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Target audience: Leading Russian universities, government bodies responsible for education, councils from federal and regional legislatures, institutions engaged in education research, public organizations and foundations with an interest in education.

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No 1, 2021

Lessons Learned from the Coronavirus Pandemic and Possible Changes to Funding Mechanisms in Higher Education

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Abstract   This paper explores the organizational and economic response of higher education to the coronavirus pandemic and the emergency transition to distance learning. We analyze the situation across different categories of universities as well as how they respond to campus closures and to the urgent transition to remote student-faculty interactions in learning. We also assess the education system's need for additional public funding to promote digital learning environments, foster professional development of faculty members, and create job opportunities for students who have lost their jobs that paid their education and/or accommodation. Improvement scenarios are proposed for the funding mechanisms underlying the fulfillment of government contracts for education and science, which have been applied since 2013.

The SARS-CoV-2 pandemic changed the situation in higher education dramatically, affecting the majority of its mechanisms, including funding mechanisms underlying the fulfillment of government contracts for education and science by universities [Abankina et al. 2010; Abankina, Abankina, Filatova 2016; Klyachko, Mau 2015a; 2015b]. It also accelerated the development of digital learning environments in higher education institutions [Center for Strategic Research, Higher School of Economics 2018; Klyachko, Sinelnikov-Murylev 2018; Platonova, Kuzminov, Froumin 2019; OECD2020; Gouëdard, Pont, Viennet 2020], extending distance learning practices from isolated courses to entire Bachelor's, Specialist's, and Master's degree programs [Center for Strategic Research, Higher School of Economics 2018; Platonova, Kuzminov, Froumin 2019; DeBrock 2018]. Public funding for other components of education also joined the agenda, as research departments and administrative structures of universities had to embrace the new format [Abankina, Abankina, Filatova 2016; Center for Strategic Research, Higher School of Economics 2018; Klyachko, Sinelnikov-Murylev 2012].

The most important change, however, affected faculty members, regardless of whether they gave lectures, seminars, or lab classes [Barannikov et al. 2020]. The concept of student-teacher ratio was no longer relevant [Klyachko, Sinelnikov-Murylev 2018; DeBrock 2018], the boundaries between student groups became blurred, and teacher workloads had to be revised because lectures and tutorials in Zoom, Skype, Webinar, or MSTeams could be joined by students and learners from other higher education institutions [DeBrock 2018; Barannikov et al. 2020]. A prototype of virtual academic mobility for students and professors emerged, promoting inter-university networks and requiring new approaches to curriculum design and implementation as well as to public and private funding [Klyachko, Mau 2015a; 2015b]. All the innovations mentioned should be conceptualized within the framework of creating a higher education funding mechanism to be used not only and not so much in emergency situations like pandemics but rather when elaborating new blended formats of higher education development.

This paper explores the changes in higher education brought by the COVID-19 pandemic and the organizational and economic transformations (improvement of the funding mechanism) that are required to promote the system's efficiency and development.

The New Situation in Higher Education

Emergency transition to distance learning that took place in Russia and other countries in spring and fall 2020 due to the coronavirus pandemic needs to be conceptualized from both organizational and economic perspectives. On the one hand, it has become a new experience for universities; on the other hand, universities have to make progress amidst a dramatically changed, unsettled environment. Changes are

going to be both internal and external, as investments in higher education will hardly be the same as before.

Short-term organizational and economic issues at the beginning of the pandemic were caused by the imperative to ensure financial stability of universities in the face of cuts expected at least in private investments, an increase in contingency expenses on the transition to distance learning, and a drop in the limits of spending determined by the ruble exchange rate.

The COVID-19 pandemic and the economic crisis that it provoked have tangible financial and economic consequences for universities. Obviously, it will take a while to restore the level of non-public revenues. Furthermore, the lack of investment in faculty adaptation to new working conditions and technologies may reduce workforce capacity and degrade the quality of teaching. Finally, the recent-years' standard level of public spending on government-funded students will be insufficient to tackle the new problems [Center for Strategic Research, Higher School of Economics 2018].

A shortage of resources for higher education development during the pandemic and in the foreseeable post-pandemic future is not specific to Russia: similar processes have been affecting universities in many developed as well as developing economies[1].

Increased University Differentiation Following the Transition to Distance Learning

Nearly all universities in Russia switched to distance learning during the pandemic. However, institutions differed greatly in their organizational approaches, distance learning technologies, and, consequently, the quality of distance instruction. As of the date of publication of this article, those differences persist.

A number of universities, mostly the leading ones, organized distance learning by rapidly enhancing the opportunities of digital learning environments (DLE) and at the same time strongly intensifying the use of fully online courses in the learning process. Faculty members at such universities started sharing study materials online and giving online lectures and webinars. They used (and continue using) such videoconferencing platforms as Moodle, Zoom, MSTeams, Webinar, and some others for their classes. Universities that moved 100% of their activities online accelerated sharply the development of modern online courses and online exam proctoring software.

Many institutions without advanced DLEs basically switched to extramural education instead of distance learning, their students receiving and submitting assignments by email.

The major problems faced by universities in their transition to distance learning included the lack of necessary infrastructure and

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[1] See, for instance, https://russiancouncil.ru/analytics-and-comments/analytics/covid-19-chto-budet-esli-otpravit-vsekh-domoy/ or https://knife.media/universities-and-covid/

software, the need to adapt courses to the distance learning format, underqualified faculty with no remote teaching experience, and unavailability of hardware and technology required for distance learning (personal computers and/or laptops, tablets, broadband access, and Wi-Fi connection) among some students and instructors.

The leading universities, accounting for about 15–20% of all higher education institutions in Russia, solved the problems described above quite quickly. They promptly built up the necessary hardware infrastructure, improved their DLE services, and ensured mass installation of software to support distance learning. They were able to provide students and faculty with personal computers, laptops, and scanners for home use. In addition, instructors were granted subsidies to modernize their home computers (laptops, tablets) and update the software required for distance learning. Such universities also promoted IT volunteering among students and experts who assisted instructors in setting up and using DLEs and solved any emerging problems. Instructional guidelines and recommendations were issued to facilitate faculty adaptation to the new conditions, and IT departments helped faculty members with distance learning classes (platforms, schedules, syllabus, deadlines, development of study materials, etc.) and communication platforms such as Zoom, MSTeams, LMS, and others.

It became clear very soon that even DLEs created by the leading universities could not support the entire learning process as their capacity was not enough to handle thousands of concurrent users. Prior to the mass transition to distance learning, this technology was used to implement a small number of courses or modules. According to statistical data collected using the form FSN No.VPO-2, only 58.7% of Russian universities had experience of using distance learning technology in 2019. To organize distance learning at the same level as traditional classroom-based learning, universities will have to spend significant extra sums of money in the nearest future on equipment, development and procurement of software, training for faculty and administrators, production of online courses required for the learning process or adaptation of some existing MOOCs, organization of webinars, etc. Meanwhile, faculty workload in distance learning is currently not lower but considerably higher than in classroom-based instruction, as faculty members are required to learn new skills, prepare new study material and present it in a different way.

Distance learning in every course is nearly impossible to organize in practice-oriented (medical, agricultural, transport) universities and art schools as well as in most vocational schools that are part of universities. For such institutions, transition to distance learning is the most challenging and may have a negative impact on their activities.

This way, the pandemic increased the gap in educational quality between the leading universities, which switched to distance learning

without significant losses in quality, and all the other institutions of higher education. In addition, it accelerated the differentiation of universities by resource and technology infrastructure.

Universities have to invest heavily in fulfilling their socioeconomic function of preventing mass youth unemployment during the pandemic. As the pandemic and the economic downturn continue, the higher education system may have to increase student enrollment essentially in Bachelor's, Specialist's, Master's, and doctoral programs, first of all for government-funded students. These measures are socially and economically justified: not only do they reduce youth unemployment but they also make it possible to preserve and expand human capital, thereby creating the potential for an effective recovery from the economic crisis after the pandemic is over. In 2020, enrollment to government-funded programs increased by 33,000 students. In addition, universities had to create jobs for students who became unable, for various reasons, to pay for their education or associated expenses (household income declined; students lost their jobs and earnings that covered their education- and accommodation-related expenses in full or in part) as well as assist their graduates in finding jobs and internships.

The pandemic exposed the digital divide: the year 2020 revealed that many students from low-income families had no hardware required for distance learning. Digital inequality contributes to the stratification of Russian households by income, reducing the role of higher education as a social elevator in modern society. To a certain extent, this problem is solved by employing students at the university, yet other measures of support are required as well, such as providing students from socially disadvantaged backgrounds with personal digital devices (laptops, tablets, etc.) and financial allowances to pay for accommodation and academic mobility. In the new context, preferential student loans as a long-term support initiative for such student categories have been put back on the agenda.

Accelerated implementation of today's distance learning model may increase the load on universities, as they will be able to teach more students than before. In this case, a specific range of measures will have to be introduced in higher education. First of all, virtual student mobility and remote inter-university cooperation should be ensured along with increasing admission quotas for Bachelor's and Master's degree applicants. Students should be allowed to study at a distance during the entire academic term or even year with universities providing fully online programs. Students should also be allowed to choose specific courses (modules) at such universities with subsequent transfer of course (module) credits to the institution at which they are enrolled or admitted. Given the situation, virtual mobility should not involve transfer of funds from the student's institution to the host university providing fully distance learning. Furthermore, a national learning management system should be developed to provide:

- Individualized instruction
- Assessment of faculty members and their participation in academic mobility programs (involvement of faculty members in course development, assistance to leading university, tutoring, etc.)
- A funding mechanism to support academic mobility of students and faculty, including virtual mobility

Obviously, promotion of virtual student mobility will increase faculty workload at universities offering fully distance learning programs, since the number of students per faculty member will increase. Besides, the competition for strong teachers will grow up. This will make it imperative to create a national platform of open online courses, invite faculty members from universities losing their students to assist instructors at universities with increasing enrollment in reviewing homework and tests, preparing presentations and assignments, and tutoring. At the same time, professional development opportunities should be provided for such faculty members. All these measures are critical for maintaining social stability in regions as the pandemic and the economic crisis carry on.

Achieving Financial Stability of the Higher Education Sector and Creating a New Financial Model

The COVID-19 pandemic will have educational as well as economic effects on the higher education sector. Advancement of distance, online, and blended learning technology will require changes to the management and financial models further into the pandemic and during the recovery period.

According to the federal budget of Russia for 2020 and the planned budget for 2021–2022, an increase in the number of government-funded students would reduce public spending per student, adjusted for inflation, even without the coronavirus pandemic. With the pandemic, public spending per student may decline even further. Besides, a possible drop in the number of self-funded students may lead to reductions in tuition fees, worsening the situation of many public and private institutions. Distance learning is often regarded by students as inferior in quality to traditional classroom-based learning, which is fraught with demands to reimburse part of tuition fees and reduce tuition for students in the second and subsequent years of study. Petitions with such demands are filed by students in most Western universities [Klyachko, Sinelnikov-Murylev 2018; 2012].

Due to a sharp economic slowdown, financial and operational stability of universities should be a priority. A lot of them may lose a substantial portion of their revenues from non-public sources. Reasons for this may include the decrease in self-funded student enrollment levels in 2020 and the subsequent years following the dramatic reduction in effective demand for education on a fee-paying basis caused by increasing uncertainty and declining incomes; a reduction in international enrollments due to travel restrictions; growing tuition debts

caused by, among other things, the loss of jobs by most students who combined work and study in the shrinking labor market; cutbacks (suspension) of corporate and regional public funding for research and expert evaluations, which will entail stagnation of or reduction in university revenues from contract research and innovation activities within the next 2–3 years. At the same time, a number of leading universities increased their number of self-funded students and revenues despite keeping their tuition fees at the level of 2019, analysis of the 2020 enrollment campaign shows.

Universities that will lose some of their private investments will have to cut salaries, which will lead to high social tension among faculty members. There is an actual risk of non-achieving the key indicators stipulated by the Order of the President of the Russian Federation No. 597 of May 7, 2012. To this end, it makes sense to maintain the size of subsidies for the fulfillment of government contracts in 2021 regardless of the risks of non-fulfillment in cases where contracts are not fulfilled for reasons such as failure to meet international student enrollment quotas or suspension of research caused by the lack of access to research equipment during the lockdown. Furthermore, conditions should be created for adopting federal initiatives to compensate for the shortfalls in universities' non-public revenues.

Financial stability of universities could be achieved with grants for dedicated projects designed to promote technology modernization and human resource development, project-based forms of learning, participation in regional development projects, exploratory research and publications, integration with industrial partners and Russian Academy of Sciences institutes, etc. Estimated funding for this measure is about 25 bln rubles.

Stabilization of universities' financial situation could also be promoted by allowing them to apply the effective income tax relief. Currently, most universities cannot apply the zero percent income tax rate because the fraction of their income not accounted as gains from educational and research activities, in terms of the relevant list approved by the Government of the Russian Federation, exceeds 10%. In particular, this list does not include such activities as experimental implementation, expert analytics, or innovative research that make an inherent part of universities' research and educational activities. Not only does the reduction in educational institutions' non-public revenues worsen their overall financial situation, but it also entails changes to the structure of such revenues, rendering the application of the effective income tax relief essentially impossible. An adequate measure would be to extend the list of activities classified as core for calculating the tax exemption thresholds by including related activities as well, primarily those associated with intellectual property commercialization. Furthermore, the existing threshold should be lowered from 90 to 75%. This measure alone will free up at least 5 bln rubles of universities' funds.

To stabilize the financial situation of universities, it would make sense to introduce a look-ahead schedule of subsidies for the fulfillment of government contracts. This measure would help universities that have temporary cash gaps while remaining financially stable overall.

In addition to the measures described above, financial stabilization of universities at risk may be achieved tactically by providing them lump-sum financial aid from the federal budget in the amount sufficient to cover the emergency pandemic-related expenses (cleaning and disinfection costs, costs associated with infrastructure management during the idling period, recovery of the costs of remote teaching, etc.), allowing them to regain solvency and avoid cash gaps.

At the same time, restructuring is unavoidable in a number of cases. Such measures can be considered viable by the founding members if the university has lost its financial stability and the founding members do not agree with the bailout plan proposed by the management.

Distance Learning Technology and Online Education: Development and Funding

Development of distance learning technology and online education is impossible without improving the information and communication infrastructure of universities, development (or procurement) of dedicated software, centralized (for all universities) development of new software solutions, and installment of compatible DLE systems across universities. Heavy investments will be required into the accelerated advancement of DLEs in universities with low levels of digitization, IT staff expansion, and emergency expansion of broadband and 5G networks to all regions. All of these measures will be critical for the advancement of not only the higher education sector but also education as a whole, giving a tangible impetus to economic activities across the regions of Russia.

We estimate the overall amount of public funds required for the accelerated development of DLEs and open-access digital platforms to be 19 and 11 bln rubles, respectively, in the academic year 2020/21. Provision of students and instructors with personal computers and laptops (tablets) will require another 15 bln rubles (given the projected increase in the number of government-funded students).

Total costs of accelerated DLE development and implementation in universities can thus be estimated at 35 bln rubles—this is the amount to be added to expenditures under the Digital Economics national project.

Maintaining Access to Higher Education and Promoting Student Employment

In order to keep social protection programs and ensure financial stability of educational institutions, a set of public support measures is needed:

• Gradually raise the quotas for government-funded students in Bachelor's, Specialist's, and Master's degree programs

• Improve access to subsidized student loans
• Develop and implement student employment promotion initiatives
• Provide social benefits for students

Let us dwell on these four measures in more detail. Raising the quotas for government-funded students may become one of the key forms of maintaining access to higher education for young people. In 2020, target enrollment in government-funded programs increased by more than 33,000 students. The targets are scheduled to grow even higher, which may contribute to the stabilization of social situation in regions of Russia, in particular during the post-pandemic period.

Access to subsidized student loans can be improved by reducing the effective interest rate on such loans from 8.9 to 3% per annum (or 1/2 of the Central Bank's discount rate) and extending the repayment period from 10 to 15 years after graduation. This measure will solve payment issues for 15% of self-funded students (100,000 students yearly). Its actualization requires 11 bln rubles of federal funds in 2020–2022.

The government has already embarked on implementing this measure by sharply improving the student loan terms and conditions: the Resolution of the Government of the Russian Federation No. 1256 "On Amending the Rules of Subsidizing Student Loans" of August 19, 2020[2], shrinks the interest rate on student loans to 3% and extends the loan repayment period and the grace period, just as it was proposed. As a result, we already observe a snowballing growth in the number of student loans granted (Sberbank reports over 3,000 new loans in one month, which is nearly five times more than the same period last year).

Initiatives to promote employment of students at the universities where they are enrolled should be funded from the federal budget in 2021 as an effective measure to maintain student employment and at the same time stimulate effective demand. Remuneration should be equal to at least the living wage in the respective region (at least twice as much for jobs requiring high qualifications). Assuming that this measure affects up to 120,000 students, the required amount of federal funds in 2020–2021 is estimated at about 20 bln rubles.

The ongoing economic slowdown is projected to reduce the number of jobs and job openings in the labor market dramatically (by up to 15% of the employment level), escalating the competition and making it objectively unsurpassable for the majority of 2020 and 2021 graduates who won't be able to obtain employment after graduation. Paid internships are one of the effective methods of introducing graduates to the labor market. This measure is implemented via grants to businesses hiring final-year students for six-month internships in relevant fields of study (compensation of up to 90% of remuneration for student interns,

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[2] http://publication.pravo.gov.ru/Document/View/0001202008250021

at least twice the living wage per student). Provided that this initiative is applied to 25% of 2021 graduates (around 140,000 students), it will require about 28 bln rubles from the federal budget in 2021.

Declining household incomes will essentially increase the number of students eligible for bursaries, entailing deficiency of scholarship funds granted to universities from the federal budget. As of now, the total level of scholarship subsidies should be increased by 9.5 bln rubles per year to enable universities to keep offering bursaries in the established amount with due regard to the number of beneficiaries.

The overall costs of supporting the youth by improving access to higher education to prevent mass youth unemployment are estimated at 165 bln rubles at the maximum, at least for the academic year 2020/21. As long as the economy recovers from the pandemic, these costs will go down.

Expenses associated with implementing the measures described above could be reduced to some extent by inviting Master's degree, doctoral, and senior Specialist's degree students to work as teacher assistants and tutors. This way, students will also benefit by getting jobs that are socially attractive amidst an economic crisis.

Funding for Initiatives Designed to Support Universities or Higher Education Activities

Additional funding will be required for the following initiatives:

- *Design of development programs* for all universities, especially financially challenged and low-resource institutions if their programs are indispensable for the country's socioeconomic development. Public funds required for this initiative are estimated at 1–1.5 bln rubles
- *Expansion of basic and applied research in all universities*; promotion of the scientific progress according to theme-based roadmaps; purchase of educational, laboratory, and research equipment (on average 50 to 150 mln rubles per institution, or at least 10 bln rubles per 200 institutions)
- *Development of online courses by the leading universities for use by all institutions* (the costs of developing a single fully online course is estimated at 1.2 mln rubles; 6 bln rubles will be required to develop 5,000 courses)
- Centralized procurement of digital libraries of books and academic journals at the national level and provision of free access to them for all universities, whether public or private (at least 3 bln rubles per year)
- *Professional development for faculty members*, particularly distance learning technology training programs (about 700 mln rubles extra)
- Training and professional development of university management teams by the leading universities (about 300 mln rubles extra)
- Engagement of faculty members from other universities in research and development projects administered by the leading uni-

versities (on average 10 mln rubles per institution, or at least 2 bln rubles per 200 institutions)

- *Development of a modern life learning system by the leading universities,* including promotion of boarding schools for highly gifted students and lyceums for high school students, including distance learning lyceums; selection of talented high school graduates through subject Olympiads; and selection of graduates from Bachelor's degree programs (including international students who are graduates from foreign programs) to Master's degree programs through dedicated Olympiads (1–1.5 bln rubles per year for 3–5 boarding schools and yearly Olympiads).

The overall amount of additional public funding for the initiatives listed above is estimated at 24–25 bln rubles.

The entire package of support measures to address the crisis in 2020/2021 will require approximately 165–170 bln rubles, according to our estimates.

Modifying the Per Capita Funding Model

The new situation created by the pandemic brought a lot of problems in higher education, but it also revealed the necessary directions of development implying the use of distance learning technology. Heavy investments are going to be required in university infrastructure, faculty professional development, and elimination of the digital divide among students as well as instructors. However, allocation of extra funds from the federal budget will not be enough: the existing university funding mechanism should undergo a major change.

Per capita university funding has been applied in Russia since 2003 with a purpose to create a quasi-market of higher education and quasi-incentives to motivate institutions for efficiency improvement [Klyachko, Sinelnikov-Murylev 2012].

In this model, the university is awarded, on a competitive basis, a government contract, a subsidy for its implementation, calculated based on per capita spending and including almost all operating expenses (payment for utility services, repairs costs, etc.), and a subsidy for other purposes, including overhaul and purchase of equipment and software. Construction of new university buildings is financed under the Federal Targeted Investment Program.

This approach to public funding in higher education ignores the fact that education is a public good that is highly differentiated because every university has a niche and a market power of its own [Klyachko, Sinelnikov-Murylev 2018; 2012; Belyakov, Klyachko 2013, Klyachko, Mau 2015a; 2015b].

Higher education has been growing more and more individualized over the recent decades, and universities come to differ greatly in the complexity of their programs. At the same time, far not all the university expenses depend on the size of enrollment, so per capita fund-

ing for expenditures unaffected by the number of government-funded students results in a significant imbalance in financing [Klyachko, Sinelnikov-Murylev 2012].

The use of economic levers in an attempt to force weak universities out of the market only degrades the quality of education and leads to inefficient use of state-owned assets [Klyachko, Sinelnikov-Murylev 2018; 2012]. If professionals trained by a weak university are demanded by the economy and society, such university should be supported (perhaps by replacing the leadership and faculty)—and if they are not, the university should be shut down [Klyachko, Sinelnikov-Murylev 2018].

The Main Directions for Reforming the Model of Public Funding in Higher Education

The need for a budget maneuver to increase public funding for university infrastructure development has been discussed by the professional community over the past 10–15 years. The issue has gained even more ground with the outbreak of the COVID-19 pandemic, as the university funding model was undergoing a reformation. First of all, universities' demand for public funds became even more differentiated; second, as distance learning technology advances and will find ever broader applications even in the post-pandemic period, universities' expenses will become less and less contingent on the number of students enrolled [Abankina, Abankina, Filatova 2016; Center for Strategic Research, Higher School of Economics 2018].

The key fork in the road of reforming the model of public funding in higher education occurs when it comes to the proportions of government contract subsidy and subsidy for other purposes in the total amount of public funds allocated to universities. Accordingly, two major scenarios to modify the existing funding mechanism are proposed.

Scenario 1. The percentage of government contract subsidy is reduced, and standard per capita funding rates apply only to expenses directly associated with providing educational services, primarily the number of students enrolled. Such expenses are mostly represented by faculty remuneration, including an increase in the number of teacher assistants and tutors interacting with students remotely.

Meanwhile, the proportion of subsidy for other purposes is raised to cover all expenses that are not directly associated with student population, including those on the development and maintenance of DLEs, creation of online courses, development of campus infrastructure (except construction of permanent buildings), improvement of access to study and laboratory equipment, etc.

Scenario 2. The proportion of government contract subsidy is increased as per capita funding is applied to more and more university expenses, including those related to DLE development; correspondingly, the proportion of subsidy for other purposes is reduced.

Key Measures Implied by the Two Scenarios of Funding Mechanism Modification

Scenario 1 implies that target enrollment is determined for every university by the Ministry of Science and Higher Education with the participation of founding members (on a non-competitive basis) for three years based on a sliding scale (competition for the distribution of a certain number of government-funded places is held among private universities only); the basic public funding standards apply to variable costs only (few components: salary, social payments, expenses on textbooks and other study materials including digital resources); all the other expenses of universities, account being taken of their newly emerged needs, are financed using the calculation of standard costs by the type of expenditure (utility services, repair works, DLE development, purchase of expendable supplies, expenses on academic exchange (including virtual programs), transport and communications, and other expenses); university development programs are financed based on cost calculation by item of expenditure. University development program indicators are negotiated with the founding members of universities; universities are allowed to change their business plan at their own discretion and redistribute their expenses among the items of expenditure depending on the economic context, if necessary; the size of tuition for self-funded students is determined by the university, the "at least the standard rate for a government-funded student" restriction being abolished.

Methods of calculating the per capita funding standards should be changed. The new model of public funding in higher education suggests keeping the basic standard only for remuneration of faculty and other staff directly involved in providing public services as well as expenses on the purchase of study literature, periodicals, publishing and printing services, and electronic publications directly related to the provision of the relevant public services.

In the new model, the basic standard of faculty payroll costs (including taxes) should be uniform within every level of university education, the lowest one being in Bachelor's and Specialist's degree programs, 10% higher in Master's degree programs, 30% higher in doctoral programs, and 25% higher in postdoctoral programs, percentages being taken from the previous level.

All the other components in the structure of basic standard expenses should be transferred to the subsidy for other purposes, which is calculated with regard to the current prices of goods and services in the regions of Russia.

Expenses on salaries (including taxes) to staff members who are not directly involved in providing public educational services are also estimated on the basis of cost calculation, as administrative staff salaries are contingent on maintenance of buildings and facilities, organization of repair and overhaul works, etc.

Expenses on salaries (including taxes) to teaching assistants and auxiliary personnel are tied to the basic standard of faculty payroll

costs, since these employees ensure organizational support of the learning process.

All the existing sectoral adjustment coefficients should be preserved, but coefficients of university effectiveness may be changed.

The part-time and extramural learning coefficients should be raised, considering that these formats will be gradually converted to distance learning based on network forms of learning organization: the part-time learning adjustment coefficient should increase from 0.25 to 0.5 in 2021–2022, and the extramural learning adjustment coefficient should increase from 0.1 to 0.15 if the proportion of extramural students reaches 20% in 2021, and to 0.25 if the percentage of distance learning goes up to 30% in 2022–2023.

Of the two existing regional adjustment coefficients applied to faculty remuneration, only the one that makes allowances for average regional salaries should be preserved for public services in higher education (determined for every region of Russia), irrespective of the office to which the university is subordinate.

The per capita funding standards calculated as described above along with normalized annual average enrollment determine the total amount of the government contract subsidy.

Maintenance of a public university's facilities and resources, including repair and overhaul works, purchase of equipment, etc., is performed based on cost calculation and is included in the subsidy for other purposes because the property of such universities belongs to the state. All property and land taxes are also accounted to the subsidy for other purposes without making allowances for the gainful activity coefficient, which should be cancelled.

The rest of the subsidy for other purposes, as before, should go to scholarships.

Calculation of funding for university development programs makes allowances for efficiency of previous development programs or some of their components. Funds are provided to universities as a subsidy for capital investments (within the investment part of the development program) or are included in the subsidy for other purposes.

Scenario 2 suggests fewer changes to the existing funding mechanism and implies the following set of measures:

- Expand the use of sectoral coefficients to all universities (as of now, they only apply to universities entitled to develop their own learning standards pursuant to Article 11 of the Federal Law "On Education in the Russian Federation")
- Enable universities to apply for higher funding standards as a reward for high efficiency and achievements in education and science. Thereby, transparent and powerful incentives will be created to motivate every university to improve their strategies, increase their human resource potential, and foster technology innovation

- Fix the funding standards for the whole period of study instead of calculating them yearly for the whole student population—in the same way as total tuition is fixed by universities for the whole period of study under the Law on Education. In particular, this measure will smooth the transition to higher funding standards when quality coefficients come to be applied by all universities
- Adapt the structure of education funding standards to modern educational technology, i. e. consider the costs of providing IT support services, developing and maintaining digital learning resources (in particular through amortization), and increasing the proportion of the payroll budget for teaching assistants and auxiliary personnel (including organizational and methodological support of online processes).

Along with improving the funding standards that maintain the essential functioning of the system of higher education, the mechanisms of project-based and special-purpose funding should be worked out to provide a targeted response to specific challenges in the evolution of the education sector, such as further reorganization of university property by developing the standards of property allocation and optimizing the range of property assets that are not used in universities' core activities; retention of scientists with internationally recognized research findings in Russia by compensating for the universities' expenses on creating competitive working conditions for research; providing accommodation to non-resident and international students by integrating a residence hall construction program and civilized mechanisms of assisting students in the rental housing market with due regard to specific contexts. In addition, support should be given to network forms of education programs and student mobility, in particular by removing the regulatory and economic barriers to inter-university and inter-sectoral cooperation in higher education. Furthermore, a motivation-based model of student scholarships should be elaborated to create effective personal incentives for students. Scholarships should enable undergraduate and postgraduate students to spend their free time on self-improvement instead of searching for ways of providing for themselves and their young families. Bringing student scholarships to the level of average starting salaries in the relevant field will broaden learning opportunities for students. Another advisable measure would be experimental integration of targeted funding mechanisms for public educational services based on social certification. The experiment should begin with offering government-funded places to prize winners of the All-Russian School Olympiad on the basis of such certificates.

    Both scenarios of funding mechanism modification involve financial measures to promote research in higher education. The key incentives should be the following:

- *Introduce long-term research programs as a form of planning to fulfill the government contract*. Such programs should be developed for the period of six years with prolongation upon achieving the target indicators. The price of government contracts for university research should reach at least 50% of the price of government contracts for education by 2024, and at least 100% by 2030. Allocation of government contract subsidies among universities and national research institutes should be performed on a competitive basis as well as under the Strategic Academic Leadership Program. Applications and research findings should be subject to independent evaluation by experts from the national panel of experts
- *Launch a new competition for institutional grants* for the development of universities' scientific potential. According to our estimates, each grant should be at least 100 mln rubles and should be provided for a period of at least five years. The competition should be administered by the Russian Science Foundation
- *Add research team support tools* to the structure of RFBR[3] or RSF[4] grants (depending on whether RFBR will be merged with RSF). Grants should be at least 10 mln rubles and should be provided for at least three years, and the proportion of grants in the total budget of the National Program for Scientific and Technological Development should be increased to 12% (from 6.5% in 2020)
- *Attract and retain scientists with internationally recognized research findings*. For this purpose, universities (and research institutes) should be compensated up to 50% of their researcher payroll costs in Moscow and Saint Petersburg, and up to 100% of such expenses in regions. In total, compensation for expenses on salaries to 1,500 internationally recognized scholars is suggested;
- *Implement a support program for young researchers* including Russian postgraduates.

It would also make sense to add equipment for new and promising research areas to the existing equipment upgrade program, thereby also promoting the development of research equipment in Russia. Programs for scientific, technological, and academic cooperation of universities with corporations, regional clusters, and specialized research institutes should be prolonged. At the same time, innovative entrepreneurship should be supported and encouraged as an independent mission.

