


Challenges Posed by COVID-19 on Doctoral Students' Wellbeing in Russia: Of International and Domestic Doctoral Students, Who Suffers More?

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Background: While universities closed, implementing remote teaching and learning in response to COVID-19, this change significantly impacted the lives of graduate students, given their exposure to unique and diverse experiences. It thus has become essential to understand the possible differences in regard to the pandemic's impact on international and domestic students.

Purpose: The aim of this study was to explore the consequences of the challenges posed by COVID-19 on doctoral students' wellbeing in Russia.

Methods: The study surveyed 4454 doctoral students across 249 Russian public universities.

Results: The challenges posed by COVID-19 negatively affected international doctoral students' learning experience ($\beta = -0.269$, $p < 0.001$); students' satisfaction with supervision ($\beta = -0.098$, $p < 0.001$); dissertation experience ($\beta = -0.039$, $p < 0.001$); and doctoral program satisfaction ($\beta = -0.034$, $p < 0.001$). Furthermore, the challenges posed by COVID-19 affected domestic doctoral students' learning experience ($\beta = -0.368$, $p < 0.001$); students' satisfaction with supervision ($\beta = -0.194$, $p < 0.001$) and doctoral program satisfaction ($\beta = -0.034$, $p < 0.001$). However, the influence of the challenges posed by COVID-19 on communication frequency was relatively positive for both international ($\beta = 0.060$, $p < 0.001$) and domestic students ($\beta = 0.021$, $p < 0.001$), and dissertation experience ($\beta = 0.061$, $p < 0.001$) was also positive for only domestic students. Furthermore, controlled factors comprising field of study ($\beta = -0.033$, $p < 0.001$); year of study ($\beta = 0.127$, $p < 0.001$); and university region ($\beta = -0.056$, $p < 0.001$) influenced the effect of the challenges posed by COVID-19 on international doctoral students.

Conclusion: The COVID-19 challenges had the greatest impact on the wellbeing of international students. Furthermore, both international and domestic students' communication frequency with their supervisors underwent a relatively positive impact (which implies no effect on both categories of students). Furthermore, the challenges posed by COVID-19 had no effect on domestic students' dissertation experiences. Finally, among the controlled variables, field of study, year of study, and university region were discovered to be significant factors in relation to the challenges posed by COVID-19 for international students.

Keywords: COVID-19, domestic, doctoral students, international, higher education, wellbeing

Introduction

The COVID-19 pandemic tremendously affected higher education at all levels,^{1,2} including doctoral education.³ The transition to remote teaching and learning restricted doctoral students' access to supervisors, colleagues, and university facilities such as laboratories, libraries, and classrooms, affecting students' wellbeing.^{4,5} Student wellbeing is the absence of stress, increased engagement in the classroom, and heightened overall satisfaction on campus.^{6,7} Student wellbeing has been shown to increase engagement in learning activities, meaning making, a sense of belonging, positive relationships with others, autonomy, and competencies while decreasing burn-out, stress, frustration, dissatisfaction, and withdrawal

from active learning.^{7–10} In the current study, student wellbeing is defined as having a positive learning experience, high satisfaction with supervisors, good dissertation experience, and satisfaction with doctoral programs.

In Russia, the first registered cases of COVID-19 broke out near the end of January 2020.¹¹ In February and early March of the same year, stricter measures were implemented at all levels with a key concentration on areas with mass public interactions in order to curb the pace at which it was spread.¹¹ In the education sector, the Ministry of Science and Higher Education of Russia introduced remote learning.¹¹ As a measure to combat the pandemic, inbound and outbound travel was halted; thus, international students were unable to return home, as well as those on suspension for research purposes, and others at home, could not enter the country. Consequently, the general term “lockdown” (from March 2020 to June 2021) became the new normal and posed diverse challenges on both domestic and international students who were present at their universities at the time of the outbreak.¹²

While Russia’s doctoral education has improved because of the 2013 reforms,¹³ it has been reported that doctoral students continue to face obstacles in the pursuit of their degrees.¹³ The study discussed obstacles, such as insufficient financing and poor supervision, as significant contributors to the low completion rates among doctoral students.¹³ Apart from these difficulties, the COVID-19 pandemic further affected the wellbeing of students,¹⁴ and we speculate that conditions may have more heavily affected the wellbeing of international doctoral students, possibly further impacting their completion of doctoral programs within the standard period of five years. In this study, we define international doctoral students as those students on doctoral programs in universities other than their native countries. Russia has an extensive doctoral education system with a significant proportion of international doctoral students.¹⁵ However, research that compares the experiences of domestic and international doctoral students studying at Russian universities amid this global calamity is lacking. With the pandemic showing no signs of abating in Russia, these challenges will likely persist for some time, thereby affecting students’ wellbeing. Recognizing the critical role that student wellbeing plays in students’ success,^{7–10} there is a need for a study to provide empirical evidence in the Russian context illuminating the consequences of the critical challenges faced by international students as a result of the COVID-19 pandemic.

The study aims to explore the consequences of the challenges posed by COVID-19 on doctoral students’ wellbeing in Russia and to make suggestions for the implementation of enhanced policies and practices to improve students’ wellbeing, and hence improve Russia’s internationalization agenda. The study’s findings will also serve as the basis for a broad discussion of alternative efforts to ensure students’ study programs completion. Additionally, universities in other countries where this type of study is rare can use these findings to improve the wellbeing of their international students during this pandemic. In this light, the article seeks to provide answers to the following research questions: (1) what are the consequences of the challenges posed by COVID-19 on doctoral students’ education in Russia? (2) Which category of doctoral students (domestic or international) do they affect most? (3) What are the control factors (eg marital status, field of study, year of study, mode of study) that influence these challenges?

The subsequent sections of the study are reported as follows. The next section reports the case of doctoral students in Russia. The second section reports the methodology, data analysis, and results. The final section reports the discussions comprising the empirical implications, limitations, and conclusions.

