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Foreword

Bangladesh Accreditation Council (BAC) was established with the mandate to promote a culture of quality assurance in higher education and to institutionalize accreditation practices in Bangladesh. In pursuing this mandate, BAC has developed standards, criteria, policies, and operational mechanisms to strengthen quality enhancement and ensure the credibility and international recognition of higher education. Since its establishment, BAC has made significant progress in strengthening the national quality assurance and accreditation system.

On that note, recognizing the importance of research in supporting evidence-based decision-making and advancing quality assurance, BAC adopted the '*Bangladesh Accreditation Council Research Policy 2022*'. Since the fiscal year 2022-23, BAC has been funding research on quality assurance and accreditation in higher education, thereby fostering a culture of research and innovation in this important field. Under this initiative, five research projects were approved in the fiscal year 2024-25 and completed successfully. The studies address several contemporary issues of strategic importance to higher education, including teachers' resistance to Outcome-Based Education (OBE) practices, OBE curricula, challenges in implementing OBE and OBE-based teaching tools, and the integration of Generative Artificial Intelligence in higher education. The findings and recommendations presented in these studies are expected to contribute significantly to strengthening quality assurance and accreditation practices. Following review and evaluation of the final reports, BAC is pleased to publish the '*Proceedings of the Workshop on Research Projects 2025*'. It is expected that this publication will serve as a valuable resource for policymakers, academics, researchers, and stakeholders engaged in the advancement of higher education quality.

I express my sincere appreciation to the members of the Research Management Committee for their dedication and contribution to the successful implementation of the research activities and preparation of this publication. I believe that this publication will further strengthen research-based initiatives and contribute to achieving the mission and objectives of Bangladesh Accreditation Council.



Professor Dr. Mesbahuddin Ahmed
Chairman
Bangladesh Accreditation Council

Preface

Bangladesh Accreditation Council (BAC) is committed to strengthening quality assurance and accreditation to promote continuous improvement and international recognition of higher education in Bangladesh. Research plays a vital role in this mission by generating evidence to inform policy, enhance institutional practices, and support quality development.

Under the *Bangladesh Accreditation Council Research Policy 2022*, BAC supports research on quality assurance and accreditation. For the fiscal year 2024-25, five research projects were selected from 115 proposals through a rigorous evaluation process and successfully completed with financial support from BAC.

The “Proceedings of the Workshop on Research Project, 2025” contains five research manuscripts focusing on Outcome-Based Education (OBE) and Generative Artificial Intelligence (GAI) in higher education. Overall, the studies emphasize that improving the quality of higher education requires strong institutional support, continuous faculty development, effective leadership, innovative teaching and assessment practices, technology integration, and robust quality assurance systems. It also highlights the importance of ethical AI adoption, curriculum alignment with industry and labor market needs, stakeholder collaboration, and a student-centered learning environment to enhance graduate competencies, employability, and the global competitiveness of higher education in Bangladesh.

I hope that Volume 3, the third publication of “Proceedings of the Workshop on Research Project, 2025”, will contribute to understanding the Bangladesh Accreditation Council's research activities, goals, and objectives.

I express my sincere gratitude to the members of the Research Management Committee for their guidance and continued support throughout the research process. My appreciation also goes to the Principal Researchers and their research teams for their dedication and timely completion of the projects. I am deeply grateful to Professor Dr. H. M. G Azam and Professor Dr. M. Shahidul Kabir for making this publication more effective. They both thoroughly reviewed the manuscripts. My sincere gratitude also goes out to the BAC authorities and colleagues for their immense support.

Finally, I acknowledge with gratitude the continued encouragement and leadership of the Chairman, BAC, Professor Dr. Mesbahuddin Ahmed, whose support has greatly contributed to advancing the research and publication initiatives of the Bangladesh Accreditation Council.



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Factors Influencing Teachers' Resistance to Outcome-Based Education Practices: A Case Study of Daffodil International University, Bangladesh

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Abstract

This study explores the psychological, organizational, and social factors driving teachers' resistance to Outcome-Based Education (OBE) by employing a dual-stage analytical approach combining Partial Least Squares Structural Equation Modelling (PLS-SEM) and Artificial Neural Networks (ANN). Grounded in Status Quo Bias Theory and Conservation of Resources (COR) Theory, the research examines how seven key variables—switching benefits, switching costs, role overload, role ambiguity, self-efficacy, organizational support for change, and colleague opinion— influence resistance behaviors. Data were collected using a structured, validated questionnaire distributed to university faculty actively involved in OBE practices, yielding 322 valid responses. The PLS-SEM results revealed that switching benefits significantly reduce resistance, while switching costs, role overload, and role ambiguity increase it. Colleague opinion also had a significant negative influence on resistance, underscoring the power of peer perceptions in educational change. Self-efficacy and organizational support showed negative but statistically insignificant relationships. To enhance predictive power, ANN analysis was used to rank the predictors' importance. The results confirmed role ambiguity (100%), colleague opinion (48.77%), and switching benefits (46.44%) as the most influential factors in predicting resistance. By integrating theory-driven modelling with advanced machine learning, this study provides empirical insights for institutions and policymakers aiming to facilitate a smoother adoption of OBE. It fills key gaps in the literature and offers actionable strategies to minimize resistance through targeted communication, role clarity, workload management, and selective technology use

Keywords: Outcome-based education; teachers' resistance; Status quo bias theory; conservation of resource theory; PLS; Artificial neural network

Introduction

Outcome-Based Education (OBE) was the first educational system to emerge, aiming to improve learning effectiveness by specifying and clearly stating the expected

outcomes learners would achieve by the end of a course or program of study. The basic features of Outcome-Based Education (OBE) revolve around the clear statement of desired outcomes, the consistency of the curriculum and instructional approach with these outcomes, and the design of appropriate evaluation tools to assess students' achievement of the learning goals.

One of the cornerstone principles of Outcome-Based Education (OBE) is its emphasis on student learning rather than content coverage. The shift from a conventional input-based model to a results-oriented approach requires a comprehensive understanding of clearly articulated learning outcomes that guide instructional strategies and curriculum development (Hamidi et al., 2024). OBE compels instructors to define the specific knowledge, skills, and attitudes learners are expected to demonstrate upon completing a course (Rao, 2020). By focusing on these outcomes, educators are better positioned to design relevant, meaningful, and effective learning experiences for students (Iqbal et al., 2020).

The introduction of OBE is not without difficulties. Lack of faculty training and resistance to change are obstacles to the effective application of outcome-based education strategies (Yen et al., 2024). Whereas, in Malaysian higher education, even though Outcome-Based Education (OBE) involves a more organized and integrated teaching and assessment strategy, some problems persist that hinder its success (Sun & Lee, 2020). Teacher training programs aimed at the underpinnings of Outcomes-Based Education (OBE) play a crucial role in preparing teachers with the skills to implement this pedagogy (Almuhaideb & Saeed, 2020).

Teachers' resistance to adopting Outcome-Based Education (OBE) may stem from several factors, including insufficient guidance and limited understanding, as well as inadequate institutional infrastructure for effective implementation. When teachers do not fully comprehend OBE principles and processes, or when they lack appropriate training, misconceptions are likely to arise, leading to reluctance or resistance. Furthermore, resistance to change is a common human tendency, particularly in workplace settings; instructors accustomed to traditional teaching methods may therefore be hesitant to embrace the pedagogical shifts required by OBE.

This study seeks to identify the key factors—drawn from status quo bias theory and role stress theory—that influence teachers' resistance to OBE in higher education. It aims to develop a theoretical framework, grounded in empirical evidence, to explain the underlying causes of such resistance. The research focuses on how resistance is expressed through teachers' debates, discussions, and articulated dissatisfaction, often manifested in complaints and negative discourse surrounding OBE implementation. By integrating relevant theoretical constructs with observed behavioral patterns, the study aspires to provide deeper insights into the roots of resistance and to contribute to the refinement and more effective implementation of OBE practices.

Literature review and theoretical foundation

To use outcome-based Education (OBE), administrators, teachers, and students themselves must concentrate on the intended learning outcomes during planning, execution, and assessment, and build a complete educational framework. Learning outcomes, Rao (2020) makes clear, are related to educational objectives, behavioral objectives, performance objectives, subordinate skills, general objectives, and specialized competencies.

Overcoming obstacles requires careful preparation and the involvement of relevant stakeholders to adopt Outcome-Based Education (OBE) successfully. Studies by Ram & Ajay (2020), Kaliannan & Chandran (2012), Gunarathne et al. (2020), among others, emphasize stakeholder support for OBE prior to its introduction. When stakeholders participate in developing learning outcomes and assessments, student learning outcomes improve and match educational goals. The adoption of Outcome-Based Education (OBE) is constrained by the time and resources required to develop assessments, frameworks, and instructional materials. Adequate resource allocation is emphasized by Akir et al. (2012), Gunarathne et al. (2020), and others as a key to addressing these challenges.

Further difficulties arise from inadequate supporting environments, instructor workload management, implementation ambiguities, and unstable system conditions. Inadequate infrastructure, insufficient resources, and dangerous learning environments, identified by Maleki (2021) and Damit et al. (2021) as obstacles to the effective application of OBE, are exacerbated by increasing teacher workloads. The lack of clear implementation guidelines often leads to uncertainty about content and approach. As stressed by Damit et al. (2021), the inconsistency of OBE systems reduces the dependability and efficiency of their application. Surmounting these obstacles requires open, dependable, resource-based OBE frameworks as well as strong institutional support.

Model Development

Status Quo Bias Theory

The Status quo bias theory explains the tendency of individuals to prefer existing conditions and resist change, even when alternatives may be objectively superior. People often favor the status quo because it is familiar, established, and perceived as less risky. Samuelson and Zeckhauser (1988) attribute this bias to three main factors: rational decision-making considerations, cognitive distortions, and psychological commitment.

Building on Kim and Kankanhalli (2009), this study examines switching benefits and switching costs associated with adopting Outcome-Based Education (OBE) in place of traditional teaching approaches. Switching benefits refer to the perceived gains from implementing OBE, such as improved instructional effectiveness, enhanced

student performance and engagement, and more efficient assessment processes. In contrast, switching costs represent the perceived disadvantages of change, including the time, effort, and additional resources required to redesign curricula and adopt new pedagogical strategies, as well as the potential short-term decline in effectiveness during the transition period (Chen and Hitt, 2002). The switching costs may also include sunk costs, uncertainty costs, and transition costs, all of which can contribute to faculty reluctance to implement OBE. Accordingly, we propose the following hypotheses.

H1: Switching benefit is negatively associated with teachers' resistance (TR)

H2: Switching cost is positively associated with teachers' resistance (TR)

Conservation of resource theory

Empirical research has shown conflicting multi-role expectations from faculty to cause role stress (Ma et al., 2020). Role stress refers to the imbalance people experience due to uncertainty, inconsistency, or overly high expectations associated with roles, norms, and behaviors (Kahn et al., 1964). It covers three dimensions: role conflict, role ambiguity, and role overload. Using role theory (Kahn et al., 1964), stress theory (Hwang & Cha, 2018), and the job demands-resources (JD-R) model (Pecino et al., 2019), the current study explores the effects of role stress on job burnout, service quality, and job satisfaction. Although role stress suggests differences in interpersonal dynamics, we suggest that role overload and role ambiguity significantly influence resistance behavior. There has been little research in this field.

Role overload occurs when people lack personal resources to complete assigned tasks, thereby impairing their ability to execute them (Rahim, 1997). In an organization, role ambiguity is the state in which members have insufficient or vague understanding of what is expected of them (King & King, 1990).

The rigidity of their roles and the weight of their obligations help to explain teachers' resistance to Outcome-Based Education (OBE). When teachers believe their tools are insufficient to meet Outcome-Based Education (OBE) criteria, role overload arises from the tension and the inability to implement new pedagogical strategies properly. When teachers do not clearly understand their responsibilities and expected outcomes within the OBE structure, they suffer from role ambiguity. Studies indicate that role ambiguity affects professional performance and creativity and increases resistance to adopting OBE practices (Lin et al. 2021). The proper implementation of OBE depends on resolving these problems. Thus, we suggest

H3: Role overload is positively associated with teachers' resistance (TR)

H4: Role ambiguity is positively associated with teachers' resistance (TR)

Additional Variable from the literature

Self-efficacy

By influencing perceived transition costs, self-efficacy for change may subtly influence resistance to Outcome-Based Education (OBE) approaches. Bandura (1995) and Compeau et al. (1999) show that teachers with high self-efficacy regarding change exhibit less fear and uncertainty when using OBE approaches. Teachers' self-efficacy influences the execution and efficacy of Outcome-Based Education (OBE). Managing the complexity of Outcome-Based Education (OBE) depends on a teacher's self-efficacy, that is, their confidence in their ability to apply instructional strategies successfully and influence student learning. Higher self-efficacious educators are more likely to adopt pedagogical strategies prescribed by Outcome-Based Education (OBE). They boldly interact with the OBE framework using fresh approaches and curriculum development aligned with the intended results. Hence, we suggest

H5: Self-efficacy for change has a negative influence on Teacher Resistance (TR)

Organizational support

Apart from teachers' own initiatives to adapt to a new learning environment, external organizational support for change is crucial in facilitating the transition to Outcome-Based Education (OBE). Organizational support for change (Hirschheim & Newman, 1988) in this study refers to the institution's efforts to help teachers adjust effectively to OBE practices. Implementing OBE requires clear direction, structured training, and access to relevant resources for curriculum development, assessment design, and outcome evaluation. Teachers' resistance to OBE adoption can be significantly reduced when change initiatives are well planned, such as professional development programs, organized seminars, mentoring opportunities, and the provision of appropriate teaching tools. Effective organizational support fosters a more positive and committed faculty attitude while reducing the perceived stress associated with change.

H6: Organizational support has a negative influence on Teacher Resistance (TR)

Colleague opinion

Opinions of colleagues are considered a significant social influence in the workplace (Lewis et al., 2003). Colleague opinion in this study refers to the belief of colleagues that they support the OBE implementation-related changes. Driven by the need for social camaraderie and concern for the consequences of noncompliance, educators often yield to their peers' beliefs. We refer to this form of peer pressure as normative influence (Ajzen, 2002; Lewis et al., 2003). Accordingly, when colleagues hold positive attitudes toward OBE-related behaviours, such perceptions may help lessen resistance. Therefore, we developed the following hypothesis:

H7: Colleague opinion has a negative influence on Teacher Resistance (TR)

Our proposed research model is shown in fig. 1.

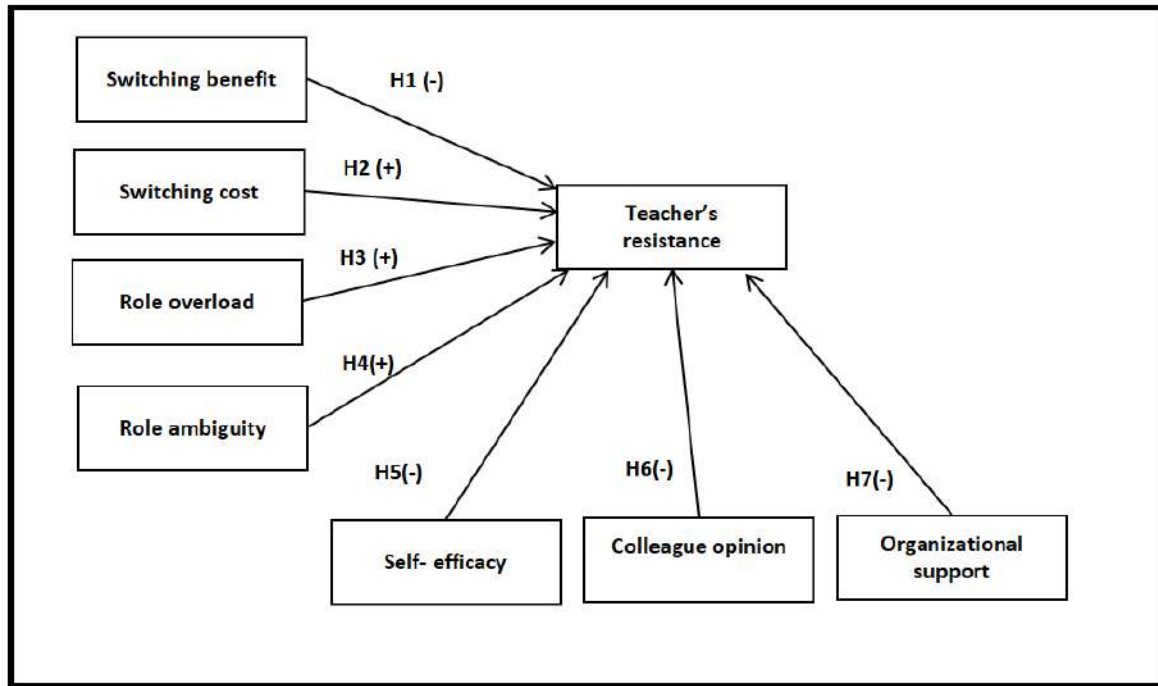


Figure 1: Conceptual Framework

Methodology

Data collection procedure and sample size

The selection criterion for the study is that accredited departments are expected to have successfully addressed and overcome resistance to implementing and using Outcome-Based Education (OBE). Given the known population size, a simple random sampling technique was employed. This approach ensured that every member of the population had an equal probability of selection, thereby facilitating the generation of a representative sample and minimizing selection bias. The use of this method enhanced the validity and reliability of the findings and effectively supported the research objectives.

For a population of 800 faculty members practicing OBE, the required sample size was calculated to be 260, assuming a 5% margin of error. Allowing for a 10% non-response rate, the adjusted sample size increased to 286 (Gill et al., 2010). To further mitigate potential survey errors and ensure an adequate number of usable responses, 400 questionnaires were distributed.

Measurement Items

Existing validated scales were utilized wherever applicable, and new scales were developed based on insights from previous literature when necessary. The table

outlines seven constructs used to measure teachers' resistance to Outcome-Based Education (OBE), with questionnaire items adapted from established sources. Teacher's Resistance (TR), derived from Mahmud et al. (2017) and Laumer et al. (2014), reflects teachers' opposition through protests, complaints, and lack of cooperation toward OBE initiatives. The Switching Benefit (SB), based on Moore & Benbasat (1991), Kim & Kankanhalli (2009), and Mahmud et al. (2017), assesses perceived improvements in job effectiveness, productivity, speed, and quality from adopting OBE. Switching Cost (SC), drawn from Ayyagari et al. (2011), and Mahmud et al. (2017), captures the time, effort, and potential losses associated with transitioning from traditional teaching. Role Overload (RO), using the same sources, measures how OBE increases workload, stress, and demands. Role Ambiguity (RA), as adapted from Ayyagari et al. (2011), and Mahmud et al. (2017), refers to uncertainty in prioritizing between OBE and core teaching tasks. Self-Efficacy for Change (SE), grounded in Taylor & Todd (1995) and Kim & Kankanhalli (2009), evaluates teachers' confidence in independently adapting to OBE. Organizational Support (OS), as defined by Thompson et al. (1991) and Kim & Kankanhalli (2009), refers to institutional and managerial assistance during the transition. Lastly, Colleague Opinion (CO), developed from Venkatesh & Davis (2000) and Kim & Kankanhalli (2009), examines peer encouragement and social influence in the adoption of OBE practices. Together, these constructs comprehensively assess psychological, institutional, and social factors that shape teachers' resistance or acceptance toward OBE. The measurement items were anchored on seven-point Likert scales (1 = strongly disagree, 7 = strongly agree). All items were phrased in terms of the OBE practice under study.

Data Analysis Strategy

SPSS version 24 will be used to analyze the demographic data and conduct initial data screening. The expectation-maximization (EM) algorithm will be applied to handle missing data within the dataset. Descriptive statistics will be generated to report the frequencies of demographic variables.

The research model, which examines the linear relationships among observed variables, will be evaluated using structural equation modelling (SEM) (Armstrong & Grover, 2009). The key factors identified through PLS-SEM will subsequently be validated using neural network modelling (NNM). Artificial Neural Networks (ANN) were selected for this study because, unlike traditional statistical techniques that primarily detect linear relationships, ANN can capture both linear and nonlinear patterns. Several prior studies have adopted a similar methodological approach (Sharma et al., 2019; Sharma & Sharma, 2019).

This integrated approach is expected to produce a more robust and accurate model, overcoming the limitations of single-method analyses and enhancing predictive capability. SPSS version 24 will also be used to implement the ANN technique.

Data analysis

Demographic

The demographic breakdown (see Table 1) of the respondents shows that the majority were male (69.9%, 225 respondents), while females accounted for 30.1% (97 respondents). This indicates a gender imbalance among the participants, with males being more predominant. Regarding faculty affiliation, most respondents (65.8%) were from the Faculty of Science and Information Technology (FSIT), reflecting the study's heavy representation of science and technology disciplines. The Faculty of Business and Entrepreneurship (FBE) contributed 10.9% of the participants, while the Faculty of Engineering (FE) accounted for 11.5%. Meanwhile, the Faculty of Humanities and Social Sciences (FHSS) and the Faculty of Health and Life Sciences (FHLS) had smaller representations, contributing 6.8% and 5% of the total sample, respectively.

Regarding designation, a significant proportion of respondents were Lecturers (59.3%), indicating that early-career academics were well represented. Lecturers on Senior Scale (Lecturer (Se)) comprised 13.7% of the sample, while Assistant Professors made up 20.2%. Associate Professors accounted for 5.9%, and Professors accounted for the smallest group, at 0.6%. Overall, the data reflects a strong representation of junior to mid-level academic staff across multiple faculties, with a notable dominance of the science and technology disciplines.

Table 1. Demographic information

		Frequency	Percentage
Gender	Male	225	69.9
	Female	97	30.1
Faculty	FSIT	212	65.8
	FBE	35	10.9
	FHLS	16	5
	FHSS	22	6.8
	FE	37	11.5
Designation	Lecturer	191	59.3
	Lecturer (Senior)	44	13.7
	Assistant Professor	65	20.2
	Associate Professor	19	5.9
	Professor	2	0.6

Assessment of the measurement model

In PLS-SEM, Composite Reliability (CR) and Average Variance Extracted (AVE) indicate the reliability and convergent validity of constructs. CR values exceeding 0.70 (Hair & Alamer, 2022) signify strong internal consistency; in this case, all structures surpass this benchmark, indicating exceptional reliability. AVE values exceeding 0.50 validate convergent validity; in this instance, all constructions satisfy the criterion. The measuring model exhibits high reliability and validity, reinforcing the robustness of the constructs included in the research (See Table 2).

Table 2. Average Variance Extracted (AVE) and Composite Reliability (CR)

Variables	Composite Reliability	Average Variance Extracted (AVE)
CO	0.919	0.791
OS	0.943	0.892
RA	0.925	0.755
RO	0.949	0.862
SB	0.967	0.880
SC	1.000	1.000
SE	0.882	0.715
TR	0.914	0.680

Next, we assessed the discriminant validity of the measurement model.

Table 3. Discriminant validity

	CO	OS	RA	RO	SB	SC	SE	TR
CO	0.889							
OS	0.452	0.944						
RA	-0.150	-0.110	0.869					
RO	-0.268	-0.137	0.610	0.929				
SB	0.415	0.408	-0.447	-0.419	0.938			
SC	0.391	0.243	-0.483	-0.400	0.653	1.000		
SE	-0.215	-0.097	0.625	0.711	-0.338	-0.359	0.846	
TR	-0.201	-0.154	0.545	0.426	-0.346	-0.213	0.384	0.825

In PLS-SEM, discriminant validity ensures that each construct is distinct from others in the model. The Fornell-Larcker criterion is commonly used, in which the square root of an AVE (diagonal values) should be greater than the correlations with other constructs (off-diagonal values). Table 3 shows the results; all constructs meet this criterion.

Assessment of the structural model

Once the measurement model's reliability and validity were confirmed, the next step was to evaluate the structural model and test the proposed hypotheses (Hair et al., 2017). The results of the structural model assessment are presented in Table 4.

Table 4. Hypothesis test result

Hypothesis	Relationship	Beta value	T statistics	P Values	Remark
H1	SB -> TR	-0.179	2.572	0.010	Supported
H2	SC -> TR	0.232	3.881	0.000	Supported
H3	RO -> TR	0.121	2.008	0.045	Supported
H4	RA -> TR	0.493	9.388	0.000	Supported
H5	SE -> TR	-0.012	0.200	0.841	Not supported
H6	OS -> TR	-0.021	0.356	0.722	Not supported
H7	CO -> TR	-0.105	1.988	0.047	Supported

The results of the structural model assessment are presented in Table 16, which confirm support for several hypothesized direct relationships. Specifically, there is a significant negative relationship between switching benefits (SB) and teachers' resistance (TR) to OBE ($\beta = -0.179$, $t = 2.572$, $p = 0.010$), and a significant positive relationship between switching cost (SC) and resistance ($\beta = 0.232$, $t = 3.881$, $p < 0.001$). Additionally, role overload (RO) ($\beta = 0.121$, $t = 2.008$, $p = 0.045$), role ambiguity (RA) ($\beta = 0.493$, $t = 9.388$, $p < 0.001$), and colleague opinion(OP) ($\beta = -0.105$, $t = 1.988$, $p = 0.047$) all show statistically significant associations with teachers' resistance.

In contrast, self-efficacy (SE) ($\beta = -0.012$, $t = 0.200$, $p = 0.841$) and organizational support(OS) ($\beta = -0.021$, $t = 0.356$, $p = 0.722$) do not exhibit significant effects on resistance to OBE, suggesting these factors may not be influential in the current context.

Therefore, hypotheses H1, H2, H3, H4, and H7 are supported, while H5 and H6 are not . Overall, all supported hypotheses explain a variance of 35.2%.

ANN analysis result

In other areas of research, artificial neural network (ANN) modelling has become a common machine learning tool. An ANN is described by Haykin (2001) as a highly parallel, distributed system consisting of basic processing units capable of storing experiential data and effectively applying it. Designed to replicate human brain function, artificial neural networks (ANNs) uncover hidden patterns in datasets through training and identify underperformance during testing. Artificial neural networks (ANNs) offer a major benefit by allowing the investigation of complex, nonlinear relationships free from assumptions about data distribution (Chong, 2013; Liebana-Cabanillas et al., 2017). ANN benefits from this adaptability over traditional statistical techniques. The input neurons for the ANN model are derived from the significant predictors identified in the SEM-PLS path analysis (Fig. 2). The presence of non-normally distributed data and the possibility of nonlinear correlations between exogenous and endogenous variables justify the use of an ANN.

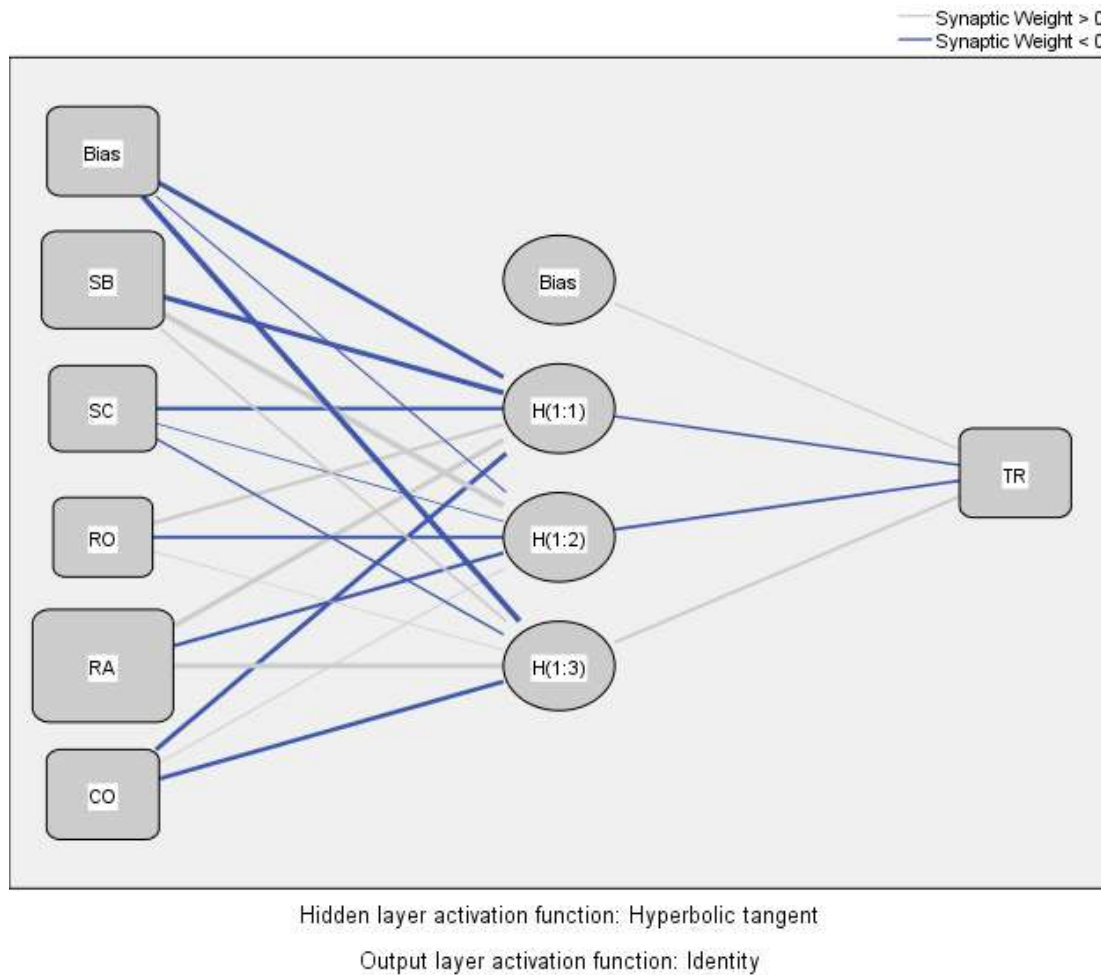


Figure 2: Artificial Neural Network (ANN) Model

We designated 80% of the samples for training, while the remaining 20% were used for testing. To mitigate the risk of overfitting, we employed a ten-fold cross-validation approach and calculated the root mean square error (RMSE) (Ooi & Tan, 2016). Table 5 illustrates that the average RMSE values for the training and testing methods are comparatively low at 0.505 and 0.498, respectively. Consequently, we affirm that the model exhibits an exceptional fit.

Table 5. Artificial Neural Network (ANN) validity

Training	Training	Training		Testing	Testing	Testing
N	SSE	RMSE		N	SSE	RMSE
255	55.478	0.466		66	15.234	0.480
261	78.34	0.548		60	13.658	0.477
259	37.674	0.381		62	14.049	0.476
257	68.407	0.516		64	15.047	0.485
253	55.798	0.470		68	12.744	0.433
256	76.971	0.548		65	17.269	0.515
249	72.258	0.539		72	18.444	0.506
255	63.157	0.498		66	20.670	0.560
251	61.129	0.493		70	21.045	0.548
265	92.203	0.590		56	13.808	0.497
Mean	66.1415	0.505			16.1968	0.498

We performed a sensitivity analysis (Table 6) to quantify the predictive power of each input neuron by calculating their normalized importance, which is the ratio of their relative importance to the maximum importance, expressed as a percentage (Karaca et al., 2019). The results indicate that RA is the primary predictor, followed by CO, with a normalized value of 48.77%. Subsequently, the percentages are as follows: SB (46.44%), SC (39.57%), and RO (29.35%).

Table 6. Sensitivity analysis

	SB	SC	RO	RA	CO
NN1	0.233	0.147	0.101	0.343	0.177
NN2	0.14	0.187	0.129	0.382	0.162
NN3	0.292	0.102	0.125	0.276	0.205
NN4	0.217	0.11	0.177	0.276	0.219
NN5	0.168	0.105	0.095	0.494	0.137
NN6	0.11	0.168	0.11	0.409	0.203
NN7	0.135	0.154	0.096	0.412	0.202
NN8	0.201	0.184	0.055	0.435	0.125
NN9	0.222	0.109	0.145	0.29	0.235
NN10	0.04	0.232	0.078	0.468	0.181
Average Importance	0.1758	0.1498	0.1111	0.3785	0.1846
Normalized Importance(%)	46.44	39.57	29.35	100	48.77

Results and Discussion

This study yielded several important findings regarding teachers' resistance to Outcome-Based Education (OBE). First, perceived benefits of switching were found to have a significant negative relationship with resistance, indicating that resistance decreases when teachers perceive greater advantages in adopting OBE. In contrast, switching costs demonstrated a positive effect, suggesting that higher perceived costs associated with transitioning to OBE increase resistance.

