate and ensure compliance with the quality standards necessary for academic achievement, by identifying areas that are in deficiency of these standards and recommending actions to ensure compliance (Patil & Codner, 2007). Andreani et al. (2020) cataloged features of degree programmes, their effectiveness, and the characteristics of entering students that impact the university teaching accreditation system.

However, the response of HEIs to accreditation is not necessarily positive: Romanowski (2022), for example, highlighted the concept of 'idolatry' in accreditation, which sheds light on various harmful influences on academic disciplines, professors, institutions, and education, helping to explain some of the issues of resistance to the accreditation process. Barroilhet et al. (2022) examined the possibility of prejudice in higher education accreditation conglomerates, and noted the risk of conflicts of interest in appointing accreditors to large *versus* public *versus* private universities. To identify several structural flaws and propose preventive measures, Bogren et al. (2021) evaluated 38 public nursing institutes in Bangladesh. They suggested that unless flaws in the educational system are rectified, it will be

difficult to quantify development in the direction of national and international mileposts that would ensure scholars possess the necessary capabilities before graduation.

Mohamed et al. (2022) aimed to develop a qualitative model that promotes the use of digital transformation as a driving force to give universities a competitive edge. Such results contribute to the evolution of strategic management practices in academic institutions by providing an empirical understanding of significant changes and their relationship to evolutionary learning. The association between advanced school certification and improvements in education and knowledge in HEIs was examined by Makhoul (2019) who found that the establishment of standards is essential to measure the excellence of instruction across all advanced education organizations.

Several scholars have noted that the caliber of instructors' academic backgrounds is a crucial factor influencing the level of service quality in higher education (Pheunpha, 2019; La Rotta et al., 2020). The quality of the academic staff and their conduct have a substantial influence on student satisfaction within the realm of higher education. Masserini et al. (2019) identified course structure and lectures as the two most crucial elements for student satisfaction. Hence, in most countries, quality assurance within the realm of higher education has the main goals of good governance, improvement, and accountability (Seyfried & Pohlenz, 2018; Makhoul, 2019; Stura et al., 2019).

The present study was designed to examine the current situation of HEIs in Bangladesh concerning accreditation in terms of their willingness to adopt accreditation, and identifiers for the enhancement of higher education quality. The precise aims of the study were: (i) to scrutinize the key features of QA and accreditation systems in Bangladesh; (ii) to investigate the perceptions of teachers, graduates, and students regarding the impact of accreditation on the quality of higher education; (iii) to examine the factors influencing the perceptions of teachers, graduates, and students regarding the accreditation system in higher education in public and private universities; (iv) to explore the willingness to pay for adopting accreditation for quality assurance; and (v) to provide pathways for introducing accreditation policies and strategies to ensure and maintain quality assurance.

## **Methodology**

### ***Population and Sampling***

A cross-sectional survey of students and teachers from public and private universities was conducted. The study population consisted of students, graduates, and teachers from public and private universities, and a two-stage sampling strategy was followed. Participants were independently selected within each category. In the first stage, four universities (one public and one private university from Dhaka, and one public and one private university from outside Dhaka) were selected using a

purposive sampling approach. In the second stage, respondents were selected using a purposive sampling method to achieve the optimal sample size.

A total of 600 individuals were selected from four universities: Sher-e-Bangla Agricultural University (SrAU), Green University of Bangladesh (GUB), Sylhet Agricultural University (SAU), and Leading University (LU). Data were collected from students, graduates, and teachers at each of the four universities, using a purposive sampling approach with 150 respondents purposively selected from each university. Twelve focus group discussions (FGDs) were conducted at each of the four universities. Each FGD included 8–12 participants. The total participants of in FGDs was 132. For each university, three FGDs were conducted separately with student, graduate, and teacher participants. Responses were recorded as 'yes/no', or on a 5-point scale (1 = lowest, 5 = highest), as appropriate to the question.

## **Results and Discussion**

The Bangladesh Accreditation Council (BAC) standards and criteria for programme accreditation are internationally benchmarked and widely accepted as good practices in higher education. The Programme Offering Entity (POE) should maintain sufficient and appropriate documentation as evidence of compliance for each criterion. Upon receiving an expression of interest, BAC shall provide an accreditation manual, counseling, and guidance to facilitate the necessary preparation for applying for accreditation. Following the BAC Accreditation Manual, the concerned HEI or POE will conduct a self-assessment and assess the level of compliance with BAC accreditation standards and criteria. The HEIs or POE may appoint a mentor for consultation services. The mentor will guide them in adopting and maintaining the BAC accreditation standards and criteria with proper documentation, facilitating the self-assessment following the BAC accreditation manual, and preparing the entity to apply for accreditation.

This study offers novel insights into the perceptions of students, alumni, and academicians that influence accreditation in public and private universities. The student-teacher ratio varies from university to university and was high in SrAU. Even in public universities, the teacher-student ratio was unsatisfactory compared to global standards, and the situation was worse in private universities. There was a significant problem regarding the development of academic (teaching-learning) and support staff. The best students want to get admission to public universities, while those who cannot gain admission to public universities go to private universities, which are costly. Once syllabuses have been designed, they are typically implemented over a long period without improvement to match with present needs of the stakeholders. To make the system functional, it is essential to monitor, evaluate, and improve it. The academic and support staff are primarily responsible for ensuring quality education. In addition to an overall dearth of teaching staff, HEIs also suffer from a shortage of well-qualified teachers.

Table 1 shows that 30.7% of students, and 39.8% of alumni, considered that teacher participated in KPI evaluation, but only 17.4% of teachers agreed that this was the case. KPI evaluations were 3.2, 2.1, and 1.2 times for students, alumni, and teachers, respectively. About 98.6% of teachers attended seminars and conferences organized by the university, followed by 75.0 % of alumni, and 56.1 % of students. Interestingly, satisfaction with the staff-to-student ratios was higher (69%) than for teachers (35%). Respondents' satisfaction with course curriculum is shown in Figure 1.

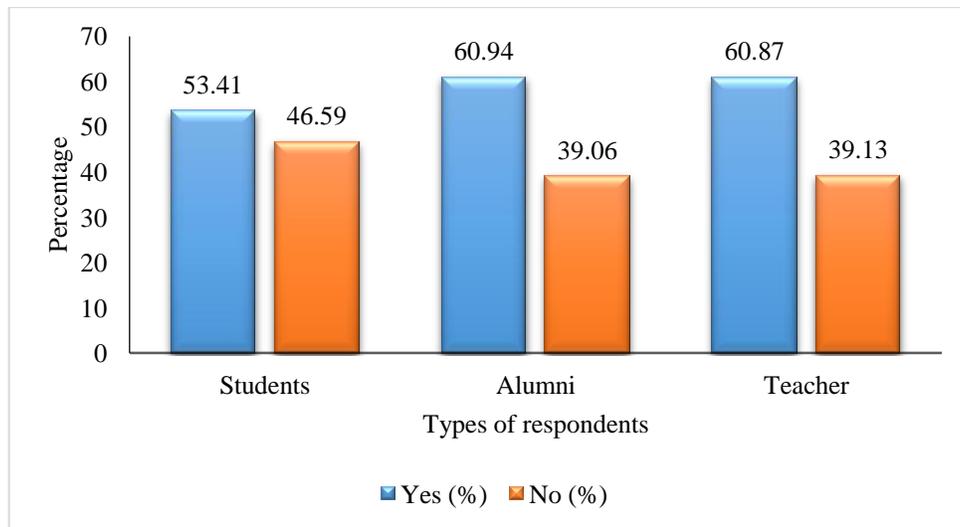


Figure 1: Respondents' satisfaction with course curriculum

Data for satisfaction with the curriculum are shown in Figure 1. Overall, about 53.4% of students, 60.9% of alumni, and 60.9% of teachers were satisfied with their course curriculum. However, when respondents' perceptions about curriculum and its related activities were examined in more detail (Table 2).

