

Online Assessment: Tertiary Level Students' and Teachers' Perception, Strategies Used, and Consideration Needed to be Taken in the Context of Bangladesh

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Abstract

Online education creates scope for learners to attain education without being physically present in institutions. Assessment being an integral part of the teaching and learning process becomes challenging in online education. The study focuses on both quantitative and qualitative aspects of the perception of online assessment based on diverse socio-economic contexts. The study also focuses on the strategies that have already been used for online education along with strategies and considerations that need to be taken to reduce the gap in both public and private universities in Bangladesh. Two major educational stakeholders such as teachers and students are selected as the population. Through convenience and purposive sampling techniques, 68 students and 9 teachers from both public and private universities were consulted for data collection. For quantitative data, descriptive and inferential statistical analysis was used and for qualitative data, thematic analysis was used. Results of the study show that pedagogy, validity, reliability, affective factors, practicality, and security are not fully achieved and it is difficult to ensure, the validity, reliability, and affective factors of online assessment. Apart from existing ones, additional considerations should be taken for pedagogy, practicality, and security of online assessments. The study proposes a blended approach for a valid, effective, and reliable online assessment process. To reduce the gap and minimize the challenges in our social context, improvised assessment strategies and considerations needed to be taken to improve the assessment process and ensure effective learning.

Keywords: online education, assessment, strategies, challenges, blended approach.

1. Introduction

Assessment is an important part of the teaching-learning process. According to Huba and Freed, (2000), "Assessment is the process of gathering and discussing information from multiple and diverse sources to develop a deep understanding of what students know, understand, and can do with their knowledge as a result of their educational experiences; the process culminates when assessment results are used to improve subsequent learning". Assessment helps to explore the level of understanding of the learners in a particular area. During the COVID-19 pandemic, most of the educational institutes conducted teaching-learning activities through online platforms following online assessment. However, the burning question was to make the online assessment suitable for the students who are dealing with several challenges like economic, psychological, physiological, technical, & infrastructural, etc. issues.

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1.1 Research problem

Online education was increasingly used in many public and private universities due to the pandemic. However, Bangladesh Open University also provided distance learning at the tertiary level of education over many years. According to the University Grants Commission (UGC), Bangladesh is unprepared for online assessment due to poor internet, insufficient awareness, participation, collaboration, and fairness (Rahman et al., 2022). Moreover, lack of suitable software, trainings, mentoring, smartphones, high internet rates were found as challenges (Ullah et al., 2022). These challenges made the private university teachers dissatisfied with online education (Ullah et al., 2022) and online assessment as it was ineffective (Rahman et al., 2022). Most of the literature (Rahman et al., 2022; Ullah et al., 2022) focused on the practices and challenges of online assessment whereas this study emphasized the perception of the students and teachers on online assessment as well the strategies being used and considerations to take for ensuring effective online assessment.

1.2 Research question

This study was based on the following research questions.

1. What are the students' and teachers' perceptions of the online assessment in terms of pedagogy, validity, reliability, affective factors, practicality, and security?
2. What are students' and teachers' perceptions according to the socio-economic context, gender, and subject area?
3. What strategies are being used for online assessment?
4. What strategies and considerations are needed for effective online assessment at the tertiary level in Bangladesh?

2. Online education

Online education, also known as online learning, refers to a method through which students acquire an internationally recognized certification without the need to attend physical classes on campus (University of Edinburgh, 2018). A significant benefit of online education is accessibility, eliminating geographical barriers that are inevitable in physical classes. However, e-learning also presents unique challenges such as a lack of interaction, technological infrastructure, training, monitoring, high package internet, communication, and collaboration between students and teachers (Rahman et al., 2022; Ullah et al., 2022).

2.1 Online assessment

Assessment is linked with learning objective and teaching learning strategies. To understand students' learning, assessment plays a vital part. For this reason, it is important that learning objectives are well connected with the online assessment strategies (Thede & Sewell, 2009). According to a study (Joshi et al., 2020) online assessment can provide rich, comprehensive, formative feedback to scaffold the learning by supporting learner to self-evaluate and achieve their learning outcome which prepares them for summative assessment. According to Schreyer Institute Self-Paced Module (2022), online assessment is conducted to assess the

following aspects of students learning, such as, interactivity, collaborative learning and collective construction of knowledge. From an online assessment platform MeritTrac, it is found that online assessment is used to evaluate an individual's abilities, behaviors, and characteristics over the internet using available web technologies to test, to select, to identify, and to provide clues to the test takers. Assessment can focus on individual learners or entire groups, such as a whole class, an institution, or a specific program to enhance learning (Sewell et al., 2010). In the educational context, assessment is a systematic process that documents and utilizes empirical data related to knowledge, skills, attitudes, and beliefs.

2.2 Medium of online assessment

Online assessment has to be effective to ensure learning which can be conducted in different ways. In several studies (Arend, 2007; Swan, 2001; Gaytan & McEwen, 2007), online discussion, exams, written assignments, experimental assignments, problem assignments, quizzes, journals, projects, presentations, self-assessments, and peer evaluations. were used for online assessment. Among these, discussions, assignments, tests, and quizzes are widely used and effective.