Furthermore, both role ambiguity and role overload significantly influenced teachers' resistance, underscoring how unclear expectations and excessive workload contribute to their reluctance to implement OBE practices. Colleagues' opinions also played a meaningful role, indicating that negative peer evaluations or skepticism may intensify resistant behaviour.

Although self-efficacy to change and organizational support were negatively correlated with resistance, the impact was greater than the variables could statistically support. Nevertheless, the results reinforce the multifaceted nature of the factors that influence teachers' perceptions of educational reform. They indicate that minimizing perceived costs, clarifying roles, balancing workloads, and introducing positive peer influence are key measures to alleviate resistance and facilitate effective OBE implementation.

Relationship with status-quo bias theory and teachers' resistance

This study, based on Kim and Kankanhalli's (2009) research, investigated the benefits and costs associated with the perceived value of transitioning from traditional modes of instruction to Outcome-Based Education (OBE).

Our results align with previous research, demonstrating a significant negative correlation between switching benefits (SB) and teachers' resistance (TR) to OBE ($\beta = -0.179$, $t = 2.572$, $p = 0.010$), as well as a significant positive correlation between switching costs (SC) and resistance ($\beta = 0.232$, $t = 3.881$, $p < 0.001$). These findings confirm that perceived benefits may diminish resistance, whereas perceived drawbacks exacerbate it. The Artificial Neural Network (ANN) research further validated the significance of these variables, with switching advantages and switching costs attaining normalized relevance values of 46.44% and 39.57%, respectively, underscoring their considerable impact on teachers' resistance to OBE.

These findings underscore the essential need for institutional efforts to enhance perceived advantages and reduce perceived drawbacks, thereby facilitating more seamless and effective OBE adoption among teachers.

Relationship with Conservation of resource theory and teacher's resistance

Conservation of Resources (COR) theory offers a valuable model for understanding teachers' attitudes toward educational innovations such as Outcome-Based Education (OBE). According to COR theory, human beings work to acquire, maintain, and preserve valuable resources to minimize stress, solve problems, and enhance well-being.

Consistent with this theoretical framework, our research revealed that both role overload and role ambiguity substantially influence teachers' resistance to Outcome-Based Education (OBE). Role overload (RO) showed a positive correlation with resistance ($\beta = 0.121$, $t = 2.008$, $p = 0.045$), whereas role ambiguity (RA) showed a significantly stronger positive correlation ($\beta = 0.493$, $t = 9.388$, $p < 0.001$). The Artificial Neural Network (ANN) analysis indicated that role overload and role ambiguity attained normalized significance values of 29.35% and 100%, respectively, underscoring their significant impact on resistance behaviors.

The findings align with those of Lin et al. (2022) and Zhao and Jiang (2022), underscoring that ambiguous expectations and excessive obligations are significant factors contributing to resistance against educational change initiatives such as OBE. Consequently, mitigating role ambiguity and role overload is crucial for institutions seeking to achieve effective, sustainable outcomes-based education.

Relationship with Self-Efficacy, Colleague Opinion, and Organizational Support

This study empirically tested the impact of self-efficacy for change, organizational support, and peer opinion on teacher resistance to Outcome-Based Education (OBE), drawing on existing literature.

The findings revealed that self-efficacy for change was negatively related to instructors' resistance. However, the effect was not statistically significant, suggesting that self-efficacy is not a direct inhibitor of resistance. Self-efficacy likely reduces resistance indirectly by reducing perceived switching costs, consistent with the idea that individuals who are more confident in their ability to adjust perceive fewer obstacles to change.

Likewise, organizational support for change showed a negative, albeit non-significant, impact on teachers' resistance, suggesting that merely offering support mechanisms may be inadequate unless teachers perceive them as actually facilitating their transition to OBE practices.

Conversely, colleague opinion showed a notable negative correlation with resistance ($\beta = -0.105$, $t = 1.988$, $p = 0.047$), underscoring the critical role of peer influence in the acceptance of educational change. While colleague opinion may function primarily as informational rather than normative pressure (Burnkrant and Cousineau, 1975), its impact on diminishing resistance is significant. The analysis of the Artificial Neural Network (ANN) further validated its impact, with colleague opinion attaining a normalized significance of 48.77% in forecasting instructors' opposition to OBE.

Implications

Theoretical contribution

This study advances understanding of teachers' resistance to Outcome-Based Education (OBE) by integrating Status Quo Bias Theory, Conservation of Resources (COR) Theory, and Social Cognitive Theory. Based on Status Quo Bias Theory, findings reveal that perceived switching benefits—such as improved teaching efficiency and enhanced student outcomes—significantly reduce resistance, while switching costs—extra time, effort, and adaptation difficulties—increase it. PLS-SEM and ANN analyses show that switching benefits and costs have normalized importance values of 46.44% and 39.57%, respectively, underscoring their substantial influence.

From the COR Theory perspective, role overload and role ambiguity emerge as major stressors that intensify resistance to OBE. Role ambiguity, characterized by unclear expectations and responsibilities, had the strongest impact ($\beta = 0.493$, normalized importance = 100%), confirming that perceived threats to personal and professional resources discourage the adoption of OBE.

Incorporating Social Cognitive Theory, the study highlights that colleague opinion significantly reduces resistance ($\beta = -0.105$; importance = 48.77%), aligning with social influence theory. Although self-efficacy and organizational support showed limited direct effects, their indirect roles via perceived costs are relevant. Overall, results from the integrated model offer valuable insights into the psychological,

resource-based, and social dimensions of resistance, guiding institutions to foster clarity, peer support, and ensure adequacy of resources for successful OBE implementation.

Practical Implication

The findings of this study offer several practical implications for University X and Y in promoting the adoption of Outcome-Based Education (OBE). The results highlight the importance of addressing instructors' attitudes toward the benefits and drawbacks of switching. DIU should emphasize the tangible benefits of OBE, such as enhanced student learning outcomes, improved teaching efficiency, and higher professional recognition, while reducing perceived costs through structured support, including comprehensive training, workload adjustments, and dedicated time for curriculum redesign.

The strong influence of job overload and role ambiguity underscores the need for clear guidelines and expectations regarding OBE implementation. Teachers must receive explicit directions on curriculum mapping, assessment design, and continuous improvement to minimize ambiguity and ensure manageable workloads.

Although self-efficacy and organizational support showed limited direct effects, DIU can strengthen these through mentoring programs, experiential workshops, and strong administrative backing to build faculty confidence and reduce resistance. Peer influence also plays a crucial role; therefore, identifying OBE champions to mentor others and share success stories can foster a positive departmental culture.

Finally, a dynamic feedback system that allows instructors to share experiences and suggestions will enhance ownership, reduce resistance, and sustain long-term commitment to effective and collaborative OBE implementation.

Recommendations

- Clarify Faculty Roles: Provide clear OBE guidelines, policies, and training to reduce role ambiguity.
- Manage Workload Effectively: Allocate sufficient time and administrative support for OBE-related activities.
- Promote OBE Benefits: Communicate the positive impact of OBE on student learning, employability, and accreditation.
- Support the Transition: Offer continuous training, mentoring, and user-friendly tools to ease the shift to OBE.
- Encourage Peer Collaboration: Develop OBE champions and faculty learning communities to share best practices.
- Strengthen Faculty Capacity: Conduct regular professional development on curriculum design, assessment, and outcome mapping.

- Enhance Institutional Support: Establish dedicated OBE support units and responsive consultation services.
- Implement Continuous Monitoring: Create feedback and evaluation mechanisms to identify and address implementation challenges.
- Foster a Culture of Quality and Innovation: Encourage faculty participation in decision-making and continuous improvement initiatives.

Limitations

Despite offering valuable insights, this study has certain limitations. First, data were collected from only two universities' faculties (X and Y), which may limit generalizability to institutions with different cultures or OBE maturity levels. Future research should include diverse universities to strengthen external validity. Second, reliance on self-reported survey data may introduce common-method bias; future studies could combine quantitative surveys with qualitative interviews to gain deeper insights. Third, other influential factors—such as leadership style, institutional pressure, or innovativeness—were not examined. Finally, future longitudinal and cross-cultural studies could explore how teachers' resistance evolves across contexts and implementation phases.

Conclusion

This study contributes to existing research on teachers' resistance against Outcome-Based Education (OBE) by covering a series of critical research gaps. First, drawing on status quo bias theory, the study identifies how educators' perceptions of switching costs and benefits significantly shape their resistance to transitioning from traditional teaching methods to OBE. Despite the established advantages of OBE, perceived costs and attitudinal resistance are significant barriers, underscoring the need for further research into how institutions can strategically manage these perceptions.

Second, drawing on the Conservation of Resources (COR) theory, this study emphasizes the central role of overload and ambiguity in role development in fostering resistance. With the increased demands on teachers under OBE, resulting stress and confusion highlight the importance of defining clear, functional roles to enable successful reform. Additional studies will be needed, however, to elucidate the more significant psychological impact of these stressors on teacher performance and health.

Third, this study builds on investigations of self-efficacy, peer opinion, and organizational support, demonstrating their multifaceted and complex impacts on resistance. While peer opinion plays a significant role in the acceptance process, the non-significant direct effects of self-efficacy and organizational support warrant further investigation into their potential indirect pathways and contextual influences.

Additionally, the research underscores the importance of comprehensive theoretical models and universal measurement instruments. Fragmented existing methodologies must yield to integrated models that capture the dynamic interaction between stressors, supports, and personal factors influencing the implementation of OBE.

Finally, this study addresses the scarcity of quantitative research on challenges of OBE implementation in Bangladesh, offering empirical insights that complement the existing qualitative narratives. It also lays the groundwork for an in-depth investigation into the psychological and decision-making mechanisms underlying teachers' resistance behaviors, a vital but underexplored area. Future research should continue in designing theory-driven, empirically validated models to guide effective strategies for overcoming resistance and ensuring successful OBE implementation.

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Investigating the Integration Opportunity of Generative Artificial Intelligence in Higher Education in Bangladesh: A Constructivist Learning Theory Approach

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Abstract

This study aims to investigate the integration opportunity of Generative Artificial Intelligence (GAI) in the higher education sector in Bangladesh. Using the Constructivist Learning Theory (CLT) and a mixed-methods approach, we collected data from 255 faculty members and four Focus Group Discussions. A Smart PLS-based Structural Equation Modelling (SEM) analysis revealed that faculty's attitude towards GAI use strongly predicts their extent of GAI use ($\beta = 0.556$, $p < 0.001$). Regarding the predictors of attitude towards GAI use, domain-specific technology relevance exhibited the most substantial effect ($\beta = 0.413$, $t = 6.561$, $p < 0.001$), followed by faculty's competency ($\beta = 0.261$, $t = 4.217$, $p < 0.001$) and students' technology use provision ($\beta = 0.168$, $t = 3.020$, $p < 0.01$). In contrast, subjective norms and the provision of institutional technology use did not make a significant contribution. Furthermore, the thematic analysis revealed that, despite GAI's potential to be a transformative force in education, faculty members had strong concerns about its effective implementation. Based on the findings of this research, this study recommends strengthening universities' capacity by providing GAI training, revising assessment rubrics, developing GAI-oriented pedagogical approaches, and establishing clear ethical guidelines to support both students and faculty. Nevertheless, the longitudinal effects of GAI on teaching outcomes and institutional readiness remain an important area for further study.

Keywords: Generative Artificial Intelligence; Constructivist Learning Theory; adoption; higher Education

Introduction

There have always been two opposing views on integrating technology into education. The debate continues, from using calculators to computers to the latest introduction of GAI. Some argue that technology speeds up the learning process, offers learner autonomy and facilitates self-paced learning. In contrast, others argue that technology limits students' critical thinking abilities, fostering division and biased assessment. These technologies include both non-electronic and electronic devices, ranging from whiteboards, posters, and flashcards to advanced

technologies such as computers, the internet, and apps. The use of virtual and augmented reality is also notable in various departments.

The introduction of GAI, however, causes much disruption and sparks further debate about its potential use in education. Using a large language model, GAI like ChatGPT or Bard generates content, answers queries (Brown et al., 2020) that are often difficult to distinguish from genuine human-written content. The transformative potential of GAI (Baidoo-Anu & Owusu Ansah, 2023) is now shaping educators' teaching and students' learning processes (Brown et al., 2020; Ahmed & Zacca, 2023).

The higher education sector in Bangladesh is also undergoing a transition. Universities are advised to introduce new courses and assessment methods to produce job-ready graduates. Universities also have the responsibility to nurture creativity, innovation, and students' critical thinking ability. Hence, there is a growing shift toward more interactive, inquiry-based, and collaborative learning approaches, i.e., group work, presentations, experiments, field visits, and the parallel development of students' technical, social, and interpersonal skills. However, in the face of a high student-to-faculty ratio, resource limitations, and various forms of inequalities (Hossain, 2023), GAI creates opportunities for personalized learning, more autonomy, automated assessments (Mulyani et al., 2025), promotes inquiry-based learning, and expands access to knowledge resources (Zawacki-Richter et al., 2019).

GAI has also disrupted curriculum design, assessment techniques, and teaching strategies (Holmes et al., 2022). Nonetheless, educators have diverse viewpoints regarding the role of GAI in higher education. Chan (2023) contends that GAI significantly disrupts traditional learning structures, questions academic integrity, and violates ethical considerations. Dependence on technology might encourage students to bypass established assessment procedures and keep them away from classroom teaching. Consequently, this may result in decreased engagement, increased dissociation from studies, and a decline in critical thinking ability. Given these challenges and the opportunities GAI may offer, this study examines GAI integration in higher education institutions in Bangladesh from teachers' perspectives.

Statement of the Problem

Despite the increasing use of GAI in higher educational institutions in Bangladesh, there is currently no national policy or institutional framework to guide their responsible integration into academic settings. Challenges include a lack of digital infrastructure, limited faculty training, and concerns about academic integrity (Chowdhury et al., 2020). Additionally, there is a gap in understanding how GAI aligns with pedagogical theories, such as Constructivist Learning Theory (CLT), which emphasizes active, student-centred learning (Jonassen, 1994). The lack of clear policies and guidelines for GAI use complicates its adoption, leaving educators and

institutions uncertain about its ethical and practical implications (Farrokhnia et al., 2024; Holmes et al., 2022). This study aims to address these gaps by investigating the prospects and challenges of integrating GAI into higher Education in Bangladesh, focusing on faculty perspectives and the theoretical foundations of CLT.

Objectives of the Study

The objective of this research is:

To what extent do university teachers in Bangladesh embrace Generative Artificial Intelligence (GAI) in education, and how can the Constructive Learning Theory (CLT) perspective guide the integration to facilitate active knowledge construction among students?

And, based on the overall objective, the researchers formulated two specific goals. These are:

- i. To determine university teachers' attitude and the extent of GAI use in their teaching-learning practices,
- ii. To explore how teachers could use GAI in supporting collaborative, inquiry-based, student-centred learning experiences.

By achieving these objectives, the study provides a roadmap for leveraging GAI to enhance higher Education in Bangladesh while addressing the potential risks and challenges.

Methodology

This study adopted the Personal-Social-Environmental-Cultural (P-S-E-C) framework to guide the research. This framework facilitates a multidimensional analysis of the factors that influence university faculty's attitudes, readiness, and practices regarding GAI adoption. The personal dimension encompasses individual characteristics, including age, gender, educational qualifications, teaching experience, academic role, technological competency, attitudes toward GAI, and the extent of GAI usage.

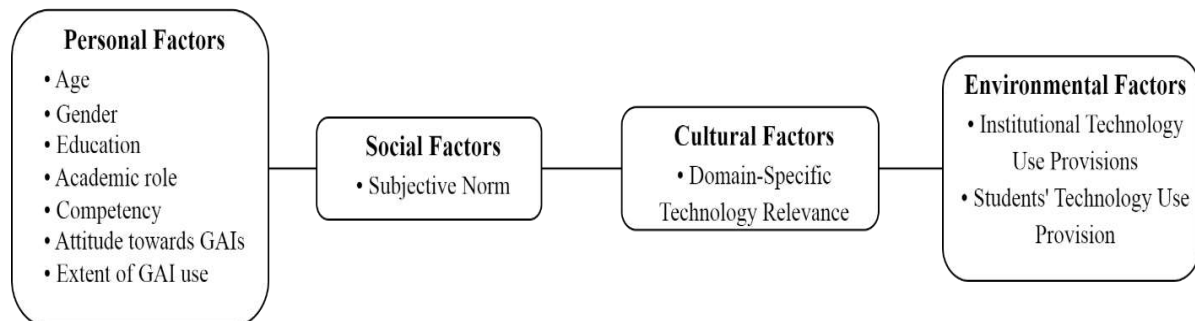


Figure 1. Personal-Social-Environmental-Cultural (P-S-E-C) Framework

Research Design

This study used a triangulation research method to provide a comprehensive understanding of the integration of GAI in higher Education in Bangladesh. Three distinct but complementary approaches were employed: (1) a literature review to establish the conceptual and theoretical foundation; (2) quantitative data collection through a structured survey of faculty members; and (3) qualitative insights gathered from focus group discussions (FGDs). The integration of these sources allowed the research to validate and cross-verify findings, enhancing both the depth and credibility of the research outcomes.

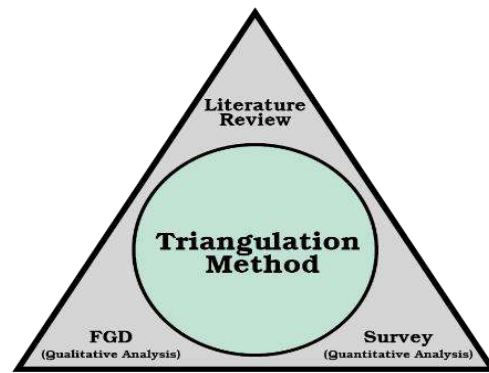


Figure 2. Triangulation method

Data were analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM) via SmartPLS software. This method was selected for its ability to handle complex models with multiple latent variables and its suitability for studies emphasizing prediction and theory development.

Selected Institutions

The study was conducted in four Bangladeshi universities, representing diverse institutional categories:

1. Sher-e-Bangla Agricultural University (SAU) – Agricultural University
2. Shahjalal University of Science and Technology (SUST) – Science and Technology University
3. University of Dhaka (DU) – General Public University
4. North South University (NSU) – Private University.

We selected these universities purposively to ensure representation from public and private sectors, as well as from science, agriculture, and general education disciplines. The locale was chosen considering regional and institutional variation in digital readiness, faculty exposure to AI tools, and ongoing academic innovation.

Population and sample of the study

The population of this study comprises faculty members at higher education institutions in Bangladesh. Initially, we chose four universities, and the faculties of the selected universities were considered the population. The sample included academic professionals at various ranks, Lecturer, Assistant Professor, Associate Professor, and Professor, engaged in teaching, research, and administrative responsibilities. Using an online sample size calculator with a 95% confidence level

and a 6% margin of error for a total faculty population of 3,423 across the four universities, a sample size of 248 faculty members was determined. Sampling was conducted using proportional stratification by rank and institution. The distribution of the respondents is presented in Table 1.

Table 1. Sample selection, Interviewee selection and Secondary data collection

University	Category	Position	Population and sample
University I	Agricultural University (Sher-e-Bangla Agricultural University)	Professor	Based on their ratio. Population: 340 Sample: 25
		Associate Professor	
		Assistant Professor	
		Lecturer	
University II	Science and Technology (Shahjalal University of Science and Technology)	Professor	Based on their ratio. Population: 566 Sample: 41
		Associate Professor	
		Assistant Professor	
		Lecturer	
University III	General University (Dhaka University)	Professor	Based on their ratio. Population: 1992 Sample: 144
		Associate Professor	
		Assistant Professor	
		Lecturer	
University IV	Private University (North South University)	Professor	Based on their ratio. Population: 526 Sample: 38
		Associate Professor	
		Assistant Professor	
		Lecturer/Senior Lecturer	
Total		Population: 3423 Sample: 248	
The sample size was determined using an online sample size determination tool (https://www.calculator.net/sample-size-calculator.html?type=1andcl=95andci=5andpp=50andps=3423andx=Calculate) at 95% confidence level and 6% margin of error.			

Development of the research instrument

The research began with an extensive literature review to identify potential variables and measurement items. This desk research yielded approximately 30 journal articles and reports relevant to the use of GAI in Education. Based on these findings,

items were selected to develop the initial research instrument – the questionnaire. This preliminary version was sent to two scholars familiar with survey data collection for content validity. Their feedback and suggestions informed revisions to the questionnaire. The revised version was then subjected to a two-round card-sorting exercise to ensure reliability and validity, following the guidelines proposed by Moore and Benbasat (1991).

Card sorting and initial validation

A total of 33 questions were developed to represent seven (7) constructs (Q1–Q7), drawing on theoretical frameworks and prior research. Each item was designed to measure a specific construct, ensuring comprehensive representation. Four groups of 2 participants each (for a total of 8 raters) were invited to participate in the 1st round of the card sorting exercise after the instrument was revised based on experts' suggestions.

The output of the two-stage card sorting exercises is presented in Tables 2 and 3. The placement ratio or hit ratio was calculated using Cohen's Kappa's formula for inter-rater reliability. The overall hit ratio was calculated as:

$$\text{Hit Ratio} = \frac{\text{Number of Agreements}}{\text{Total number of Items}}$$

Table 2. First card sorting round

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	N/ A	Total	TGT%
Q1	18	0	0	0	0	0	0	0	18	100
Q2	0	16	0	0	0	0	0	0	16	100
Q3	1	0	16	0	0	0	0	0	17	94.12
Q4	0	0	0	24	0	0	0	0	24	100
Q5	0	0	0	0	20	2	0	0	22	90.91
Q6	0	0	0	0	0	18	0	0	18	100
Q7	1	0	0	0	0	0	16	0	17	94.12
Total Item Placements: 132				Hits: 128			Hits Ratio: 96.97			
Bold indicates that items were placed correctly under each respective construct.										

In the first round, there were 132 (i.e., 33 × 4 = 132 items) item placements, with 128 items correctly placed into their intended categories, achieving an overall hit ratio of 96.97%, indicating high agreement among participants. However, certain questions were identified as problematic. These questions were restructured based on qualitative feedback and statistical analysis to enhance clarity and relevance.

Table 3. Second card sorting round

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	N/A	Total	TGT%
Q1	16	0	0	0	0	0	0	0	16	100
Q2	0	16	0	0	0	0	0	0	16	100
Q3	0	0	16	0	0	0	0	0	16	100
Q4	0	0	0	24	0	0	0	0	24	100
Q5	0	0	0	0	20	0	0	0	20	100
Q6	0	0	0	0	0	16	0	0	16	100
Q7	0	0	0	0	0	0	16	0	16	100
Total Item Placements: 124				Hits: 124			Hits Ratio: 100%			
Bold indicates that the items were placed correctly under each respective construct.										

In the second round, after removing and refining problematic questions, the hit rate improved to 100%, indicating complete agreement among participants. This demonstrated the effectiveness of the iterative refinement process in achieving content validity and reliability.

Data collection methods and tools

The finalized questionnaire was developed using KoBoToolbox, facilitating both online and offline data collection, ensuring inclusivity and accessibility for all participants. Both open and closed-ended questions were included in the survey. The questionnaire was specifically designed for university teachers, the target respondents of the study, and a mixed-mode approach was adopted to maximize participation. Combining digital and traditional methods enhanced response rates and ensured convenience, developing inclusivity for respondents with varying levels of access to digital tools (Creswell & Creswell, 2018). This survey was conducted from 19 November 2024 to 27 April 2025. For the qualitative component of the study, four Focus Group Discussions (FGDs) were conducted across four selected universities. Each group comprised six faculty members, chosen through stratified sampling to ensure gender diversity. The discussions were held in Bangla, recorded with the participants' consent, and subsequently transcribed for thematic analysis. These FGDs took place from December 12, 2024, to April 18, 2025. However, during survey data collection, the research team was unable to reach the targeted sample size of 248 responses, particularly due to low response rates at one of the selected universities. Therefore, we decided to circulate the online survey questionnaire through teachers' social media groups across different universities for one week. As a result of these efforts, we collected 268 responses, of which 255 were considered valid and included in the final dataset. All valid respondents were

faculty members at higher education institutions, ensuring alignment with the study's targeted population. The distribution of the sample is given below for further clarification.

Table 4. Final (Revised) sample size of the Stakeholder

University	Category	Target sample size	Final sample size
University I	Sher-e-Bangla Agricultural University	25	30
University II	Shahjalal University of Science and Technology	41	42
University III	Dhaka University	144	100
University IV	North South University	38	41
Other Universities		n/a	42
Total		248	255
A total of 268 responses were collected (125 in-person and 143 online), of which 255 were retained after data cleaning. Only the final sample is presented in the table.			

Data Processing and Analysis

Data cleaning

To avoid errors, the raw data was carefully reviewed. The researcher carefully scrutinized the interview to facilitate better coding and tabulation of all data.

Categorization of data

In contrast to traditional methods that categorize respondents based on their answers, this study employed a distinctive approach. Scale variables were evaluated by respondents' ratings on a 5-point modified Likert scale for each item. Subsequently, each construct was categorized based on respondents' response frequencies. For demographic variables (age, education, gender, etc.), respondents were categorized by their characteristics.

Data Analysis Techniques

This study employed a mixed-method data analysis strategy, integrating both quantitative and qualitative techniques to explore the integration of GAI in higher education through the lens of CLT.

Quantitative data analysis

The quantitative data, collected through structured questionnaires, were analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS. The quantitative data analysis process consists of two essential models, i.e., the

measurement model for reliability and validity, and the structural model. For the sake of the measurement model, four tests are conducted: internal consistency (composite reliability), convergent validity (average variance extracted > 0.50), discriminant validity, and indicator reliability (Hair et al., 2017). Internal consistency, represented by Cronbach's alpha, assumes equal outer loading of all indicators on the relative constructs, with an expected outer loading above 0.7 for each indicator. Additionally, internal consistency can be assessed using the composite reliability value (0.60-0.70) of a latent variable. A significance level of 5% was set to evaluate the hypotheses. They were tested at the 5% level of significance. Support for a hypothesis was determined if the computed (β) value equalled or exceeded the significance level, indicating a significant contribution of independent variables to the dependent variable. Conversely, if the computed (β) value was below the significance level, the hypothesis was not supported, suggesting no significant contribution of the independent variables to the dependent variable.

Qualitative Data Analysis

To complement the quantitative findings, qualitative data were collected through Focus Group Discussions (FGDs) conducted at four universities. The FGDs aimed to capture participants' deeper perspectives on GAI use, including perceived benefits, concerns, and institutional readiness. In this regard, a thematic analysis process was applied. First, all FGD responses were transcribed from the local language (Bangla) to English. Transcripts were read iteratively to identify emergent codes and subsequent themes using a platform named napkin.ai. Themes were cross-checked with quantitative findings to ensure consistency and enrich interpretation.

Results and Discussion

A total of 255 valid responses representing a diverse range of backgrounds i.e., age, gender, education, academic roles, and institutional affiliations, were analyzed. The demographic analysis highlights various intersections, focusing on the integration of GAI in higher education.

Demographic Distribution

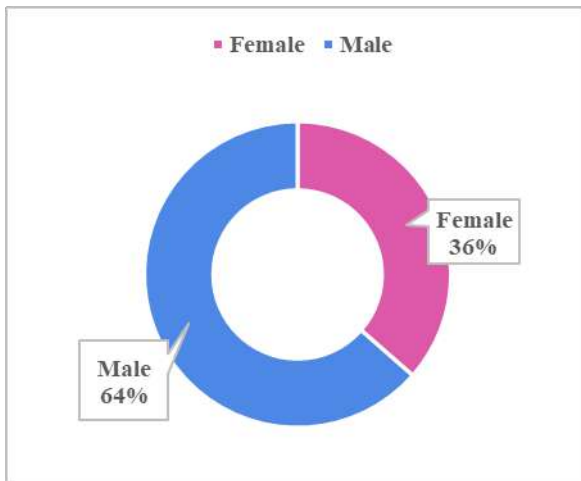


Figure 3. Gender representation

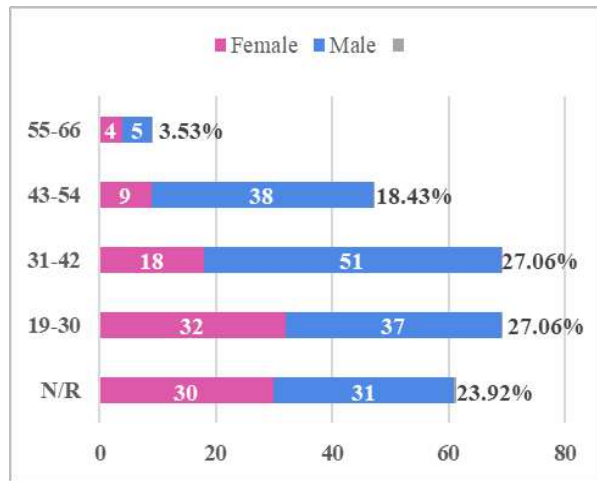


Figure 4. Gender age representation

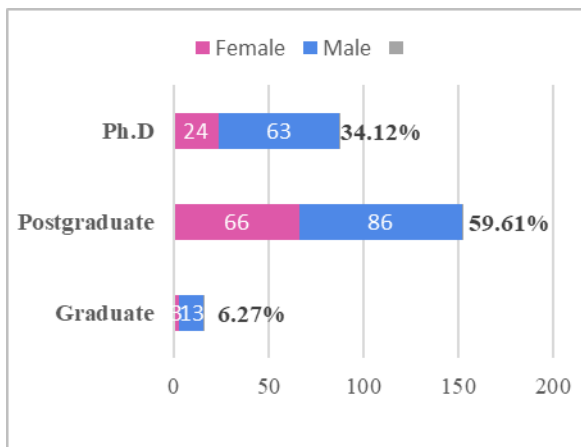


Figure 5. Gender and education distribution

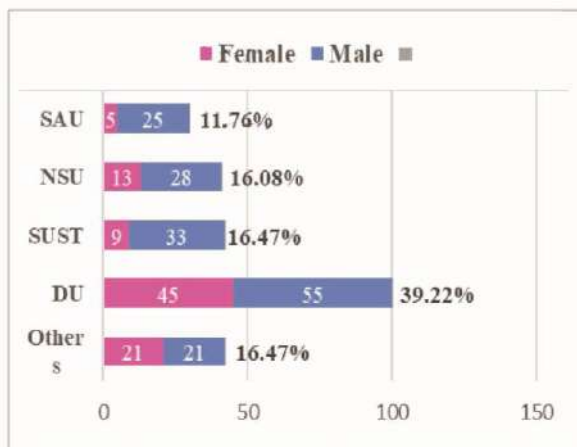


Figure 6. Gender and university distribution

Demographic Distribution

Figure 3 shows a clear gender imbalance among respondents, with 64% male ($n = 162$) and 36% female ($n = 93$) participants. This reflects broader gender disparities in Bangladeshi higher education, where men dominate academic positions (BANBEIS, 2023). Such inequality can limit women's participation in digital and AI-related training (UNESCO, 2023). Therefore, gender-sensitive strategies are essential for equitable capacity-building in GAI integration (Gonzalez et al., 2024; Guettala et al., 2024).

As shown in Figure 4, over 58% of respondents were early- to mid-career faculty (ages 19–42), including 51 males and 18 females aged 31–42, and 37 males and 32 females aged 19–30. Senior faculty (ages 43–54) represented 18.43%, while the most senior group (ages 55–66) accounted for 3.53%. About 23.9% did not disclose age. Female representation was highest among early-career faculty, while male

respondents were evenly distributed across age ranges. This relatively young academic composition suggests a workforce more open to adopting and experimenting with emerging technologies like GAI (Møgelvang et al., 2024). Figure 5 presents academic qualifications by gender, revealing that 59.61% of faculty held postgraduate degrees (Male = 86, Female = 66) and 34.12% had doctoral degrees, with males outnumbering females across all qualification levels, including among PhD holders (63 males vs. 24 females). Given that faculty with higher degrees often lead curriculum development, this imbalance may restrict women's influence in institutional GAI integration (UNESCO, 2023). Finally, Figure 6 depicts institutional affiliations, showing that most respondents were from DU (39.22%), followed by SUST (16.47%), NSU (16.47%), and SAU (11.76%), with the remaining 16.47% distributed among other institutions. Gender gaps were most evident at SAU and SUST, while DU exhibited a relatively balanced ratio. This **institutional diversity** enhances the representativeness of the sample and is vital for promoting **inclusive GAI adoption** across Bangladesh's higher education landscape (Zhou et al., 2023).