Respondents' perceptions about the curriculum and its related activities are shown in Table 2. Overall mean responses of students (3.4/5) and alumni (3.5/5) were lower than those of teachers (3.8/5). The difference was not significant. The poorest scores, which were given by all three groups of respondents, were to the question '*curriculum load is optimum and exerts no pressure*' (2.5, 3.0, 2.8/5 for students, alumni, and teachers, respectively). This was closely followed by responses to the question '*curriculum developed through exit interviews with prospective graduates etc*' (2.9, 3.0, 3.2/5). The highest scores were given to the questions '*curriculum developed through need assessment*' (3.9, 4.1, 4.1/5) '*maintains documented course file with course plan*', and '*maintains documented course file with credit value*' (overall mean for all participants: 4.0/5).

Table 1: Respondents' participation in Academic Staff-related activities

Items	Students		Alumni		Teachers	
	(%) Yes	Average Score	(%) Yes	Average Score	(%) Yes	Average Score
KPI evaluation happen	30.7	-	39.8	-	17.4	-
Number KPI evaluation	-	3.2	-	2.1		1.7
Attend seminars/ conferences organized by the university	56.1	-	75.0	-	98.6	-
Number of participations in seminar/ conference	-	3.1	-	3.9	-	4.8
Receive training during your work period	-	-	-	-	95.7	-
Receive training related to accreditation	-	-	-	-	55.1	-
University maintaining salary structure with incentives to retain the talented and experienced academic and professional staff	-	-	-	-	33.3	-
Happy with the current teacher-student ratio	68.9		-	-	34.8	-

Table 2: Respondents' perceptions about curriculum-related activities

Aspects of Evaluation	Average Score		
	Students	Alumni	Teachers
Curriculum developed through need assessment	3.9	4.1	4.1
The curriculum was developed through consultative meetings with key stakeholders	3.4	3.5	4.0
The curriculum was developed through a student survey	2.8	3.2	3.3
Curriculum developed through exit interviews with prospective graduates etc.	2.9	3.0	3.2
Curriculum content and structure adequately match with university's mission	3.2	3.5	4.1
Curriculum content and structure adequately match with university's Objectives	3.2	3.5	4.1
The curriculum is reviewed and updated at regular intervals.	3.1	3.3	3.7
Maintains documented course file with course plan	3.9	3.8	4.2
Maintains documented course file with credit value	3.9	3.7	4.2
Maintains documented course file with teaching learning and assessment method	3.6	3.7	3.9
Maintains documented course file with facilities/resources that are necessary to attainment of course learning outcome.	3.5	3.5	3.9
Department/institute uses different teaching-learning methodology	3.5	3.7	4.1
Department/institute uses aids and motivates co-curricular activities that meet the quality of education	3.4	3.5	4.2
Smooth execution of the programme takes place with requires time-frame maintenance	3.3	3.0	3.5
Smooth execution of the programme takes place with requires student handbook and resources available with access	3.5	3.5	3.7
Courses in the curriculum from lower to higher levels are consistently arranged.	3.6	3.6	3.9
Teaching strategies are clearly stated in the curriculum.	3.3	3.5	3.8
Assessment strategies are explicit in the curriculum (Diversified assessment methods used, CGPA, criteria, benchmark, and related tools for assessment circulate among students).	N/A	3.5	3.9
The curriculum load is optimum and exerts no pressure.	2.5	3.0	2.8
The curriculum is effective in achieving day-one skills (which happens right at the beginning of the first day at the workplace).	N/A	3.2	3.4
Provision of internship/project/dissertation/fieldwork/work integrated learning is included in the curriculum.	3.7	3.7	3.6
Overall average score	3.4	3.5	3.8

Note: Responses were given on a 1-5-point scale, in which 1 was the lowest, 3 was neutral and 5 was the highest score.

Respondents' perceptions of leadership are summarised in Table 3. Similar proportions of students, alumni, and teachers considered that the 'organisation was appropriately structured' (3.5, 3.6, 3.7/5), respectively), although these responses were only mid-way between 'neutral' and 'agree'. Responses to the questions 'every person doing their responsibilities properly' and 'recruitment policy and practices are good enough for competent academic and non-academic staff' were close to neutral (3.1, 3.0, 3.2; and NA, 2.8, 3.1, respectively).

Table 3: Respondents' perceptions of leadership

Students						
Aspects of Evaluation	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Average
Organization is structured	6.1	10.9	23.5	44.7	14.8	3.5
Every person doing their responsibilities properly	11.7	21.6	27.3	29.2	10.2	3.1
The entity encourages students to foster social responsibility	8.3	5.7	24.2	43.3	18.6	3.6
Alumni						
Organization is structured	6.3	9.4	26.6	34.4	23.4	3.6
Every person doing their responsibilities properly	17.9	10.9	28.9	34.4	7.8	3.0
Recruitment policy and practices are good enough for competent academic and non-academic staff	22.1	16.5	25.2	29.9	6.3	2.8
The entity encourages alumni to foster social responsibility	4.7	6.3	26.6	50.8	11.7	3.6
Teachers						
Organization is structured	5.8	13.0	15.9	39.1	26.1	3.7
Every person doing their responsibilities properly	7.3	21.7	26.1	34.8	10.1	3.2
Recruitment policy and practices are good enough for competent academic and non-academic staff	8.7	18.8	31.9	31.9	8.7	3.1
The entity encourages teachers to foster social responsibility	4.4	7.3	21.7	53.6	13.0	3.6

Participants' willingness to engage with the accreditation process is shown in Table 4. Overall, 91.3% of students, 94.5% of alumni, and 97.1% of teachers wanted degrees to be accredited, and students were willing to spend an additional 4.7 hours working to do so. Similarly, more respondents wanted the accreditation for the

university as a whole (89%, 95%, and 100% for students, alumni, and teachers, respectively) and students and teachers were also willing to develop additional work time to it. They were also willing to spend money on an average of Taka: 21,893 ( $\geq$ Taka 20,000/=per annum) for developing the quality culture of the HEIs.

The determinants of the perception of the accreditation system of the respondents are summarized in Table 5. The estimated chi-square ( $\chi^2$ ) value was 17.177, which indicated that the coefficients of explanatory variables were different from zero. The fitted model was statistically significant ( $p < 0.01$ ).