Both scenarios of modifying the university funding mechanism imply that the new model will feature a flexible combination of per capita funding for educational services and project-based and special-purpose funding for development and reformation. Such an approach is

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expected to ensure a breakthrough growth in higher education quality within acceptable budget constraints.

Conclusion   The COVID-19 pandemic changed the format of learning in higher education and revealed a considerable differentiation of universities by the quality of digital learning environment and the level of digital infrastructure development, exposing digital inequality among both students and instructors. Heavy public investments are required to increase higher education funding in order to bridge the gaps in university infrastructure and overcome the digital divide. Further discussion is required on the funding mechanism of ensuring access to distance learning for students, yet institutional methods appear to be the most effective ones, as with bursaries.

At the same time, transition to distance learning during the pandemic showed that granting extra public funding to universities is not enough: the existing funding mechanism underlying the fulfillment of government contracts should be restructured. Two scenarios of restructuring are proposed: the first one suggests preserving per capita funding standards for faculty remuneration only and accounting all the other university expenses to the subsidy for other purposes, while the second one, on the contrary, suggests extending the range of per capita funding items and removing part of the costs from the list of expenses covered by the subsidy for other purposes.

Both scenarios imply changing the principles of university research funding, raising bursaries, integrating social certificates that will benefit prize winners of national school Olympiads at the first stage, and creating financial conditions for attracting and retaining internationally recognized scholars in Russia. It means that project-based and special-purpose funding should be used along with per capita funding standards to achieve a more effective handling of the new problems faced by higher education.

Translated from Russian by I. Zhuchkova.

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The Future of Distance Learning as Perceived by Faculty Members

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Received in
June 2020

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Abstract

A questionnaire survey of 33,987 faculty members in April 2020 revealed predominantly negative evaluations of learning effectiveness in the context of distance learning, as compared to in-person instruction, and a rather pessimistic vision of the future of higher education in Russia. This article formulates hypotheses about the reasons of such attitudes among faculty members and provides arguments for possible opinion shifts and alleviation of resistance to technological change. The paramount problem consists in the contradiction between the acceptance of the idea and value of digital innovation and the rejection of such at the level of personal teaching practices. During expert interviews, faculty members were offered alternative scenarios of the future. The data obtained was then used to analyze the attitudes and beliefs behind their resistance and to find out which perceptions of the future correlated with negative and positive evaluations of distance learning.

A strong belief that modern education development is inextricably connected with digital solutions, the ever-complicating world of software products, Internet technology, distance communication, and massive open online courses dominates today in publications and analytical reports [Basak, Wotto, Bélanger 2018; Faisal, Kisman 2020; Polat, Ekren 2020; Reinertsen 2020; Rye 2013; Vasilyeva, Fefelova 2019; Voytsekhovskaya 2019; Center for Strategic Research, Higher School of Economics 2018; Zakharova 2016; Martynov 2013] as well as in administrative laws and journalistic articles. Yet, skepticism about this sce-

nario persists as well: in private conversations, interviews, and public speeches, professors give rather negative remarks about the ongoing technological and organizational change.

Exceptions are rare and rather reflect peculiarities of respondent sampling than opinions of any specific group of faculty members. A fairly positive perspective of adaptation to self-isolation and emergency transition to distance learning during the coronavirus pandemic is presented by Evgeniy Terentev and Ulyana Zakharova [2020:77–79]. In their opinion, professors successfully mobilized to work under the new conditions, and models for choosing communication platforms emerged during the very first weeks. Nevertheless, the authors mention serious mental health issues, increasing social isolation, challenges of working from home, heightened uncertainty, and indeterminacy in planning. It remains an open question whether mobilization is the right word to be used in the context of this mental crisis.

In spring 2020, the Covid-19 pandemic forced nearly all academics to move online [Tesar 2020:557]. From a hypothetical and auxiliary format, distance learning became everyone's Hobson's choice overnight. The absence of alternatives was spiced by feelings of uncertainty and fear of the future which can take unpredictable turns. Counter-measures against the spread of infection were implemented from above, and the transition to distance learning came to be associated with administrative command. Grassroots innovations, autonomy, and initiative fell by the wayside, superseded temporarily by the urgent and quite aggressive imperative of rapid adaptation to a force-majeure situation.

A giant leap in the spread of distance learning has happened, inevitably encountering an equally powerful wave of resistance and antagonism. No learning support measure [Klyagin, Makaryeva 2020] can substitute for the habitual face-to-face communication. Without understanding and accepting the distance learning practices, emergency transition to online education only meets irritation and an urge to come back to familiar formats as soon as possible[1].

Any significant change to information technology will encounter resistance [Bauer 1991; Hirschheim, Newman 1988; McCabe, Ciuk, Gilbert 2019]. However, not every change is accepted in essence, ideologically, while being renounced effectively, in practice—and yet this is exactly how distance learning is perceived by most faculty members. While being open to information technology and distance learning formats in theory, they are reluctant to use them in teaching, unwilling to immediately give up on their decades-old analog instruction practices. This article seeks to explore the dualism in faculty's perceptions of the ongoing changes and the ambivalence of their values and attitudes.

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[1] Fedoruk M. "Talking to the Box": Rector of Novosibirsk State University on the Challenges of Online Learning. *RBC-Novosibirsk*, June 5, 2020: https://nsk.rbc.ru/nsk/05/06/2020/5ed8b03e9a79477260724ceb

Simply acknowledging the resistance to distance learning and the undeniable preference for in-person, classroom-based instruction is not enough. It is necessary to figure out the reasons for such resistance, explore the attitudes and expectations associated with eliminating face-to-face communication or radically reducing it, and assess correlation between the evaluations of distance learning and the expectations and perceptions about the future of higher education as such. The main research question is thus the following: which expectations increase, and which reduce resistance to distance learning? A field for further social research will be constructed by answering this question.

Method of Data Collection and Analysis

A survey of university instructors was conducted by The Ministry of Science and Higher Education of the Russian Education and the Russian Presidential Academy of National Economy and Public Administration (RANEPA) on April 10–15, 2020. Originally, 58,612 people participated in the survey, of whom 20,273 failed to meet the sampling criterion (faculty membership). Only 6% of the initial faculty sample refused to participate, and 5% of completers interrupted the questionnaire. The final set of data consisted of 33,987 fully completed questionnaires.

A river sample (for more on non-probability sampling, see [American Association for Public Opinion Research 2016]) was formed using three techniques: (i) asking university management to organize a blanket survey of faculty members; (ii) chain-referral (snowball) sampling; and (iii) targeted sampling by placing banners on the social networking websites Facebook and VKontakte[2].

Unlike probability sampling, there is no single framework that adequately encompasses all of non-probability sampling [American Association for Public Opinion Research 2016:138] or analysis of data sampled this way. Non-probability sampling is highly contingent on decisions made by those who are selected than those who select. Traditional statistical methods based on probability estimates allow testing hypotheses about non-randomness of relationships revealed. In non-probability sampling, however, the concept of "randomness" becomes rather problematic. Sergey Chesnokov proposed an alternative method of social data analysis, which he named "determination analysis" [Chesnokov 2009]. This method is based on the idea that no answer is random and relationships and patterns should be discovered

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[2] For more on survey methodology and sampling procedure, see: Rogozin D. (2020) *Metodicheskoe opisanie issledovaniya: Massovy opros professorsko-prepodavatel'skogo sostava vysshikh uchebnykh zavedeniy Rossiyskoy Federatsii o razvitii onlayn-sredy v usloviyakh koronavirusnoy infektsii (COVID-19), 10–15 aprelya 2020 g.* [Methodological Profile of Research: A Mass Survey of Faculty Members in Russia on the Development of Online Learning Environments amidst the COVID-19 Pandemic, April 10–15, 2020], Moscow: Institute for Social Analysis and Forecasting, Russian Presidential Academy of National Economy and Public Administration. April 23 (manuscript).

by forward calculation of various sets of characteristics. Chesnokov's theoretical approach is thus focused on searching for statistical determinism and revealing the rules behind the choice of answers.

Large non-probability samples are the best for determination analysis, as they allow to avoid calculating the mean and the standard deviation as well as analyzing correlations between different parameters, and to calculate precise dispersions of meaningful sets of characteristics instead. Otherwise speaking, large samples afford ground for analysis of subsamples emerging as a function of respondents' answers.

Data analysis is built around calculating all possible combinations of significant parameters of perceptions of the future and comparing them to the target characteristic of faculty members' beliefs about effectiveness of in-person and online education. Faculty's perceptions were assessed by their answers to the question, "Do you think the quality of online learning is higher, lower, or the same as in offline instruction?" The difference between online and distance learning is not problematized in the present article, the two terms being used as synonyms.

Parameters of perceptions of the future were identified based on transcripts of expert discussions with faculty members from RANEPA and Moscow School of Social and Economic Sciences (Shaninka) and researchers from RANEPA's Institute for Social Analysis and Forecasting. A total of six significant characteristics of such perceptions were isolated: individualization of educational trajectories, development of online learning environments, increase in competition, development of new student assessment methods, increase in government control, and increase in professors' freedom to choose teaching methods.

This operationalization of significant characteristics has a number of essential limitations, first of all associated with the risk that the image of the future is incomplete and unthinkable in expert evaluations. Respondents were simply asked to agree or disagree with the forecasts offered, which had been formulated in advance and represented contextually determined expert evaluations. At the same time, this mechanism of building a dataset using closed-ended questions allows lowering the cognitive load on respondents and reducing the time spent on the survey.

A Negative Future

At first, faculty members were asked to compare the quality of learning in online and offline formats without the temporal perspective. Seventy per cent said that the quality of online learning was inferior, only 2% considered it superior, 15% found no difference in learning quality between the formats, and 13% were undecided. The majority of professors thus gave priority to in-person instruction.

Next, faculty members were asked about the future of the education system, in which the share of distance learning will obviously be substantially higher: "A year from now, do you think the quality of higher education in Russia will be better than now, worse, or remain

Table 1. **Six assumptions about the future of higher education** (row percentage)
Question: Imagine what higher education in Russia will be like a year from now.
To what extent do you agree or disagree with the following?

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree	Undecided
Learning will become more individ-ualized, tailored to students' personal educational trajectories	6	30	34	12	17
The vast majority of lectures and seminars will be delivered remotely in online learning environments	3	19	43	24	11
Regional enrollments will decline due to an outflow of students to global online education markets	8	29	32	9	21
New student assessment methods will be introduced that are focused more on self-assessment	9	54	17	5	15
Government control over curricu-lum and teaching methods will increase	11	40	20	6	23
Faculty's freedom to choose teaching methods and techniques will increase	6	35	31	12	16

unchanged as a result of the COVID-19 pandemic?" Only 15% of professors believe that educational quality will improve, while 43% say it will degrade, 20% think it will remain unchanged, and 23% refused to answer this question. In the current situation of disrupted work routines, work-life convergence, restrictions imposed on travel and, most importantly, freedom during the self-isolation period, one can hardly notice any improvements or confidently expect them in the future. Pessimism about the future affects experiences at present [Seginer 2000:308], shaping negative attitudes toward not only current events but also people and measures taken to overcome the devastative effects of the pandemic.

Apart from general evaluation of the national education system of the future, faculty members were also asked to agree or disagree with six possible scenarios of higher education development in the next 12 months on a five-point scale (Table 1).

In such an uncertain situation as today, the future appears vague, so categorical judgments are rare among professors. The only scenario encountering strong disagreement on the part of a large percentage of faculty members (24%) is that the majority of lectures will be moved online (24%); for the rest of the assumptions, categorical an-

swers are at least twice less frequent. Few respondents believe in fully online learning, 67% disagreeing with this point somewhat or strongly. Such judgments are quite reasonable, as distance learning does not imply mandatory dismantlement of the in-person instruction model.

Thirty-six per cent agree and 46% disagree (the options "Strongly agree" and "Somewhat agree" are merged, and so are "Strongly disagree" and "Somewhat disagree") that education will become more individualized and personalized. Twenty-two per cent agree and 67% disagree that most lectures and seminars will be moved online. Thirty-eight per cent agree and 43% disagree that there will be an outflow of students to global universities. Sixty-three per cent agree and 22% disagree that new assessment methods will be introduced. Fifty-one per cent agree and 26% disagree that government control over education will increase. Finally, 41% agree and 43% disagree that professors will have more freedom in choosing the methods and techniques of teaching.

Three assumptions split the sample almost in halves: 30% somewhat agree and 34% somewhat disagree that learning will become more individualized; 29% somewhat agree and 32% somewhat disagree with an increase in global competition and a reduction in regional enrollments in the future; 35% somewhat agree and 31% somewhat disagree that academic freedom will increase.

Finally, two scenarios find more support than resistance: 40% of faculty members believe that government control over curriculum and teaching methods will increase, and 54% agree that new methods of student assessment will be introduced. Most of the respondents who are apprehensive about the future expect first of all an increase in government control and changes to their own control practices, i.e. assessment methods. A negative future is rather associated with control than freedom.

Variability of the Future in Faculty's Answers

Let us consider all possible combinations of answers—"Agree", "Disagree", and "Undecided"—to the six scenarios of the future of higher education offered to faculty members, provided that the options "Somewhat agree" and "Somewhat disagree" are included in the options "Agree" and "Disagree", respectively. There are 650 possible combinations that can be made out of six items and three response options—that is the number of unique groups that can be isolated from the sample. Out of 30,779 faculty members in the dataset, 79 had unique combinations of response options that were not reproduced by any other respondent; 233 combinations reoccurred from 2 to 9 times; and 284 were reproduced from 9 through 99 times. These are rare combinations of answers that may arise from fault or negligence, and they are irrelevant to the present study. Meanwhile, 54 out of 650 combinations were reproduced by over 100 faculty members each. These are of much more interest, as they reflect some common trends and patterns.

Table 2. **Combinations of faculty's answers about the future of higher education** *(row percentage)*
Question: A year from now, do you think the quality of higher education in Russia will be better than now, worse, or remain unchanged as a result of the COVID-19 pandemic?

Combination code*	Better	Worse	Unchanged	Undecided	Number of respondents
111111**	43	25	20	12	1613
222222	3	67	23	7	1258
111221*	**35**	**23**	**30**	**12**	**1073**
211122	*5*	*70*	*16*	*9*	*899*
211222	8	52	27	13	891
212222	4	60	28	8	839
000000	1	18	8	73	804
111121	29	37	21	13	793
111222	16	44	27	14	630
111211	**43**	**15**	**30**	**12**	**616**
221122	*4*	*73*	*16*	*7*	*530*
211121	20	44	21	15	509
211111	28	39	20	13	501
211221	25	33	28	14	497
111122	9	60	19	12	472
222122	2	83	11	4	464
221222	5	56	31	7	459
121222	12	48	31	10	448
121221	**39**	**21**	**29**	**10**	**431**
122222	8	54	29	9	364
211112	6	66	16	11	343
121111	38	32	20	10	334
112222	8	49	29	14	329
212122	*2*	*77*	*14*	*7*	*314*
000020	3	27	17	53	289
121122	*6*	*72*	*16*	*6*	*286*
121121	32	39	22	8	274
111112	10	57	19	14	211
000022	4	61	13	22	186
112221	22	31	37	10	181
221112	*5*	*71*	*14*	*10*	*174*
111011	31	13	21	35	170

Combination code*	Better	Worse	Unchanged	Undecided	Number of respondents
111021	25	23	17	36	163
211211	30	29	23	19	162
202222	2	52	29	17	161
221221	20	38	29	12	156
200022	2	64	11	24	152
212221	18	32	40	10	147
221121	23	55	16	5	146
221111	15	60	18	7	141
002222	2	53	21	24	129
101222	18	37	20	25	127
001000	4	23	10	63	123
101221	**33**	**14**	**20**	**33**	**123**
222221	18	47	29	7	120
121112	14	61	16	9	119
121211	**52**	**16**	**20**	**12**	**119**
122221	27	35	32	6	118
211022	5	46	22	28	116
222022	2	76	13	9	113
211212	9	55	24	12	105
000220	3	22	21	53	103
101111	28	18	21	34	101
210022	4	68	9	19	101

* Codes are made up of the item's position and response options: position 1—assumption about individualized learning, 10—about moving the majority of lectures online, 100—about reduction in regional enrollments, 1000—about new methods of student assessment, 10000—about an increase in government control, and 100000—about an increase in academic freedom. Response options are coded as 1 for "Agree", 2 for "Disagree", and 0 for "Undecided". Summing up all the answers in the matrix table, we obtain combination codes that allow unambiguous identification of response options chosen by each respondent. For example, code 0 means that the respondent was undecided about every scenario; code 111111 means that the respondent agreed with each assumption; and code 222222 means that the respondent disagreed with all the items. Code 111221 reflects the following belief about the future of higher education: professors' freedom in choosing the methods and techniques of teaching will increase (code 1000000), government control over curriculum and teaching methods will increase as well (code 100000), and new student assessment methods will be introduced (code 1000), but regional enrollments will not reduce (code 200), and the vast majority of lectures and seminars will not be moved online (code 20), even though instruction will become more individualized (code 1).

** Combinations with six repeating digits (111111, 222222, 000000) may indicate gross measurement errors caused by respondent's negligence or intentional dishonesty. Such answers require revalidation, but due to the lack of variables allowing to assess their integrity, these combinations are excluded from the present analysis.

*** Combinations of answers that are predominantly optimistic about the future of higher education are given in boldface, and those that are predominantly pessimistic are given in italics.

Table 3. **Five most pessimistic groups of faculty members**
Question: Imagine what higher education in Russia will be like a year from now.
To what extent do you agree or disagree with the following

	The quality of higher education will be worse a year from now* (percentage of respondents with a negative view of the future in the group,%)				
	70 (211122)**	71 (221112)	72 (121122)	73 (221122)	77 (212122)
Learning will become more individualized, tailored to students' personal educational trajectories	No	No	No	No	No
The vast majority of lectures and seminars will be delivered remotely in online learning environments	No	Yes	No	No	No
Regional enrollments will decline due to an outflow of students to global online education markets	Yes	Yes	Yes	Yes	Yes
New student assessment methods will be introduced that are focused more on self-assessment	Yes	Yes	Yes	Yes	No
Government control over curriculum and teaching methods will increase	Yes	No	No	No	Yes
Faculty's freedom to choose teaching methods and techniques will increase	No	No	No	No	No

* Response option "Worse" to the question, "A year from now, do you think the quality of higher education in Russia will be better than now, worse, or remain unchanged as a result of the COVID-19 pandemic?"
** Combination code (see footnote to Table 2).

That is to say, 54 combinations of answers, or 8% of all possible combinations, represent opinions of 20,027 professors, or 65% of all questionnaire respondents (Table 2).

On average, degradation of the quality of higher education is predicted by 43% of faculty members, the proportion of pessimists reaching two thirds in some groups with specific combinations of scenario choices.

The Most Negative In five groups, the share of pessimists is in excess of 70% (Table 3). Beliefs shared by these groups are agreement with the assumption that regional enrollments will reduce due to an outflow of students to global online education markets and disagreement with the scenarios of individualized learning and increased academic freedom.

Pessimism about distance learning is associated with detachment and alienation from the current events as well as changes and transformations initiated from above. Imposed changes trigger irritation and apathy.

Antagonists of distance learning are categorical and presumptuous in their answers to the open-ended question about the future of education. Their comments are basically addressed either to the distance

learning of 30 years ago—when technology was so primitive that interactivity, personalization, and communication were out of the question [Curran 1987; Rampal 1989]—or to extramural learning.

> Education and formation of personality are impossible without face-to-face interaction with students. Distance learning as a strategic policy of higher education will be misleading for the country. We don't need creators, only operators of foreign equipment (Doctor of Sciences, Peter the Great St. Petersburg Polytechnic University).

> Simplification of education and elimination of academia as such. Perhaps, higher education will cease to exist or be replaced by some kind of ersatz (Doctor of Sciences, institution unspecified).

> Depersonalization of the learning process and extreme digitization of all interactions leading to ultimate social disintegration (Candidate of Sciences, Moscow International Higher Business School MIRBIS).

> The human aspect will go, and educational formalism will thrive; creativity will be inhibited by distance learning (Doctor of Sciences, Mordovia State Pedagogical Institute).

> A crackdown on professors' initiative by tight and incompetent control from the government and administrators (Doctor of Sciences, Irkutsk State University).

Lack of freedom and autonomy, depersonalization, and passive response to external factors shape anti-innovation behaviors among faculty members, spurring them into concealed protest and sabotage of any technological change.

It would hardly be reasonable to infer that critics of distance learning lack the key four motives of educational innovators: self-sufficiency, novelty search, universalism, and kindness [Khavenson, Koroleva, Lukina 2018:8–9]. Rather, they lack self-confidence and opportunity to exhibit the qualities mentioned above, rejecting the very possibility of choice and change and seeing distance learning as an adverse administrative decision imposed from above.

Rudy Hirschheim and Michael Newman identify nine reasons for resistance to digital technology: (i) innate conservatism, inertia, and reluctance to change the familiar practices and habits; (ii) lack of felt need, i.e. lack of obvious benefits from the change or impossibility to recognize them; (iii) uncertainty, inability to predict the future, and lack of income security; (iv) lack of involvement in the change, i.e. the feeling of being excluded from the decision-making process and resistance to being changed by others; (v) risk of uncontrolled redistribution of resources and the threat arising from the disruption of the *status quo*; (vi) organizational invalidity, i.e. a mismatch between spe-

Table 4. **Five least pessimistic groups of faculty members**
Question: Imagine what higher education in Russia will be like a year from now.
To what extent do you agree or disagree with the following

	The quality of higher education will be worse a year from now* (percentage of respondents with a negative view of the future in the group,%)				
	14 (101221)**	15 (111211)	16 (121211)	21 (121221)	23 (111221)
Learning will become more individualized, tailored to students' personal educational trajectories	Yes***	Yes	Yes	Yes	Yes
The vast majority of lectures and seminars will be delivered remotely in online learning environments	No	Yes	Yes	No	No
Regional enrollments will decline due to an outflow of students to global online education markets	No	No	No	No	No
New student assessment methods will be introduced that are focused more on self-assessment	Yes	Yes	Yes	Yes	Yes
Government control over curriculum and teaching methods will increase	D/K	Yes	No	No	Yes
Faculty's freedom to choose teaching methods and techniques will increase	Yes	Yes	Yes	Yes	Yes

* Response option "Worse" to the question, "A year from now, do you think the quality of higher education in Russia will be better than now, worse, or remain unchanged as a result of the COVID-19 pandemic?"
** Combination code (see footnote to Table 2).
*** Answer to the item in the current row. Each column thus reflects the combination of answers that corresponds to the column's code.

cific features of change and characteristics of the existing organization, including elements of organizational structure and work patterns; (vii) lack of management support and substitution of control and accounting for cooperation; (viii) poor technical quality or low computer literacy; and (ix) personal characteristics of the developers and users [Hirschheim, Newman 1988:399–400].

The present study did not perform such a differential diagnosis of resistance to change, but the answers obtained from respondents already allow identifying the distinguishing characteristics of the current rejection of distance learning and, hence, of latent resistance to digital innovation. First of all, these include uncertainty, lack of engagement, fear of losing the *status quo* and money, and a strong belief that control and supervision over teaching will increase.

The Least Negative

In five groups of respondents, the proportion of negative evaluations is minimal, ranging from 14 to 23% (Table 4). These groups share disagreement with the scenario of reduction in regional enrollments and a strong agreement that learning will be individualized and academic

freedom will increase. In addition, they believe that new methods of student assessment will be introduced that will be focused more on self-assessment.

Optimistic assessment of the situation should probably not be expected amidst a pandemic, with the exception of some answers given from the perspective of administrative approval: "We're fine! No problems, I agree with everything." However, such answers are far more evasive than optimistic. Even positive evaluations are born through struggle and strain, in spite of the fear of external threats. With this in mind, the groups of respondents with relatively low levels of pessimism will be hereinafter referred to as pessimists with a new perspective, or neo-pessimists. This perspective has a lot in common with the phenomenon of defensive pessimism [Saana et al. 2006; Seginer 2000; Spencer, Norem 1996] as a method of resisting current or upcoming threats.

Neo-pessimist professors as a subsample of respondents in the present study differ little from other groups in gender, age, and academic degrees and titles, but they differ significantly in preferred methods of teaching and attitude towards the education process. Online learning materials are used by 76% of neo-pessimist faculty members, as compared to 62% in the total sample. Fifty-four per cent of neo-pessimist professors believe that access to learning materials should be open for everyone, as compared to 39% in the total sample. Finally, 49% of neo-pessimists are willing or somewhat willing to include supplementary reading in a foreign language in their courses, as compared to 40% in the total sample. Therefore, it is not young age or computer skills but a shared belief in the possibility of free teaching independent from administrative pressure that fosters positive perceptions of the future and readiness to support the integration of online technology.

Neo-pessimists are ready to embrace digital technology and expand the field of communication in educational and research activities.

> Distance learning expands faculty collaboration all over the country, promoting exchange of achievements to find and select methods and techniques of teaching within specific fields of study and majors in the evolving online environment (Doctor of Sciences, Yuri Gagarin State Technical University of Saratov).

> More opportunities for academically engaged students and higher dropout rates among low performers, that's what I see as the main idea (no academic degree, Kuzbass State Technical University).

> We might face formalization, schematization, simplification of knowledge, for example in philology, shortage of communication with the professor, and lack of live feedback from students, which lecturers need so much. And at the same time we can expect high levels of self-organization and learning autonomy from students, although no one knows what will come of it. Students need permanent men-

torship up to a certain moment (Candidate of Sciences, Saint Petersburg State University of Economics).

Distance learning makes communication with students more personalized, as they find it easier to do it online. But rigid control from the Ministry will deny professors the opportunity to restructure the content of lectures. I wish there were less ministerial intervention in education (Candidate of Sciences, D. Mendeleev University of Chemical Technology of Russia).

Distance learning allows the professor to find new ways of content delivery and student assessment to be used later in person. Still, the professor and the student are separated by the monitor, which is a huge mental stress (no academic degree, Moscow State University of Geodesy and Cartography).

Neo-pessimists do not tout impersonal forms of learning. For them, distance learning is a new educational technology yet to be assimilated, which supplements and enhances in-person instruction, and thus can always take free and mixed formats depending on the context and student characteristics. It is in adaptive web design [Prasad et al. 2014; Montanana et al. 2015], gamification of learning [Joseph et al. 2013], extended discussions with ubiquitous device support [Zhao, Okamoto 2009], digital logic design for knowledge representation [George 2019; Weng, Zhu, Cheng 2009], possibility of remote experiments [Oguz 2016; Polat, Ekren 2020], and step-by-step complex systems of skill acquisition and assessment [Kaya, Tan 2014; Nickels 2000] that researchers see advantages of distance learning.

Allegedly, researchers actually prevail among neo-pessimists. Distance higher education ultimately dissolves the boundaries between teaching and research. Teaching is not perceived as transmission of a body of knowledge anymore, but as experimenting, testing hypotheses, solving complex problems, and searching for optimal solutions together with students. The traditional division into basic and applied research is subject to a fundamental revision, as a holistic knowledge of the world is always theoretical and applied at the same time.

It is not in-person instruction but analog, limited knowledge that is confronted by distance, or digital, learning. At the same time, face-to-face formats of education have been traditionally opposed to extramural learning. It is this blend of distance and extramural learning formats that feeds the resistance, nudging faculty members to see a degradation of higher education in distance learning. In practice, distance learning can be implemented in in-person formats that are rich in communication[3]. Marcus L. George enumerates the basic dis-

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[3] "The Way in Which Students Are Taught in Russia is Better than in the United States": Yaroslav Kuzminov, Rector of HSE, on the Revolution in Higher Educa-

tance technologies that facilitated his teaching throughout the coronavirus pandemic: (i) e-learning platform, (ii) digital workbook with interactive links between theoretical modules and practical questions, (iii) digital electronics visual tutor, (iv) online navigation through all course resources, (v) online YouTube videos, (vi) email-based consultations, (vii) supplementary e-worksheets, (viii) online mock quizzes, (ix) mock quiz feedback document, and (x) mixing of learning resources, such as Zoom and Blackboard Collaborate [George 2020:8–13]. This is a huge extension of educational tools within a single course, without the slightest hint of extramural format, degradation, or simplification of learning that pessimist professors anticipate.

Such a large-scale expansion of education practices also has two essential limitations, or reservations: individual educational trajectories and academic freedom, which are mentioned by neo-pessimists. On the one hand, digital formats are personalized and barely applicable to large audiences, so it would be an illusion to expect reduction in the price of online education. On the other hand, distance learning is impossible without faculty's academic freedom. The latter is indispensable in any type of education, but the traditional format concealed actual practices behind analog interactions that were hidden from outside parties over many years. Academic freedom and openness are the central idea of distance learning.

Three types of academic freedom can be identified based on this survey: (i) collaborative freedom, where educational trajectories are individualized and students are granted agency and choice; (ii) methodological freedom, i.e. the freedom of professors to choose teaching approaches and methods and make autonomous decisions about the organization of learning process; and (iii) organizational freedom, which includes the lack of fear of global competition, response to emerging challenges and the development of open online courses [Kuzminov et al. 2019:78] as an institutional resource, not a barrier to university's activities or a threat of reduction in enrollment. Freedom of opinion and free learning environment are key characteristics of the education system of the future as perceived by faculty members with the least negative perceptions of the present and the lowest level of pessimism about the future.

Avenues for Further Research

The present survey of faculty members took place in the middle of April, a few weeks into self-isolation and emergency remote teaching. In no small part, negative forecasts are due to the compulsory nature of distance teaching and the lack of alternatives. New measurements will be made after the lockdown restrictions are eased, when there will

tion, Universities for the Elite, and the Outcomes of the Pandemic. *Forbes*, July 18, 2020: https://www.forbes.ru/biznes/403155-my-uchim-luchshe-chem-v-ssha-rektor-vshe-o-revolyucii-v-vysshem-obrazovanii-vuzah-dlya

be some distance from the shock experience and faculty members will be able to express a well-reasoned and unemotional opinion about the current and future state of education.

Perceptions of the future may change, and the levels of pessimism and detachment may decline. Post-pandemic surveys will help understand the reasons behind faculty members' fears and negative emotions as well as which measures, or the absence of such, make them resist modern technology. Future studies will clarify faculty's perceptions of distance learning practices in their universities, international open online courses, and transparent learning environments. Such surveys will allow to find out whether the current expectations of changes in tuition and human resource policies will persist. It is not so much facts as it is sentiment and expectations that make sense right now, as that is what shapes the public attitude—critical or supportive of change. Whether distance learning will or will not develop as a regular format depends in the first place on professors, and measures should be taken not only to make their voices heard but also to provide a communicative space for discussing and constructing a common future.