2.3 Validity and reliability of online assessment

Validity and reliability are fundamental concepts in assessment. Validity pertains to how well a test measure what it intends to measure, while reliability indicates the consistency and trustworthiness of scores obtained from that test. A valid conclusion cannot be drawn from a test score unless the test is reliable. However, even when a test is reliable, it may only sometimes be valid. Therefore, when selecting a test, it's crucial to ensure both reliability and validity.

Several factors pose potential threats to the validity of online assessment methods. These include modality effects and students' computer-related attitudes, such as computer anxiety and engagement which can impact performance in computerized testing situations (Beckers, Rikers, & Schmidt, 2006; Hewson, 2012).

2.4 Affective factors

Affective factors play a pivotal role in the perception and analysis of online assessments, particularly concerning students' and teachers' readiness for electronic examinations. When students are inadequately prepared for online assessments, it can lead to fear and anxiety. However, equipping students with proper institutional support, guidance, and technological knowledge, and addressing technical issues can mitigate stress and allow for a more accurate assessment of students' actual knowledge (Jereb et al., 2005; Shraim, 2019).

Research findings diverge on the impact of online assessment anxiety. James (2013) suggest that online assessments reduce anxiety and examination stress. Jareb and Bernik (2005) found that students prefer online-based assessments over traditional methods due to their comfort with digital tools as typing is quicker than writing (James, 2013).

However, prolonged screen time during online exams can hinder concentration, prompting British Standard 23988 to recommend breaks during lengthy scheduled examinations. Furthermore, Shraim (2019) highlights concentration issues in online math assessments where students must simultaneously use both computers and paper and pencil which leads students to lose marks for the process and incorrect answers.

2.5 Security

Online assessments offer enhanced security and minimize privacy concerns. Over time, the initial distraction and nervousness associated with webcam surveillance tend to dissipate once students engage in actual examinations (James, 2013). Additionally, studies by Shraim (2019), Jereb and Bernik (2005) affirm that online test materials and results are more secure.

However, robust encrypted data security remains essential. Safeguarding question banks, login credentials, navigation, exam access, and responses requires meticulous attention. While Jereb and Bernik (2005) argue that cheating is less likely in online examinations, James (2013) suggests focusing on diverse pedagogical approaches rather than solely relying on a foolproof automated authentication system to prevent cheating. Shraim's (2018) research aligns with this, highlighting students' use of various mediums (smartwatches, wireless Bluetooth, mobile hotspots) to cheat, share answers, and copy-paste information from different devices. Students favor randomized questions from question banks resonates with Shraim (2019), who observed that randomized questions create a new order, making cheating less feasible compared to conventional paper-based exams.

3. Research methodology

A mixed method research is conducted to use both quantitative and qualitative data to understand the research problem and get answers to the research questions as suggested by Creswell and Creswell (2018). Thus, a better understanding from both objective and subjective perspectives can be developed than either method by itself.

3.1 Data source

Data sources of this study are given in the following:

1. Tertiary level students (public and private university, public and private college where bachelor programs are available)
2. Tertiary level teachers (public and private university, public and private college where bachelor programs are available)

