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An Analysis of Fairness and Quality Issues in Online Assessment at Higher Education in Pakistan

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ABSTRACT

Remote assessment during pandemic Covid-19 had remained a big challenge for higher education institutions (Cooper & Tschobotko, 2020). Many issues related to fairness and quality in particular needed to be resolved (UNESCO, 2020). The study, thus, attempted to address in detail, quality and fairness issues associated with online formative and summative assessment at higher education. The study opted for a questionnaire including fixed-choice items as well as extended response questions. Undergraduate students (n=323) from higher education were population of the study. Quantitative data of students were analyzed through mean scores, percentages, t-test and ANOVA, whereas extended responses of students were analyzed through thematic analysis. Results revealed that online assessment at higher education seemed to be unsatisfactory whether related to fairness and quality in formative assessment as well as summative assessment. Formative assessments lacked in quality in terms of low quality assessments for students' knowledge and practical skills; and unfair in terms of biasness and unfair award of marks. Online summative assessments lacked in quality test-construction, exacerbated by security and cheating threats. Other than that, teachers lacked in methodology, punctuality and teaching with responsibility during online education. Also, it was found that females were more sufferers of online assessment as compared to male students. Overall, online formative assessment and summative assessment whether in terms of fairness and/or quality had been unsatisfactory and many issues related to fairness and quality remained untouched which have serious implications in online education leading to face to face education and assessment system at large.

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1. Introduction

The COVID-19 pandemic situation altered the set-up of educational institutions across all over the world (UNESCO, 2020). Keeping the educational process in the progress, all educational institutions, specifically universities around globe moved to online education Burgess and Sievertsen (2020), thus assessing students through computer based-examination stood crucial. Due to sudden and unexpected use of technology, online assessment came as a major challenge for the students (Kuriakose & Luwes, 2016). Chang (2020) in a report of UNESCO emphasized that issues like quality, fairness, valid grades, and authenticity of online assessment remained big challenges due to various technical and security threats. Thus, building on this rationale, the current study attempted to analyze online formative and summative assessments in higher Education public sector in Pakistan amid pandemic COVID 19, assuming that there remained severe limitations in providing valid, reliable and fair scoring during formative and summative assessments to students. Based on the findings, the study suggests some practical solutions for improving the assessment system at higher education level in Pakistan.) elaborated that online assessments provide opportunities for meaningful feedback

and interactive support for learners as well as possible influences on the engagement of learners and learning outcomes (Heil & Ifenthaler, 2023).

Along with many issues related to un-stable internet connection, poor infrastructure about online exam security, UNESCO (2020) reported many instance of academic dishonesty too, with high rate of cheating. Students used variety of tools during online exams for their cheating, such as, use of multiple windows on their computer screen and use of their multiple phones (Al-Rabiaah et al., 2020; Cao et al., 2020; Wang, 2019; Zhai & Du, 2020). According to Rutgers (2020), student had been frustrated with the low quality of online assessment due to validity issue of examination pattern, as, most of the universities constructed only multiple choice items for online assessments, which have limitations to assess holistic cognitive abilities of students. Consequently, the results could not distinguish between high and low ability students. Students always required variety of question types during online examination and wanted it to be true reflective of their skills and abilities (Al-Rabiaah et al., 2020; Cao et al., 2020; Wang, 2019; Zhai & Du, 2020). Wolverton (2018) perceived that for students, starting learning in a distance mode remained challenge, and physically disconnected students had to confront issues like, content validity of assignments, academic dishonesty, lack of receiving feedback from teachers and overburden of projects by teachers. In summative assessments also, students faced issues like, validity of examination pattern, lack of random item blocks, technical issues, poor infrastructure about exam security and high rate of cheating in digital examination conducted through web based ICT post pandemic e-learning mode (Adnan & Anwar, 2020). Thus, the current study assessed the pitfalls in online formative and online summative assessment in terms of quality and fairness. In online formative assessment issue of 'quality' included content validity of assignments and the 'fairness' included academic dishonesty, lack of proper feedback from teachers, and excessive workload of academic task. In online summative assessment, issue of 'quality' related to assessment pattern, lack of random items block and fairness 'related' to technical issues, poor infrastructure of exam security, and academic dishonesty in digital examination. Following research questions and hypotheses were formulated:

1.1. Research Questions

1. What was the quality of online formative assessment as perceived by university students?
2. What was the level of fairness in online formative assessment as perceived by university students?
3. What was the quality of online summative assessment as perceived by university students?
4. What was the level of fairness in online summative assessment as perceived by university students?
5. What do students suggest to improve assessment system at higher education?

