Academic Environment from Homogenous to Heterogonous: The Effect of Covid-19 on Students' Performance

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ABSTRACT

Covid-19 forced students to leave their educational institutions toward their original living place, and they moved from an undifferentiated environment to a differentiated one. The environmental change due to Covid-19 brought many concerns about learning loss and vulnerable students in distance learning. The study investigates students' GPA data before and during Covid-19 to see how this environmental change has affected the GPA distribution among college students during Covid-19. The data consists of 537 students from the School of Law at Sultan Qaboos University SQU who attended the Spring 2019 and Spring 2020 semesters before and during the Covid-19 outbreaks. The study reveals that the students' environmental change during Covid-19 has affected their performance, and several students' subgroups are more vulnerable than others. The students' performance differences in distance learning decreased compared to face-to-face learning, revealing a convergence trend in performance. Male students seem to be less vulnerable in distance learning than their female students' counterparts. Most of the changes in students' performance during Covid-19 are led by male students, especially in poor and excellent performance categories. Specifying the most susceptible students benefits policymakers in the education field, which precisely aims at helping the most vulnerable students in distance learning.

Keywords: Environmental change, Academic performance, Pandemic, Distance learning.

INTRODUCTION

Undoubtedly, the Covid-19 pandemic has hugely changed our activities, especially social aspects. Higher education is one sector that has been dramatically affected by the pandemic. Governments worldwide have put different restrictions on face-to-face teaching, extraordinarily affecting larger populations of students for the first time in history (UN, Education during COVID-19 and beyond, 2020). While acknowledging the public health benefit gained from the closure of colleges, specifying the most vulnerable students could calculate the cost of this closure.

The environmental change that students experienced due to COVID-19 as they move from the university environment to their home living environment, fairly to say, leads to differences in their academic performance. Typically, several determinants contribute to students' performance, such as educational status and other demographic factors (Ro & Knight, 2016). Female students outperform their male counterparts in different levels of schooling (Buchmann & DiPrete, 2006). In addition, students with more earned credit hours tend to be more informed about the profession, have already adjusted to the college system(Elias, Noordin, & Mahyuddin, 2010), and are expected to perform better than those with less earned credit hours. Moreover, the impact of gender differences on performance may vary between senior and first-year students (Atman, et al., 2010).

With universities don't discriminate in offering services to their students, academic performance differences before Covid-19 are fair to say that they are not related to differences in a schooling environment. Then, Covid-19 forced students to leave their university's homogenous environment and be subject to various living environments. Thus, we may suspect that the magnitude effect of the performance determinants may not remain the same in distance learning during Covid-19.

It is worthwhile to investigate how students' performance determinants have changed during Covid-19. The pandemic imposes many changes due to the need for physical separation and all other changes resulting from students switching from a university environment to their family or living environment. University life provides one standard setting for all students and equal access to resources within the university. On the contrary, Covid-19 forced all students to scatter along a wide geographical area as they returned to their original accommodation, which caused students to be vulnerable to a broader range of differences. For instance, male and female students may encounter different social responsibilities (Canney & Bielefeldt, 2015) based on their living areas. In addition, the lack of resources in students' living areas may affect their performance (Murillo & Roma´ n, 2011).

The study intends to work on administrative students' college data before and during Covid-19 to understand the structure of determinants that proportionally explain students' performance differences and see how these determinants' effects have changed during Covid-19. This study is structured as follows; Section 2 surveys the related literature. Section 3 states the SQU students' environmental change due to Covid-19. Section 4 illustrates the data and methodology of the study. Sections 5 and 6 discuss the results and summarize the discussion.

LITERATURE REVIEW

Higher education in distance learning format is not new and has existed before the Covid-19 pandemic. Previously academic institutions designed distance learning to attract non-traditional students to improve the graduation rate (Allen & Seaman, 2007), increase higher education access, and provide an alternative to students where tuition and other expenses are an obstacle (Lips, 2010). However, the unique elements that Covid-19 has brought are that distance learning requires physical separation, and in addition, it is not a student choice. Students before Covid-19 willingly enroll in online education for several reasons, such as time constraint issues ((Dutton, Dutton, & Perry, 2002); (Grimes & Antworth, 1996)); ability to work ((Dutton, Dutton, & Perry, 2002); (Mattes, Nanney, & Coussons-Read, 2003)), and mitigating home responsibilities ((Conklin, 1997); (Grimes & Antworth, 1996)).In addition, distance learning provides an excellent opportunity to integrate academic education and work experience(Qureshi, Morton, & Antosz, 2002).