Literature Review

The Case of Doctoral Education in Russia

Doctoral education has grown dramatically in Russia.¹⁵ The number of graduate students is thus relatively high. For example, in 2021, 90,156 doctoral students were studying at universities and research institutes nationwide, with 27,992 new doctoral students enrolling and 14,326 graduating.¹⁵ Earlier evidence suggests that the system of doctoral education in Russia keeps expanding.¹³ Due to the country’s “democratization” of doctoral education, the number of doctoral students skyrocketed between 1990 and 2000, from 53,541 in 1994 to 157,437 in 2010.¹⁶ This mass distribution of doctoral degrees, coupled with the production of lower-quality doctorates and the admission of less qualified candidates to doctoral programs, led to criticisms which in turn resulted in several reforms.¹⁷

Before 2012, Russia’s doctoral education system was conceptualized as a research training program with little teaching and a primary emphasis on dissertation writing.¹⁷ After passing the three qualification examinations, the

candidate for a science (doctorate-equivalent) degree had to give a final oral examination and publish at least one or two papers in a journal from an approved list.¹⁷

According to the country's new Federal Law "On Education in Russia", doctoral programs are now considered the third tier of postsecondary education.¹⁵ As a result, significant structural changes in doctoral education have occurred. First and foremost, the course load has significantly increased. As part of the reconceptualization of doctorate education, graduate students are now required to complete 30 credits of coursework (mostly in their field) in addition to their research and teaching internships.¹³ Doctoral students must pass a comprehensive exam consisting of two parts: a pedagogical and methodological presentation based on their thesis results and a presentation of the research report that includes the significant findings of that thesis study.¹³ Successful completion of the comprehensive examination opens the door to being awarded the title of "Researcher" and the "Lecturer" diploma (which allows one to teach in master's programs) and then to proceed to the ultimate defense of their work. Graduation with a Ph.D. requires an oral defense before the dissertation council. As a further significant result of the new regulations, doctoral candidates' publishing requirements have been increased from one to two or three journal articles, depending on the topic of study.¹³

Russia has taken several steps in the last decade to internationalize doctoral education. The government and several of the country's most prestigious universities have launched programs to assist international students to travel abroad.¹⁸ The number of international doctoral students (IDS) at Russian universities and research institutions increased dramatically between 2010 and 2019.¹⁵ In 2019, IDS constituted 9% of doctoral students. Today, most doctoral students in Russia come from Asia and the Middle East and countries of the former Soviet Union (making up nearly 40% of all IDS).¹⁵

Despite several national and institutional efforts, the quality of doctoral education remains a source of contention and frequent criticism.¹³ The low completion rate of doctorates has sparked several complaints.¹³ In 2021, only 1500 doctoral program graduates defended their dissertations, accounting for 11% of all graduates.¹³ One area of concern is the insufficient financial assistance. The government provides financial aid to doctoral students through grants and scholarships, but these do not cover the total cost of a student's education.¹³ As a result, many doctoral students seek full-time employment outside academia.¹⁹ Inadequate supervision and changes have also been identified as systematic concerns in the literature, as have ineffective systems for selecting doctoral candidates and the charge that institutions and research institutes are ill-prepared for the "democratization" of doctoral programs.¹⁷ More empirical research on doctoral education will be required to address these concerns fully. The conceptualization of the study is illustrated in Figure 1.

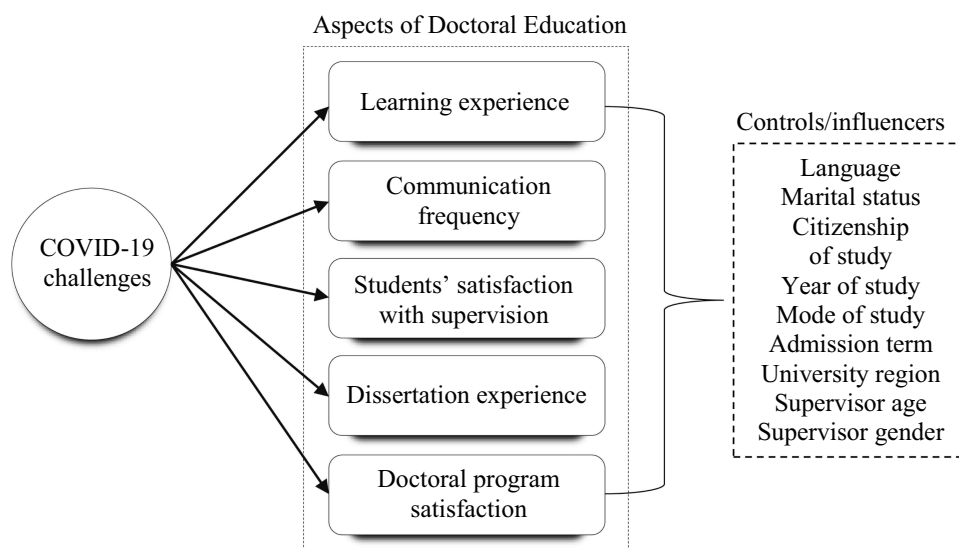


Figure 1 Research framework.

Doctoral Students' Experience During the COVID-19 Pandemic

Exploring doctoral students' wellbeing during the COVID-19 pandemic in the global context has become an essential topic. Many studies have investigated students' wellbeing in general without making a distinction between domestic and international students.^{20–29} For instance, an online survey of doctoral students investigated the effect of the pandemic on the student-supervisor relationship. The study divided students into two groups, and one group of students lamented over having fewer encounters with their supervisors throughout the outbreak.²⁰ Another study reported a lack of software to work on their dissertations.²¹ A SERU COVID-19 survey also reported that depressive illness was prevalent among Ph. D. students because of their inability to obtain funding for their research.²² Reduced time spent on research assignments, delays in receiving feedback from supervisors, lack of access to laboratories and libraries, and an increase in the workloads of students were discovered in another study.²³ Similarly, delays in receiving feedback from supervisors, the closure of libraries, which affected students' ability to meet and share ideas, and financial constraints and uncertainties were again reported.²⁴ Other researchers reported hardship due to the loss or reduction of campus jobs,²⁵ financial problems,²⁶ stress due to delays in graduation,²⁷ identity anxiety, and a diluted sense of belonging.²⁹

Many other researchers have focused on investigating only international students' wellbeing during the COVID-19 pandemic.^{12,30–40} For instance, a study compared Russian-speaking and English-speaking international doctoral students' experiences with the general quality of learning and found that English-speaking international students were dissatisfied with access to laboratory equipment, software for dissertation work, and library services.¹² Another conducted a comparative study between international and local Taiwanese students and found that international students had lower susceptibility to COVID-19 and higher anxiety as compared to local Taiwanese students.³⁰ A study in China found that slow internet connectivity disrupted students' studies and was expensive for most international doctoral students.³¹ Other studies focusing on international doctoral students reported loneliness due to social life restrictions,^{32,35} travel restrictions,³⁴ homesickness,^{36,37} and financial concerns.^{33,41,42} Furthermore, international doctoral students initially were faced with certainty and uncertainty before some students could strategically navigate the Chinese academic sub-field,³⁸ and another study reported challenges like: the feeling of being in limbo, nostalgia, detachment, and academic difficulties because of travel restrictions due to COVID-19.³⁹ Lastly, other empirical evidence revealed that the COVID-19 pandemic impacted international doctoral students due to loss of jobs and alteration of their career plans.⁴⁰

From the above, most of the studies focused on doctoral students' wellbeing during the pandemic rather than viewing the topic through a comparative lens. Some studies only focused on exploring only international doctoral students' experiences during COVID-19, mostly in other countries, and a few compared international and local students' experiences during the COVID-19 pandemic in the Taiwanese and New Zealand context respectively.^{30,40} The consequences of the COVID-19 pandemic challenges is unknown as to who has suffered more (ie, whether domestic or international doctoral students) in the Russian context. This necessitates an in-depth comparative exploration of the consequences of the challenges posed by COVID-19 on doctoral students' wellbeing in Russia. This will offer insight into which category of doctoral students (domestic or international) have been most affected by the consequences of the challenges posed by COVID-19 in the Russian higher education context.