More than half a century ago, Jerome S. Bruner formulated four significant changes in educational practices of those times, or "innovations", as they would be called today. First, the concept of *homo educandus* changed, and a complex science of pedagogy emerged. Second, researchers learned to interpret and understand mental processes. Third, understanding of the learning process evolved as a result of numerous experiments in education. Fourth, new perspectives developed on how youth should be taught and how education could look ahead of the present and into the future [Bruner 1966:22–23]. All the four aspects can be safely recalled today at the new stage. Progress in the global education market has become obvious over these years: we have come to know more about human beings, mental processes, learning procedures, and youth's needs. However, a fifth change should be added to Bruner's list: freedom is now valued more as a necessary and sufficient condition of any type of education. It is only in a free, decentralized, globally integrated environment that a modern educational community may evolve. Furthermore, distance learning is the only learning format that meets all the freedom criteria and adds value, meaning, and immense utility not only to the learning environment but also to the instruction itself. There is little left to do: overcome the negative emotions and fears, steer clear of abuse of administrative power, and devote oneself to liberal education.

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The Pandemic as a Challenge to the Development of University Networks in Russia: Differentiation or Collaboration?

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Abstract

As an inevitable result of Russia's higher education policies of the past two decades, new university leaders in and outside of Moscow and St. Petersburg have emerged, and vertical differentiation has increased. Inequality of educational potential has a strong regional dimension, exerting a considerable delayed impact on regional socioeconomic development. Differences in universities' resources affected their ability to adapt their instructional, research, and administrative processes during the pandemic, thus broadening the education and research quality gap in higher education. Some regions may face an increased outflow of youth talent to universities based in Moscow and St. Petersburg, that will certainly weaken the socioeconomic growth prospects of Russia's regions.

The pandemic accelerated the debate over this problem and demonstrated readiness of universities for joint efforts. This leads to an expansion of policy to create a cooperative network of universities and their stakeholders so as to reduce institutional differentiation and promote exchange of experience and competence among universities. This paper investigates into the main characteristics of vertical differentiation in Russian higher education that had been in place when the pandemic broke out and determined whether universities succeeded or failed in switching to distance learning. Furthermore, lockdown measures and their economic impact on different types of

universities are analyzed. Finally, we discuss possible avenues and specific considerations for expanding cross-institutional collaboration and engaging stakeholders in university development.

1. Regional Differentiation in Higher Education

The recent decades have witnessed an unprecedented worldwide increase in demand for higher education. Student population has grown more than three times faster than world population over the past 50 years [Gabdrakhmanov, Nikiforova, Leshukov 2019], giving rise to systems of mass (16–50% of an age cohort) and universal (over 50%) higher education [Trow 2007]. As the institutional landscape of education systems is growing more complicated, the network of higher education institutions (HEI) is getting more differentiated. Mass systems of higher education feature increased differentiation both vertically and horizontally [Cantwell, Marginson, Smolentseva 2018].

Vertical differentiation in higher education is normally understood as cross-institutional differences in educational quality, selectivity, resources, and reputation [Teichler 2008], while horizontal differentiation is defined as differences in universities' specialization, formats of learning, and function [Malinovsky, Shibanova 2020].

In a number of countries, the evolution of HEIs leads to vertical differentiation at more than one level; in particular, there are selective vs. mass universities. By some estimates, selective, or elite, universities represent 2 to 5% of all HEIs in the world [Altbach, Reisberg, de Wit 2017]. They produce positional goods [Marginson 2006] that provide access to social prestige and income-earning. Selective universities do not compete with other institutions for the entire student market; instead, they focus exclusively on talented candidates with high aspirations.

Complication of the institutional landscape is typical for Russia's higher education system, too. The number of universities more than doubled between 1991 and 2009 (or increased more than fourfold if branch campuses are considered). Naturally, such an expansive growth gave rise to new types of HEIs and increased both vertical and horizontal differentiation in higher education. Studies exploring university differentiation [Kuzminov, Semenov, Froumin 2013; Knyazev, Drantusova 2013; Platonova 2015] indicate that regional dimension of inequality is one of the most relevant aspects for analysis, not only in terms of higher education system development but also as a potential chal-

lenge to sustainable development of regions and cities. The COVID-19 pandemic accelerated the debate over the regional aspect of university inequality. This study adds to the scientific discourse and expert discussions on the increase in regional differentiation in higher education due to the pandemic.

2. Patterns of Regional Differentiation in Russia's Higher Education

The historically enduring gap in enrollment quality, selectivity, and resources between universities in different parts of the country has widened substantially over the last 15 years. Judging by changes in the average USE score of admitted students, academic differentiation was increasing for the entire student population in 2011–2017. Meanwhile, the student bodies of national research universities, federal universities, and «Project 5–100» universities were growing more and more homogeneous. This may be due to sort of a self-sustaining mechanism where applicants begin to perceive such universities as more prestigious and offering a higher quality of education, while universities enhance the quality of enrollment along with education [Zagirova, Romanenko, Makaryeva 2019]. As a result, half of Russia's regions have no selective universities with average USE scores of admitted student above 70 [Malinovsky, Shibanova 2020]. Only 5% of public universities (main campuses) that are not listed as leading have over 10% of their revenues coming from research and development and an average USE score of admitted student of over 65 [Platonova, Kuzminov, Froumin 2019]. This indicates a strong polarization of universities in Russian higher education.

Having tasked the system of higher education with creating modern research universities, the government focused on institutions that were most prepared for transformation—national research universities, federal universities, and universities with a special status—and gave them priority support [Froumin, Povalko 2014]. That effort culminated in launching the academic excellence program «Project 5–100». These measures had a significant impact on the scope and structure of university research [Matveeva, Sterligov, Yudkevich 2019] and gave rise to a number of strong research universities that not only contribute to national scientific and technological development and produce workforce for the economy but also promote socioeconomic development of their regions and macro-regions. All reforms implemented by the government have a common goal of demarcating the institutional landscape to facilitate governance of complex high-participation systems of higher education [Platonova 2015].

At least 37 similar initiatives have been implemented across the world since 2005 [Salmi 2015], predictably increasing vertical differentiation in national systems of higher education. Extension of the list of «Project 5–100» participants and the newly launched flagship university development program are important initiatives for university transformation, but they hardly cover 10% of Russian public universities.

Post-Soviet transformations also had different consequences for the development of sectoral universities, many of which lost their affiliation with and direct support from government agencies [Kuzminov, Semenov, Froumin 2013]. As a result, the evolutionary scenario of higher education network development increased the divide in enrollment quality, selectivity, and resources between universities [Abramova et al. 2020]. The regional dimension of this divide has to do, among other things, with regional socioeconomic contexts: differences in regions' financial stability underlie differences in educational quality and increase differentiation of access to quality education [Adrian, Bentabet, Vinokur 2000]. A high level of socioeconomic development ensures a better standard of living and is indispensable for concentration of resources, including human capital.

The reverse logic is also true: universities provide gross contribution to regional development [Valero, van Reenen 2019; Leshukov, Froumin 2017; Belyakov, Klyachko 2016]. In fact, vertical differentiation is increased through a self-sustaining mechanism: quality higher education promotes regional economic growth [Agasisti et al. 2020], while the region invests more and more financial and human resources in the university's development. As a result, some regions strengthen their positions, while others face long-term risks for their sustainable socioeconomic growth. Tolerating the increasing stratification in higher education means accepting the regional divide in the quality of life and socioeconomic development.

One of the long-term effects of stratification in higher education is the growing migration of talented young people, who are unable to obtain an education matching their ambitions where they were born, to specific regions. Figure 1 shows the correlation between average USE scores and academic migration. In 2017–2018, migration outflow of 18-year-olds was observed in 65 regions of Russia; as a result, 20 regions—nearly one in every three—lost over 5% of population in the respective cohort. In some remote regions, up to 30–40% of high school graduates choose to continue their education in a different region [Gabdrakhmanov, Nikiforova, Leshukov 2019].

Outflow of high-performing high school graduates escalates competition in recipient regions, thereby enhancing the quality of education in their universities and leading to degradation of educational quality in donor regions. Recipient regional economies benefit both in the short term, during the period of study, and in the long run, when university graduates stay to live and work in the region.

Access to government-funded education and allocation of enrollment quotas among universities are important factors of academic migration. Government policies are aimed at providing access to quality education while using resources efficiently. Besides, education accessibility should go hand in hand with extending the choice of educational opportunities and increasing autonomy of educational institutions. Solving those problems was one of the purposes of adopting the per

Figure 1. **Annual net migration vs. average USE scores across regions**

Average USE scores, government-funded students (2019)

Moscow and Moscow Oblast

St. Petersbug

Tatarstan

Sverdlovsk Oblast

Tomsk Oblast

Kaliningrad Oblast

Leningrad Oblast

Tumen Oblast

Novosibirsk Oblast

Nizhny Novgorod Oblast

Samara Oblast

Krasnoyarsk Kray

Primorsky Kray

● Regions with 5-100 universities
• Other regions

Annual net migration of student aged 18 in 2017–2018, %

Source: Compiled by the authors.

capita funding model [Abankina et al. 2016]. The principle of allocating the budgetary funds on a competitive basis depending on university performance is generally welcomed by universities and the academic community [Zarubina 2016]. However, a lot of questions remain as to the specific mechanisms and practices of such competitive allocation, and its consequences for the system of higher education have been subject to a lively discussion [Nurieva, Kiselev 2019].

There is an essential imbalance in the allocation of enrollment quotas among the regional systems of higher education [Gabdra-khmanov, Leshukov, Platonova 2019]. The standard quota of "800 government-funded places per 10,000 population aged 17–30" is maintained at the national level but is not fully integrated at the level of regions. Deviation of the actual number of government-funded students from the quota remains within 10% only in 20 regions, being much greater in the majority of federal subjects. One notable example is Tomsk Oblast, where deviation from the "800 places per 10,000 population" quota exceeds 100%. This imbalance is largely contingent on the presence of leading universities with high quotas in the region, which aggravates regional disparities by providing additional incentives to applicants with better chances of admission.

Allocation of enrollment quotas among regions is imbalanced not only in the number of places assigned but also in their structure. Such structural imbalances are most prominent in the humanities programs, which have been traditionally popular among applicants despite po-

Figure 2. **Proportions of self- and government-funded students admitted to programs in the humanities and social sciences in 2019 across regions**, %
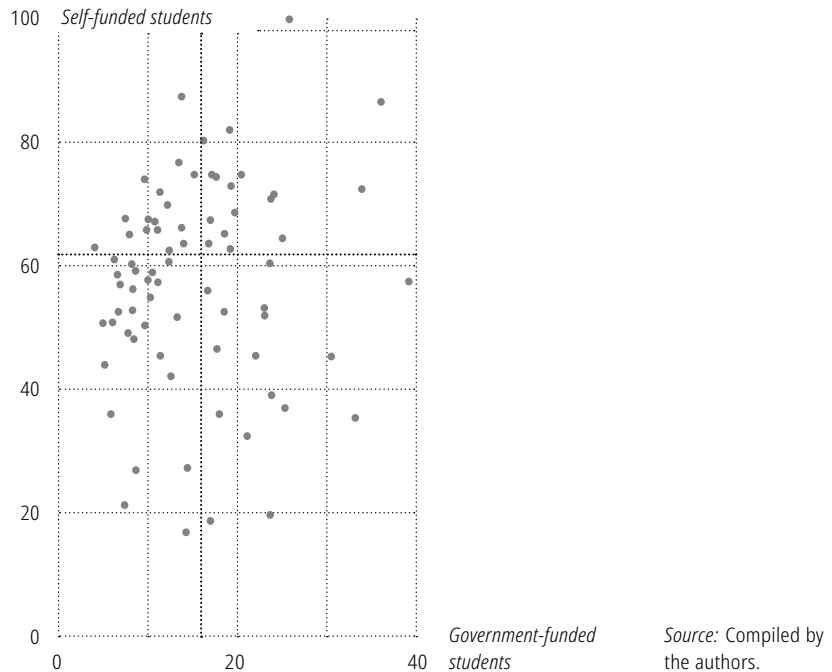
tential problems with finding a matching job in the future. Government-funded places are relatively few in the humanities, representing about 16% of total enrollment in the field. As a result, self-funded students enrolled in the humanities account for more than 60% of all fee-paying students.

Proportions of self- and government-funded students also differ greatly across the regions. Out of 76[1] regions analyzed, the ratio may be considered balanced in 44, where both proportions are higher (17 regions) or lower than average (27 regions). Seventeen regions demonstrate a relative shortage of government-funded places in the humanities and social sciences (Figure 2). The most outstanding example is Bryansk Oblast, where 4.1% of all government-funded students and 63% of all self-funded students were admitted to programs in the humanities and social sciences in 2019. As a result, 88% of the region's students in these majors were self-funded.

In regions similar to Bryansk Oblast, economic efficiency of universities largely depends on the market conditions. This is especially

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[1] Regions with small university enrollments (fewer than 100 government-funded students and fewer than 50 self-funded students) were excluded from analysis to avoid outlier bias.

true for small regional institutions that are assigned very few government-funded places per program/major. Financial viability of such degrees is in serious jeopardy. In cases like that, the function of enrollment quotas as a means of supporting universities via government contracts is prioritized over their function as a factor of supply.

The pandemic crisis of 2020 revealed important patterns in higher education, including those in regional inequality of systems and universities. Because Russia's education system is characterized by isomorphism of institutions located within the same region [Maskaev, Savko, Oganesyan 2017], it makes sense to analyze heterogeneity at the level of regional systems of higher education and the impact of the pandemic on universities across regions. This subject is also significant in a broader context, since the effects of stratification in higher education exacerbate the socioeconomic gap between regions, jeopardizing sustainable development of Russia's territories.

3. Regional Inequality in Higher Education: Challenges Imposed by the Pandemic

The COVID-19 pandemic became a stress test [Barannikov et al. 2020] for all Russian universities, but the speed of their adaptation varied greatly due to profound differences in the level of technology and competence. These differences have a strong regional dimension and are associated with gaps in the quality of secondary as well as higher education. The pandemic was a shock that made the accumulated imbalances more conspicuous. Universities had to respond promptly in order to adapt to the new operating conditions, and it was much easier for the institutions that had already started the process of transformation.

For instance, Ural Federal University had been planning to move 20% of its educational content to distance formats in 2020, so it had prepared for integrating new learning technology. When the pandemic broke out, the university was already using the course management system Moodle and the e-learning system HyperMethod, so a number of faculty members already had some experience with this software. As a result, the university concentrated its efforts on solving problems associated with system scaling, license purchases, and exam proctoring [Koksharov, Zagaynova 2020].

Below, we will have a closer look at the differentiation of universities by access to and the use of digital infrastructure, learning support practices, and the impact of the crisis on resources required for sustainable development of any organization.

3.1. Differentiation of Universities by Digital Infrastructure

As a result of active transformation along with substantial financial support, as compared to other HEIs, not only did the leading universities upgrade their existing infrastructure and create a new one but they also developed new competencies. Eventually, they had enough groundwork to start the process of digitalization, i.e. create the IT infrastructure, establish communications among students and faculty

with the use of digital platforms, train instructors, and develop and distribute digital learning content.

The lockdown exposed unpreparedness of learning management systems (LMS) in a number of universties. Over 88% of HEIs reported integrating LMS platforms, but only 45% managed to get them working under stressful conditions [Abramova et al. 2020], whereas the rest launched their systems nominally, partially, or experimentally [Karlov, Shvindt, Garev 2020]. At the beginning of lockdown, 19% of faculty members experienced difficulties using the necessary hardware. Over the first two months of the pandemic, this percentage reduced by one third only.

By the time the coronavirus lockdown was announced, 15% of universties did not even have a well-functioning system of online communication with students, which essentially limited the possibility of keeping them informed in a critical situation [Abramova et al. 2020]. Furthermore, even universities equipped with such systems often failed to notify their students and faculty about the new schedules and requirements. Only 60% of HEIs created dedicated websites or sections within their official websites to inform and support their faculty and other employees.

When the pandemic broke out, the universities with a special status had an established digital infrastructure that enabled them to change over to mass distance learning within a short period of time. High-performance Internet access points were available to all the leading universities covered by the survey on digital infrastructure, but only to 11% of the total sample. Medium- and high-performance access points were available to 94% of the flagship universities but only to 77% of the total sample. All the leading universities that participated in the survey disposed of medium- and high-performance data storage systems, as compared to 37% in the total sample. Finally, technical hurdles and network failures were reported more often by students enrolled in universities with no special status (54% of the respondents) than those in leading universities (48%).

Of course, the ability of even the leading universities to provide quality online education, especially in engineering and science, should not be overestimated. However, these universities possessed a wider array of tools for emergency adaptation to distance learning as they had started developing their infrastructure and promoting professional development well in advance, and did it consistently. The obsolete, often redundant and cost-ineffective infrastructure of universities in regions with small student populations limits their potential rather than being helpful in a crisis.

3.2. Differentiation of Universities by Learning Support Practices

Successful adaptation of universities to distance learning was indispensable for retaining educational quality. Pre-pandemic, 60% of faculty had virtually no experience of teaching from a distance. A few months into the lockdown, 5% of instructors in more successful universities

and up to 30% in mainstream institutions failed to learn how to use the tools necessary for distance learning. The consequences carried by such differences between universities in adapting to the distance learning format can be pretty grave. If 5% of the faculty fail to adjust to the new situation, educational quality will be affected very little as more experienced colleagues or digital volunteers will come to help. However, this additional workload will be impossible if distance learning technology has not been embraced by one third of the faculty. In this case, the university will practically switch to extramural education with all its shortcomings, thereby exacerbating the differentiation within the system of higher education.

Digital competencies in Russian higher education have been enhanced markedly over the past few years, yet they have been concentrated in a very limited number of universities. Nearly 1,000 Russian courses are offered today on three massive open online course platforms: National Open Education Platform (NOEP), Coursera, and Ed X. However, they were developed by fewer than 20 universities, even though faculty members from a number of HEIs have had a relevant experience when designing digital learning materials for intra-university purposes (Table 1). Out of 18 universities that offer their courses in one of the platforms, only six are located outside Moscow and St. Petersburg, five of these six being participants of the «5–100 Project». On the one hand, this is evidence of effectiveness of the project which provided top regional universities with resources for strategic development and enabled them to compete on equal terms with Moscow and St. Petersburg HEIs. On the other hand, the project increased regional differentiation in higher education, boosting the development of universities in Moscow, St. Petersburg, and the participating regions and extending their lead over other institutions of higher education.

However, digital learning materials are only one element, though a key one, in the organization of distance learning. A survey of students conducted during the first weeks of lockdown showed that 67 of 355 universities (18.9%) were unable to deliver some of their courses from a distance or online using their institutional resources. Due to program peculiarities, 6.5% of students were basically unable to complete their studies remotely. The biggest problems were faced by students enrolled in majors requiring lab work and dedicated equipment, art school students, and prospective social infrastructure employees [Shibanova et al. 2020].

3.3. University Differentiation by Resources

In terms of long-run effects of the pandemic, universities may suffer dramatically from a decline in household income, which can reduce demand for education, particularly among vulnerable social groups, and entail cuts in companies' spending on education, training, and R&D. In addition, the announcement of lockdown restrictions spurred a wide public debate over the fairness of pre-pandemic tuition fees under the new conditions. Eighty per cent of student survey participants report

Table 1. **Russian courses on NOEP, Coursera, and EdX in the first half of 2020.**

University	Number of courses offered on the platform			
	NOEP	Coursera	EdX	Total
St. Petersburg State University	131	61	–	192
National Research University Higher School of Economics	100	74	–	174
National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)	34	28	25	87
Peter the Great St. Petersburg Polytechnic University	67	16	–	83
Tomsk State University	23	54	–	77
Moscow Institute of Physics and Technology	20	48	–	68
ITMO University	52	–	14	66
Ural Federal University	52	–	6	58
National University of Science and Technology MISiS	37	–	2	39
Lomonosov Moscow State University	37	–	–	37
Moscow State Institute of International Relations	–	20	–	20
Novosibirsk National Research State University	–	18	–	18
Saint Petersburg Electrotechnical University "LETI" (ETU)	13	–	–	13
Tyumen State University	8	–	–	8
Samara National Research University	8	–	–	8
Bauman Moscow State Technical University	4	–	–	4
Industrial University of Tyumen	2	–	–	2
Russian University of Transport (MIIT)	1	–	–	1

Source: Compiled by the authors.

that their self-funded peers expect problems in paying for their tuition fees [Abramova et al. 2020]. Meanwhile, tuition increased by 15–20% in 2020 due to the pandemic and the transition to distance learning [Barannikov et al. 2020].

Over one third of university rectors expect their cumulative budgets to reduce by more than 10% in 2020–2021[2]. Small institutions with low enrollment quotas for government-funded students and universities lacking resources and competence for effective adaptation will be affected by budget reductions most of all. An increase in vertical differentiation is thus highly probable. The earliest results of the 2021

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[2] Survey of rectors conducted as part of the analytical report *Lessons from the Stress Test. Universities during and after the Pandemic* [Barannikov et al. 2020].

admission campaign demonstrate that the average USE score among admitted self-funded students has decreased in roughly one third of all Russian universities, as compared to only one in eight leading universities (Moscow State University, St. Petersburg State University, 21 Project 5–100 universities, and national research universities).

Patterns of student migration are also expected to change in the new context. The pandemic has raised the cost and risks of moving to another city as a result of tightened economic constraints faced by households, concerns about infection, and perceptions of digital learning formats as less valuable [Malinovsky, Shibanova 2020]. According to survey data, a number of university leaders believe that regional universities will get an increased inflow of students because high school graduates will not be ready to move to megalopolises such as Moscow and St. Petersburg in the first place. Consequently, social migration of youth from small towns and remote areas will decline, limiting the choice of educational opportunities for those who stay. It is in such localities that household economic constraints will be most likely to reduce demand for higher education. Educational and career trajectories will shift towards earlier entry to the labor market and preference of vocational schools over universities.

4. Post-Pandemic Prospects for University Network Development

Increased vertical differentiation in higher education is one of the possible effects of the pandemic. At the same time, the lockdown highlighted the need for inter-university cooperation. In the light of proactive approaches adopted by universities and regulatory agencies, the lockdown shock can be expected to promote the transition of the higher education system from a bunch of weakly interacting universities and quasi-competitive research institutes into a network of HEIs. This network could evolve resting on the principles of cooperation (with due regard to international practices) and stakeholder empowerment.

The early months of the COVID-19 lockdown demonstrated universities' readiness for mutual support in a crisis. Providing free online access to their online courses became a popular way for HEIs to show solidarity. Free online courses were announced by many universities in Moscow and St. Petersburg, such as National Research University Higher School of Economics[3] or St. Petersburg State University[4], as well as in regions, such as Ural Federal University[5] or Tomsk State University[6].

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[3] The First University Abroad Joins HSE's Free Online Courses: https://www.hse.ru/news/edu/357674294.html

[4] SPSU Expert at St. Petersburg International Legal Forum: "Pandemic Calls for Solidarity in Higher Education": https://spbu.ru/news-events/novosti/ekspert-spbgu-na-pmyuf-pandemiya-trebuet-solidarnosti-vuzov

[5] UrFU Grants Open Access to Its Online Courses for All: https://tass.ru/ural-news/8086803

[6] TSU Grants Open Access to Its Online Courses for Every Student in Russia: https://

The Ministry of Science and Higher Education of Russia produced a list of 581 online courses from 19 universities to be delivered at no charge[7].

Still, this is not enough to eliminate inequality among HEIs. The cooperation scenario of higher education development implies elaboration of comprehensive solutions to allow for effective collaborations that involve not only universities but also their stakeholders. Getting access to learning content makes little sense unless the institution is able to make use of it, which means it should have skilled instructors and well-established management logistics, adapt its program portfolio to various formats of learning under emergency conditions, etc.

Achievement of this goal requires acting in three main directions: eliminate the existing infrastructural inequality, create conditions for improvement of educational quality in all universities, and review some principles of higher education system operation. Below, we analyze these three directions in more detail.

The importance of eliminating the existing infrastructural inequality became obvious during the pandemic: the inability of many universities to switch to distance learning rapidly was largely associated with the lack of necessary hardware, software, and technology. Access to infrastructure is a basic premise, the absence of which renders mitigation of regional inequality impossible.

To mitigate differences in the level of infrastructure in higher education, universities themselves should make an effort in the first place. Possible measures include audits of available capacity, optimization of capacity utilization and maintenance expenses, shared use of infrastructure by universities, etc.

Creation of conditions for improvement of educational quality in all universities can be promoted by providing system-wide support to the spread of leading universities' practices and thereby reducing the existing gap in educational quality. It is imperative to expand access to the best practices of Russian universities, for example by creating a national network to aggregate digital solutions and technologies (training simulation, etc.) and make them available for use by universities, research institutes, and—in a longer run—by secondary and vocational schools as well.

For the same purpose, universities should work out a unified approach to a number of components of the learning process in lockdown, including work placements and internships, laboratory and practical classes with the use of equipment, and assessments. This

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www.riatomsk.ru/article/20200316/tgu-besplatnij-dostup-studentov-rf-k-onlajn-kursam/

[7] The Ministry of Science and Higher Education of Russia Produces a List of Online Courses to Be Delivered at No Charge: http://neorusedu.ru/news/minobrnauki-rossii-sformirovalo-perechen-besplatnyh-onlajn-kursov; The list of online courses to be delivered at no charge: https://www.minobrnauki.gov.ru/common/upload/library/2020/03/Spisok-onlayn-kursov-20200315–01.pdf

will allow setting the universal minimum quality baseline in distance learning to reinforce communications within the university network. Expansion of cross-regional and intra-regional university (research institute) partnerships will provide not only for exchange of experience but also for development of new education and research platforms to host new world-class network education programs.

A similar but broader initiative consists in creating regional academic clusters on the basis of leading and flagship universities. Access to resources possessed by these universities will provide other cluster participants with technological platforms, methodological frameworks, and organizational solutions to deliver quality education. Another important measure at the federal level could be creating a network of regional resource centers to provide methodological support and access to equipment for laboratory and practical classes both online and offline. The transfer of practical classes in engineering and science majors online became the biggest challenge during the lockdown for all universities.

Review of some principles of higher education system operation requires involvement of not only universities and the Ministry of Science and Higher Education but also a wide range of university stakeholders. A more flexible and resilient system of enrollment quota allocation should be developed to offer more freedom of choice to applicants and at the same time provide for mechanisms to partially retain youth talent in the region. A legal framework for stakeholder engagement in university development should be created to integrate such mechanisms.

Expansion of higher education opportunities implies direct and indirect support for those willing to learn: partial tuition scholarships, long-term subsidized loans, etc. Such measures will contribute to mitigating the risks of decline in demand for higher education as a result of the pandemic and provide for a more flexible support of regional universities. Support measures may include academic certificates for talented high school graduates willing to continue education in their home region.

It would also make sense to look into the possibility of raising enrollment quotas in the fields of study with a high proportion of self-funded students and high-quality programs (programs that passed social and professional expertise and programs included in academic excellence initiatives) with due regard to regional development priorities and the existing imbalances in technology, social sciences, and humanities enrollment between regions. When allocating enrollment quotas, situations should be avoided where the quota is too low for the university to form a student group and reach the minimum efficient scale for the program without a considerable number of fee-paying students.

A cooperative network capable of reducing vertical differentiation in higher education should include not only universities but also a

broad range of stakeholders. An important step in this direction would be legal empowerment for local stakeholders to participate in university governance and maintenance, e. g. by cofounding federally funded universities from regional and sectoral initiative budgets, bringing regional innovation infrastructure under the coordination by universities, etc.

Some of the measures proposed here can find their way into the widely discussed project initiated by the Ministry of Science and Higher Education under the working title of Strategic Academic Leadership Program. The purpose of this program is to form a group of national university leaders to provide the economy and social sphere with scientific support, technology, and human resources. Its paramount priority will be creating consortiums of universities, scientific institutions, and real economy businesses to establish new cooperative networks and expand the already existing ones.

An important novelty introduced by the program is the practice of identifying candidate universities that do not meet the original criteria at the moment but have the potential to improve, which will receive financial support to implement their development programs. This practice will expand the pool of universities interested in the program. It suggests selecting 100–120 institutions of higher education, which is 16% of all Russian universities, or 9% of the aggregate network of HEIs (if main and branch campuses are counted independently). A substantial expansion of the number of participants is virtually impossible due to the lack of universities with competence and resources required for effective participation in the program. A critical aspect of program design consists in discussing support and development measures for all regional university networks so as to prepare concise education development programs for every region with the assistance of the Ministry, regional governments, leading universities in the region, and local stakeholders. Such programs should provide the basis for the federal initiative, coordinating regions' education development potentials and priorities with the federal level as well as across the regions.

5. Conclusion   Vertical differentiation is an inevitable and indispensable factor underlying the system of higher education. However, excessive differentiation carries considerable risks and expenses for the system itself as well as for sustainable regional socioeconomic development. Active higher education policies of the recent decades have reached a lot of goals, yet they unavoidably sharpened institutional differentiation.

The pandemic exposed differences in universities' potential and in the ability of various system elements to adapt to the new conditions. Educational quality has remained at high levels in the leading universities, while plummeting in a number of other institutions. As a result, the pandemic has exacerbated the differentiation in higher education, and the ongoing crisis may widen this gap.

At the same time, having exposed the problem, the pandemic launched actual debate and search for solutions, and a lot of universities demonstrated their readiness for mutual support in a crisis. A context has arisen that is conducive to transformation of the education system into an effective cooperative network capable of reducing vertical differentiation. Promotion of network cooperation among universities is a mission whose relevance has been emphasized for years and which concerns the entire university community [Lobanov 2016]. A unique feature of the current situation is the opportunity to make good progress towards this transformation.

Certain steps have already been made in this direction. Enrollment quotas are being increased in all regions by order of the government. Parameters of the Strategic Academic Leadership Program allow expecting that this initiative will also contribute to progress on the way toward bridging the gaps. Solving the accumulated problems highlighted by the pandemic should become part of a long-term public education policy, in which initiatives presented in this study are major ingredients.

Translated from Russian by I. Zhuchkova.

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Educational Inequality and COVID-19 Pandemic: Relationship between the Family Socio-Economic Status and Student Experience of Remote Learning

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Received in October 2020

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Abstract

The urgent transition to remote learning in March 2020 revitalized the debate on the influence of new educational reality on inequality in education. A study was performed to measure the relationship between the difficulties experienced by students during remote learning and their socio-economic status. Data from a nationwide survey of students administered in late March–early April 2020 by a team of researchers from a few Russian universities was used as empirical basis of this study. Results demonstrate significant differences in obstacles faced by students from families with different levels of income. Students from low-income families were the most likely to have technical and self-regulation problems and to lack skills required for effective remote learning. Results indicate the importance of finding system-level solutions to ensure equal opportunities for students in remote learning, regardless of their socio-economic status.