1.2. Hypotheses

HO1: There is no significant difference in students' perceived pitfalls in online formative assessment and online summative assessment on basis of students' gender
HO2: There is no significant difference in students' perceived pitfalls in online formative assessment and online summative assessment on basis of students' locality
HO3: There is no significant difference in students' perceived pitfalls in online formative assessment and online summative assessment on basis of students' age
HO4: There is no significant difference in students' perceived pitfalls in online formative assessment and online summative assessment on basis of students' family monthly income
HO5: There is no significant difference in students' perceived pitfalls in online formative assessment and online summative assessment on basis of students' degree
HO6: There is no significant difference in students' perceived pitfalls in online formative assessment and online summative assessment on basis of students' faculty

2. Research Methodology

The study was exploratory in nature and used a self-constructed questionnaire incorporating 85 fixed-choice items and one extended-response question to explore the phenomenon. A total of 323 students (n=323) from University of Sargodha were participated in the study. University of Sargodha is one of the general public universities situated in Punjab. Study participants were divided into three strata (social sciences, sciences, Arts and humanities) and then, students were selected from different departments through convenience sampling.

Data had been collected between May to June, 2021. Sampling framework of study shown in the below table

Table 1: Sampling Frame of the Study

Sr.	Faculties	Departments	No. of respondents	Total No.
1	Social sciences	Education	45	
		Social work	12	
		Psychology	20	
		Economics	18	
		Sociology	17	112
2	Sciences	Botany	17	
		Zoology	26	
		Biotechnology	21	
		Physics	20	
		Chemistry	17	
		Mathematics	41	142
3	Arts	English	25	
		Law	20	
		Islamic studies	24	69
		Total	323	323

Owing to the newness and nature of research topic, no standard questionnaire was available, so the questionnaire had been self-developed by the researcher. Ensuring validity of the research instrument was a developmental process. Validity of the research tool was confirmed through opinion of five field experts. Field experts kept examining the questionnaire through identifying the weaknesses in questionnaire, aligning the items with major constructs and objectives of the research. The validated tool was subjected to piloting on 30 students of M.A Education. Cronbach's alpha reliability statistic was run, which confirms, how well group of items focus on single idea or the construct (Krippendorff, 2018). The results of Cronbach's alpha reliability coefficient were appropriate to be further used on to the wider population. Variable wise reliability statistics are represented below:

Table 2: Variable Wise Reliability Measures

Variables	No. of items	Reliability
1. Challenges in online Formative assessment	34	.789
2. Challenges in online Summative assessment	51	.915
Overall reliability	85	.928

3. Procedure for Quantitative Data Analysis

Quantitative data was analyzed through IBM SPSS-22 software. Descriptive statistical analysis involved percentage, mean and standard deviation, where in percentage analysis, responses taken on likert scale, i.e., 'strongly agree' and 'agree' as well as 'strongly disagree' and 'disagree' were combined, while the percentage of 'Undecided' was calculated separately. In, inferential statistics, hypothesis were tested through independent sample *t*-Test and one-way ANOVA. Detailed quantitative analysis is represented below:

3.1. Students' Demographics

Table shows that students who participated in the study were more of females, students from urban area; BS programs, science discipline and from senior semesters.