Table 4: Respondents' willingness for accreditation

Aspects of Evaluation	Students		Alumni	Teachers	
	Yes (%)	Average	Yes (%)	Yes (%)	Average
Want their degree to be accredited	91.3	-	94.5	97.1	-
Time wants to spend in a week (hours)	-	4.7	-	-	4.4
Money wants to spend (Taka)	-	21,893	-	-	26,476
Want their university to be accredited	88.6	-	95.3	100	-
Time wants to spend in a week (hours)	-	5.6	-	-	3.6
Money wants to spend (Taka)	-	26,562	-	-	2,272

Table 5: Determinants of participants' perception of the accreditation system based on a logistic regression model

Teachers			
Variables	Coefficient	Standard Error	Marginal Effects
Constant	-7.4**	3.8	-
Gender	1.5	1.2	1.0
Year of Service	0.6**	0.3	0.0
Training on the Accreditation system	2.0*	1.1	0.1
Satisfaction with curriculum	-0.2	1.0	-0.0
KPI evaluation	2.2**	1.2	0.1
Willingness to Pay	3.2**	1.4	0.2
$\chi^2$	17.2***		
Alumni			
Variables	Coefficient	Standard Error	Marginal Effects
Constant	-120***	45	-
Gender	0.6	0.4	0.105
Year of Education	0.5*	0.3	0.1
Seminar Attendance	0.8	0.6	0.2
Research Activity	0.9*	0.5	0.1
Satisfaction with curriculum	0.8*	0.5	0.2
KPI evaluation	0.9**	0.4	0.1
$\chi^2$	27.7***		
Students			
Variables	Coefficient	Standard Error	Marginal Effects
Constant	-13.221***	4.055	-
Gender	0.460	0.531	0.0
Year of Education	0.558**	0.262	0.0
Seminar Attendance	1.09*	0.611	0.1
Satisfaction with curriculum	-0.048	0.523	-0.0
KPI evaluation	1.244**	0.537	0.1
Willingness to Pay	1.296**	0.595	0.1
$\chi^2$	28.2***		

Note: asterisk \*, \*\* and \*\*\* indicates statistical significance at 10%, 5% and 1% level, respectively

The model contained six explanatory variables: gender, year of education, seminar attendance, satisfaction with curriculum, KPI evaluation, and willingness to pay for adopting the accreditation. Based on the principles of the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC), the fitted model 1 for teachers was the best among the three models because it shows the lowest value of AIC and BIC (Table 6).

Table 6: Comparison table of different stakeholders' models based on model selection criteria

Items	Model 1 (Teachers)	Model 2 (Alumni)	Model 3 (Students)
Log-likelihood	-14.1	-70.3	-59.2
AIC	42.1	154.6	132.2
BIC	57.8	174.5	157.4

Note: AIC: Akaike Information Criterion, BIC: Bayesian Information Criterion

## Implications

The features of the quality assurance process that were identified in this study will be useful for competition among the universities, which should benefit the students and the nation in the long run. The perceptions and willingness of teachers, alumni, and students on accreditation of higher education will be useful for successfully introducing the accreditation policy and pathways for undertaking the mission. This study will expect to add some valuable information to bridge gaps in existing knowledge about the leadership, curriculum, and academic staff for ensuring the quality of education in public and private universities. The present study identified the determinants of the perception of accreditation of quality assurance of higher education with valid and reliable policy implications to meet students' expectations. The document offers policy recommendations that could potentially improve the quality of tertiary education. The findings could significantly be implemented at institutional and national levels, particularly those relating to the coordination of quality assurance in higher education.

These findings are anticipated to enhance the comprehension of the quality of higher education by shedding light on its scope and characteristics. The results will provide valuable insights for policymakers to address the weaknesses and challenges associated with quality assurance in HEIs. The study will focus on how accreditation standards, self-assessment processes, and compliance monitoring can be utilized to enhance the capacity building of the institutions in meeting quality assurance and accreditation standards. Valuable information generated will be helpful for the accrediting agency in its pursuit of establishing itself as an acknowledged organization dedicated to promoting academic excellence in higher education, which in turn, will contribute to sustainable growth by fostering the cultivation of human capital. Finally, national-level policymakers could potentially use the

findings to prioritize resource allocation, scale up efforts, and invest in quality education to achieve leadership for sustainable development goals.

### **Limitations**

For practical reasons, only two public and two private universities were covered for analysis. This study was based on cross-sectional data. Most of the data were collected by using self-reported data, which might be affected by the differential reporting behaviour of men and women. However, the results should be treated with caution due to the small sample size and lack of details regarding all standards for accreditation of academic programme in Bangladesh.

### **Recommendations**

- The focus of the strategy should be on Bangladesh's national qualifications framework (BNQF) and the adoption of accreditation standards at institutional and programmes levels, to ensure internationally recognized quality assurance practices;
- The teacher-student ratio should be improved to ensure the quality of education;
- The curriculum should be revised following the principles of outcome-based education (OBE) with the reflection of stakeholders' demands;
- Curriculum revision should ensure that they are not overloaded *in toto* and are not overloaded with declarative information in particular;
- The HEI authority should pay attractive salaries to retain the best teachers to uphold a good academic and conducive environment for higher education;
- Institutions should take the initiative to introduce a KPI evaluation system in higher education;
- It is important to focus on training, seminars, and workshops for students in developing the ethical and moral components of their education.

### **Conclusions**

Alumni and teachers were interested in accrediting their degrees and universities. Six explanatory variables with the findings of distinct variables impacted each group's understanding of the accreditation system. Year of service, training on accreditation process and rules, KPI evaluation, and a good salary for the teachers are important factors for the academicians. Overall, these data imply that several factors may impact knowledge of the accrediting system among various categories of participants. The accrediting system contributes to the establishment of a level of excellence that benefits students, employers, and the community. The results indicated the scope for improvement in various areas of HEIs, that are considered to reflect the generality of HEIs across Bangladesh. The study emphasizes the need for HEIs to provide improved training opportunities and research incentives to

encourage teachers to publish their work in high-quality journals. The teacher-student ratio with class size should accord with the standards and criteria laid down by the Bangladesh Accreditation Council, and the curriculum should follow OBE with the reflection of stakeholders' needs. Training, workshops, and seminars should be organized regularly with students' enrolment.

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# Status of Implementation of Outcome-Based Education in Engineering Programmes in Bangladesh

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## Abstract

The challenges of implementing outcome-based curricula (OBE) faced by the programme offering entity (POE) for dissemination to the stakeholders were investigated through status analyses. Interview-based surveys were carried out in six private and three public universities. A total of 21 engineering programmes on the perception of OBE, its practice and motivation, understanding of its components, bottlenecks, challenges, and status in practice, transition, the realization of benefits, future sustainability requirements, and strategies were studied. Administrative feedback was obtained to encompass resource challenges and on boarding of the programmes for OBE-based implementation. Programme-level challenges were the mind-set and motivation of the instructors regarding the shifting, familiarity, understanding of its components, and consequent reflections on practice, assessment issues, and overload with implementation. Student-level challenges were understanding the approach to achieve the outcomes, and relating the theoretical with practical applications. More expertise on OBE concepts is required across the system, and laboratory courses need to be integrated with theory courses to bring a culmination to complex engineering problems. Crucial factors identified in the transition towards OBE include workshop/training, support from authority (<10%), balancing extra load with teaching, building industry relations, curriculum development, resource assessment, and mentoring the course learning outcomes (CLO) and programme learning outcomes (PLO). National accreditation authorities are faced with bringing a large number of institutions to adopt a globally recognized education system. Based on the findings, OBE essence needs to be transmitted at all levels of education, implementing agencies, and stakeholders. Needs assessment is essential to reduce the gaps of transition of OBE and identifying the roles of different stakeholders for successful and holistic implementation would be the next step towards implementation of OBE across higher education institutions in Bangladesh.