Materials and Method

Design

The study adopted a cross-institutional online survey to investigate the effect of the challenges posed by COVID-19 on international and domestic doctoral students at Russian universities. The survey was conducted between May and June 2021 on behalf of the Russian Ministry of Science and Higher Education under the project "Scientific and methodological support for the development of quality management system of higher education in the conditions of coronavirus disease 2019 (COVID-19) pandemic and thereafter". The primary purpose of the survey was to investigate the challenges and opportunities for enhancing the wellbeing of doctoral students at Russian universities during the pandemic.

The questionnaires were written in both English and Russian by an expert in both languages (who is the researcher's supervisor) and they covered the following topics: (1) satisfaction with university learning conditions and services; (2)

frequency of communication with a supervisor; (3) major challenges encountered with a supervisor's supervision; (4) dissertation preparation experience; and (5) satisfaction with the doctoral program.

Study Population and Sampling Strategy

The survey targeted all doctoral students studying at Russian universities. To access the respondents, the author and his supervisor used letters of support from the Russian Ministry of Science and Higher Education, which were delivered to all Russian universities via the Ministry's electronic system. Letters were addressed to Deans of universities who were asked to share the link of the survey with their students. Participation in the survey was voluntary. A total of 249 Russian universities, offering doctoral programs, were purposively sampled. This sampling technique was used based on past studies.⁴³⁻⁴⁵

Sample Characteristics

The analysis of the demographic factors yielded 4462 respondents consisting of 4071 (91.23%) domestic students, and 391 (8.76%) international students of whom 97.6% spoke Russian and the remainder spoke English (2.4%). The highest frequency and percentage scores obtained for the sample's field of study, university region (Moscow), marital status (not married), mode of study (full-time), admission term (budget admission), supervisor's gender (male), and supervisor's degree (doctor of science) were 585 (13.1%), 878 (19.7%), 2470 (55.5%), 3538 (79.4%), 3042 (68.3%), 2553 (59.4%), and 3234 (75.2%) respectively. Table 1 elaborates the statistics of the sampled doctoral students and supervisors' characteristics.

Table 1 Sample Demographic Statistics - Both Groupings

Variables	Category	Frequency	Percent
Language	Russian	4349	97.6
	English	105	2.4
Country of citizenship	Abkhazia	3	0.1
	Afghanistan	2	0.0
	Algeria	12	0.3
	Angola	2	0.0
	Argentina	3	0.1
	Azerbaijan	7	0.2
	Bangladesh	1	0.0
	Belarus	10	0.2
	Belgium	1	0.0
	Benin	1	0.0
	Bosnia and Herzegovina	2	0.0
	Burundi	1	0.0
	Cameroon	3	0.1
	China	72	1.6
	Co d'Ivoire	1	0.0
	Colombia	1	0.0
	Congo, Dem Rep of	1	0.0

(Continued)

Table 1 (Continued).

Variables	Category	Frequency	Percent
	Cuba	2	0.0
	Cyprus	1	0.0
	Ecuador	2	0.0
	Egypt	8	0.2
	Eritrea	1	0.0
	Estonia	1	0.0
	Ethiopia	2	0.0
	Gabon	1	0.0
	Georgia	1	0.0
	Ghana	1	0.0
	Guatemala	1	0.0
	Guinea	3	0.1
	Hungary	1	0.0
	India	1	0.0
	Indonesia	3	0.1
	Iran	12	0.3
	Iraq	18	0.4
	Ireland	1	0.0
	Israel	2	0.0
	Jamaica	1	0.0
	Jordan	1	0.0
	Kazakhstan	54	1.2
	Korea, North	1	0.0
	Kyrgyzstan	8	0.2
	Latvia	3	0.1
	Lebanon	1	0.0
	Macedonia	1	0.0
	Mali	3	0.1
	Mauritania	1	0.0
	Mauritius	1	0.0
	Mexico	1	0.0
	Moldova	4	0.1
	Mongolia	1	0.0
	Morocco	2	0.0
	Myanmar	11	0.2
	Nigeria	1	0.0
	Philippines	2	0.0
	Russia	4060	91.2
	Rwanda	1	0.0
	Serbia	2	0.0

(Continued)

Table I (Continued).

Variables	Category	Frequency	Percent
	Sri Lanka	1	0.0
	Syria	22	0.5
	Tajikistan	10	0.2
	Tunisia	4	0.1
	Turkey	2	0.0
	Turkmenistan	9	0.2
	Ukraine	7	0.2
	Uzbekistan	12	0.3
	Venezuela	1	0.0
	Vietnam	29	0.7
	Yemen	3	0.1
	Others	5	0.1
Field of study	Mathematics and mechanics	109	2.4
	Physics and Astronomy	141	3.2
	Chemistry	79	1.8
	Earth sciences	117	2.6
	Biological sciences	278	6.2
	Engineering and construction technologies	218	4.9
	Computer science	379	8.5
	Electrical and heat engineering	222	5.0
	Chemical technology	96	2.2
	Applied geology, mining, oil and gas engineering and geodesy	27	0.6
	Clinical medicine	585	13.1
	Fundamental medicine	99	2.2
	Agriculture, forestry and fisheries	177	4.0
	Psychological sciences	111	2.5
	Economics and management	332	7.5
	Sociology and social work	51	1.1
	Education and pedagogical sciences	335	7.5
	Jurisprudence	183	4.1
	Political science and regional studies	45	1.0
	Linguistics and literary studies	186	4.2
	History and archaeology	115	2.6
	Philosophy, ethics and religious studies	49	1.1
	Cultural studies and socio-cultural projects	46	1.0
	Other	435	9.8
	Techno sphere safety and environmental management	39	0.9
Marital status	Married	1984	44.5
	Not married	2470	55.5

(Continued)

Table 1 (Continued).

Variables	Category	Frequency	Percent
Year of study	1	1724	38.7
	2	1272	28.6
	3	956	21.5
	4	437	9.8
	5	27	0.6
	Other (specify)	38	0.9
Mode of study	Full-time	3538	79.4
	Combination of full-time and part-time	45	1.0
	Part-time	871	19.6
Admission term	I am on a budget admission	3042	68.3
	I pay full tuition	1277	28.7
	I am on a targeted admission	135	3.0
University's region	Moscow	878	19.7
	Saint Petersburg	454	10.2
	Sevastopol	14	0.3
	Kabardino-Balkar Republic	48	1.1
	Altai Republic	1	0.0
	Bashkortostan, Republic of	8	0.2
	Buryatia, Republic of	21	0.5
	Dagestan, Republic of	1	0.0
	Komi Republic	5	0.1
	Republic of Crimea	3	0.1
	Mari El Republic	30	0.7
	Mordovia, Republic of	117	2.6
	Sakha (Yakutia) Republic	3	0.1
	North Ossetia-Alania, Republic of	16	0.4
	Tatarstan, Republic of	289	6.5
	Tuva Republic	14	0.3
	Udmurt Republic	13	0.3
	Chechen Republic	2	0.0
	Chuvash Republic	53	1.2
	Khanty-Mansi Autonomous Okrug – Yugra	60	1.3
	Altai Krai	117	2.6
	Krasnodar Krai	67	1.5
	Krasnoyarsk Krai	30	0.7
	Perm Krai	5	0.1
	Primorsky Krai	71	1.6
	Stavropol Krai	42	0.9
	Khabarovsk Krai	22	0.5

(Continued)

Table 1 (Continued).