Table 3: Frequency and Percentage on Students' Demographics

Sr. No.	Demographics		Frequency	Percent %
1	Gender	Male	119	36.8%
		Female	204	63.2%
		Total	323	100.0%
2	Locality	Rural	158	48.9%
		Urban	165	51.1%
		Total	323	100.0%
3	Age	20 year	78	24.1%
		20-25	236	73.1%

		More than	25	9 2.8%
		Total	323	100.0%
4	Family income	10,000-20,000	34	10.5%
		20,000-30,000	109	33.7%
		More than 30,000	180	55.7%
		Total	323	100.0%
5	Semester	1-4	104	32.2%
		5-8	219	67.8%
		Total	323	100.0%
6	Degree BS		243	75.2%
		B.ED	20	6.2%
		MA/M.SC	60	18.6%
		Total	323	100.0%
7	Departments	Social Sciences	114	35.3%
		Sciences	141	43.7%
		Arts	68	21.1%
		Total	323	100.0%

Table 4: Percentage on fairness and quality of online formative and summative assessment

Variables	Indicator	Sub indicators	Agreement%	Undecided%	Disagreement%
Formative assessment	Fair assessment	Academic dishonesty	53.2	10.2	35.7
		Lack of proper feedback from teachers	54.3	12.6	33.0
		Excessive workload	53.9	12.6	33.5
	Quality assessment	Content validity of assignments	53.8	11.8	34.0
		Total	55.3	13.9	34.2
Summative assessment	Fair assessment	Technical issue	54.5	12.8	32.5
		Poor infrastructure about exam security	60	10.7	34.3
		Academic dishonesty in digital examination	63	10.7	25.7
		Total	41.8	8.3	49.7
	Quality assessment	Lack of valid examination pattern	54.9	9.9	36.5
		Lack of random item blocks	58.1	11.9	29.8
		Total	62.9 60.5	11.8	27.5
		Grand Total Percentage	57.7	10.8	32

Table 9 shows that majority of the students hinted towards lack of fairness and quality in online formative (54.5%) and online summative assessments amid Covid-19 (57.7%).

Table 5: Mean and standard deviation on fairness and quality of online formative and summative assessment

Variables	Indicator	Sub indicators	Mean	SD
Online formative assessment	Fair assessment	Academic dishonesty	3.2	1.341
		Lack of proper feedback from teachers	3.27	1.258
		Excessive workload	3.28	1.271
	Quality assessment	Content validity of assignments	3.30	1.253
		Total	3.2	1.273
Online summative assessment	Fair assessment	Technical issue	3.4	1.271
		Poor infrastructure about exam security	3.5	1.258
		Academic dishonesty in digital examination	2.8	1.361
	Quality assessment	Lack of valid examination pattern	3.3	1.251
		Lack of random item blocks	3.4	1.185
		Total	3.2	1.265

Total mean values in table above (M= 3.2) show lack of fairness and quality in both online formative as well as online summative assessment.

3.1. Hypothesis Testing

$H_{o1:}$ There is no significant difference in students' perceived pitfalls in online formative assessment and in online summative assessment on basis of students' gender.

Table 6: Independent sample t-Test for gender differences in students' perceived pitfalls in online formative assessment and in online summative assessment

Variables	Gender	N	Mean	SD	t	df	P
Online formative assessment	Male	119	109.7	5.7	-1.285	21	.808
	Female	204	112.0	5.0			
Online summative assessment	Male	119	169.0	8.7	-.984	21	.022
	Female	204	172.0	24.0			

P>0.05

No significant difference on basis of gender was found in students' perceived pitfalls in online formative assessment (p=.808). Significant difference was found in students' perceived pitfalls in online summative assessment on gender basis (p=.022).

$H_{o2:}$ There is no significant difference in students' perceived pitfalls in online formative assessment and in online summative assessment on basis of students' locality.

Table 7: Independent sample t-test comparing students' perceived pitfalls in online formative assessment and in online summative assessment on locality basis.

Variables	Locality	N	Mean	SD	t	df	p
Online formative assessment	Rural	158	110.5	14.6	-.718	321	.350
	Urban	165	111.7	15.9			
Online summative assessment	Rural	158	170.2	26.5	-.429	321	.501
	Urban	165	171.5	25.2			

P>0.05

No significant difference on basis of locality was found either in students' perceived pitfalls in online formative assessment (p=.350) or online summative assessment (p=.501).