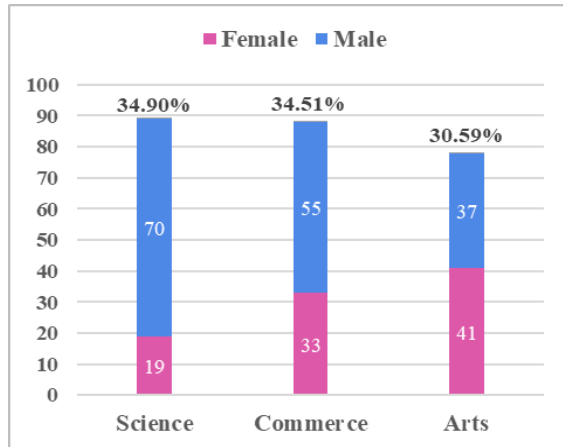


Figure 7. Gender and study area distribution

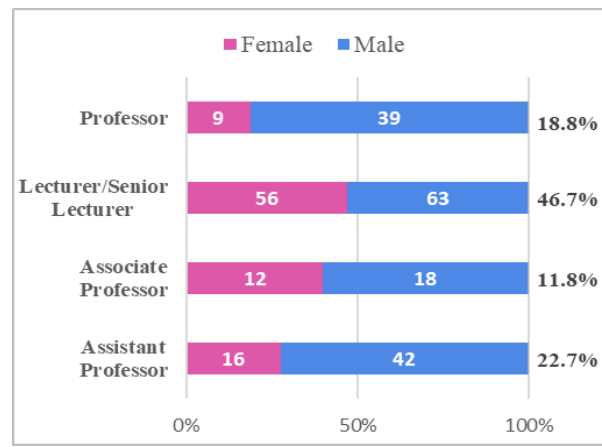


Figure 8. Gender and academic role distribution

According to Figure 7, just over one-third of the respondents (34.90%) came from science disciplines, followed closely by Commerce at 34.51% and Arts at 30.59%. While males were predominant across all disciplines, the gender gap was narrower in the Arts. The integration of GAI is likely to vary across disciplines; Science and Commerce are expected to focus more on data-driven applications, while the Arts may benefit from generative tools in writing and analysis (Holmes et al., 2022). Faculty in all fields will need tailored GAI training to address these contextual differences. Figure 8 demonstrates that Lecturers/Senior Lecturers constitute the largest group among academic roles, accounting for 46.70% (Male=63, Female=56) of the sample. Assistant Professors follow this at 22.70%. Associate Professors account for 11.8%, while Professors make up only 5.88% of the sample. Male respondents are more prevalent at all academic ranks, particularly in senior positions. Since senior faculty play a significant role in shaping academic policy and making curricular decisions, these disparities may hamper equitable input into reforms related to

Generative Artificial Intelligence (GAI) unless inclusivity is deliberately prioritized (Gonzalez et al., 2024).

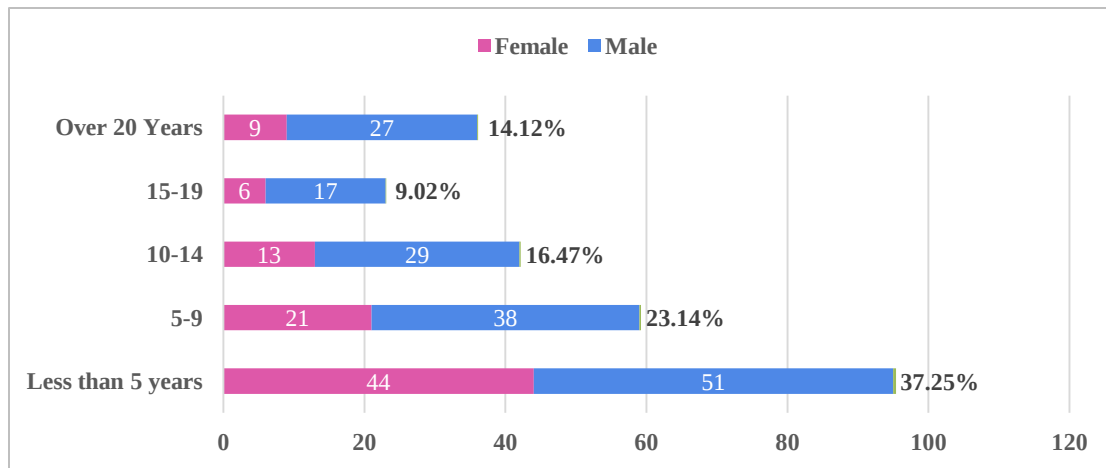


Figure 9. Gender and length of service in higher education

Figure 9 highlights the length of service in higher education. Over one-third of faculty (37.25%) had less than 5 years of experience, and another 23.14% had served between 5–9 years. This predominance of early-career educators aligns well with the demands of GAI integration, as this group tends to be digitally fluent and pedagogically flexible (Zawacki-Richter et al., 2019). However, without structured institutional guidance, their interest in GAI may not translate into effective practical, ethical, and equitable classroom use (UNESCO, 2023).

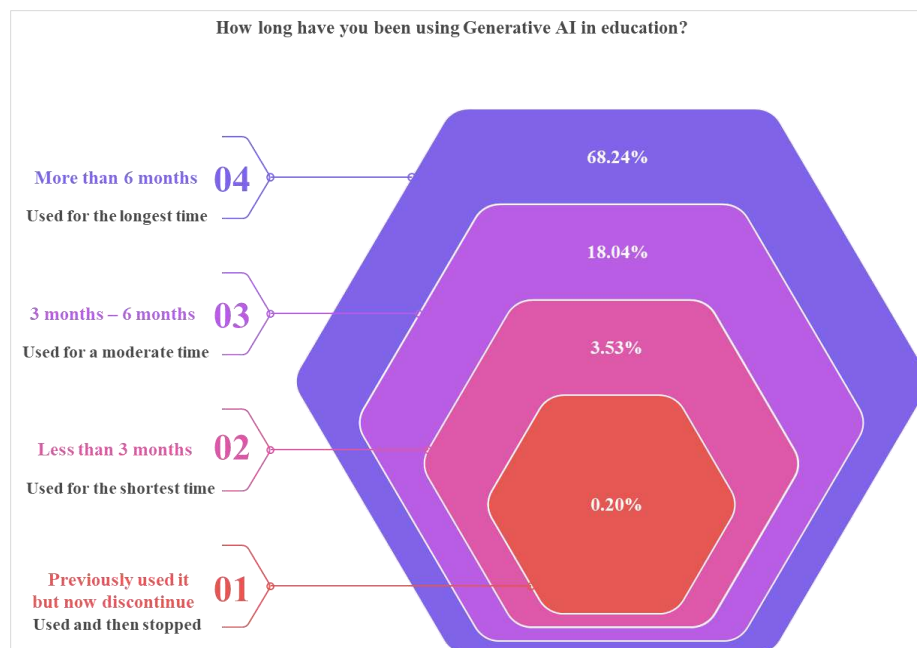


Figure 10. Generative AI usage in education

Figure 10 examines faculty engagement with Generative AI (GAI) tools. A significant proportion of respondents (68.24%) reported active experimentation with GAI in their academic tasks for more than 6 months. Meanwhile, 18.04% of the faculty reported moderate use of GAI (between 3 and 6 months), and 3.53% reported using GAI for a shorter period (less than 3 months). Notably, only 0.20% of faculty members have stopped using GAI after having previously used it. Males reported slightly higher levels of use, though the gender differences were less pronounced than in other areas. Increasing exposure to tools like ChatGPT and Grammarly has started to shift perceptions of GAI from being seen as a novelty to becoming a necessity in academic workflows (Møgelvang et al., 2024). Figure 11 shows that faculty primarily use GAI for information searches (70.59%), followed by research activities, including scientific investigations and studies (67.84%). Teaching-related tasks, such as lecture preparation, account for 57.73% of GAI usage. Additionally, 56.08% of faculty use GAI for preparing course content, and 39.22% use it to create presentations for academic talks. These suggest that faculty view GAI as a tool to enhance their work rather than as a replacement for traditional teaching methods.

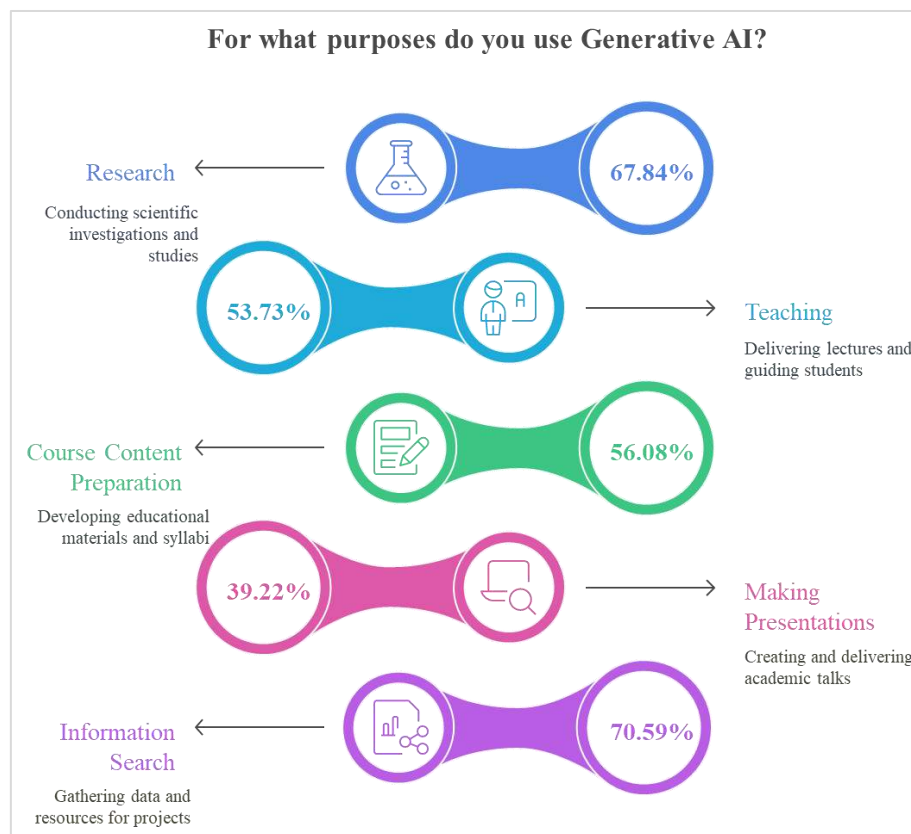


Figure 11. Purpose of using Generative AI in Education

Faculty are using GAI to manage workloads, brainstorm teaching ideas, and personalize materials, practices that reflect a shift toward human-AI instructional models (Gonzalez et al., 2024). However, the lack of formal training may lead to

inconsistent practices, underscoring the need for capacity-building initiatives across departments (UNESCO, 2023).

Reliability and Validity of the Measurement Model

The Structural Equation Modelling (SEM) analysis was conducted using SmartPLS to examine the proposed relationships in the conceptual framework regarding the GAI in higher Education in Bangladesh. The model demonstrated strong reliability and validity. All constructs met the thresholds for internal consistency reliability, with composite reliability (ICR) values ranging from 0.733 to 0.886. Additionally, the average variance extracted (AVE) values for all constructs exceeded the recommended minimum of 0.50, confirming convergent validity. Discriminant validity was also established through the Fornell-Larcker criterion (Fornell & Larcker, 1981), as the square root of each construct's AVE was greater than its correlations with other constructs.

Table 5. Validation of the measurement model and bivariate correlations

	AVE	ICR	ATT	Comp	EoU	TUPS	DSTR	SN	ITUP
ATT	0.686	0.847	0.828						
Comp	0.739	0.882	0.564	0.860					
EoU	0.649	0.733	0.676	0.526	0.806				
TUPS	0.678	0.763	0.493	0.316	0.421	0.823			
DSTR	0.745	0.886	0.687	0.429	0.542	0.419	0.863		
SN	0.601	0.834	0.398	0.345	0.310	0.283	0.350	0.775	
ITUP	0.645	0.748	0.147	0.101	0.057	0.153	0.143	0.257	0.803
Constructs: ATT (Attitude), Comp (Competency), EoU (Extent of GAI use), TUPS (Technology use provisions for students), DSTR (Domain-specific technology relevance), SN (Subjective norm), ITUP (Institutional technology use provisions) *ICR= Internal Consistency Reliability (Composite Reliability); *AVE = Average Variance Extracted Diagonal elements are the square root of AVE, and off-diagonal elements are correlations.									

Table 5 indicates that the square roots (diagonal elements in the table of all constructs exceeded their correlations with other constructs in the model. Consequently, it can be concluded that the cross-loadings and the Fornell-Larcker test provide evidence of satisfactory discriminant validity for the model. Furthermore, an examination using Variance Inflation Factors (VIFs) indicated that multi-collinearity among the constructs did not pose a concern for this study.

Results of the Structural Model

The theoretical model and hypothesized relationships were analyzed using SmartPLS. The model's explanatory power was evaluated through the R^2 value of the dependent variable. Hypothesis testing involved calculating t-statistics for the standardized path coefficients at a 5% significance level.

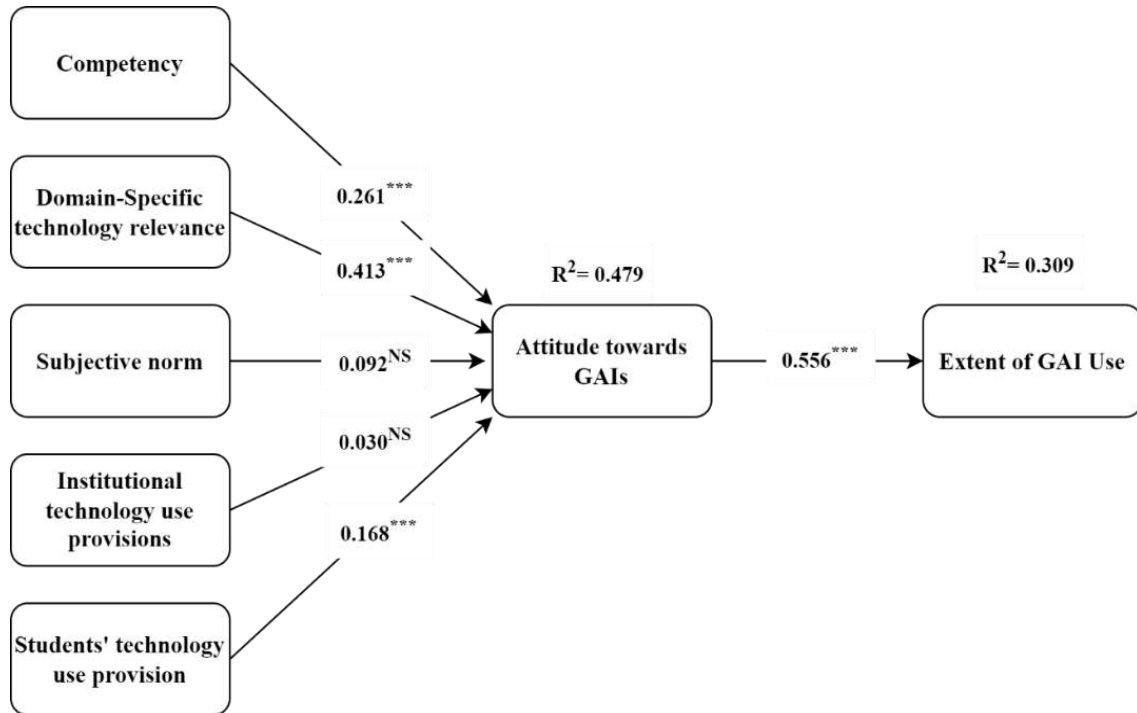


Figure 12. Results of the study model showing the coefficient and variance

As shown in Figure 14, the structural model explained 47.9% of the variance in attitude and 30.9% in the Extent of Use. The path from Attitude to Extent of Use of GAI was both positive and significant ($\beta = 0.556$, $t = 10.439$, $p < 0.001$), indicating that a more favorable attitude toward GAI strongly predicts higher usage in academic contexts. Among the predictors of attitude toward GAI use, domain-specific technology relevance exhibited the most substantial effect ($\beta = 0.413$, $t = 6.561$, $p < 0.001$), followed by competency ($\beta = 0.261$, $t = 4.217$, $p < 0.001$), and technology use provision for students ($\beta = 0.168$, $t = 3.020$, $p = 0.003$). These findings highlight the critical roles of subject relevance, user competence, and belief in student benefits in shaping positive attitudes toward GAI. In contrast, subjective norm and institutions' technology use provision did not have significant effects on attitude, with path coefficients of $\beta = 0.092$ ($p = 0.102$) and $\beta = 0.030$ ($p = 0.576$), respectively. These nonsignificant paths suggest that social influence and institutional support alone may not be sufficient to develop positive attitudes toward GAI integration without individual competency and perceived relevance.

Table 6. Results of the structural model of path coefficients

Relationship	Path Coefficients	t values	Sig. values	p values
ATT - - > EoU	0.556	10.439	***	0.000
Comp - - > ATT	0.261	4.217	***	0.000
TUPS - - > ATT	0.168	3.020	**	0.003
DSTR- - > ATT	0.413	6.561	***	0.000
SN- - > ATT	0.092	1.635	NS	0.102
ITUP- - > ATT	0.030	0.559	NS	0.576
NS=Not significant; *p<0.05; **p<0.01; ***p<0.001				

Overall, the findings support the hypothesis that individual and contextual factors influence attitudes, which in turn significantly drive the extent of GAI use in higher education settings. A post hoc analysis was also conducted to examine the effects of control variables on the theoretical model of this study. Out of the five control variables, no variable showed a significant contribution to the extent of GAI use.

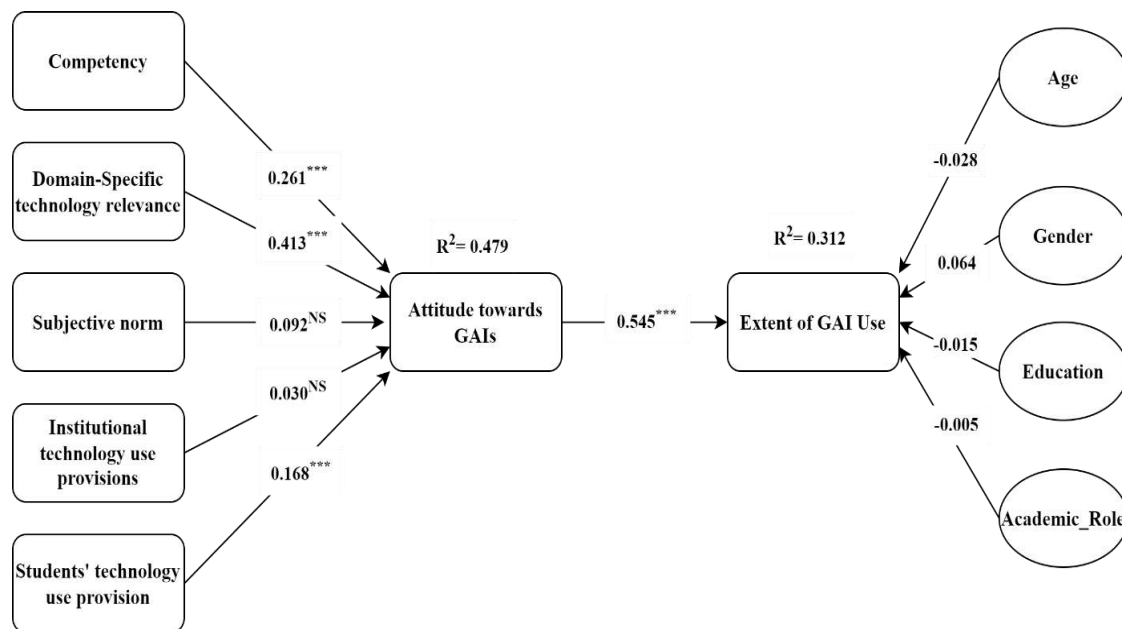


Figure 13. Results of the study with the control variable

In contrast, age ($\beta = -0.028$), gender ($\beta = 0.064$), education ($\beta = -0.015$), and academic role ($\beta = -0.005$) did not show a significant contribution to the extent of GAI use. These results indicate that demographic factors such as age or education are less predictive of GAI utilization compared to one's academic position. This highlights the potential impact of institutional roles and responsibilities on the adoption of emerging technologies in higher education contexts.

Strategies for GAI Use in Education

The other main objective was to identify how GAI could be used in supporting a collaborative, inquiry-based, student-centered learning environment. This objective is satisfied through open-ended survey responses and four FGDs conducted at different universities across Bangladesh.

Policy recommendations for GAI use in education

In this section, we develop a thematic map from responses to open-ended survey questions. First, all the raw responses from open-ended survey questions were extracted and pasted into a spreadsheet. The responses were carefully read for overlapping themes and concepts. After initial cleaning and sensitizing the data, the raw responses were uploaded to the Napkin.ai platform to develop a thematic map, which generated ten (10) overarching themes for GAI use areas in education. The thematic analysis below highlights ten recurring themes, supported by illustrative excerpts from the responses. Key themes identified include the importance of Monitoring and Evaluation, which was frequently highlighted as a concern. Respondents emphasized the need for institutions to use AI-detection tools such as Turnitin to identify potential misuse of Generative AI (GAI) in student submissions.

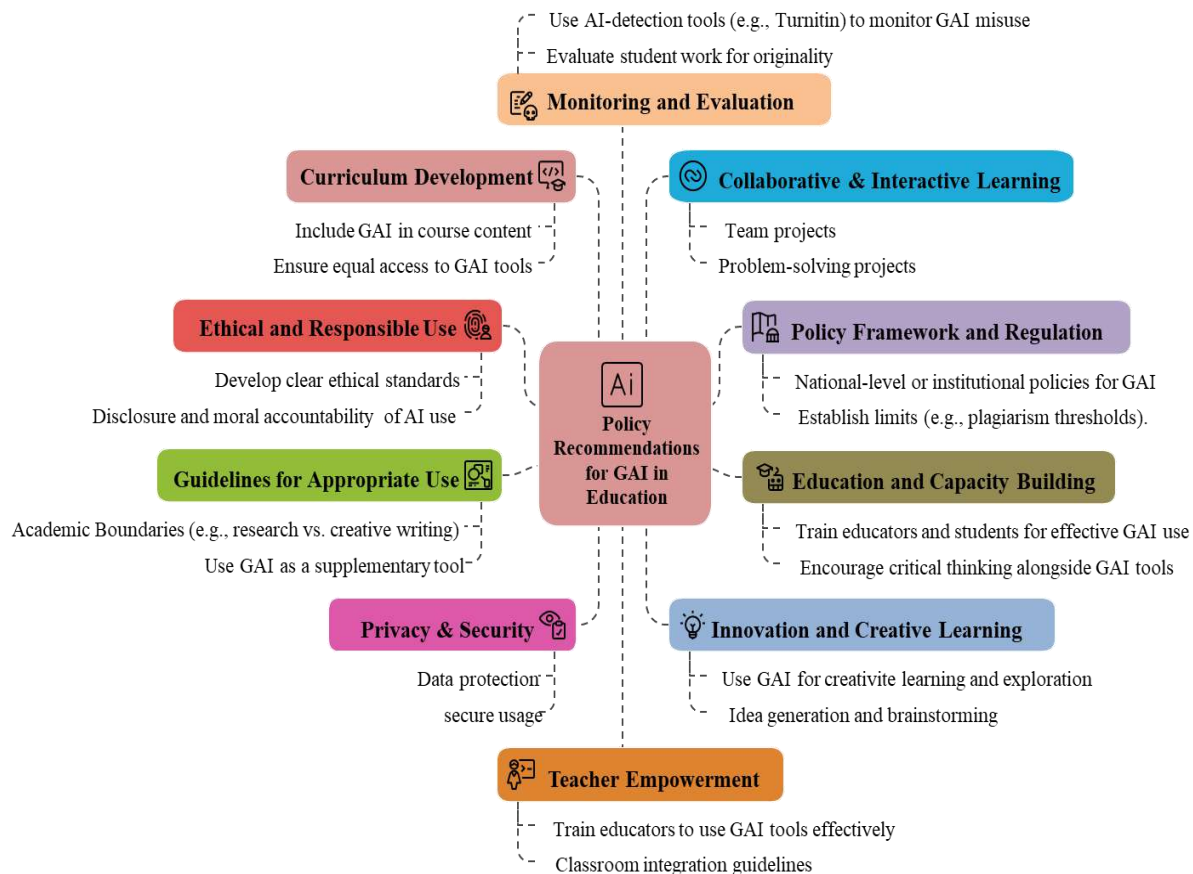


Figure 14. The thematic outcomes derived from open-ended survey questions

Curriculum Development was identified as essential for long-term integration of General Artificial Intelligence (GAI). Collaborative and Interactive

Learning also emerged as a key theme. Survey participants proposed using GAI to support team projects and problem-solving exercises that foster peer learning. Ethical and Responsible Use was a prominent theme. Policy Framework and Regulation were suggested to address institutional ambiguity. Guidelines for Appropriate Use reflected a desire to distinguish contexts in which GAI adds value from those in which it may undermine learning. Education and capacity building were widely supported. Participants expressed a strong need for structured training programs for both teachers and students. Several respondents raised concerns about privacy and security, emphasizing the importance of data protection and secure platforms when using AI tools. Additionally, the absence of institutional oversight was identified as a potential risk to user safety and academic integrity. On a more positive note, the potential for innovation and creative learning emerged as a significant theme. Finally, Teacher Empowerment was cited as essential for successful classroom integration. Respondents called for professional development opportunities and clear usage frameworks that enable teachers to use GAI meaningfully in instruction. There were calls for "classroom integration guidelines" that allow educators to align AI use with broader learning goals.

Results and Discussion

The study revealed a predominance of early- and mid-career faculty (ages 19-42, about . 60%), indicating a youthful and potentially digitally literate academic workforce. These results align well with global trends showing that younger educators are more open to adopting advanced tools like Generative AI (GAI) in teaching (Zawacki-Richter et al., 2019; Nikolopoulou, 2024). Gender disparities were notable, with male faculty dominating across age, academic qualifications, institutional affiliations, and academic disciplines, which reflects national patterns in academia; it also raises concerns regarding equitable access to GAI training, leadership roles, and pedagogical influence (Al-Samarraie et al., 2024; Gonzalez et al., 2024). Respondents' educational qualifications were strong, with nearly 60% holding postgraduate degrees and over one-third holding doctoral degrees. Such academic grounding is promising for GAI integration, as faculty with higher qualifications often have greater autonomy in curriculum development and assessment design (Holmes et al., 2022). However, male faculty accounted for a higher proportion across all qualification levels, including PhDs. To fully harness the potential of GAI in Education, institutional policies must also emphasize inclusive institutional empowerment. Institutionally, respondents represented diverse public and private universities, though GAI engagement varied by gender balance and infrastructure. Differences among universities (e.g., NSU vs. SUST) suggest that institutional culture and support systems play a crucial role in adoption (Zhou et al., 2023). Disciplinary patterns showed strong representation from Science

and Commerce, with fewer from Arts. GAI was mainly used for content creation, assessment, and administration, aligning with global findings that emphasize GAI as a supportive, not substitutive, teaching tool (UNESCO, 2023). Despite encouraging engagement, most GAI use was informal, driven by individual initiative rather than policy. The lack of structured guidance raises ethical and consistency concerns, underscoring the need for formal institutional frameworks and training (Al-Samarraie et al., 2024). Empirical analysis supported the constructivist perspective, showing that attitude toward GAI significantly influenced its use ($\beta = 0.556$, $p < 0.001$). Positive attitudes were shaped mainly by domain-specific relevance ($\beta = 0.413$) and competency ($\beta = 0.261$), confirming that educators adopt GAI when it aligns with their disciplinary needs and when they possess the skills to use it confidently (Jonassen, 1999). Faculty who believed in students' use of GAI also showed higher acceptance ($\beta = 0.168$, $p = 0.003$). Conversely, subjective norms and institutional provisions had no significant effect, suggesting that policy and peer influence alone cannot foster adoption without perceived value and training. Control variables such as age, gender, and academic role also showed no strong predictive power, indicating that attitude and context outweigh demographics in shaping GAI use. Overall, the findings highlight a favorable landscape for GAI integration in Bangladeshi higher education – driven by young, capable, and open-minded faculty. For sustainable adoption, institutions should ensure inclusive capacity building, equitable access, ethical guidelines, and context-specific policies that empower educators to integrate GAI responsibly and effectively.

Implications

This study implies that the successful integration of Generative Artificial Intelligence (GAI) in higher education depends largely on faculty competency and the relevance of AI to specific academic disciplines. Universities should prioritize faculty training, curriculum innovation, and student-centered pedagogical approaches to maximize the benefits of GAI. At the same time, concerns related to academic integrity, ethical use, privacy, and critical thinking highlight the need for clear institutional policies and regulatory frameworks. Overall, the findings emphasize that effective GAI adoption requires a balanced approach combining technological capacity, faculty preparedness, ethical governance, and educational transformation to enhance the quality of higher education in Bangladesh.

Recommendations

Considering the findings and limitations of the study, several policies and practical recommendations are proposed to support the effective and ethical integration of GAI in higher education:

Professional development training should be a continuous part of higher education institutions. Faculty members should be informed and updated through tailored

GAI training for their professional needs. Since technology-induced changes are inevitable, universities should integrate GAI into both curriculum design and pedagogy. While we did not dismiss the risks or potential overuse of technologies like Generative AI in Education, most teacher-respondents strongly echoed the need for clear institutional guidelines to support its responsible use, particularly concerning data privacy and academic integrity. Instead of limiting access to GAI tools, they emphasized the importance of building technical infrastructure and establishing support centers to promote effective adoption. One promising strategy is the creation of communities of practice through inter-university collaboration. At a broader level, a comprehensive national policy framework addressing issues such as intellectual property rights and academic integrity in the context of GAI is urgently needed. In this regard, fostering partnerships with international organizations such as UNESCO and other education-focused agencies is essential for promoting best practices. Finally, scholars and policymakers are encouraged to invest sustained effort and resources in ongoing research and monitoring to better understand the impact of GAI on education and to refine strategies as the technology continues to evolve.

Limitations

Although the statistical findings are supported by qualitative insights, certain limitations may threaten the generalizability and interpretability of this study's findings. This research may be ideal if it had considered both student and teacher samples, yet this ended up with only a teacher sample from multiple public and private universities in Bangladesh. The data collection process captured a snapshot in time and cannot account for changes in faculty attitudes or GAI usage behaviors over time. Another constraint is the gender imbalance among the respondents. An uneven representation of male and female faculty participants could lead to biased interpretations regarding perceptions and behaviors related to GAI integration. The study relies on self-reported perceptions, which are inherently subjective and may be influenced by personal biases or misunderstandings stemming from limited exposure to GAI technologies. Lastly, the constructs were derived and validated within the Bangladeshi higher education context, and their operational definitions may not be universally applicable across different cultural or educational environments.

Conclusion

From the perspective of Constructivist Learning Theory (CLT), this study offers ways of integrating GAI in higher education settings in Bangladesh. The study confirms that GAI usage is strongly associated with users' psychological and need-based factors, such as domain-specific technology relevance and competency, rather than external pressures or institutional facilities. Since a favorable attitude is a prerequisite for actual technology adoption, faculty members' positive disposition in

favor of GAI use for their teaching-learning process was the central construct. The study reported that such a positive disposition was significantly influenced by an individual's perceived competency and the relevance of GAI within their academic discipline, which, in turn, led to actual GAI use. Contrary to the initial hypotheses, subject norms and the institutional provision of technology use were not found to significantly affect attitudes towards GAI or the extent of use. This result suggests that while external factors such as peer influence and organizational support mechanisms are important, they may not be as influential as individual beliefs and professional relevance in favor of GAI use.