In March 2020, Russian universities switched to remote learning to minimize the risks of COVID-19 spreading. Mass transition of most classroom-based programs to the online environment was performed within an extremely short period of time and became a challenge for

universities as well as students, who had to adapt to the new educational reality.

The impossibility of in-person instruction during a long period of time has revitalized the debate on how mass remote learning will affect inequality in higher education [Lederman 2020; Williamson, Eynon, Potter 2020; Chan 2020; Arnove 2020; Aucejo et al. 2020; Soria, Chirikov, Jones-White 2020]. International findings show that students who were moved to remote learning struggle to stay motivated to learn effectively in the new format [Soria, Chirikov, Jones-White 2020; Means, Neisler 2020], suffer from isolation and a lack of interpersonal connections with instructors and fellow students [Soria, Chirikov, Jones-White 2020], experience an increased level of stress [Soria et al. 2020; Chirikov et al. 2020], and spend more time preparing for classes [Aucejo et al. 2020]. All these changes in learning may have negative effects on educational outcomes. Students from low-income backgrounds experience more barriers in their adjustment to online learning and can be a more vulnerable group than their peers from wealthier families [Soria, Chirikov, Jones-White 2020]—and this is also true for Russia.

The present study contributes to the debates on how the transition to remote learning during the COVID-19 pandemic affected the inequality in higher education. Data from a Russian nationwide survey of students administered in March–April 2020 by order of the Ministry of Science and Higher Education is used to analyze socio-economic status (SES) differences in how students managed through the transition to remote learning due to the COVID-19 pandemic and in the barriers that they faced in their adjustment process. Findings from this study will be used to formulate hypotheses as to which characteristics of remote learning increase educational inequality between students from different socio-economic backgrounds and to suggest possible ways of mitigating those effects.

1. Digital Technology and Educational Inequality: A Review of Literature

Online learning, in particular Massive Open Online Courses (MOOCs), was expected to reduce inequality in access to education [Bekova et al. 2020]. However, there is empirical evidence that learning in this format can exacerbate rather than reduce SES differences in educational outcomes [Hansen, Reich 2015, Kizilcec, Davis, Cohen 2017]. During the pandemic, mass transition to remote learning became the only way to prevent disruption of the educational process, but it also raised the risks of exacerbating inequality in a few dimensions.

The first dimension of inequality has to do with lack of access to the Internet and necessary devices. According to research, Internet usage penetration among people aged 30 or younger in Russia reached 99% in 2018[1]. However, it does not mean that there are no technolog-

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[1] GfK (2019) Internet Usage Penetration in Russia: 2018 Year in Review: https://cdn2.

ical barriers in online learning. First, the level of Internet penetration is growing at the expense of mobile Internet users, whose proportion is rather high among youth[2]. Forty-one percent of young people access the Web from mobile devices[3]—which are not an optimal choice for effective learning. Second, broadband speed, prices, and penetration vary greatly between regions of Russia as well as within them, depending on the size of locality[4]. Third, research shows that access to the Internet and digital equipment (computers, laptops, etc.) varies as a function of income and type of locality [Sabelnikova et al. 2018].

The second dimension of inequality is individual disparities in Internet usage, which can bring people with equal Internet access opportunities to different educational outcomes. Findings suggest that, although Internet access is becoming ubiquitous, Internet uses are not homogeneous: people with higher levels of education use the Web for education and career advancement, while those with lower levels of education use it largely for entertainment [Hargittai, Hinnant 2008; Volchenko 2016]. Remarkably, differences are observed even in using the same web resources [Smirnov 2018].

Transition to remote learning required students as well as professors and other university staff to embrace new communication platforms and improve their digital literacy skills. Today's students, as well as the entire generation born roughly between 1980 and 1994, have been characterized as the "digital natives" or the "Net generation" because of their familiarity with and reliance on information and communications technology (ICT) [Bennett, Maton, Kervin 2008]. However, researchers found that university students do not really have deep knowledge of technology, and what knowledge they do have is often limited to surfing the Internet, emailing, and basic office suite skills [Kirschner, Van Merriënboer 2013]. Students entering colleges often suffer from a lack of computer literacy, despite the fact that there is a widespread perception that modern students are extremely knowledgeable [Keating 2014]. Meanwhile studies show that respondents with the highest level of comfort and confidence using online learning technology perceive significantly fewer barriers for social interaction, administrative/instructor issues, and technical problems [Muilenburg, Berge 2005]. Remote learning also requires specific skills, knowledge, and experience, in particular the ability to self-motivate and develop

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hubspot.net/hubfs/2405078/cms-pdfs/fileadmin/user_upload/dyna_content/ru/documents/press_releases/2019/gfk_rus_internet_audience_in_russia_2018.pdf

[2] https://mediascope.net/news/1067271/

[3] GfK (2019) Internet Usage Penetration in Russia: 2018 Year in Review: https://cdn2.hubspot.net/hubfs/2405078/cms-pdfs/fileadmin/user_upload/dyna_content/ru/documents/press_releases/2019/gfk_rus_internet_audience_in_russia_2018.pdf

[4] Yandex (2016) Internet Development in Regions of Russia: https://yandex.ru/company/researches/2016/ya_internet_regions_2016#stoimostiskorostdostupavinternet; Speedtest (2018) A Brief Analysis of the Russian Market and Speedtest Results in 2018: https://www.speedtest.net/reports/ru/russia/

learning strategies [Milligan, Littlejohn 2013; 2014], a high level of critical thinking [Schunk, Zimmerman 2008; Artino, Stephens 2009], and previous online learning experience [Wang, Newlin 2002; Lim, Yoon, Morris 2009]. Studies of Russian students who take online courses as part of their university programs show that successful learning is largely contingent on students' ability to organize their study space, allocate enough time to study in this format, set goals, and reflect on the learning process and their progress [Bekova et al. 2020].

Evidence from research demonstrates a substantial variation in the difficulty of transitioning to remote learning depending on the level of education, parental education, and field of study. The most vulnerable groups include first-generation students [Soria et al. 2020], undergraduate students [Chirikov et al. 2020], science, technology, engineering, and mathematics (STEM) students, and students majoring in arts and design [Soria, Chirikov, Jones-White 2020]. In addition, remote learning experiences and perceptions differ significantly as a function of SES. A survey of over 22,000 undergraduate students at five leading U.S. public research institutions revealed that students from low-income families are much more likely to suffer from a lack of access to technology and an appropriate study space for remote learning [Soria, Chirikov, Jones-White 2020]. Such students are also significantly more likely than their peers to experience financial hardships and major depressive disorder during the COVID-19 pandemic [Soria, Horgos 2020]. A survey of students at one of the largest public institutions in the United States showed that lower-income students are more likely than their higher-income peers to expect to delay their graduation because of COVID-19 [Aucejo et al. 2020].

The present article uses data from a cross-sectional survey of Russian university students to find out how students of different socio-economic backgrounds differ along two dimensions of inequality: (a) learning conditions and access to technology and (b) skills useful in remote learning.

2. Data Data from a nationwide student survey conducted on behalf of the Ministry of Science and Higher Education between March 25 and April 3 2020 by an inter-university team of sociologists representing National Research University Higher School of Economics, ITMO University, Ural Federal University, and Tomsk State University formed the empirical basis of research. Data was collected online using two recruitment techniques: (a) contextual targeting in the social network VKontakte displaying ads with the link to the questionnaire to users aged 17–23 and (b) distribution of the link to the questionnaire among students by university administrators as a piece of news at the official website or via email. Any user with access to the link could participate in the survey.

All respondents who followed the link were asked screening ques-

tions. Only those who reported being enrolled in a full- or part-time higher education program could proceed with the questionnaire.

Over 11,500 users passed the screening test and completed the questionnaire. As students from different universities were represented disproportionately, the sample was adjusted. For example, 50% of randomly selected responses obtained from two universities with the number of respondents exceeding 500 were excluded from analysis to neutralize the university effect. The final sample consisted of 10,018 questionnaires completed by students from 647 Russian universities. The questionnaire was dedicated entirely to the use of remote learning technology by universities and the measures that they took to prevent COVID-19 from spreading. Descriptive statistics of the sample are given in the Appendix.

3. Variables and Analysis

The following indicators were used to assess the technological infrastructure and learning environment of students in remote learning:

- Access to devices ("Please select all types of devices that you have access to"; "Apart from you, who else has access to this equipment?")
- Quality of devices ("Do the devices accessible to you meet all the functional requirements for learning?")
- Characteristics and quality of Internet connection ("Do you have access to the Internet at your current place of residence?"; "Do you experience technical or network connectivity problems?")
- Overall perception of technical challenges ("What technical constraints did you encounter after the transition to remote learning?")

Challenges encountered by students in remote learning were assessed by asking them the question, "Does remote learning present any challenges to you?" Respondents were asked to select all that applied from the following:

1) I struggle to find an appropriate study space for remote learning.
2) I am uncomfortable with the instructor asking me to turn my camera on.
3) I have no suitable devices (e.g. a computer with Internet access) for remote learning.
4) I find it difficult to understand the interface of online courses and remote learning programs.
5) I find it difficult to remain focused when watching video lectures.
6) I find it difficult to focus during self-study.
7) I find it difficult to ask the instructor questions in the absence of in-person classes.
8) I find it difficult to answer questions or ask instructors for clarification online.

9) I cannot discuss learning material with my classmates.
10) I lack interactions with my classmates.
11) I lack in-person discussions with instructors.
12) I feel lonelier and more isolated in remote learning.
13) I find it difficult to study from home.
14) I experience technical and network connectivity problems.
15) Remote learning is not an issue for me.

Household purchasing power was used to assess students' SES. Respondents were asked to answer the question, "How would you describe your family's financial situation?" by choosing one of the following options:

- We live a frugal life and have just enough money to cover basic daily living expenses, but buying new clothes is a challenge." (Group 1)
- We have enough money for food and clothes, but buying major appliances is a challenge unless we take out a loan." (Group 2)
- We are basically well-off but would have to take out a loan or save money to buy a car or go on an expensive vacation." (Group 3)
- We are well off and can easily afford to buy a car or go on an expensive vacation." (Group 4)

4. Survey Results
4.1. Challenges of Remote Learning

Data from the survey shows that the transition to remote learning raised a number of challenges for students, many of which were widespread (Figure 1). Only a quarter of respondents reported having had no problems moving to remote learning. The most widespread obstacles were technological barriers and problems associated with specific characteristics of remote learning as such and a lack of relevant skills. In particular, over one third of students said that they lacked interactions with peers and professors and experienced technical and network connectivity problems. This is largely in line with the international findings describing the lack of interpersonal connections with fellow students and instructors as a major obstacle to effective remote learning (for example, [Soria, Chirikov, Jones-White 2020]). At the same time, evidence from Russia indicates a high incidence of technical problems related to access to digital equipment and the Internet. Below, we will zero in on the two categories of obstacles—(a) technical barriers to the transition to remote learning and (b) specific characteristics of remote learning and lack of necessary skills—and show whether their impact varies as a function of SES.

4.2. Access to Digital Equipment

Data obtained from the online survey does not allow assessing adequately the technology component of inequality in access to remote learning. Yet, it is sufficient to measure SES differences in access to digital equipment. On average, students who have no access to any device other than a mobile phone account for 6% of the sample, but

Figure 1. **Proportions of students facing obstacles in remote learning**, %

I lack interactions with my classmates	35.1
I lack in-person discussions with instructors	34.3
I experience technical and network connectivity problems	33.6
I find it difficult to focus during self-study	28.9
I find it difficult to study from home	27.5
I find it difficult to ask the instructor questions in the absence of in-person classes	26.4
I feel lonelier and more isolated in remote learning	24.9
I find it difficult to answer questions or ask instructors for clarification online	24.3
Remote learning is not an issue for me	23.6
I cannot discuss learning material with my classmates	20.3
I find it difficult to remain focused when watching video lectures	16.1
I am uncomfortable with the instructor asking me to turn my camera on	15.3
I struggle to find an appropriate study space for remote learning	14.1
I find it difficult to understand the interface of online courses and remote learning programs	13.3
I have no suitable equipment (e. g. a computer with Internet access) for remote learning	6.9

Figure 2. **Proportions of students who have no access to equipment for remote learning, by income groups** (Group 1 representing students from the lowest-income families), %

Group 1	12.0
Group 2	6.7
Group 3	3.8
Group 4	3.6
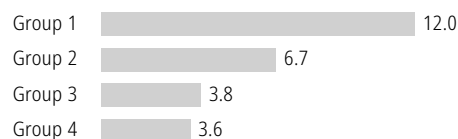
the proportion is twice as high in the lowest-income group and twice as low in the highest-income group ($\chi2= 123.773$, $p < 0.000$) (Figure 2).

In fact, 12% of low-income students have no access to computer, laptop, or tablet and use their mobile phones for learning. They are also less likely to use fixed broadband and more likely to use mobile Internet: 43% compared to 33% in the highest-income group ($\chi2= 19.942$, $p < 0.000$). Furthermore, student from low-income backgrounds are more likely to experience technical and connectivity problems (40.5% compared to 27.6% in the highest-income group, $\chi2 = 43.636$, $p < 0.000$).

Figure 3. **Access to digital equipment by income groups**, *%*

Laptop
70.5
76.3
81.4
83.1

Computer
28.9
31.5
34.9
44.4

Tablet
13.2
15.6
22.3
35.0

- Group 1
- Group 2
- Group 3
- Group 4

Figure 4. **Obstacles related to remote learning environment, by income groups**, *%*

I find it difficult to study from home
31.2
31.6
27.4
21.5

I struggle to find an appropriate study space for remote learning
18.7
18.4
13.0
10.4
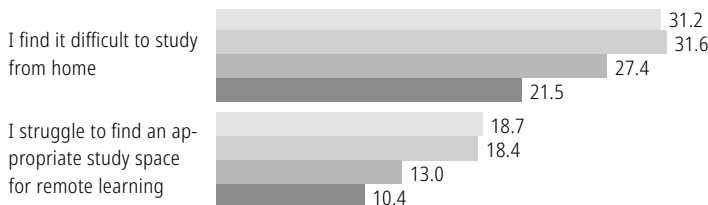
More students from the highest-income group have access to all types of digital equipment than in any other income group (Figure 3). As a result, the proportion of those who had no technical issues moving to remote learning is significantly higher in Group 4 (78.3% compared to 62.8% in the lowest-income group, $\chi2 = 99.631$, $p < 0.000$).

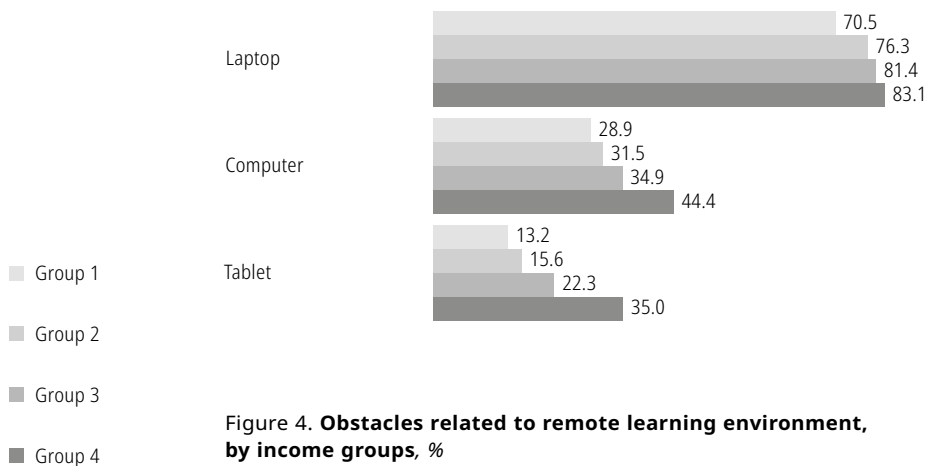**4.3. Obstacles Related to Specific Characteristics of Remote Learning**

Apart from access to digital equipment, a few more prerequisites are required for effective remote learning. One of them has to do with the learning environment, specifically with access to a comfortable study space where distractions are minimized and the student can put her/his whole mind on the learning process [Bekova et al. 2020].

The survey reveals essential variance in this parameter across the income groups (Figure 4). For example, the lowest-income group features the highest percentage of those who find it difficult to study from home ($\chi2 = 31.409$, $p < 0.000$) and those struggling to find an appropriate study space ($\chi2 = 53.159$, $p < 0.000$).

A high degree of technical competence is another prerequisite for effective remote learning [Martin 2012; Bali 2014]. Lack of necessary skills shows a statistically significant correlation with family income (Figure 5). Students from low-income families are much more likely to face difficulties because of their lack of skills for effective remote

Figure 5. **Difficulties in the transition to remote learning as a function of family socio-economic status**, *%*

Group 1
Group 2
Group 3
Group 4

In remote learning, I delay doing assignments more often
44.7
45.2
41.1
38.0

I find it difficult to focus during self-study
30.2
32.4
29.1
22.7

I find it difficult to answer questions or ask instructors for clarification online
26.4
26.2
24.0
20.4

I find it difficult to understand the interface of online courses and remote learning programs
17.9
14.0
12.3
12.2
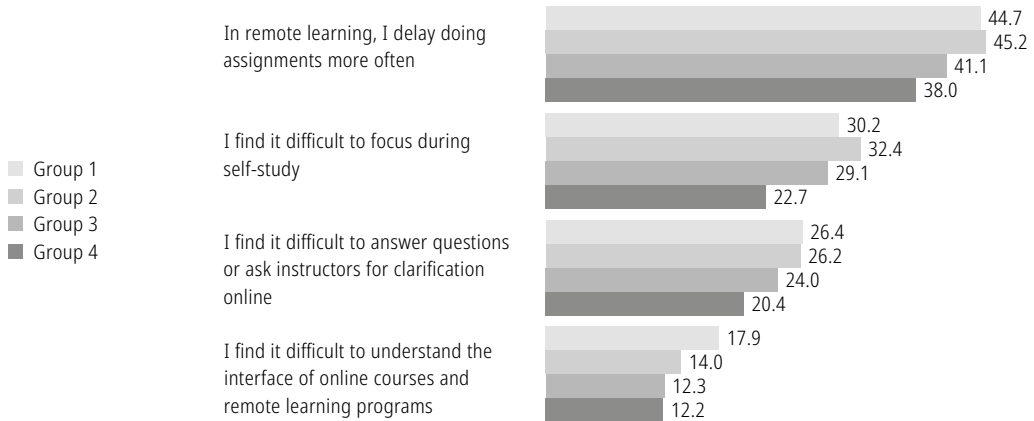
Figure 6. **Perceived effectiveness of remote learning as a function of family SES**, *%*

Group 1   53.0
Group 2   51.5
Group 3   49.3
Group 4   45.0
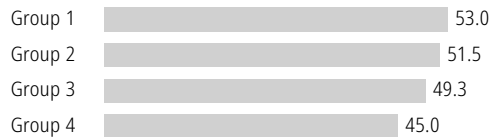
learning. In particular, they find it difficult to answer questions or ask instructors for clarification online (26.4% compared to 20.4% in the highest-income group, χ2 = 11.430, p < 0.05) as well as to focus during self-study (30.2% compared to 22.7% in the highest-income group, χ2 = 23.068, p < 0.000), and they are more likely to experience difficulties understanding the interface of online courses and programs (17.9% compared to 12.2% in the highest-income group, χ2 = 23.383, p < 0.000) and to delay doing assignments in the remote learning format (44.7% compared to 38.0% in the highest-income group, χ2 = 15.594, p < 0.01).

4.4. Perceived Effectiveness of Remote Learning

Results of the present study allow assuming that disparities in remote learning environments and experiences between students from different socio-economic backgrounds may lead to inequality of educational outcomes (Figure 7). Although the study did not imply collecting data on students' performance or other objective indicators of their academic success, the questionnaire contained an item asking how students perceived the effectiveness of remote learning. Perceptions were found to vary significantly depending on family SES: 53% of stu-

dents from the lowest-income group agreed that remote learning was less effective than in-person instruction, compared to 45% in the highest-income group ($\chi2 = 11.883$, $p < 0.01$).

5. Conclusions and Discussion

The urgent and mass transition to remote learning in March 2020 due to the COVID-19 pandemic became a stress test for the Russian system of higher education [Barannikov et al. 2020]. It revitalized, and in some cases sharpened, the debate around higher education, its problems and prospects of development. One of the most important discussions—not only in Russia but worldwide—is the one about the influence of mass transition to remote learning and teaching on manifestations of inequality in access to higher education [Lederman 2020; Williamson, Eynon, Potter 2020; Chan 2020; Arnove 2020].

The present study contributes to this discussion, demonstrating empirically that remote learning may exacerbate the inequality of educational opportunity between students from different socio-economic backgrounds. Our findings are largely consistent with the results of some studies, which found that students from low-income families faced more challenges transitioning to remote learning than their more economically advantaged peers [Aucejo et al. 2020; Soria, Chirikov, Jones-White 2020; Soria, Horgos 2020]. In particular, essential variance is observed in access to digital equipment among students from different income groups as well as in the severity of problems that they experienced due to the lack of an appropriate study space and specific skills required for effective learning in this format.

Limited access to devices suitable for remote learning and inappropriateness of learning environments among students from lower-income groups are easy to understand and explain. The gap between students of low- and high-income backgrounds may affect educational outcomes. Universities can mitigate the effects of such differences by monitoring students' access to digital equipment to identify vulnerable groups, providing necessary equipment to students in residence halls, or developing individualized learning plans with regard to access to remote learning technology.

Instructors should also take the existing limitations into account. When delivering classes and designing homework and test assignments, they should keep in mind that some learners may connect via mobile devices and avoid mandatory camera policies so as to prevent exposure of low economic status or difficult living situations, which may have long-term negative psychological effects[5].

SES disparities in students' technical competence may be related to differences in their patterns of online activities: difficulties understanding the interface of platforms and embracing the remote learn-

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[5] https://www.stanforddaily.com/2020/06/01/please-let-students-turn-their-videos-off-in-class/

ing format may indicate that learning is not a regular online behavior for low-SES students. Despite the active use of technology in life, students struggle to use specific online platforms. In order to prevent such obstacles from becoming a factor affecting educational outcomes, universities could offer brief training courses and various instructions to help students learn new practices. It would also be expedient to reduce the diversity of platforms and programs used in remote learning to decrease student workload.

The present study has a few peculiarities that impose limitations on data interpretation. Firstly, the sample cannot represent all students of Russian universities due to the use of convenience sampling. Some institutions, majors, courses, and modes of study are represented more strongly, while some universities are underrepresented or not represented at all. Research design does not allow controlling for this sampling bias in analysis and therefore extrapolating the inferences made from the sample data to the whole population of Russian university students. Yet, this sample is appropriate for comparing student groups by various indicators, which was performed in the present study.

Secondly, we cannot assess effectiveness of remote learning across specific student groups on the basis of course progress and educational outcomes. We can only suggest, relying on previous findings, that there is a relationship between obstacles in remote learning and educational outcomes.

Thirdly, assessment of access to digital equipment was limited in that it was administered online and thus originally selected students with access to the Internet, devices, and social media. Due to the method of data collection, the survey did not include students who had no access to the resources mentioned. Participation of such students would allow a more accurate assessment of the severity of technical problems associated with the transition to remote learning. The online method of data collection was chosen as the most time- and cost-efficient and the safest one during the pandemic.

Despite the limitations mentioned above, the present study allows describing the situation faced by students in 2020 and formulating hypotheses about its impact on the inequality of educational outcomes. Meanwhile, the following problems remain unsolved and require further investigation: inequality of students in different regions and types of university, relationship between economic consequences of the pandemic and educational trajectories of students from different income groups, and disparities in educational outcomes between students from different socio-economic backgrounds.

Appendix   Table 1. **Key sample characteristics.**

Variable	Sample percentage,%
Gender	
Male	30
Female	70
Mode of study	
Full-time	98
Part-time	2
Field of study	
Natural Sciences (Chemistry, Biology, Physics, etc.)	10
Mathematics	2
Economics and Management	15
Computer Science	7
Engineering, Technology, and Science	18
Social Sciences (Sociology, Psychology, etc.)	11
Education and Pedagogical Sciences	8
Humanities (Philosophy, Philology, etc.)	14
Arts and Culture	3
Healthcare and Medical Sciences	6
Agriculture and Agricultural Sciences	2
Defense and National Security, Military Sciences	1
Don't know	2
Level of education	
Bachelor's degree	76
Specialist's degree	17
Master's degree	7
Year of college	
Final year	18
University status	
Project 5–100 university	14
National research university	12
Federal university	7
Flagship university	12
No special status	67

Variable	Sample percentage,%
How would you describe your family's financial situation?	
We live a frugal life and have just enough money to cover basic daily living expenses, but buying new clothes is a challenge	12
We have enough money for food and clothes, but buying major appliances is a challenge unless we take out a loan	23
We are basically well-off but would have to take out a loan or save money to buy a car or go on an expensive vacation	57
We are well off and can easily afford to buy a car or go on an expensive vacation	8

Translated from Russian by I. Zhuchkova.

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Characteristics of Teacher Stress during Distance Learning Imposed by the COVID-19 Pandemic

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Received in
October 2020

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Abstract   Recent studies show that stress levels are higher among teachers than in many other occupational groups. Semi-structured interviews with 14 teachers from various regions of Russia were conducted to investigate the characteristics of psychological stress and coping strategies in the context of the abrupt transition to distance learning imposed by the COVID-19 pandemic. In remote schooling, teachers have to implement education programs despite their own pandemic anxiety, provide emotional support to students, and stimulate their motivation for learning. It appears from the interview data that teacher stress is elevated by the absence or lack of support from school administrators and a substantial increase in teacher workload caused by the need to search for new techniques of teaching and preparing for classes from a distance, intensified communication with students and their parents, and the growing amount of homework assignments to review. The stress factors specific to the pandemic include the new work-from-home setup and changes in the work-life balance. The most common strategies of coping with stress and reducing its consequences include an effort to search for the silver lining and/or new opportunities, seeking social and emotional support, physical exercise, and hobby activities.

At the beginning of 2020, school teachers and administrators as well as students and their parents had to rapidly embrace new learning tools and formats under tremendous pressure of external circumstances

caused by the COVID-19 pandemic. A qualitative study was performed to find out how this situation affected subjective well-being and emotional experiences of teachers and what strategies they utilized to cope with negative feelings.

Teaching is one of the most exhausting social activities, which is often fraught with psychological stress [Rean, Kolominsky 2000; Regush, Rean, Rogov 2007]. Recent international research indicates that when compared to members of other occupational groups, teachers experience higher rates of mental health problems [Schonfeld, Bianchi, Luehring-Jones 2017]. The main stress factors affecting teachers are job stressors, which include high workload, unsupportive administration [Guglielmi, Tatrow 1998], and excessive emotional involvement with students, their parents, and colleagues [Kokkinen et al. 2014; Schonfeld et al. 2010]. A number of longitudinal studies conducted in Australia, Sweden, Finland, Great Britain, Israel, United States, and other countries show that these stressors give rise to depression and irritability, have adverse effects on self-esteem and job satisfaction, predict psychosomatic symptoms, and may lead to addictions [Schonfeld, Bianchi, Luehring-Jones 2017]. All these are symptoms of burnout, one of the most severe consequences of prolonged exposure to stress, which consists in psychological inability to cope with work-related difficulties [Maslach, Schaufeli, Leiter 2001]. Risks of burnout are especially high when new working methods and tools have to be embraced during the pandemic and in self-isolation. Analysis of coping strategies for stress are thus an important prerequisite for the development of recommendations for teachers to help them maintain subjective well-being under trying circumstances.

Teacher well-being largely determines the quality of the modern education process, which is based around creating a safe environment conducive to development, creativity, learning, and socialization [Zaretsky 2020; Zausenko 2012; 2013]. Teachers satisfied with their lives and capable of protecting their own peace of mind are much better at inculcating in their students the qualities necessary to achieve the same outcomes [Zausenko 2013].

Extensive literature is devoted to the choice of suitable self-care and coping strategies for psychological stress [Griffith, Steptoe, Cropley 1999; Liao et al. 2012; Vachkov, Savenkova 2019; Gurieva, Afanasyeva 2019]. However, no uniform conception of effective teacher strategies for dealing with uncertainty exists so far [Vachkov, Savenkova 2019; Rasskazova, Gordeeva 2011].

The present study investigates the characteristics of psychological stress and coping strategies in the unique context of emergency remote teaching imposed by the COVID-19 pandemic. Its findings can also be used in other situations characterized by high levels of uncertainty, distress, and increased workload.

1. Psychological Stress and Coping Strategies

Physiologically, stress is the nonspecific response of the body to any external demand, directed at returning to the initial state [Selye 1979]. Cognitive processes and emotions play an important role in the response to specific stressors, largely determining the quality of recovery [Fink 2009]. Psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being [Lazarus 1970]. This state can be described as two sub-processes: appraisal of the demand (stressor) and strategies for coping with it, or coping strategies.

Coping strategies are unique behavioral strategies that help overcome threats causing psychological stress [Lazarus, Folkman 1984]. Richard S. Lazarus and Susan Folkman distinguish between two major functions of coping: coping that is directed at managing or altering the problem causing the distress and coping that is directed at regulating emotional response to the problem. Accordingly, they distinguish between what they refer to as problem-focused coping (e. g. planning to solve the problem) and emotion-focused coping (e. g. looking for the silver lining or, by contrast, responding aggressively) [Ibid.]. Lazarus and Folkman's theoretical framework has been used in assessment of coping strategies [Carver, Scheier, Weintraub 1989] as well as in practical psychology.

An approach alternative to Lazarus and Folkman's theory suggests distinguishing between the personality and coping strategies and underlines the importance of a holistic perspective on behavioral strategies in stressful situations [Haan 1963; Kryukova 2004; Nartova-Bochaver 1997; Sergienko 2007]. Both approaches have supporters [Bityutskaya 2011; Sokolova 2007], and both require a specific research design. The present study explores methods of coping with stress in the specific situation of remote teaching during the pandemic. Actions taken by respondents to cope with stressors are qualified here based on Lazarus and Folkman's paradigm of coping strategies without making allowances for respondents' personality.

2. Recent Findings on Teacher Stress and Coping

The impact of psychological stress and stress management issues on human life has been demonstrated empirically a number of times: stress has adverse effects on overall psychological well-being [Fry 1995; Kuiper, Martin 1998] and work performance [Brown, Westbrook, Challagalla 2005; Leonova, Bagry 2009]. Teachers experience higher levels of stress than many other occupational groups, such as healthcare professionals [Ingersoll 2003] or human service workers [Kokkinen et al. 2014], and are more likely to develop functional disorders, such as depressive and psychosomatic symptoms, etc. [Schonfeld, Bianchi, Luehring-Jones 2017]. Along with working conditions and excessive emotional involvement mentioned above, current trends in the development of education systems — the integration of new learning formats and information technology, which require learning new

skills and enhancing digital literacy — have become for many teachers a stressor which often makes them adopt avoidance strategies [Dmitrieva, Kachanovetskaya 2013]. Teachers today are in a desperate need of support, and searching for the most adaptive coping strategies to reduce work-related stress is a promising avenue of research.