Variables	Category	Frequency	Percent
	Amur Oblast	37	0.8
	Arkhangelsk Oblast	34	0.8
	Astrakhan Oblast	46	1.0
	Belgorod Oblast	91	2.0
	Bryansk Oblast	21	0.5
	Vladimir Oblast	82	1.8
	Volgograd Oblast	131	2.9
	Vologda Oblast	3	0.1
	Voronezh Oblast	80	1.8
	Jewish Autonomous Oblast	2	0.0
	Ivanovo Oblast	14	0.3
	Irkutsk Oblast	103	2.3
	Kaliningrad Oblast	37	0.8
	Kaluga Oblast	41	0.9
	Kemerovo Oblast	15	0.3
	Kirov Oblast	5	0.1
	Kurgan Oblast	19	0.4
	Kursk Oblast	61	1.4
	Leningrad Oblast	7	0.2
	Lipetsk Oblast	18	0.4
	Moscow Oblast	59	1.3
	Murmansk Oblast	10	0.2
	Nizhny Novgorod Oblast	79	1.8
	Novgorod Oblast	7	0.2
	Novosibirsk Oblast	115	2.6
	Omsk Oblast	49	1.1
	Orenburg Oblast	23	0.5
	Oryol Oblast	105	2.4
	Penza Oblast	2	0.0
	Pskov Oblast	18	0.4
	Rostov Oblast	51	1.1
	Ryazan Oblast	20	0.4
	Samara Oblast	40	0.9
	Saratov Oblast	182	4.1
	Sakhalin Oblast	24	0.5
	Sverdlovsk Oblast	104	2.3
	Tambov Oblast	28	0.6
	Tver Oblast	27	0.6
	Tomsk Oblast	137	3.1
	Tula Oblast	1	0.0

(Continued)

Table 1 (Continued).

Variables	Category	Frequency	Percent
	Tyumen Oblast	65	1.5
	Ulyanovsk Oblast	42	0.9
	Chelyabinsk Oblast	1	0.0
	Yaroslavl Oblast	29	0.7
	Not sure	5	0.1
Supervisor's gender	Male	2553	59.4
	Female	1746	40.6
Supervisor's degree	Ph.D.	940	21.9
	Doctor of Science	3234	75.2
	Do not know	125	2.9

Note: n=4462 (391 international doctoral students and 4071 domestic doctoral students).

Variables and Measurement

As shown in [Figure 1](#), the survey instrument consisted of one independent variable (challenges posed by COVID-19) and five dependent variables regarding aspects of doctoral education (learning experience, communication frequency, students' satisfaction with supervision, dissertation experience, and doctoral program satisfaction) as well as nine control variables (language, citizenship, marital status, field of study, year of study, mode of study, admission term, university's region, supervisor's age, and gender).

An expert team comprising the doctoral degree program supervisors and other scholars in the author's university developed the survey questions/items. The selection items were based on prior studies and relevant theories in the field and adapted to fit the context of the present study. All items of the independent and dependent variables were scored on a 5-point Likert scale with the value of 1 denoting strong disagreement and 5 denoting strong agreement. The control variables were operationalized using dummy variables; for instance, the two categories of language were coded as 1 = Russia and 2 = English (see [Table 1](#) for all categories).

Challenges Posed by COVID-19

Challenges posed by COVID-19 were assessed with 12 items (eg, what challenges in connection with the COVID-19 epidemic did you face when working on your dissertation? Postponed exams, pre-defense, dissertation defense) and had a Cronbach alpha of 0.745 for significance.

Learning Experience

Learning experience was measured with 11 items (eg, please indicate how strongly you agree or disagree with the following statements about your distance learning experience during the COVID-19 pandemic - I like to study online). The Cronbach alpha was 0.912 for significance.

Communication Frequency

Communication frequency (eg, did the way you communicate with your supervisor change during the pandemic?) was measured with five items. A valid Cronbach alpha value of 0.707 was obtained.

Students' Satisfaction with Supervision

Twelve items were used to measure students' satisfaction with supervision (eg, please rate your satisfaction with the supervisor's work on these issues during the COVID-19 pandemic - Read your research project for admission and give advice on it). The statistically significant Cronbach alpha value was 0.969.

Dissertation Experience

Four items assessed dissertation experience and had a Cronbach alpha value of 0.713 for significance. A sample item was: (1) Evaluate the degree of your experience/satisfaction under the COVID-19 conditions regarding how it affected the conceptualization/selection of your dissertation's topic - The topic of my research was exclusively my personal choice.

Doctoral Program Satisfaction

Six items were employed to measure doctoral program satisfaction (eg, please indicate how strongly you agree or disagree with the following statements about your academic experience at the doctoral program during the COVID-19 lockdown - I have access to my colleagues/friends in my department/school/institute). The Cronbach alpha value was valid at 0.793.

Data Collection

To persuade so many students to participate in the survey during the pandemic, the universities sent the survey link via emails in both English and Russian languages to students and they were assured that their information would be kept confidential. A total of 4454 doctoral students (391 international students) participated in the survey, representing 9% of the doctoral student population.

Data Analysis

Using the Statistical Package for Social Sciences (SPSS) software version 22, we adopted the prior statistical procedures^{44,46} consisting of construct/item reliability and validity, correlations (Pearson's bivariate), and hierarchical linear regression estimation techniques to address this study's research questions. Robustness tests such as common method variance and collinearity analysis were conducted to prove that the data were suitable for all phases of the analysis.

Common Method Variance Analysis

Since the data in the current study were drawn from a single sample (doctoral students) via a one-off cross-sectional survey, we performed Harman single-factor analysis (SFA) to determine whether the degree of common method variance (CMV) was acceptable according to statistical guidelines.⁴⁷ The value of 34.5% (less than 50%) aligned with the guideline,⁴⁷ thereby verifying that CMV posed no issues regarding the validity of this study's dataset. We also estimated the degree of variance inflation factor (VIF). Table 2 demonstrates values that met the VIF condition of less than 10 for statistical approval.⁴⁸ Thus, the degree of VIF posed no threat in this study.

