

Online Examination System in the Times of COVID-19: A Case Study of Pakistan

*¹Nawaz Abdul Rehman, ²Anwar Usama & ³Akhtar Sohail

^{1,2&3}Students, Department of Economics, University of the Punjab, Lahore 54590 & Pakistan

ABSTRACT

The study investigates the role of the online examination system during the COVID-19 pandemic and suggests multiple ways to minimize cheating in online exams. Owing to COVID-19, educational institutions have been compelled to adopt an E-learning system all across the globe. Similarly, an E-examination system has been adopted by institutions to save the academic year of the students in Pakistan. Moreover, students are also being facilitated by the teachers during online exams to minimize the deleterious impacts of an unprecedented situation on their grades. The present study discusses the nexus between the online examination system and cheating in Pakistan. A Convenience sampling technique is used to collect the data from the students of different universities in Lahore, Pakistan. The Total potential respondents were 130 and all were approached by using different social media apps. The Chi-square, KMO, and Cronbach's alpha tests were applied by using IBM SPSS-23 for the analysis. Results of the study show that cheating can be minimized by having MCQs type paper with equations and higher-order short questions-answers. Moreover, the use of software like LMS would be beneficial.

Keywords: COVID-19, Cheating, Education, Online Exams

Article Publication

Published Online: 14-Feb-2021

*Author's Correspondence

Nawaz Abdul Rehman

Student, Department of Economics,
University of the Punjab, Lahore 54590 &
Pakistan

✉ abdulrehmanar1242@gmail.com

© 2021The Authors. Published by *Research Review Journals*

This is an open access article under the CC BY-NC-ND license

(<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

1. Introduction

Assessing the students after teaching them- either online or physical- has been the favorite practice of teachers. Online and physical exams are the two most important ways to assess the students. The ideal exam reckons the student's capabilities and problem-solving ability. The concept of the online education system came into light in the 1970s and over time, it gained more importance (Keegan, 1996). More institutions moved towards the online examination system during the COVID-19 pandemic. COVID-19 spread like havoc and all the activities of the people including educational activities are disturbed. Since people are directed to maintain social distancing all across the globe resultantly; the online examination system gained more importance during the pandemic. This article covers how the online examination was like and how cheating (which is of major concern) can be minimized. One of the benefits of the online system is that it helped students to stay in touch with the studies.

Cheating has been the major concern of teachers in the examination history. Similarly, cheating is the major flaw of online exams that needs to be fixed. Suppose student A is hardworking while student B is dull who does not prepare for the exam. In physical exams, student A gains 100% while student B scores only 25% by using his abilities, but in online exams, B also scores 100% like that of student A which means that 75% of the marks he/she gains by cheating. It can be minimized with the help of some techniques. This article explains the ways how we can minimize cheating. If this system is improved using cheating minimizing techniques, this can be used further after the pandemic because even with cheating about 37% of students want online in the future. It reduces the time and cost of both the institution and the students.

2. Literature Review

The exam in which students and teachers are physically separated and connect with the help of the internet is called an online exam. It has gained importance, particularly during the COVID-19 pandemic. Similarly, the use of material that is considered

unsuitable for academic assignments is called cheating. Any activity of the student regarding exams that violates the institutional law is called cheating. It can be minimized by using the g-factor technique i.e. providing students with different questions within the same period.

The study shows that the practice of cheating can be minimized by using the phenomenon of shuffling the paper. Student A is given Question-1 then at the same time, Question-2 should be provided to student B (Nizam, Gao, Li, Mohamed, & Wang, 2020). This method can minimize cheating but it cannot completely eradicate it. Various techniques can be applied to minimize cheating.

Another research proposes that online cheating can be minimized by using a fingerprint ID. Not any two persons in the world have the same fingerprint. Moreover, an eye tracker is also a very useful method to locate cheating. Tracker focuses on the eye movement whenever the examinee looks around the window (Bawarith, Basuhail, Fattouh, Gamalel-Din, & Applications, 2017). The online exam is better to minimize cheating as compared to traditional exams because there is a lot of software and apps which keep an eye on the student doing a paper and help minimize cheating.

According to Bilen, Matros, and Organization (2021), online cheating can be minimized by having a camera located on the front which will enable the administrator to watch every move of the examinee and he will also be able to see things in the room in which the examinee is conducting the paper. According to Moten Jr, Fitterer, Brazier, Leonard, and Brown (2013) cheating can be mitigated if questions are Essay-type with optimum time so that the examinee will not be able to cheat. Short time does not provide examinee the chance to search for the topic on the internet. Even if students get a chance to search for the internet, cheating can be minimized by creating a fake website. It would show wrong answers to the examinee which he/she will be looking for. After getting the wrong answers, the examinee will not dare search the internet again. Moreover, Class mode can be helpful to minimize cheating.