H_{o3}: There is no significant difference in students' perceived pitfalls in online formative assessment and in online summative assessment on basis of students' age.

Table 8: ANOVA comparing students' perceived pitfalls in online formative assessment and in online summative assessment on basis of students' age

Variables	Variance	df	F	Sig
Online formative assessment	Between group	2	.720	.488
	Within group	320		
	Total	322		
Online summative assessment	Between group	2	.985	.375
	Within group	320		
	Total	322		

P>0.05

No significant difference on basis of students' age was found either in students' perceived pitfalls in online formative assessment (p=.488) or online summative assessment (p=.375).

Ho4: There is no significant difference in students' perceived pitfalls in online formative assessment and in online summative assessment on basis of students' family monthly income.

Table 9: ANOVA comparing students' perceived pitfalls in online formative assessment and in online summative assessment on basis of students' family monthly income

Variables	*Variance*	*df*	*F*	*Sig*
Online formative assessment	Between group	2	.437	.646
	Within group	320		
	Total	322		
	Between group	2	1.171	.311
Online summative assessment	Within group	320		
	Total	322		

P>0.05

No significant difference on basis of students' family income was found in students' perceived pitfalls in online formative assessment (p=.646) and online summative assessment (p=.311)

Ho5: There is no significant difference in students' perceived pitfalls in online formative assessment and in online summative assessment on basis of students' degree.

Table 10: ANOVA comparing students' perceived pitfalls in online formative assessment and online summative assessment on basis of students' degree

Variables	Variance	df	F	Sig
Online formative assessment	Between group	2	.277	.758
	Within group	320		
	Total	322		
Online summative assessment	Between group	2	.199	.820
	Within group	320		
	Total	322		

P>0.05

No significant difference on basis of students' degree was found in students' perceived pitfalls in online formative assessment (p=.758) and online summative assessment (p=.820).

Ho6: There is no significant difference in students' perceived pitfalls in online formative assessment and in online summative assessment on basis of students' faculty.

Table 11: ANOVA comparing students' perceived pitfalls in online formative assessment and in online summative assessment on basis of students' faculty.

Variables	Variance	df	F	Sig
Online formative assessment	Between group	2	.433	.649
	Within group	320		
	Total	322		
Online summative assessment	Between group	2	2.034	.132
	Within group	320		
	Total	322		

P>0.05

No significant difference on basis of students' faculty was found in students' perceived pitfalls in online formative assessment (p=.649) or online summative assessment (p=.132).

3.2. Qualitative Data Analysis

Themes were generated from the written responses obtained from extended response question, by sorting data into codes, creating categories out of responses and generating themes as suggested by (Fraenkel & Wallen, 1990). In response to the question, 'What would you suggest to improve the assessment system at higher education?', seven themes were generated. The table below presents the thematic map developed after analyzing the qualitative data on the question. Table also includes frequencies and percentage and total percentage on categories, that end up in major themes on the qualitative data.

Seven themes had been generated out of the qualitative data. The majority of students had opined that teachers were not fair in paper checking. Teachers show favoritism towards some specific students. Teachers do not award marks according to ability, rather, award more marks to favorite students. Thus, also award exaggerated marks in assignments and projects to favorite students while neglecting other students of class. Many students reflected upon lacking continuous and timely feedback by teachers on submitted assignments that if checked timely, may enable students to improve their weaknesses in learning. There was found no mechanism of regular assessments by teachers, whether in form of quizzes, surprise and/or oral tests. Skill based teaching also seemed to be a miss, and rote learning seemed to be used as the basic method of students' learning. Majority of the students demanded that teachers need to focus on imparting practical skills and critical thinking skills to students, for better understanding of the concepts.