Motivation is a crucial element of students' performance; a sample of undergraduate students (MacBrayne, 1995) found that younger students enjoy face-to-face learning with their classmates and instructors and are more motivated. Also, male students are intrinsically more motivated to complete online courses than female students. (MacBrayne, 1995) refers to lower motivation in young (18-22 years) distance learning students than those 31 and above. Most students who have chosen distance learning are older, self-motivated, and under elevated pressure (i.e., family/work) (Qureshi, Morton, & Antosz, 2002).

Distance learning students often differ from face-to-face students when both types are available choices. The Covid-19 outbreak has made distance learning the only option for students. Traditional instructors must experience difficulties with distance learning instructions, which may be more stressful than regular classes (Klapproth, Federkeil, Heinschke, & Jungmann, 2020). Distance learning during Covid-19 has indicated the conventional advantages evidenced before the coincidence; flexibility, accessibility, comfort (Mukhtar, Javed, Arooj, & Sethi, 2020), and money-saving(Manea, Macavei, & Pribeanu, 2021). However, relevant

literature doesn't explicitly indicate if the shared educational environment that Covid-19 ends influences students' performance on an aggregation or individual bases.

The traditional gender role reveals that male students fall behind their female counterparts in performance, and male students are less motivated and less engaged (Butler, 2014). However, these traditional findings may have changed during Covid-19 as the latter causes physical separation, environment living change, and social obligation that may disproportionally affect male and female students. Thus, the interest in gender effects has been updated during the Covid-19. (Vargas-Ramos, et al., 2022), Using questionnaire data from college students' samples has found that students' performance during Covid-19 has improved; family interaction, parental supervision, and leisure activities may have led to this performance improvement.

On the demographic bases, females with no failed courses and a low risk of alcohol consumption achieve the best academic performance. (Korlat, et al., 2021) utilized a questionnaire dataset collected in April 2020 on Austrian secondary schools to quantify gender differences in digital learning during Covid-19. Participants answered questions based on gender and gender attributes regarding their perceptions of competence belief, intrinsic value, engagement, and teacher support during school closure. The study finds that girls scored higher in inherent value, employment, and perceived support, where results on competence beliefs are insignificant. (Yu, 2021) studies the role of gender, educational level, and personality traits on learning outcomes through interview data collected from a Chinese public university during the Covid-19 pandemic. The study regression results reveal that gender doesn't contribute to learning outcomes, presumably, because of offset forces due to the superiority of male students in some online learning aspects and the inferiority of others in favor of female students. The educational levels are significantly associated with a positive view of online learning.

(Alghamdi, Karpinski, Lepp, & Barkley, 2020) examine the effects of multitasking (such as texting, emailing, and playing games) on learning outcomes through students' self-efficacy beliefs in male and female university students. The study sample consists of 278 students who revealed their perceptions regarding the investigation in physical and virtual classroom formats. Females experience fewer effects of online multitasking on GPA than males do.

Our study is like the growing literature on students' performance determinants during Covid-19 ((Korlat, et al., 2021) (Yu, 2021); (Alghamdi, Karpinski, Lepp, & Barkley, 2020)). In contrast, our study relies on administrative data, not participants' self-reported, where sometimes academic performance gets overstated because of the social desirability of the participant (Alghamdi, Karpinski, Lepp, & Barkley, 2020). Moreover, several studies investigate the role of personality traits on students' learning outcomes, with virtually no studies accounting for students' initial academic performance before online learning.

In addition, our data is not one point in time dataset where participant provided their perceptions regarding their performance during the pandemic; instead, we rely on administratively collected data from two points in time for the same set of students. One point before the pandemic serves as the initial status of our variables. The other point of data collection is to measure these variables during Covid-19. Finally, our study includes induces that account for students' living environment during Covid-19. These indices are the population of the students' living district, the number of small and medium businesses, and the student's destination from the SQU, as the feeling of institutional presence, may affect students' perception of learning outcomes (Shin & Chan, 2004).