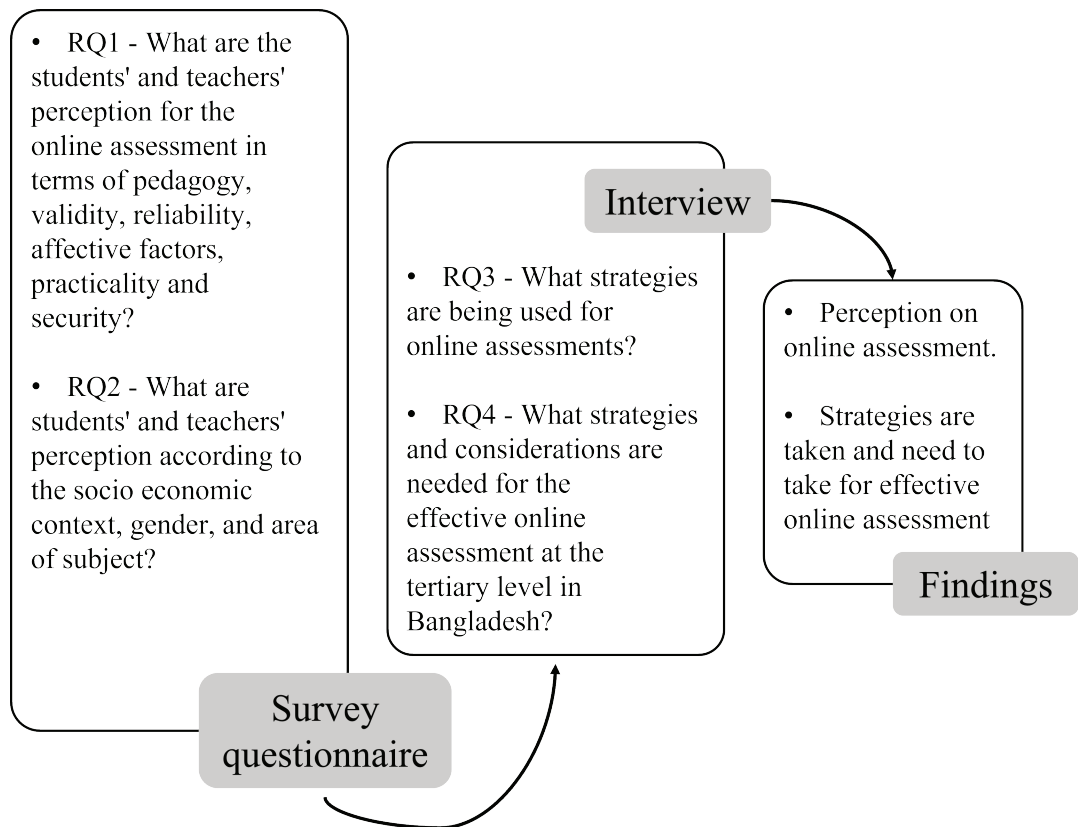


Figure 1: Research Design

3.2 Sample and sampling technique of the study

In this study, students and teachers were selected from different universities through convenience sampling based on access, availability (Johnson & Christensen, 2014) and purposive sampling based on their response and expertise (Creswell & Creswell, 2018). Online survey forms were disseminated on the social media platform where 68 students and 9 teachers responded. Upon the responses, it was seen that only 37 students and 5 teachers had the experience of online assessment. Therefore, further interviews were conducted for 13 students and 5 teachers purposively based on their experience of online assessment.

Table 1. Research Matrix

Research Question	Respondents	Sampling Technique	Type of Data	Sample Size	Instruments
RQ 1	Students and teachers	Convenience Sampling	Quantitative Data	Teacher 9 Student 68	Survey questionnaire
RQ 2		Convenience Sampling			Survey questionnaire
RQ 3		Purposive Sampling	Qualitative Data	Teacher 5 Student 13	Interview
RQ 4		Purposive Sampling			Survey questionnaire and interview

3.3 Instruments

To collect data relevant to the research questions, two sets of different tools were used. The tools were (a) a survey questionnaire with 4 point Likert scale for measuring students' and teachers' perceptions of online assessment along with demographic data and (b) an interview schedule for collecting supporting data to understand the strategy being used and the consideration needed for effective online assessment.

3.4 Data analysis

The quantitative data from the survey questionnaire were analyzed using descriptive statistics (frequency, percentages and mean) and inferential statistics (independent t test) through statistical software SPSS 25. Later, the qualitative data from the interviews were analyzed using thematic data analysis techniques (Rossman & Rallis, 2012). Interviews were recorded and transcribed, then categories and codes were given to generate themes for the study. Through data triangulation, peer debriefing and member checking the credibility was ensured (Marriam, 2009).

3.5 Ethical consideration

During the survey and interview conduction, the researcher sought permission from the responders to collect data. A brief description of the purpose of the research, data collection procedure, security and confidentiality of the information was provided to the students and teachers to ensure their privacy and security (Creswell & Creswell, 2018). Moreover, opportunity was given to them to withdraw themselves at any point.

4. Result of the study

In this study, the perception of the participant towards online assessment is presented based on some indicator such as pedagogy, validity, reliability, affective factors, practicality and

security from 68 students among which 54.4% (37) students had the experience of online assessment and 45.6% (31) students did not have the experience. Similarly, among the 9 teachers, 55.6% (5) had the experience of conducting online assessment and 44.4% (4) teachers did not have. Based on gender, for students, 45.6% (31) were female and 54.4% (37) were male; and for teachers, 66.7% (6) were female and 33.3% (3) were male. In regards of types of university, 63.2% (43) students and 66.7% (6) teachers were from public universities; and 36.8% (25) students and 33.3% (3) teachers were from private universities. From Table 2 cross tabulation of type of university and online assessment conduction, it was seen that most of private universities were conducting online classes compare to the public ones.

Table 2. Cross tabulation between type of university and online assessment

Type of University / Institution	Is your institution taking online exams?		Total
	Yes	No	
Public University / College (Hons / Masters)	14	29	43
Private University / College (Hons / Masters)	23	2	25
Total	37	31	68

4.1 Pedagogy

4.1.1 For students

Most of the students agreed on the pedagogical aspect of online assessment as immediate feedback helps deeper understanding (55.9%) and enables them to take new learning approach (69.1%).

Table 3. Students' response on pedagogical aspect of online assessment

Statements for Pedagogy	p/f	SD	D	A	SA	Mean
a. Immediate feedback in online exams helps learners to get a deeper understanding of the subject	%	4.4%	20.6%	55.9%	19.1%	2.73
	n	3	14	38	13	
b. Using technology in online exams enables students to take a new online learning approach	%	4.4%	10.3%	69.1%	16.2%	
	n	3	7	47	11	
c. Online exams facilitate a more adaptive learning approach than paper-based ones	%	23.5%	33.8%	30.9%	11.8%	
	n	16	23	21	8	

However, 33.8% students disagreed that online assessment is more adaptive than paper based ones. Overall, the mean score was found 2.73 that implied the online assessment is mostly helpful for ensuring pedagogical aspect. (Table 3)

While comparing the mean score of pedagogy aspect of online assessment, no significance ($p = .434$) was found through independent t test based on students' experience of online exam.