**Keywords:** Outcome Based Education; Engineering Programmes; Accreditation; Teaching Learning; BAETE

## Introduction

The University Grants Commission (UGC), Bangladesh, set out mandatory requirements to implement Outcome-Based Education (OBE) in each university in Bangladesh in 2020. Since 2017, workshops, training programmes, and mentorship support on implementing OBE for engineering programmes in public and private universities have been initiated by the Board of Accreditation for Engineering and Technical Education (BAETE), Bangladesh. This initiative was to obtain the full signatory status of the Washington Accord of the USA. Accreditation of engineering programmes has switched to OBE rather than traditional education over the past five years as several universities in Bangladesh have voluntarily implemented OBE. To comply with the requirements of OBE, the institutions that wanted accreditation from the Institution of Engineers, Bangladesh (IEB) had to transform their academic programme. It has been a paradigm shift.

Implementing changes, including a Continuous Quality Improvement (CQI) loop, and getting feedback from stakeholders was imperative. There was a lack of information regarding the challenges encountered in OBE-based undergraduate engineering programmes. The objectives of the studies were:

- i. Evaluation of Engineering Programmes in Public and Private Universities Implementing OBE
- ii. Identification of the engineering programmes that have started their transition towards OBE;
- iii. Identification of the model of OBE that has been incorporated into the engineering programmes;
- iv. Investigation of the stages of transition towards OBE, analysing the challenges faced;
- v. Enumerating the strategies to overcome the challenges.

Spady (1994) defines OBE as a 'system that equips students with the knowledge, skills, and competencies to succeed, enabling them to excel in their chosen fields'. The OBE paradigm is founded upon three fundamental premises and four guiding principles. The premises: (i) all students possess the capability to learn, albeit at varying rates; (ii) learning begets further learning; and (iii) the circumstances that educational institutions regulate, directly impact the achievement of successful learning. The principles are (i) a clear focus on the desired outcomes; (ii) the Provision of ample opportunities and support to facilitate successful learning; (iii) the expectation that all learners will achieve success; and (iv) careful design of outcomes to ensure their attainability. OBE paradigm employs a conventional or transitional approach emphasizing subject-specific content delivery, enabling students to develop problem-solving skills and collaborative work abilities (Kootsookos et al., 2017).

The OBE approach emphasizes achieving academic benchmarks and learning objectives (LOs). The two primary components underscored are the programme outcomes and the programme's educational outcomes (Tshai et al., 2014). According to Gurukkal (2020), institutions must ensure that outcomes are aligned/synchronised with the programme contents when adopting OBE. Rao (2020) emphasised the importance of establishing attainable and quantifiable outcomes that correspond with the three principal domains of Bloom's Taxonomy (Bloom, 2020). Mitra & Gupta (2020) asserted that the primary objective of OBE is to equip graduates with the skills and knowledge to enhance their employability. The contemporary job market necessitates specialized expertise, effective communication, technical proficiency, and analytical and critical thinking (Deepak & Venishri, 2018). The theoretical framework of Biggs (1996) proposed constructive alignment with the OBE (Tam, 2014). Efficacy of OBE has been analysed for more than two decades (Tucker, 2004; Biggs & Tang, 2007; Yusof et al., 2007; Wong et al., 2011; Borsoto et al., 2014; Yusoff et al., 2014; Hegde, 2015; Macatangay et al., 2016; Isa et al., 2017; Deepak & Venishri, 2018; Senaratne & Gunarathne, 2019; Katawazai, 2021).

Bangladesh has initiated efforts to implement OBE since 2017, to achieve international standards. In 2017, the Bangladesh Accreditation Council (BAC) was established to guarantee the provision of quality education and confer accreditation upon programmes offered by public and private universities (BAC, 2017). BAC is responsible for implementing the Bangladesh National Qualifications Framework (BNQF) Level 7-10 (BAC, 2017) to facilitate the development, classification, and recognition of skills, knowledge, and competencies. This Framework is internationally benchmarked and a valuable instrument in achieving these objectives. The proposed system outlines a higher education framework centred on outcomes and is founded on standardized qualifications criteria (BNQF, 2021). The UGC has disseminated a curriculum template based on OBE to higher education institutions to ensure quality education for producing employable graduates and achieving global rankings.

Governance, curriculum, resources, faculty development, and research opportunities should improve simultaneously to improve the quality of higher education. There are now 151 public and private universities, with more than 30,000 teaching staff and around 600,000 students (The Business Standard, 2021). To meet BAC standards and criteria, universities have set up Institutional Quality Assurance Cells (IQAC) as focal points to standardize the curriculum, teaching strategies, and facilities, and to integrate OBE. According to the BAETE Accreditation Manual, course objectives must be planned to target the programme-specific results using quantifiable action verbs rather than abstract verbs. This study was designed to determine the current state of implementation of OBE in undergraduate engineering programmes in private and public universities. This will help to identify the discrepancies in the understanding of OBE and to evaluate the challenges in the transition process.

## Methodology

The study aimed to collect information first-hand from the stakeholders of OBE implementation in selected universities. The questionnaire was developed to obtain information about the following matters:

- i. Institution Administration: Engineering programmes and status of accreditation; Administrative plans on OBE implementation; Awareness of UGC directives on OBE curriculum; Administrative challenges in the implementation of OBE; Future strategies; Education indicators.
- ii. Institution Programme: Short-term and long-term plans on OBE implementation; Implementation status of UGC directives; Background of exposure to and initiation of OBE implementation; Timeline and challenges in OBE implementation; Expected and visible changes through OBE; Details of OBE components in implementation; Status and frequency of CQI; Teaching methodology and assessment tools, curriculum; Perception of Complex Engineering Problem attributes; Education Indicators.
- iii. Institution/Programme Students: Familiarity with accreditation and its benefits; Perception of the accreditation requirements and OBE; Familiarity with OBE components, CQI, Complex problems and challenges with transition; Education Indicators; Interaction and teaching system; Satisfaction and improvisation.
- iv. BAETE: Objectives and requirements of signatory status at Washington Accord; Initiation of implementation of OBE and approach; Status of accreditation and applications in engineering programmes; Assistance and plans to prepare programmes; Details and the challenges in the process of accreditation; Existing limitation in resources; Coordination among Institution of Engineers Bangladesh (IEB), BAETE, UGC, and BAC
- v. UGC: Student enrolment in Engineering programmes; Rationale for implementation of OBE; The timeline and the context of the introduction of OBE-based curriculum; Awareness of visions of BAC and BAETE: Status of submission and evaluation of OBE curriculum from Engineering programmes; Plans, strategies on activities and training on OBE curriculum and implementation (Personnel Communication, 2023).

The intended population consisted of administrative personnel, officials affiliated with IQAC, faculty members of the engineering programmes, and students enrolled in programmes. To ensure impartiality, institutions were selected on the following criteria:

- i. The reputation of the programme of the chosen university;
- ii. Application and accreditation status of the programme;
- iii. Willingness to participate in the project.

The Institutions approached for the survey and the subjects being taught were as follows. (Computer Science and Engineering (CSE); Electrical and Electronic

Engineering (EEE); Civil Engineering (CE); Mechanical Engineering (ME); Aeronautical Engineering (AE).

1. Islamic University of Technology (IUT) – CE [Private – 1]
2. East West University (EWU) – CSE, EEE, CE [Private – 2]
3. North South University (NSU) – ECE, CE [Private – 3]
4. United International University (UIU) – CSE, EEE, CE [Private – 4]
5. BRAC University – CSE, EEE [Private – 5]
6. University of Asia Pacific (UAP) – CSE, EEE, CE [Private – 6]
7. Chittagong University of Engineering and Technology (CUET)– CE [Public – 1]
8. Military Institute of Science and Technology (MIST) – EEE, CE, AE, ME, CSE [Public – 2]
9. Bangladesh University of Engineering and Technology (BUET)– CE [Public – 3]

In total, 21 programmes were studied in nine universities, six private and three public. Table 1 shows the number of programmes and their status in implementing OBE.