Paper construction came out as a serious issue highlighted by many students. Students reported that question paper was seldom from taught syllabus, which added to frustration in students. As the data revealed, students looked forward to assessment of applied knowledge rather assessing them on basic knowledge, traditionally. Few students suggested teachers' training for using different teaching methods in class according to the nature of topic, enriching lectures with question-answer method, activity method, discussion method and demonstration method for science subjects. The students' data revealed teachers lacking on punctuality and

honesty. Students suggested that teachers need to teach classes in their own allotted time and deliver lecture with honesty and clarify the concepts honestly. From the reflections of students, it seemed that teachers had been habitual of taking extra classes, Students reflected that suggested that teachers should not take extra classes at the end of semester and overburden the students. Many stduents responded lacking of a friendly teachers-student communication, due to which, which limits opportunities for students to share learning difficulties with teachers and timely resolution of difficulties. Many students recorded their frustration with online examination due to issues of unfair awarding of scores, lack of check on poor quality of submitted assignments, cheating during paper solving and unsatisfactory paper pattern. Students claimed that online system failed in awarding them authentic scores according to the hard work done. Major identified issues related to unfair awarded marks, lack of continuous feedback, lacking in imparting practical skills, and poor infrastructure for conducting online examination.

Table 12: Thematic Map

Themes	Categories	Frequency	Percentage
Lacking Fairness	favoritism	23	7.6%
	Provide marks to favorite Students'	15	5%
	Dishonest Paper checking	10	3.3%
	Self- concepts	10	3.3%
	Total	58	19.3%
Lacking continuous feedback	Continuous feedback issue		
	improper daily and weekly assessment	25	8.3%
	Total	23	7.6%
		48	16%
Skill based teaching	Practical skill		
	Field work	20	6.6%
	Rote- memorization	10	3.3%
	Critical thinking	12	4%
	Total	08	2.6%
		50	16.6%
Paper construction	Paper from taught syllabus		
	Practical questions	21	7%
	Mix method paper	08	2.6%
	Total	10	3.3%
		39	13%
Teaching methodology	Question-answer method		
	Discussion method	09	3%
	Demonstration method for science subjects	10	3.3%
	Total	08	2.6%
Teachers' punctuality	Come on time		
	Deliver honest lecture	27	9%
	Proper guidance		
	Solve difficulties	20	6.6%
	Total	10	3.3%
		05	1.6%
Frustration with online examination	Unfair score	06	2%
	MCQ based paper	41	13.6%
	cheating issue		
	Total	12	4%
		15	5%
		10	3.3%
		37	12.3%
Grand total	Total	300	99.8%

4. Findings

1- 54.5% of students showed agreement to existing issues in fairness and quality in online formative assessment, with mean score value M= 3.2 and standard deviation= 1.273.

2- 57% students showed agreement to existing issues in fairness and quality in online summative assessment, with mean score value M= 3.2 and standard deviation= 1.265

3- Female students faced more issues in online summative assessment as compared to male students.

4- Qualitative analysis highlighted many flaws in assessment system, such as lacking fairness in awarding marks, lack of continuous feedback mechanism, less emphasis on imparting practical skills and critical thinking skills to students. Paper construction has also been pointed out as a crucial issue to be dealt with as most teachers did not create question papers out of taught syllabus. Teachers did not use a variety of methodologies in teaching, and teachers were reported to be lacking in punctuality and responsiveness towards teaching. Overall students depicted frustration towards online assessment mechanisms because of undue exaggerated scores to students and unauthentic results.

5. Discussion

The online assessment scenario amidst pandemic remained under quality, whether formative or summative assessments. Students recorded frustrations from the online assessment system which actually reflected the weaknesses and limitations in traditional assessment system at large. There existed manifold issues in the online assessments, most out of which had been rooted traditionally in our education system. Many of the identified issues were of the nature that had less to do with online systems. Issues of fairness, for instance, awarding marks unfairly to favourite students, lacking in provision of proper and timely feedback to students, communication gap between teacher and students, and, accepting academic dishonesty by students are the issues that have had been prevailing and destroying our education system since long. However, with the onset of online education, the issues became manifold. For instance, the study found out that educational projects assigned by teachers had been without proper guidance and limited time was given for submission, which further lacked in quality check resulting in exaggerated marks by teachers. Vlachopoulos and Makri (2019) also highlighted such issues, leading to un-fair assessment that resulted in low motivated attitude for learning among students.