Seeking social support is teachers' most popular behavioral strategy in a stressful situation [Aldrup, Klusmann, Lüdtke 2017; Clipa 2017; Sandilos et al. 2018; Dmitrieva, Kachanovetskaya 2013; Osadchaya 2018]. This strategy may be qualified as both emotion- and problem-focused coping because it can be used to achieve different goals: solve a problem, obtain information (problem-focused coping), calm down, distract oneself, or release emotions (emotion-focused coping). Findings from a study of U.S. and British teachers imply that escape avoidance, accepting responsibility, and uncontrolled aggression are used as negative coping strategies and exercise is indicated to be an effective way of coping [Austin, Shah, Muncer 2005]. Years of teaching experience correlate positively with effective coping strategies in a teacher's repertoire. However, the same authors who revealed this correlation also show that more experienced teachers are more likely to suffer from burnout [Alhija 2015; Kukhterina, Fedina 2016; Ozerov 2011]. Therefore, the question of long-term adaptive coping strategies for teachers remains open.

The present publication continues the series of studies on teacher stress and coping and contributes to the body of research on how changes in life caused by the COVID-19 pandemic affect teachers' mental health and work performance [Petrikov et al. 2020; Rasskazova, Leontyev, Lebedeva 2020; Kharlamenkova et al. 2020].

Teachers themselves expressed a demand for interviews in which they could discuss their pandemic-related stressful experiences with psychologists, so the practical goal of research was to lend them every possible psychological help. Teachers were interviewed by one of the co-authors of this article, a clinical psychologist qualified to conduct supportive interviews of this kind.

The research goal consisted in analyzing how teachers coped with psychological stress and organized their remote teaching activities during the COVID-19 pandemic.

3. Research Methodology

The study uses a qualitative data collection method of semi-structured interviews. Interviews were conducted using a dedicated interview guide and supportive techniques such as active listening, mirroring, and use of metaphors. The guide was designed to elicit information on the level of stress experienced, factors exacerbating or alleviating stress, and coping strategies. It comprised three modules of questions:

• Changes in working and home lives during the COVID-19 pandemic (time spent in self-isolation; use of distance learning (including

online) tools; communication with students, their parents, and colleagues; technological and psychological support from school administrators; changes in daily routines; interaction with family members);
- Perceived stress and coping strategies utilized (work-life balance during the lockdown; self-care techniques; daily routines, nutrition, sleep, socializing with friends and family, exercise);
- Perceptions of the future (returning back to normal; self-isolation practices that could be of use in the future; changes in relationships with students, their parents, and colleagues).

Interviews were conducted with 14 teachers (13 women and one man) from eight cities of Russia: Moscow, Khimki, Zheleznogorsk (Krasnoyarsk Krai), Omsk, Vorkuta, Saratov, Shakhty, and Yaroslavl. The number of years of teaching experience among the respondents ranged from 3 to 40. Seven respondents were middle school teachers, three taught elementary and middle school students, and one was a school administrator. Six of the teachers interviewed also worked as form teachers. Apart from subject teachers (in history, foreign language, etc.), the sample also included a school counselor, a psychologist, and deputy headmasters.

Time that respondents had spent in self-isolation and distance learning ranged from one week to two months. Such variance results from the fact that interviews were conducted over the period of two months (April–May 2020) and from regional differences in lockdown restrictions and remote work requirements, including those in distance learning.

Interviews were administered online. All the respondents gave their consent to participation in the present study and audio recording. Recordings were transcribed, and content analysis was used to analyze the data.

Content analysis revealed the following key themes: psychological stress (whether, how exactly, and how severely it is experienced), factors alleviating or exacerbating stress, and coping strategies. Results will be presented in accordance with these themes.

4. Stress from Remote Teaching during the COVID-19 Pandemic

Some respondents pointed out that they perceived the emergency transition to distance learning as a threat to their psychological well-being and health in general.

"That was a shock for our school." (Respondent no. 1, three weeks into remote teaching)

"We were absolutely unprepared for this distance learning, absolutely." (Respondent no. 2, two weeks into remote teaching)

For some, the feeling of uncertainty was particularly disturbing.

> "This feeling of uncertainty all the time, because no one knows what happens next." (Respondent no. 2, two weeks into remote teaching)

An abrupt change in working conditions caused acute emotional distress in some respondents.

> "And then I went into hysterics, because all this stress, it's not caused by everything that's going on, it's an emotional overload <...> By the end of the week I was fagged out, I just cried and went crazy, I mean, because of the overload." (Respondent no. 4, two weeks into remote teaching).

Teachers who did not initially perceive the transition to distance learning as a threat or found resources to cope with the situation reported virtually no symptoms of psychological stress.

> "I'm home, and I control my child, I know exactly what should be done and when, so I'm comfortable with the format." (Respondent no. 5, about one month into remote teaching)

> "I'm actually used to this format, I work a lot from home, with my kids, because of them in part. You just come, turn on the computer, as always, sit there, and work on <...> Yes, I lie on the couch! I need no make-up! I even don't need no comb my hair—to think of it! And my dog is around, too. Benefits wherever I look." (Respondent no. 6, three weeks into remote teaching)

> "There's no this fixed rule that you get up in the morning and head to school in any weather, rain or snow. Now, when it's nasty outside, you're home—such small things are really nice... It's just convenient. In this sense, I wasn't scared of staying home, it's pretty familiar for me to be home. It feels more comfortable and safe psychologically, so working remotely gives me no strain." (Respondent no. 7, about one month into remote teaching)

Interviews demonstrate that teachers who perceived the situation as threatening did not fear the pandemic itself (concerns about their own and their family's health) but rather the abruptness of the transition from in-person to distance learning as well as the uncertainty about how long this period would last.

5. Factors Alleviating or Exacerbating Stress
5.1. Administrative Support

Administrative support may manifest itself in a considerate way of notifying teachers about the transition to a new format, in preparation for such transition, in providing access to technical and information

resources, and in organization of psychological assistance from colleagues and administrators.

Interviews revealed a variety of teacher support strategies applied by schools during the transition to distance learning, from strong involvement to no support at all. Some teachers reported that school administrators had organized master classes and tutorials on various online platforms, experience exchange sessions, and mock online classes. Teachers who had an opportunity to seek assistance from IT departments or computer science teachers highly appreciated this supportive measure.

> "Mock online classes started the day before the lockdown, while we were still in the workplace. Those who still had questions after such classes could seek assistance from experts... Our IT support guys have been doing great: they're available 24/7, and we have special chats with them..." (Respondent no. 8, three weeks into remote teaching)

Others, however, did not feel supported by the school administration.

> "I panicked because I'm not an advanced user. I would contact my colleagues who had similar problems, and we would deal with them on our own. Some were helped by their grown-up children, others by someone else, but there was no support from the school." (Respondent no. 9, six weeks into remote teaching)

> "We were just given recommendations as to which platforms we could use and what we could recommend to our students, but there are few resources for elementary school." (Respondent no. 10, one month into remote teaching)

Some teachers described the school's strategy in the transition to distance learning as granting them complete freedom, which in fact was equal to no support at all.

> "On the one hand, we were granted freedom, but on the other, it was like we were not taken care of. No one discussed with us how exactly it was gonna work. They just gave us a command, and that was it." (Respondent no. 2, two weeks into remote teaching)

When talking about administrative support, nearly all the respondents mentioned technology infrastructure and earlier experience of using online platforms by teachers as well as schools in general. For example, one of the schools had used Discord on a regular basis before the pandemic and made this platform its core technology during the lockdown. Yet, in some schools the transition to distance learning was performed at the expense of teachers' personal resources.

> "In fact, not every classroom at our school has access to the Internet. We were basically left to the devices that we had at home. I was lucky to have a laptop and a smartphone, but the storage regularly gets full and has to be cleared." (Respondent no. 10, one month into remote teaching)

The choice of tools for remote teaching and communication with students and their parents depended on households' access to technology as well as students' age and experience. Respondents who were quick enough to select their teaching and communication tools reported lower levels of stress.

5.2. Workload Increased teacher workload during the period of distance learning is caused not only by the need to seek new teaching methods and adjust content to the new format but also by intensified communication with students and their parents and an increased amount of homework to review. Some routine tasks became more difficult to perform in distance learning, such as reviewing written assignments and preparing feedback for each student. This complaint was most common among elementary school teachers and form teachers.

> "My working days now end at 2 or 4 a. m. I should review all the assignments from every student. Sixty students send in their assignments, and each may have, say, four or seven attachments, it depends… Some of them don't see their assignments are under review already and send the entire amount of homework they did. Well, I need to look through all of this, because if they do it, they might need my help or assistance with something." (Respondent no. 10, one month into remote teaching)

> "The only thing I can say is that I spend at least 12–14 hours a day on computer." (Respondent no. 11, two months into remote teaching)

> "Each assignment should be reviewed individually, and you do it from the screen. You either print it all out or stare at the screen—it causes eye discomfort." (Respondent no. 12, six weeks into remote teaching)

Elementary school teachers are engaged in communication with parents more than any other type of respondents.

> "Today is May 1, and I have over 100 messages <from parents> since last night, and they started coming quite late in the evening." (Respondent no. 10, one month into remote teaching)

Some teachers believe that the role of parents increased in distance learning and mention having hoped for their support. Others, meanwhile, say that they provided support to parents, particularly during the first days of lockdown.

"They may call to ask for assistance with homework as well as some family issues." (Respondent no. 10, one month into remote teaching)

In distance learning, teachers spent a lot of time on finding formats that would allow them to deliver the material more effectively and support children's well-being.

"Most kids… they need our facial expressions, our lips when they watch us, it's easier for them to understand this way… I normally record an audio or video message and drop it to the <parents'> chat group so that everyone could hear and watch me explain something and then show this to their children or put it in their own words." (Respondent no. 10, one month into remote teaching)

"I set strict deadlines: assignments should be submitted within two days. I make a reading list for them, indicating the chapter and the topic, and add a link, or a video or presentation if the link doesn't work, and give written test assignments. If there are no assignments, they just study theory." (Respondent no. 7, about one month into remote teaching)

"You have to consider a lot in advance and try to predict difficulties with comprehension that may arise—purely didactic moments. And you have to elaborate assignments more carefully and ask more comprehension questions than usual." (Respondent no. 13, three weeks into remote teaching)

"We meet <with children> via Zoom for a small talk because I need to see how the kids feel. You see, family relationships come to play a huge role in self-isolation, and some families have socioeconomic difficulties and hardships. So I need to see how the kids feel. It matters to me <…> And now we have Zoom meetings almost every day at 8 p.m. And we have this project, Bedtime Stories. Right now, we're reading about Winnie-the-Pooh." (Respondent no. 1, three weeks into remote teaching)

Teachers tried various formats for their classes: video conferencing (sometimes only for consultations or homerooms), discussions, video-recorded tutorials, etc.

"We actually analyzed cases that had been reviewed by the Constitutional Court. I clutched my head and panicked, but I had no other choice. There was no use in reading the textbook cuz it's empty talk, and lecturing made no sense either, so we studied court cases." (Respondent no. 8, three weeks into remote teaching)

"I think a fundamental outcome of my work is when a student becomes able to self-organize and do the work without me. Firstly, I de-

clare this as my goal. Secondly, classes are originally designed on the basis of "flipped classroom". It's vital to have students ask questions and engage them in conversation. I keep using group work techniques, so that each group of students is assigned their own chatroom." (Respondent no. 6, three weeks into remote teaching)

In addition, teachers started paying more attention to feedback.

"If a child knows his or her work will be reviewed and assessed, it totally motivates them. I review assignments very carefully, and they know it." (Respondent no. 10, one month into remote teaching)

5.3. Work-Life Balance

Transition to the new format and increased workload affected the work-life balance. A number of respondents were stressed by difficulties protecting their personal space.

"Up to May 1, we would constantly receive all kinds of requests and instructions on WhatsApp. We were available for the headmaster day and night. In the end, someone asked her to give us some rest on Sunday, because it took all the time, this WhatsApp, this smartphone, this incessant work." (Respondent no. 9, six weeks into remote teaching)

For some respondents, allowing themselves some personal space became a challenge but at the same time a source of energy.

"Ever since pre-pandemic days, I've got my English course. This is my rigidly scheduled personal time when I study English, period. It distracts me a lot and just makes me feel better. Whatever state you're in, you do it just to rewire your brain to a different language... This is crucial for me." (Respondent no. 8, three weeks into remote teaching)

"And parents don't understand that I can't bury myself in the computer <...> and then, maybe two weeks later, I texted in the group chat, "Dear parents, let's set a break between 12 and 13 p. m." (Respondent no. 10, one month into remote teaching)

As we can see, factors alleviating or exacerbating teachers' stress induced by the transition to distance learning include administrative support (or lack of it), increased workload caused by the need to seek new teaching methods and keep in touch with students, intensified communication with parents, and disrupted work-life-balance.

6. Coping Strategies

A few respondents tried to look on the bright side of things throughout the period of teaching in self-isolation.

"I do believe in God, and I understand that if we are sent into a situation, it means we need it and we ought to go through it <...> I think when people stop, during this period of slowdown, they should catch this feeling, something like 'I love you all', and change a little for the better." (Respondent no. 4, two weeks into remote teaching)

"I've found myself thinking, when I approach a traffic light and it changes from green to red right in front of me... Back in normal life, I would feel bad about it and think, 'There we go, I'm late, what a shame.' And now I think, 'How nice, I'm gonna stand for a whole minute in the sunshine.'" (Respondent no. 3, two weeks into remote teaching)

Nearly all the respondents say that the situation at hand is a good opportunity to learn new skills for employing modern technology and distance learning practices. This is especially valuable for teachers from regions with long winters and extremely low temperatures.

"For our region, it will definitely improve performance in case of weather-related cancellations. I mean, these distance learning practices should be extrapolated to such days. It would be a big win if our teachers used their skills with online learning platforms to teach more effectively in such situations." (Respondent no. 5, about one month into remote teaching)

"We live in Siberia and we have freezing temperatures at times. And usually, when we did, distance learning was announced officially, but children didn't study because we didn't know what to do with them. At least now we have some idea." (Respondent no. 2, two weeks into remote teaching)

Leisure activities was another coping strategy for managing stress.

"My hobby is making beaded brooches, and now I'm in the middle of an online course. The instructor is currently located in Israel, so we use Google Forms and Google Classroom to study and do our assignments." (Respondent No. 2, two weeks into remote teaching)

"I took out my knitting today, I've been dreaming of knitting in front of the TV for several months, and now I'm gonna finally do it, yay!" (Respondent no. 3, two weeks into remote teaching)

Respondents took longer walks with their pets, and some of them starting exercising.

"Me and my family members, we found some Latin dance online courses, so now we dance. It's fun, it's laughable, and it's some kind of release." (Respondent no. 1, three weeks into remote teaching)

Socializing with family and friends also worked as a factor alleviating negative emotions.

> "I now call my mom more often because I understand she needs socializing too. She goes out to her large balcony and walks around it with the phone in her hand. She says, 'Right, I'm walking, talk to me.'" (Respondent no. 3, two weeks into remote teaching)

> "Socializing with friends via Skype and Telegram helps a lot. But it has to be a pool of people you really want to talk to." (Respondent no. 8, three weeks into remote teaching)

Most respondents managed to find "positive" coping strategies. However, anxiety about remote teaching and uncertainty about the future of teaching prompted some interviewees to respond aggressively.

> "Everyone says it's the future, this distance learning, but I think it's just not for me. The teacher cannot be reduced to a fancy moving puppet!" (Respondent no. 9, six weeks into remote teaching)

> "I'm not optimistic! I know perfectly well that education will be gradually forced into the virtual environment! <...> A human being should be nearby, and that's what I'm very concerned about. As soon as humans are removed from the chain of transfer of sociocultural experiences, they will stop being humans." (Respondent no. 14, six weeks into remote teaching)

To sum up, the interview data reveals the following major coping strategies: (a) looking for the silver lining and trying to find something good or even useful in the situation, (b) engaging in favorite activities and exercise, and (c) socializing with friends and family. In some cases, the strategy of aggression was also applied.

7. Characteristics of Psychological Stress and Coping Strategies during the Transition to Distance Learning

Psychological stress during the COVID-19 pandemic was caused by the living conditions as such, i. e. the constant risk of infection that led to mandatory self-isolation [Kharlamenkova et al. 2020]. At the same time, teachers had to embrace modern technology and remote teaching practices within an extremely short period of time, while supporting students and their parents and maintaining students' motivation for learning.

Teachers involved in the study reported various levels of psychological stress experienced. Remarkably, their stress was not caused by the pandemic itself with its threats to life and health, but rather by the emergency transition to distance learning and the associated uncertainty.

Findings reveal that stress was exacerbated by the lack or absence of the following: administrative support, preparedness for the transition to distance learning, technical and information resources, and psychological support from colleagues and administrators.

Essentially increased workload became a critical stressor for teachers, manifesting itself in the need to seek new methods of teaching and lesson preparation in the context of distance learning, intensified communication with students and their parents, and increased amount of homework to review. Work overload was reported most often by elementary school teachers and form teachers, which may be due to specific job features and the age of children that they worked with. Analysis of the relationship between workload and specific characteristics of the teaching profession may become an avenue for further research.

Results of the present study are mostly consistent with earlier findings about teacher stress being caused by working conditions (high workload, no administrative support) and excessive emotional involvement in relationships with students, their parents, and colleagues [Schonfeld et al. 2010; Bagnetova 2017]. However, the transition to distance learning introduced a stress-exacerbating factor that had never been the focus in earlier studies: the work-life balance was seriously disrupted by working from home and increased workload. Challenges associated with protecting one's personal space may be a stressor and thus require further investigation.

Design of the present study does not allow making inferences about the relationship between individual teacher characteristics such as years of experience, weeks/months into remote teaching, and region of residence, on the one hand, and stress-exacerbating factors, on the other. Possible mutual influences among these factors also present a promising area of research.

Judging by interview results, teachers utilize a variety of strategies to cope with stress and mitigate its consequences. One of them consists in looking for the silver lining and/or new opportunities in the situation, or positive re-appraisal—an example of emotion-focused coping according to Lazarus and Folkman's theory. Another example of emotion-focused coping is aggression, where the teacher looks on the dark side of things.

Hobby and exercise distracted teachers from work-related stressors and helped them boost their energy levels, which is in line with the finding that exercise is one of the most effective emotion-focused coping strategies [Austin, Shah, Muncer 2005].

Socializing with family and friends and seeking assistance from colleagues (seeking social support, in Lazarus and Folkman's terms) can be regarded as both emotion- and problem-focused coping—as a way of settling nerves and searching for support in solving specific problems. In the present study, this coping strategy had a double meaning as well: some respondents mentioned interactions with family, friends, and colleagues as a pleasant pastime to alleviate negative

emotions caused by the lockdown (emotion-focused coping), but many also viewed socializing as an opportunity to obtain the information necessary for embracing new technology (problem-focused coping).

Research design does not allow measuring the incidence of emotion- and problem-focused coping among teachers. A quantitative study could be a good way of answering this question.

8. Conclusions

Analysis of interviews with teachers reveals factors associated with teacher psychological stress and coping strategies in the unique situation of transition to distance learning during the COVID-19 pandemic. As a next step, the impact of every factor on the level of psychological stress as well as the incidence and effectiveness of different coping strategies could be explored.

Yet, the results of the present study already point to the need for creating a system to support teachers' mental health, which we regard as requisite to promote education effectiveness in terms of both learning outcomes and psychological well-being of all participants in the learning process.

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It Can't Be Taught Online: Applied Sciences Students during the Pandemic

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Received in October 2020

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Abstract

Transition to distance learning during the Covid-19 lockdown in spring 2020 was a challenge to the education system in general and higher education in particular. Applied Sciences were unanimously recognized as the most affected due to their focus on practical skills, being closely tied to the institutional infrastructure, and a moderate curriculum digitalization. This article describes student experiences during the spring semester of academic year 2019/20, using data obtained from 30 interviews with students in Engineering & Technology, Health & Medical Sciences, and Arts & Culture degrees. Delivery of lectures and practical classes, placements, dissertations, and faculty–student interactions are analyzed. Findings are consistent with the widely discussed perception of education during the pandemic not as distance learning but rather as emergency remote teaching that requires supportive measures to compensate for time loss in learning as well as solutions to technical and methodological issues.

The emergency transition to distance learning formats during the COVID-19 pandemic became a challenge to the system of higher education as most university students had no previous experience of distance learning [Tsener, Oshkina 2020]. Studies carried out during the pandemic show that students have faced a number of difficulties, first of all problems caused by poor Internet connection and lack of nec-

essary devices [Gruzdev, Kamaldinova, Kalinin 2020; Tsener, Oshkina 2020; Kapasia et al. 2020]. Other issues include reduced interactions with peers and faculty and the feelings of loneliness [Gruzdev, Kamaldinova, Kalinin 2020; Elmer, Mepham, Stadtfeld 2020]. A lot of students experienced problems with self-management during the lockdown [Gruzdev, Kamaldinova, Kalinin 2020; Kapasia et al. 2020]. Their mental health was also affected by the transition to distance learning [Aleshkovsky et al. 2020; Elmer, Mepham, Stadtfeld 2020].

The urgent transition to distance learning in the lockdown has had a number of long-term consequences. For instance, some students have delayed graduation and avoided entering the labor market, being unable to complete their studies [Aucejo et al. 2020]. Nearly one third of students have been expecting to earn less in the future.

Students in Applied Sciences are the most vulnerable group: despite technological progress, the transition to distance learning has become a real challenge for universities offering programs in engineering, medicine, and arts. Due to the focus on practical skills, the learning process in those fields is largely contingent on the facilities and equipment available at the university or partner corporation. Access to institutional and corporate infrastructure has been limited or denied during the COVID-19 pandemic. Most Applied Sciences programs are impossible to deliver online or remotely [Shibanova et al. 2020]. Researchers emphasize the importance of in-person student–faculty interactions in Applied Sciences [Abramyan, Katasonova 2020; Levanov, Perevezentsev, Gavrilova 2020], which are hard to ensure in distance learning formats. Changes have affected not only the learning process but also the way exams are conducted. Art school students have complained that online learning prevents them from demonstrating the quality of their work to the full extent[1], and the impossibility of taking licensure exams may have negative effects on employment of medical graduates [Chandratre 2020; Choi et al. 2020, Hilburg et al. 2020].

A lot of researchers doubt that educational practices emerging during the pandemic can be considered proper online learning. Rather, the new phenomenon is referred to as Emergency Remote Teaching and Learning[2] or Emergency Remote Teaching (ERT) [Hodges et al. 2020]. ERT is not fully equivalent to in-person or distance learning. Online learning is aimed at recreating a full-scale learning environment, whereas ERT is temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances [Ibid.]. Authors of such studies agree that in the absence of theoretical underpinning for ERT, the focus of their research is on the narratives of key players in education,

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[1] Toner P. (2020) How Are Final Year Art School Students Dealing with the Impact of COVID-19 on their Education? https://www.10magazine.com/arts/covid-19-fashion-art-design-students-csm-lcf/

[2] Milman N. B. Pandemic pedagogy // Phi Delta Kappan. https://kappanonline.org/pandemic-pedagogy-covid-19-online-milman/

and their paramount objectives are to analyze the situation and provide recommendations for the future [Bozkurt et al. 2020; Hodges et al. 2020]. The goal of this paper is to investigate into experiences of Applied Sciences students during the COVID-19 pandemic.

1. Distance Learning Experiences as Reported by Students

Even before the distance learning period was over, ample literature devoted to students' learning experiences during the COVID-19 pandemic in spring 2020 had been produced in Russia [Aleshkovsky et al. 2020; Gruzdev, Kamaldinova, Kalinin 2020; Tsener, Oshkina 2020] and beyond [Aucejo et al. 2020; Elmer, Mepham, Stadtfeld 2020; Kapasia et al. 2020], analyzing the organization of learning and the challenges faced by university students. All of these studies are descriptive, as the changes that have occurred in education are so radical that they cannot be fitted into any of the existing theoretical models.

In a survey of students from Siberian State University of Telecommunications and Informatics [Tsener, Oshkina 2020], only 5% of the respondents reported having pre-pandemic distance learning experience. At the same time, 92% of students believe that "in-person learning is superior in quality". Similar results have been obtained in India, where an overwhelming majority of medical students (84%) consider distance learning ineffective [Kumar et al. 2020].

The reason for students' dissatisfaction with distance education may be their passive role in learning formats of this kind [Aleshkovsky et al. 2020]. However, they also name some specific characteristics of distance learning organization that they believe degrade the quality and effectiveness of education. According to a survey of Russian university students [Aleshkovsky et al. 2020], only some lectures were delivered as synchronous webinars and could be accessed later as recordings or were replaced with third-party online courses from open platforms. The majority of lectures were left to self-study with the use of lecture slides and reading materials provided by instructors or sources from the recommended reading list. Meanwhile, analysis of changes in engineering education during the pandemic shows, in particular, that despite the advancement of digital technology and infrastructure, engineering students usually learn their practical skills only in face-to-face interactions with the instructor [Abramyan, Katasonova 2020].

As for exam organization, about 40% of students did not notice any significant difference between in-person and distance exams, the latter being easier for 28% and harder for 20% of the respondents [Tsener, Oshkina 2020].

Survey data allows analyzing students' emotions and perceived effectiveness of education. The experience of distance learning is assessed as positive by hardly one third of the students, while half of the respondents have "mixed feelings", and one in five refers to this experience as negative [Aleshkovsky et al. 2020]. A study of Swiss students

found that social ties among students became weaker during the period of distance learning, students growing more likely to feel lonely [Elmer, Mepham, Stadtfeld 2020]. Similar results were obtained in a national survey of university students in Russia [Gruzdev, Kamaldinova, Kalinin 2020]. The lack of peer contact and in-person discussions with instructors were mentioned among the most significant difficulties [Ibid.]. The absence of regular interactions affected students' mental health, increasing the frequency of depressive symptoms, anxiety, and stress [Elmer, Mepham, Stadtfeld 2020]. A possible contributor to this result may have been the need to adapt quickly and without help to an unfamiliar e-learning environment [Horita, Nishio, Yamamoto 2020]. Students had to study on their own and organize their learning process themselves—and many exhibited low levels of self-regulation.

Essential difficulties were experienced with technological infrastructure. Students often had to learn to use new tools on their own [Tsener, Oshkina 2020], and many of them had no suitable space or devices for learning [Gruzdev, Kamaldinova, Kalinin 2020; Kapasia et al. 2020]. Internet connection issues were reported not only by Russian students [Gruzdev, Kamaldinova, Kalinin 2020; Tsener, Oshkina 2020] but also by their counterparts in India [Kapasia et al. 2020] and Nepal [Koirala et al. 2020].

International scholars point out that pandemic-induced distress was considerably higher among medical students than in any other population group. Clinical practice constitutes a large part of medical education, the most important exams being taken in clinics as well. Impossibility to access hospitals jeopardized practical training as well as licensure exams, which might have negative effects on the job prospects of medical students [Chandratre 2020; Choi et al. 2020, Hilburg et al. 2020]. Despite the integration of some distance learning components over the recent years, the system of medical education turned out to be unprepared for the urgent transition to distance learning formats [Hilburg et al. 2020]. Physical examinations were replaced with clinical data analysis. Students were encouraged to train their practical skills on family and friends. Virtual simulations were sometimes used; however, researchers believe these techniques to be inadequate substitutes for direct patient care. Many of the clinical teachers were overloaded with inpatient care and unable to pay due attention to distance learning organization [Ibid.]. Based on their distance teaching experiences, medical faculty members came to a conclusion that in-person class schedule is an important motivational and organizational factor for students, while the transition to communication via messaging apps often makes instructors adapt to students' personal schedules, leading to problems with planning and time management [Levanov, Perevezentsev, Gavrilova 2020].

The only real chance for medical students to practice their newly learned skills was volunteering on COVID-19 wards, which did not provide, however, any knowledge or skills beyond a specific area [O'Bryne,

Gavin, McNicholas 2020]. Access to clinical practice was also limited due to residence hall closures and the outflow of non-resident students to their home towns [Lucey, Johnston 2020]. A number of medical institutions in the United States and Great Britain graduated their fourth-year students two months early in order to solve the shortage of healthcare professionals and avoid the challenges of distance learning organization [Flotte et al. 2020; Macdougall et al. 2020]. Many of such graduates felt less prepared for beginning work as doctors [Chandratre 2020; Choi 2020].

Students in music and art departments also faced difficulties specific to their fields of study. Signing or playing instruments at home could be irritating for apartment residents and sometimes led to conflicts. Internet connection was the most important problem for student musicians, as poor sound transmission made it impossible to learn the techniques from instructors [Ozer, Ustun 2020]. In art and design, practical work often depends upon access to machinery and equipment, so final-year students found themselves unable to complete their projects at home. Degree shows are usually attended by potential employers, and final-year-students had every reason to doubt that an online graduate exhibition would allow making an adequate inference about the quality and unique features of their works[3].

As we can see, learning in a lockdown is particularly challenging for students in Applied Sciences due to the focus on practical skills, dependence on the institutional infrastructure, and a low level of curriculum digitalization [Shibanova et al. 2020]. Organization of laboratory classes and work placements is not even addressed in the literature described.

This study aims at exploring the pre-pandemic learning environments in medical, engineering, music, and art programs, organization of the transition to distance learning, and lockdown learning experiences including such elements of the learning process as lectures and seminars, term papers and theses, and work placement internships.

2. Research Design

2.1. Interviewee Recruitment

Semi-structured interviews with students from five Russian universities served as empirical basis of the research. Relying upon the findings obtained by Ekaterina Shibanova and her colleagues [2020], we came up with a list of fields of study in which students will be unable to complete their degrees at a distance: Engineering & Technology, Health & Medical Sciences, and Arts & Culture. Interviewees were recruited by university representatives from among students in the relevant degrees. Their contact information was provided by faculty members and senior administrators.

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[3] Toner P. How Are Final Year Art School Students Dealing with the Impact of COVID-19 on their Education? https://www.10magazine.com/arts/covid-19-fashion-art-design-students-csm-lcf/

2.2. Sampling
The method of criterion sampling was applied so that students from the three selected fields of study would be represented equally in the sample. Sample size was determined by the principle of saturation: data collection was stopped as soon as no new substantive information was acquired from the interviewees.