4.1.2 For Teachers

Most of the teachers strongly agreed on the pedagogical aspect of online assessment as immediate feedback helps deeper understanding (55.6%) and technology enables them to take new learning approach (66.7%).

Table 4. Teachers' response on pedagogical aspect of online assessment

Statements for Pedagogy	p/f	SD	D	A	SA	Mean
a. Immediate feedback in online exams helps learners to get a deeper understanding of the subject	%	0	0	44.4%	55.6%	3.48
	n	0	0	4	5	
b. Using technology in online exams enables students to take a new online learning approach	%	0	0	33.3%	66.7%	
	n	0	0	3	6	
c. Online exams facilitate a more adaptive learning approach than paper-based ones	%	0	11.1%	55.6%	33.3%	
	n	0	1	5	3	

Moreover, 55.6% teachers agreed and only 11.1% teachers disagreed that online assessment is more adaptive than paper based ones. Overall, the mean score was found 3.48 that implied the online assessment is very helpful for ensuring pedagogical aspect. (Table 4)

4.2 Validity

4.2.1 For students

About half of the students (45.6%) strongly disagreed that online exams are appropriate for all subject area. Similarly, they disagreed that online exams are appropriate to test the learners' level of knowledge (44.1%) and it is authentic than traditional methods (39.7%).

Table 5. Students' response on validity aspect of online assessment

Statements for Validity	p/f	SD	D	A	SA	Mean
a. Online exams are appropriate for all subject area	%	45.6%	36.8%	14.7%	2.9%	2.08
	n	31	25	10	2	
b. Online exams are appropriate to test learners' level of knowledge	%	14.7%	44.1%	35.3%	5.9%	
	n	10	30	24	4	
c. Online exams facilitate more authentic assessment than traditional methods through the integration of multimedia, simulations, etc	%	23.5%	39.7%	32.4%	4.4%	
	n	16	27	22	3	

However, less than 20% students agreed with these statements. Overall, the perception is poor as the overall mean is close to 2 which depicted the students disagreed that online assessment were valid. (Table 5)

While comparing the mean score of validity of online assessment, significance ($p = .014$, $p < .05$) test was found through independent t test based on students' experience of online exam. There is difference in the mean scores of perceptions for validity of online assessment between students who had online assessment experience and those who did not have.

4.2.2 For teachers

Equal number of teachers (33.3%) strongly disagreed and agreed that online exams are appropriate for all subject area and it is authentic than traditional methods.

Table 6. Teachers' response on validity aspect of online assessment

Statements for Validity	p/f	SD	D	A	SA	Mean
a. Online exams are appropriate for all subject area	%	33.3%	11.1%	33.3%	22.2%	2.44
	n	3	1	3	2	
b. Online exams are appropriate to test learners' level of knowledge	%	11.1%	33.3%	44.4%	11.1%	
	n	1	3	4	1	
c. Online exams facilitate more authentic assessment than traditional methods through the integration of multimedia, simulations, etc	%	22.2%	33.3%	33.3%	11.1%	

However, they agreed that online exams are appropriate to test the learners' level of knowledge (44.4%). Overall, the perception is on average as the overall mean is close to 2.5 which depicted, teachers have neutral perception on online assessment being valid. (Table 6)

4.3 Reliability

4.3.1 For students

Almost half of the students (44.1%) have agreed that marking online exams automatically is more accurate than paper-based marking.

Table 7. Students' response on reliability aspect of online assessment

Statements for Reliability	p/f	SD	D	A	SA	Mean
a. Marking online exams automatically is more accurate than paper-based marking	%	16.2%	27.9%	44.1%	11.8%	2.29
	n	11	19	30	8	
b. Online exams are fairer than paper-based exams	%	23.5%	44.1%	30.9%	1.5%	
	n	16	30	21	1	
c. The technology used in online exams is reliable	%	20.6%	36.8%	38.2%	4.4%	
	n	14	25	26	3	

However, same number of students (30) disagreed that online exam are fairer than paper-based exams. Moreover, quite equal number of students disagreed (25) and agreed (26) that online exams are reliable. Overall, students' perception was between disagreement and agreement range that online assessment is reliable. (Table 7)

While comparing the mean score of reliability of online assessment, no significance ($p = .728$) was found through independent t test based on students' experience of online exam.

4.3.2 For teachers

Around half of the teachers (44.1%) have agreed that marking online exams automatically is more accurate than paper-based marking.