Furthermore, this understanding aligns with constructivist principles that emphasize learners' autonomy, self-paced learning, and technology exploration in educational settings. Despite teachers' raised concerns regarding students' use of GAI, viewing it as a threat to the development of their critical thinking ability and a challenge to fair assessment practices, they broadly spoke for developing a formal institutional framework to guide the ethical use of technology in education. Overall, this research captures a contextualized understanding of GAI use in higher education institutions in Bangladesh and offers multifaceted insights for fostering student-centric learning environments in the age of GAI.

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Transforming Educational Practice Towards Outcome-Based Education Curriculum: Challenges of Learning Outcomes for Higher Education

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Abstract

This study examines the implementation of Outcome-Based Education (OBE) at Khulna University's undergraduate programs and its alignment with the Bangladesh National Qualifications Framework (BNQF). The research primarily addresses four objectives: first, to evaluate the status of four core learning domains namely fundamental, thinking, social, and personal within the university's OBE curriculum; second, to investigate teachers' knowledge, attitudes, and practices concerning general education courses; third, to document the perceptions and understanding of OBE among both faculty and students; and fourth, to identify gaps between the current undergraduate OBE curriculum and the BNQF standards. We employed a mixed-methods research design, in which quantitative data were collected through structured surveys administered to 320 students from eight Disciplines across eight Schools/Faculties of Khulna University. Qualitative data were collected through in-depth interviews with 24 teachers and 24 students, accompanied by key-informant interviews. Our methodology comprised three distinct phases: conceptualization and literature review incorporating bibliometric network analysis; sequential data collection; and data analysis utilizing JMP software for statistical procedures and MAXQDA for qualitative thematic analysis. Students acknowledged strengths in application-oriented learning (50% positive responses) and practical, participatory approaches (48% positive responses). However, significant concerns arose regarding accessibility and innovation: only 29% of students perceived OBE as facilitating easy, flexible learning, and only 20% recognized the integration of modern tools and techniques into current OBE practices. A hierarchy exists across skill development domains: Fundamental Knowledge Skills received the highest favourable rating (63%), followed by Critical Thinking Skills (54%), while Social Skills (33%) and Personal Skills (15%) showed insufficiencies. Regarding general education courses, students reported challenges primarily related to insufficient academic consistency (38%) and relevance to their

Disciplines (36%). The study recommends several strategic interventions, including curricular reforms to establish clear linkages between general education content and discipline-specific applications; the adoption of problem-based learning approaches to simultaneously strengthen critical thinking and social competencies; the implementation of structured orientation programs to clarify learning objectives and assessment criteria; and the integration of technology through transformative pedagogical strategies that foster interactive learning experiences across all domains of learning.

Keywords: OBE; Learning Domains; Curriculum Implementation; Quality Assurance

Introduction

According to the Bangladesh National Education Policy 2010, the education system should deliver a pro-people, readily available, uniform, well-planned, and science-oriented Education with high standards (Ministry of Education, 2010). However, tertiary Education in Bangladesh still faces significant challenges, which can be further attributed to infrastructural and pedagogical issues. These challenges include restrictions on students' access to academic resources and high-quality educational materials. Additionally, these issues are related to socio-economic disparities and infrastructural limitations, which can limit the progress toward achieving high-quality higher Education. The gap between policy aspirations and actual implementation has created a persistent crisis in the higher education sector that demands immediate attention and innovative solutions.

As mentioned above, tertiary Education in Bangladesh is characterized by weak curriculum design, inadequate teaching methods, and a lack of qualified faculty (Al-Amin & Al-Amin, 2023; Kono et al., 2018; Ullah, 2020). It is contended that the traditional curriculum often fails to align with the demands of the job market and the expectations of potential employers. As a result, graduates of tertiary institutions appear less prepared to tackle real-world problems (Ullah, 2020). Critical thinking and creativity among students pose another challenge in the tertiary education learning process. These are evolving and gradually increasing due to the high prevalence of memorization in learning activities and exam-focused teaching methods (Mridula & Ahsan, 2025). These pedagogical shortcomings have created a vicious cycle in which students seem to receive certificates without acquiring the competencies needed for meaningful professional engagement.

Despite efforts over the last couple of decades to modernize curricula to meet industry needs, shift the emphasis to effective classroom delivery, and encourage students to apply what they learn in the real world, tertiary education institutions' rigid, old-fashioned systems persist. (Ehsan, 2021). Learner's active engagement in the learning process remains severely limited, as infrastructurally Bangladeshi

universities are not equipped for the learner-centric approach, with many students sitting in several rows of benches, having minimal spaces that hardly leave any scope for adopting critical thinking, group discussion, problem-solving, simulations, role-playing, case analysis, and other student interactive techniques (Ehsan, 2021). The magnitude of the employability problem is further underscored in a study by the Bangladesh Institute of Development Studies (BIDS), which estimated the graduate unemployment rate at 36.6% (Murshid et al., 2019).

Outcome-based Education (OBE) has emerged as a modern educational paradigm for tertiary-level students focused on applying their acquired knowledge and on their prospects after completing their courses or programs. In contrast to traditional models, which tend to focus on content delivery or instructional methods, OBE emphasizes measurable learning outcomes as the primary focus of educational effectiveness. OBE intends to shift the focus of content-based teaching to student-centric teaching and learning that emphasizes the mastery of specific learning outcomes (Qadir et al., 2020; Shama, 2021). In addition, OBE aims to establish a results-oriented approach as an alternative to the conventional input-focused model, where the emphasis traditionally lies on content delivery and classroom time allocation. This results-oriented framework is designed to shift educational priorities towards ensuring that students not only receive information, but also acquire specific knowledge and skills by the conclusion of their academic programme (Aggarwal, 2024; Lui & Gladie, 2012). This exemplary shift has aligned our education with the demands of the 21st century. Moreover, this shift is helping our students prepare for an increasingly complex and competitive world, where adaptability and practical skills are key to employability.

OBE targets to achieve measurable learning outcomes, which provide a concrete framework for educational planning and assessment. As an integral part of OBE, the development of clear and specific objectives that yield more focused and effective teaching-learning outcomes is necessary (Mohieldein, 2017; Sunra et al., 2024). OBE not only enhances the quality of Education but also ensures that students acquire the skills and knowledge required to succeed in their chosen fields (Saha et al., 2023; Sharma & Dwivedi, 2021). The measurability aspect of OBE has introduced accountability mechanisms that were previously lacking in traditional educational methods. By focusing on clear, quantifiable learning outcomes, OBE enables tertiary educational institutions to monitor student progress more effectively and to use data-driven strategies to assess the effectiveness of their courses and programmes.

OBE supports students in engaging in active learning rather than memorization, which ultimately fosters a deeper understanding and application of knowledge (Morcke et al., 2013; Shama, 2021). However, one criticism of OBE is its rigidity, which can lead to a 'one-size-fits-all' approach to Education that can potentially limit creativity and critical thinking (Fakier, 2001). To overcome that criticism of OBE, there are provisions for a customized teaching-learning approach to target

individual courses/programs. As a result, OBE can play a crucial role in promoting critical thinking, problem-solving, and creativity among learners by fundamentally transforming the learning experience.

As highlighted above, the OBE has been criticized for the rigidity or overly prescriptive approach to the teaching-learning implementation process, which may lead to memorization rather than deeper learning (Morcke et al., 2013; Shama, 2021). Additionally, assessing certain outcomes, such as soft skills and moral competencies, poses a challenge in OBE; unlike technical skills, these are more difficult to quantify, leading to debates about the validity and reliability of assessment methods (Manggali et al., 2024). Despite these challenges, OBE remains a powerful tool for driving continuous quality improvement in Education by establishing clear outcomes and assessment criteria that provide a framework for systematically evaluating and enhancing educational programs (Qadir et al., 2020).

This research examines the effectiveness of the OBE curriculum, contextualized at Khulna University, in shaping graduates' qualities by assessing how its alignment with the standards set by the Bangladesh Accreditation Council (BAC). This research includes four main areas related to (i) learning domains, (ii) knowledge, attitudes, and practices (KAP) regarding general Education, (iii) difficulties in implementing OBE, and (iv) success in achieving learning outcomes for higher Education at Khulna University. This research aims to provide evidence-based insight into how OBE can be effectively utilized to enhance the quality and relevance of tertiary Education in Bangladesh.

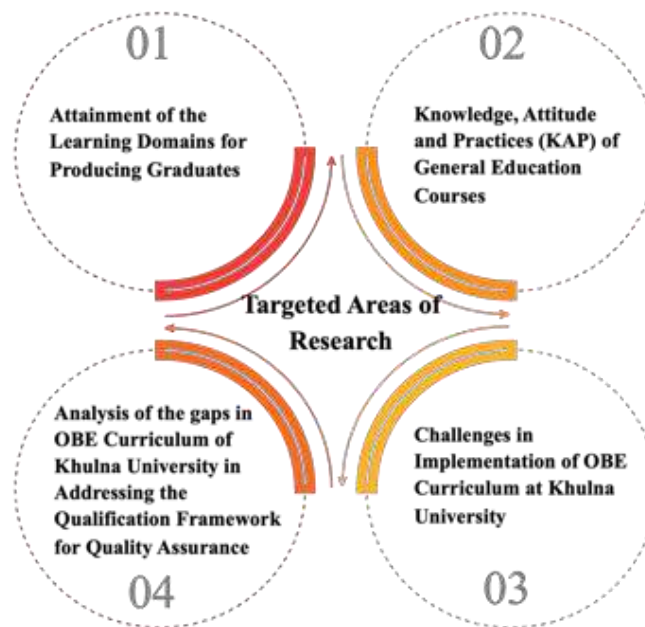


Figure 1: Targeted areas of the research

Methodology

Bibliometrics Network Analysis

We began with a comprehensive literature review to draw on existing knowledge of the higher education attainment model that integrates outcome-based Education (OBE). At this stage, we have produced the 'argument of discovery,' in which the discoveries of fact reflect the current level of knowledge about higher Education, and the 'argument of advocacy,' in which the ideas serve as the logical drivers of a conclusion (Machi & McEvoy, 2022). In this regard, we conducted a bibliometric network analysis using the VOSViewer platform (Waltman, 2019). Using the VOSViewer platform, the research team initially explored the Crossref database (a freely available metadata base) to create maps of co-authorship, keyword co-occurrence, and citations. The findings then guided the development of a structured questionnaire.

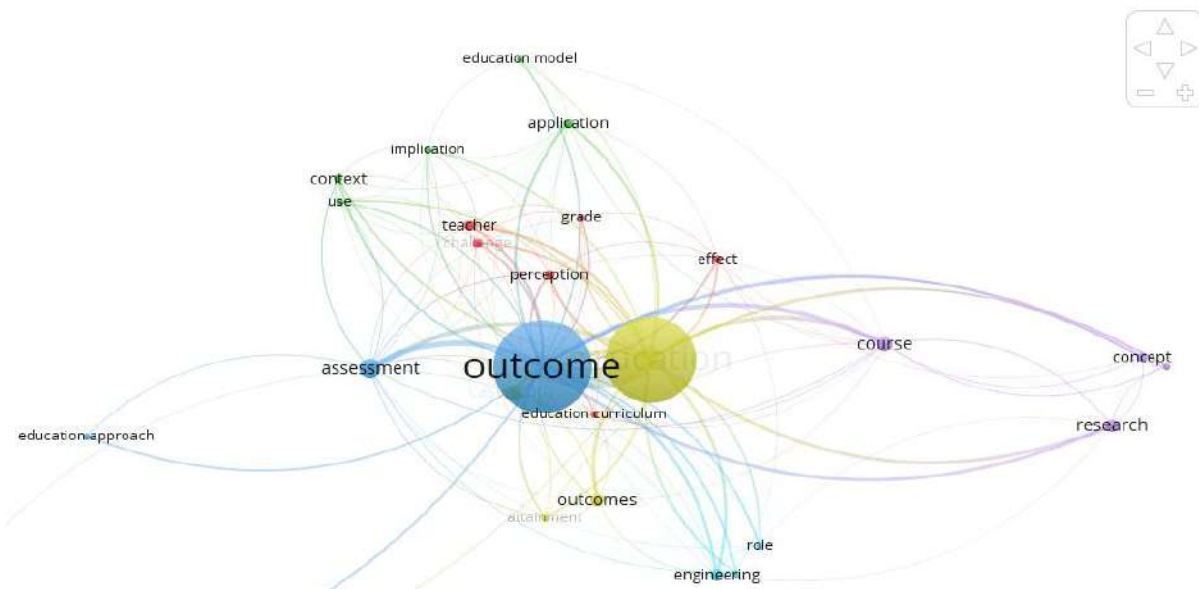


Figure 2: Meta data analysis framework using VOSviewer platform

Data Collection Strategies

Mixed-Methods Approach in Educational Research

Educational research often draws upon a multidisciplinary perspective, as highlighted by Breakwell et al. (2020) and Wright (2019). This diversity of disciplines enriches the research process, enabling a comprehensive exploration of complex educational phenomena.

In this study, a sequential mixed-methods design was employed. The process began with quantitative data collection, followed by qualitative data gathering. This order of data collection is deliberate, ensuring that insights gained from the quantitative phase can inform and deepen the qualitative exploration.

The rationale for integrating both quantitative and qualitative methods stems from the need to understand multifaceted scenarios in higher Education, especially those involving outcome-based Education (OBE). By combining these two approaches, the research aims to capture the nuances and complexities of higher educational attainment within the OBE framework (Brinkmann & Kvale, 2014).

For the quantitative part, this research has incorporated a 'survey research,' using a structured questionnaire to attain each objective of the research. The questionnaire survey has captured perceptions and knowledge of both teachers and students regarding the undergraduate OBE curriculum, including learning domains, practices in general education courses, advantages and challenges of implementation, and performance indicators of the alignment of the undergraduate OBE at Khulna University with the Bangladesh National Qualifications Framework (BNQF). By administering this survey to both teachers and students, we have analyzed their perceptions, knowledge, and attitudes (KAP) towards OBE implementation at the undergraduate level. This method has allowed us to explore patterns, compare groups, and draw statistical inferences as shown by Rao (2020).

At present, Khulna University has three batches (but, due to the limited experience of first-year first-term students, we have only considered students of the second and third years). Therefore, the number of selected batches was two, studying under the Outcome-Based Education (OBE) framework, comprising approximately 2320 students in total. To achieve a 95% confidence level that the actual value lies within $\pm 5\%$ of the survey value, we included approximately 320 students in the questionnaire. Again, around 5% of all members of the Program Self-Assessment Committee (PSAC) and course teachers of different levels in the OBE implementation process, totalling approximately 25 teachers, were included in the questionnaire survey.

Specifically, this research has adopted a 'sequential mixed methods' approach where, at the beginning, the quantitative data were collected through a questionnaire survey. As soon as the questionnaire survey was completed, qualitative data collection was started to identify key aspects of the OBE implementation process.

The rationale for incorporating both quantitative and qualitative data collection methods in this research stems from the need to understand complex circumstances surrounding the implementation of Outcome-Based Education (OBE) from the perspectives of students and teachers. By employing mixed methods, the study aims to create a comprehensive understanding of the OBE implementation process and the challenges encountered within the research target areas. This approach enables the generation of multi-contextual information, which is crucial for developing recommendations tailored to specific contexts, thereby addressing OBE implementation challenges more effectively (Kvale, 1996; Richards & Morse, 2013). Both note-taking and audio recording were used during interviews to establish

greater trustworthiness and conformability in interpretation (Denzin and Lincoln, 2011). The audio-recording device was placed visibly in front of the participants during the data collection process.

Data Analysis Process

JMP software and MAXQDA were used for statistical analysis and thematic analysis, respectively. The use of JMP software has enabled us to conduct statistical analyses, visualize quantitative data, and communicate numerical findings. Using MAXQDA software has helped us generate codes and categorize the data to identify patterns and trends in the qualitative data. The following figure shows the analytical methods for different research questions.

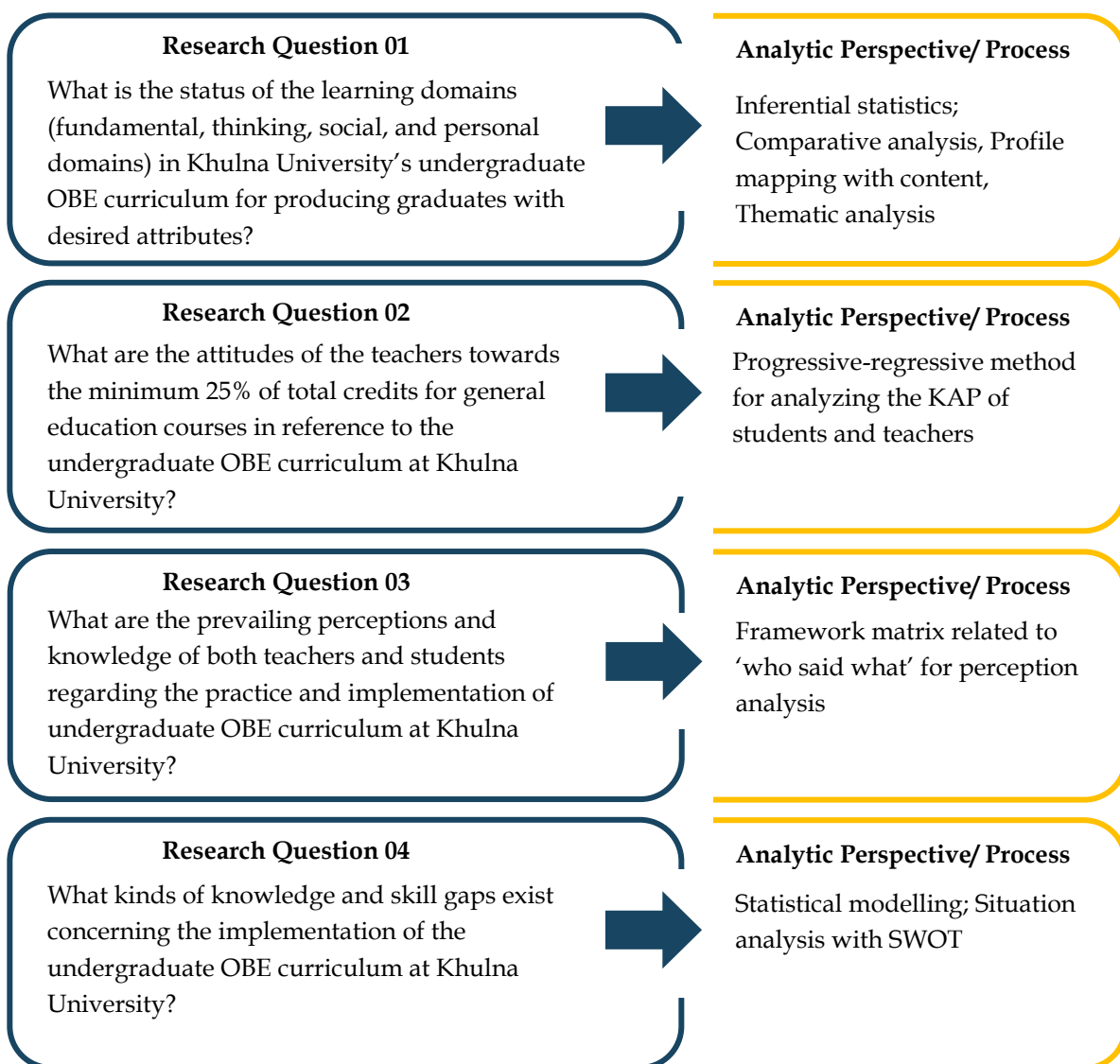


Figure 3: Research questions with analytical methods

During quantitative data analysis, we used JMP software because it offered a range of features and tools for easy data analysis and interpretation. One of the key benefits of using MAXQDA for qualitative data analysis is that it provides a structured, organized approach to handling large amounts of qualitative data and generating meaningful interpretations. It helped us identify themes and connections within data and gain insights from complex data sets.

Results and Discussion

Sources of Information about OBE

Students get familiar with the OBE curriculum, especially after enrolling in an undergraduate program. The table below shows how students at Khulna University learn about the OBE curriculum through various channels, highlighting significant disparities in information dissemination methods. Teachers and classroom engagements emerge as the primary source of OBE knowledge, with 66% of respondents indicating they gain understanding through direct instructional interactions. This result stands in contrast to discipline-specific initiatives and peer observation, which prove far less effective, with only 12% of students accessing OBE information through these channels.

Formal orientation programs at Khulna University demonstrate a moderate level of effectiveness in communicating information about Outcome-Based Education (OBE) to students. Survey results reveal that students are nearly evenly divided in their experiences: 49% report acquiring knowledge about OBE through structured orientation sessions, while 51% indicate that they did not gain such information from these programs. This near parity suggests that although formal orientation efforts do play a role in disseminating OBE-related information, they are not universally effective for all students.

Additionally, analyzing changes from the previous curriculum emerges as a less prominent source of information regarding OBE implementation. Only 19% of respondents identify comparative curriculum analysis as a means by which they understand OBE, highlighting its limited impact. This finding indicates that, for most students, observing differences between current and prior curricular structures does not substantially enhance their understanding of OBE practices.

Table 1: Source of information about OBE

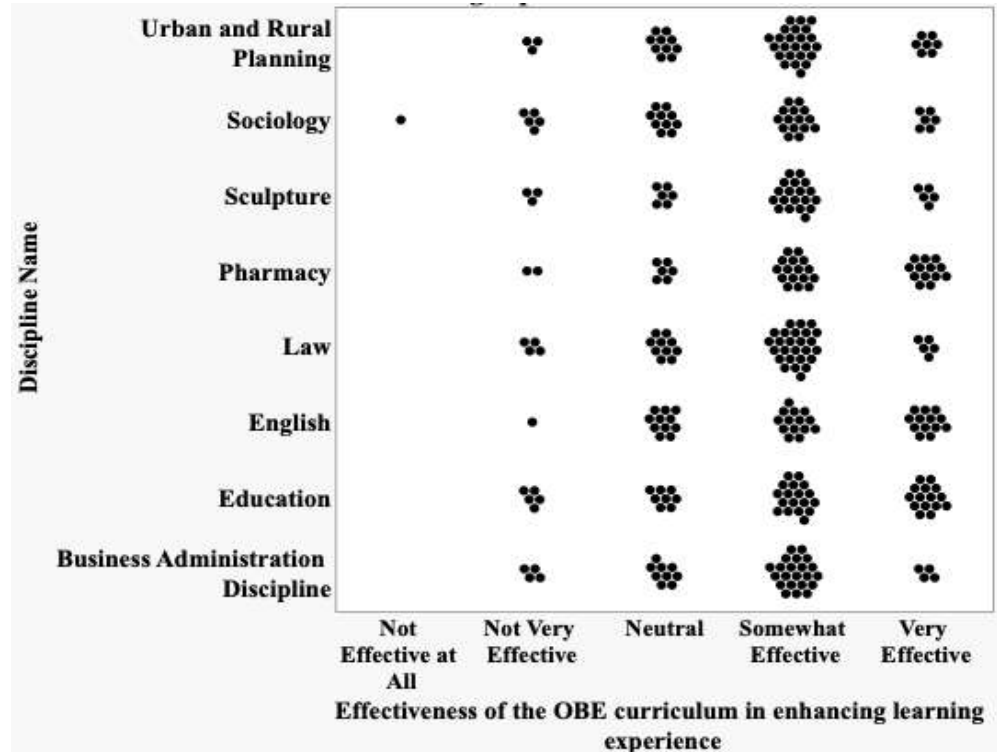
Source of information about the OBE curriculum	Response	
	No	Yes
Teachers and classroom engagement	34%	66%
Formal orientation program	51%	49%
Initiatives of Discipline	88%	12%
Observing the changes from the previous curriculum	81%	19%
Observing the OBE curriculum from peers and senior students	88%	12%

Source: Fieldwork, 2025

The data show a clear hierarchy in information acquisition, with direct instructional methods significantly outperforming informal or observational approaches. This suggests that institutional efforts to communicate OBE principles should prioritize teacher training and classroom integration, while supplementing them with enhanced formal orientation programs. The minimal impact of discipline initiatives, curriculum comparison, and peer learning indicates potential areas for improvement in comprehensive OBE information dissemination strategies.

Effectiveness of OBE Curriculum Across Disciplines

Students' perceptions of the effectiveness of the OBE curriculum across eight academic disciplines show a positive view of OBE implementation, with the majority of responses falling in the 'Somewhat Effective' category, followed by a mix of 'Neutral' and 'Very Effective'. Law and Business Administration Disciplines show the strongest concentration of 'Somewhat Effective' responses, indicating consistent moderate satisfaction with OBE implementation. Meanwhile, disciplines like Urban and Rural Planning, Pharmacy, Education, and English demonstrate more balanced distribution between 'Somewhat Effective' and 'Very Effective' categories, suggesting these Disciplines may have implemented OBE principles more successfully. Notably, very few students across any discipline rated OBE as 'Not Effective at All,' with only Sociology showing minimal representation in this category.



Source: Fieldwork, 2025

Figure 4: Effectiveness of OBE curriculum across Disciplines

Discipline-specific differences in student perceptions highlight variations in OBE implementation, with practical and applied fields generally reporting more positive views. Notably, students in Education report relatively high effectiveness despite limited resources, suggesting that resource quality may matter more than quantity. In contrast, disciplines such as Sociology show larger neutral responses, indicating areas where implementation may need refinement to support learning better. Overall, while OBE is viewed positively across the curriculum, there are clear opportunities to strengthen its effectiveness in specific contexts.

Alignment of OBE with Future Aspirations

The OBE curriculum plays an important role in the students' career goals and future aspirations. This section shows students' perceptions regarding how well the OBE curriculum aligns with their career goals and future aspirations across eight academic Disciplines. The data show overwhelmingly positive sentiment, with substantially larger density distributions on the 'Yes' side across all Disciplines, indicating strong perceived alignment between the OBE curriculum and professional aspirations.

Professional and applied Disciplines demonstrate powerful career alignment. Urban and Rural Planning, Pharmacy, and Business Administration show the most pronounced positive distributions, suggesting these fields have successfully implemented OBE frameworks that students perceive as directly relevant to their professional futures. This may reflect the practice-oriented nature of these Disciplines, where competency-based outcomes naturally connect with the workplace demands. Law also shows robust positive alignment, though with a slightly different distribution pattern, suggesting more varied student experiences.

More theoretical disciplines, like English and Sociology, while still predominantly positive, show relatively smaller 'Yes' distributions than their applied counterparts. Sculpture presents an interesting case with a distinctive distribution pattern that suggests more polarized student opinions about career relevance. Education Discipline shows strong positive alignment despite challenges in resource accessibility, indicating that the curriculum content effectively connects to students' teaching career aspirations regardless of resource limitations. These findings suggest that while OBE implementation is broadly successful across disciplines, there exist opportunities to strengthen career alignment, particularly in more theoretical fields.

Table 2: Ways to align OBE curriculum with career goals

Types of ways that the OBE curriculum aligns with career goals	Response		
	No	Yes	Total Responses
Learning has become Easy and Flexible	71%	29%	320
Learning is Application-Oriented	50%	50%	320
Learning has become contextualized and example-oriented	59%	41%	320
Learning is Practical and Participatory	52%	48%	320
Learning has Become Innovative using Modern Tools and Techniques	80%	20%	320

Source: Fieldwork, 2025

The data shows that application-oriented learning (50% positive) and practical/participatory approaches (48% positive) are the strongest elements of the OBE curriculum, with students nearly evenly divided on whether these aspects adequately support their career preparation. Contextualized and example-oriented learning shows moderate positive perception at 41%, suggesting that while some students appreciate the real-world context provided in their courses, the majority still find this aspect lacking.

Most concerning are the findings regarding ease of learning and technological innovation. Only 29% of students find that OBE has made learning easy and flexible, while a mere 20% believe the curriculum employs innovative modern tools and techniques. These results highlight a critical gap between the theoretical promise of OBE and its practical implementation, particularly regarding accessibility and technological integration. This suggests that while students value the career-oriented nature of OBE, substantial improvements in delivery methods and technological integration are needed to fully realize its potential in preparing students for their professional futures.

Perception of GED courses in the OBE Curriculum

25% GED courses have become mandatory for each OBE curriculum at the undergraduate level, as per the BNQF. Notably, most of the students do not report significant issues with general education courses, with all 'No' responses exceeding 60% across the five challenge categories. The table below presents student perceptions of general education courses within the OBE curriculum, revealing moderately positive sentiment overall but identifying important areas for improvement.

General education implementation under OBE has achieved reasonable success in meeting basic student expectations. The most frequently reported challenge is

insufficient academic objectivity, with 38% of students indicating that general education courses are 'Not challenging enough.' This concern is complemented by perceived relevance issues, as 36% of students find these courses 'Seem irrelevant' to their educational goals (see the following table). The apparent contradiction between these findings and the earlier positive career alignment suggests that while students value the OBE approach conceptually, they question the practical implementation and objectivity of general education components specifically.

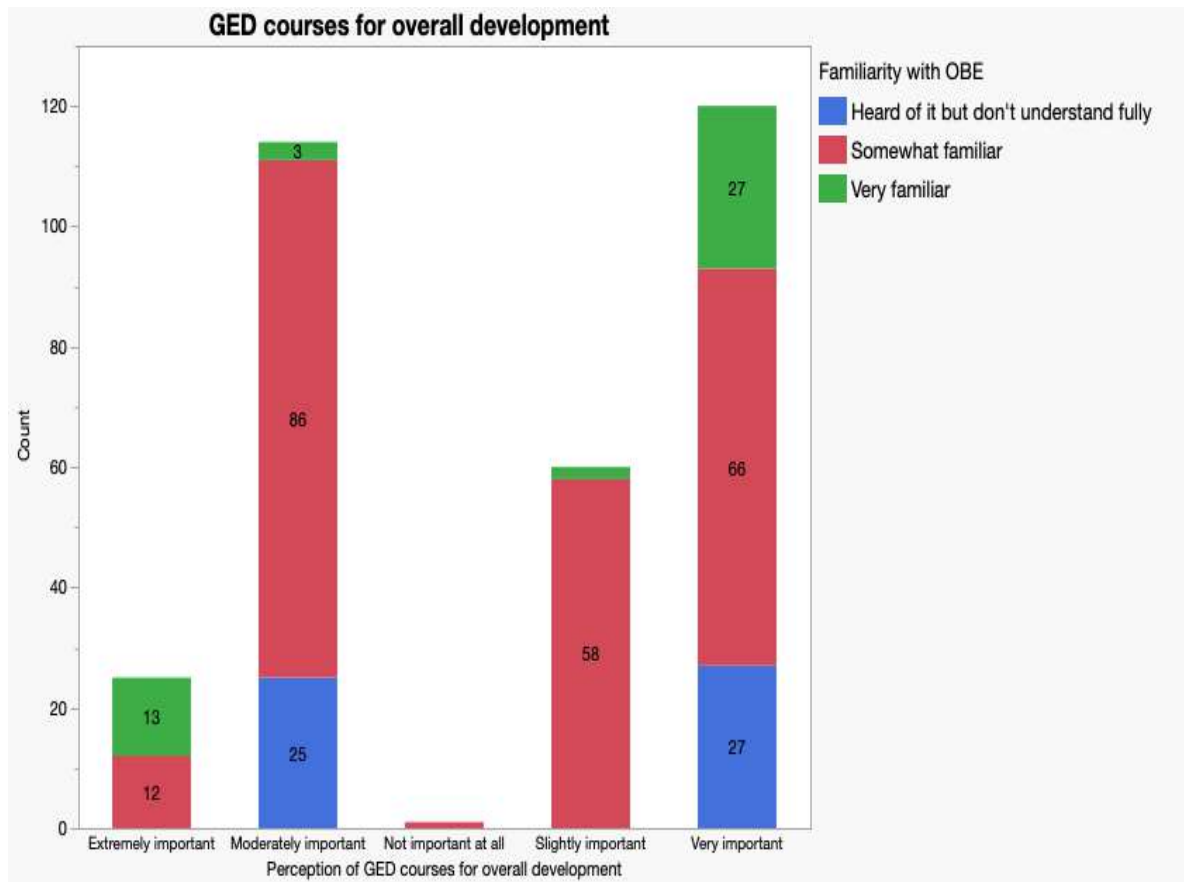
Table 3: Challenges of GED courses in the OBE Curriculum

Challenges with general education courses under OBE	Response		
	No	Yes	Total Responses
Seem irrelevant	64%	36%	320
Too difficult	77%	23%	320
Not challenging enough	63%	38%	320
Poor teaching quality	73%	27%	320
Limited options/choices	69%	31%	320

Source: Fieldwork, 2025

Course flexibility and instruction quality concerns are apparent, with 31% reporting 'Limited options/choices' and 27% indicating 'Poor teaching quality.' Interestingly, only 23% find general education courses 'Too difficult,' the lowest percentage among all challenges, reinforcing that academic merit is a greater concern than excessive difficulty. These findings suggest that while general education courses under OBE largely avoid major problems, improvements in course relevance, appropriate challenge level, and instructional variety could enhance their effectiveness in supporting comprehensive skill development. The data indicate a need to integrate general education components with discipline-specific learning to improve perceived relevance and better address challenges.