SQU Students Environmental Change Due to Covid-19

Like most universities worldwide, the SQU decision to suspend face-to-face learning occurred in the Spring of 2020 (UN, Education during COVID-19 and beyond, 2020). All students must leave the SQU campus per the university protection plan to deal with the pandemic. SQU is committing to providing an equal

opportunity to its students to enjoy the university's valuable resources. However, due to the pandemic measurements, students may not enter the university, and teaching has changed to distance instruction. Thus, maintaining this commitment has become a challenge for the university.

Before Covid-19, all students equally enjoyed the great resources of the SQU alike. All students enjoy the university's library, transportation, free internet services, bookstore and supplies, and other facilities. In distance learning, due to Covid-19, students are more vulnerable to the availability of resources and their different environment, which may affect their performance (EU, 2017). The quality and availability of educational services are essential for students' performance; however, such services probably differ across cities and towns (Felder, Mohr, Dietz, & Baker-Ward, 1994). Thus, the student's performance may vary on their living location during Covid-19.

In addition, male and female students could experience different obligations and responsibilities relative to the campus. There are no prior expectations of whom would be more socially engaged with families and relatives. Still, we can expect differences in the time allotted and the environment students encounter compared to SQU life. Teaching face-to-face is an environment that promotes students' willingness to compete. The distance learning instructions due to the pandemic may differently impact students' motivation (Hobson & Puruhito, 2018).

Moreover, students' motivation in learning may vary depending on the number of credits remaining. The student's concerns regarding the GPA level probably increase as the student gets closer to graduation (Atman, et al., 2010), while students in the first year may suffer the unfamiliarity of the profession and are more vulnerable to losing interest. Several factors contribute to SQU students' performance and being affected by learning environmental change due to Covid-19.

DATA AND METHODOLOGY

Participants

Our data sample consists of the school of law students at SQU who enrolled in Spring 2019 and Spring 2020. The college provides us with approximately 1,200 students' data[1] for each semester. However, many students only appeared either in Spring 2019 or Spring 2020 because of new enrollment students in Spring 2020, graduated students in Spring 2019, or students who temporarily or permanently withdrew in either of the semesters. For a better comparison, we have restricted our dataset only to include students who attend Spring 2019 and Spring 2020. Although this procedure has reduced our dataset from around 1200 students to 537 students, it allows us to see how the Covid-19 pandemic has changed student performance during the students' environmental change while controlling students' characteristics and preferences.

The courses that students may enroll in vary in classification. The classes are classified into college requirements, college electives, university electives, and university requirements. Usually, the availability and variety of the courses are balanced across semesters to provide multiple choices in each category to the students. In addition, the common practice among academic supervisors and the dean's office of undergraduate studies is to encourage students to have different course classifications when enrolling each semester. Thus, it is more likely that students' performance differences in the Spring of 2019 and Spring of 2020 due to course selection are tiny.

Variables and Procedure

Accumulated GPA (the dependent variable) is the student's accumulated GPA achievement out of 4 points. The observed accumulated GPA contains all the student's performance history since enrollment. The GPA for Spring 2019 reflects the student's performance in all credits earned since registration, and so does the

GPA for Spring 2020. The accumulated GPA for Spring 2020 contains the one of Spring 2019 plus Fall 2019 and Spring 2020. Thus, our interest is in the differences between the Spring 2020 parameters with the one of Spring 2019, with a limitation that we include the GPA difference of Fall 2019 within online learning differences. However, as the length of the student's performance history increases, this limitation effect should be minimized.

We have six independent variables that contribute to students' performance differences. *Gender* is a dummy variable that takes one if a student is male and 0 if the student is female. *Distance* is the number of kilometers of the student's living home to the SQU; this variable is calculated through Google Maps, where the student's living place is according to the college records. *Credit earned* is the number of credit hours the student earns since enrollment; this variable test whether students' familiarity with the profession can be an advantage over others in performance before and during the Covid-19 pandemic. *Credit remained* is the number of credit hours remaining to graduation; this variable considers the assumption that students may increase their performance as they get near graduation. The population is the population of the student living district; this variable is constructed by setting the corresponding population to each student's living community. The time allotted to study may vary based on the population in the residing area. *No. SME*: the number of small and medium enterprises in the student living district; this variable accounts for services available across students' living areas during the Covid-19. The *population* and *No. SMEs* are obtained through the (NCSI Oman, 2020) June 2020.