Table 8. Teachers' response on reliability aspect of online assessment

Statements for Reliability	p/f	SD	D	A	SA	Mean
a. Marking online exams automatically is more accurate than paper-based marking	%	11.1%	11.1%	44.4%	33.3%	3.00
	n	1	1	4	3	
b. Online exams are fairer than paper-based exams	%	22.2%	55.6%	22.2%	0	
	n	2	5	2		
c. The technology used in online exams is reliable	%	11.1%	44.4%	44.4%	0	
	n	1	4	4	0	

However, more than half of the teachers (5 out of 9) disagreed that online exam are fairer than paper-based exams. In addition to that, equal number of teachers disagreed (44.4%) and agreed (44.4%) that online exams are reliable. Overall, teachers' mean score of reliability of online assessment was found to be positive as $M = 3$ referred to the agreement of the statements. (Table 8)

4.4 Affective factors

4.4.1 For students

Variation among the statements of affective factors were found. Although 36.8% students agreed that online assessment reduce stress and anxiety due to automatic correct marking than paper based marking, 33.8% students disagreed and 23.5% strongly disagreed with the statement.

Table 9. Students' response on affective factors of online assessment

Statements for Affective Factors	p/f	SD	D	A	SA	Mean
a. Online examinations reduce stress and exam anxiety marking online exams automatically is more accurate than paper-based marking	%	23.5%	33.8%	36.8%	5.9%	2.25
	n	16	23	25	4	
b. Using online exams allows learners to focus and concentrate more on the questions	%	19.1%	41.2%	38.2%	1.5%	
	n	13	28	26	1	
c. Learners feel more comfortable doing an online exam than a paper based one	%	19.1%	33.8%	44.1%	2.9%	
	n	13	23	30	2	

Similarly, 41.2% disagreed and 38.2% agreed that online exam allows learners to focus and concentrate on questions. Moreover, 44.1% students agreed that learners feel comfortable on online exam than a paper based exam. Overall, students were tending towards agreement that affective factors were present in online assessment. (Table 9)

While comparing the mean score of affective factor of online assessment, no significance ($p = .556$) was found through independent t test based on students' experience of online exam.

4.4.2 For teachers

In comparison with students, teachers' overall mean score was found 1.8 which showed disagreement that online assessment are able to manage affective factors. 44.4% teachers disagreed that online exam reduce stress and marking is accurate than paper based marking.

Table 10. Teachers' response on affective factors of online assessment

Statements for Affective Factors	p/f	SD	D	A	SA	Mean
a. Online examinations reduce stress and exam anxiety marking online exams automatically is more accurate than paper-based marking	%	33.3%	44.4%	22.2%	0	1.8
	n	3	4	2		
b. Using online exams allows learners to focus and concentrate more on the questions	%	33.3%	33.3%	33.3%	0	
	n	3	3	3		
c. Learners feel more comfortable doing an online exam than a paper based one	%	22.2%	22.2%	22.2%	11.1%	
	n	2	2	2	1	

However, 33.3% teachers strongly disagreed, disagreed and agreed that online exams allows learner to focus and concentrate. Similarly 22.2% teachers strongly disagreed, disagreed and agreed that learners feel comfortable for online exam. (Table 10)

4.5 Practicality

4.5.1 For students

Less than half of the students (45.6%) agreed with the fact that online exams are more efficient in terms of time, effort, and money spent. Most of the students (60.3%) agreed that reusable MCQ allows easy storage and review.

Table 11. Students' response on practicality of online assessment

Statements for Practicality	p/f	SD	D	A	SA	Mean
a. Online exams are more efficient in terms of time, effort and money spent	%	14.7%	33.8%	45.6%	5.9%	2.53
	n	10	23	31	4	
b. Creating a question bank of reusable MCQs allows easy storage and review	%	7.4%	20.6%	60.3%	11.8%	
	n	5	14	41	8	
c. Online exams are more accessible than paper-based exams	%	13.2%	39.7%	39.7%	7.4%	
	n	9	27	27	5	

However, 39.7% students disagreed and agreed that online exam are more accessible than paper based exam. Overall, students are mostly agreeing the practicality of online assessment as the mean score is 2.53. (Table 11)

While comparing the mean score of practicality of online assessment, no significance ($p = .803$) was found through independent t test based on students' experience of online assessment.

4.5.2 For teachers

About one third of the teachers (33.3%) agreed with the fact that online exams are more efficient in terms of time, effort, and money spent. Most of the teachers (66.7%) agreed that reusable MCQ allows easy storage and review.

Table 12. Teachers' response on practicality of online assessment

Statements for Practicality	p/f	SD	D	A	SA	Mean
a. Online exams are more efficient in terms of time, effort and money spent	%	22.2%	22.2%	33.3%	22.2%	2.52
	n	2	2	3	2	
b. Creating a question bank of reusable MCQs allows easy storage and review	%	0	22.2%	66.7%	11.1%	
	n	0	2	6	1	
c. Online exams are more accessible than paper-based exams	%	22.2%	44.4%	33.3%	0	
	n	2	4	3	0	

However, 44.4% teachers disagreed that online exam are more accessible than paper based exam. Overall, teachers are mostly agreeing the practicality of online assessment as the mean score is 2.52. (Table 12)

4.6 Security

4.6.1 For students

Around half of the students agreed with the fact that test materials and results of online exams are more secure than traditional methods (51.5%), technology used in online exams is sufficiently effective in dealing with cheating and plagiarism (41.2%) and randomized questions from a bank means that cheating during online exams is less likely than for paper-based ones (45.6%).