Based on the selected number of institutions and the different types of stakeholders, the programme level survey obtained responses ( $N_1 = 40$ ), the Administration level survey obtained responses ( $N_2 = 22$ ), and the student-level survey obtained responses ( $N_3 = 96$ ). In addition, BAETE and UGC were approached for similar responses.

Table 1: Number and status of the engineering programmes under investigation

Engineering Discipline/ Programme	Number of programmes Investigated	Status
Civil Engineering	8	Accredited – 3 Pending renewal – 2 Applied - 3
Computer Science and Engineering	6	Accredited – 4 Applied and non-accredited – 1 Preparation - 1
Electrical and Electronic Engineering	5	Accredited – 3 Applied and non-accredited -1 Pending renewal - 1
Mechanical Engineering	1	Accredited
Aeronautical Engineering	1	Accredited

*Note:* Electronic and Communication Engineering (ECE) under NSU has been considered under the CSE programme in this table.

## Results and Discussion

### *Status of Tertiary Education and OBE Introduction in Bangladesh*

The higher education system in Bangladesh has reached a crucial moment when reforming the country's conventional curriculum into an OBE is necessary in light of dramatic impact of globalization on education. Professionals in the 21<sup>st</sup> century need to adapt to new circumstances quickly, think critically, and make independent decisions, all due to the rapid evolution of the corporate world (Syed et al., 2022). The Ministry of Education and the UGC have emphasized the importance of transforming and implementing of OBE curriculum to develop future skilled human capital using the BNQF, Level 7-10 (2021). Universities in Bangladesh have focused their attention on adopting the OBE curriculum based on the BNQF with the alignment of standards and criteria of the BAC. To reduce the future skills gaps in the workforce, BNQF has identified four areas of learning: foundational knowledge, interpersonal competence, critical thinking, and self-awareness (BNQF, 2021). According to Toufique (2014), there need to be more qualified candidates in the Bangladeshi labour market, with 62% of young employees needing more training. Significant interest has lately been shown in Bangladesh's Open and Blended Learning (OBL) in higher education programme. After the Higher Education Quality Enhancement Project (HEQEP) initiated by UGC, backed by the World Bank, a self-assessment programme the universities had to start by themselves. IQACs have been formed at 69 of 138 universities to carry out self-assessments and put the post-self-assessment improvement plan into action (IQAC, 2015; BNQF, 2021).

### *Perception and Planning on OBE*

When the programmes were asked about their short-term and long-term plans for OBE implementation, their responses involved options such as (i) faculty training and workshop; (ii) CLO and PLO mapping; (iii) OBE software development; (iv) internal departmental meeting discussions; and (v) IDP - Capstone development and design. Regarding the perception of Complex Engineering Programme (CEP) attributes and addressing the design project requirements, the categories with which the programmes responded were: (i) addressing through laboratory courses; (ii) yet to be started; (iii) in the stage of mapping outcomes; (iv) feeling of a conceptual gap; (v) able to define CEP attributes; and (vi) included already in syllabus. Students' perception of OBE involved the responses in the categories of (i) reflection in project report; (ii) understanding CLO and PLO; (iii) course mapping and relationship with PO and PEO; (iv) participation in continuous assessment; and (v) course outline reflection. Responses in percentages are shown in Figure 1.

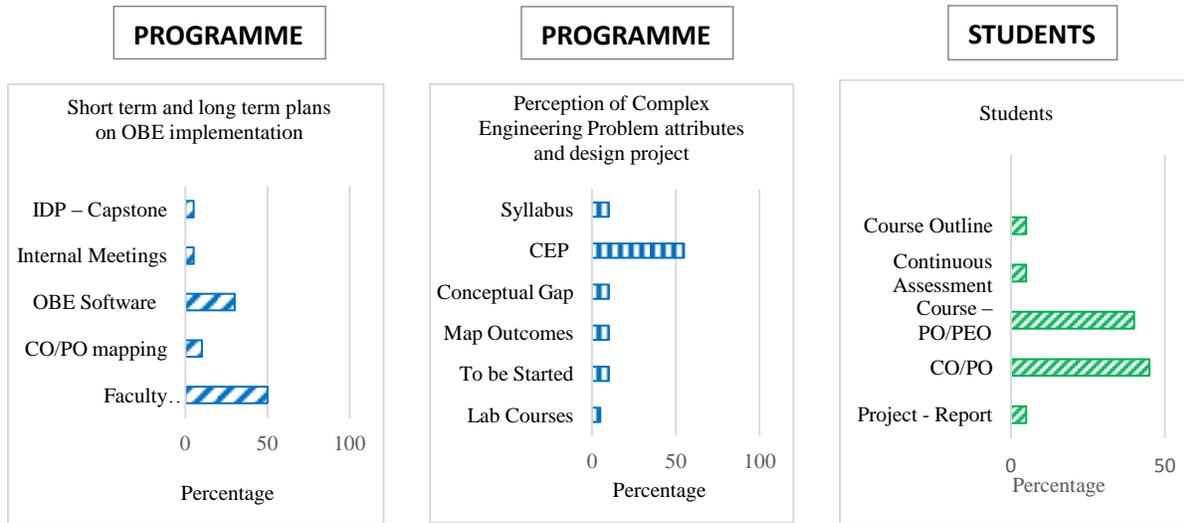


Figure 1: Percentage of Responses on Perception and Planning

***Rationale, Motivation, and Timeline for Implementing OBE***

While asked about the rationale and motivation behind OBE implementation, the programme stakeholders responded in the categories of i) motivation for OBE for its outcomes; ii) accreditation need and the subsequent quality practices; and iii) BAETE information and requirements. When students were asked about the importance and meaning of accreditation, they responded in the categories: (i) IEB membership; (ii) Job field; (iii) recognition; and (iv) certification. Responses in percentages are shown in Figure 2.

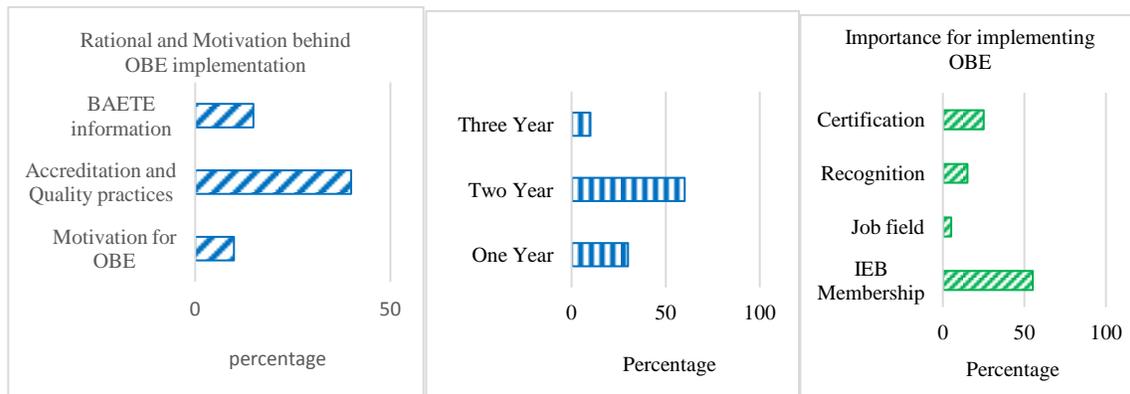


Figure 2: Percentage of responses on rationale, motivation, and timeline

***Preparedness for OBE-based Accreditation and Involvement***

Faculty members mentioned the challenges as i) training/workshop; ii) supportive initiative from university authority; iii) CLO and PLO mapping sessions; iv) discussions and meetings; v) struggling with extra load; and vi) building industry relationships. University authorities were asked regarding the implementation of