The study applies descriptive and regression analysis to investigate the students' performance differences during environmental change due to Covid-19. First, we illustrate the dependent variable distribution parameters to define the changes in students' learning outcomes before and during Covid-19. Second, we employed multiple cross-sectional regressions to account for students' GPA differences between Spring 2019 and 2020 due to the environmental transition of students' lives. We utilize the following equation to account for the magnitude effect of the students' performance indicators contributing to GPAs. These indicators are gender, credit remaining, credit earned, destination, population, and SME businesses. The following equation is tested to investigate the magnitude of these indicators in each student's face-to-face SQU environment and distance learning environment.

$$GPA_i = \alpha + \beta Gender_i + \partial CerditEreaned_i + \gamma Credit.Remained_i + \delta Destination_i + \mu Population_i + \rho SME.businesses_i + e_i \quad (1)$$

Where: e is the error term; *i*: the student order takes a value from 1 to 537. We are interested in the coefficients of each regression to assess each learning system but, more importantly, in the differences between the results of the two regressions. Finally, we move to investigate the performance differences by performance subgroups; we test if the impact of our independent variables varies across different students' performance levels. In other words, we will try to determine whether the academic environment change has a common effect on all students or if it differs as students' performance varies. Thus, we proceed with quantile regressions for both face-to-face and distance learning instructions.

Our analysis is cross-sectional, but the essence of accumulated GPA reflects the historical performance of all credit hours a student completed. The study compares the performance results of two points in time (before and during Covid-19); however, the variations being explained is the student history of their performance in college.

RESULTS

Descriptive Results

The data sample of 537 students consists of 47.86% male and 52.14% female. The variable that we seek to

explain its variation is the accumulated GPA for Spring 2019 and Spring 2020. This variable tracks the same students set before and after the Covid-19 outspread. Below are the descriptive statistics of the accumulated GPA for Spring 2019 and Spring 2020 and a distribution graph. The descriptive statistics reveal an increase of 4% in the Spring 2020 average earning GPA compared to Spring 2019. More importantly, the deviation away from the mean has decreased in Spring 2020 relative to Spring 2019, indicating that the Student's GPA is less scattered.

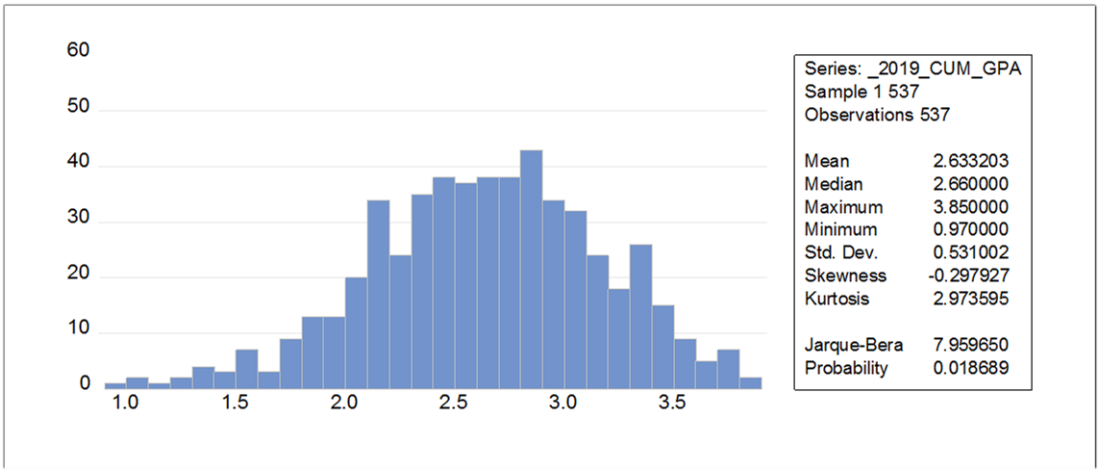

Figure. 1 Accumulated GPA distribution Spring 2019

Alt text. 1 Histogram and descriptive statistics of 2019 students' accumulated GPA. The distribution refers to an almost symmetric pattern.