Table 13. Students' response on security of online assessment

Statements for Security	p/f	SD	D	A	SA	Mean
a. Test materials and results of online exams are more secure than traditional methods	%	14.7%	25%	51.5%	8.8%	2.44
	n	10	17	35	6	
b. The technology used in online exams is sufficiently effective in dealing with cheating and plagiarism	%	17.6%	35.3%	41.2%	5.9%	
	n	12	24	28	4	
c. Using randomized questions from a bank means that cheating during online exams is less likely than for paper-based ones	%	10.3%	41.2%	45.6%	2.9%	
	n	7	28	31	2	

Overall, students were neither disagreed nor agreed with security of online assessment as the mean score was 2.44. (Table 13)

While comparing the mean score of practicality of online assessment, no significance ($p = .803$) was found through independent t test based on students' experience of online assessment

4.6.2 For teachers

About one third of the teachers (33.3%) agreed and disagreed with test materials and results of online exams are more secure than traditional methods.

Table 14. Teachers' response on security of online assessment

Statements for Security	p/f	SD	D	A	SA	Mean
a. Test materials and results of online exams are more secure than traditional methods	%	11.1%	33.3%	33.3%	22.2%	2.48
	n	1	2	3	2	
b. The technology used in online exams is sufficiently effective in dealing with cheating and plagiarism	%	11.1%	44.4%	22.2%	22.2%	
		1	4	2	2	
c. Using randomized questions from a bank means that cheating during online exams is less likely than for paper-based ones	%	33.3%	11.1%	55.6%	0%	

However, 44.4% teachers disagreed that technology used in online exams is sufficiently effective in dealing with cheating and plagiarism (41.2%). More than half of the teachers (55.6%) agreed that randomized questions from a bank means that cheating during online exams is less likely than for paper-based ones (45.6%). Overall, teachers were found neutral for security of online assessment as the mean score was 2.48. (Table 14)

4.7 Learners' and teachers' perception according to the socio-economic context, gender, and subject area

4.7.1 Online assessment from socio economic context

Most of the students (63.2%) and teachers (77.8%) were join to take online classes using Wifi followed by mobile data (23.5% students and 11.1% teachers) and broadband (13.2% students and 11.1% teachers). Additionally, majority of the students (66.2%) and all of the teachers agreed with suitability of internet facilities in those respective areas where they reside in. According to 57% students and 66.6% teachers, the internet facilities were not costly for them.

4.7.2 Gender issues for online assessment

Most of the students (86.7%) and teachers (88.9%) perceived that online assessment is not biased on gender. In addition to the survey opinions, when independent t-test was conducted on online assessment based on gender, no significance was found between the mean scores of both groups.

4.7.3 Suitability of online assessment for subject areas

A wide range of departments or subjects were covered according to the responses which were the followings, education, medical, business, engineering, science, social science, arts and others. The variety of discipline shaped the understanding of the appropriateness of online assessment in these departments/subjects. Just above 50% students (35) agreed that their respective subject field is suitable for online assessment. The reasons for finding online assessment not suitable are, science related subjects require practical experiences of using lab, business related field requires field visit to organizations, medical field require practical experience on patient, lack of interaction, and misinterpretation of plagiarism reports of the assignments and unavailability of studios, resources etc. According to the students, these issues were not seen in the paper pencil, project, demonstration, and lab based assessments. On the other hand, most of the teachers (88.9%) agreed the suitability of online assessment for these subjects. However, a few of the teachers agreed that hands on activity and practical assessments in some of the courses are not possible on online. Therefore, online assessment is not suitable for all subject areas as responded by 73.5% students and 66.7% teachers.

4.8 Strategies used for online assessment

The current strategies that are being used to conduct online assessments; an interview was taken of the participant (teachers & students). They were asked about the current strategies they are using to assess the learning of the students. The strategies of current online assessment are following:

Assignment: Assignment is being used to the students to assess them. It is a more reliable medium to assess the learning of the students. Both the teachers and the students said that they have usually been given assignments as a form of assessment. T3 said that,

“I usually give the students assignments to assess them. It helps them to explain their knowledge and understanding. They can use a different source such as internet books or any other platform to fulfill the task.”

MCQ exam: MCQ based questions are being used to assess the students' learning in the online exam. According to them, the MCQ test allows them to give instant feedback so that the students can understand their gaps. S1 said that,

“We are assessed through MCQ based questions using a platform like a google form. Usually, this type of test was conducted for our quiz and class test. After completing the exam, we can get the result almost instantly. That helps me to identify my lacking in the particular subject area”.

Presentation: Presentation is another form of assessment generally being used for assessing the students online. Often the students are given presentations individually or in a group on a different topic. They have to present using the online platform. T2 said that’

“I prefer to give the students a presentation to assess them online. In this case, they can use whatever data source they want. They have presented this in front of the class using online platforms. I find it more reliable as they have to present their understanding. So, there is a minimal chance of cheating during this process.”