OBE and the responses were: (i) OBE training; (ii) curriculum development; (iii) motivational workshops; (iv) CO and PO mapping mentoring; (v) resource assessment; and (vi) faculty awareness. After preparation of the programmes and the HEIs plans on OBE, students were asked about their familiarity with the complex engineering problems. Their responses were: (i) working on a project; (ii) working in a group; (iii) solving problems; and (iv) non-familiarity. They were questioned about their experience with project design or open-ended projects and the categories of responses were: (i) capstone; (ii) no open-ended project started yet; (iii) project through internship; (iv) initial difficulties; (v) presentation and report preparation processes; and (vi) industry/factory demonstration inclusion. Figure 3 shows the responses in percentages.

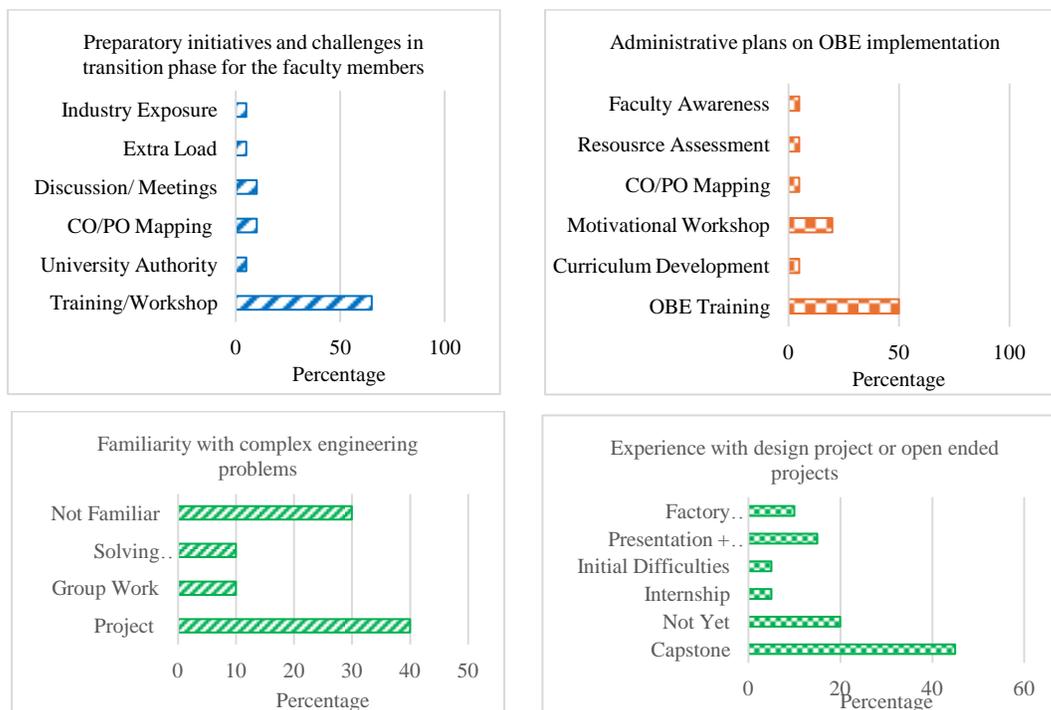


Figure 3: Percentage of responses on preparedness and involvement

### *Process of OBE and Impact*

Programmes were inquired on the impacted education indicators and the OBE model was followed the responses were: (i) infrastructural improvising; (ii) increase in the strength of faculty; (iii) teaching-learning system transition; (iv) dominating model adoption; (v) culminating model adoption; and (vi) improvement in communication. Students' opinions were categorized: (i) infrastructural improvising; (ii) increase in the strength of faculty; (iii) teaching-learning system transition; and (iv) improvement in communication. Figure 4 shows the responses in percentages.

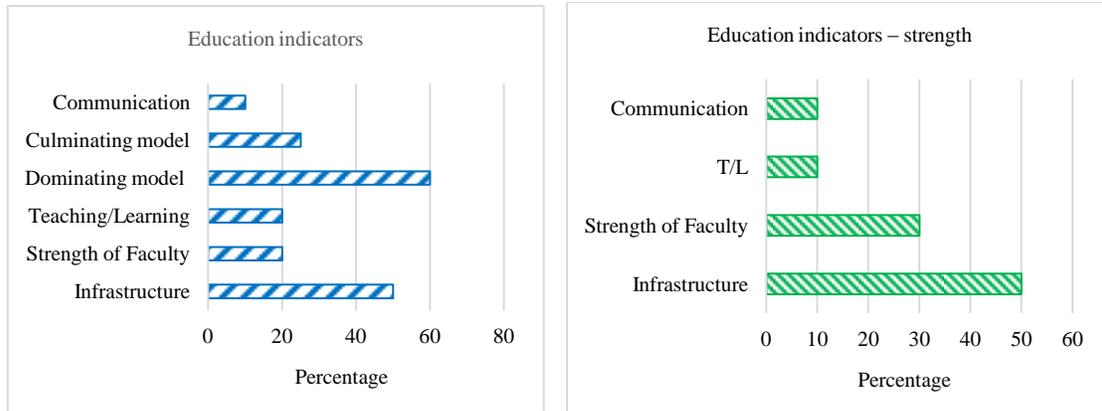


Figure 4: Percentage of responses on the process of OBE and its impact

### *Analysis of Roles, Challenges, and Strategies in OBE Implementation*

Analysis of roles of faculty facing challenges for implementing OBE were poorly defined changes of curriculum and lack of strategies. Programmes specified faced by them were challenges from HEIs administration as (i) laboratory development; (ii) infrastructural support; (iii) faculty retention; (iv) OBE coordinators; (v) administrative support; (vi) mindset; and (vii) data processing/logistics. Programme respondents were inquired about the expected and visible changes in their academic environment and the responses were as (i) paradigm shift in the education system; (ii) change in the curriculum; (iii) project management; (iv) student engagement; (v) PLO attainment; (vi) facilities and resources improvement; and (vii) introduction of capstone and projects. Programmes mentioned certain specific challenges and changes in the curriculum: (i) alignment with OBE; (ii) adjustment in total credits; (iii) designing courses; (iv) need for faculty training; (v) credit management; (vi) leadership; and (vii) CLO and PLO mapping steps. For further strategies, programme respondents provided options on (i) mental alignment; (ii) documentation and acquisition of knowledge; (iii) workloads of teachers; (iv) guideline framework; (v) faculty recruitment; and (vi) brainstorming. Hasan et al. (2012) and Rajaei et al. (2013) pointed out certain challenges in the past aligned with this. Percentage of responses in roles, challenges, and strategies is given below (Figure 5).