The sample consisted of 30 students, of whom 16 were female, aged on average 21 (SD = 1.97). They represented five Russian universities: two medical, two technical, and one specialized in the humanities. Ten of the interviewees were enrolled in Engineering & Technology, eleven in Health & Medical Sciences, and nine in Arts & Culture. For more details on the participants' profiles, see the Appendix.

2.3. Interviewing
Interviews were conducted online in June 2020 with the use of video- and audioconferencing apps such as Skype, Zoom, and WhatsApp. The participants provided informed consent their permission to use interview recordings and transcripts for research purposes. The names of students and universities are not disclosed for reasons of confidentiality. Every interview lasted from 37 to 90 minutes, the average length being about an hour. The interview guide contained the following modules of questions: biographical data; students' experiences before and during the pandemic; and their expectations of post-pandemic life.

2.4. Data Analysis
The method of categorization [Kvale 2003] was used to analyze the data collected. First, key categories of student experiences were determined: time spending, work/internship in the field of study, practice-oriented learning, learning during the pandemic, communication with peers and faculty, self-regulated learning skills, and future expectations. Next, each of the categories was divided into subcategories, according to which the interviews were coded. Categorization at the first stage was carried out by two experts independently. At the second stage, the experts discussed the results obtained, and another expert joined the coding procedure in case of discrepancies.

3. Results
3.1. "There Were Only a Couple of Courses Where We Would Just Sit and Listen": Pre-Pandemic Learning
Before universities went into the lockdown, a typical day of a student involved attending classes at the campus or at other institutions (hospitals and kindergartens for medical students, museums for art students). Students made extensive use of the opportunities provided by universities: musical instruments, expandable materials at workshops, libraries with anatomical charts that are "easier to work with than online anatomy atlases", equipped laboratories, computers with expensive licensed engineering design software, etc. Students spent their time outside classes on homework, supplementary courses, scientific communities and research groups, but most of all on working. Engineering undergraduates often had jobs that mismatched their field of study but did not take much of their time. The situation was different for medical students who normally combined study with clinical shifts

and often worked at nights, and art and music students who worked under short-term contracts, at nominal cost, or free of charge.

According to the interviewees, the use of modern learning technology before the lockdown was rather moderate: many of them cannot remember using any digital tools. Some of the interviewees mention PowerPoint presentations and transfer of study material by instructors on computer media or by email as typical pre-pandemic learning technologies. The use of computer media was not always welcomed by faculty out of copyright concerns, and PowerPoint presentations were not always fully realizable.

> I remember one day when we had no screen, so we had to hang up a large bedsheet (interview #30, Health & Medical Sciences, 6th year).

Other technologies, except for discussion of organizational issues with instructors via messaging apps, were rarely used in learning. That is why some isolated cases of technology use particularly stuck in students' memory: videos of surgery procedures, video lectures recorded by faculty, webinars in cases of teacher illness, interactive boards, instant mobile surveys, and muscle anatomy apps in medical degrees.

Students showed the most interest in practical classes where they learned professional skills in real life by watching their instructor—a practicing engineer, doctor, musician, or artist—work, or by working together with them, be that communication with patients, operation of equipment, visits to places of art or playing with a band outside the university, or during one-on-one sessions.

> There were only a couple of courses in the fourth year where we would just sit and listen: Public Health and Healthcare, and Innovation Management, but the latter was taught remotely <during the lockdown> (interview #12, Health & Medical Sciences, 4th year).

3.2. "It Seemed It Would Not Be Long": The Transition to Distance Learning

Students reacted to the news about campus closures differently. Some were caught by surprise when they came to classes that had been cancelled by the relevant order or when their supervisors notified them about possible event cancellation. Some interviewees were happy about getting a two-week break from their busy student schedule—"It seemed it would not be long" (interview #29, Health & Medical Sciences, 2nd year)—while others were puzzled by unprecedented measures and upset by the anticipation that "it wouldn't be normal education and <we> would basically have to learn on our own" (interview #17, Engineering & Technology, 2nd year).

> We all experienced severe emotional stress, because of all this anxiety transmitted by mass media <...> We all just wandered and didn't know what to do or what would come of it (interview #13, Arts & Culture, 3rd year).

Some students monitored the situation in Russia and the rest of the world. They knew that some campuses had already been closed and expected similar notice from their rectors. Medical students were outraged at continuing clinical practice in hospitals, which increased the risks of infection for their family members. A few students were thinking of getting a job to fill their freed-up time.

> Everyone started slagging off the university: why are they doing nothing if the ministerial decree has already been issued? As a pragmatic person, I knew that it would take a while for the system. So I was totally cool about it (interview #30, Health & Medical Sciences, 6th year).

> Everything worked as scheduled. <University name> switched over to Mirapolis quickly, and we just kept doing our work. In fact, the lockdown coincided with our pre-graduate internships, the very end of them. All the companies were shut down: we got our journals back real fast, and everything was closed in two days (interview #20, Engineering & Technology, 4th year).

Educational interactions were transitioned to distance formats in different ways and with varying degrees of success. It took a while to resume some courses online. Students relate this delay to the difficulty of carrying out the university's key activities remotely with the use of digital technology and to the advanced age of faculty members, who had to learn to use tools they had never dealt with before. However, few courses were postponed until the fall semester: universities mostly chose to deliver the spring semester courses at least in a reduced form.

3.3. "The Instructor's Mood Defined the Way the Class Would Go": Lectures During the Self-Isolation Period

Lectures during lockdown were delivered with the use of various technologies and in a variety of formats, the most widespread ones being synchronous webinars with the instructor and self-study of lecture texts.

Webinar lecture is a format most closely resembling the type of student–faculty interactions in traditional in-person lectures, which allows students to ask questions and receive immediate answers and requires no substantial content reorganization. Webinars were delivered using such videoconferencing apps as Zoom, Skype, Mirapolis, and Megafon. In addition to making the lecturer seen and heard, such apps also make it possible for instructors to demonstrate PowerPoint slides or share their screen with students. Effectiveness of this format is determined by the ability of participants, lecturers in the first place, to use videoconferencing apps, their access to properly functioning web cameras and microphones, reliable Internet connection, and flawless app operation.

> The university obliged all lecturers to turn up in Zoom meetings on time according to the schedule. And we had to attend with our web

> cams on. That kept us quite disciplined (interview #22, Health & Medical Sciences, 5th year).

> We didn't have to do anything in lectures; listening was all we did (interview #10, Arts & Culture, 4th year).

As simple as this format may seem, a number of interviewees report that it was ignored by faculty.

> It would have been better if we had had lectures via Zoom. With anatomic pathology and all those tests, and with gross anatomy too... I mean, our lectures should have been organized better: the course is tough, but all we did was just going to the website, answering some questions, and moving to the next module (interview #25, Health & Medical Sciences, 3rd year).

When lecturers chose self-study as a way of consuming lecture material, they would upload presentations, articles, and textbooks to the distance learning environment or send them to students by email. Some interviewees believe that this method was applied "due to some negligence on the part of the instructor" (interview #15, Engineering & Technology, 2nd year). Many students complain that material for self-study was often too extensive and explain this high level of workload either by faculty's desire to get them occupied during lockdown or faculty's lack of distance learning experience. Interviewees claim that instructors in extramural learning programs are more accurate in distributing workload when organizing self-study work of students.

> Some instructors would give us assignments for the whole week. Not that it's a bad thing, of course. Plus, six books for good measure. But then again, we are learning, and someone should tell <us> something (interview #30, Health & Medical Sciences, 6th year).

In this scenario, students should send a photo of handwritten lecture notes or take a test at the end of the module. The quality of student work was largely contingent on the lecturer's support, specifically on the possibility of asking them a clarifying question and getting a prompt response. Since some instructors only replied by email, ignoring messaging apps and social media, answers could be delayed for an indefinite period. If students could not be sure about getting an answer to their question, they would have to spend additional time on searching for the necessary information or seek help from their peers and join efforts to find the solution.

> You come across something confusing, and you have no one to ask a question to. But you don't want to delay finishing the notes that you're going to complete in, like, 20 minutes. And you have no idea

when the lecturer will get back to you. So you think, "Whatever, let's pretend I got it." And you keep writing. In this example, <it becomes clear that> effectiveness is obviously lower (interview #19, Engineering & Technology, 3rd year).

Students point out that the quality of learning degrades when notes are taken at home as compared to classroom-based lectures due to lower concentration and engagement. Quite often, they would listen to music or just mind-wander while taking notes because the environment was unconducive to learning. Moreover, even note-taking could not guarantee acquisition of knowledge, as time was only enough for putting everything down but not learning the lecture notes by heart.

End-of-module tests were another form of control. Automatically assessed assignments would often imply finding answers within the lecture text without any reflection or reformulation.

All you had to do was open the PowerPoint presentation, find the necessary slide containing answers to two or three questions, and just copy and paste them (interview #12, Health & Medical Sciences, 4th year).

With tests on large modules, students asked for answers among their peers who had already done the module. Alternatively, they divided the module into portions so that everyone would search for specific answers, and then brought the results together. Students are critical about this type of assessment, contending that tests only assess retention in memory, while comprehension requires other methods of evaluation. Some interviewees report having been given much lower grades for tests submitted during lockdown than for written or oral tests taken pre-pandemic, even though the latter had been more in-depth and challenging. They believe that low performance is partially explained by the way such tests were developed by their instructors or by technological shortcomings of the distance learning system.

And then we had tests with Google Forms to fill in, and the tests seemed more difficult because it was multi select multiple choice, and if you got at least one answer wrong, you would get zero points for the item (interview #25, Health & Medical Sciences, 3rd year).

If lecture material called for no assessment, students would postpone reading it until later and focus instead on assignments with deadlines. In such cases, they would sometimes never get to the postponed material.

It could be inferred from students' answers that pre-pandemic distance learning infrastructure of universities was unable to withstand the increased load.

> Our university had a distance learning website. It had a major problem, which still persists: with too many concurrent users, it gets overloaded and goes down (interview #12, Health & Medical Sciences, 4th year).

A lot of faculty members do not know how to use the university's distance learning system, so they either ignore it or use its most basic functions.

> Some <instructors> make active use of this website as they find it easier this way. Others have never used it, not even once—they would just email us assignments in PDF or Word formats, and that was it (interview #17, Engineering & Technology, 2nd year).

3.4. "That'll Do, They'll Give me Credits Anyway": Learning Practical Skills During Lockdown

Students in Applied Sciences consider practical training an indispensable part of becoming a professional. According to the interview data, practice constitutes a major part of the learning process.

> Practice-oriented learning is everything in medicine. You can read every book in the world, but if you have a poor imagination, there is no way you can visualize it <…> You have to watch someone else performing a surgical procedure a few times before you do it yourself (interview #11, Health & Medical Sciences, 6th year).

Students do not think of distance learning as effective. The key problems with this format are the lack of access to laboratories and workshops, the impossibility of hands-on skill practice sessions, and the absence of direct interactions with the instructor.

> It helps a lot when the instructor comes and does a bit of your work. Some tiny grapelet in your still life, but she'll do it and show you what it is exactly that she means. Sometimes words are useless because you just can't get what she's talking about, and she can't get what exactly you're not getting, so the whole communication is a failure (interview #5, Arts & Culture, 5th year).

Changes in the format of practical training affected its content, making it more generalized and theory-oriented.

> We could see, me and my peers, <…> we learned nearly nothing, as compared to in-person classes <…> basically, we discussed the same things day after day, some no-brainer stuff. Meanwhile, in face-to-face training, we would dwell on specific subtle aspects, and we knew why we were doing what we were doing <…> We could all see that we would have learned more from training offline (interview #26, Health & Medical Sciences, 5th year).

The new format of practical training also had a negative effect on the motivation of students, who reported feeling less engaged in learning.

> There was less practice, less engagement, less commitment... I think it was due to inconvenience. Conducting via video conference is inconvenient, you need a concertmaster for this <...> So, I considered it ineffective <...> and I would think, "That'll do, they'll give me credits anyway" (interview #10, Arts & Culture, 4th year).

Some students believe that their practical skills remained unchanged during the period of distance learning, while others report a degradation. First-year students had not mastered practical skills to a sufficient degree when the pandemic broke out, so their losses were not too great. Meanwhile, senior students had already practiced a number of their skills long enough to reach a level of automatic action—and yet they were concerned about possible negative effects of distance learning on their future careers in the relevant field of study.

> Yes, you may know how to recognize a pathologic condition, but people are all different, and so are their conditions, so you need to see it with your eyes at least once <...> In this sense, it was hard for me. We were about to graduate, and yet we'd never even set eye on a kid (interview #30, Health & Medical Sciences, 6th year).

3.5. "We're Just Sitting There and Reading": Theses, Term Papers, and Work Placement Internships

Students who had embarked on their theses and were not anymore in need of the institutional or corporate infrastructure were happy to work from home and contact their academic supervisors remotely. Moreover, one engineering student said he had saved on printing out the different versions of drawings upon every review by his supervisor, as sending them by email did not involve any expenses. At the same time, it was inconvenient to demonstrate works from a distance, as instructors had not got used to the new technology yet. Art school students found it especially challenging: it was not always possible for them to take the degree paintings home because of their size or the prohibition against taking them out of the university building. For such students, working on degree projects was suspended for the whole period of mandatory self-isolation.

> I am one of the few students who were able to take their project home and keep working on it. But all the others had no such opportunity, I just had a big luck with the owners of my piece, and the faculty supervised me all the time (interview #8, Arts & Culture, 4th year).

Work placement internships scheduled for the spring semester were also affected. Some of them were cancelled, others were postponed until fall, and yet others were carried out in the format of self-study, where students filled out their journals but never visited manufacturing facilities or engaged in any actual work.

> We should be doing our first work placements right now <...> We should have been employed in plants for a month to practice on fa-

cilities, each on their own. <...> and now, we're doing it in a distance format. They've just sent us assignments, like a term paper, and we're sitting there and reading (interview #16, Engineering & Technology, 3rd year).

Students wait to return to laboratories and workshops. Some medical students have a chance to practice their skills during summer internships, while others try to integrate hands-on practice as on-the-job training. Art school and engineering students say that they are going to spend a large portion of their time in the upcoming academic year on catching up on the practice they missed.

Before the lockdown was announced, we had enough time <...> to submit our projects by the end of the fourth year and take on new ones for the next academic year. But now the upcoming year will be spent on finishing the work from the previous year, and we won't be assigned any new projects (interview #6, Arts & Culture, 4th year).

Due to the impossibility of organizing practical classes, skill assessment was excluded from degree exams.

They had nothing—<the degree show was> cancelled. All they did was writing a thesis (interview #10, Arts & Culture, 4th year).

4. Lessons from the Pandemic

Rapid digitalization in education and professional activities engenders solutions that optimize and expand human capabilities. However, even with virtual labs, training simulators, and a broad array of online learning opportunities, a number of degrees turned out to have not enough digital learning technology tools to complete the academic year amidst the pandemic. In this study, problems faced by higher education institutions preparing doctors, engineers, musicians, and artists during the lockdown are analyzed through the prism of student experiences before, during, and after the COVID-19 pandemic.

Pre-pandemic, the use of digital technology in Applied Sciences degrees in nonselective Russian universities was kept to a minimum. Practical skills were normally trained at university laboratories or in real-life conditions. Distance learning systems were available, but they were not used in classroom-based learning; in isolated cases, they served as a digital repository of learning materials and as a platform for testing. These inferences about the pre-pandemic system of digital learning technology are consistent with the findings obtained from interviews with faculty members [Abramov et al. 2020].

Immediately following the emergency transition to distance learning, instructors used messaging apps and email as familiar means of communication. Later on, they added videoconferencing services to their repertoire, Zoom and Mirapolis in the first place—but they only

used the very basic function of direct video calls. Replacing in-person lectures with video conferences requires very few changes to the lesson plan, unlike with other digital learning formats, and yet even videoconferencing was not available to all students, the reason being low faculty access to information and technology. Similar results have been achieved in other studies [Aleshkovsky et al. 2020, Levanov, Perevezentsev, Gavrilova 2020]. The interviews conducted with students allow suggesting that, provided there is strong Internet connection, students are far more enthusiastic about synchronous forms of learning than instructors, who find the format uncomfortable.

The data collected demonstrates the prevalence of summative over formative assessment. Isolated cases of using formative assessment were infallibly welcomed by students and strengthened the instructor's authority in their eyes. A lot of faculty members struggled to organize and plan students' independent work during the period of self-isolation. For them, student workload in a course was still synonymous to classroom hours, not the amount of time required for students to perform all the actions necessary to complete the course. Students need help with organizing their self-study activities, as they are used to external regulation—particularly the one mediated by the schedule—and face difficulties with self-management [Gruzdev, Kamaldinova, Kalinin 2020].

The problem of professional skills formation is not solved by substituting empirical data analysis, relevant paperwork, and demonstration of video-recorded procedures for actual practical training. Of all Applied Sciences majors analyzed in this study, medical and art school programs have suffered the most from the transition to distance learning, while engineering degrees associated with calculations and computer modelling have been affected somewhat less. The impossibility to develop and train practical skills had a direct consequence of practical modules being removed from the midterm and end-of-term examinations, and sometimes of classes being postponed until the next semester. However, students themselves did not consider the damage incurred during the spring lockdown irreparable, provided that they would be able to resume their studies and work as normal in the fall semester.

Because the lockdown was extended, students failed to catch up on what they had missed in the spring semester, and the 2020 graduates lost this opportunity for good. Given this, it became imperative for new studies to find out how the second wave of the coronavirus and lockdown measures changed students' perceptions of the learning environment imposed by the pandemic as well as of universities' efforts in restructuring the learning process.

Current expert predictions concerning the COVID-19 pandemic blatantly contradict the interviewees' assumption that the university, the learning process, and their professional activities on which they have already embarked with varying degrees of intensity will come back to

normal almost unaffected as soon as the pandemic is over as well as their desire for events to follow this scenario.

The widely discussed opinion that a sharp increase in the share of distance learning in education will become the new normal does not resonate with the interview participants. Applied Sciences students and their instructors unanimously agree that only soft-skill courses can be moved online, while practical skills can only be developed in face-to-face interactions [Zakharova, Vilkova 2020]. This point of view may stem from the lack of quality alternatives to in-person instruction in the market of digital learning technology, low proficiency of all players—students, faculty, and administrators—in applying the existing solutions, and the ongoing professionalization of higher education, which results in humanities and social sciences being perceived as less important and thus easily optimizable. A promising area of research would be a more detailed analysis of the grounds for skepticism about distance learning on the part of Applied Sciences students and their instructors.

Judging by the interview results, it is not distance learning but emergency remote teaching that was implemented in all the universities from which participants were sampled, with extremely rare exceptions that apparently stayed within specific departments or even activities of specific faculty members. For this reason, the assessments and comparisons presented in this article should not be applied to distance learning as such. Universities have been able to find more or less successful ways of completing the academic year, but this is not enough to ensure a fully-fledged training in Applied Sciences. Obviously, the problems are not restricted to poor technological infrastructure or low faculty preparedness. Apart from this, the repertoire of "classical" distance learning simply lacks the necessary tools. During the period of remote learning, Applied Sciences were taught in just the same way as theoretical disciplines, with no allowances made for their peculiarities.

This study has some methodological limitations, which at the same time represent promising areas for further research. First, the interviews paid little attention to specific types of hardware and apps that students used for communication. Such information would be useful for assessing the differences in learning process organization depending on the devices available to students. Second, the qualitative methodology of research allowed only description of the process of transitioning to distance learning. Reliable inferences require quantitative data, including digital footprints of all the participants in the learning process.

Appendix   Table 1. **Characteristics of interviewees**

Inter-view #	University specialization	Field of study	Year of study	Age (years)	Sex
1	Technical	Engineering & Technology	2	19	Male
2	Technical	Engineering & Technology	2	20	Male
3	Technical	Engineering & Technology	2	19	Male
4	Humanities	Arts & Culture	3	21	Female
5	Humanities	Arts & Culture	5	22	Female
6	Humanities	Arts & Culture	4	26	Female
7	Humanities	Arts & Culture	4	21	Female
8	Humanities	Arts & Culture	4	22	Female
9	Humanities	Arts & Culture	2	22	Female
10	Humanities	Arts & Culture	4	23	Female
11	Medical	Health & Medical Sciences	6	25	Female
12	Medical	Health & Medical Sciences	4	21	Male
13	Humanities	Arts & Culture	3	23	Female
14	Humanities	Arts & Culture	1	21	Female
15	Technical	Engineering & Technology	2	19	Male
16	Technical	Engineering & Technology	3	20	Male
17	Technical	Engineering & Technology	2	19	Male
18	Technical	Engineering & Technology	4	22	Female
19	Technical	Engineering & Technology	3	20	Male
20	Technical	Engineering & Technology	4	22	Male
21	Technical	Engineering & Technology	1	18	Male
22	Medical	Health & Medical Sciences	5	22	Female
23	Medical	Health & Medical Sciences	1	19	Male
24	Medical	Health & Medical Sciences	4	22	Male
25	Medical	Health & Medical Sciences	3	23	Female
26	Medical	Health & Medical Sciences	5	25	Male
27	Medical	Health & Medical Sciences	5	22	Female
28	Medical	Health & Medical Sciences	4	22	Male
29	Medical	Health & Medical Sciences	2	20	Female
30	Medical	Health & Medical Sciences	6	24	Female

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Economic Aspects of Emergency Transition to Distance Education, or The Price of Going Online in Higher Education

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Abstract

As Russian universities switched to distance education in March 2020 to prevent COVID-19 from spreading, self-paying students started questioning the fairness of tuition fees during the pandemic. They filed petitions, emphasizing that distance learning could not be equated to traditional classroom-based learning, that educational services were not delivered to the full extent, and that educational quality had decreased. On those grounds, students required cutting tuition fees down to the size of those in part-time or extramural education. To understand whether universities can afford making this step, we undertake to measure the price that they have paid for the transition to distance learning.

For this purpose, we use data from a survey of faculty teaching and curriculum organization practices carried out at a federal university between March 23, 2020 and June 21, 2020, which involved 4,099 faculty members, as well as financial records of some departments within that university. Findings show that teaching workload reduced by 15% with distance learning during the pandemic, and the number of contact hours decreased 1.7 times. However, the overall amount of faculty workload increased by 50%, first of all due to a 2.4-time rise in curriculum organization activities. Therefore, the transition to distance education led to a significant increase in faculty workload, given that contact hours were preserved. Furthermore, the university invested heavily in the transition to distance learning and continuity of educational processes during the pandemic, in particular by financing the establishment of a new department for digitalization of learning processes.

An inference is made that distance education imposed by the pandemic has not been reduced to part-time or extramural studies. Decisions about cutting tuition fees for self-paying students should be made at the institutional level, with due regard for faculty workload and digitization costs.

In March 2020, taking cue from most educational institutions across the globe, Russian universities switched to distance learning. Pursuant to Order No. 397 of the Ministry of Science and Higher Education "On the Reorganization of Learning in Institutions of Higher Education and Professional Development to Prevent the Spread of SARS-CoV-2 in the Russian Federation", educational institutions are recommended to use e-learning and distance education technology in all their classes for the purpose of keeping students and faculty healthy.

Development of a modern digital learning environment[1] and integration of online education in universities and other educational institutions have been actively promoted at the national level over the past three years in Russia, yet the urgent transition to distance learning became a real challenge for the whole education system. Universities had to purchase hardware and software needed for remote teaching, build a new infrastructure and system processes to ensure continuity of learning, and provide consulting and assistance to faculty members who were unable to take their courses online on their own [Klyagin et al. 2020; Barannikov et al. 2020]. Faculty faced an increase in workload, difficulties rearranging the learning process in the middle of the academic year, and the need to learn new digital technology to be able to give classes. It was especially tough for teachers who had never used webinar platforms or other online learning services before— they accounted for up to 25% of faculty in a number of universities[2]. Students started receiving higher amounts of independent work, and many of them found it difficult to build their own learning trajectories within courses [Klyagin et al. 2020; Barannikov et al. 2020].

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[1] Charter of the Priority Project "Modern Digital Educational Environment in the Russian Federation", approved by the Presidium of the Presidential Council for Strategic Development and Priority Projects, Minutes No. 9 of October 25, 2016.

[2] Podtserob M., Bershidsky M., Petrova Y. (2020) Rossiyskie vuzy raportuyut o perekhode v onlayn [Russian Universities Report Going Online], *Vedomosti*, March 26. Available at: https://www.vedomosti.ru/management/articles/2020/03/25/826230-rossiiskie-vuzi

Being given complete freedom of choice, universities implemented distance learning technology in a variety of ways, from moving all their lectures and seminars online (e. g. with the help of video conferencing) or using ready-made online courses to sending out course materials for independent study without direct student–teacher interaction [Ibid.]. In effect, the choice of synchronous or asynchronous e-learning technology depended on university infrastructure, faculty competence, and learning support administrators. A number of universities were able to maintain a full-time format for many courses by using synchronous e-learning technology, while others had to switch many of their courses to a part-time mode, increasing the proportion of independent work and reducing the number of contact hours [Barannikov et al. 2020].

Transition to distance learning made students and their parents question the fairness of tuition fees in the spring term 2020. Over 25,000 signatures[3] were collected on petitions[4] addressed to the Ministry of Science and Higher Education, university rectors, and other officials, asking to review the tuition fees for self-paying students. Petitioners justified the need for reviewing the spring semester tuition fees and proposed specific methods of recalculation. Urgency was explained by economic problems, related in the first place to the overall recession in the country, financial issues in families, and an increase in additional costs and risks faced by students, particularly self-paying ones (<education> "in a pandemic makes self-paying students a socially vulnerable group"). Petitions also emphasized that distance learning was not equivalent to full-time education ("distance learning <...> cannot be regarded as a perfect substitute for face-to-face instruction"), therefore "educational services <...> are not provided to the full extent", so tuition fees for distance learning should be commeasurable to those in part-time or extramural programs, which is regarded as a fair solution ("our proposal is essentially simple, and we believe it to be fair").

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[3] For comparison: petitions filed by UK university students reached over 200,000 signatures (see, for example, https://petition.parliament.uk/petitions/302855 and https://petition.parliament.uk/petitions/306494).

[4] See, for example, petitions created on change.org: "Reduce tuition fees for self-paying MSU students during the pandemic!" (addressed to the Rector of Moscow State University, the President of the Russian Federation, and the Chairman of the Russian Government); "Lower tuition fees" (addressed to the Rector of Don State Technical University); "We demand reimbursement of tuition fees to self-paying students of RSUH" (addressed to the Rector of Russian State University for the Humanities); "Recalculate tuition and accommodation fees for students in Sverdlovsk Oblast" (addressed to the Minister of Science and Higher Education of the Russian Federation); "Discounts for self-paying students in the new format of distance learning" (addressed to the Rector of National Research University Higher School of Economics); "Reduce tuition fees for the current academic term" (addressed to the Rector of Novosibirsk State University of Economics and Management), etc.

It follows from the petitions that students see distance learning as different from full-time instruction. Meanwhile, the 2012 Law on Education defines distance education as "distance learning technology" that can be applied by universities in delivering all types of education programs: full-time, part-time, and extramural. Furthermore, Order No. 816 of the Ministry of Education and Science of the Russian Federation of August 23, 2017, which regulates implementation of e-learning and distance learning technology by educational institutions, states that universities have the discretion to decide on "the proportion of direct student-teacher interactions, including those mediated by e-learning and distance learning technology".

Using the term "distance learning" somewhat incorrectly, petitioners at the same time indicate that "some of the classes could not be classified as components of a full-time or part-time program", since they were write-only, or consisted of assignments posted on the e-learning portal, or were not given at all ("some may forget about having a class, and others may just send out the lecture saying "read this"). Based on this, petitioners argue that the quality of distance learning is inferior to that of full-time education, but not only because of fewer contact hours when using asynchronous e-learning technology (which increases the transactional distance and the gaps in communication between teachers and students and may create a psychological void [Offir, Lev, Bezalel 2008]): its quality is poor even when the number of contact hours remains intact, petitioners believe.

Can universities afford to reduce tuition fees during the period of distance learning? Will savings on costs associated with physical classroom attendance cover the costs of accelerated digitization? This paper was designed to measure the price that universities paid for this compulsory measure, using one of Russia's federal universities as an example. Our research hypothesis is that the costs of transition to distance learning that universities had to make during the COVID-19 pandemic are at least as high as the costs of providing traditional classroom-based instruction. The study is based on analysis of changes in direct and indirect expenses associated with using distance learning technology in full-time education.

The goal of this research is to compare the actual amount of faculty workload between distance and full-time formats of learning and to assess the extra infrastructure costs of ensuring continuity of educational processes. The study uses data on distance learning implementation obtained from weekly progress reports submitted by faculty of Ural Federal University (UrFU) as well as financial records of some departments within UrFU that are responsible for organizational and technical learning support.

1. Direct and Indirect University Expenses on Distance Learning

International findings [Rubin 2005; Bates 2005; Jones 2004] show that expenses on distance learning exceed essentially those on in-person

instruction, as they involve the extra costs of software development and IT infrastructure maintenance and require a lot of time to digitize the existing courses or create online courses from scratch. Cost reduction can only be expected after the investment in such courses is returned in full, provided that enrollment remains high and course content remains relevant.

To assess the direct and indirect expenses on distance learning, factors affecting the production costs of educational services should be determined. The main ones include (1) faculty workload in all kinds of teaching and curriculum organization activities performed to achieve the learning outcomes, (2) payment for services rendered by another educational institution providing online courses under a network agreement, and (3) infrastructure costs of providing sufficient technology resources to implement distance learning [Sedun, Gorbacheva 2010].

Indirect expenses of a university are funds allocated for administrative and executive salaries, overhead, and other expenses [Vysotskaya 2013]. Implementation of distance learning may reduce indirect expenses on the following:

- Maintenance and operations personnel
- Stationery
- Supplies for operations and maintenance
- Utility services
- Repair of buildings and facilities
- Repair of furniture and equipment (except for computers and networking hardware)
- Representation

Items of direct expenses include teacher remuneration, learning management system (LMS) maintenance, learning support by tutors and IT staff, organization of online proctored exams, and network agreements (if any)[5].

Direct expenses, comprising the production costs of distance learning, are usually divided into one-time expenses and operating expenses. Costs associated with course digitization or online course development are classified as one-time expenses. Operating expenses are expenditures on the administration and support of learning processes and course content updates [Koletskaya, Lovchinskaya, Pobirukhina 2011]. One-time expenses may be assigned to the production costs of a course in full or in part, depending on the accounting policy. The

[5] A Method for Calculating the Target Cost of Government-Funded Higher Education Programs, by Majors and Fields of Study (approved by Order No. 1272 of the Ministry of Education and Science of the Russian Federation of October 30, 2015): http://base.garant.ru/71265064/53f89421bbdaf741eb2d1ecc4ddb4c33/#ixzz6cQ2y5xhw

size of one-time expenses is affected by such factors as course complexity and relevance, the number of developers and their qualifications, the amount and format of study material, and the price of hardware and software.