Oral test/ Viva: Oral tests or viva are also being used for assessing the students. Both the teachers and students said that they go through viva for the assessment. According to T5,

“I use viva as a form of assessment for the learners. I find it more reliable as the students get the opportunity to express themselves. There is a chance for me to challenge their understanding, and I think there is no chance to cheat during the viva for the students.”

4.9 Consideration for assessment strategies

4.9.1 Students perspective

13 students from 9 different tertiary educational background shared some important insights from the interview session such as-

Online Viva: According to most of the students, the online viva is more reliable than any other strategy. One student can easily cheat in written exams, MCQ exams, while online viva can be a good strategy to ensure reliability in online assessment. Participant S7 said that,

“Online viva should be the best way to assess a student. Even if it is conducted online, there are very few chances for a student to cheat during the assessment process.”

According to S2, viva is a more convenient way for students for online assessments. He said that,

“One-to-one personal interview or group interview can be a good assessment strategy in online assessment using Zoom or any online based application.”

Blended approach: One of the participants S1 replied that,

“Blended approach should be taken. In my opinion, no kind of biases can be seen in a blended approach & a blended approach can make the process more effective.”

The blended approach refers to a combination of both online and offline/traditional assessments for the assessment of the students.

Presentation: Presentation by sharing slides online or sharing MCQ online can be a good strategy. Participant S5 agreed with it. Participant S6 also replied that,

“assignment or give any presentation on any topic that would be a better way to do an online assessment. Here we get the opportunity to express our understanding, which will be more comfortable for us than writing on laptops.”

Assignment: Assignment can be a good strategy in online assessment. Participant S9 replied that a research-based assignment, which consists of creative questions, is the best way to assess students over online sessions.

Email: Email can be a good medium for online assessment. Participant S8 said that, “Teachers should give students his/her email address or any link where students can submit his/her answer script of a given question regarding the class test.”

Time allocation: Time allocation is very important in online assessment. Sometimes it takes more time to upload the picture of the answer sheet due to network problems & it takes more time to convert the written answer sheet in PDF format due to slow configuration of laptop, electronic devices. So, in online assessment teachers should increase allocation time.

4.9.2 Teachers’ perspective

According to the teachers, the strategies and consideration needed to be taken to ensure effective online assessment are following:

Framework for online assessment: According to the teachers there is no specific framework for the online assessment. It basically depends on the teachers how they want to take their classes and assess the students. A proper framework for the assessing online will be helpful for the learners as well as the teachers to ensure online assessment. According to T3,

“There is no specific framework for us about how to assess the students over online platforms. It varies from teacher to teacher. A proper guideline can be helpful for us to ensure proper assessment of the learners”

Introduce blended assessment approach: According to most of the teachers online assessment cannot be replaced with traditional assessment system. It can be important for overall assessment. A blended assessment approach of both online and offline assessment should be introduced to ensure effective assessment of the students.

Introducing open book exam: Most of the participant teachers believe that there is a significant chance of cheating during the online classes. According to teachers, open book exams are being introduced and the questions are made on this basis. The opportunity to cheat in the online assessment will be reduced.

Providing financial aid: Students in tertiary level usually comes from different socio-economic backgrounds. Often they don’t have proper ICT equipment or internet facilities to take part in the online assessment. Financial aid such as scholarships or student loans can be given to the students' from low socio-economic background. T4 said,

“We have taken an initiative to help the low socio-economic background students financially to buy ICT equipment to take part in the online classes. Though it is a lengthy process, we will not be able to help every student. But a proper initiative like that can help the students to access the online classes.”

Ensure internet facilities: Proper internet facilities are a must to ensure participation in online class as well as online assessment. Without ensuring proper internet facilities online assessment cannot be effective. Bad internet connection can hamper the participation of the students in the online exams. T3 said,

“Most of the students at my university are from diversified areas. In some cases, they don’t have the proper internet facilities to attend the class or take part in the online assessment due to bad internet connection in their area. We have to ensure proper high speed net facilities to ensure effective assessment for the students.”

Collaboration with mobile network operators: Collaboration between the network operator and the universities can be helpful for the students. A large number of students take part in online classes by using mobile data, which can be costly for the students. If a collaboration can be done with the mobile network operators, it can be helpful and more cost-effective for the students.

5. Discussion

One of the major findings of this study was that both student and teacher perceive that pedagogical aspect such as getting immediate feedback, introduction to new learning approaches are more adaptive in online assessment than paper pencil test. However, there is certain concern about the validity, reliability and affective factors of online based assessment systems as the mean score is around 2 in most cases which refers those students and teachers find it hardly valid, reliable, stress and anxiety free, and comfortable in the context of Bangladesh. This finding is similar to (Burrus et al., 2007); as they stated that “Online cheating is more prevalent than classroom cheating”. On the contrary to the findings of this study, Hewson (2012) opined, online assessment can make the learner more comfortable as they complete the test at a time and place of their own convenience. Another study (Clesham, 2010) shows that the online assessment makes reduction in anxiety and examination stress. The possible reason for such findings in Bangladesh context might be the poor network infrastructure, inability to use technology and fear of technicality related issues that could affect their performance in exams. Another major finding of this study was that students and teachers believed that online assessment comparatively practical and secured than traditional assessment which is found in other studies (Shraim 2019; Jereb & Bernik, 2005; Dermo, 2009). Such agreement might be possible as teachers can use question banks, navigate responses and randomize of the questions to reduce students’ chance of cheating.