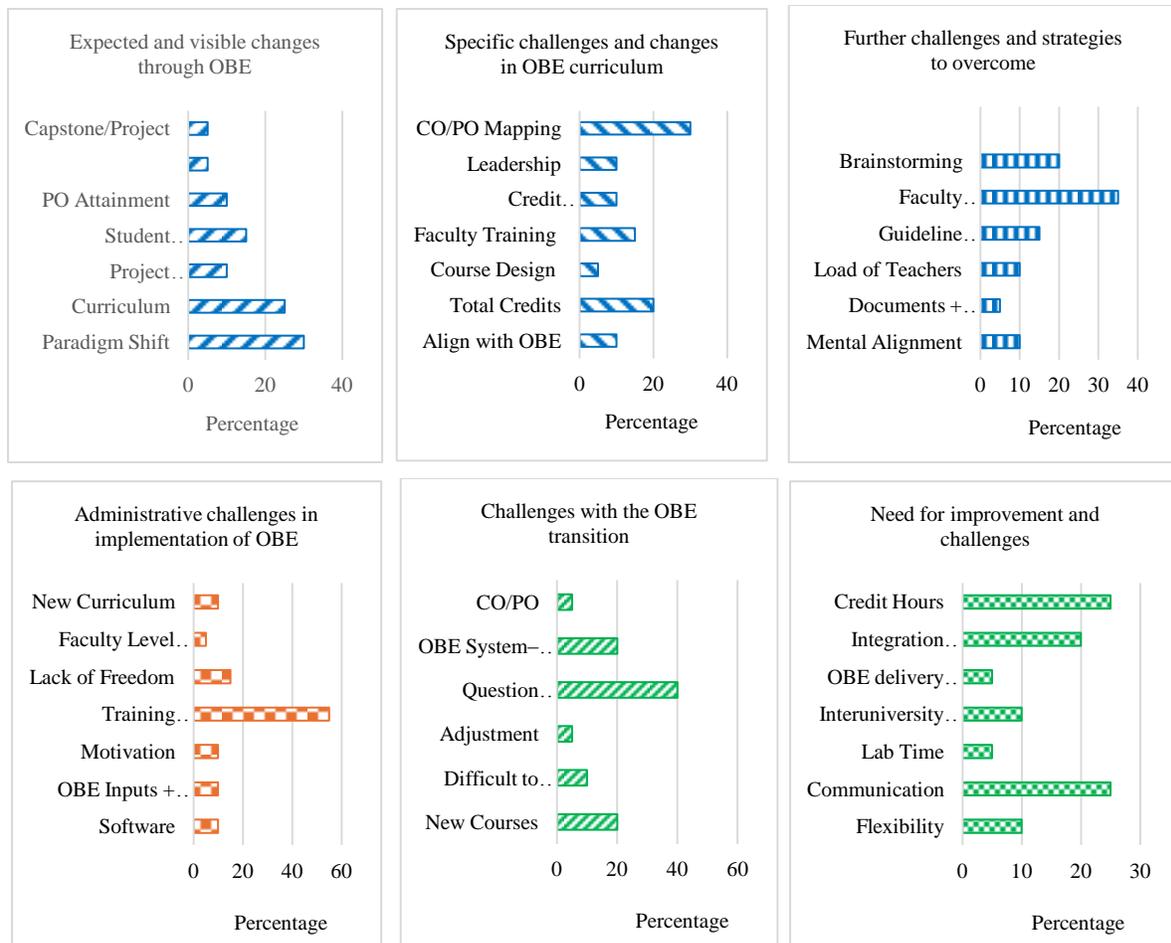


Figure 5: Percentage of responses in roles, challenges, and strategies

The administration mentioned the challenges on (i) software requirement and development; (ii) OBE inputs and outputs processing; (iii) keeping motivation; (iv) continuing training and workshop; (v) lack of freedom on priority issues; (vi) faculty level challenges; and (vii) introducing new curriculum. Students expressed the challenges with OBE transition in the categories: (i) familiarity with new courses; (ii) difficulty in implementation; (iii) adjustment with the terminology; (iv) challenge with question pattern change; (v) OBE level understanding; and (vi) understanding of CLO and PLO. Students expressed opinions regarding the need for improvements, which included: (i) more flexible implementation; (ii) communication; (iii) duration of the laboratory; (iv) need for inter-university competition; (v) respite from OBE delivery and feeling of burden; (vi) integrated efforts and initiatives; and (vii) handling total credit hours including capstone. Figure 5 shows the responses in roles, challenges, and strategies.

### *Gaps to be Fulfilled and Needs to be Addressed*

Programmes were questioned on the areas where gaps exist that need to be filled. They indicated that the following categories were important: i) final year design

project (FYDP) assessment, (ii) check system in the department; (iii) continuation of seminars and training with expertise; (iv) revision of the assessment and attainment; and (v) software for assessment. When university authorities were asked about the gaps to be filled and strategies to make, their opinions included: (i) the need for monitoring; (ii) quality of implementation and preparedness; (iii) curriculum revision; (iv) systematic approach follows; (v) quality teaching; and (vi) assessment of system improvement for CLO/PLOs. Figure 6 shows the responses in gaps and needs.

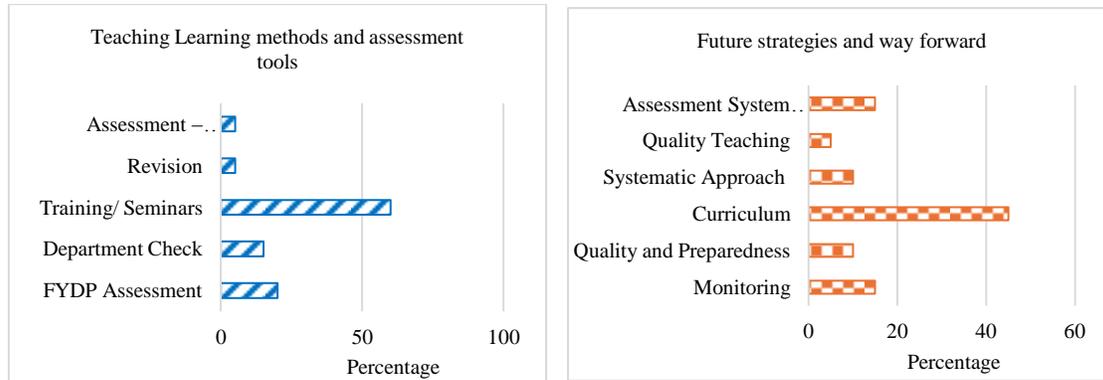


Figure 6. Percentage of responses in gaps and needs

Based on these findings, the following need to be addressed to translate into the benefits to be incurred in the long run from the accreditation practices: priority, preparation, motivation, understanding, and knowledge base, training and development, freedom to innovate, bottom-up communication, sharing to solve the common problems, logical and timely facilitation of bottleneck removal, alignment of stakeholders, clarity on the roles and mutual recognition of accreditation authorities.