The following chart illustrates how students' understanding of OBE correlates with their perception of the importance of General Education (GED) courses for overall development. The data shows several significant patterns about how familiarity with educational frameworks influences the perceived value of general education components.



Source: Fieldwork, 2025

Figure 12: Contribution of GED courses for overall development

Most students consider GED courses valuable, with the largest groups rating them as 'Very important' (120 students) or 'Moderately important' (114 students). However, their level of familiarity with OBE influences this perception considerably. Among students who consider GED courses 'Extremely important,' a majority (13 out of 25) are 'Very familiar' with OBE, suggesting that a deeper understanding of OBE principles correlates with higher valuation of general Education.

Conversely, students with limited OBE understanding (Heard of it but don't understand fully) are primarily concentrated in the 'Moderately important' and 'Very important' categories, but notably absent from the 'Extremely important' group. The 'Somewhat familiar' group—representing most respondents—spreads across all importance levels but concentrates in the 'Moderately important' category.

The distribution of student responses highlights that a more thorough grasp of Outcomes-Based Education (OBE) philosophy is associated with a heightened appreciation for general education (GED) courses. Students who demonstrate a deeper understanding of OBE principles are more likely to recognize and value the role that general Education plays in their overall academic and personal

development. By strengthening the integration between OBE frameworks and general Education, institutions can address existing concerns about course relevance and ensure that students view these courses as meaningful contributors to their holistic development.

These observations are consistent with earlier findings on implementation challenges within the curriculum. Improved integration of OBE principles into general Education could address issues related to perceived course relevance, ultimately enhancing the effectiveness of GED offerings in supporting comprehensive skill development.

Improvement of Areas in OBE Curriculum

The data show that teaching methods are the most critical area needing improvement in OBE curriculum implementation, with 60% of students identifying this as a priority. This finding aligns perfectly with earlier results showing deficiencies in higher-order skill development, suggesting that while the OBE framework may be conceptually sound, its classroom execution through effective pedagogical approaches requires significant improvement. The emphasis on teaching methodology rather than content indicates that students recognize that how material is taught fundamentally affects skill acquisition, particularly for complex competencies such as critical thinking, communication, and lifelong learning.

Table 4: Areas of improvement in OBE curriculum

Areas that require improvement in OBE curriculum	Response		
	No	Yes	Total Responses
Course content	59%	41%	320
Teaching methods	40%	60%	320
Assessment techniques	56%	44%	320
Learning resources	50%	50%	320
Practical/lab facilities	53%	47%	320
Industry connection	75%	25%	320

Source: Fieldwork, 2025

Learning resources and practical facilities show substantial improvement needs (50% and 47%, respectively), reflecting a balanced student perspective on infrastructure requirements. The equal split in learning resources suggests varying experiences across Disciplines, while the moderate concern with practical facilities aligns with earlier findings about insufficient hands-on, application-oriented learning opportunities. These physical and resource limitations likely contribute to challenges in developing the practical, participatory learning environments essential for comprehensive skill development under OBE.

Assessment techniques (44%) and course content (41%) show moderate improvement needs, indicating that while not optimal, these aspects of OBE implementation are less problematic than teaching methods. The lower concern about course content despite earlier relevance issues suggests students may attribute implementation problems more to delivery than to the fundamental material being taught. This perspective aligns with OBE's competency-focused approach, where appropriate assessment and content exist but require better integration through improved teaching methods (Guggari et al., 2023).

Surprisingly, industry connections show the lowest improvement need (25%), contrasting with earlier findings on career preparation gaps. This unexpected result may indicate that students don't perceive industry linkages as the primary solution to skill development challenges, instead prioritizing improvements in classroom execution through better teaching approaches and resources. Alternatively, students may already find the existing industry connections adequate but see disconnects in how these relationships translate into effective teaching and learning experiences that develop workplace-relevant skills.

Suggestions for Improvement of OBE Curriculum

This section presents student recommendations for enhancing engagement with the OBE curriculum, revealing critical insights into learner priorities. Most significantly, the suggestion to improve 'Engagement of Teachers' role in OBE Curriculum' is the only one supported by a majority of students (53%), underscoring the essential role instructors play in effectively implementing OBE principles. This finding directly connects to the previous data highlighting teaching methods as the primary area requiring improvement, and pedagogical training should be prioritized in OBE enhancement efforts.

Table 5: Suggestions for improvement in OBE curriculum

Suggestion to improve student engagement in the existing OBE curriculum	Response		
	No	Yes	Total Responses
Clarity in Learning Objectives in OBE Curriculum	51%	49%	320
Engagement of Teachers' Role in OBE Curriculum	47%	53%	320
Increase Practical Assignments	59%	41%	320
Increased Use of Technology in Teaching Topics	55%	45%	320
More Interactive Sessions, both by Teachers and Peers	51%	49%	320
Provide More Resources with Real-World Applications	64%	36%	320
Simplify Complex Concepts with Visual Learning	62%	38%	320
Reduce Workload	68%	32%	320

Source: Fieldwork, 2025

'Clarity in Learning Objectives' and 'More Interactive Sessions' both received substantial support (49% each), indicating students value both structural clarity and interactive pedagogy. This balanced response suggests that effective OBE implementation requires both well-defined competency targets and engaging instructional approaches. Technology integration in teaching (45%) and increased practical assignments (41%) received moderate support, reflecting student interest in modernized, and applied learning experiences while suggesting these are complementary rather than primary concerns.

Lower-priority improvements included visual learning for complex concepts (38%), additional real-world application resources (36%), and workload reduction (32%). The minimal support for reducing workload is particularly noteworthy, suggesting students are less concerned with course difficulty than with instructional quality and relevance. This contradicts the assumption that students primarily seek easier coursework and instead indicates that they value meaningful, well-structured learning experiences.

Overall, these form a coherent improvement framework focused on enhanced teaching approaches, more precise learning objectives, and increased interactivity (Chan et al., 2022). The data suggests students want OBE implementation that preserves academic consistency while improving instructional approaches and clarity. These priorities align with fundamental OBE principles that emphasize transparent outcomes and effective pedagogical methods, indicating that properly implementing core OBE philosophies rather than structural fixes would address most student concerns.

Implications

The findings of this study suggest that while Outcome-Based Education (OBE) has enhanced students' knowledge and critical thinking skills, greater attention is needed to develop social, personal, and professional competencies. Effective OBE implementation requires improvements in teaching methods, assessment practices, faculty development, technology integration, and curriculum alignment with learning outcomes and career needs. The study also highlights the importance of continuous institutional support, student-centered learning, and quality assurance measures to ensure that OBE contributes to graduate employability and the overall quality of higher education in Bangladesh.

Recommendations

The recommendations are designed to address the identified implementation gaps while acknowledging the evolving national context. The specific recommendations are as follows:

Recommendations for the Bangladesh Accreditation Council (BAC)

Based on the findings of this research, which highlight challenges in the implementation of OBE, the following recommendations are offered to the Bangladesh Accreditation Council (BAC) to strengthen the quality assurance framework at a national level:

- **Issue Supplementary Guidelines for Skill-Domain Integration:** The research showed significant deficiencies in the development of social and personal skills across the curriculum. BAC should develop and disseminate supplementary guidelines or best-practice manuals that provide HEIs with concrete strategies for integrating the social and personal learning domains into technical and theoretical courses. This would help institutions move beyond focusing solely on the fundamental knowledge domain.
- **Clarify the Pedagogical Rationale for GED Courses:** Given students' perception that General Education Development (GED) courses are irrelevant, BAC should provide a clearer rationale for the mandatory 25% GED credit requirement outlined in its standards. This could include publishing exemplars of how GED courses can be effectively integrated with core-discipline objectives to foster the holistic development of graduates, in line with the BNQF.
- **Promote and Standardize Faculty Training on OBE Pedagogy:** The findings pinpoint ineffective teaching methods as the primary obstacle to successful OBE implementation. BAC should consider incorporating a criterion into its standards requiring HEIs to provide continuous, certified training for faculty in student-centered pedagogical approaches essential to OBE. This would reinforce Standard 5 (Teaching-Learning & Assessment) and Standard 7 (Faculty and Professional Staff).
- **Establish Standards for OBE-Supportive Learning Environments:** To address the need for more interactive learning, BAC should establish minimum standards for physical and digital learning environments under Standard 8: Facilities & Resources. These standards should specify requirements for flexible classroom designs, collaborative spaces, and the technological tools necessary to support an OBE approach, moving beyond simple availability to functional integration.

Comprehensive Faculty Development Program

Establish a structured, continuous faculty development initiative specifically targeting OBE implementation skills. This program should:

- Provide intensive training in student-centered, interactive teaching methodologies that develop higher-order competencies;
- Include regular workshops on innovative assessment techniques that measure competency development across all four learning domains;
- Establish mentorship systems pairing experienced OBE practitioners with faculty newer to the framework;

- Incorporate regular teaching observations and feedback mechanisms to improve pedagogical practices continuously;
- Create communities of practice across disciplines to share effective teaching strategies and resources.
- Develop and implement a clear system of incentives and recognition to address the lack of teacher motivation for the extra effort OBE implementation requires. This should align with BAC Standard 7-2, which calls for incentives to retain talented faculty, and could include mechanisms such as workload adjustments, research grants, or formal awards for pedagogical innovation.

Curriculum Redesign and Integration

Implement a curriculum review process that balances competency development across all learning domains. This program should:

- Restructure general education courses to clearly articulate their relevance to professional development and discipline-specific applications;
- Integrate project-based learning components that simultaneously develop technical, social, and personal skills;
- Create explicit connections between course activities and specific BQF competencies to enhance perceived relevance.
- Develop progressive skill-building pathways across the four-year curriculum (five-year curriculum for architecture).
- Adopt a 'design-down' approach for all curriculum development and review. This process should begin with the desired graduate profile/attributes, followed by the definition of program learning outcomes (PLOs), and then the alignment of individual course learning outcomes (CLOs), teaching activities, and assessments.

Enhanced Communication and Awareness

Develop comprehensive education initiatives to improve understanding of OBE principles and objectives. This program should:

- Incorporate mandatory experiential learning components in every program to address the deficiency in practical application.
- Create orientation programs for new students explaining OBE philosophy, assessment practices, and competency frameworks.
- Provide visual curriculum maps showing the relationship between courses, competencies, and career outcomes.
- Develop digital resources explaining how specific courses contribute to overall competency development.

Technology and Resource Enhancement

Develop a structured plan for technology integration and resource development specifically supporting OBE implementation. This program should:

- Create dedicated collaborative learning spaces designed for interactive group work.
- Implement learning management systems that track competency development across courses.
- Establish resource-sharing networks with other institutions.
- Create a dedicated OBE resource center that provides assessment examples.
- Implement comprehensive rubrics explicitly connected to learning domain competencies.
- Balance formative and summative assessments to provide continuous feedback.

Limitations

The single-institution focus is a primary limitation, as the study examined only Khulna University's OBE implementation. This institutional specificity restricts the generalizability of findings to other universities in Bangladesh, which may operate under different administrative structures, resource availability, and institutional cultures. Also, the cross-sectional nature of the data collection provides only a snapshot of OBE implementation at a specific point in time, limiting our understanding of how implementation processes evolve over more extended periods. Educational reforms typically require substantial time for full integration, and this study cannot capture the developmental path of OBE practices or how student and faculty perceptions might change as implementation develops. A longitudinal approach would have provided more profound insights into the sustainability and progressive development of OBE practices.

With 320 student respondents across eight Schools, the sample size from individual Disciplines may have been insufficient to identify discipline-specific implementation challenges. Additionally, the selection of participants may have introduced self-selection bias, as those with stronger opinions about OBE (either positive or negative) might have been more motivated to participate in the research. The reliance on self-reported data from students and faculty presents inherent limitations regarding objectivity. Respondents' perceptions may be influenced by personal biases, limited understanding of OBE principles, or recent positive or negative educational experiences that could skew their overall assessment. Without direct observational data of classroom practices or independent assessment of student competencies, the research cannot definitively verify the accuracy of reported implementation practices or outcomes.

Conclusion

The assessment of Khulna University's Outcome-Based Education implementation shows a system in transition, with promising frameworks in place but significant gaps in execution, particularly regarding higher-order skill development. The research also shows that while OBE principles have been adopted institutionally, their translation into effective teaching practices remains incomplete. The findings conclusively answer the research objectives by identifying specific deficiencies in learning domains, particularly in social and personal skills development, which employers increasingly value. The investigation reveals that general education courses, while conceptually appropriate within the Bangladesh Qualifications Framework, suffer from perceived relevance and consistency issues that limit their effectiveness in developing well-rounded graduates. Both students and faculty demonstrate varying levels of understanding of OBE principles, with more precise comprehension correlating strongly with more positive educational outcomes and perceptions.

Critical gaps exist between the BNQF's aspirational goals and Khulna University's implementation reality, particularly in teaching methodologies, learning resources, and assessment techniques. The research concludes that despite institutional commitment to OBE principles, pedagogical practices remain heavily oriented toward traditional knowledge transmission rather than competency development across all learning domains. This disconnect explains why students consistently identify teaching methods (60%) as the most critical area needing improvement, with faculty engagement (53%) as their highest priority recommendation.

This research further concludes that while Bangladesh's policy direction toward OBE is appropriate and aligns with global educational trends, successful implementation requires comprehensive institutional transformation beyond curriculum redesign. The findings suggest that Khulna University – and likely other institutions across Bangladesh – stands at a critical stage where bridging implementation gaps through faculty development, pedagogical innovation, and resource enhancement will determine whether OBE fulfills its promise of producing graduates with the comprehensive competencies needed for professional success and national development.

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Challenges Universities Face in Implementing Outcome-Based Education (OBE) Curriculum in Bangladesh: A Case Study on Jatiya Kabi Kazi Nazrul Islam University

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Abstract

The adoption of Outcome-Based Education (OBE) has emerged as a crucial reform in higher education to enhance graduate employability, align academic outcomes with labor market demands, and ensure quality assurance in line with international standards. Despite policy mandates by the Bangladesh Accreditation Council (BAC) and the University Grants Commission (UGC), universities in Bangladesh are struggling to implement OBE effectively. This study investigates the multifaceted challenges Jatiya Kabi Kazi Nazrul Islam University (JKKNIU) faces in adopting the OBE framework, using a mixed-methods approach that combines Focus Group Discussions (FGDs), Key Informant Interviews (KIIs), and a structured survey of faculty members. Qualitative findings reveal significant barriers, including inadequate training, shortage of qualified teachers, excessive workloads, insufficient infrastructure, weak institutional leadership, and socio-cultural resistance to pedagogical change. Quantitative analysis using Structural Equation Modeling (SEM) identifies key determinants such as leadership effectiveness, communication, evaluation systems, and working environment as significant factors influencing the challenges of OBE implementation. The study underscores a persistent gap between policy formulation and ground-level execution. It concludes that successful OBE adoption in Bangladesh requires comprehensive faculty development programs, improved institutional logistics, enhanced monitoring mechanisms, and stronger coordination among BAC, UGC, and universities. By addressing these barriers, Bangladeshi higher education institutions can ensure that graduates are more competent and better equipped to meet the dynamic demands of the twenty-first-century labor market.

Keywords: Outcome-Based Education (OBE); Higher Education; Implementation; Challenges; Faculty Development; Bangladesh Accreditation Council (BAC).

Introduction

The 21st Century has witnessed a paradigm shift in educational practices worldwide. The traditional education system, which focused predominantly on teacher-centered instruction, rigid curricula, and the delivery of theoretical knowledge, has been challenged by a growing demand for more dynamic, flexible,

and outcome-oriented teaching and learning models. One of the most widely recognized responses to these changes is the adoption of Outcome-Based Education (OBE). First conceptualized by Spady in the 1980s, OBE is a student-centric learning philosophy that focuses on measuring student performance through outcomes (Spady, 1994). These outcomes are clearly defined objectives that learners are expected to achieve by the end of a course or program. This shift in educational focus from inputs (e.g., teacher qualifications, course content) to outputs (e.g., skills, competencies, and graduates' attributes) has become an essential component of education reform globally.

In higher education, OBE has emerged as a comprehensive strategy to improve educational quality and align graduate skills with labor-market needs. Countries such as the United States, the United Kingdom, Australia, South Africa, New Zealand, Malaysia, and the Philippines have adopted OBE frameworks to varying extents, recognizing their capacity to bridge the gap between academic training and professional expectations (Biggs, 1996; Rao, 2020). The Bologna Process in Europe and the Washington Accord are key examples of international movements that emphasize learning outcomes, quality assurance, and the mutual recognition of qualifications through competency-based standards.

In developing countries, particularly in South and Southeast Asia, the need for an outcome-based framework in higher education has been propelled by economic globalization, technological advancement, and increasing demand for employability skills among graduates (Senaratne & Gunarathne, 2019). For instance, Malaysia has been at the forefront of institutionalizing OBE in its tertiary education sector since the early 2000s. It has integrated OBE into national quality assurance mechanisms through the Malaysian Qualifications Framework (MQF) and the Malaysian Qualifications Agency (MQA). Studies by Hassan (2012) and others suggest that the Malaysian experience with OBE offers important lessons for neighboring countries, including Bangladesh.

Bangladesh's education system, historically influenced by colonial legacies and rote-based learning, has undergone significant reforms in recent decades. However, the traditional higher education model remains primarily focused on memorization, delivery of theoretical content, and summative assessment (Toufique, 2014). Despite the increasing number of graduates entering the job market each year, employers in Bangladesh frequently report a mismatch between graduates' skills and labor market requirements. This skills gap is attributed to limited exposure to critical thinking, problem-solving, and practical application of knowledge in higher education curricula (Chowdhury & Das, 2022, Asim et al 2021).

Recognizing these limitations, the Government of Bangladesh, in collaboration with the University Grants Commission (UGC) and the World Bank, initiated a series of reforms aimed at quality assurance and institutional development in higher education. One of the landmark initiatives was the Higher Education Quality

Enhancement Project (HEQEP), which supported institutional self-assessment and encouraged universities to adopt student-centered, outcome-based teaching and learning strategies. The formulation of the Bangladesh National Qualifications Framework (BNQF), particularly Part B for Higher Education (Level 7–10), and the establishment of the Bangladesh Accreditation Council (BAC) under the Bangladesh Accreditation Council Act 2017 have been significant steps toward aligning the national education system with international standards (BAC Standards for Accreditation of Academic Program, 2019).

The BAC recognizes teaching-learning outcomes into four core parts: fundamental or core skills, social skills, conceptual or thinking skills, and individual or personal skills. The Government of Bangladesh, through BAC, requires that educational institutions incorporate the domains into their curricula and learning processes. The application of such a teaching-learning procedure is expected to enhance students' employability and engagement in lifelong learning.

Despite the policy decision, the implementation of OBE is facing practical challenges and significant resistance. The challenges come from both the educators and the students. During implementation, university teachers and administrators serve as the front-end players. However, their understanding of OBE principles is often inadequate, which may be due to inadequate training, resource and infrastructure constraints, resistance to change, pedagogical unpreparedness, leadership weaknesses, and poor governance (Hossain, 2023). The student's part is often reported for resistance to change.

A transition from a long-standing, historic system to a contemporary one is always time-consuming, and the same goes for OBE curricula. Prior research suggests that such change requires significant care and effort from the Government and education administrators to design curricula, transform the teaching-learning culture, revise evaluation procedures, and support faculty development (Longmore et al., 2017). For example, Biggs (1996) argues that an efficient alignment of the curriculum plan requires good synchronization among targeted learning outcomes, teaching, and evaluation techniques. Success in OBE implementation requires curriculum redesign, appropriate institutional readiness, faculty expertise, and stakeholder input (Harden, 2007).

However, international evidence, such as from Sri Lanka and India, identifies that universities often face challenges in operationalizing OBE due to bureaucratic red tape, lack of policy clarity, and shortage of trained faculty members (Senaratne & Gunarathne, 2019). Sri Lankan university professors reported that large class sizes, ineffective monitoring, and a lack of university autonomy hinder the effective implementation of OBE. Such a situation may be present in Bangladesh due to partial similarities in social and academic cultures. It is also a matter of concern that, despite mandates from UGC and the Government of Bangladesh, the overall implementation of OBE has yet to be supported by academic freedom and capacity-building.

There have been very few empirical studies that have explored the multidimensional challenges of OBE implementation across public and private universities. It leaves a serious gap in research, as effective OBE implementation is not only a matter of policy directives but also a deeper conceptualization of the challenges and approaches to OBE implementation, which may help in multifaceted institutional contexts. Although limited, studies on Bangladesh indicate a lack of clarity and faculty members' readiness in curriculum formulation, outcome planning, and assessment mapping. Moreover, the lack of practical guidelines for assessing the achievement of program learning outcomes (PLOs) or course learning outcomes (CLOs) delayed OBE success.

Moreover, the lack of effective coordination among the regulatory authorities, the UGC, the BAC, and the Ministry of Education has made implementation more challenging. It resulted in duplication of efforts, inconsistent policy-making, and fragmented implementation procedures. Additionally, a lack of effective monitoring and evaluation has slowed down the process. As Bangladesh is still at a beginning stage, given the national and international scenario and complex interaction of socio-cultural, academic, and administrative factors, it is of particular importance to have an empirical and critical investigation of the issue to formulate policy advice for the upcoming days, targeting more effective implementation of OBE in Bangladeshi universities.

Statement of the Problem

Significant shifts in educational frameworks worldwide have called for replacing the traditional curriculum with an OBE curriculum at the tertiary level in Bangladesh. Furthermore, professionals in the twenty-first Century must be able to adapt, think critically, and make independent decisions due to significant changes in the corporate environment (Longmore et al., 2017; Toufique, 2014). The terms "performance-based education," "result-based education," "transformation education," and "competency-based education" have all been used to refer to OBE in the past few decades (Hassan, 2012; Senaratne & Gunarathne, 2019). Now, 47 nations, including the United States, the United Kingdom, Australia, New Zealand, South Africa, Malaysia, and the Philippines, have adopted it and found it successful as an educational system (Biggs, 1996; Rao, 2020). The OBE curriculum for higher education has recently garnered significant interest in Bangladesh. The process was vigorously reenergized shortly after the UGC's HEQEP initiative for institutional quality development was supported by the university Self-Assessment program under the World Bank (Bangladesh Accreditation Council (BAC) Standards for Accreditation of Academic Program, 2019; Bangladesh National Qualification Framework Part-B for Higher Education, 2021).

In 2021, the Ministry of Education and the University Grant Commission (UGC) of Bangladesh released the "Bangladesh National Qualifications Framework (BNQF) Part-B Higher Education Level 7-10" by the Bangladesh Accreditation Council Act,

2017 (Bangladesh Accreditation Council (BAC) Standards for Accreditation of Academic Program, 2019; Bangladesh National Qualification Framework Part-B for Higher Education, 2021). This highlights the need to transform and implement the OBE curriculum to develop future-skilled human capital. Many Bangladeshi universities have redirected their attention and resources toward the implementation of the OBE curriculum at the National Qualification Framework (NQF) level of seven to ten. The Bangladesh Accreditation Council (BAC) has identified four learning outcome domains: fundamental skills, social skills, thinking skills, and personal skills to minimize the future employment-based skill gap (Bangladesh National Qualification Framework Part B for Higher Education, 2021).

Even though OBE implementation holds great potential for Bangladeshi students, successful integration in Bangladeshi higher education institutions is beset by significant challenges. Therefore, educationists and education policymakers should comprehend the challenges, extent, and exposure of those challenges to implement OBE successfully in higher education institutions (Bangladesh Accreditation Council Act 2017, 2017). The institutions must overcome such challenges in OBE implementation to achieve significant quality improvement (Chowdhury R. & Das C., 2022). Successful implementation of OBE may improve the quality of graduates by enhancing their skills and competencies, thereby helping meet dynamic market demands (Chowdhury R. & Das C., 2022). By critically engaging with these challenges, educators, policymakers, and academic administrators may generate actionable insights that inform more robust policy development. This study, therefore, seeks to offer comprehensive, evidence-based recommendations to address the identified constraints and support the effective integration and implementation of Outcome-Based Education within higher education institutions in Bangladesh.

Rationale of the Research Project

The need for this study arises from a confluence of national policy priorities, international quality assurance standards, and the demands of an evolving labor market. With the rapid advancement of the Fourth Industrial Revolution (4IR) and the increasing integration of automation, artificial intelligence, and digital platforms into the global economy, graduates are now expected to demonstrate not only cognitive knowledge but also emotional intelligence, creativity, collaboration, and adaptability. Bangladesh, aspiring to become an upper-middle-income country by 2031 and achieve Sustainable Development Goal (SDG) for Quality Education, must ensure that its higher education system produces globally competitive graduates.

However, despite policy-level initiatives, the transition from input-based to outcome-based curriculum has been partial, uneven, and fraught with practical challenges. There is a gap in the empirical literature on the experiences of stakeholders, including faculty, academic leaders, and policymakers, during OBE implementation. This study adopts a mixed-methods approach to investigate the

measurable trends and nuanced experiences of OBE implementation in Bangladeshi universities, thereby filling a gap in the literature.

Scope of the Study

This study investigates the challenges Bangladeshi universities face in implementing the Outcome-Based Education (OBE) curriculum across different dimensions. It focuses on the pedagogical change associated with OBE implementation. It involves faculty members across different faculties, academic administrators, and policymakers, who share their experiences, expectations gaps, and ways forward in this regard. The outcomes of this study aim to generate constructive insights for improving the successful integration of OBE into Bangladesh's higher education institutions.

Objectives of the Study

The objectives of the current study are divided into general and specific objectives:

a. General Objective:

This study aims to assess the challenges Jatiya Kabi Kazi Nazrul Islam University (JKKNIU) faces in implementing OBE and to identify effective strategies to overcome them, ensuring successful implementation.

b. Specific Objectives:

- i. To identify the challenges JKKNIU is facing while implementing OBE.
- ii. To examine the preparedness of faculty members for the pedagogical changes and demands of OBE in the context of higher education in Bangladesh.
- iii. To examine the role of institutional leadership and support to facilitate the implementation of OBE in JKKNIU.
- iv. To propose recommendations to address the noted challenges and enhance the application of OBE in the higher education landscape of Bangladesh.

Methodology

Study Design, Study Area, and Data Collection Tools

This study will follow an exploratory sequential mixed-methods research design to identify the challenges that universities in Bangladesh face in implementing the OBE Curriculum. This study will first collect qualitative data to understand the issue better, then conduct a survey to identify the prevalence, and finally conduct various statistical analyses. As part of a qualitative study, this study will employ various qualitative data collection methods.

Focus Group Discussion (FGD)

To collect depth data on the challenges of OBE in universities, this study will conduct multiple FGDs with university teachers. This study will follow both

homogeneous and heterogeneous group data collection techniques to collect research data. We will also include chairpersons and deans in FGDs. FGDs will cover the key challenges encountered in implementing OBE, the discomforts reported by teachers and students, and ways to address these issues.

Key Informant Interviews (KIIs)

This study will develop KII guidelines to collect data from key informants of the university, especially those who work in policy formulation, i.e., UGC personnel, university registrars, treasurers, pro-vice chancellors, and Vice-chancellors, regarding their understanding of OBE. The key informants will be asked about the challenges they face in planning, implementing, and evaluating the OBE curriculum and relevant events in their academic environment. The KIIs will be designed to transmit the challenges and suggestions identified through IDIs and FGDs and to seek the current status and future suggestions from the key informants.

Quantitative Data Collection Process

Sample Selection

This study will collect data from the different stakeholders of Jatiya Kabi Kazi Nazrul Islam University (JKKNIU). A stratified random sampling technique will be used to select teachers from six faculties of JKKNIU to collect survey data. The sampling frame for this study will include all the teachers of Jatiya Kabi Kazi Nazrul Islam University (JKKNIU). For each faculty, the required sample size will be determined using Taro Yamane's formula for a known population size

$$n = \frac{N}{1 + Ne^2} \dots \dots \dots (1)$$

Where, n = Sample size; N = Population size, and e = Margin of error of 5%.

The total number of teachers in JKKNIU is 220 as of the 1st of July 2024. Hence, the required sample size will be

$$n = \frac{N}{1 + Ne^2} = \frac{220}{1 + 220 \times 0.05^2} = 141.94 \approx 142.$$

Faculty-wise teachers in Arts, Science & Engineering, Social Science, Business Administration, Fine Arts, and Law and Justice are 60, 41, 60, 43, 9, and 7, respectively. Each faculty will be considered as a stratum, and the number of teachers from the faculties or strata will be determined by proportional allocation, thus implementing simple random sampling.

Table 1. The faculty-wise distribution of sample size using Taro Yamane's Formula

Faculty	Population	Sample Size from faculty, n_i
Arts	60	39
Science & Engineering	41	26
Social Science	60	39
Business Administration	43	28
Fine Arts	9	6
Law and Justice	7	4

Hence, the final sample size would be $n = n_1 + n_2 + n_3 + n_4 + n_5 + n_6 = 39 + 26 + 39 + 28 + 6 + 4 = 142$ teachers from Jatiya Kabi Kazi Nazrul Islam University, Mymensingh, Bangladesh.

All sample sizes for qualitative interviews will be achieved, ensuring data saturation. The required sample size will be determined in accordance with all guidelines, pre-tested to identify inconsistencies, and revised based on the pre-test findings. All the qualitative interviews will be conducted following face-to-face interview procedures.

After the qualitative data collection, a closed-ended quantitative questionnaire will be developed based on the findings of the qualitative study. Using the formula for single proportions, with a prevalence of 50%, a 95% confidence level, a 5% margin of error, and a design effect of 1, the minimum sample size for this study is 142. The questionnaire will be prepared in OKD and shared online (via email and social media platforms) with teachers from selected universities to make it easier for respondents to access.

Data Analysis

Each qualitative interview will be conducted by two interviewers: one interviewer and another note-taker. We will transcribe interviews into Bengali first, and later translate them into English and import them into the computer-aided qualitative data analysis software (CAQDAS) NVivo version 8. Then we will minutely examine the data to identify emergent shapes and themes for analysis in NVivo. Finally, we will illustrate the themes with verbatim quotes and explain by revising the current literature.

Quantitative data will be entered into the Statistical Package for the Social Sciences (SPSS), cleaned, and transferred to Stata version 15.0 for analysis. This study will perform Univariate and Bivariate analyses. For the Univariate analysis, all univariate frequency distributions and the percentages of relevant variables for both dependent and independent variables will be presented in both tabular and graphical form. For the Bivariate analysis, the relationship between conceptually related independent and dependent variables will be examined. To identify

significant factors associated with the challenges universities face in developing and implementing OBE curricula, regression-based statistical models will be used.

Results and Discussion

This study combines the findings of both qualitative and quantitative studies, focusing on the study objectives. The results and findings section presents the overall picture of OBE, its challenges, and the requirements for future implementation. The qualitative investigation and the quantitative analysis findings follow this section.