According to Cluskey Jr, Ehlen, Raiborn, and Ethics (2011), there are few online exam control procedures (OECF) that help to minimize cheating. Only one MCQ should be available to the student for a certain period. When he/she has dealt with that, then the next MCQ should be provided. It will help greatly to minimize cheating. The student should be allowed to take the exam only once. Reset should not be allowed by the administrator in any case except that of genuine one as the reset (second term) will enable him to answer all the questions correctly. The instructors must use software like Blackboards Responds Lockdown Browser (RLB) for taking exams. RLB indicates when a student leaves the window to search for the answer. These procedures will help to reduce cheating. These are the ways that are very effective in minimizing cheating.

3. Selection of the Topic

During COVID-19, an online education system has prevailed all across the globe. But along with the benefits of the online system (as the crucial year of the students is saved), there is a huge disadvantage which is cheating. Students use much more modern ways to cheat in the online exams that one cannot think of. This topic is considered to be important because it is necessary to make the online system as clear of cheating as possible. Some of the solutions have been proposed to minimize cheating which will help in the future.

4. Methodology

A research methodology is a specific technique or procedure used to identify, select, process, and analyze information about the topic. For that purpose, a convenience sampling technique is used to collect the responses from the students of different universities in Lahore. A total sample of 130 respondents is collected and analyzed by SPSS-23. All of the respondents were approached by using different social media apps.

5. Sample and data collection

The data through a Google-form (questionnaire) is collected from students belonging to a different gender, age, and education groups in Lahore. Students are posed with close-ended questions. The questionnaire is uploaded on Google forms, from where anyone with the link could open the form and give his/her response. A total of 130 students returned the response with complete answers. A Convenience sampling technique is used. Since Pakistan is facing a countrywide lockdown due to the COVID-19 pandemic, so Convenience sampling method is found to be appropriate to use.

5.1. Demographic profile

Tables 1, 2, and 3 provide the frequency and percentages of demographic characteristics of the respondents. There are 88 males (67.7 %) and 42 females (32.3 %) among the respondents. A total of 130 respondents recorded their responses.

Table-1
Frequency and percentage table for demographic variable gender.
Gender

Variables	frequency	Percentage
Male	88	67.7
Female	42	32.3
Total	130	100

Among the respondents, 18-23 age group are 116 in frequency which is about 89.2 in percentage measure, which is followed by 24-29 age group with 13 frequencies and 10.0%, and 30-35 age group with 1 frequency and .8%.

Table-2
Frequency and percentage table for demographic variable age.
Age

Variables	frequency	Percentage
18-23	116	89.2
24-29	13	10.0
30-35	1	0.8
36-40	0	0.0
Total	130	100

Those respondents which are in bachelors' level of education are 100(76.9%), followed by Masters which are 20 (15.4%), followed by M.Phil. which are 9 (6.9%). There is only 1 (0.8%) Ph.D.

Table-3
Frequency and percentage table for demographic variable education.
Education

Variables	frequency	Percentage
Bachelors	100	76.9
Masters	20	15.4
M.Phil.	9	6.9
PhD	1	0.8
Total	130	100

6. Results and finding

6.1. KMO and Bartlett's test

Table 4 provides the results of two tests i.e. KMO and Bartlett's test. KMO test is used to check the adequacy of data for factor analysis. The findings show that the KMO test value is 0.746 which is greater than the benchmark value of 0.7, which means the sample is adequate.

Table-4
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.746
Bartlett's Test of Sphericity	Approx. Chi-Square	1431.312
	Df	378
	Sig.	.000

The Bartlett test of sphericity is a statistical test used to verify the null hypothesis which states that variances are equal across groups or samples. This test is used to test if k samples are from the populations with equal variances and whether a factor analysis may be useful with the data.

The null hypothesis for the test is that the variances are equal for all samples. In statistics terms, that's: $H_0: \sigma_1^2 = \sigma_2^2 = \dots = \sigma_k^2$
the alternate hypothesis is that the variances are not equal for at least one pair or more: $H_1: \sigma_1^2 \neq \sigma_2^2 \neq \dots \neq \sigma_k^2$

The results of Bartlett's test show that the value of significance level is less than 0.05, which means there is at least one significant correlation between two of the items. So, it rejects the null hypothesis, and a factor analysis would be useful with the data.