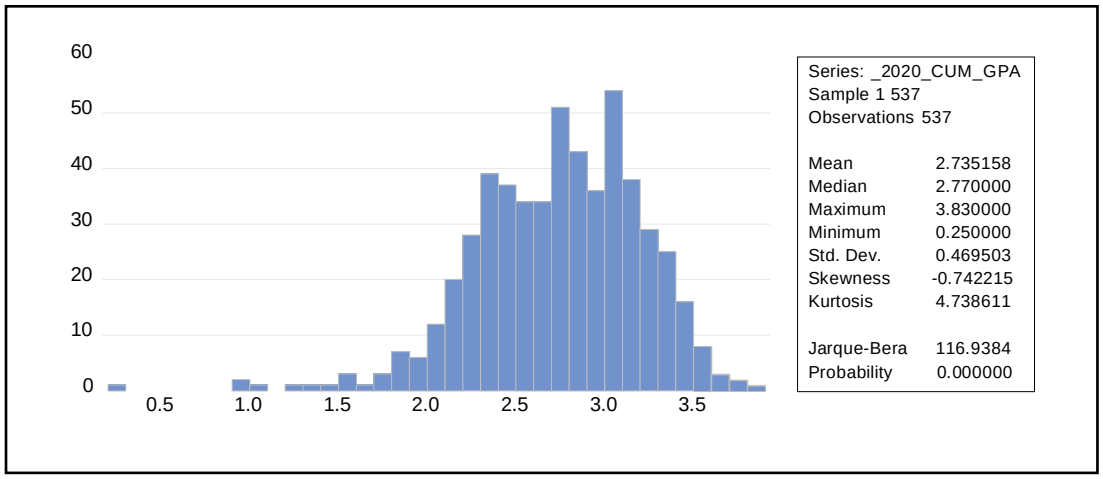

Figure.2 Accumulated GPA distribution Spring 2020

Alt text. 2 Histogram and descriptive statistics of 2020 students' accumulated GPA. The distribution refers to high kurtosis.

Finally, the GPA distribution in Post-Covid-19 is more negatively skewed than in Pre-Covid-19. Comparing the two semesters reveals that the Spring 2020 GPA distribution possesses higher kurtos is than the Spring 2019 GPA distribution. In other words, the student's performance differences narrowed in Spring 2020, which could imply difficulties in implementing efficient assessment methods in distance learning. Or it may indicate that distance learning is less competitive, so students don't compete as they do in the class, which may lower their performance differences. If this is the case, we may expect that students on the tail of the performance distribution (poor and excellent performed students) have converged to the center of the

distribution.

Regression Results

Table 1 represents three regressions for each semester; column 1 in both semesters includes one variable, the gender effect. Columns 2 and 3 alternately add the remaining and earning credit to the central equation. We start with a single dummy regression to account for students' gender effects on face-to-face and distance learning, column 1 in Spring 2019 and Spring 2020. Our results of the gender effect of Spring 2019 align with the conventional findings that female students outperform their male counterparts. However, this gap between female and male performance has narrowed, as the gender coefficient of Spring 2020 indicates. It seems that this environmental change due to Covid-19 works in favor of male over female students. Females are probably more socially engaged with families and relatives in distance learning.

As expected, the credit remains hours coefficient has a negative sign, as the students closer to graduation tend to attain higher GPAs. The magnitude effect of this coefficient does not seem to change for students before and during Covid-19. The credit-earned hours seem to have the same impact on both semesters; students with more credit hours tend to have higher GPAs. It could be logical that the student with a long time spent is more dedicated to studying than those with limited hours earned before the coronavirus outbreaks. Moreover, students with more credit earned probably completed most core courses before Covid-19 and are better informed about the profession than those who took the core courses in distance learning. There fore, students who experienced Covid-19 in the first year of college went through a more challenging stage than those in later years of schooling.

Through Spring 2019 and Spring 2020 tests, the R-squared level ranges between 13% to 15% of the GPA variations. Other factors influence the student's performance, such as time allotted to study, social environment, parents' education levels, family financial status, etc.; unfortunately, such information is unavailable.