Remuneration to course developers accounts for a large proportion of operating expenses, which also include, unlike in full-time instruction, compensation to IT specialists and purchase of software and hardware. Operating expenses are assigned to the production costs of a course in full.

The Educause survey [Grajek 2020] projected a considerable reduction in IT budgets in 2020–2021 due to the following:

- Travel bans
- Hiring freezes
- Professional development reductions
- Delaying planned work

Indeed, as institutions tightened their belts due to the pandemic, many of them had to cut their spending on IT infrastructure development. In the majority of cases, however, the reductions did not affect wages or staff size. The most acceptable IT cost reduction tactics have been focused on travel, professional development, compensation freezes, delaying planned work, and renegotiating contracts and licensing [Grajek 2020].

As universities switched to distance learning, most of them faced IT issues: a slowdown in growth / reduction in the size of technical staff (despite planned staff expansions), IT budget reductions, an outflow of IT specialists due to increased demand and competition for human resources, and a forced reduction in expenses on new technology integration and testing.

During the COVD-19 pandemic, some universities have been running low on money, so their IT departments have been reviewing the budgetary policies. Financially sounder institutions can reduce their revenues and continue strategic investments in technology. Meanwhile, financially disadvantaged and vulnerable universities are in a desperate need for extra funding to promote technology development.

Factors affecting the volume of direct and indirect expenses incurred by universities during the COVID-19 pandemic will be analyzed below to evaluate changes in university cost structure.

2. Research Design

Changes in direct expenses were evaluated using data from a survey of faculty teaching and curriculum organization practices carried out at Ural Federal University between March 23, 2020 and June 21, 2020. The university's administration decided to launch this survey within the very first week following the emergency transition to distance learning in order to identify and respond to problems as soon as possible.

Table 1. **Correspondence between the types of faculty workload in traditional classroom-based learning vs. distance learning.**

Type of class	Type of workload	Traditional class-room-based learning	Emergency distance learning
Lectures	Teaching	Classroom lectures Out-of-class discussions	Online lectures Online out-of-class discussions
	Curriculum organization	Preparing for class-room lectures	Preparing for online lectures Creating and uploading video lectures Preparing and uploading text materials to the digital learning environment (DLE) Preparing and posting tests for self-assessment Preparing and posting quiz questions in the DLE Answering students' questions via chat or the LMS Giving grades in the DLE Helping students to understand course content
Tutorials/ seminars	Teaching	In-person seminars Out-of-class discussions	Webinars Webinar out-of-class discussions
	Curriculum organization	Preparing for in-person seminars	Preparing for webinars Preparing and posting seminar assignments to the DLE Reviewing students' papers Answering students' questions via chat or email Preparing and posting homework assignments to the DLE Giving grades in the DLE Helping students to understand course content
Lab classes	Teaching	In-person lab classes Out-of-class discussions	Lab classes with the use of simulators and virtual hands-on labs Webinar out-of-class discussions
	Curriculum organization	Preparing for in-person lab classes	Developing and posting instructions for lab assignments to the DLE Reviewing students' lab reports Answering students' questions via chat or email Giving grades in the DLE

To monitor faculty activities on a weekly basis, a database was created, providing information about the teaching workload scheduled in education program plans (in-person lectures, seminars, and lab classes as well as the number of students in groups) and the actual volume of teaching workload in distance learning.

The database includes data on all types of teaching and curriculum organization activities in distance learning that can replace traditional classroom-based instruction without compromising on the quality of teaching (Table 1). Every week, faculty members reported their workload to the administration. Later, the information submitted would be accumulated into a consolidated report on the entire university.

The survey involved 4,099 faculty members. The database consists of 3,364,590 entries indicating the amount of student and faculty workload in the relevant units of measurement. All cells in the table

are formatted as numbers quantifying the workload, e. g. duration of an online lecture delivered using a recommended webinar platform, the amount of text materials uploaded, or duration of a pre-recorded and uploaded video lecture. Most of the data could be verified using the relevant LMS platforms and services, while some information was unverifiable (or hard to verify) and was collected from faculty members' answers.

Data was cleansed (irrelevant values being removed or corrected) and normalized to improve survey accuracy. The existing normative time standards approved by the rector were applied to estimate the amount of workload in every type of routine faculty work. In the absence of such standards for specific types of work introduced by the transition to distance learning, chronometric assessment was performed by active faculty members with distance teaching experience. Descriptive statistics were applied to the data collected.

Indirect expenses were analyzed using financial records of some departments within the university that were responsible for organizational and technical support in distance learning. A dataset for the period from March to October 2020 was compared to the same period in the previous fiscal year.

3. Analysis of Faculty Workload Based on Teaching and Curriculum Organization Activities

The survey results indicate that faculty workload has changed quite substantially in distance learning, as compared to traditional classroom-based learning. In particular, the number of contact hours has decreased: only 83,561 hours of webinar classes were delivered via different platforms as a substitute for the scheduled 140,836 hours of in-person classes (lectures, seminars, lab classes). Video lectures with a total duration of 4,762 hours, 1,688,371 pages of lecture notes and supplementary reading materials (textbooks and study guides), 112,432 pages of instructions for lab assignments, 43,239 self-assessment tests, 91,346 quiz questions, 48,126 homework assignments, and 72,099 course assignments were prepared and uploaded to the DLE by faculty members.

To monitor the learning outcomes, teachers sent out self-assessment tests, class and homework assignments, and quiz questions to students every week—over 350,000 tasks in total. They gave 147,745 grades (reviews) on quiz questions and homework assignments, 176,632 grades on course assignments, and 64,061 answers to students' questions (exclusive of those given in social media) and reviewed 60,583 lab reports. Midterm assessments were also left out, as workload associated with test administration differs little between distance learning and the traditional full-time format.

The findings were used to make diagrams showing the distribution of faculty and student workload during the period of distance learning in the spring term 2020. As can be seen from Figure 1a, about 50% of faculty time was spent on synchronous online classes, about 20% on

Figure 1. **Distribution of faculty (a) and student (b) workload during the emergency distance learning period**, *%*
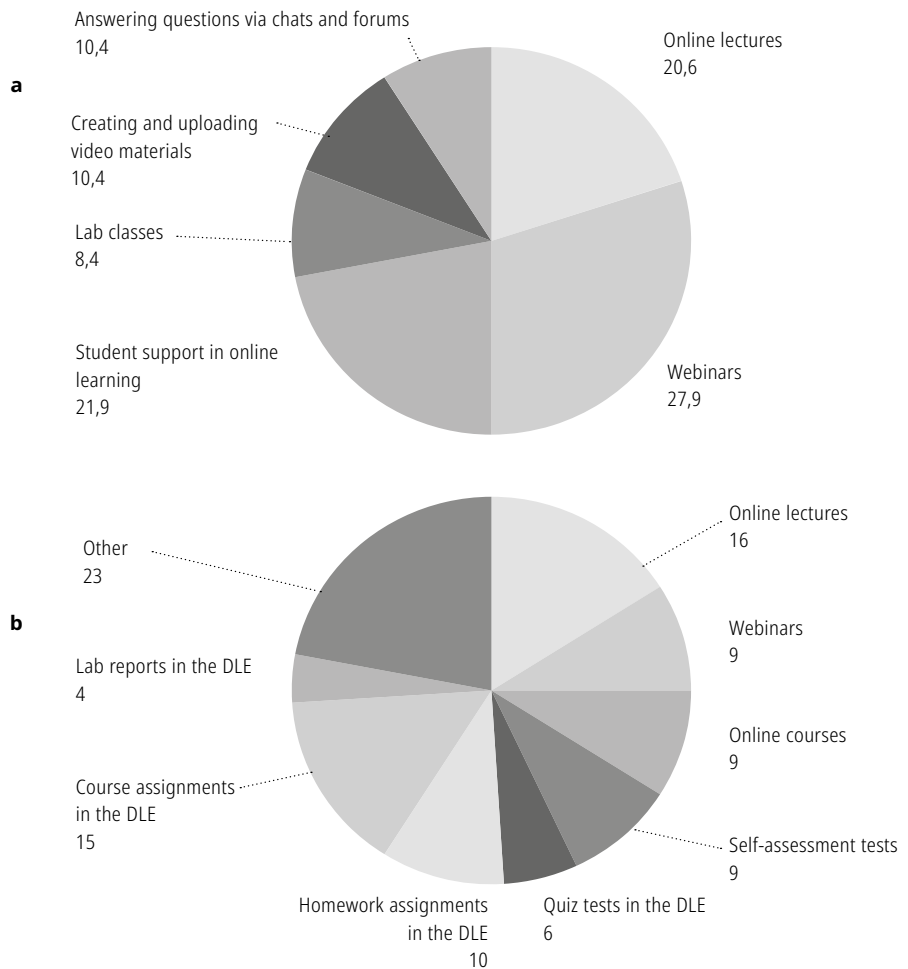
student support in online learning, and 9% on answering questions asked via chats and forums on the open education platform. The rest of the time was distributed between delivering lab classes with the use of simulators and virtual hands-on labs and recording and uploading video lectures to the DLE.

Student activities included participation in online lectures and webinars (25%), doing course assignments, quiz tests, homework assignments, and self-assessment tests (38%), writing lab reports (4%), and taking online courses (9%) (Figure 1b).

Normative time standards and approximate workloads for specific work activities were used to estimate overall faculty workload. Ta-

Table 3. **Faculty workload in traditional full-time education vs. distance learning**

Parameter	Full-time education	Distance learning during the COVID-19 pandemic	Faculty workload after the emergency transition to distance learning, as a proportion of workload in full-time education
Teaching workload including out-of-class discussions (hours)	167,836	142,256	0.85
Curriculum organization workload (hours)	140,836	336,763	2.40
TOTAL	308,672	479,019	1.55

ble 2 presents estimates of faculty workload in distance learning, giving traditional instruction values for comparison.

Apart from teaching workload displayed in Table 2, faculty members engaged in multiple curriculum organization activities needed to arrange online learning:

- Organize online lectures, webinars, lab classes, and consultations via Zoom, Google Meet, Ms Teams, etc.
- Notify students by email about the date and time of online lectures, webinars, lab classes, and consultations
- Help students with registration on learning platforms
- Set up equipment for distance learning (web cameras, microphones)
- Learn to use new digital services and platforms for distance learning
- Manage online chat rooms and social media groups
- Monitor students' activity and academic performance
- Submit weekly reports on distance learning outcomes

Table 3 displays the overall volume of teaching and curriculum organization faculty workload in full-time education vs. the emergency distance learning period.

Calculations show that overall faculty workload increased by approximately 50% with the transition to distance learning. Teaching workload reduced by 15%, while the amount of curriculum organization activities increased as much as 2.4 times. The growth in and redistribution of workload have to do first of all with the imperative to develop digital resources for all learning activities and to monitor learning outcomes on a permanent basis. Most faculty members coped with the task, but only few were able to use ready-made online courses from the National Open Education Platform (NOEP) and international MOOC platforms. Free access to such courses allowed the university to make do with the funds allotted without increasing direct expenses on program implementation.

4. Evaluating Changes in Direct and Indirect Expenses on Distance Learning

Financial and organizational models of online education were used to assess the extra costs incurred by the university due to the COVD-19 pandemic. Four models of online learning are approved and implemented in UrFU:

Model 1: hybrid learning, where some of the classes are delivered using an online course (online course is developed by a UrFU faculty member, evaluated by experts, and assigned the relevant status; 70% of full-time workload is preserved).

Model 2: fully online learning using a UrfU online course (online course is developed by UrFU faculty members teaching the course, evaluated by experts, and assigned the relevant status; 50% of full-time workload is preserved).

Model 3: fully online learning using an online course provided by a partner university under a network agreement (online course is developed by another university under an agreement on network implementation of education programs; full-time workload is not preserved).

Model 4: blended learning, where a course is taught with the use of digital technology (a digital learning course on the LMS platform, evaluated by experts and assigned the relevant status; full-time workload is preserved in full).

Model 4 has been used most widely by faculty members, allowing them to keep their hours and add content to digital resources on LMS platforms on their own, without seeking IT support. This model was applied to 63% of all 13,777 courses, exclusive of seminars and research activities. Several platforms were used to ensure load balancing: Hypermethod, three Moodle platforms with different modifications, and the Open Educational Resources Portal.

IT experts from the Information Technology Board, the Institute of Open Technology, and the Center for Independent Assessment of Learning Outcomes were invited to maintain platform operation and increase server space. The IT support department provided assistance to both faculty and students. In addition, faculty members were provided with computer equipment to work from home. IT workloads increased several fold.

About 11 million rubles was allocated to establish a new department for developing services to support the university's essential activities. Twenty-eight million rubles was invested to modernize the university's private cloud storage and provide simultaneous access to course content by multiple users. Institutes were granted 40 million rubles to develop their local digital infrastructure and digitize their educational processes.

Hybrid learning and online learning were also actively applied during the spring term 2020. The number of UrFU students enrolled in online courses developed by UrFU and partner universities increased 1.7 times, and the number of students from other universities enrolled in UrFU courses increased seven-fold. Accordingly, the costs of organizational and technical learning support and exam proctoring went up.

Table 2. **Estimating faculty workload during the emergency distance learning period, as compared to traditional classroom-based learning**

Parameter	Survey data	Preparing for classes		Uploading/ Posting materials to the DLE		Reviewing assignments		Teaching workload (hours)	Curriculum organization workload (hours)
		Norm. stand. hours	Actual hours	Norm. stand. hours	Actual hours	Norm. stand. hours	Actual hours		
Traditional classroom-based learning									
Classroom hours scheduled (including lectures, seminars, and lab classes)	140,836	1	140,836					167,836*	140,836
Distance learning									
Online lectures (hours)	29,279	1	29,279					29,279	29,279
Video materials uploaded to the DLE (hours)	4,762	3	14,287	0.1	476			14,763	
Text materials uploaded to the DLE (pages)	1,668,371	0.05	83,419						83,419
Number of self-assessment tests posted to the DLE	43,239	0.15	6,486	0.1	4,324				10,810
Number of quiz questions posted to the DLE	91,346	0.15	702	0.1	9,135				2,2837
Number of students who answered quiz questions in the DLE	89,218					0.2	17,844		17,844
Humber of homework assignments given to students in the DLE	48,126	0.15	7,219	0.1	4,813				12,032
Number of grades (reviews) given on homework assignments in the DLE	147,745					0.2	29,549		29,549
Webinars (hours)	42,273	1	42,273					42,273	42,273
Number of course assignments given to students in the DLE	72,099	0.15	10,815	0.1	7,210				18,025
Number of grades (reviews) given on course assignments in the DLE	176,632					0.2	35,326		35,326
Number of answers given by faculty members to students' questions via DLE forums	64,061					0.2	12,812	12,812	
Student support in online learning (number of students)	13,831							31,120**	
Lab classes with the use of simulators and virtual hands-on labs (hours)	10,917	1	10,917	0.1	1,092			12,009	12,009
Instructions for lab assignments posted in the DLE (pages)	112,432			0.1	11,243				1,243
Number of lab reports reviewed in the DLE	60,583					0.2	12,117		12,117
TOTAL			218,397		38,293		107,648	142,256	336,763

* including 4–7 contact minutes per student per credit unit
** according to the normative time standard of 30 minutes per student per credit unit of an online course

Table 4. Analysis of UrFU's indirect expenses in March–October 2019 vs. the same period in 2020

Item of expenses	March–October 2019	March–October 2020	Saved	Overruns
Utility consumption:	115,881,541	99,543,231	16,338,310	
Electricity	55,740,751	46,301,166	9,439,585	
Heating	45,350,139	41,546,466	3,803,673	
Hot water	5,162,106	3,528,438	1,633,668	
Cold water	9,628,545	8,167,161	1,461,384	
Garbage disposal	8,068,875	5,212,605	2,856,271	
Full-service cleaning	59,900,574	54,551,495	5,349,079	
Expenses on preventing the transmission of SARS-CoV-2: Purchase of air disinfection equipment and thermometers; Purchase of personal protective equipment (medical masks, gloves, disinfectant wipes, etc.); Testing employees for SARS-CoV-2	0	34,083,603		34,083,603
Purchase of equipment and hardware components needed to support distance learning; service setup	0	28,080,000		28,080,000
TOTAL	299,732,531	321,014,165		21,281,633

Thanks to free access to third-party online courses via the NOEP and Coursera, the university managed to avoid increasing the expenses on buying courses under network agreements. However, the emergency transition to distance learning increased the direct expenses on the following:

- Technical support for students and academic progress monitoring (2.3 times)
- Development of online courses (1.8 times)
- Third-party proctoring services (11.6 times)
- Software and Internet connection (10.9 times)
- External educational resources (2.1 times)

Additional funds were allocated to prevent the transmission of SARS-CoV-2, supply the classrooms with equipment needed for online classes, rent webinar platforms, and provide organizational and financial learning support. Money saved on utility bills during the lockdown were used as reserves. However, these funds do not cover the costs of accelerated digitization (Table 4).

UrFU's finance departments had a strategic mission of maintaining the university's solvency and ensuring that it fulfilled its commitments in a situation of a sudden drop in revenues. Optimization of planned

expenses and investments in digitization were the right strategies to succeed in a challenging time.

5. Conclusion   Data from a survey of faculty teaching and curriculum organization practices shows a 1.7-time decrease in contact hours following the transition to distance learning (83,561 hours of webinars as a substitute for 140,836 hours of in-person classes). The amount of teaching workload also decreased by 15% (142,256 hours in distance learning, as compared to 167,836 hours in the traditional format). These findings justify the complaints about the reduced number of contact hours formulated in students' petitions.

However, the overall faculty workload in distance learning increased by 50% as compared to in-person education, primarily due to a 2.4-time rise in curriculum organization activities. During the lockdown, faculty members spent more time and effort on preparing for classes, planning lessons, developing digital resources, monitoring the learning process, and mastering new online services and learning platforms.

Therefore, distance learning differs from traditional classroom-based learning in the structure of faculty workload: the amount of teaching workload is reduced, yet that of curriculum organization activities increases, so the overall faculty workload is eventually greater. Distance learning should be distinguished from part-time and extramural learning, as this format preserves contact hours that are indispensable for providing and supporting the learning process.

Our findings show that teaching from a distance does not reduce faculty workload, thus not allowing the university to save on salaries. Such savings could be achieved by switching to fully online learning with the use of online courses under network agreements, where traditional faculty workload is not preserved. However, most faculty members applied the blended learning model, in which full-time workload is preserved in full.

UrFU spent 113 million rubles on the transition to distance learning and on ensuring continuity of educational processes during the COVID-19 lockdown. This money was used to develop services for supporting the university's essential activities, modernize the university's private cloud storage, provide simultaneous access to course content by multiple users, develop the local digital infrastructure, and digitize the educational processes. The sharpest rise was observed in expenses on proctoring services during the spring 2020 final exams and entrance exams (11.6 times) as well as on software and Internet connection (10.9 times). During the period of distance learning, indirect expenses on facility operating costs were reduced by saving on utilities. However, those savings cannot cover the extra expenses on hardware needed for distance learning, expansion of server capacity, and overtime pay for faculty's work in the distance learning environment.

This study shows that the university paid a high price for the transition to distance learning and learning support, given that contact hours were preserved and the amount of time spent on curriculum organization increased dramatically. Up to 40% of all universities in Russia faced a substantial rise in expenses during the COVD-19 pandemic [Barannikov et al. 2020]. For instance, the production costs of education programs at National Research University Higher School of Economics augmented by 20%[6].

Caution should be exercised when extrapolating these findings to universities with low pre-pandemic levels of digitalization, institutions with small enrollments, and those that used different models of online learning during the spring term 2020.

Further research is needed to assess how effectively universities digitized their educational processes within such a tight deadline and how much time will pass before they can cover their expenses on the transition to distance learning.

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Epidemic as History:
Interplay of Structure and Agency in Narratives of the Black Death in Contemporary Textbooks for Russian Language Schools

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Abstract   The article presents the results of a comparative analysis of narratives of the Black Death (the epidemic of plague that struck Western Europe in the mid-1300s) in six contemporary history textbooks in the Russian language published in Russia, Belarus, Ukraine, and Kazakhstan. Structural narrative analysis provides an answer to the research question about the interplay of external circumstances (structure) and individual choices (agency) in depicting the causes of the Black Death, its course of events, and attribution of its developments and consequences. Findings demonstrate that structure prevails over agency. The textbooks offer no behavioral patterns to internalize and implicitly conceptualize behavior in an epidemic as a mass phenomenon, not as a product of many individual choices. This perception of agency blatantly contradicts the two prerequisites for an effective epidemic response elaborated during the COVID-19 pandemic: quality of governance and population's willingness to comply with authorities' recommendations in spite of the growing circulation of false information. The Black Death is presented in textbooks as an inevitable attribute of the Middle Ages—the "era of calamities". Hence, an epidemic in any other historical period appears an omen of "bad times" coming, which is likely to create expectations of new unavoidable disasters and foster catastrophic perceptions of the already existing problems. To shift this approach to history as "life's teacher", intrinsic to didactic pedagogy, two methods are suggested: explicit comparison with epidemics from other historical periods (not only the present) and counterfactual thinking to create alternative scenarios with regard to general patterns of human behavior and the characteristics of the Medieval Period.

Keywords   textbook research, public history, narrative analysis, epidemic, structure, agency, medievalism.

The COVID-19 pandemic naturally stirred interest in how the process of an epidemic and the measures to counteract it affect everyday practices and social institutions, including education. Substantially less attention is paid to the opposite: how education can affect behaviors of people caught off guard by a pandemic. A recent essay in *Nature Human Behavior* suggests that two factors are required to respond effectively to an epidemic: adequate decision making at the level of public administration and population's willingness to comply with the new social norms [Bave et al. 2020]. In a situation where even health care professionals can only gradually come to grips with the novel coronavirus's characteristics, readiness to follow justified recommendations while ignoring equally rampant false ideas is a function of not only health literacy but also the behavioral patterns associated with earlier epidemics.

Significance of prior experience quickly manifested itself in attempts to make sense of what was going on. Mass media stressed that the last epidemic of this scale—Spanish flu—took place about a century ago. Furthermore, the pandemic was perceived as an attribute of the past that was long over and could never happen again, which made it look highly unexpected and therefore frightening. This calamitous projection from the past into the present could have prompted the "I never thought it would happen to me" mentality, which affected critical thinking and resulted in "rule of thumb" behavioral patterns based on previous experience. If the situation is perceived as having no modern analog and referring to a collective experience in the past, what was that experience like?

Prototypicality of various past epidemics in today's public mind has never been studied empirically. Media sources indicate that the COVID-19 pandemic is associated most often with Europe's deadliest epidemic of plague that occurred in the 14th century, also known as the Black Death. The short and vivid name itself, along with the extent of consequences, contributes to the Black Death being more recognizable than other notorious epidemics, such as the Plague of Justinian (6th-8th centuries) or the Great Plague of London (1665–1666). Association of the current pandemic with the Black Death is interesting in that it makes reference to the Middle Ages, one of the historical periods represented most vividly in public history.

Representations of Medieval Western Europe in the collective mind have become an independent subject of research at the interface of medieval studies and culturology. In contrast with medieval studies—basically the history of the Middle Ages—medievalism is focused on how this epoch is reconstructed in the latest historical periods. Special attention is given to the divide between historical facts established by medievalists and individual and mass interpretations of those facts [Matthews 2015]. Interest in some events and phenomena of the Middle Ages often has to do with using this information not so much for rethinking the past as for making sense of the modern age. Matching one's times to the Medieval Period as the "dark ages", typical of Re-

naissance and Enlightenment scholars, or, by contrast, trying to regain the moral and aesthetic ideals from medieval heritage in the Romantic way, directly reflect and define to some extent the major dichotomy of rational vs. irrational in European thought. Throughout the 20th century, these two versions of medieval historical narrative alternated as mutually exclusive, according to the famous historian Norman Davies [Davies 2014]. However, they are often intricately intertwined in popular culture of the 21st century, where the image of not only romanticized but also "suffering Middle Ages" [Kosyakova 2018] with their hardships and fallacies is regarded as a source of life wisdoms and role models [Elliott 2017]. It comes as no surprise that a number of mass media outlets published recommendations for the COVID-19 pandemic based on medieval practices[1].

However, the most universal, in terms of outreach, medieval narrative is communicated not by mass media, even such powerful as *Washington Post* or *New Yorker*, or through pop-cultural experiences, even such dominating as the *Game of Thrones* television series—it is contained in school history textbooks. Adolescence, during which those textbooks are studied, is the period of identity formation and search for role models. That is why it is so important to know exactly what kinds of narrative of the Black Death as a prototypical epidemic of the past are represented in today's medieval history textbooks.

This study aims at analyzing the representations of reality and behavioral patterns amidst a pandemic that contemporary world history textbooks in the Russian language communicate in their Black Death narratives. Comparative textbook analysis between Russia and other post-Soviet countries with Russian language schools reveals diverse and ambivalent interpretations of the same material within a common geographic and linguistic area. The key research question directly follows from the dichotomy of perceptions about the Middle Ages mentioned above. Are medieval people presented to contemporary school students as unlucky victims of external circumstances beyond their control or as autonomous agents capable of bearing responsibility for the consequences of their actions? In social sciences, this question harks back to the general theoretical debate on structure vs. agency, making it possible to assess, without falling into anachronism, the impact of Black Death narratives on the beliefs and behaviors during the COVID-19 pandemic.

The nexus of structure and agency can be considered a leitmotif across social sciences, sociology in particular. Agency is the capacity of social actors to form their intentions and attempt to convert them into actions independently. Structure, meanwhile, is the general logic of external constraints that determine those intentions and actions

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[1] Knight S. Reading about the Black Death with My Daughter during the Coronavirus Outbreak // The New Yorker. 2020. March 14; Mulhall J. Milan's Medieval Response to the Plague Holds Lessons for Today // The Washington Post. 2020. April 27.

or at least set a framework for their implementation. Structure-based approaches imply focusing on how seemingly autonomous actors (such as authors of school textbooks) in fact reproduce the structural rules of social institutions and socially shared values dictated from the outside (such as subordinate status of some population categories), sometimes without even realizing it [Stanton 2014]. Contrastingly, agency-centered approaches focus on the potential of social actors to transform, through directed effort, the supposedly unshakeable versions of social order regarded by many as natural and the only possible ones [Welzel 2017]. A recent study analyzing school textbooks from 78 countries shows that there has been a worldwide increase in emphasis on people as agentic actors, though emphasis on older social institutions remains stable [Lerch et al. 2017]. Therefore, the dualism of structure and agency is reproduced not only in research approaches, including the field of sociology of education, but also in the very subject of research, in particular school textbooks and curricula.

Over the past few decades, the structure-agency balance has been subject to reconceptualization in social theory as well as in empirical studies. On the one hand, the idea of returning to agency (after the prevalence of structural functionalism, structuralism, and even post-structuralism) gave rise to an explanatory model based on the transition from conceptions of static structures to structuration as a process. In structuration theory, social structure is not a "social fact" in the Durkheimian sense; rather, it is recreated or transformed through and by virtue of instantiation by social actors [Shilling 1992]. On the other hand, the social constructivist perspective suggests that, just as individual intentions and actions of social actors, the very idea of agency is structurally determined and represents a social construct of post-Christian Western culture in which agency is gradually relocated from godly powers (perceived increasingly as more transcendental and less likely to actively intervene in earthly matters) to human beings, i.e. the willpower and behavior of individual and collective actors [Meyer, Jepperson 2000].

In a number of textbook studies, the shift of focus from structure to agency is associated with giving place in history to minorities that were marginalized in Western societies. For this reason, issues concerning the dualism of structure and agency are often raised in the context of whether textbooks adequately represent the agenda associated with people's ability to conceive themselves as instigators of social change and empowered historical subjects [Éthier, Lefrançois, Demers 2013], e.g. as relative to the environmental movement [Bromley, Meyer, Ramirez 2011] or human rights [Bromley 2014].

This study zeroes in on history textbook representations of individual free choices and external constraints in tackling a problem which arose as extrinsic—by virtue of its biological nature—to individual and collective actors as well as to the social structure, but quickly became a social one. The course of the epidemic, not to mention the associat-

ed social changes, were not determined by the biological parameters of the disease alone—to at least the same extent, they were a function of collective behaviors. The available array of mass reactions to the Black Death, including organized collective responses, is represented as a social fact that exists independently of individual minds, as objective as the Black Death itself. The historical period in which the Black Death occurred as a prototypical epidemic also provides a context for both structure-based and agency-centered approaches. On the one hand, medieval society, similar to other traditional societies, is normally conceptualized as a stable rigid structure where everyone is assigned a strictly defined status by birth. Even though medieval Western Christianity emphasized the individual aspect—the idea that human beings are created in the image and likeness of God, the value of saving every single human life, and personal responsibility to exercise faith in Christ—it did not welcome individualism in the social sphere. On the other hand, the image of the Middle Ages in the public mind was largely shaped under the influence of Romanticism, where agency was embodied in Romantic heroes standing for their interests and their right for self-expression, sometimes by rejecting the established social norms. This tradition of medieval history popularization may have a certain influence on textbook authors, prompting them to unwittingly project the perceptions of agency typical of later historical periods, including modernity, to the Middle Ages, especially when describing events such as the Black Death, which obviously required active effort to fight an external threat. Therefore, Black Death narratives in school textbooks are ambiguous enough to become a material for projecting and communicating a variety of perceptions of the structure-agency balance in external-threat situations such as the ongoing COVID-19 pandemic.

1. Data and Methods
1.1. Sampling school textbooks on medieval history

Research was based on post-Soviet Russian-language history textbooks currently used in schools, which feature at least one paragraph devoted exclusively to the Black Death narrative. The final sample meeting the requirements was comprised of six textbooks on world history, of which two were used in Russia, one in Belarus, two in Ukraine, and one in Kazakhstan:

1) Aytbay R., Kasymova A., Yeshmukambetov A. (2018) *Vsemirnaya istoriya: Uchebnik dlya 6-go klassa obshcheobrazovatel'noy shkoly* [World History: 6th Grade Textbook for Secondary School], Almaty: Atamura;
2) Boytsov M., Shukurov R. (2016) *Vseobshchaya istoriya. Istoriya Srednikh vekov: uchebnik dlya obshcheobrazovatel'nykh organizatsiy* [World History. The Middle Ages: Textbook for Secondary Education Institutions], Moscow: Russkoe slovo;

3) Vedyushkin V., Ukolova V. (2014) *Istoriya. Srednie veka. 6-y klass. Uchebnik dlya obshche-obrazovatel'nykh organizatsiy* [History. Middle Ages. Sixth Grade: Textbook for Secondary Education Institutions], Moscow: Prosveshchenie;
4) Krizhanovsky O., Khirnaya E. (2007) *Istoriya srednikh vekov: uchebnik dlya 7-go klassa obshcheobrazovatel'nykh uchebnykh zavedeniy* [History of the Middle Ages: 7th Grade School Textbook], Lvov: Oriana-Nova;
5) Likhtey I. (2007) *Istoriya Srednikh vekov: uchebnik dlya 7-go klassa* [History of the Middle Ages: 7th Grade Textbook], Kiev: Gramota.
6) Fedosik V. et al. (2009) *Istoriya Srednikh vekov: XIV—XV vv.: uchebnoe posobie dlya 7-go klassa obshcheobrazovatel'nykh uchrezhdeniy s russkim yazykom obucheniya* [History of the Middle Ages: 14th-15th Centuries: 7th Grade Schoolbook for Russian-Speaking Institutions of Secondary Education], Minsk: Narodnaya asveta.