The study also revealed that issues further exacerbated due to recurrences of technical problems in online paper solving, matters of paper security, lack of students' skills in solving online question papers. Students easily got cheated during online examination from their classmates. Paper pattern during online examination system also remained an unresolved issue as teachers had to create only multiple choice test items for the online examination, hence, testing of multiple cognitive abilities remained under addressed. Due to only objective paper pattern, paper content failed to meet the learning objectives that also ended up in un-authentic scoring. Most of the time, multiple choice items were out of the taught content, rather googled out from internet. Results of tests of significance found that female students faced more issues in online summative assessments as compared to the male students. The results are in true connection to real scenario in Pakistan, where generally, females are less mobile and, thus, the technical issues of online assessment system remained beyond their control. This finding was supported through the recent work of Hillier (2014) who found that female students suffered more during online examination as compared to their male counterpart. The rest of the students' demographics, such as locality, age, degree, and department had no effect on the phenomenon under study.

However, a striking finding of the current study, with no significant difference found in online assessments' challenges based on students' monthly income, unlike other field researches, (such as (Scheerder, Van Deursen, & Van Dijk, 2017)) where significant difference in students' academic results were found in students from different socioeconomic backgrounds. These researches, however, were not based on online assessment results. Hence, fairness and quality compromises were observed in online assessment systems, whether weakness lied on part of teachers' willful discriminations, lacking in giving timely feedback, punctuality, honesty, or due to underlying technical issues in novice online assessment systems and/or the single paper pattern comprising multiple choice items only, and the attached exacerbating issues of malpractices in formation of multiple choice items by teachers. The study highlights and provides a clear insight into addressing issues, which are indeed deep-rooted, that multiplied in online educational scenarios. Thus, the implications of the study lie not only in improving online assessment systems, but to address the inherent and established issues, that have remained untreated in our education system. Although, researchers sensitive to equity, quality and fairness issues in Pakistan's education have been emphasizing such issues, however, as bringing equity and fairness necessitates to challenge the existing norms, it needs to be on top priority of people in power, so that it penetrates into the system and practitioners.

6. Conclusion

The study identified potential pitfalls in online formative as well as summative assessment mechanisms related to fairness and quality at higher education. Formative assessments lacked in timely teachers' feedback, acceptance of low quality assignments and limitations of the teaching learning process in imparting practical skills to students, award of undue, exaggerated marks to favourite students. Online summative assessments lacked authentic and fair scoring by teachers, exacerbated by lacking valid and random test items, security and cheating threats during online examination. Teachers lacked in methodology, punctuality and teaching with responsibility during online education. Also, it was found that females were more sufferers of online assessment systems as compared to male students. Overall, online formative assessment and summative assessment whether in terms of fairness and/or quality had been unsatisfactory and many issues related to fairness and quality remained untouched which have serious implications in online leading to physical assessment system at large.

6.1. Recommendations

1. Human values like honesty, punctuality, and dutifulness are important ingredients to perform any task in an organization. The higher authorities in universities should keenly observe these basic human values. Therefore, it is important to train and sensitize the teachers on these basic human values so that they may perform their duties honestly.
2. Higher authorities need to train the teachers on basic teaching skills like, use of variety of methodologies and imparting assessment literacy skills in teachers.
3. Curriculum revisions need to be done by incorporating practical based knowledge in curricula of higher education
4. Strong implementation mechanisms need to be jotted for implementing the practicum based curricula for transforming teaching-learning process in line with the international standards in education.
5. Higher education institutions need to be cognizant of the underlying weaknesses and technical flaws in online assessments, and work to strengthen the online assessment mechanisms with all the required high quality software and required infrastructure to be all set to shift to online system, whenever, it is required in future.
6. As the data had been collected from one university, further studies should be conducted on wider populations for better generalizability of research findings.

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