6.2. Cronbach's alpha test

It is used to assess the reliability of test items. In other words, the reliability of any given measurement refers to the extent to which it is a consistent measure of a concept, and Cronbach's alpha is one way of measuring the strength of that consistency. This test is most commonly used there are multiple Likert questions in a questionnaire. This test is very appropriate to check the reliability of our questionnaire because our questionnaire consists of Likert-type questions.

Table-5
Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.827	.821	28

In our case, we can see that Cronbach's alpha is 0.827, which indicates a high level of internal consistency for our scale.

Table-6
Students' responses in % about examination content

Exam content ↓	Strongly disagree	disagree	neutral	Agree	Strongly agree
Exam content was relevant to the topic studied in online classes	11.5	20.0	17.7	47.7	3.1
Exam workload was appropriate	7.7	22.3	30.0	34.6	5.4
Exam was easy and concise	8.5	34.6	23.8	27.7	5.4
Exam pattern was pre-determined	8.5	13.8	23.8	44.6	9.2
Exam set up helped students to achieve their satisfaction level	12.3	27.7	26.2	26.9	6.9

As per the responses recorded, almost 1/4th of students hold no strong opinion about the content of online examination; they remain unaffected with the scheme of exam being clear and organized. And almost 40 to 45% of students are giving feedback that the content of the online examination is quite appropriate for them. And 30 to 35% of students' are saying that exam content is not appropriate. Therefore, we can conclude that overall exam content during online exams is not bad but we can make it better by making exams easy, concise, and reducing the workload of the exam.

Table-7
Students' responses in % about attitude

Attitude ↓	Strongly disagree	disagree	Neutral	Agree	Strongly agree
Students do more cheating in online exams	9.2	13.1	11.5	34.6	31.5
It is important to report students who cheat during exams	9.2	11.5	23.8	36.2	19.2
It is always wrong to cheat during exams	9.2	6.9	13.8	46.2	23.8
Students can cheat during exams if they can get chance	6.2	9.2	20.8	44.6	19.2
I have allowed another student to copy my work during	18.5	25.4	20.0	28.5	7.7

exams					
I never cheated during online exams	16.2	26.9	26.2	22.3	8.5
If I wanted to cheat during the exam, it would have been easy	6.9	16.9	28.5	33.1	14.6
Some invigilators don't mind if students cheat or not during an online exam	10.0	26.9	23.1	30.8	9.2

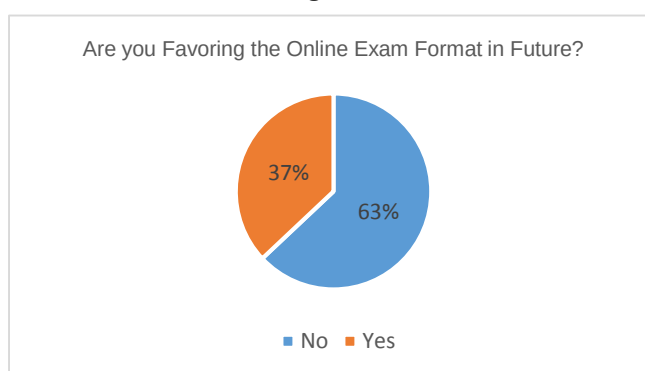
As per responses recoded, it is obvious that students do more cheating in online exams as compare to traditional exams, despite that they consider it as a wrong act, and also favoring to report the cheaters to invigilators. We can observe from students' responses that cheating in online exams is a not difficult task. Students also allowed others to copy-paste their work.

Table-8
Students' responses in % to minimize cheating in online exams

Minimize cheating ↓	Strongly disagree	disagree	Neutral	Agree	Strongly agree
Multiple choice questions with equations for a limited time can minimize cheating	12.3	21.5	20.0	36.9	9.2
Open book exam help to minimize cheating	13.8	23.8	22.3	26.2	13.8
Higher-order thinking short answers question, with limited time, can help to minimize cheating	10	16.2	19.2	41.5	13.1
By using software like LMS (safe browser) can minimize cheating	9.2	13.1	31.5	36.9	9.2

And the question about the online examination system whether it continues in the future or not is also asked and responses are shown by pie chart diagram. A total of 37% of respondents favoring the online format in the future, this is a good number in quantity. Therefore, we should do some work to minimize cheating in online exams to bring transparency in an online format.