### ***Feedback from Accreditation Authorities***

By 2017, the BAETE Accreditation Manual for OBE Version 1 was launched after nine months of work developing the graduate attributes. Switching towards OBE implementation was gradual while Version 2 of the manual was launched during the COVID-19 pandemic in 2021, including CEP's attributes. BAETE envisions launching Version 3 of the manual, which will align the curriculum with sustainable development goals in graduate attributes and professional competency (GAPC). Around 300 engineering programmes were targeted by the BAETE to sensitize them for implementing OBE. Over the process and multiple dissemination sessions, around 100 programmes started to implement OBE. BAETE has conferred accreditation to 76 engineering programmes according to the procedures of the BAETE Accreditation Manual (BAETE Manual, 2021). Figure 7 shows the total picture of the transformation toward certification. For programme accreditation, 65 applications were successful (out of 70) following the BAETE manual before the implementation of OBE; 15 programmes obtained accreditation including renewal

(out of 16 applications) adopting BAETE Manual Version 1 (in 2017); two obtained accreditations (out of 16 applications) adopting Manual Version 2 (2021), while five programmes were accredited (out of 87 applications) adopting Manual Version 2.1. None of the programmes were accredited in the first cycle to date. At the institutions level, around 30 institutions had at least one programme accredited.

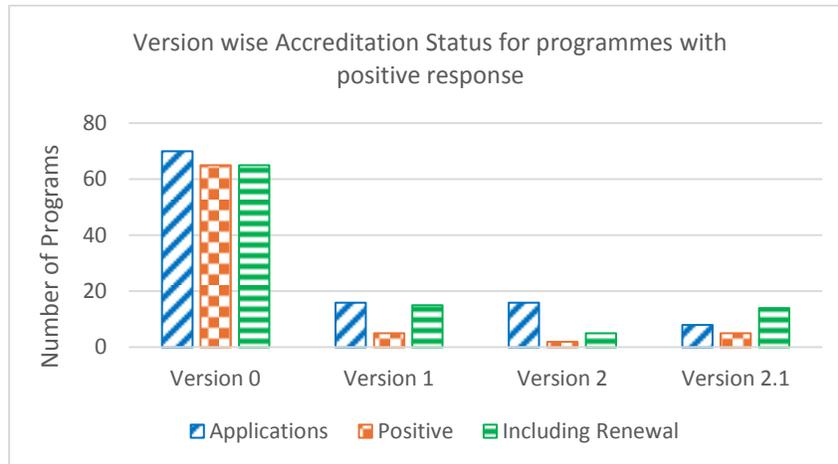


Figure 7: Programme-wise accreditation status for programmes accredited at first attempt according to versions of manuals updated so far

The evaluation and approval process of the curriculum is still under process by UGC, which takes a couple of steps as follows:

Review by subject specialist → comments for correction → collection of faculty CVs laboratory visit by experts.

As the process is lengthy, to improve the curriculum by addressing the comments (approval is targeted by June 2023), UGC has started implementing the OBE curriculum at the beginning of 2023 for all universities (UGC, 2021). Training for the academic staff is targeted for OBE implementation as part of the foundation training by UGC. Modules of training are prepared for teachers while updated versions of OBE are to be included in the annual report of the UGC from the next fiscal year.

### Implications

The Bangladesh Accreditation Council is facing challenges to bring a huge number of universities to adopt the globally recognized education system in Bangladesh. The essence of OBE needs to be transmitted and realized at all levels of the education system. To prepare the students for future workplace, their innovative capabilities need to be nurtured by providing enough flexibility and freedom. Instead of hard evaluation and exam-based assessment on theoretical content, practical implementation and evaluation should be improved, so that they will be able to generate more practical perspectives

An important aspect of the study was to bring out the need for frequent monitoring of the practices, with validation for the reliability of the findings. This could be ensured through assessing the programmes from practical aspects and checklists continuously to track down the deviation from the findings at a frequent interval concerning their consistency in implementation, continuous improvements, addressing the challenges, and removing bottlenecks with overall upgrading or improvement. This will validate the status of the institutions and programmes continuously to reach the implementation-related milestones setting newer standards and benchmarks on the way forward.

### **Limitations**

The scope of the study within a limited time frame was to cover a limited number of public and private universities. There is still an inadequate number of universities and programmes that have started implementing OBE. To have a broad-spectrum coverage on the status of OBE, implementation, and perception of OBE in engineering programmes, more institutions need to be covered in the future. Stakeholder engagement could not be ensured to be diversified enough considering the variability in the application of OBE, the teaching-learning process, and relating OBE components with the process.

### **Conclusions**

The dynamic transformation of the academic environment in engineering programmes towards OBE has happened through changes in curriculum, teaching-learning and assessment methodology, tools utilized, and overall mind-set. This study investigated the overwhelming experiences and challenges being faced through status analyses and dissemination to stakeholders. Major findings from the responses to the interview and close observation of the academic activities of respective programmes are provided below:

- More than half of the engineering universities in Bangladesh are adopting OBE as one of the contemporary approaches step by step to prepare the students with better hard and soft skills, innovative capacity, and better employment potentials.
- Private universities enrolling more than 10 times more students in engineering programmes than public universities need more empowerment so that quality students can be attracted and existing students are better equipped.
- From an accreditation perspective in OBE practice, more than 70 engineering programmes obtained accreditation with renewals, and around 30 universities as of now have at least one programme accredited.
- Transformation of mindset and culture is not taking place simultaneously with implementation, under the OBE umbrella BAETE is setting a benchmark, which will help in developing the programmes.

Most of the programmes follow the dominating model of OBE with multiple courses across the curriculum to attain the programme outcomes: it took mostly between 1 – 3 years to bring them to that stage of implementation. The interviews reflected that the short-term and long-term plans for OBE are needed for requirement-based development. Only 50% of responders showed interest in training and development plans while 30% talked about OBE software, and  $\leq 10\%$  mentioned CLO and PLO mapping sessions with capstone and institutional development plans. More expertise in OBE is required, and laboratory and workshop-related courses need to be integrated with theory courses to culminate the complex engineering problems. Students did not have enough perception of OBE, with less than 50% mentioning CLO and PLO at course level and  $< 10\%$  mentioning OBE exposure. Crucial factors in the transition towards OBE include workshops and training, support from an authority, balancing extra load with teaching, building industry relations, curriculum development, resource assessment, CLO, and PLO mentoring. Time commitment remains a challenge and alignment with OBE is lost under procedural fault.

From an impact point of view, most of the stakeholders believed that there are significant infrastructural improvisations such as in laboratory and engineering workshop expansion, and occupational and health safety features should be taken into consideration during OBE implementation with improvement in faculty strength and teaching-learning. Strategies to overcome the bottlenecks and reduce the gaps have been envisioned through extra credit management, faculty recruitment, involvement and engagement with OBE coordinators and frequent training programmes, strengthening the capacity building of Institution Quality Assurance Cell (IQAC), and monitoring of curriculum implementation from UGC.

### **Recommendations**

From the implementation end, continuous quality improvement needs to be ensured through analysis of stakeholders' feedback, so that proper reflection on the curriculum, course content, delivery, and assessment will be determined. An all-round understanding of the components of OBE and the relevance of each of the programme outcomes, knowledge profiles, and domains need to be communicated at the level of translating those into teaching and learning processes effectively. Accreditation is the driving factor for following up with documentation and inventory practice. However, universities and programmes should not feel burdened to implement OBE only for the sake of meeting the requirement of accreditation milestones. This teaching-learning process should not lose the freedom of connections beyond the boundary of course objectives. This could be established through the sharing of best practices in the journey of OBE implementation. This will enable continuous tracking of status, which is recommended for validation and reliability checking. From an accreditation requirement perspective, the authorities need to clarify their roles and responsibilities without any confusion. Finally, an

assessment of the need to reduce the gaps in OBE adoption and identifying the roles of stakeholders in implementing OBE's successful and holistic approach would be the next steps, so that a smooth transition towards OBE culture is developed.

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