Table 1. Cross-sectional regressions for students' GPA performance

	Spring 2019 (Face-to-face)			Spring 2020 (Distance)		
	[1]	[2]	[3]	[1]	[2]	[3]
Female	2.82	2.95	2.74.	2.89	2.96	2.81
performance (a)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Male performance	-0.39	-0.38	0.38	-0.33.	-0.32.	-0.32
difference (b)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Remained hours	-0.002			-0.001		
	(0.00)			(0.00)		
Earned hours	0.002			0.0012		
	(0.02)			(0.06)		
Observations	536			537		
R-squared	16%			14%		

***Note**: Accumulated GPA is the dependent variable. *P* values in parentheses

Table 2 represents a similar regression analysis to the one in Table 1. We add three variables to distance learning regression: students' destination, population, and No. SME to account for the student's GPA differences and whether these variables can explain student performance changes after Covid-19 outbreaks. The results reveal that destination has no significant effects on student performance, which is logical. For

example, a student who lives 50 kilometers away from SQU but has a poor internet connection would be worse off than a student who lives 1000 kilometers away but has a better internet connection. The population variable shows a negative effect on the performance of distance learning students, possibly reflecting that a crowded district seems time-consuming to the students' allotted studying time. On the contrary, the number of businesses indicates a positive effect on a student's performance in distance learning that could reflect the student's need for educational resources, services, and supplies that vary depending on the number of businesses in the student's living area.

Table 2. Cross-sectional regressions for students' GPA performance

	Spring 2019 (Face-to-face)	Spring 2020 (Distance)
Female performance (a)	2.95(0.00)	3.04 (0.00)
Male performance difference (b)	-0.37(0.00)	-0.31(0.00)
Remained hours	-0.002 (0.01)	-0.001 (0.02)
No. SME	3.16	(0.00)
Population	-3.76	(0.00)
Destination	-0.00005	(0.76)
Observations	536	537
R-squared	16%	14%

The dependent variable is the Accumulated GPA.*P* values in parentheses.

Our findings in Tables 1 and 2 declared that environmental change due to Covid had brought performance changes to the students. The gap between male-and-female performance has shrunk on average, but who drives this move, male or female? Another important question within the gender itself: Who does make this change? Poor, intermediate, or excellent performance students. To answer this question, we need to unlock the gender variations in their performance. Plus, students' performance in distance learning had shown some out liners.

We use quantile regression for nine performance levels of males and females, and we run the central equation to see the magnitude effect of gender for each performance level. The quantile regression allows for investigating the role of gender upon multiple performance levels and takes care of outliners. The result reveals a distinct observation; that females' performance at all levels remains relatively the same before and after the pandemic. Specifically, the poor performance of female students has increased their GPA in distance learning. In contrast, high-performance female students reduce their GPA in distance learning (see Graph 4).

Table 3 Quantile regressions for students' GPA

	Spring 2020 (Distance learning)		**Spring 2019 (Face-to-face)**	
	Female	Male	Female	Male
Quantile	Constant	Coefficient	Constant	Coefficient
0.1	2.35	-0.28	2.15	-0.35
	[0.00]	[0.00]	[0.00]	[0.00]
0.2	2.56	-0.29	2.43	-0.41
	[0.00]	[0.00]	[0.00]	[0.00]
0.3	2.72	-0.38	2.6	-0.43
	[0.00]	[0.00]	[0.00]	[0.00]

0.4	2.81	-0.38	2.75	-0.44
	[0.00]	[0.00]	[0.00]	[0.00]
0.5	2.92	-0.38	2.84	-0.4
	[0.00]	[0.00]	[0.00]	[0.00]
0.6	3.05	-0.34	2.97	-0.42
	[0.00]	[0.00]	[0.00]	[0.00]
0.7	3.12	-0.31	3.07	-0.39
	[0.00]	[0.00]	[0.00]	[0.00]
0.8	3.25	-0.27	3.23	-0.38
	[0.00]	[0.00]	[0.00]	[0.00]
0.9	3.38	-0.22	3.43	-0.33
	[0.00]	[0.00]	[0.00]	[0.00]
Average	**2.92**	**-0.38**	**2.84**	**-0.4**
	[0.00]	[0.00]	[0.00]	[0.00]
R-squared	7%	9.10%		
Observations	537		537	

The dependent variable is the Accumulated GPA.*P* values in parentheses

Differently, male students' performance has increased for poor and high-performing students after the pandemic compared to their performance before the pandemic. The male students of average performance have remained almost the same in distance learning (see Graph 5). Improving poor and high-performance male students have lessened the gap to female students.