Figure-1



7. Discussion

The exam should be open book. The survey result shows that 40% of the students believe that open-book exams can minimize cheating while 47% of students propose that using safe browsers like LMS can minimize cheating. The student should be given simple questions and limited time to solve them. In this way they will not waste time searching for the answer on the browsers, instead, they will use their mind to answer. If the paper set is multiple choices (MCQ) type, then each question should be inculcated with mathematical equations. Around 46% of the respondents think that it will minimize cheating. MCQ, s with equations when searched on the browser do not give desired results which will help minimize cheating. Based on the survey that has been conducted, 68% of the students believe that the online system is not as effective as the on-campus system. Students do more cheating in online exams. About 66% of the students had the opinion that students do more cheating in online exams.

8. A Way Forward

From these responses, it is concluded that there are several ways to minimize cheating in the online examination system. But based on observations, there are two best ways to minimize cheating

Firstly, multiple-choice questions with equations for a limited time, using software like LMS, is the best way to minimize cheating because in this method students have limited time to solve the multiple-choice question, and these types of questions are not easy to tackle. LMS doesn't allow them to communicate with other fellows. Multiple choice questions with equations are also a good criterion for the assessment of the students. Moreover, this method is convenient for instructors.

Secondly, higher-order thinking short answers question, with limited time can minimize cheating. Time must be limited for higher-order thinking questions and the next short question comes after the solving of the previous question, it would not allow students to cheat during online exams.

And the question about the online examination system whether it should continue in the future or not? is also asked and responses are shown by pie chart diagram. A total of 37% of respondents favoring the online format in the future, this is a good number in quantity. Therefore, we should do some work to minimize cheating in online exams to bring transparency in an online format.

9. Conclusion

The online examination system has been encouraged during the COVID-19 pandemic. It helped institutes to reckon students. But there is a high risk of cheating during online exams which needs to be fixed. Software like LMS help to identify students doing cheating because when students move to the other website, this software show an alarm to the invigilator, and cheating. Moreover, an open-book exam with limited time as well as multiple-choice questions with equations is also helpful to minimize cheating. If the invigilator asks the students to share screens of the laptops or phones, it will be more beneficial. In this way, all the activities of students will be visible to the invigilator and students will avoid cheating.

10. Limitations

This study has few limitations. Firstly, it is based on three variables, importance, responsiveness, and attitude. Secondly, it is conducted in Lahore, Pakistan. Future researchers can conduct it in different cities with different variables.

Acknowledgment

The authors would like to acknowledge the Department of Economics, University of the Punjab, Lahore 54590, Pakistan. Moreover, the authors would like to Thank Dr. Saira Hanif for her valuable suggestions.

Authors Contribution

All authors contributed equally in designing, data collection, assimilation, and writing of this manuscript, and the final version was read and approved by all authors.

Conflict of Interest

The authors declare no conflict of interest.

References

1. Bawarith, R., Basuhail, A., Fattouh, A., Gamalel-Din, S. J. I. J. o. A. C. S., & Applications. (2017). E-exam cheating detection system. *8*(4), 176-181.
2. Bilen, E., Matros, A. J. J. o. E. B., & Organization. (2021). Online cheating amid COVID-19 . *182*, 196-211.
3. Cluskey Jr, G., Ehlen, C. R., Raiborn, M. H. J. J. o. A., & Ethics, B. (2011). Thwarting online exam cheating without proctor supervision. *4*(1), 1-7.
4. Keegan, D. (1996). *Foundations of distance education*: Psychology Press.
5. Moten Jr, J., Fitterer, A., Brazier, E., Leonard, J., & Brown, A. J. E. J. o. E.-I. (2013). Examining online college cyber cheating methods and prevention measures. *11*(2), 139-146.
6. Nizam, N. I., Gao, S., Li, M., Mohamed, H., & Wang, G. (2020). Scheme for Cheating Prevention in Online Exams during Social Distancing.

Appendix

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.827	.821	28

IMPORTANCE section 1

Cronbach's Alpha	N of Items
.749	5

Responses of examiner and**Exam content section 2**

Cronbach's Alpha	N of Items
.872	10

Attitude and way to minimize**cheating section 3**

Cronbach's Alpha	N of Items
.725	13

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gender * Education	130	100.0%	0	0.0%	130	100.0%