Qualitative Investigation

Table 2. Demographic Characteristics of the KII Respondents

Participants	Age	Sex	Faculty/Office	Designation
KII-1	50	Male	Vice-Chancellor's Office	Vice-Chancellor
KII-2	54	Male	Office of the Treasurer	Treasurer
KII-3	44	Male	Faculty of Social Science	Dean
KII-4	36	Male	Faculty of Law	Dean
KII-5	46	Male	Faculty of Business Administration	Dean

Table 3. Demographic Characteristics of the FGD Respondents

Participants	Age	Sex	Faculty/Department	Designation
First FGD				
FGD-1	44	Male	Accounting and Information Systems	Professor
FGD-2	33	Male	Population Science	Assistant Professor
FGD-3	32	Male	Sociology	Assistant Professor
FGD-4	38	Male	Human Resource Management	Associate Professor
FGD-5	41	Male	Accounting and Information Systems	Professor
FGD-6	38	Male	Public Administration	Associate Professor
FGD-7	34	Male	Statistics	Assistant Professor
Second FGD				
FGD-8	29	Male	EEE	Assistant Professor
FGD-9	26	Male	Sociology	Lecturer

Participants	Age	Sex	Faculty/Department	Designation
FGD-10	28	Male	Sociology	Lecturer
FGD-11	27	Male	Philosophy	Lecturer
FGD-12	33	Female	Film & Media	Assistant Professor
FGD-13	34	Male	Film & Media	Assistant Professor
FGD-14	40	Female	CSE	Associate Professor

In-Depth Interview/FGD Checklist

Current Status of OBE in the Respondent's University

The implementation of the OBE curriculum varies across diverse faculties and departments. In the six faculties and 25 departments, the OBE curriculum is being implemented, and progress is in its early stages. A faculty member from the faculty of social science opined:

"We have taken initiatives following training from the IQAC and have started working on the OBE curriculum. But we are in the initial stage of OBE formation. There are huge tasks to implement in our department.

Most of the FGD respondents agreed and shared that they are in the beginning stage of the OBE curriculum implementation in their departments. "

Another FGD respondent from the Faculty of Arts shared that:

"We, the faculty members, did not launch OBE because we did not have enough knowledge and expertise to design the OBE curriculum. As we are following the traditional syllabus, we have a lot of difficulties following the OBE course objectives and outcomes."

Another faculty member of the Film and Media Studies department opined that:

"We have started OBE and distributed courses for corrections, and some have completed, while others have not. We just got training, but the trainer was not from the arts faculty. So, we did face difficulties in completing the OBE curriculum. Consequently, in our department, we have yet to complete it. We do not know the PLO and CLO properly."

A prompt respondent from the Faculty of Science and Engineering also shared his opinion:

"We are yet to implement OBE, though we have completed our syllabus. We need more time to implement due to inadequate teachers and staff."

Challenges of Implementing OBE

Despite the growing emphasis on Outcome-Based Education (OBE) as a modern educational approach to enhance student competencies and align academic programs with global standards, its implementation at Jatiya Kabi Kazi Nazrul Islam University is beset with numerous challenges. The key issues identified through FGD, IDI, and KII are discussed below:

Inadequate training programs

A significant barrier to effective OBE implementation is inadequate training for faculty and administrative staff. Many teachers are not fully oriented with the principles, methods, and assessment strategies associated with OBE. Inadequate training results in inconsistent application across departments and a limited understanding of expected learning outcomes. One of the IDI respondents opined that:

"The university authority has started training and workshops for the teachers, but it is not adequate. Only a day-long training is not sufficient to understand and realize the connections between the course objectives and outcomes. Moreover, all the faculty members still need theoretical knowledge as well as a practical outline of making an OBE curriculum."

Most of the FGD respondents opined that:

"We have only one training course from IQAC, and that was not sufficient. We need more training to understand the entire OBE system. Otherwise, it is impossible to implement the OBE curriculum. At first, we need knowledge development, then we will think about the implementation."

Scarcity of teachers

The university faces a shortage of qualified teachers, which hinders the effective delivery of the curriculum designed under the OBE model. This scarcity also limits student-teacher interaction, feedback, and personalized guidance, which are essential components of OBE. Among 25 departments, most are newly established and have no professors yet. One FGD respondent pointed out that:

"We have six teachers and two of them are on leave for PhD. We are new teachers and participated in only one course on OBE. We are yet to learn about the curriculum, and we have a knowledge gap. We cannot focus on the OBE because we have lots of tasks, including classes, exams, research, and other activities."

Lack of research professor, and teaching assistant

Most of the departments do not have professors. Research professors and teaching assistants play a crucial role in enhancing academic quality and supporting students. Their absence affects not only classroom instruction but also the research and innovation needed to support outcome-based learning. The absence of research-oriented faculty and teaching assistants negatively impacts both the teaching-

learning process and academic research culture. These roles are crucial for fostering critical thinking, supporting research-based learning, and assisting in continuous assessment, all of which are integral to OBE."

A FGD respondent shared that:

"We are new faculty members, and we do not have senior teachers like professors. That's why we do not have much opportunity to learn from them, especially in research and other activities."

Inadequate officers and staff

Administrative and technical support is vital for managing data, coordinating assessments, and maintaining resources. The shortage of officers and staff, especially in newer departments or faculties like Arts, Social Science, Science and Engineering, and Business, disrupts the operational efficiency required for smooth OBE implementation. Sometimes teachers have to take on the officers' tasks due to a shortage. In this regard, almost all respondents in the FGD agreed that they have a shortage of officers, staff, and other personnel. They pointed out:

In our department, we do not have sufficient officers and staff. We have five to six batches in our department in both undergraduate and postgraduate programs. We have continuous exams, classes, results, and other tasks. We need continuous support from the officers and staff, the lack of which creates difficulties. We have to complete their task and do our activities. That is why we do not have much time and opportunity to enhance OBE.

Lack of laboratory and library facilities

Practical learning is a cornerstone of OBE. However, the university's inadequate laboratory infrastructure and limited library resources hinder students' access to hands-on learning and updated academic materials. Inadequate laboratory and library facilities restrict the achievement of both course-specific and program-level learning outcomes. OBE emphasizes practical learning and access to updated knowledge resources. The insufficient laboratory infrastructure and outdated or limited library resources undermine students' ability to achieve intended learning outcomes, particularly in science, technology, and applied fields.

Lack of logistic support and facilities

Effective implementation of OBE necessitates access to IT infrastructure, smart classrooms, and digital learning tools. The lack of such logistical facilities impedes the effective implementation of OBE practices such as digital assessment tracking, blended learning, and performance analysis. One FGD respondent shared that:

In the government university, we do not have sufficient logistical support. We face a shortage of paper, envelopes, laptops, printers, multimedia equipment, sound systems, and so on. The scarcity hinders our academic activities.

Excessive faculty workload

Due to the teacher shortage, existing faculty members are overburdened with teaching, administrative duties, and curriculum development. This high workload limits their ability to engage in individualized student mentoring, innovative pedagogical practices, and continuous course refinement. Lack of Adaptive Capacity of Students with the Course Curriculum. Based on the FGD, IDI, and KII, it is clear that almost all teachers have excessive workload. They agreed that:

We have a full workload, work after office hours, and even work on weekends. We have continuous classes, exams, evaluations, and research activities. As we have to attend the meeting, we sometimes have to reschedule our classes. Against this backdrop, implementing the OBE curriculum is a burden for us. If we have enough teachers and staff, we would not have difficulties implementing.

Limited adaptive capacity of students

Students at newly established universities, such as Jatiya Kabi Kazi Nazrul Islam University, face challenges across various aspects. Many students struggle to adapt to the self-directed, outcome-focused learning style of OBE, especially those from traditional educational backgrounds. This results in a mismatch between student readiness and curriculum expectations.

Limited industrial demand for graduates

One of the goals of OBE is to align academic outcomes with industry needs. However, in some disciplines, limited job-market demand affects student motivation and raises questions about the relevance of some program outcomes. A disconnect between academic outcomes and industry requirements, particularly in certain disciplines, limits graduates' employability. This disconnect reduces the practical relevance of OBE efforts and demotivates both students and faculty from fully engaging with the approach.

Lack of collaboration or MoU

Collaboration with industry, research institutions, and international universities enhances the scope and effectiveness of OBE. However, the university currently lacks sufficient numbers of formal collaborations or Memoranda of Understanding (MoUs), limiting opportunities for student internships, joint research, and curriculum enrichment.

Environmental and cultural limitations

Socio-cultural resistance to change and a lack of awareness regarding the benefits of OBE pose additional barriers. In many cases, traditional mindsets, especially among senior faculty or within local communities, hinder the acceptance and successful integration of OBE practices.

Preparedness of the faculty members

The education system is gradually changing in response to globalization and the demands of human society. Artificial Intelligence (AI) is crucial to all of us, particularly in the education system. Internet, distance learning, and robotics are the innovations during the fourth industrial revolution. AI-based education is obligatory for the future generation. Regarding these issues, university teachers who participated in the FGD, IDI, and KII are aware of the need to shift from a traditional to a modern, advanced education system. Most of the FGD respondents shared that:

"We have to change our education pedagogy to compete with the global context, but we do not have sufficient resources. Society is transforming forward so fast, but we are not. We need to concentrate on developing the quality of the teachers, the learning environment, and ensuring enough budget allocation."

Another FGD respondent opined that:

"Someone makes us bound to implement OBE without providing enough training, teachers, staff, and other necessary support. We need a better environment and resources. We need to make our students technology-oriented from college level so that they can adapt to the advanced curriculum. Teachers should be free from workload to maintain the OBE curriculum properly. The journey is still in a dilemma."

Notably, the overall scenario of the quality of the university teachers sounds good, but still, they need to be more skilled and adaptable with new technology and innovation like Artificial Intelligence (AI)."

FGD respondents shared harmoniously that:

"We have a traditional educational syllabus in our student life, but now we are implementing the advanced OBE without enough training. So, it is challenging, and we need to have sufficient training and knowledge on it. Otherwise, it is difficult to implement in both theoretical and practical aspects."

With regard to the readiness of the faculty members, the study found a different scenario. Some respondents want to implement OBE right now, and some have a scarcity of teachers and staff. One FGD respondent opined that:

"We are not properly ready to implement OBE because we have lots of limitations and a lack of resources. We are not equipped with teachers, officers, staff, and other resources. "

Another respondent shared that:

"We are already overloaded. We do not know the advantages or disadvantages of OBE. We are not ready to accept it. I think most of the faculty members have similar experiences."

Some other FGD respondents thought positively. They think that OBE is good for all the stakeholders."

One of them shared that:

"We are ready to accept it because it is good for all stakeholders. Teachers and students should allow the OBE curriculum. But we need sufficient training and resources before implementing OBE."

Requirements for effective implementation of outcome-based education (OBE)

Based on Focus Group Discussions (FGDs), In-Depth Interviews (IDIs), and Key Informant Interviews (KIIs) with university faculty and stakeholders, several critical requirements have been identified for the successful implementation of the Outcome-Based Education (OBE) framework. These requirements reflect the theoretical, practical, institutional, and socio-cultural needs essential to transforming the academic system.

Environmental and cultural changes

Creating a positive, inclusive, and innovative-driven academic culture is essential for adopting OBE. Resistance to change, rigid mindsets, and traditional pedagogical values can hinder implementation. A shift toward open, collaborative, and learner-centered approaches is required.

Recruiting sufficient and qualified teachers

OBE demands active learning, continuous assessment, and student-centered facilitation. This requires a well-staffed faculty with the appropriate academic and pedagogical qualifications. Adequate recruitment ensures manageable class sizes, personalized instruction, and quality assurance. Without enough faculty members, it is quite impossible to implement OBE.

Increasing logistics support and facilities

To implement OBE, institutions must invest in logistics such as smart classrooms, assessment tools, audiovisual equipment, and administrative resources. These support structures are crucial for delivering outcome-aligned instruction and assessments efficiently.

Improving lab and library facilities

Practical and research-based learning are central to OBE. Modern laboratory setups and updated library resources enable students to achieve discipline-specific outcomes and engage in inquiry-based learning, particularly in science, technology, and applied fields.

Student counselling

Effective counselling services help students adapt to new learning methods, clarify academic and career goals, and manage stress. Support mechanisms like academic advising, mental health counselling, and skill development workshops improve learning outcomes and student engagement.

Enhancing training of trainers (ToT) for teachers and officers

OBE implementation depends on educators' and administrative officers' capacity to understand and implement its principles. Regular ToT programs ensure that all involved stakeholders are trained in curriculum design, outcome mapping, assessment strategies, and quality assurance.

Including staff and students in training and workshops

OBE is a system-wide approach. Training opportunities should extend beyond faculty to include administrative staff and students. Broad-based training fosters a shared understanding, smooth coordination, and greater ownership of the change process.

Improving the internet, computer, and other technological supports

Digital infrastructure plays a vital role in blended learning, data management, online assessments, and communication. Fast internet, updated software, and sufficient hardware are essential to support modern OBE practices.

Ensuring job supply and university-student collaboration

Connecting academic outcomes with real-world employment opportunities enhances the relevance of OBE. Career services, internship programs, and alumni networks should be developed to bridge the gap between education and employment.

Connections with market demand

OBE must align curriculum outcomes with market needs. Continuous industry feedback and collaboration help in designing programs that produce graduates with relevant and employable skills.

Awards for the extra work of the teachers

OBE often requires faculty to engage in extra activities, such as curriculum mapping, developing rubrics, conducting continuous assessments, and mentoring. Providing incentives or recognition motivates teachers and sustains their engagement.

Enhancing blended learning and distance learning opportunities

Flexible learning models such as blended and distance education provide students with greater access to content and diverse learning experiences. These methods are beneficial for addressing large class sizes and varying learner needs.

Improving resources for online and offline learning

Accessible and high-quality learning resources, videos, readings, and interactive content in both digital and printed formats enhance students' ability to meet learning outcomes across different contexts and learning styles.

Making the university website functional and informative

A well-maintained university website should provide access to syllabi, learning outcomes, assessments, and academic calendars. This increases transparency, accessibility, and engagement for both students and external stakeholders.

Ensuring readily available and easily accessible learning resources

All academic materials, including books, handouts, past papers, and digital content, should be well-organized and easily accessible. Easy access to academic materials helps students stay on track with course expectations and learning goals.

Strengthening monitoring and coordination mechanisms

OBE implementation requires continuous monitoring, evaluation, and coordination among academic and administrative units. A dedicated OBE coordination cell or quality assurance unit can help ensure compliance, consistency, and continuous improvement.

Continuous quality assurance (QA) mechanism

OBE is a dynamic system that requires ongoing evaluation and improvement. Internal QA processes help track whether outcomes are being achieved and identify areas for improvement in teaching, learning, and assessment. Moreover, the university authority should run continuous training and workshops on OBE.

Dedicated OBE implementation cell or committee

A centralized body to coordinate OBE-related activities ensures consistency, monitoring, and support across departments. It acts as a bridge between policy and practice. If the IQAC takes the initiative, it should be assigned all the responsibilities for implementing OBE.

Student feedback and reflection mechanism

Regular student feedback provides valuable insights into whether the learning environment is supportive and whether the intended outcomes are being met. Reflective practices also enhance self-directed learning.

Faculty collaboration and peer support

OBE encourages interdisciplinary learning and team teaching. Faculty collaboration enhances curriculum coherence, allows sharing of best practices, and fosters mutual support in implementing OBE methods.

Budget allocation for OBE activities

Successful implementation requires financial resources - for training, infrastructure, digital tools, assessment systems, and materials. Budget support reflects institutional commitment to OBE.

Institutional leadership, support, and challenges of implementing OBE

The most significant Key Informant, the Vice-Chancellor of the University, provided detailed insights. He confessed that, despite the limitations of implementing OBE, he wants to implement it at the university to advance academic standards. He pointed:

"The OBE curriculum is significant in the current era to compete globally. Currently, we are at the initial stage. There are some departments where only 2-4 teachers run the department. It is difficult to implement OBE for these departments. The class size is big enough in terms of the teacher, but the student-to-teacher ratio is not appropriate. The organogram has enough teachers and staff, but the UGC needs to allow and approve us to recruit. Otherwise, we cannot circulate for the vacancy."

Regarding OBE implementation, he also pointed out that:

"We need prudent manpower, including teachers and staff. There is also a lack of efficiency among current teachers as they have not received enough training, especially on OBE. To make them more efficient, UGC needs to concentrate on regular training. More importantly, UGC needs to allocate enough budget for the OBE curriculum. The monitoring and the coordination are also significant."

Furthermore, the key informant shared that:

"The OBE implementation will contribute to the improvement of the quality of education. To implement OBE, UGC needs to fix a deadline for the universities and supply necessary teachers, staff, and other re-equipment. Then the universities will follow the deadline to implement the OBE. Otherwise, it will not be possible to implement properly."

The vice chancellor of the University opined that:

"The university has more than 200 faculty members, 150+ officers and other staff. There is an IQAC that organizes regular training and workshops. In terms of the quality, there is huge lack behind due to the budget, efficiency and concentration. The university is capable to implement OBE, but we need more teachers, officers and staff. Significantly, we need high standard training for all the teachers and officers. We also need collaboration with UGC, and other experts including collaboration with the industries."

Another key informant, the Treasurer, shared the current status of the OBE at the university, the challenges, and the future directions. He opined:

"OBE has a global standard; it is helpful to ensure the quality of education. In our university, there are several challenges, such as: lack of faculty members and staff, limited workshops and training, lack of senior teachers, logistic support and so on. We are trying to mitigate the crisis. To implement the OBE in our university, IQAC should collaborate with the departments separately. They should meet the demands and supply the necessary support. "

He also pointed out that:

"We do not get top support from the upper authority. We do not have sufficient teachers, staff, and other logistic supports. We need directions from UGC, and the IQAC should pay special attention to OBE. "

Another key informant shared that:

"The university authority should recruit sufficient teacher, staff so that they can concentrate on OBE. It is not possible to implement OBE taking work pressure into account. Moreover, it needs to ensure efficiency and quality among the teachers. Otherwise, it will be difficult to lead and run the OBE curriculum. "

Findings of Quantitative Analysis

Background Characteristics of Participants

In the survey, 200 questionnaires were distributed among the active faculty members of Jatiya Kabi Kazi Nazrul Islam University (JKKNIU). Of these, 143 teachers completed the survey (71.5% response rate) with self-consent and returned the questionnaire. Hence, the final sample size for analysis was 143. The demographic, socio-economic, and personal characteristics of the faculty members are summarized in Table 1.

Most respondents (66.5%) had less than 10 years of teaching experience, with 33.6% having fewer than 5 years and 32.9% having 5-10 years. Approximately 29.4% reported having 11 to 20 years of experience, while only 4.2% had over 20 years. The mean age of respondents was 35.69 years, with a standard deviation of 7.00 years, indicating a predominantly young faculty. In terms of religious affiliation, most participants identified as Muslim (86.0%), while 14.0% identified as Hindu or belonged to other religions. Regarding academic designation, 41.3% were Assistant Professors, followed by Lecturers (26.6%), Associate Professors (16.8%), and Professors (15.4%). Faculty distribution included 30.8% from the Faculty of Social Science, 26.6% from Science and Engineering, 23.1% from Business Administration, 16.8% from Arts and Performing Arts, and 2.8% from the Faculty of Law. When asked about the number of students in their respective programs, 28.0% reported having between 201 and 250 students, and 26.6% had more than 250 students. Smaller cohorts were less common, with 16.1% managing fewer than 50 students. In terms of professional development, a significant proportion (81.8%) had received formal training in Outcome-Based Education (OBE), while 18.2% had not. Regarding familiarity with OBE principles, 63.6% reported being moderately familiar, 29.4% were somewhat familiar, 5.6% were highly familiar, and only 1.4% stated they were not familiar at all.

Table 4. Distribution of demographics of the respondents

Factors	Labels	Percentage (%)
Teaching Experience (in years)	< 5	33.6
	5-10	32.9
	11-20	29.4
	21-30 and above	4.2
Age	Mean $\pm$ SD	35.69 $\pm$ 7.00
Religion	Islam	86.0
	Hindu and others	14.0
Designation	Lecturer	26.6
	Assistant Professor	41.3
	Associate Professor	16.8
	Professor	15.4
Faculty	Arts and Performing Arts	16.8
	Science & Engineering	26.6
	Business Administration	23.1
	Social Science	30.8
	Law	2.8
Number of Students in the Program	<50	16.1
	50-100	12.6
	101-150	5.6
	151-200	11.2
	201-250	28.0
	>250	26.6
OBE Training	Yes	81.8
	No	18.2
How familiar are you with the principles of OBE?	Not at all	1.4
	Somewhat	29.4
	Moderately	63.6
	Highly	5.6

Seven constructs constitute the challenges related to objective-based education (OBE), namely working environment (WE), distribution of workload (DW), communication (Com), teacher development (TD), evaluation (EV), leadership (Lead), and OBE challenge (OC).

Construct Reliability and Validity

Table 2 presents the reliability and validity measures for the key latent variables analyzed in this study. All constructions exhibited strong internal consistency, with Cronbach's alpha values ranging from 0.701 to 0.927, exceeding the recommended threshold of 0.70. The composite reliability values for all constructs were also satisfactory, ranging from 0.862 to 0.939, indicating high internal consistency and reliability. Furthermore, the Average Variance Extracted (AVE) values for all constructs surpassed the acceptable level of 0.50, confirming adequate convergent validity. Overall, these results demonstrate that the measurement model has satisfactory levels of reliability and validity, ensuring that the constructions are robust for further structural analysis.

Table 5. Construct reliability and convergent validity measures

Constructs	Cronbach's Alpha (α)	Rho_A	Composite Reliability	Average Variance Extracted (AVE)
Com	0.86	0.958	0.908	0.768
DW	0.701	0.805	0.862	0.758
EV	0.918	1.016	0.959	0.922
Lead	0.869	0.897	0.919	0.79
OC	0.927	0.937	0.939	0.632
TD	0.926	0.972	0.937	0.789
WE	0.867	1.09	0.933	0.874

Discriminant Validity: Fornell-Larcker Criterion

To evaluate discriminant validity, we applied the Fornell-Larcker criterion, as shown in Table 3. The square root of the Average Variance Extracted (AVE) for each construct, represented by the diagonal elements, exceeded the corresponding inter-construct correlations. This finding indicates strong discriminant validity among the constructs. Notably, the construction Evaluation (EV), Leadership (Lead), Teacher Development (TD), and Working Environment (WE) demonstrated particularly robust discriminant validity, with their AVE square roots significantly higher than their correlations with other constructs. These results confirm that each construction is distinct and captures phenomena not represented by the others in the model.

Table 6. Discriminant validity assessment using the Fornell-Larcker criterion

Constructs	Com	DW	EV	Lead	OC	TD	WE
Com	0.876						
DW	0.641	0.871					
EV	0.407	0.461	0.96				
Lead	0.549	0.557	0.693	0.889			
OC	-0.116	0.092	-0.203	0.076	0.795		
TD	0.384	0.587	0.454	0.6	0.171	0.888	
WE	0.333	0.473	0.364	0.426	-0.207	0.571	0.935

Discriminant Validity: Heterotrait-Monotrait (HTMT) Ratio

Further assessment of discriminant validity was conducted using the Heterotrait-Monotrait Ratio (HTMT), as shown in Table 7. All HTMT values fell below the conservative threshold of 0.85, providing additional evidence of strong discriminant validity. Specifically, the HTMT values ranged from 0.124 to 0.843 across all construct pairs, confirming that the constructs are empirically distinct. This dual confirmation, utilizing both the Fornell-Larcker and HTMT criteria, reinforces the robustness of the measurement model.

Table 7. Discriminant validity assessment using the Heterotrait-Monotrait Ratio (HTMT)

Constructs	Com	DW	EV	Lead	OC	TD	WE
Com							
DW	0.843						
EV	0.475	0.567					
Lead	0.655	0.71	0.765				
OC	0.139	0.124	0.215	0.122			
TD	0.468	0.706	0.521	0.668	0.14		
WE	0.419	0.581	0.401	0.495	0.213	0.677	

Assessment of Multicollinearity

Table 5 presents the results of the multicollinearity test using the Variance Inflation Factor (VIF) values. All VIF values ranged from 1.565 to 2.717, which is below the recommended cutoff of 5.0. This result indicates that multicollinearity is not a concern within the dataset. Consequently, these findings confirm that the regression coefficients are stable and that the predictors are not excessively correlated, thereby enhancing the reliability of the structural model estimates.

Table 8. Multicollinearity assessment using the Variance Inflation Factor (VIF) values

	Com	DW	EV	Lead	OC	TD	WE
Com					1.9		
DW					2.299		
EV					1.965		
Lead					2.717		
OC							
TD					2.132		
WE					1.565		

Hypotheses Testing Results Using Path Analysis

Table 9 presents the path coefficients, t-values, and p-values from the structural equation model analysis in Table 6. Among the hypothesized relationships, several were found to be statistically significant at the 5% or 1% levels. Specifically, Communication (Com) had a significant negative effect on OBE Challenge (OC) ($\beta = -0.237, p = 0.013$), while Distribution of Workload (DW) positively influenced OC ($\beta = 0.238, p = 0.026$). Evaluation (EV) showed a substantial negative impact on OC ($\beta = -0.426, p < 0.001$), whereas Leadership (Lead) ($\beta = 0.317, p = 0.012$) and Teacher Development (TD) ($\beta = 0.337, p = 0.021$) showed significant positive impacts on OC. Additionally, Working Environment (WE) had a highly significant negative effect on OC ($\beta = -0.398, p < 0.001$). These findings provide empirical support for most hypothesized relationships, underscoring the complex challenges of implementing the OBE curriculum.

Table 9. Hypothesis testing results based on structural equation modeling

Hypothesis	Path	Path coefficient (β)	t-value	*p-value
H_1	Com -> OC	-0.237	2.482	0.013
H_2	DW -> OC	0.238	2.232	0.026
H_3	EV -> OC	-0.426	4.212	0.000
H_4	Lead -> OC	0.317	2.512	0.012
H_5	TD -> OC	0.337	2.304	0.021
H_6	WE -> OC	-0.398	3.997	0.000

*Significant at $p < 0.05$, **Significant at $p < 0.01$.

Outer Loadings of Measurement Items

Table 7 presents the outer loadings of the measurement items for each construct. All item loadings exceeded the acceptable threshold of 0.70, indicating strong relationships between the individual indicators and their associated latent variables. Notably, the items EV-1 (0.945) and EV-2 (0.975) for the Evaluation construct, along with WE-1 (0.970) and WE-2 (0.899) for the Working Environment construct, demonstrated exceptionally high loadings, reflecting excellent indicator reliability. These results confirm that the selected items for each construct effectively represent the underlying theoretical concepts.

Table 10. Outer loadings of measurement items on corresponding constructs

	Com	DW	EV	Lead	OC	TD	WE
Com-3	0.91						
Com-4	0.837						
Com-5	0.88						
DW-1		0.93					
DW-3		0.807					
EV-1			0.945				
EV-2			0.975				
L-1				0.907			
L-3				0.869			
L-8				0.89			
OC-10					0.814		
OC-2					0.798		
OC-3					0.74		
OC-4					0.784		
OC-5					0.782		
OC-6					0.813		
OC-7					0.895		
OC-8					0.702		
OC-9					0.809		
TD-2						0.95	
TD-3						0.942	
TD-4						0.82	
TD-5						0.834	
WE-1							0.97
WE-2							0.899

Structural Equation Model

Figure 1 presents the structural equation model illustrating the standardized path coefficients among the constructs. This model highlights both the direct and indirect relationships associated with challenges in Outcome-Based Education (OBE). Notably, there are stronger negative paths from Evaluation (EV) and Working Environment (WE) to OBE Challenge (OC). At the same time, Leadership (Lead), Teacher Development (TD), and Distribution of Workload (DW) exert positive influences on OC. A visual presentation effectively complements the numerical results from hypothesis testing. It provides a clear overview of the complex interrelationships among the constructs that impact the successful implementation of Outcome-Based Education in universities.

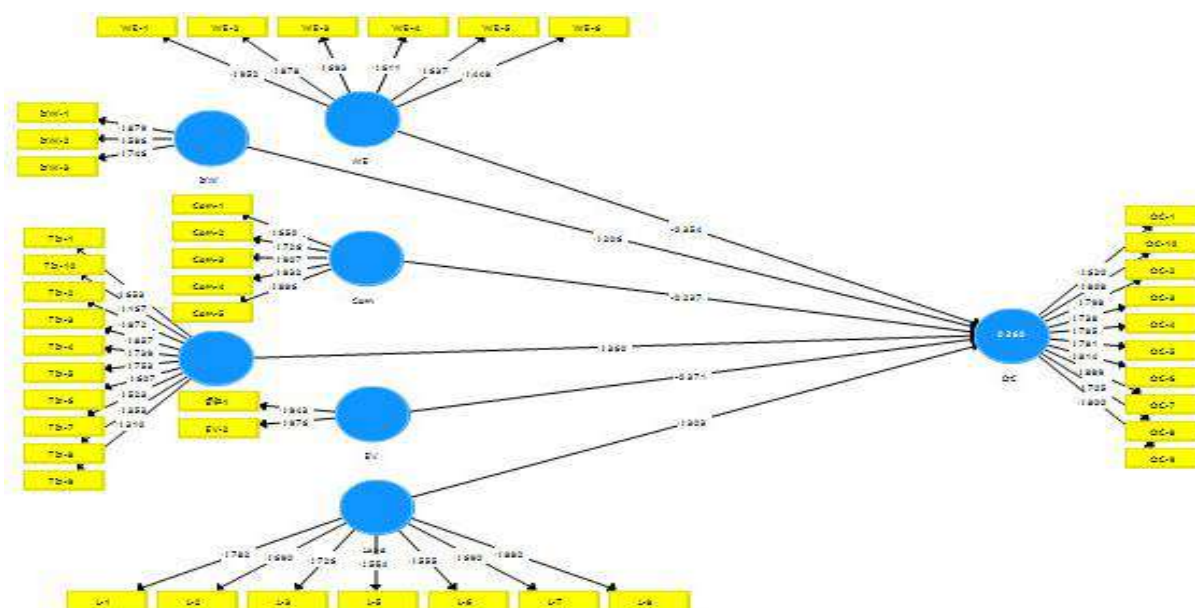


Figure 1. Structural equation model illustrating standardized path coefficients

Results and Discussion

The purpose of this study was to explore the challenges universities face in implementing an Outcome-Based Education (OBE) curriculum in Bangladesh. Drawing on both qualitative and quantitative findings, the discussion chapter synthesizes key insights, compares them with existing literature, and provides a critical analysis of the results.

Synthesis of Key Findings

The study reveals that while several universities have adopted OBE, its practical implementation remains in its nascent stage. Despite policy advocacy by the Bangladesh Accreditation Council (BAC) and the University Grants Commission (UGC), the study found a range of institutional, pedagogical, and cultural challenges that obstruct effective OBE implementation. Key issues include inadequate training

programs, faculty shortages, insufficient logistical support, limited understanding of OBE principles, and socio-cultural resistance.

Quantitative results further corroborate the qualitative findings. Constructs such as working environment, distribution of workload, leadership, teacher development, and evaluation system significantly affected the perceived challenges of implementing OBE. High workload and poor communication practices also negatively influenced faculty motivation and ability to engage with the OBE framework.

Faculty Preparedness and Training Gaps

The lack of sufficient training for the faculty emerged as a significant bottleneck. Most faculty members reported attending only a single workshop or training session, which was often lacking in depth and practical orientation. This finding aligns with Yasmin and Yasmeen (2021), who identified the absence of continuous professional development as a key barrier to OBE implementation in South Asia. Moreover, teachers trained in traditional education systems struggle to adapt to outcome-oriented paradigms without extensive re-skilling.

Senaratne and Gunarathne (2019) similarly observed in Sri Lankan universities that training inadequacies compromised faculty readiness for OBE, echoing the experiences of Bangladeshi academics documented in this study.

Structural and Institutional Barriers

The results indicated that the scarcity of qualified faculty, the absence of teaching assistants, and poor logistical facilities significantly hampered the operationalization of OBE. Faculties expressed concern over excessive workloads, insufficient laboratory and library resources, and a lack of digital infrastructure, such as smart classrooms.

These results resonate with McNeil et al. (2006) and Mogashoa (2013), who argued that institutional resource limitations are primary inhibitors of educational reforms such as OBE. Institutions with fragile infrastructure cannot effectively support learner-centered models that demand extensive feedback, assessments, and continuous learning support.

Leadership and Governance Issues

Leadership was found to be another crucial determinant. Although university leaders acknowledged the significance of OBE, they faced systemic limitations in recruitment and budget allocation, primarily due to constraints imposed by higher regulatory bodies such as the UGC. Inadequate leadership support, both in training facilitation and resource mobilization, compounded the challenges.

This finding is consistent with Darling-Hammond (2000), who emphasized the role of leadership in driving and sustaining quality assurance mechanisms in higher education. Leadership inadequacies have also been noted in earlier studies by

Bhuiyan and Ahmmed (2009), underscoring their critical role in creating a conducive environment for reforms.