Through the quantiles, the males under perform females in both types of education; however, the gap between genders narrowed in distance education. The performance difference decreases more with low and outperforms male students, and the gap has kept almost the same in the quantile 0.5, as Table 3 indicates. The gender variable explains 7% to 9.1% of the students' performance variations. The R-squared is lower in 2020 (distance learning) as if the gender role decreases its effects when genders are separated due to distance learning.

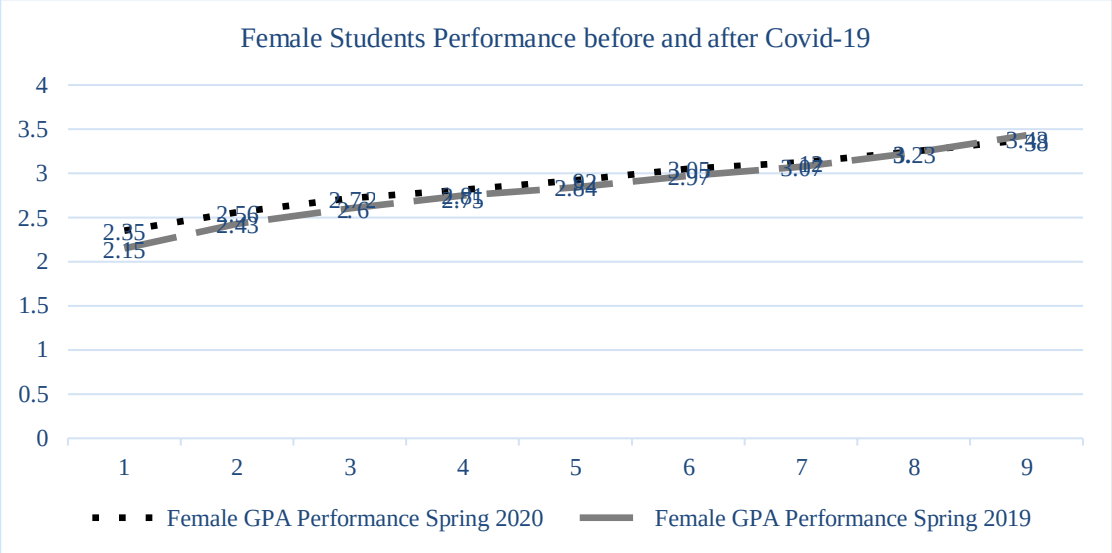

Figure. 3 Female Students Performance before and after Covid-19 by performance levels

Alt text. 3 Two curves depict female students' performance before and during Covid-19 with respect to different levels of performance. The graphs are very close to each other indicating that females' performance before and during Covid did not change significantly.

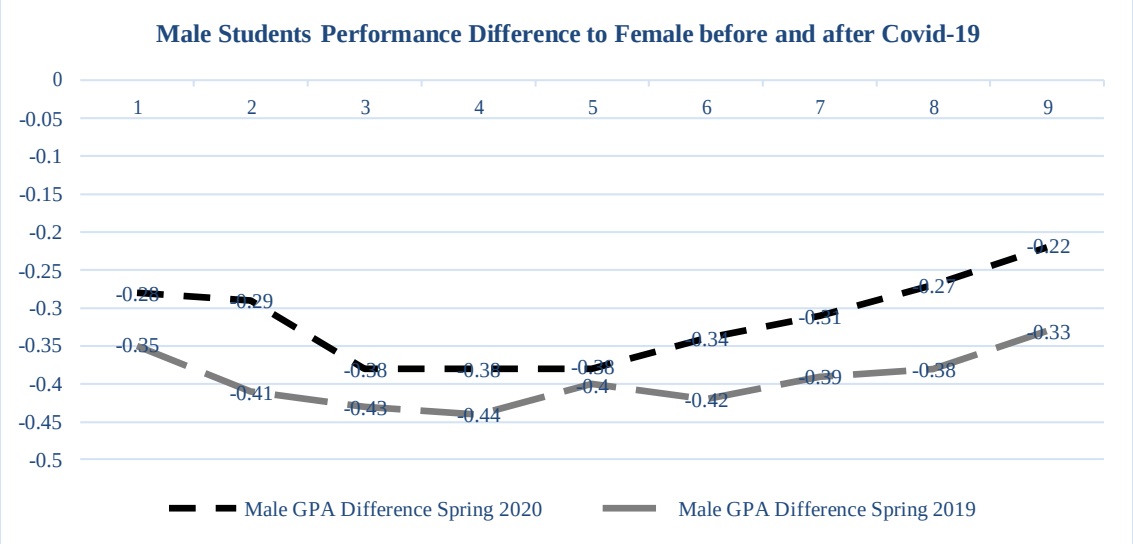

Figure. 4 Male Student's Performance before and after Covid-19 by performance levels

Alt text. 4 Two curves depict male students' performance differences from their female counterparts before and during Covid-19 with respect to different levels of performance. The two curves diverge referring to male-female performance differences have shrunk in favor of male students during Covid-19.