Gender * Education Cross tabulation

			Education				Total
			Bachelors	Masters	M.Phil.	PhD	
Gender	Female	Count	31	9	2	0	42
		% within Gender	73.8%	21.4%	4.8%	0.0%	100.0%
		% within Education	31.0%	45.0%	22.2%	0.0%	32.3%
		% of Total	23.8%	6.9%	1.5%	0.0%	32.3%
	Male	Count	69	11	7	1	88
		% within Gender	78.4%	12.5%	8.0%	1.1%	100.0%
		% within Education	69.0%	55.0%	77.8%	100.0%	67.7%
		% of Total	53.1%	8.5%	5.4%	0.8%	67.7%
Total	Count	100	20	9	1	130	
	% within Gender	76.9%	15.4%	6.9%	0.8%	100.0%	
	% within Education	100.0%	100.0%	100.0%	100.0%	100.0%	
	% of Total	76.9%	15.4%	6.9%	0.8%	100.0%	

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.447 ^a	3	.485
Likelihood Ratio	2.703	3	.440
Linear-by-Linear Association	.005	1	.942
N of Valid Cases	130		

a. 3 cells (37.5%) have an expected count less than 5. The minimum expected count is .32.

Symmetric Measures

	Value	Approx. Sig.
Nominal by Nominal Phi	.137	.485
Cramer's V	.137	.485
N of Valid Cases	130	

Factor Analysis**KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.746
Bartlett's Test of Sphericity Approx. Chi-Square	1431.312
df	378
Sig.	.000

Communalities

	Initial	Extraction
Institutions moved more toward online system during COVID-19	1.000	.196
Online examination system is more effective than physical	1.000	.681
Online courses have the same quality as face-to face courses	1.000	.498
To enjoy online learning significantly more than traditional classroom	1.000	.428
There a lot of benefits of online exams over traditional exams	1.000	.508
Paper was set up in appropriate way	1.000	.548
Instructions were clear, as easy to follow	1.000	.571
Examiner was available for help	1.000	.480
Students were facilitated in online exam by the examiner	1.000	.464
Grading was prompt and had useful feedback given after exam	1.000	.463
Exam content was relevant to the topic studied in online classes	1.000	.444
Exam workload was appropriate	1.000	.355
Exam was easy and concise	1.000	.408
Exam pattern was pre-determined	1.000	.367
Exam set up helped students to achieve their satisfaction level	1.000	.570
Students do more cheating in online exams	1.000	.549
It is important to report students who cheat during exams	1.000	.304
It is always wrong to cheat during exams	1.000	.339
Students can cheat during exams if they can get chance	1.000	.317
I have allowed another students to copy my work during exams	1.000	.300
I never cheated during online exams	1.000	.294
If I wanted to cheat during exam, it would have been easy	1.000	.428
Some invigilators don't really mind if students cheat or not during online exam	1.000	.173
Multiple choice questions with equations for limited time can minimize cheating	1.000	.526
Open book exam help to minimize cheating	1.000	.281

Higher order thinking short answers question, with limited time can help to minimize cheating	1.000	.637
By using software like LMS (safe browser) can minimize cheating	1.000	.339
Are you favoring the online exam format in future?	1.000	.459

Extraction Method: Principal Component Analysis.

Rotated Component Matrix^a

	Component		
	1	2	3
Instructions were clear, as easy to follow	.751		
Paper was set up in appropriate way	.734		
Exam set up helped students to achieve their satisfaction level	.712		
Examiner was available for help	.658		
Grading was prompt and had useful feedback given after exam	.637		
Exam content was relevant to the topic studied in online classes	.630		
Students were facilitated in online exam by the examiner	.626		
Exam was easy and concise	.614		
Exam pattern was pre-determined	.594		
Exam workload was appropriate	.581		
Institutions moved more toward online system during COVID-19	.354		
Online examination system is more effective than physical	.303	-.765	
Students do more cheating in online exams		.651	.352
Are you favoring the online exam format in future?		.636	
There a lot of benefits of online exams over traditional exams	.387	-.593	
Online courses have the same quality as face-to face courses	.402	-.576	
Students can cheat during exams if they can get chance		.535	
If I wanted to cheat during exam, it would have been easy		.527	
To enjoy online learning significantly more than traditional classroom	.460	-.465	
I have allowed another students to copy my work during exams	.332	.434	
I never cheated during online exams		-.402	.355
Higher order thinking short answers question, with limited time can help to minimize cheating			.792
Multiple choice questions with equations for limited time can minimize cheating			.716
It is always wrong to cheat during exams			.568
By using software like LMS (safe browser) can minimize cheating			.548
Open book exam help to minimize cheating			.509
It is important to report students who cheat during exams			.502
Some invigilators don't really mind if students cheat or not during online exam			.327

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.^a

a. Rotation converged in 5 iterations.

Component Transformation Matrix

Component	1	2	3
1	.911	-.302	.282
2	.073	.789	.609
3	-.407	-.534	.741

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser

Normalization.