Moreover, the study found that students and teachers should have a suitable internet connection to take part in online class or online assessment process. However, such arrangements put an extra economic pressure on students’ life, which is similar to literature (Dutta et al., 2020). Though it was also found from the study online assessment can hardly be biased based on gender. This study also shows that online assessment is not suitable for all subject areas as many of these required hands-on activities to understand practical experiences.

Additionally, this study finds assignment, viva, presentation, MCQ exams are mostly used strategies as these strategies are quite congenial for both students and teachers during online assessment. This finding is similar to Swan (2001); as she stated that discussion, written assignments, projects, quizzes and tests, and group work can be helpful strategies for online assessment. Similarly, Arend (2007) mentioned due to the same reason assignments and quizzes are mostly used assessment strategies which is common in

Bangladesh. This study also finds that projects, timed tests and quizzes and asynchronous discussion are also used in the online platform for effective assessment. Though self-assessment, peer assessment are also necessary strategies for effective assessment but these strategies are not being used in Bangladesh. That's why this study is not very similar to Gaytan and McEwen (2007). As they stated that projects, portfolios, self-assessments, peer evaluations, peer evaluations with feedback, timed tests and quizzes, and asynchronous discussion are effective mediums for online assessment.

The study finds out strategies and considerations that are needed for effective online assessment at the tertiary level in Bangladesh. Further studies investigating this topic would therefore be of value, particularly in the context of fully-online courses as opposed to blended learning contexts which use a combination of online/computerized and face-to-face learning and assessment, since the former have received very little attention to date (Stöberg, 2012). This finding supports both students and teachers perspective on online education. Both of these stakeholders do not support relying on fully online based assessments rather they want a mixture of both so that their learning can be properly assessed. Students think that online viva, presentation, and emailing can be used for better communication. Also, special consideration should be taken for time allocation and other health issues. Teachers' also raised a consideration of financial aid, internet facility & collaboration with the network operators from their experience of students' attendance in their classes due to the poor network and other socio-economic concepts in mind. These are some suggestions from both ends for making online assessment effective that can be ensured by the authorities.

6. Implications and limitations

This study finds that there are some issues at the policy level as there is no framework for online assessment. To make a specific framework for online assessment at tertiary level and resolving the issue regarding online learning & assessment this study can be useful. Initiatives can be taken for making online assessment valid, reliable with appropriate strategies. Meanwhile, facilities, supports and resources should be kept under considerations. As the study was conducted on a small scale with students who responded through internet, therefore, in future, large-scale research can be done in different contexts and settings.

7. Conclusion

Online learning and assessment should be focused on educating students and evaluating student academic achievement. Online assessment can be a helpful medium to make assessment more effective. At the tertiary level, a collaborative framework between teachers and students should guide assessment practices addressing socio-economic disparities which is crucial for equitable participation. A blended approach, combining online and traditional assessments, enhances effectiveness. Effective online assessment strategies encompasses quizzes, projects, portfolios, self-assessment, and peer evaluations by ensuring validity, reliability and transparency to minimize cheating risks. To ensure that online instruction and assessment must balance the requirements of technology, pedagogy, learning methods, and learning outcomes.

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Md. Istiaque Hasan is a dedicated humanitarian worker currently serving as an Education Coordinator at the Norwegian Refugee Council (NRC) in Bangladesh. With over six years of professional experience in the education sector, he has made significant contributions to various educational programs. Istiaque previously worked with ASA's education program and was a Program Coordinator at Agami Education Foundation. Additionally, he contributed as a Research Assistant at UNICEF Bangladesh, focusing on pre-primary and primary curriculum revision. Istiaque holds a Bachelor of Education and a Master of Education from the Institute of Education and Research, University of Dhaka. He also completed a Master's in Governance and Development Studies from Jahangirnagar University, Bangladesh. His research work includes a publication on "Challenges of Implementing the Inquiry-Based Teaching Learning in Primary Science Classroom" in the Journal of Teacher Education, Bangladesh Open University. His extensive background and dedication to education make him a valuable asset in the humanitarian field.

Susmita Ghosh is currently a consultant at Room to Read Bangladesh, where she leverages her expertise in the educational sector. With over four years of experience in various roles: including teacher, trainer, facilitator, researcher, content developer, and manual developer she has made significant contributions to the field. She holds an honors degree in Science, Mathematics, and Technology Education, as well as a Master's degree in Curriculum and Instructional Technology from the Institute of Education & Research at the University of Dhaka, providing her with a strong foundation in educational theories and practices. Throughout her career, she has excelled in curriculum development and instructional design, enhancing the educational experiences of both students and educators. Her skills extend to creating comprehensive training manuals and conducting impactful research, further solidifying her role as an influential figure in education.

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