Reliability and Validity Analysis

Table 3 demonstrates all the loading factors: Cronbach's alpha (CA), composite reliability (CR), average variance extracted (AVE), and the square root of AVE scores of all constructs/indicators. The CA measures the internal consistency at a threshold of not less than 0.7 for validity.⁴⁹ CR and AVE measured the convergent validity and were validated at a cut-off point of greater than 0.7 and 0.5,⁴⁹ respectively. To measure the constructs' discriminant validity, we calculated the square root of the AVE scores obtained. Next, we compared the square root of the AVE scores of each construct with their respective correlation coefficient and generated AVE (square root) values above the correlation coefficients of the observed constructs. This validated that the latent constructs had good discriminant validity⁵⁰ (see Table 3 for all the results).

Table 2 Descriptive Statistics, Mean, Standard Deviation, and Correlations – Both Categories

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Language	1															
Country of citizenship	−0.313**	1														
Marital status	0.017	−0.012	1													
Field of study	−0.011	−0.030*	−0.012	1												
Year of study	0.049**	−0.015	−0.075**	−0.067**	1											
Mode of study	−0.059**	0.073**	−0.150**	0.181**	0.019	1										
Admission term	0.013	−0.030*	−0.040**	0.170**	−0.012	0.564**	1									
University's region	0.133**	−0.011	−0.045**	0.020	0.004	0.004	0.042**	1								
Supervisor's gender	0.004	0.006	−0.035*	0.189**	−0.046**	0.139**	0.108**	−0.015	1							
Supervisor's degree	0.042**	0.004	−0.034*	0.002	0.023	0.061**	0.048**	0.033*	−0.032*	1						
LE	0.065**	−0.035*	0.010	0.008	−0.089**	−0.005	0.029	−0.016	0.035*	0.028	1					
CF	0.043**	−0.008	0.032*	0.002	−0.064**	0.026	0.053**	−0.005	0.001	0.067**	0.144**	1				
SSS	−0.004	0.003	0.006	0.026	−0.021	0.013	0.006	0.031*	0.049**	−0.014	0.067**	−0.057**	1			
DE	−0.001	−0.007	0.039*	−0.009	−0.020	0.029	0.053**	−0.024	0.026	0.048**	0.165**	0.246**	0.056**	1		
DPS	0.010	−0.012	0.016	0.003	−0.013	0.026	0.050**	0.018	0.021	0.046**	0.223**	0.323**	−0.025	0.392**	1	
COVID-19 CHS	0.029	−0.029	−0.012	−0.034*	0.112**	−0.009	−0.020	−0.044**	−0.008	−0.015	−0.273**	−0.009	−0.110**	−0.026	−0.031*	1
Mean	1.02	130.44	1.56	12.61	2.08	1.40	1.35	35.76	1.41	1.81	2.80	8.68	3.72	7.72	8.06	0.20
SD	0.153	20.934	0.497	6.672	1.091	0.794	0.537	43.129	0.491	0.460	0.901	15.525	0.515	14.018	14.480	0.179
VIF	1.007	1.016	1.041	1.078	1.030	1.595	1.537	1.015	1.061	1.012	1.055	1.081	1.019	1.116	1.144	

Notes: n=4462; **p< 0.01 level (2-tailed), *p< 0.05 level (2-tailed).

Abbreviations: LE, Learning experience; CF, Communication frequency; SSS, Students' satisfaction with supervision; DE, Dissertation experience; DPS, Doctoral program satisfaction.

Table 3 Measurement Scale Properties

Constructs/Items	Factor Loadings	CA	CR	AVE	AVE (Square Root)
COVID-19 challenges		0.745	0.950	0.619	0.786
CC1 What challenges in connection with the COVID-19 epidemic did you face when working on your dissertation? - Postponed exams, pre-defense, dissertation defense.	0.947				
CC2 What challenges in connection with the COVID-19 epidemic did you face when working on your dissertation? - Inability to carry out research (closure of laboratories, inability to go out into the field and work with people, lack of access to the library).	0.885				
CC3 What challenges in connection with the COVID-19 epidemic did you face when working on your dissertation? - Lack of communication with the supervisor.	0.750				
CC4 What challenges in connection with the COVID-19 epidemic did you face when working on your dissertation? - Lack of communication with faculty/research staff.	0.723				
CC5 What challenges in connection with the COVID-19 epidemic did you face when working on your dissertation? - Unavailability of administrative services.	0.990				
CC6 What challenges in connection with the COVID-19 epidemic did you face when working on your dissertation? - Increased teaching load due to the transition to online format.	0.783				
CC7 What challenges in connection with the COVID-19 epidemic did you face when working on your dissertation? - Increased research workload.	0.656				
CC8 What challenges in connection with the COVID-19 epidemic did you face when working on your dissertation? - Increased employment elsewhere.	0.675				
CC9 What challenges in connection with the COVID-19 epidemic did you face when working on your dissertation? - Inability to attend conferences.	0.967				
CC10 What challenges in connection with the COVID-19 epidemic did you face when working on your dissertation? - Lack of normal conditions for working from home.	0.643				
CC11 What challenges in connection with the COVID-19 epidemic did you face when working on your dissertation? - The need to take care of family members.	0.653				
CC12 What challenges in connection with the COVID-19 epidemic did you face when working on your dissertation? - Financial constraints.	0.649				
Learning experience		0.912	0.924	0.529	0.727
LE1 Please indicate how strongly you agree or disagree with the following statements about your distance learning experience during the Covid-19 pandemic. - I like to study online.	0.718				
LE2 Please indicate how strongly you agree or disagree with the following statements about your distance learning experience during the Covid-19 pandemic. - I had more time to work on papers, and process and analyze data for my dissertation research.	0.785				

(Continued)

Table 3 (Continued).