CONCLUSION

Covid-19 suspended university schooling that provides an equal shared environment to all students who must leave the universities and be subject to their original living environment. This transition would probably influence students' performance. Thus, it is interesting to investigate whether students' environmental change affects their academic performance. The differences in performance are apparent, and it was there before Covid; however, students in the university enjoy a familiar environment, and their performance differences don't reflect environmental advantages but rather other factors. Learning during Covid, students were geographically scattered and exposed to various environmental differences that may cause performance differences.

This study investigates the effect of environmental change due to Covid on students' performance. It employs a data set of university students at the College of Law in SQU (Sultan Qaboos University). The sample size is 537 students who attend Spring 2019 and Spring 2020, where the first is the semester before Covid-19, and the latter is the semester during Covid-19. This sample is unique as it tracks the same students in regular classes and distance once. For our matching sample of Spring 2019 and Spring 2020, we have multiple characteristics that contribute to students' performance. These characteristics are gender, earned credit hours remaining, destination to SQU, student district population, and the number of businesses in the student's living area.

The study employs several statistical methods to investigate the students' performance differences due to Covid-19. It utilizes descriptive analysis, cross-sectional regression, and quantile regression using. These analyses indicate multiple findings regarding student performance changes due to Covid-19. The results suggest that students' performance differences have shrunk as if students' performance differences are

getting smoother. Perhaps the assessment methods to differentiate among students' performance are ineffective(Adedoyin & Soykan, 2020) or students are less motivated to compete in distance learning, a conventional finding in the literature on online courses before Covid-19.

The average performance of students has increased slightly in distance learning, and female students outperform male students in both types of education. However, the difference between females and males in performance has decreased in distance learning, indicating that male students proportionally increase their performance relative to female students. The quantile regression results suggest that poor and high-performance male students are the ones who mainly drive the performance improvement, as the average performance of male students doesn't seem to improve that much in distance learning.

The destination doesn't seem to affect the student's performance, as results indicate that it is insignificant in explaining students' performance in distance learning. The population has a negative effect; the students tend to perform poorly in distance learning when the people living area is higher, assuming that the higher the people, the more easily time is wasted where time is the most valuable resource for students. Finally, the number of businesses in the student living area seems to better the students' performance indicating the students' necessity for educational services and supplies. From a policy perspective, the commonality that the university provides to its students is missing during Covid-19 distance learning, and policymakers should allocate students vulnerable to environmental change.

Students' performance changes due when the student's environment changes. This study demonstrates that Covid-19 challenges the SQU commitment to provide equal opportunities to all its students when Covid forced students to leave SQU and be subject to their original living environment. The study specifies the number of subgroups that are most vulnerable to learning loss during Covid, which is beneficial to policymakers in the education field and precisely aims at helping the most vulnerable students with distance learning.

Disclosure statement

The authors report there are no competing interests to declare.

Data availability statement

Data on GPA and other characteristics of the students' samples are confidential and cannot be shared unless a legitimate request is made.

KEY POINTS

What is already known about this topic:

- Covid-19 has changed our way of learning, increasing students' risk of learning loss.
- Students worldwide had to leave schools and rely on distance learning without preparing.
- Universities' commitment to providing students with an equal opportunity to learn has become challenging during distance learning.

What this paper adds:

- The paper adds to our understanding of academic performance during Covid-19.
- The paper emphasizes the environmental change students underwent and how it affected their performance.
- As students moved from a homogenous to a heterogenous environment, several students' subgroups

were more vulnerable than others.

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FOOTNOTE

[1]Data on GPA and other characteristics of the students' samples are confidential and cannot be shared due to ethical and legal restrictions. The Dean's Office of Undergraduate Studies in the College of Law at SQU provides us with the data after a specified arrangement to ensure the confidentiality of the students' information.