Student Readiness and Learning Culture

The transition to OBE not only affects faculty but also demands significant adjustments from students. Many students, accustomed to rote learning and passive knowledge reception, were found unprepared for the self-directed, competency-based demands of OBE. Similar observations were made by Tam (2014), who argued that students from conventional academic backgrounds experience resistance and confusion when faced with active learning environments promoted by OBE.

Additionally, limited industrial demand in certain fields diminishes students' motivation to achieve specific learning outcomes, a challenge previously highlighted by Pepito (2019).

Implications

The findings of this study suggest that successful implementation of Outcome-Based Education (OBE) in Bangladesh requires more than curriculum reform; it depends on institutional readiness, faculty development, effective leadership, adequate resources, and a supportive learning environment. The results highlight the importance of continuous professional training, improved infrastructure, balanced workloads, and strong quality assurance mechanisms to enhance learning outcomes. Furthermore, collaboration among universities, policymakers, and industry stakeholders is essential to align academic programs with labor market needs and national qualification frameworks, ultimately improving educational quality, graduate employability, and global competitiveness.

Recommendations

Based on the key findings and discussions, several actionable policy recommendations emerge:

- **Strengthen Faculty Training and Development:** Continuous professional development programs should be institutionalized. Workshops, certificate programs, and advanced training on curriculum mapping, learning outcome formulation, and outcome-based assessment should be mandatory for all teaching staff.
- **Recruit and Retain Qualified Faculty:** Universities must prioritize the recruitment of adequately trained teachers, including the hiring of research professors and teaching assistants, to address workload issues and foster research-driven academic culture.
- **Enhance Infrastructural and Logistical Support:** Investment in laboratories, libraries, IT facilities, and smart classrooms is crucial. Universities should ensure

that both physical and digital learning environments are conducive to the effective delivery of OBE curricula.

- **Align Curriculum with Market Needs:** Universities should actively collaborate with industries to regularly update curricula and ensure alignment with evolving job market demands. Industry collaboration enhances graduates' employability and motivates students to engage with OBE methodologies actively.
- **Promote Student Adaptability:** Orientation programs and skill-building workshops should be introduced to prepare students for outcome-based learning styles, emphasizing critical thinking, problem-solving, and self-directed learning.
- **Foster Institutional Leadership:** University leadership must be proactive and visionary in championing OBE implementation. A dedicated OBE Implementation Cell or Quality Assurance Unit should be established to coordinate, monitor, and consistently support the initiative.
- **Ensure Budgetary and Policy Support:** Both government and university authorities should allocate specific budgets for OBE-related activities. Financial support is essential for training, resource development, and the maintenance of continuous quality improvement mechanisms.
- **Strengthen Monitoring and Accountability Mechanisms:** Robust monitoring, evaluation, and feedback systems must be implemented. Regular assessments and audits can ensure that departments maintain consistency and quality in OBE practices.

Limitations

While this study provides valuable insights into the challenges universities face in implementing Outcome-Based Education (OBE) in Bangladesh, it is not without its limitations. First, the research was conducted primarily at a single public university, which may limit the generalizability of the findings to all Bangladeshi higher education institutions, particularly private universities that may face different challenges. Second, although a mixed-methods approach was adopted, reliance on self-reported data from surveys and interviews may have introduced biases, such as social desirability bias and selective memory. Additionally, due to resource and time constraints, the study could not cover a larger number of faculties and administrative personnel, which might have enriched the analysis with more diverse perspectives. Moreover, the study focused primarily on internal institutional challenges, with relatively less emphasis on broader external factors such as national policy shifts, global educational trends, or employer expectations. Lastly, while the study tried to incorporate both qualitative and quantitative perspectives, the complexity of OBE implementation may require longitudinal analysis to capture its evolving nature more comprehensively. Recognizing these limitations offers

valuable guidance for future research seeking a deeper, broader understanding of OBE challenges in Bangladesh.

Conclusion

The present study set out to explore the multifaceted challenges that universities in Bangladesh face in implementing Outcome-Based Education (OBE) curricula. Anchored by three primary objectives – identifying challenges, examining faculty preparedness, and understanding the role of institutional leadership – the research revealed critical insights that not only align with global experiences but also highlight context-specific barriers.

The findings showed that although national policy initiatives such as the Bangladesh National Qualifications Framework (BNQF) and the Higher Education Quality Enhancement Project (HEQEP) advocate for OBE, actual implementation at the university level remains in the preliminary stages. The challenges span several dimensions: insufficient faculty training and preparedness, inadequate infrastructure and logistical support, scarcity of qualified faculty, excessive workload, low student readiness, and ineffective institutional leadership and monitoring mechanisms.

Quantitative results supported these insights by demonstrating that factors such as working environment, teacher development, workload distribution, and leadership effectiveness significantly influence perceived challenges to OBE implementation. These findings directly addressed the research objectives and reinforced the argument that successful educational reform demands systemic change rather than isolated efforts.

Moreover, the discussions with faculty members, administrators, and key informants underscored the socio-cultural and environmental barriers to change. Resistance from traditional mindsets, misalignment between academic outputs and market demands, and a lack of coordinated leadership were all seen as significant impediments.

Thus, while the intent to modernize higher education is clear, Bangladesh's higher education institutions require a comprehensive and multi-layered strategy to realize the promises of OBE.

Future Research Guidelines

Building on this study's findings, future research should expand the investigation to a broader range of universities, including private and specialized institutions across Bangladesh. A comparative analysis between public and private universities could uncover unique institutional factors influencing OBE implementation. Longitudinal studies would also be valuable for tracking the progress and evolution of OBE practices over time, offering deeper insights into institutional adaptation and faculty development. Additionally, exploring students' perspectives more thoroughly could

shed light on their readiness, challenges, and expectations from an outcome-based learning environment. Future studies should consider integrating perspectives from employers and industry leaders to better align academic outcomes with labor market needs. Moreover, investigating the role of digital transformation, such as e-learning tools and artificial intelligence, in facilitating OBE, could present modern solutions to existing challenges. Mixed-method approaches combining quantitative modeling with rich qualitative narratives are encouraged to capture the complexity of educational reforms. Policy-focused research examining the effectiveness of national frameworks, such as the Bangladesh National Qualifications Framework (BNQF), would be beneficial in assessing how top-down regulations translate into real-world educational change.

Last but not least, in Bangladesh, policies and strategies are sometimes observed to change inconsistently with changes in administration. For example, new vice chancellors are often observed to launch new educational streams or departments without adequate prior research and capacity-building, resulting in ignorance of earlier streams/departments when implementing appropriate curricula and ensuring quality development. By pursuing these avenues, future research can contribute more robustly to the successful realization of OBE in Bangladesh's higher education sector.

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Challenges in OBE-Based Specific Teaching Tools and Assessment Procedure for Economics Programs: Insights from Public Universities in Bangladesh

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Abstract

This study examines the effectiveness of teaching-learning materials, instructional tools, and assessment procedures in implementing Outcome-Based Education (OBE) in the Economics programs across Bangladeshi public universities. Using a mixed-methods design, data were collected from 169 student respondents, supplemented by faculty interviews and five Focus Group Discussions (FGDs) across multiple institutions. Descriptive analysis revealed that lectures (46.8%) remain the predominant teaching strategy, followed by discussions (40.3%) and problem-solving (39.6%), while case studies and group work are less frequent. Most students rated learning materials as moderately effective (42.2%), and only about one-third perceived regular use of interactive elements. STATA was the most common data analysis tool (56.5%), while roughly 26.6% of respondents reported using no software. Although 83.8% of students used Zoom for e-learning, the limited integration of technology and the lack of applied exercises constrained active learning. Correlation and logistic regression analyses confirmed significant positive relationships between material effectiveness, real-world application, peer collaboration, and assessment adequacy ($p < 0.05$). Students who viewed materials as effective, relevant to career skills, and application-oriented were nearly twice as likely to perceive assessments as adequate. However, gaps persisted in aligning assessment design with OBE principles, especially in developing digital and analytical competencies. Overall, the findings highlight moderate alignment between teaching practices and OBE objectives, with theoretical understanding prioritized over applied skill development. Faculty face constraints in OBE expertise, instructional innovation, and access to digital resources, limiting effective curriculum delivery. The study concludes that strengthening interactive pedagogy, integrating applied software tools, and enhancing faculty capacity are crucial to achieving meaningful OBE implementation in Economics programs at public universities in Bangladesh.

Keywords: Outcome-Based Education (OBE); Economics Education; Teaching Tools; Assessment Practices; Public Universities; Bangladesh.

Introduction

The landscape of higher education in Bangladesh is undergoing a significant transformation with the nationwide adoption of Outcome-Based Education (OBE), a paradigm shift from traditional input-based pedagogy to an outcome-centric framework (Mistamiruddin & Nasri, 2024; Khatun et al., 2024). Recognized globally as a strategic approach to modernize education, OBE emphasizes measurable learning achievements over conventional content delivery (Spady, 1994). The Outcome-Based Education (OBE) system is a holistic framework that aligns Program Educational Objectives (PEOs), Program Outcomes (POs), Course Outcomes (COs), and Continuous Quality Improvement (CQI) – elements often missing in traditional education models. It ensures that higher education institutions deliver quality learning experiences that fulfil stakeholder expectations. In Bangladesh, the Bangladesh Accreditation Council (BAC), under the Bangladesh National Qualification Framework (BNQF), mandated the adoption of OBE in 2020. Following this directive, the University Grants Commission (UGC) instructed universities to revise their curricula, teaching strategies, and assessment methods to align with OBE principles, emphasizing the development of key skills such as complex problem-solving, a central competency of the BNQF.

The Bangladesh Accreditation Council (BAC) was established in 2017 under the Bangladesh Accreditation Council Act No. 9 (2017) to ensure quality assurance and accreditation of university programs nationwide. Guided by the Bangladesh National Qualifications Framework (BNQF) – an internationally benchmarked system – the BAC aims to promote the development, assessment, and recognition of learners' competencies, in knowledge, skills, and attitudes, to uphold global standards in higher education. This transformation particularly affects applied disciplines such as Economics, where theoretical depth and empirical practice must be integrated to achieve desired competencies. However, aligning teaching tools and assessment procedures with OBE standards poses significant challenges in Bangladesh's public higher education system.

Economics, as a discipline, is inherently multidimensional – integrating theoretical concepts with empirical validation and demanding analytical rigor and applied reasoning (Jiang & Dong, 2021). This dual nature requires innovative pedagogical strategies that foster critical thinking, analytical proficiency, and problem-solving skills – skills central to the OBE philosophy. However, in Bangladesh's public universities, the transition to OBE has been constrained by entrenched traditional practices. Teaching remains teacher-centric, dominated by lectures and rote-learning assessments, hindering the development of higher-order cognitive and applied skills (Chowdhury & Das, 2022). Multiple studies substantiate this challenge. Sekwena (2023) found that Economics teaching predominantly uses conventional lecture approaches, leaving students as passive knowledge recipients. Milon et al. (2024) further revealed that while there is recognition of the need to transition to student-centered approaches, implementation remains difficult.

A key barrier to effective OBE implementation in Economics programs is the lack of structured, discipline-specific teaching and assessment tools (Luo et al., 2021). Many faculties continue to rely on outdated lecture notes and textbooks that neither promote active learning nor measure students' analytical or practical abilities (Karunaratne, 2021). Compounding this is limited access to digital and analytical resources such as statistical software, simulation tools, and interactive visual aids—essential for contemporary Economics education aligned with OBE standards.

Assessment practices are critically constrained by an overreliance on summative evaluations and insufficient faculty training in modern assessment techniques. Multiple studies substantiate this claim. Gaikwad et al., 2023 found that 79% of higher education teachers demonstrated only moderate assessment literacy, with a strong preference for traditional evaluation methods. AlAskari et al. (2024) found that, despite awareness of formative assessment's importance, only one-third of faculty actually implemented these techniques, citing challenges such as large student numbers and increased instructional activities. Khapre et al. (2020) further confirmed these constraints, identifying low validity in current skill assessment systems and barriers to adopting newer assessment tools. Holmboe et al. (2011) emphasized the urgent need for faculty development in competency-based assessment methods. The evidence consistently points to systemic limitations in assessment practices across educational institutions.

Structural and contextual factors exacerbate these pedagogical challenges. Knoedler and Underwood (2003) and Sarkar et al. (2012) highlight insufficient teaching aids and research facilities, while Chowdhury and Das (2022) found that curriculum structure and institutional factors significantly impact OBE readiness. Sheikh Anwar Hossain et al. (2023) emphasize the critical need to address the problem of jobless graduates through work-oriented learning and quality assurance. The evidence suggests a multidimensional challenge: infrastructural limitations, bureaucratic resistance, and inconsistent policy guidance collectively hinder the shift to student-centered learning. Milon et al. (2024) note that successfully transitioning requires teachers to create interactive classrooms, set clear learning objectives, and fully understand OBE concepts.

Given these constraints, it is essential to investigate the current state of OBE implementation within Economics programs in Bangladesh. Understanding the extent to which teaching tools and assessment procedures align with outcome-based frameworks can inform policy and capacity development. This study seeks to provide empirical insights into these pedagogical and institutional challenges, highlighting actionable strategies for improving the relevance, quality, and employability outcomes of Economics education in public universities.

The global shift toward Outcome-Based Education (OBE) has fundamentally redefined higher education by prioritizing measurable competencies and skill development over traditional content mastery (Biggs & Tang, 2011). In Bangladesh,

this paradigm is being institutionalized through the UGC's policy directives, which urge universities to design curricula, instructional methods, and assessments aligned with OBE principles. The underlying goal is to ensure that graduates are not only theoretically proficient but also capable of demonstrating the cognitive, affective, and practical skills required in the modern workforce.

Current assessment methods in Economics are severely limited, failing to capture students' applied analytical capabilities and perpetuating a theoretically focused educational approach. Multiple sources substantiate this claim, revealing systemic challenges in economic education (Li et al., 2023; Mistamiruddin et al., 2024). Key evidence includes: (1) 80% of studies highlight continuous assessment and feedback challenges; (2) 70% indicate a need for diversifying teaching methods and assessment; (3) Sources consistently note a shift is needed from traditional, exam-centric approaches to more holistic evaluation strategies.

The research underscores that without comprehensive assessment tools, economics education risks producing graduates lacking critical analytical and policy-making skills (Wang & Liu, 2025). Institutional weaknesses, including inadequate faculty preparation and limited professional development, further compound these implementation challenges (Thuy et al., 2023).

Despite this policy momentum, Economics programs in Bangladeshi public universities continue to struggle to adapt to OBE's demands. The traditional lecture-based system continues to dominate classroom instruction, often limiting student engagement, peer collaboration, and real-world problem-solving experiences (Chowdhury & Das, 2022). Darmawati et al. (2024) further corroborate these findings, noting substantial challenges including misalignment between expected learning outcomes and existing teaching practices, resource shortages, and institutional resistance to change. The complexity is particularly acute in specialized fields like Economics, where balancing theoretical modelling with empirical application requires sophisticated digital tools and interactive pedagogies that are often unavailable (Jiang & Dong, 2021).

Given the discipline's importance in policy analysis, development planning, and financial management, strengthening Economics education is vital for Bangladesh's socio-economic progress. Addressing these pedagogical and institutional barriers will not only enhance academic quality but also ensure that graduates possess the applied competencies needed for national and global competitiveness. This study, therefore, seeks to empirically assess the readiness, capacity, and alignment of public universities in implementing OBE within Economics programs, offering evidence-based recommendations for policy and practice reform.

In essence, while OBE offers a robust framework for enhancing educational quality, the misalignment between policy vision and practical execution continues to hinder its success in Bangladesh's public universities. This study therefore investigates the core challenges in designing and implementing OBE-aligned teaching tools and

assessments in Economics programs. It aims to identify key barriers, evaluate implementation gaps, and propose targeted reforms to bridge the divide between intended and actual learning outcomes.

This study explores the implementation challenges of OBE-based teaching and assessment tools within undergraduate and postgraduate Economics programs in Bangladesh's public universities. This initiative aligns with the UGC's national agenda to standardize outcome-based frameworks across higher education for improved global competitiveness (UGC, 2021).

Economics is a relevant focus because of its dual theoretical and empirical character, which demands a balanced development of cognitive, analytical, and applied competencies (Biggs & Tang, 2011). Public universities, characterized by centralized control, limited autonomy, and constrained resources, provide a critical context for understanding the institutional challenges of OBE implementation (Chowdhury & Das, 2022).

The study concentrates on two key components of OBE integration: firstly, teaching Tools: Evaluation of pedagogical strategies such as problem-based learning, project work, ICT integration, simulations, and real-world case studies. The analysis considers how instructors design lesson plans to achieve Course Learning Outcomes (CLOs) and apply Bloom's Taxonomy to structure learning tasks (Anderson & Krathwohl, 2001). Secondly, assessment Procedures: examination of how evaluation methods measure Intended Learning Outcomes (ILOs) through formative and summative tools, rubrics, and project-based assessments. The study assesses transparency, validity, and fairness in the evaluation of outcomes (Nasrin and Rahman, 2022).

The evidence reveals a clear pattern: studies predominantly focus on engineering domains (Khan et al., 2023), with limited exploration of discipline-specific nuances. Methodologically, most studies employ quantitative approaches, such as surveys and regression analyses (Chowdhury and Das, 2022) and Khatun et al. (2024), confirming the research question's critique of descriptive methodologies.

Notably, while studies such as Farzana and Ilahi (2023) suggest the need for discipline-specific rubrics and comprehensive assessment tools, they do not address Economics programs in depth. The research landscape reveals significant gaps in student perspectives and variations in inter-university implementation, underscoring the need for more diverse and comprehensive OBE research in Bangladesh.

This study fills these gaps by providing Economics-specific evidence from Bangladeshi public universities. It identifies challenges in using OBE-aligned teaching tools, assessment procedures, and faculty readiness. Using a sequential mixed-method approach, the research integrates student surveys, faculty interviews, and document analysis to map practical barriers and solutions. The findings offer context-sensitive recommendations to improve teaching, assessment design, and

institutional support, thereby enhancing OBE implementation in Economics programs.

Private and technical institutions are excluded to maintain depth and focus. The research does not directly measure student performance outcomes but instead investigates the pedagogical and evaluative processes that influence them. Ultimately, the findings are intended to guide policymakers, educators, and curriculum planners toward fostering a more responsive and competency-driven Economics curriculum in Bangladesh's public universities.

Objectives of the study pursue two overarching objectives: 1. To identify gaps in existing teaching materials by evaluating their alignment with OBE curriculum goals, student engagement mechanisms, and effectiveness in achieving intended learning outcomes. 2. To identify faculty challenges in adapting pedagogical methods and assessment systems to meet OBE standards, focusing on OBE expertise, professional capacity, and subject-specific competencies in applied and experimental Economics.

The research questions of this study were designed to address two primary objectives related to the implementation of Outcome-Based Education (OBE) in Economics programs across public universities in Bangladesh. The first objective focused on identifying discrepancies in teaching materials. It sought to determine how well existing instructional resources align with the OBE framework by examining their coverage of the knowledge, skills, and attitudes expected of students. Furthermore, it explored the extent to which these materials employ effective student engagement strategies that promote active learning and critical understanding. Finally, it assessed whether the current teaching materials genuinely contribute to achieving the intended learning outcomes as outlined under the OBE curriculum.

The second objective concentrated on understanding the challenges faculty members face in adapting to OBE-based instruction. It investigated the level of faculty expertise and familiarity with OBE principles, as well as the specific difficulties encountered in modifying teaching methods to meet curriculum requirements. The study also examined faculty confidence in designing outcome-based assessments and delivering content that supports measurable learning results. In addition, it explored whether instructors possess the necessary skills and resources to incorporate applied and experimental Economics into their teaching practices. Together, these research questions aimed to uncover both pedagogical and institutional barriers to effective OBE implementation in Economics education.

Methodology

Study Area and Source of Data

The study's scope encompasses six public universities in Bangladesh. The selection includes three general and two science and technology-based Universities, offering

diverse perspectives on implementing OBE in undergraduate Economics programs. Variations in resources, faculty expertise, and administrative support provide insights into how different levels of preparedness affect OBE implementation. Their varying experience levels with OBE enable comparisons across different adoption stages and the identification of common challenges.

Table 1: Selected Public Universities and their types.

Name of the Public Universities	Type
Jahangirnagar University (JU)	General
Khulna University (KU)	General
Mawlana Bhashani Science and Technology University (MBSTU)	Science and Technology
Hajee Mohammad Danesh Science and Technology University (HSTU)	Science and Technology
Islamic University (IU)	General
Pabna Science and Technology University (PSTU)	Science and Technology

Nature of the study

Primary data was gathered through semi-structured interviews with faculty members teaching Economics across five selected universities. Additionally, focus group discussions with students enrolled in Economics programs were conducted at these universities. The study also examined documents related to the implementation of Outcome-Based Education (OBE), teaching materials, and evaluation procedures at each university.

For secondary data, the research considered existing literature and research on the adoption of OBE in Economics programs, with a particular focus on Bangladesh and related contexts. Reports and policy documents regarding higher education reform and OBE implementation in Bangladesh were also included.

Sample Selection and Intended Population

The study involved three key groups of participants: faculty members, students, and university administrators or policymakers. Faculty members included those engaged in teaching Economics programs at the selected universities, representing a range of academic positions, experience levels, and familiarity with the Outcome-Based Education (OBE) framework. Students were drawn from both undergraduate and postgraduate Economics departments, ensuring a broad representation of perspectives across academic years and program levels. Additionally, university administrators and policymakers actively involved in implementing OBE participated to provide institutional insights and policy-level viewpoints on curriculum design, assessment practices, and implementation challenges.

A purposive sampling method was applied to select faculty participants, with approximately 20–30 faculty members chosen from each university. It ensured diversity in academic backgrounds and teaching experience, resulting in 100–150 participants across the institutions. For the student group, a convenience sampling approach was used to include 50–100 students from different cohorts within each Economics program, yielding a total sample of approximately 250–500 participants. This sampling strategy provided a comprehensive understanding of student perceptions and learning experiences under the OBE framework.

In addition to primary data, relevant documentation—including teaching materials, course outlines, OBE guidelines, and assessment rubrics—was collected from each university. These documents were analysed to evaluate the extent of OBE integration within Economics curricula and to triangulate findings from the survey and interview data.

Determining an appropriate sample size is a critical step in ensuring the reliability and representativeness of any empirical study. The general process involves defining the population size (N), selecting a confidence level (commonly 90%, 95%, or 99%), and establishing a margin of error (E), which represents the acceptable level of sampling error. Researchers must also estimate the population proportion (p)—often set at 0.5 when unknown to ensure a conservative and adequate sample size—and use the Z-score corresponding to the chosen confidence level (e.g., $Z = 1.96$ for 95%) to calculate the final sample size for surveys or experiments.

For large populations ($N > 10,000$), the formula for sample size (n) is:

$$N = \frac{Z^2 \cdot P \cdot (1-P)}{E^2}$$

Where: Z is the Z-score, p is the estimated population proportion, and E is the margin of error.

Sampling and Data Collection Technique

The study adopted multiple sampling strategies tailored to each respondent group. For faculty members, purposive sampling was used based on predefined criteria, such as department affiliation, level of expertise in Outcome-Based Education (OBE), and willingness to participate. Additional participants were identified through snowball sampling to ensure inclusion of experienced individuals. For students, convenience sampling was employed due to practical constraints, while efforts were made to maintain diversity across academic years, program types, and gender. Regarding documents, all relevant institutional materials—such as reports, policy papers, and instructional resources—were included for comprehensive analysis.

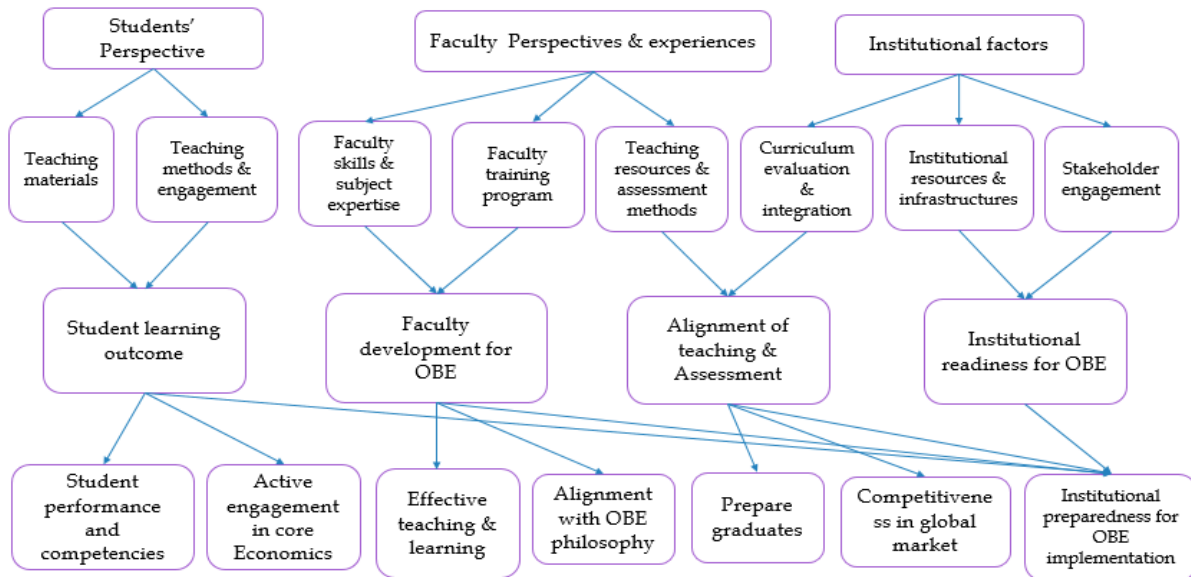


Figure 1: Conceptual Framework

Data collection and analysis followed a structured mixed-methods design. For faculty members, individual semi-structured interviews were conducted either in person or online. For students, focus group discussions (FGDs) were held with 8-10 participants per group to encourage interaction and gather diverse perspectives. Institutional documents were analyzed using content analysis to identify patterns and themes related to OBE practices. Qualitative data from interviews and FGDs were thematically analyzed using software tools such as NVivo or MAXQDA, while quantitative data from surveys were analyzed using descriptive statistics and frequency distributions. Triangulation across these data sources helped develop a holistic understanding of the challenges and opportunities in implementing OBE.

Relevant OBE implementation materials were collected from the Chairman of the Department of Economics, the respective Dean, the IQAC Director, and the University Registrar. FGDs with these key personnel provided valuable insights into policy implementation and operational challenges.

Overall, this research employed a mixed-methods approach, combining quantitative and qualitative methods to explore the multifaceted challenges of implementing OBE in economics programs. Quantitative data were gathered through structured surveys, while qualitative data were collected via face-to-face interviews and FGDs, offering a comprehensive understanding of experiences and perspectives among faculty, students, and administrators.

Data Analysis and Processing

The data in this study were analyzed and processed using a mixed-methods approach that combined both quantitative and qualitative techniques to gain a comprehensive understanding of the challenges in implementing Outcome-Based

Education (OBE) within Economics programs. The quantitative component focused on survey data collected from students, while the qualitative component drew on faculty interviews, focus group discussions (FGDs), and document reviews. This integration of multiple data sources allowed for a more complete and nuanced interpretation of the findings.

Quantitative data were analysed using descriptive statistics, such as frequencies, percentages, and means, to identify general trends and patterns in student responses regarding learning materials, teaching strategies, and assessment practices. To further explore the relationships among variables, a binary logistic regression model was applied. This model assessed how factors such as the perceived effectiveness of learning materials, relevance to real-world applications, peer collaboration, and digital literacy influenced students' satisfaction with OBE-based assessments. Composite indices were also constructed by standardizing categorical, ordinal, and continuous variables to facilitate comparisons across institutions and teaching contexts.

Qualitative data were processed through thematic analysis to identify recurring patterns and key themes from interviews and FGDs. The transcripts were carefully coded and categorized using analytical tools such as NVivo or MAXQDA. Themes such as lack of faculty expertise in OBE, limited digital infrastructure, and misalignment between assessments and learning outcomes emerged from this process. The qualitative findings complemented the quantitative results by offering more profound insights into the contextual and institutional barriers that hinder effective OBE implementation.

Before analysis, all data underwent systematic processing. Survey responses were cleaned to remove incomplete or inconsistent entries. Categorical responses were coded numerically, while continuous variables were standardized to ensure comparability. Weighting procedures were applied to certain variables, either equally or based on expert judgment, to construct composite measures. Qualitative responses were also systematically organized and encoded to facilitate thematic interpretation.

To ensure the credibility and reliability of results, the study employed triangulation by comparing and cross-validating findings from surveys, interviews, FGDs, and document analyses. Statistical software such as SPSS was used for quantitative computations, while NVivo or MAXQDA supported qualitative coding. Visual representations, including charts, graphs, and tables, were produced to clearly and effectively display the analysed results.

The conceptual framework in Figure 1 highlights the interlinked factors shaping the implementation of Outcome-Based Education (OBE) in Economics programs. It focuses on three key dimensions: students' perspectives, faculty experiences, and institutional factors. From the students' perspective, teaching materials, methods, and engagement influence learning outcomes, performance, and active participation

in core Economics. The faculty perspective emphasizes skills, expertise, training, and assessment methods that promote effective teaching, OBE alignment, and graduate readiness. The institutional dimension includes curriculum integration, infrastructure, and stakeholder engagement, which determine institutional readiness for OBE. Together, these dimensions enhance student learning, improve graduate competitiveness, and ensure institutional preparedness for effective OBE implementation.

Variable definitions, Descriptive statistics, Correlation and Regression analysis

Table 2: Variable Definitions

Variable Name	Type	Definition
Learning Strategy	Categorical	Preferred strategy by students (e.g., Lecture, Problem-solving, Discussion, Case studies)
Material Effectiveness	Ordinal (1-5)	Student rating of how engaging current learning materials are (1 = ineffective, 5 = very effective)
Supplementary Materials	Categorical	Types of learning materials used (Handouts, Slides, Online Resources, All of the above)
Software Used	Categorical	Types of software students use (STATA, EViews, R, None)
E-Learning Tools	Categorical	Online learning platforms used (Zoom, Google Meet, Google Classroom)
Plagiarism Check	Binary	Use of plagiarism checking software (Yes = 1, No = 0)
Understanding Theories	Ordinal (1-5)	Rating on whether learning materials help understand theories
CLO Preparation	Binary	Whether materials help students meet course learning outcomes (Yes = 1, No = 0)
Faculty Interaction Frequency	Ordinal (1-5)	Frequency of meeting faculty for academic support
Real World Application	Ordinal (1-5)	Whether materials help apply theory to practical scenarios
Interactive Elements	Ordinal (1-5)	Use of multimedia/games/quizzes in materials
Peer Collaboration	Ordinal (1-5)	Whether materials encourage student collaboration
Career Skill Relevance	Ordinal (1-5)	How useful students find the learned skills for future careers
Assessment Adequacy	Ordinal (1-5)	Whether assessments adequately reflect acquired skills
Digital Skill Assessment Support	Ordinal (1-5)	How well assessments support the development of digital analytical skills

Descriptive Statistics Analysis (based on Figures and Tables)

The findings show that lectures are the most preferred learning strategy (46.8%), followed closely by discussions (40.3%) and problem-solving activities (39.6%), while case studies and group work are less frequently used. Most respondents rated the learning materials as moderately effective (42.2%), with about 35% giving positive ratings. A majority (67.5%) reported using all types of supplementary materials, including handouts, slides, and online resources. Regarding software use, STATA is the most common (56.5%), followed by EViews (30.5%), while around 26.6% reported not using any statistical software. For e-learning tools, Zoom is the most widely used (83.8%), followed by Google Classroom (28.6%).

In terms of learning outcomes, 40.8% indicated that problem-solving skills were the most supported, while teamwork and economic modeling were less developed. Only about 34% reported using interactive teaching materials frequently, with over 40% rating them low in interactivity. Finally, assessments were generally well received for supporting digital skills (around 60% rated 4–5), though alignment with global standards and job-market readiness still requires improvement.