Constructs/Items	Factor Loadings	CA	CR	AVE	AVE (Square Root)
LE3 Please indicate how strongly you agree or disagree with the following statements about your distance learning experience during the Covid-19 pandemic. - I had more time to write up my dissertation.	0.802				
LE4 Please indicate how strongly you agree or disagree with the following statements about your distance learning experience during the Covid-19 pandemic. - I had more time to sleep and rest.	0.697				
LE5 Please indicate how strongly you agree or disagree with the following statements about your distance learning experience during the Covid-19 pandemic. - I had the opportunity to attend classes more often.	0.649				
LE6 Please indicate how strongly you agree or disagree with the following statements about your distance learning experience during the Covid-19 pandemic. - I began to devote more time to my studies and dissertation.	0.678				
LE7 Please indicate how strongly you agree or disagree with the following statements about your distance learning experience during the Covid-19 pandemic. - It became easier for me to participate in discussions in classes, seminars, etc.	0.623				
LE8 Please indicate how strongly you agree or disagree with the following statements about your distance learning experience during the Covid-19 pandemic. - My supervisor became more accessible for communication	0.792				
LE9 Please indicate how strongly you agree or disagree with the following statements about your distance learning experience during the Covid-19 pandemic. - Other faculty/staff of the department/school/institute became more accessible for communication.	0.838				
LE10 Please indicate how strongly you agree or disagree with the following statements about your distance learning experience during the Covid-19 pandemic. - We began to communicate more often with other graduate students of my department/school/institution.	0.683				
LE11 Please indicate how strongly you agree or disagree with the following statements about your distance learning experience during the Covid-19 pandemic. - I became less anxious about my graduate studies.	0.703				
Communication frequency		0.707	0.892	0.627	0.791
CF1 Has the way you communicate with your supervisor changed during the pandemic?	0.698				
CF2 Please rate your agreement with the following statements about whether the transition to distance learning during the Covid-19 pandemic has affected your communication with your supervisor. - During the pandemic, my communication with my supervisor became less.	0.664				
CF3 Please rate your agreement with the following statements about whether the transition to distance learning during the Covid-19 pandemic has affected your communication with your supervisor. - During the pandemic my supervisor was always available to help and advice.	0.801				
CF4 Did you find the number and duration of meetings with your supervisor sufficient during the Covid-19 pandemic?	0.998				
CF5 Did the frequency of your communication with your research supervisor change during the Covid-19 pandemic?	0.755				
Students' satisfaction with supervision		0.969	0.977	0.767	0.875
SSS1 Please rate your satisfaction with the supervisor's work on these issues during the COVID-19 pandemic: - Reading your research project for admission and giving advice on it.	0.955				
SSS2 Please rate your satisfaction with the supervisor's work on these issues during the COVID-19 pandemic: - Advising on literature and doing research on the topic of the dissertation.	0.770				

SSS3 Please rate your satisfaction with the supervisor's work on these issues during the COVID-19 pandemic: - Recommending elective training courses.	0.926				
SSS4 Please rate your satisfaction with the supervisor's work on these issues during the COVID-19 pandemic: - Recommending experts to whom you could turn for advice on issues within the framework of the dissertation.	0.928				
SSS5 Please rate your satisfaction with the supervisor's work on these issues during the COVID-19 pandemic: - Commenting on your articles	0.822				
SSS6 Please rate your satisfaction with the supervisor's work on these issues during the COVID-19 pandemic: - Commenting on parts of your dissertation.	0.889				
SSS7 Please rate your satisfaction with the supervisor's work on these issues during the COVID-19 pandemic: - Editing your articles.	0.943				
SSS8 Please rate your satisfaction with the supervisor's work on these issues during the COVID-19 pandemic: - Editing the text of your dissertation.	0.917				
SSS9 Please rate your satisfaction with the supervisor's work on these issues during the COVID-19 pandemic: - Helping with the selection of conferences in which to participate.	0.900				
SSS10 Please rate your satisfaction with the supervisor's work on these issues during the COVID-19 pandemic: - Helped with the selection of a magazine to submit publications.	0.940				
SSS11 Please rate your satisfaction with the supervisor's work on these issues during the COVID-19: - Helping with the organization of the field stage of the research.	0.791				
SSS12 Please rate your satisfaction with the supervisor's work on these issues during the COVID-19 pandemic: - Giving advice on the choice of research design, methods of data collection and analysis.	0.844				
Dissertation experience		0.713	0.916	0.734	0.856
DE1 Evaluate the degree of your experience/satisfaction under the COVID-19 conditions regarding how it affected the conceptualization/ selection of your dissertation's topic. - The topic of my research was exclusively my personal choice.	0.731				
DE2 Evaluate the degree of your agreement with the following statement regarding the topic of your dissertation during the pandemic. - The topic of my research is related to the work carried out by my supervisor or his research group	0.880				
DE3 Evaluate the degree of your agreement with the following statement regarding the topic of your dissertation during the pandemic. - The topic of my research is of great interest to me	0.856				
DE4 Evaluate the degree of your agreement with the following statement regarding the topic of your dissertation during the pandemic. - The topic of my dissertation is a continuation of the research topic within the framework of the WRC in the specialty/master's degree	0.946				
Doctoral program satisfaction		0.793	0.895	0.589	0.767
DPS1 Please indicate how strongly you agree or disagree with the following statement about your academic experience of the doctoral program during the pandemic. - I have access to friends in my department/school/institute.	0.823				
DPS2 Please indicate how strongly you agree or disagree with the following statement about your academic experience of the doctoral program during the pandemic. - I still feel like I belong to my department/school/institute.	0.734				

(Continued)

Table 3 (Continued).

Constructs/Items	Factor Loadings	CA	CR	AVE	AVE (Square Root)
DPS3 Please indicate how strongly you agree or disagree with the following statements about your academic experience of the doctoral program during the pandemic. - I am still proud to be a doctoral student of my department/school/institute.	0.851				
DPS4 Please indicate how strongly you agree or disagree with the following statement about your academic experience of the doctoral program during the pandemic. - My department/school/institute still creates a welcoming and supportive environment.	0.704				
DPS5 Please indicate how strongly you agree or disagree with the following statement about your academic experience of the doctoral program during the pandemic. - I can still always talk (in person or remotely) with faculty of my department/school/institute.	0.660				
DPS6 Please indicate how strongly you agree or disagree with the following statement about your academic experience of the doctoral program during the pandemic. - Faculty of my department/school/institute still treat me fairly.	0.815				

Results

Descriptive Statistics and Bivariate Correlations

In Table 2, we present the descriptive statistics along with Pearson's bivariate correlation coefficients (r) of all the variables in this study. We measured the strength of the variables' linear correlation using Pearson's ranges between a magnitude of -1.0 and 1.0 for significance.⁵¹ Accordingly, we found statistically significant correlations. The results demonstrated in Table 2 attest to their validity.

Estimation of the Research Questions Using Hierarchical Linear Regression Analysis

Consistent with past analytical presentations,^{44,46} we employed the hierarchical linear regression technique to estimate the study's research questions. Accordingly, the questions were estimated in three hierarchies. In hierarchy 1 (Table 4), we estimated the research: What are the consequences of the challenges posed by COVID-19 on doctoral students' education in Russia? Utilizing models 1 to 5 (Table 4), the effect of the challenges posed by COVID-19 on aspects of doctoral education for both international and domestic students was estimated. Challenges posed by COVID-19 had a significant negative effect on learning experience ($\beta = -0.274$, $p < 0.001$); students' satisfaction with supervision ($\beta = -0.106$, $p < 0.001$); dissertation experience ($\beta = -0.028$, $p < 0.001$); and doctoral program satisfaction ($\beta = -0.030$, $p < 0.001$). However, the challenges posed by COVID-19 had a minimal effect on communication frequency ($\beta = 0.001$, $p < 0.001$).