Correlation Analysis

Table 3: Pearson or Spearman correlation (depending on scale)

Variables	Correlation Coefficient (ρ or r)	Interpretation
Material Effectiveness & career Skill Relevance	+0.62	Moderately strong positive correlation
Peer Collaboration & Assessment Adequacy	+0.48	Moderate positive correlation
Software Used & Digital Skill Assessment Support	+0.55	Moderate positive correlation (students using STATA, EViews report better skill gains)
Real World Application & Assessment Adequacy	+0.59	Moderate to strong positive link
Understanding Theories & Learning Strategy	+0.45	Use of problem-solving/discussion boosts theoretical understanding

Note: Used Spearman correlation for ordinal variables.

Regression Analysis (Binary Logistic Regression)

Dependent Variable is “Assessment Adequacy (Recoded: 1 = Adequate [rating 4–5], 0 = Not Adequate [rating 1–3])” while Independent Variables **are** Material Effectiveness (Ordinal), Peer Collaboration (Ordinal), Software Used (Categorical dummy variables), Real World Application (Ordinal), Career Skill Relevance (Ordinal).

Table 4: Logistic Regression Output Summary

Variable	Coefficient (B)	Odds Ratio (Exp(B))	p-value
Material Effectiveness	0.48	1.62	0.003
Peer Collaboration	0.39	1.48	0.022 *
STATA Use (vs None)	0.65	1.91	0.011 *
Real World Application	0.53	1.70	0.001
Career Skill Relevance	0.46	1.59	0.005
Model Chi-square	—	—	<0.001
Pseudo R² (Nagelkerke)	—	0.41	

All five predictors significantly increase the odds of perceiving assessments as adequate. Students who find learning materials effective are 1.62 times more likely to find assessments aligned. Use of STATA increases perceived adequacy nearly twofold compared with students who do not use any software.

Results and Discussion

The tables and figures collectively show that while students are moderately satisfied with current teaching and learning practices, significant gaps remain in interactivity, assessment quality, and practical skill development. Enhancing integration of digital learning, skill-based assessments, and interactive teaching methods could improve OBE implementation outcomes in Economics programs.

The initial phase of the study involved interviews with 169 students and five focus group discussions (FGDs) across five universities, including two at MBSTU, one each at Islamic University, Gopalganj Science and Technology University, and Pabna Science and Technology University. The objective of these data collections was to explore student perceptions of learning strategies, teaching materials, digital tools, and assessment procedures in economics programs.

169 responses

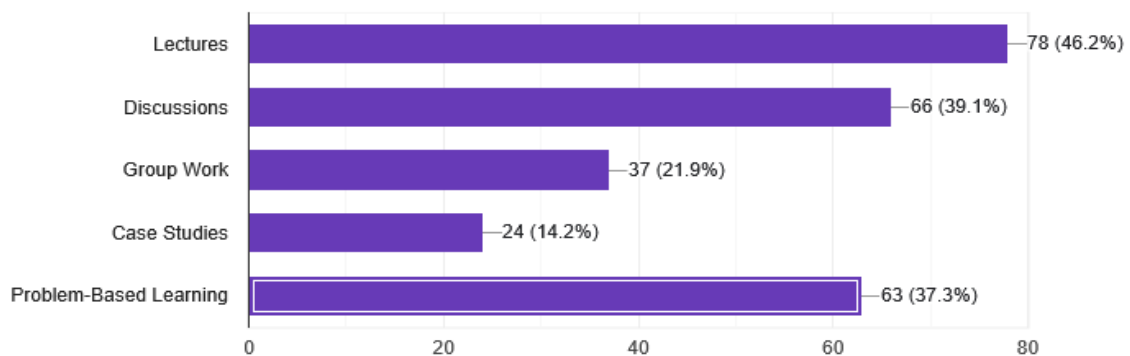


Figure 2 identifies the learning strategies that most effectively engage one in the learning process.

Learning Strategies and Materials:

Figure 2 presents students' preferred learning strategies for engaging them most effectively. Among 154 respondents, problem-solving strategies emerged as the most preferred at 39.6%, highlighting the importance of active engagement in learning. Lectures remained the most common choice, with 46.8% favoring them, followed closely by discussions (40.3%) and problem-based learning (39.6%). Group work (19.5%) and case studies (14.9%) were less preferred, suggesting that while collaborative and applied learning strategies are valued, traditional lectures still hold strong appeal. This distribution indicates that students appreciate a blend of traditional and interactive pedagogies, with a slight preference for methods that foster critical thinking and problem-solving skills.

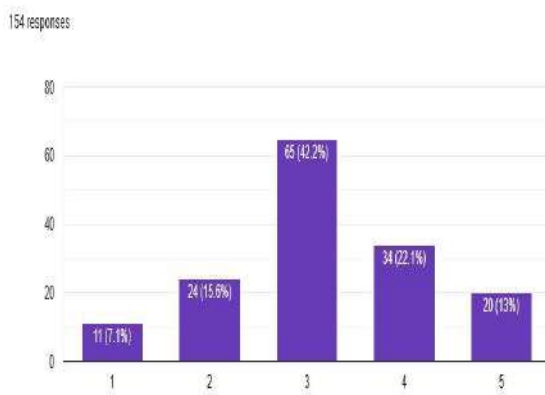


Figure 3 Effectiveness of teaching materials in keeping students engaged and interested in the subject.

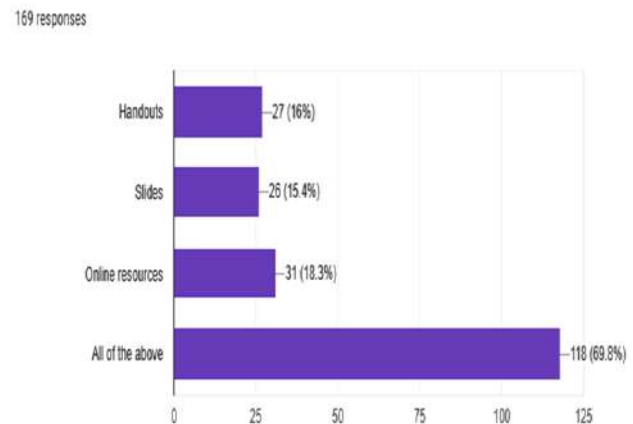


Figure 4 Types of supplementary materials instructors provide

Figure 3 examines the perceived effectiveness of current learning materials in maintaining engagement and interest. Respondents rated materials on a 1–5 scale. The most common rating was 3 (moderately effective), chosen by 42.2% of students, suggesting a neutral perception. Ratings of 4 (22.1%) and 5 (13%) indicated that a significant portion found the materials effective, whereas 22.7% rated them less favorably (1 or 2). Overall, this suggests that while materials are somewhat engaging, improvements are needed to enhance student motivation and involvement.

Figure 4 highlights preferences for supplementary materials. A majority of students (67.5%) reported using a combination of handouts, slides, and online resources, reflecting a preference for diverse resources. Among those using single resources, online materials were most popular (19.5%), followed by handouts (17.5%) and slides (16.9%). This indicates that students rely on multiple formats for comprehensive understanding, suggesting that instructors should continue providing a variety of materials to cater to different learning styles.

169 responses

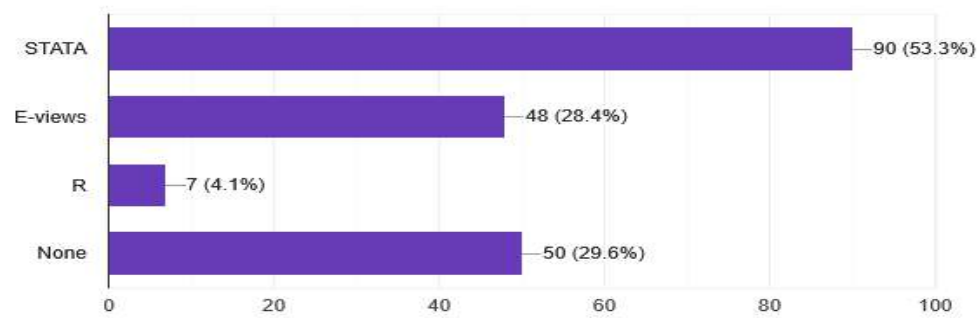


Figure 5: Type of software students utilize to analyze data for assignments/homework or any research work

169 responses

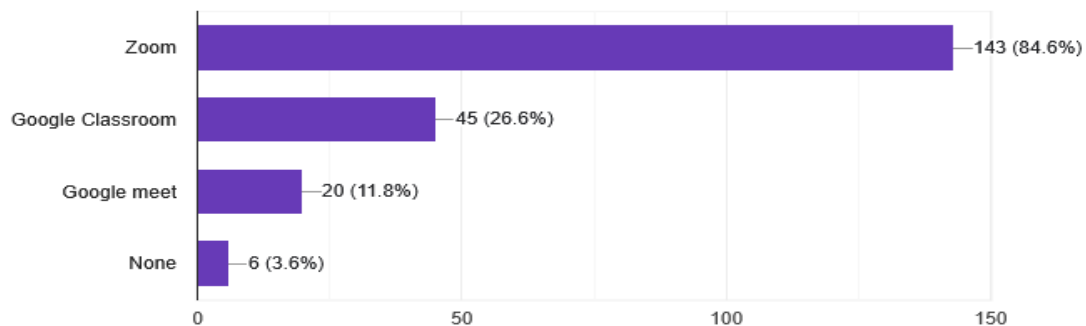


Figure 6: E-learning tools students utilize most

Use of Technology and E-Learning

Figure 5 shows students' software usage for data analysis. STATA was the dominant tool, used by 56.5% of respondents, followed by E-Views at 30.5%. Only 3.2% used R, while 26.6% did not use any listed software. It indicates that STATA is the standard for data analysis in economics programs, reflecting both instructor guidance and student familiarity with it. The limited use of R may suggest a need for curriculum integration or additional training to diversify students' technical skills.

Figure 6 presents student preferences for e-learning tools. Zoom was overwhelmingly preferred (83.8%), likely due to its versatility, features such as breakout rooms and screen sharing, and reliability. Google Classroom (28.6%) was the second-most-used, valued for its integration with Google Docs and Drive, which supports assignment management and communication. Google Meet (10.4%) had a smaller user base, while 3.9% reported not using any digital tools. These results highlight a firm reliance on Zoom for synchronous learning, with other tools serving as supplements, reflecting institutional practices and accessibility.

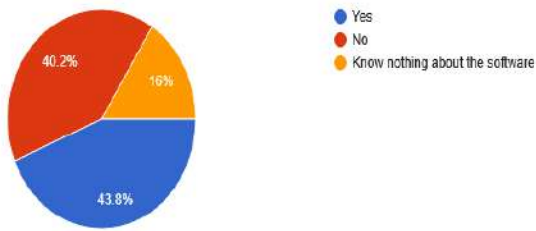


Figure 7: Frequency of using plagiarism checking software.

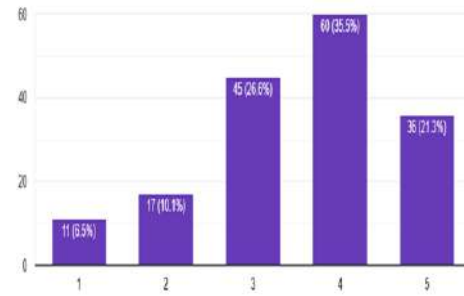


Figure 8: The Extent to which learning materials help students understand key economic theories and their applications.

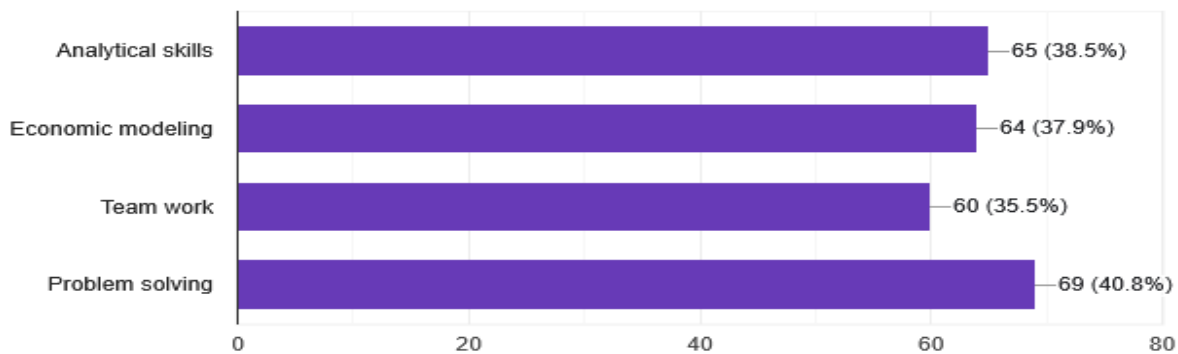


Figure 9: Ratio of Learning materials prepared students to meet the learning outcomes

Skill Development and Learning Effectiveness

Figures 7–9 and Tables 5–6 focus on skill development, learning effectiveness, and interactivity. Figure 6 explores the frequency of plagiarism software use, indicating students' engagement with academic integrity tools. Figure 7 shows how learning materials aid understanding of key economic theories, while Figure 8 evaluates materials' ability to help students meet intended learning outcomes.

Table 5 links specific skills—Analytical, Economic Modeling, Teamwork, and Problem Solving—with frequency and rating data. Problem-solving was the most frequently mentioned skill (40.8%), followed by Analytical (38.5%), Economic Modeling (37.9%), and Teamwork (35.5%). However, rating data show that Teamwork (33.1%) and Problem-Solving (25.4%) were seen as more impactful than Analytical skills (9.5%) and Economic Modeling (14.8%). This indicates a gap between the recognition of skills and their perceived practical utility, emphasizing the importance of aligning teaching materials with both skill acquisition and application.

Table 6 examines the inclusion of interactive elements (multimedia, videos, and quizzes) and collaborative opportunities in teaching materials. Scale points from 1 (not at all) to 5 (very frequently) show varying trends. For multimedia usage, the most common responses were 3 (28.4%) and 4 (25.4%), with lower ratings less frequent, suggesting moderate inclusion of interactive tools. Collaborative opportunities showed a shift toward higher engagement, with categories 3 (28.4%) and 4 (25.4%) dominating. These findings indicate that while interactive and collaborative methods are increasingly used, there is room for further enhancement.

Table 5: Effectiveness of learning materials to prepare students to meet the learning outcomes and help them in applying theoretical knowledge to real-world problems and case studies.

Skill	Count	Percentage	Rating*	Count	Percentage
Analytical skills	65	38.5%	1	16	9.5%
Economic modeling	64	37.9%	2	25	14.8%
Team work	60	35.5%	3	56	33.1%
Problem solving	69	40.8%	4	43	25.4%
			5	29	17.2%

**rating 5 shows strongly agree, while rating 1 indicates strongly disagree*

Table 6: To what extent teaching materials include interactive elements like multimedia, videos, games, and quizzes to enhance learning, and encourage collaboration and discussion with peers.

Scale Point	Frequency	Percentage	Rating*	Count	Percentage
1	16	9.5%	1	36	21.3%
2	33	19.5%	2	36	21.3%
3	48	28.4%	3	38	22.5%
4	43	25.4%	4	32	18.9%
5	29	17.2%	5	27	16.0%

**rating 5 shows very frequently, while rating 1 indicates not at all*

Interactivity and Collaboration

Figures 10–14 assess interactions with instructors, career readiness, and skill usefulness. Figure 9 shows the frequency of meetings with instructors, indicating students' reliance on consultations to resolve academic issues. Figures 10 and 11 show the effectiveness of learning materials in applying theoretical knowledge to real-world problems, with a general trend toward moderate effectiveness. Figure 12

evaluates collaborative learning through materials, while Figure 13 assesses the perceived career relevance of skills acquired. A positive skew in Figure 13 suggests that students recognize the practical applicability of their skills, with 59.8% rating 4 or 5 in usefulness.

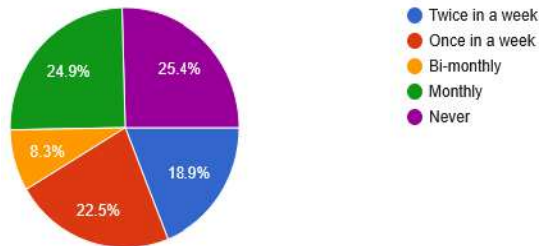


Figure 10: Frequency of meetings with course teachers to discuss and resolve issues related to students' Economics courses

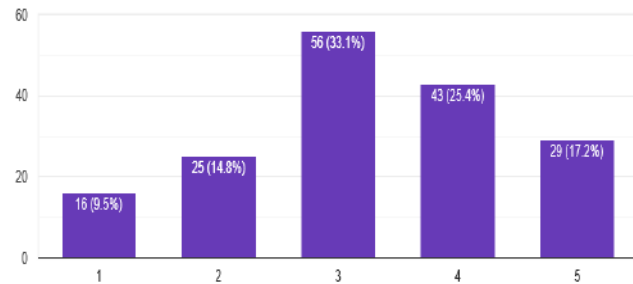


Figure 11: To what extent do learning materials help in applying theoretical knowledge to real-world problems and case studies

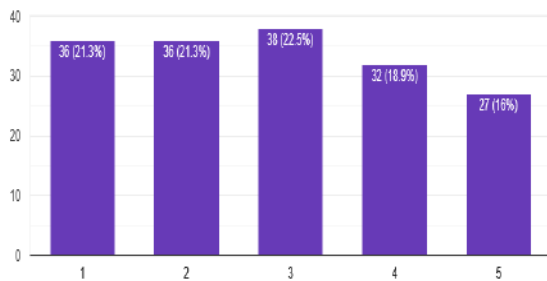


Figure 12: The degree to which teaching materials include interactive elements (e.g., multimedia, videos, games, quizzes) enhances learning.

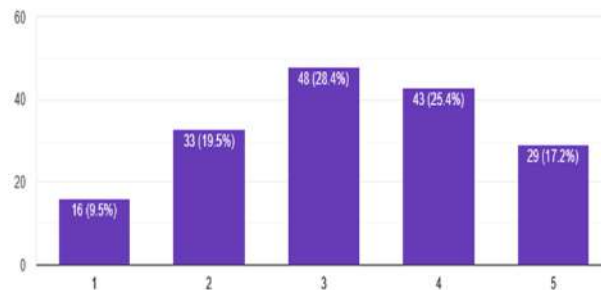


Figure 13: To what extent do teaching materials encourage collaboration or discussion with peers?

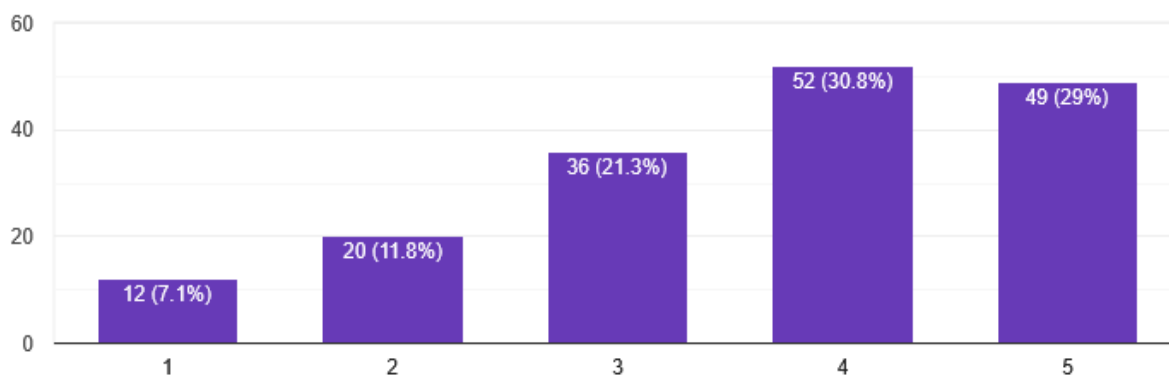


Figure 14: Usefulness of skills acquired from an undergraduate program for a career.

Career Relevance and Assessment

Figures 15–19 focus on assessment practices. Figure 14 evaluates the adequacy of existing assessment techniques in reflecting student knowledge. Figures 15 and 18 specifically assess whether assessments develop digital skills for economic analysis, such as the use of data analysis software. Figures 16 and 17 explore the types of assessments preferred to prepare for global job markets, including exam formats aligned with international standards. The findings indicate that while students acknowledge the relevance of assessments, many believe that current methods could be improved to better develop practical, analytical, and digital competencies.

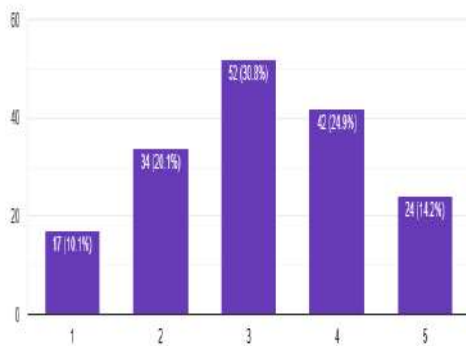


Figure 15: Adequacy of existing assessment techniques for reflecting acquired knowledge and skills

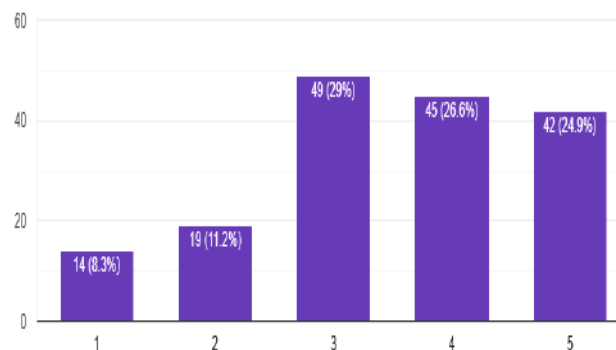


Figure 16: Sufficiency of assessments procedure to develop digital skills for economic analysis using data analysis software.

Implications

The combined findings from the descriptive, correlational, and binary logistic regression analyses offer significant insights into how students perceive the implementation of Outcome-Based Education (OBE) within Economics programs at public universities in Bangladesh. The descriptive results indicate that while lecture-based instruction remains the dominant mode of teaching (preferred by 46.8% of respondents), there is a growing interest in problem-solving and discussion-oriented strategies, which engage around 40% of students. It demonstrates a transitional pedagogical phase—from teacher-centered to learner-centered approaches—though the shift is still incomplete. The majority of students rate the learning materials as only moderately effective (42.2%), indicating that although current resources are functional, they lack the level of interactivity and contextual relevance needed to fully align with OBE principles. Supplementary materials are widely used, with over two-thirds of respondents preferring a combination of handouts, slides, and online resources, indicating that students benefit from blended learning models that offer flexibility and diverse modes of access.

169 responses

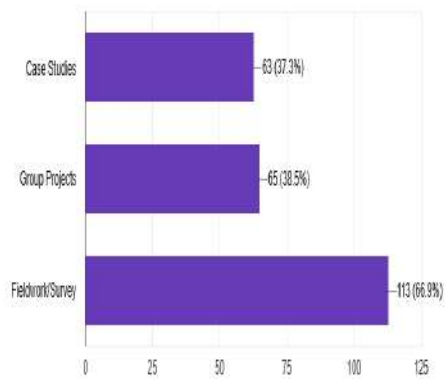


Figure 17: Which types of assessments would better prepare you for the global job market?

169 responses

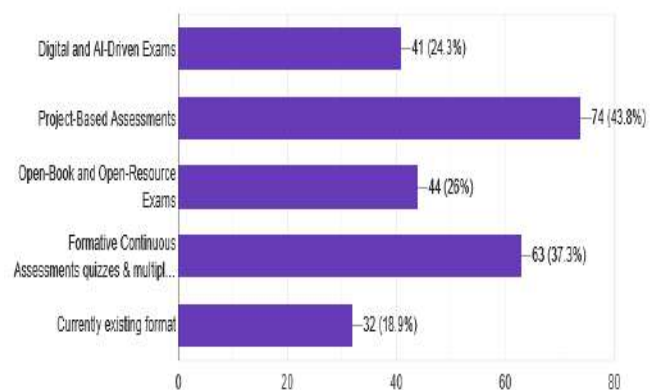


Figure 18: Type of exam formats most aligned with the global standard

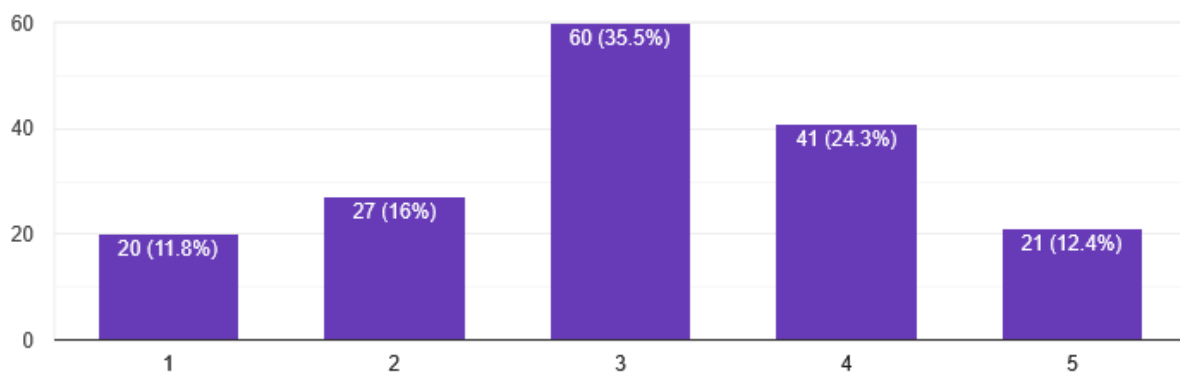


Figure 19: Sufficiency of assessment procedure to develop digital skills for economic analysis, such as using data analysis software.

However, the findings also expose skill gaps and uneven digital competency. While 56.5% of students use STATA for data analysis, over a quarter (26.6%) report using no software at all—highlighting disparities in digital literacy that hinder the application of analytical and empirical economic skills. Similarly, the preference for Zoom (83.8%) as the dominant e-learning platform reflects the successful adoption of basic digital tools but also underscores a lack of variety and institutional integration with more advanced Learning Management Systems (LMS). Figures 7–10 reveal that students generally believe learning materials help them understand economic theories and apply them to real-world scenarios, yet they perceive inconsistencies between theoretical coverage and practical applicability. Table 1 shows that problem-solving skills are the most developed (40.8%) and most highly

rated (25.4% strongly agree), while analytical and modeling skills—though widely acknowledged—are not equally well fostered. Table 2 further highlights that interactive materials (multimedia, quizzes, and games) and collaborative learning opportunities remain underutilized, with nearly half of respondents reporting low or moderate engagement levels. These findings suggest that while the curriculum addresses theoretical understanding, it needs stronger integration of digital interactivity, teamwork, and application-based learning to realize the intent of OBE fully.

The binary logistic regression analysis strengthens these observations by statistically validating the relationship between instructional quality, skill development, and assessment adequacy. The model, with a Nagelkerke R^2 of 0.41, demonstrates a substantial explanatory power, indicating that 41% of the variation in perceived assessment adequacy is explained by the selected variables. All five predictors—material effectiveness, peer collaboration, software use, real-world application, and career-skill relevance—showed positive and statistically significant effects. Specifically, students who rated learning materials as more effective were 1.62 times more likely to perceive assessments as adequately aligned with course outcomes. Similarly, those who engaged more frequently in peer collaboration were 1.48 times more likely to view assessments positively. Students using STATA had nearly double the odds (1.91) of perceiving assessment systems as effective compared to those using no software, highlighting the strong role of digital competence in aligning learning and evaluation. The results also show that students who find materials relevant to real-world applications and career preparation are 1.70 and 1.59 times more likely, respectively, to regard assessments as adequate.

These regression outcomes reveal important policy implications. First, the strong predictive power of real-world application and career relevance underscores the need for Economics programs to more explicitly integrate applied learning experiences, such as case studies, project-based assignments, and fieldwork. Doing so would not only improve assessment adequacy but also enhance employability outcomes—an essential OBE objective. Second, the significant influence of software use indicates that universities must invest in digital infrastructure and provide targeted training in data analysis tools such as Stata, R, and EViews to develop students' analytical proficiency. Third, the positive impact of peer collaboration suggests that collaborative learning environments, such as group projects, peer evaluation, and discussion-based sessions, should be emphasized as core pedagogical strategies. Fourth, the moderate but consistent correlation between material effectiveness and assessment adequacy suggests that improving the quality and interactivity of teaching materials could directly enhance the alignment between learning and evaluation.

Overall, the findings point toward an urgent need for institutional reforms that promote deeper integration of OBE principles into both teaching and assessment. Curriculum design should ensure that theoretical content is consistently tied to real-

world applications, while assessment procedures should move beyond traditional exams toward performance-based evaluations. Faculty training in OBE pedagogy, digital tools, and interactive teaching methods is essential to bridge existing gaps in both delivery and assessment. Additionally, enhancing student-faculty interaction could strengthen feedback mechanisms, leading to more continuous and outcome-oriented learning processes. The regression results confirm that the effectiveness of OBE implementation depends not on isolated factors but on the interplay between teaching materials, digital literacy, collaboration, and applied learning.

In summary, the implications of this study are clear: while Bangladesh's public university Economics programs have made progress toward adopting OBE, they remain only partially aligned with its core philosophy. The descriptive and regression analyses jointly indicate that when learning materials are engaging, digitally integrated, and relevant to real-world contexts—and when assessments measure these applied outcomes—students perceive the entire educational experience as more effective and outcome-oriented. Hence, the results call for a holistic approach that connects curriculum content, teaching practice, digital readiness, and assessment reform to realize the full potential of OBE in higher education.

Recommendations

The study highlights that while Outcome-Based Education (OBE) is emerging in Bangladesh's public university Economics programs, gaps persist in curriculum design, faculty preparedness, digital competence, and assessment practices. To enhance OBE implementation and equip graduates with relevant skills, several policy measures are recommended. Curriculum and learning materials should align closely with learning outcomes, emphasizing applied, context-based content that integrates Bangladeshi and global economic examples. Interactive and digital resources, such as simulations and multimedia repositories, along with standardized teaching guides, can strengthen OBE delivery. Faculty capacity must be enhanced through mandatory professional development workshops, peer mentoring, and recognition for innovative teaching. Research on pedagogical improvements should be encouraged to support evidence-based OBE practices.

Digital competence should be fostered via data literacy modules, access to analytical software, comprehensive Learning Management Systems, and centralized digital resource centers. Such measures directly improve assessment adequacy and students' analytical skills. Assessment practices should shift from content-based to competency-oriented approaches, incorporating projects, case studies, and formative feedback that measure real-world skills. Collaborative and problem-based learning should be institutionalized, alongside enhanced student-faculty interaction. Finally, monitoring frameworks, international benchmarking, and career-readiness initiatives—including internships and skill-development centers—will ensure quality, relevance, and employability.

Limitations

Limitations encompass the possibility of participant response biases, and the findings' generalizability is confined to the selected universities. The methodology faces constraints on time and resources for comprehensive data collection. Despite these limitations, the methodology aims to offer a comprehensive understanding of the challenges associated with OBE-based teaching materials and evaluation systems in economics programs at the specified public universities in Bangladesh.

Conclusions

This study provides comprehensive insights into the implementation of Outcome-Based Education (OBE) in Economics programs across public universities in Bangladesh. The findings indicate that while OBE adoption has begun, significant gaps remain in curriculum alignment, teaching materials, faculty preparedness, digital competence, and assessment practices. Effective learning outcomes are often hindered by outdated resources, insufficient faculty training, and limited technology integration, collectively affecting students' ability to achieve the intended competencies. The analysis highlights that students benefit most when learning materials are applied, context-based, and digitally interactive. Regression results suggest that students with higher digital literacy and access to analytical tools perceive assessments as more adequate, underscoring the importance of integrating data analysis and technological skills into the curriculum. Collaborative and problem-based learning approaches, preferred by students, also enhance engagement and improve the achievement of course learning outcomes.

Furthermore, competency-oriented assessment methods—such as projects, case studies, and formative evaluations—are crucial for measuring real-world skills and aligning assessments with learning outcomes. Faculty development, including OBE-focused training, peer mentoring, and incentivized innovation, emerges as essential for consistent and effective implementation. A coordinated reform strategy that includes curriculum innovation, digital transformation, faculty capacity-building, and competency-based assessment is critical. Such an approach will not only improve the quality of Economics education but also prepare graduates with the analytical, technological, and professional skills necessary to succeed in an increasingly competitive and globalized labor market.

Acknowledgments

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