In hierarchy 2 (Table 4 and Table 5), we estimated the effect of the challenges posed by COVID-19 on both international and domestic students, in response to the research question: Which category of doctoral students (international or domestic) have they affected most? According to models 6 to 10 of Table 4, the challenges posed by COVID-19 negatively affected international doctoral students' learning experience ($\beta = -0.269$, $p < 0.001$); students' satisfaction with supervision ($\beta = -0.098$, $p < 0.001$); dissertation experience ($\beta = -0.039$, $p < 0.001$); and doctoral program satisfaction ($\beta = -0.034$, $p < 0.001$). Models 11 to 15 (Table 5) estimated the effect of the challenges posed by COVID-19 on the aspects of domestic students' doctoral education: learning experience ($\beta = -0.368$, $p < 0.001$); students' satisfaction with supervision ($\beta = -0.194$, $p < 0.001$) and doctoral program satisfaction ($\beta = -0.034$, $p < 0.001$). Nonetheless, the influence of the challenges posed by COVID-19 on communication frequency was relatively positive for both international ($\beta = 0.060$, $p < 0.001$) and domestic students ($\beta = 0.021$, $p < 0.001$), and that of dissertation experience ($\beta = 0.061$, $p < 0.001$) was also positive for only domestic students.

In hierarchy 3, the research question: What controlled factors (eg, marital status, field of study, year of study, mode of study) influence these challenges? According to models 16a to 17 (Table 6), the controlled factors comprising field of study ($\beta = -0.033$, $p < 0.001$), year of study ($\beta = 0.127$, $p < 0.001$), and university region ($\beta = -0.056$, $p < 0.001$) influenced the effect of the challenges posed by COVID-19 on international students' doctoral education (Model 16a). In Model 16b, all the controlled variables insignificantly relate to the challenges posed by COVID-19 (language, country of citizenship, marital status, field of study, year of study, mode of study, university region, and supervisors' gender and degree), except for admission term which was significantly negative ($\beta = -0.129$, $p < 0.001$). Among the controlled variables in Model 17 (Table 6), only doctoral students' country of citizenship ($\beta = -0.026$, $p < 0.001$), field of study ($\beta = -0.029$, $p < 0.001$), year of study ($\beta = 0.115$, $p < 0.001$), and university region ($\beta = -0.057$, $p < 0.001$) had a significant effect on the challenges posed by COVID-19.

Discussion and Implications

The aim of this study was to explore the consequences of the challenges posed by COVID-19 on doctoral students' wellbeing in Russia. The results of the empirical estimation of all three research questions of this study led to new perspectives that echo previous findings on the negative consequences of COVID-19 on doctoral education. However, this study's findings also begin a fresh conversation on its non-effect on communication frequency between all groups of doctoral students observed and their supervisors. The ensuing paragraphs detail the findings and contributions to existing scholarship.

Table 4 COVID-19 Challenge on Aspects of International Doctoral Students' Education

Dependent Variables:	Learning Experience	Communication Frequency	Students' Satisfaction with Supervision	Dissertation Experience	Doctoral Program Satisfaction
Models:	Model 6	Model 7	Model 8	Model 9	Model 10
Variables	β	β	β	β	B
Control variables					
Language	0.004	0.046**	0.002	-0.009	0.012
Country of citizenship (Russia only)	-0.013	0.008	-0.027*	0.030*	0.006
Marital status	-0.001	0.029*	0.004	0.038**	0.015
Field of study	-0.019	-0.005	0.013	-0.035**	-0.012
Year of study	-0.064***	-0.073***	-0.006	-0.019	-0.017
Mode of study	-0.009	0.014	0.010	0.017	0.006
Admission term	0.019	0.040**	-0.010	0.046**	0.043**
University's region	-0.046**	-0.051***	0.025	-0.026*	-0.015
Supervisor's gender	0.034**	-0.006	0.043*	0.029*	0.020
Supervisor's degree	0.026*	0.067***	-0.016	0.053***	0.048**
Independent variable					
COVID-19 challenges	(-0.269)***	0.060	(-0.098)***	(-0.039)**	(-0.034)**
Number of observations	391	391	391	391	391
Model fit indices					
R ²	0.384	0.118	0.314	0.409	0.307
Adjusted R ²	0.382	0.115	0.311	0.412	0.305
F	33.338***	6.576***	5.025***	4.493***	2.680***

Note: *p< 0.1, ** p< 0.05, ***p< 0.001; Significant regression coefficients are bolded and bracketed.

Table 5 COVID-19 Challenges on Aspects of Domestic Doctoral Students' Education

Dependent Variables:	Learning Experience	Communication Frequency	Students' Satisfaction with Supervision	Dissertation Experience	Doctoral Program Satisfaction
Models:	Model 11	Model 12	Model 13	Model 14	Model 15
	β	β	β	β	B
Control variables					
Language	0.024	-0.052	-0.019	-0.008	-0.020
Country of citizenship (Others)	0.030	-0.025	-0.039	0.044	0.003
Marital status	-0.024	-0.044	0.064	-0.037	-0.038
Field of study	0.094*	-0.060	0.000	0.015	-0.055
Year of study	-0.122**	-0.153**	-0.013	-0.158**	-0.062
Mode of study	-0.065	-0.099	0.015	-0.018	0.040
Admission term	0.070	0.109*	0.006	0.014	-0.018
University's region	-0.055	-0.014	0.047	0.015	0.048
Supervisor's gender	0.002	0.028	0.061	0.005	0.008
Supervisor's degree	0.052	0.095	0.010	0.000	0.008
Independent variable					
COVID-19 challenges	(-0.368)***	0.021	(-0.194)***	0.061	0.005
Number of observations	4071	4071	4071	4071	4071
Model fit indices					
R ²	0.376	0.045	0.350	0.231	0.214
Adjusted R ²	0.344	0.008	0.312	-0.206	-0.224
F	5.552***	1.211*	1.315**	0.844*	0.366*

Note: *p< 0.1, **p< 0.05, ***p< 0.001; Significant regression coefficients are bolded and bracketed.

Table 6 Effect of Control Variables on Aspects of International and Domestic Doctoral Students' Education

Category:	International Doctoral Students	Domestic Doctoral Students	Both Categories
Dependent variable:	COVID-19 challenges		
Models:	Model 16a	Model 16b	Model 17
Variables	β	β	β
Control variables			
Language	-0.005	-0.006	-0.004
Country of citizenship	0.005	0.034	(-0.026)*
Marital status	-0.015	0.076	-0.007
Field of study	(-0.033)**	0.035	(-0.029)*
Year of study	(0.127)***	-0.026	(0.115)***
Mode of study	0.006	0.047	0.008
Admission term	-0.011	(-0.129)**	-0.016
University's region	(-0.056)***	-0.060	(-0.057)***
Supervisor's gender	0.007	-0.051	0.001
Supervisor's degree	-0.019	0.008	-0.015
Model fit indices			
R ²	0.222	0.126	0.119
Adjusted R ²	0.219	-0.118	0.117
F	8.858***	0.766**	8.377***

Note: *p < 0.1, **p < 0.05, ***p < 0.001; Significant regression coefficients are bolded and bracketed.

First, this study's findings show that COVID-19 had a negative consequence for both international and domestic students' learning experience, satisfaction with supervision, dissertation experience, and doctoral program satisfaction, but not students' communication frequency with their supervisors. This is in line with previous studies.^{20–29} Second, from a comparative perspective, international doctoral students' wellbeing was affected the most, which agrees with studies which indicated that international doctoral students were most affected^{30,40} and is similar to studies that found the pandemic to have an adverse effect on the wellbeing of both domestic and international students.^{12,30–40} This further reduced students' positive learning experiences, satisfaction with supervision, dissertation experience, and doctoral program satisfaction. Regarding domestic doctoral students, the findings show that they only had negative experiences with learning and receiving supervisors' supervision. In their case, dissertation experience and satisfaction with the doctoral program were insignificant. However, throughout all estimations, all student categories observed had no issues with regard to the frequency of communication with their supervisors. The findings provide additional support for past research discoveries on the negative consequences of COVID-19 for students' wellbeing in higher education.^{2,52,53} Third, for international students, the controlled variables encompassing their field of study, year of study, and university region were found to significantly influence the challenges posed by COVID-19.

In light of the findings, critical implications are revealed as follows: First, international doctoral students are more exposed to increased stress, burnout, frustration, dissatisfaction, dropout due to bad experiences arising from non-suitable learning environments, poor supervision that affects student grooming, and late dissertation defenses rather than the usual five-year time limit for doctoral programs in Russia. Additionally, international students' ability to receive ideas and knowledge from others (eg, supervisors or experts) while conducting their research is negatively impacted which further affects their successful completion of programs. This is consistent with the findings of past studies.^{23,24} Furthermore,

mental health disorders could be higher among international students compared to domestic students in Russia. This is supported by studies that reported an increase in depressive illness, stress due to delays in graduation, anxiety, a diluted sense of belonging, and loneliness.^{22,27,29,32,35} Cumulatively, the negative repercussions can further worsen the low completion rate of doctoral programs, especially among international doctoral students in Russia and this corresponds to the finding that suggested doctoral education is characterized by low completion rates in Russia.¹³

Second, regarding the discovery of a non-significant effect of the challenges posed by COVID-19 on the communication frequency among international and domestic students, an emphasis can be placed on the intervening role of online technology communication media (WhatsApp, Instagram, and Zoom conferencing applications). Social media is bridging the communication gap, thus lessening in-person and physical communications.^{48,54} Until the emergence of COVID-19, the salience of social media was only known to a few multinational firms and institutions across the globe. However, its beneficial contribution to society was highlighted during COVID-19. This provides valid reasons why the communication frequency between doctoral students (both categories) and their supervisors was not affected. Past research has emphasized that a supervisor's contribution to a student's doctoral journey cannot be overstated.^{23,24,27} Thus, supervisors are students' primary support source, and the quality of this relationship is crucial to a student's entire experience and wellbeing.²¹ Tinto emphasized that students' experiences, for example, their frequent encounters with faculty and research staff, aid their integration into the university's environments.⁵⁵ In addition, it improves their wellbeing, and knowledge transfer.⁵⁵ Similar to past findings, for instance, international doctoral students reported higher unsatisfactory engagements (eg, dissertation supervision) with research staff who usually would aid them in resolving issues in line with their research.²⁴ This novel discovery contradicts past findings.^{20,24,25} Thus, university administrators and academics must possess adequate knowledge of online and virtual communication channels to maximize usage and serve as a risk mitigation posture to prevent a halt or bad experiences in students' online learning. Furthermore, the study revealed that the challenges posed by COVID-19 had a positive impact on domestic students' dissertation experience. Domestic students' familiarity with the educational culture of their host institutions, previous studies in the same university, and understanding of Russian society among others may have helped them to still carry out their dissertation project with few or no problems.

Third, conclusions can be drawn from the significant linkage that the challenges posed by COVID-19 had on the controlled variables. For international students, their field of study, year of study, and university region were significantly correlated. As online learning and communication became the only means of interaction, doctoral students with study fields in, for example, the natural sciences, where laboratory experiments are key for advancement of research, were negatively impacted. The year of study may imply that students in their last years faced major negative consequences. However, the year of study comprised all levels of students' doctoral programs; thus, each year group was deprived of the usual flow of scheduled progress in their doctoral program. This infers that lockdown measures during the COVID-19 pandemic may have varied according to the location of universities, as different regions may have had stricter lockdown measures than others. For domestic students, only their admission terms (full tuition, budget, and targeted admission terms) significantly correlated with the challenges posed by COVID-19. This could infer that funding support for domestic doctoral students was minimal during COVID-19. This finding aligns with past discoveries in other contexts about the increased financial difficulties faced by doctoral students.^{26,27} In this case, domestic doctoral students at Russian universities encountered more significant financial difficulties than their international counterparts.

In sum, international students' wellbeing was mostly affected by the consequences of the challenges posed by COVID-19 compared to their domestic counterparts.

Limitations and Suggestions for Future Research

Despite the intensive work done, the current study suffered from some limitations. First, the adoption of a cross-sectional design with a single phase of data gathering could affect the replication of our results in other contexts. Considering the nature of the COVID-19 crisis, it would be very useful to employ longitudinal or time-series data. In addition, the study used self-reported data that could have created a certain bias, so future studies should consider using observations and document analysis to triangulate data. Given the subjective nature of perceptions of students' experiences, there is an opportunity to extend the research and give a deeper understanding of a dual survey of university authorities/academics

and students to draw conclusions about the intensity of this study's findings or otherwise. The study mainly assessed the effect of COVID-19 on doctoral students' education. Further studies could also explore potential variables that may be more likely to show differences in a cross-cultural context, as well as variables that can aid universities and students alike to combat the negative consequences of the pandemic on doctoral research and students' welfare.

Conclusion

The study is the first to present a comparative analysis of international and domestic doctoral students' experiences during COVID-19 in Russia. It presents a piece of quantitative evidence revealing the negative consequence of the challenges posed by COVID-19 on both international and domestic students' learning experience, satisfaction with supervision, dissertation experience, and doctoral program satisfaction. Comparatively, the wellbeing of international students was mostly affected by the consequences of these COVID-19 challenges. Furthermore, there was a relative positive impact on students' communication frequency with their supervisors for both international and domestic students (which implies no effect on both categories of students). In addition, the challenges posed by COVID-19 had no effect on the dissertation experience of domestic students. Lastly, among the controlled variables, field of study, year of study, and university region were found to significantly influence the challenges posed by COVID-19 for international students.

Universities in Russia could provide more support to their international doctoral students by maximizing the use of online interactive communication technologies (eg, online libraries and class sections, Telegram, and WhatsApp) to improve learning and supervision experiences. Other areas of improvement may include introducing flexibility or a waiver of financial obligations that come along with students' admission terms to hedge against students' psychological trauma that may affect their wellbeing.

Abbreviation

IDS, International Doctoral Student.

Data Sharing Statement

The raw data supporting the conclusions of this article will be made available by the authors without undue reservation.

Ethics Statement

The study was conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all the participants. The study was approved by the National Research University, Higher School of Economics.

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