Both Russian textbooks on the history of the Middle Ages are designed for 6th-grade students and are included in the federal list of textbooks recommended by the Ministry of Education. In the textbook by Vladimir Vedyushkin and Viktoriya Ukolova, the Black Death narrative is contained in the chapter entitled *The 14th Century in European History*, specifically its first three sections: *The Black Death* (key events and course of events), *Search for the Guilty* (contemporaries' attempts to understand what caused the epidemic), and *Peasants, Lords, and Effects of the Plague* (medium-term socioeconomic consequences of the epidemic). In the textbook by Mikhail Boytsov and Rustam Shukurov, the Black Death narrative is included in the chapter *The Hard Times*, specifically its first two sections, *Hunger and the Black Death* (causes and key events of the epidemic) and *From Subsistence to Market Economy* (economic effects of the epidemic).

The Belarusian textbook under the editorship of Viktor Fedosik is designed for 7th-grade students—the history of the Middle Ages is studied during two academic years (as compared to one year in Russia), the second one being dedicated entirely to the 14th-15th centuries, the so-called Late Medieval Period. The Black Death narrative is represented in the chapter *Everyday Life in the Late Middle Ages*, specifically in the second section *The Black Death and Its Aftermath*.

Ukrainian textbooks included in the sample target 7th-grade students and cover the entire medieval period. Oleg Krizhanovsky and Elena Khirnaya placed the Black Death narrative in the chapter *Medieval Fidgets. "The Three Calamities"*, the latter meaning war, famine, and epidemic. Igor Likhtey's textbook features the Black Death narrative in the section *Population Composition and Mobility* of the chapter *People in the Middle Ages*.

The Kazakh textbook by Rosa Aytbay, Aliya Kasymova, and Altay Yeshmukambetov devotes an entire chapter to the Black Death, entitled *The Pestilence. Peasant Revolts in France and England*, opening the

textbook part *Medieval European Society in the 14th–First Half of the 15th Centuries*.

1.2. Narrative analysis: rationale and procedure

Narrative analysis is not the only method to analyze historical texts in general and history textbooks in particular. Textbook studies often use content analysis to focus on specific segments of content [Okolskaya 2012] and critical discourse analysis to examine narratives as a whole [Bloor, Bloor 2013]. An essential part of public history research is about the most controversial events in national historical narratives that play a critical role in collective identity formation. In this regard, critical discourse analysis is used to reveal attempts to promote ideological perceptions, disguised as neutrality. Unlike in this kind of research, the Black Death narrative is not a battlefield among historians (at least yet), so its projection into modernity has to do with conveying behavioral patterns in an epidemic, not ideological orientations. Narrative analysis allows understanding exactly how the text represents the logic of developments and people's actions. This logic of narration is often implicit, recognizable only in the choice of ways to deliver the same material through different stories [Fabrykant 2017]. Therefore, narrative analysis reveals causal reasoning implicitly engrained in the very narrative structure, which lends meaning and coherence to the events described [Puzanova, Trotsuk 2003]. That is why narrative analysis is used in this study to investigate the interplay of structure and agency in narratives of the Black Death that can be found in modern Russian-language school textbooks.

This basic narrative structure was used to define the parameters for comparing the Black Death narratives across the textbooks. Focus on causal relationships implies comparing the texts separately by how they represent the historical event itself (what events are selected? in which order are they arranged? how are they logically related?), its causes (is there only one cause or more? how are they related to the historical event and to one another?) and consequences (which spheres of life did the event affect? which actors of the narrative were affected and how? are the effects assessed as positive, negative, neutral, or ambivalent?). In addition, since the Black Death is not a single event but rather a series of events, it makes sense to compare the causes and individual episodes attributed to the Plague across the textbooks—otherwise speaking, why the Black Death actually happened and why it happened the way it did. In accordance with the research question concerning the interplay of structure and agency, the narrative material was differentiated based on whether it referred to externally determined circumstances or actors' independent actions for each of the four comparison parameters. A fragment of narrative would be classified as reflecting the structure-based approach if it described events, including actions of individuals, groups, or population categories, as determined by specific characteristics of social order, external and predetermined in relation to the participants. Contrari-

wise, the agency-centered approach was recognized in cases where a fragment presented individual or collective social actors acting out of their own free will and interests and choosing freely from many possible options. Preliminary analysis of the textbooks in the sample shows that none of them is strongly dominated by either structure-based or agency-centered approach that would permeate every chapter and every description of the various events, phenomena, and periods of medieval history. It follows from the above that the balance of structure and agency in the Black Death narratives does not convey textbook authors' general perspective of historical reality but reflects their perceptions of the specific historical phenomenon.

2. Results

Analysis of the Black Death narratives in each of the six textbooks according to the plan is presented in Table 1. Below, we zoom in on the similarities and differences among the textbooks in terms of structure and agency for each of the narrative components.

2.1. Causes of the Black Death

None of the textbooks analyzed mentions causes of the epidemic that could be attributed to agency. Structural causes can be divided into two groups. The first one refers to the "spirit of the age" as an ultimately general characteristic of the era of "hard times" (the 14th century in the Russian and Belarusian textbooks or the whole Medieval Period in the Ukrainian textbooks). In this regard, the Black Death is in line with other "calamities" of those times: famine and war. A relevant horizon of expectations is constructed, where the Black Death is regarded as inevitable and at the same time confined to the well-defined period in the past, the (late) Middle Ages, which is perceived categorically in a negative way.

The other category of causes—international trade—is not presented as specific to the epoch, being identified in a non-evaluative manner. None of the textbooks asserts that trade restrictions could have prevented the epidemic from breaking out. The region in which the plague originated is also specified neutrally, without any evaluation or connotation. Although one of the Ukrainian textbooks indicates migration as the primary cause of medieval "calamities", along with famine, war, and epidemic, it refers to migrations within Western Europe and implies no xenophobic connotations. None of the textbooks mentioning the Eastern origins of the Black Death describes its outbreak or events in the East, the focus being entirely on Western Europe.

In the narratives analyzed, it is not a remote country that is represented as alien, dangerous, and exotic, but the historical past itself, i.e. the Middle Ages as dangerous times. Thereby, causality attributed to the Black Death could be defined as confined fatalism: the Black Death is inevitable within the "era of calamities", yet harmless beyond it.

An interesting exception is the Kazakh textbook, which specifies no causes of the Black Death at all: the narrative has no buildup, opening

with the outbreak straight away. This way of putting things can also be considered fatalistic—whatever happened, happened and cannot be changed—but it makes no linkage to the specific historical period and its distinguishing characteristics. By contrast, confined fatalism implies generalization: a single negative event as major as a plague epidemic is regarded as a marker of the "era of calamities", which may entail expectations of new disasters to come as well as catastrophic perceptions of the already existing negative phenomena.

2.2. Course of events

Unlike the causes of the Plague, its course of events is described with elements of both structure and agency in all the six textbooks analyzed. Structural features include the rapid spread of the disease, while descriptions of people's behavior focus on fleeing from the infected towns to the countryside as the most typical pattern. One of the Russian textbooks and the Kazakh one assess such behavior as destructive and conducive to the spread of the Black Death to new areas. In one of the two Ukrainian textbooks, conversely, this behavioral pattern is regarded as the only effective response. The other three textbooks describe it as self-evident without evaluating its appropriateness in any way. The same neutral perspective is kept on the overall emotional state of fear and desperation. Meanwhile, the textbooks differ in conveying the understanding of the situation. Both Russian textbooks say that the epidemic galvanized the epoch-specific visions of an imminent doomsday with various signs preceding it, while in the Belarusian textbook, contemporaries rather perceive the situation as a time gap between the past and the future.

All the narratives analyzed describe only the behavior of town dwellers fleeing to the countryside, while leaving out the other population categories covered in previous chapters on medieval history, such as peasants in that same countryside or lords in their castles. Neither is there any mention of church or secular authorities' actions, even though the preceding chapters went into detail describing the role of the church in the Middle Ages and the centralization of power in a number of countries in Western Europe.

As we can see, the Black Death narrative has only one protagonist: a town dweller in Medieval Western Europe who is taken unawares, confused, unable to understand the causes of what is going on, and left to their own devices. The cross-country textbook studies mentioned above associate greater diversity of social actors, including less powerful ones, with agency-centered approaches, and the focus on major social institutions and key actors with structure-based approaches [Lerch et al. 2017]. There is no antagonist in this narrative, since the Black Death is not impersonated but represented as an act of nature and part of objective reality. The protagonist's loneliness and, consequently, its inability to collide with other characters, align with a flat story arc as a typical feature of the Black Death narrative. Nothing is said about the geographical patterns of spreading or any oth-

Table 1. **Comparative narrative analysis of representations of the Black Death in school history textbooks**

	Causes	Course of events	Attribution of the course of events	Effects
Boytsov, Shukurov (Russia)				
Structure	The entire 14th century being the "hard times; The Silk Road bringing caravans from Central Asia; Rats travelling on ships	Rats on merchant ships arrive to a port in Italy — the Plague devastates towns	Amplification of the medieval conception of the world	Death of one third of Europe's population, with entire towns wiped out. Reduction in peasant population
Agency	No	Town dwellers depart to the countryside, spreading the disease even further — expectations of doomsday	No understanding of the causes of what is going on	Requests to increase wages — peasant revolts
Vedyushkin, Ukolova (Russia)				
Structure	Famines arising from harvest failures and weakening the population; East-West trade routes; Rats travelling on ships	The Black Death kills people	Concentration of population in towns	Reduction in European population by one third, in some regions by three fourths
Agency	No	Attempts to escape from the outbreak areas — further spread of the disease	No	Accusations of Jews; violent attacks on Jewish communities, and further persecutions of Jews. Increased tensions between peasants and lords: demands for personal freedom vs. attempts to shift the hardships on peasants
Fedosik (Belarus)				
Structure	Lower resistance to disease due to famine; Contacts with the East; Rats and fleas travelling on ships	The disease spreads rapidly	Concentration of population and poor sanitation in towns; poor medical knowledge. Rapid disease progression	Death of nearly half of the population of Western Europe
Agency	No	Town dwellers leave their homes and property and flee to the countryside. No understanding of the causes of what is going on; fear. A feeling of life interrupted, a time gap between the past and the future	No	No
Krizhanovsky, Khirnaya (Ukraine)				
Structure	The Middle Ages as a period of calamities: epidemics along with migrations, famines, and wars	The disease kills people rapidly	No	Death of one quarter to half of Europe's population
Agency	No	Escape from the affected areas as the only effective response	Doctors' ignorance of the source of the disease and of how to treat it	Massacres of Jewish communities — migration of Jews to Eastern Europe. People who took possession of the dead's property became wealthy overnight and embarked on trade and banking
Likhtey (Ukraine)				
Structure	Epidemics as one of the four calamities of the Middle Ages	The Plague spreads rapidly; homes of the dead are open for looters	Concentration of population and "horrible living conditions" in towns	Death of nearly 25 million people. A 60% reduction in Europe's urban population
Agency	No	An atmosphere of "desperation, fury, and fear"	No	Improved living conditions for survivors: inheritance received from the dead; a better bargaining position of peasants and artisans due to worker shortages. Massacres of Jewish communities
Aytbay, Kasymova, Yeshmukambetov (Kazakhstan)				
Structure	No	The disease spreads rapidly, inevitably killing its victims	High concentration of population and poor sanitation in towns. Low status of medicine. Hundred Years' War: refugees and armies. Trade	Death of a considerable part of population
Agency	No	People flee from the infected areas and thus spread the disease even further	No understanding of the biology of the disease	No

er characteristics of the pandemic across different countries and regions of Medieval Western Europe. As a result, the disease is pictured not as spreading, rapidly yet gradually, but rather as hitting the entire Europe at once. This specific feature of the narrative contributes to fatalism in representations of the Black Death, which has already been mentioned with respect to the causes of the epidemic.

2.3. Attribution of events
The textbooks analyzed are largely similar in their interpretations of why the epidemic developed the way it did. Structural causes can be found in all the textbooks except one Ukrainian textbook, and four of the five explain the Plague's characteristics—its impressive size and rapid spread—by the concentration of population and "horrible living conditions" in towns in the first place, thereby maintaining the logic of focusing on urban experiences that was pointed out above. While it would be reasonable to talk about high population density in medieval towns as compared to medieval rural areas, *a priori* judgments about urban and countryside living conditions are hardly appropriate. Although there is no direct reference to standards for comparison, life in a medieval town is more likely to appear unsanitary when contrasted with present-day city life than to medieval rural environments. A similar implicit comparison to the present day is observed in another version of attributing events to structure offered in one of the Russian textbooks: the events that occurred during and due to the epidemic happened because the Black Death amplified the significance of the already existing conceptions of the world, first of all expectations of doomsday as part of medieval Christianity's worldview. Therefore, structural causes of the events within the Black Death narrative are presented in the textbooks largely through general reference to the distinguishing characteristics of the Medieval Period as such—just as the causes of the epidemic itself, if only less distinctly.

It is debatable how applicable this observation is to attribution of events to agency, which can be found in only half of the textbooks, unlike attribution to structure. In all the three cases, people's actions during the pandemic are explained by the lack of medical knowledge about the biology of the disease and the true causes of its spread as well as overall inability to understand what was going on. The reasons for such ignorance are not specified, and neither is the relationship between unawareness and behaviors. Apparently, the textbook authors considered the described response to a situation of mass disorientation just as natural and inevitable (or at least the most probable) as the unavailability of today's evidence-based medical knowledge back in the Middle Ages. Therefore, the lack of knowledge as such is specific to the historical period, but the causal relationship between ignorance and behavior—panic and a rush to leave the areas affected by a disaster of unknown origin—is presented as universal.

2.4. Consequences of the Black Death

The effects of the Black Death listed in the textbooks are quite numerous. A drastic reduction in population size is mentioned most often among the structural consequences. Different textbooks report the Black Death killing one quarter, one third, and even half of Western Europe's population. Alternatively, exact numbers are given or high mortality rates are indicated without quantification. Some authors mention high death tolls in individual regions and towns, sometimes reporting their entire populations to have been wiped out. This method of delivering information creates a picture of a huge catastrophe, yet the comparison is not against the consequences of other disasters and calamities of the Middle Ages or other historical periods but probably against some general beliefs about what effects can be considered catastrophic. The textbook authors find it obvious that death of a quarter, let alone one third of the population will be intuitively classified as catastrophic without explanations.

Agency-attributed consequences of the Black Death are more diverse. The one mentioned most frequently is the increased demands of the peasants as a result of their improved bargaining positions due to labor shortages in agriculture, along with the lords' reluctance to make such concessions, especially agree to grant personal freedom to peasants. This conflict results in peasant revolts in England and France, providing a plot to the narrative that immediately follows the Black Death in most textbooks. Another type of consequences of the Plague is massacres of Jewish communities, arising from anti-Semitic conspiracy theories and followed by persecutions of Jews and their mass migration to Eastern Europe. Textbook studies indicate agency of ethnic and other minorities that were challenged by macrosocial structures [Bromley 2014]. However, it is mentioned not in every textbook and not among the first lines. As a result, what is demonstrated is not the opportunity for social change but, quite the opposite, the structural constraints that were not eased but rather strengthened even more by the Black Death as an external threat. Other long-term effects include the overnight improvement in the standard of living among plague survivors who inherited or simply appropriated the dead's belongings, giving rise to trader and banker dynasties. Therefore, while structural consequences of the Black Death are described in the textbooks as a common and universal calamity, agency-attributed effects are interpreted in categories of winners and losers.

This description of various types of confrontations—presented, at least in the case of peasants and lords, as zero-sum games—contradicts the textbooks' earlier representations of Medieval Western European society as a stable and internally coordinated hierarchical structure, inertness of which was hard to shatter even for enthusiastic and influential reformers. This change is not mentioned explicitly, yet it is well in line with the role that the Black Death narrative plays in history textbooks—as a story about one of the "calamities" that opens a new page in medieval history. This transformation is associated with

the overall worsening of living conditions, not an increased malleability of social structures. New opportunities arise, but they are embraced either by chance (inheritance) or as a function of pre-epidemic status in the structure of medieval society (peasant revolts and persecutions of Jews), according to the narratives. This restriction of opportunity, along with confrontations themselves and the zero-sum game paradigm, is presented neutrally rather than as something inevitable and natural. Conspiracy theories, meanwhile, are expressly criticized, but their origins are observed exclusively in the specific features of the epoch—medieval anti-Semitism—and thus do not imply generalization. Although the textbooks give lot of attention to people's psychological state when covering the course of events, they never analyze the psychological impact of such a traumatic experience. Descriptions of peasants realizing and starting to use their improved bargaining position right after the end of the epidemic create an impression that everyday life and the overall perception of the world were back to normal as soon as the Black Death was over.

3. Discussion   Analysis of the Black Death narratives in modern Russian-language history school textbooks reveals the primacy of structure over agency. This is common for textbooks from all the four countries (no prominent cross-country differences in interpretation are observed) and manifests itself in the ways of describing the causes, developments, and effects of the epidemic. Structural characteristics of the Black Death, its causes and consequences are quite diverse, whereas actors are presented as an undifferentiated mass of medieval citizens. Their actions and feelings are portrayed as uniform and rigidly determined by external circumstances—the pandemic itself and some general characteristics of the epoch. Textbook authors hold different views on the appropriateness of the only response to the disease mentioned in their narratives—fleeing to areas as remote as possible and staying there for as long as possible—but they unanimously regard the outbreak and disastrous consequences of the Plague as unavoidable. Therefore, the textbooks offer no behavioral patterns to internalize, implicitly conveying the concept of human behavior in a pandemic as a mass phenomenon, not a product of individual choices. This uniformity occurs spontaneously and contradicts the fact that participants of the Black Death narratives are left to their own devices, without any unifying intervention from governments or church authorities. The lack of an external, consolidated, and potentially consolidating plan for fighting the epidemic may prevent manifestations of agency but at the same time serve as a restricting social fact (just as availability of such a plan), creating the overall atmosphere of disorientation. Furthermore, the primacy of structure over agency rules out statism: medieval states, similar to other social institutions such as the church, have no more agency than individual actors—all of them rather being prisoners of structural

constraints. This representation of agency explicitly contradicts the two prerequisites for an effective epidemic response: quality governance and population's willingness to comply with authorities' recommendations in spite of the growing circulation of false information. Medieval citizens in areas affected by the Black Death, as they are presented in school textbooks, find themselves left to the mercy of fate, confused, copying behaviors and attitudes of others spontaneously and without thinking, thereby fostering the spread of not only the disease itself but also false beliefs about it. Therefore, the textbooks communicate what could be called a perfect negative example, the quintessence of behaviors and conceptions that are undesirable in a pandemic—yet without marking them as such, except conspiracy theories. As a result, the negative learning component is not too obvious here, while the overall fatalistic perspective is quite salient.

Importantly, fatalism that pervades the Black Death narratives in the textbooks is explicitly confined to the Medieval Period. The prevalence of structure over agency is not dictated by the specific characteristics of the Middle Ages; in the context of modern social sciences, it has a prominent value component, which is the extent of believing in the opportunity to achieve directed social change. Interpretation of the epidemic as an attribute of the Middle Ages may be perceived in different ways. On the one hand, exoticization of epidemics on a par with knights' tournaments, the Crusades, and gothic architecture intensifies the typical response to any unexpected negative development—denial of what is happening—which, during an epidemic, may lead to riskier behaviors as a result of underestimating the probability of acquiring infection. On the other hand, if pandemic is an attribute of the Middle Ages as the era of calamities, it means that an epidemic occurring in any other historical period may be regarded as a sign of "bad times" coming. Such perceptions may lead people to anticipate new disasters of comparable size in the future, view them as unavoidable, and reevaluate the present-day negative events—again, catastrophizing their possible effects.

The results of narrative analysis reveal possible practical implications for the contradiction, intrinsic to any historical narrative, between the ambition to avoid anachronisms and deliver as an objective representation of the past as possible, on the one part, and the didactic message of treating history as "life's teacher", on the other part. In the textbooks analyzed, despite the obvious (as compared to other genres of historical narrative) and even normatively inherent didactic role, the urge to communicate a non-anachronistic image of the epoch clearly prevails over providing an opportunity to learn a lesson. The textbook authors were probably convinced that, by telling the story of the Black Death, they reconstructed events from the remote forgotten past, which were not supposed to be matched against individual experiences in the present. In this case, we are talking about unintentional learning, where an obvious analogy with past events triggers brows-

ing through available historical experiences in search of possible forecasts for event developments, consequences, and behavior patterns. As a result, narratives conceived by their authors as neutral, acquire a prognostic ("here is what may happen and how") and normative ("here is what you can do and feel") status. Intended as unbiased, description of events may indirectly promote the reproduction of non-optimal behavioral patterns due to the lack of alternative patterns to internalize.

Comparison with events from other historical periods, in this case other epidemics, is one of the possible solutions to avoid such unintended consequences without moralizing and falling into generalizations inappropriate for modern historical narrative. Comparisons may be offered in the main text, end of chapter questions, or creative project assignments. Another method to overcome this contradiction is counterfactual thinking, where students are asked to imagine alternative scenarios of past events, including behaviors of various actors. At the same time, anachronisms should be avoided by delving into the relevant epoch to understand its internal logic, opportunities for agency, and structural constraints. Both cases imply extending agency beyond the historical narrative, in the process of learning history itself—especially the negative experiences that had better not be reproduced in the present.

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Challenges for Education during the Pandemic: An Overview of Literature

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Abstract

This article overviews studies exploring the COVID-19 pandemic's impact on education systems and their responses to lockdown restrictions, comparing available findings with international statistics based on continuous education system monitoring. Global organizations acknowledge disruption of classical educational processes and emergency transition to distance learning during the pandemic. Scientific literature examines accessibility of online education, alternative forms of distance learning, and the pandemic-induced financial constraints on universities inhibiting new construction, social support for students, scholarship application, professional development of faculty members, and research growth. The pandemic illuminated the issue of inequality in education, which worsened as a result of emergency transition to online studies. In particular, researchers focus on the most vulnerable groups of students, such as children from low-income families, children from migrant backgrounds, and students with disabilities.

Projects aimed at studying the digitalization of education account for the biggest chunk of research inspired by the new pandemic reality. A number of studies discuss not just a formal transition to distance learning but a major technological turn that allows using the unique opportunities provided by digital technologies, which is especially important when teaching medical students.

Theoretical inquiry is a distinctive feature of scientific discourse, as compared to the discourse of international expert and analytical reports on the problems of education in the context of the COVID-19 pandemic. Research on changes to the learning process makes it possible to reconstruct the direct and indirect, as well as latent, threats of the pandemic.

The COVID-19 pandemic changed the social, economic, and cultural aspects of public life, and it certainly could not leave education unaffected. The UNESCO, the OECD, and the World Bank have been continuously monitoring changes in education caused by the pandemic. Based on their findings, they have identified the main tendencies of change, outlined the group of people involved in problematic transformations (students, their parents, teachers, and education stakeholders), and developed global and local practical recommendations for best practices [Department of International and Regional Cooperation of the Accounting Chamber of the Russian Federation 2020].

Two major trends have been common to national education systems worldwide in the context of the pandemic: disruption of classical educational processes and emergency transition to distance learning formats.

Learning disruption increased socioeconomic inequality in education. Among specific threats, international organizations mention interrupted learning, difficulties obtaining the usual economic support (e.g. free or reduced meals at school), child neglect (in case parents went to work) or high economic costs of childcare (if it prevented parents from working outside the home), health system overload (if female health workers had to stay home to look for their children), and problems directly related to schooling: increased workload in schools that remained open, a rise in dropout rates following the reopening of schools, and reduced opportunities for student socialization.

Challenges of the pandemic were multidimensional, affecting the economic, technological, social, and methodological aspects of education. According to international studies, very few education systems were fully prepared for the transition to distance learning due to technological as well as economic factors. Difficulties of integrating distance learning formats could be psychological (unfamiliar format of classes and diminished motivation, which decreased learning effectiveness), socio-psychological (co-responsibility of parents for the organization of distance learning), methodological (difficulty of moving some educational activities online; additional training for teachers to embrace new teaching methods), and policy-related (lack of management models describing the transition to online learning). All these challenges have a common effect of increasing social stratification and inequality during the distance learning period imposed by the pandemic.

The overall picture of education during the COVID-19 pandemic is constructed not only from the monitoring reports of international organizations but also from the relevant scientific publications. Extensive surveys performed by international organizations and research studies focusing on specific problems complement each other in reconstructing the context in which education systems have had to operate during the pandemic.

The present article is aimed at systematizing the available findings on education during the COVID-19 pandemic and comparing them with

the key conclusions drawn by international organizations engaged in continuous monitoring of education systems.

Publications for this review study were sampled using the following keywords:

• "education COVID", "education pandemic", "university COVID", "university pandemic", "school COVID", "school pandemic"—for publications in English; and
• "obrazovanie" (education), "pandemiya" (pandemic), "koronavirus" (coronavirus), COVID—for publications in Russian

Search for and selection of publications were carried out using the official websites of the publishers Elsevier, Wiley, Springer, Sage, Oxford University Press, and Cambridge University Press (available in the National Research University Higher School of Economics' digital library of scientific periodicals). The portal eLIBRARY.RU was used as well, specifically open-access articles. The sample included publications of the types "research article" and "book chapter" for the period from April to November 2020 as well as works to be published in 2021, which usually represented findings from empirical studies.

The logic of publication analysis and classification implied identifying the major trends in research on education during the COVID-19 pandemic and comparing the findings with the key challenges in modern education reported by international expert communities: digitalization of education and disruption of the educational process, which exacerbated the reproduction of socioeconomic inequality during the pandemic [Department of International and Regional Cooperation of the Accounting Chamber of the Russian Federation 2020].

Even research centers that engage in forecasting did not previously qualify the pandemic threat and the following "imposed" digitalization of social life among challenges of the future (see, for instance, [Nestik, Zhuravlev 2018]). A review of recent reports of international organizations and research findings on changes in education caused by the pandemic will allow estimating the possible damage and finding the best possible ways out of the COVID-19 crisis in education.

Pandemic and Online Education

In reports of international organizations, emergency transition to distance learning is considered to be a major education trend during the pandemic. Two aspects are emphasized in this wording: distance and emergency. Freedom of choosing whether to implement online and blended learning formats has been replaced by emergency, or "imposed", online education.

In research, the emergency of transitioning to online education and distance learning technology is normally represented from a critical perspective, as scholars seek to find out how exactly the quality of education has been affected for students learning from a distance

during the COVID-19 pandemic. For example, distance learning in lockdown is believed to have undermined preparedness of Russian high school students for the Unified State Exam (USE) in advanced mathematics. Despite the increased use of exam coaching services, actual USE scores were lower than expected, which affected students' choice of higher education institution and field of study [Yakobyuk 2020].

A Danish study shows that during the first lockdown phase, children of parents with no college degree decreased their reading activity compared to pre-lockdown [Reimer et al. 2021], and the shift to remote teaching in elementary schools of Malaysia became a challenge for teachers as well as learners and their parents [Jan 2020]. Along with methodological questions about distance learning technologies suitable for elementary school, the article also explores the psychological and psychophysiological aspects of engaging elementary school students in distance learning.

An economic analysis of Russian educational institutions that switched to online education due to the pandemic shows that digitalization has an essentially negative impact on preschool and supplementary education (particularly private for-profit institutions), where in-person classes cannot be replaced fully with distance learning, which leads to reductions in enrollment and in the range of fee-based educational services [Toshchenko 2020].

Even before the COVID-19 pandemic, online education technology had been a priority in university education development in Vietnam, Germany, India, Canada, China, Russia, the United States, Turkey, and a number of other countries. However, it was the emergency of change and the imposed digitalization that moved online education to the top of the agenda [Klyagin et al. 2020; Bao 2020; Ozkaral, Bozyigit 2020; Mishra, Gupta, Shree 2020; Hiep-Hung, Tien-Thi-Hanh 2020; Kerres 2020; Palvia et al. 2018]. The following aspects of online university education during the coronavirus pandemic are covered in scientific literature:

- Methodological and technological support of online learning in the context of emergency transformations [Ladyzhets et al. 2020; Bao 2020]
- Consequences of imposed digitalization and involuntary nonresistance of university administrators against the transition to online learning [Kerres 2020]
- Disappointment of students whose in-class education has been replaced by online learning, whose expectations (e. g. about internships) have not been fulfilled, and who experience technical issues associated with the digitalization of education [Ozkaral, Bozyigit 2020]
- Development of multimodal approaches to course content design to promote critical thinking in students; the need for government

support to ensure high-quality digital academic experience [Mishra, Gupta, Shree 2020]

- Digital technology in education and the need for social mobilization to promote online and blended learning [Hiep-Hung, Tien-Thi-Hanh 2020]
- Rational and well-founded integration of online and offline learning after the pandemic [Osman 2020]
- Post-pandemic changes in some education programs; for instance, the possibility of increasing digitalization of legal education is being considered, given the ongoing "digital transformation" of the legal profession [Osina, Tolstopyatenko, Malinovsky 2021]

As soon as the COVID-19 pandemic broke out, preparedness of Russian universities for distance learning was assessed [Klyagin et al. 2020]. Degrees of adaptation to online learning practices varied across institutions, departments, programs, and fields of study. For this reason, some parts of education programs or entire programs in a number of Russian universities "could only be delivered with the use of online courses provided by other universities" [Ibid.:54].

A large number of studies analyze the role of distance learning and digitalization in medical education, in particular the following:

- Prospective applicants' problems with the residency application process, away rotations, and obtaining letters of recommendation [Hanson et al. 2020]
- Peculiarities of using online learning tools due to the fact that many psychomotor skills are developed in practical sessions only (such as weighing, pipetting, microscope slide making, DNA swabbing, and many other skills) [Thompson et al. 2020]
- Lack of regular communication between students and personal tutors due to the transition to distance learning technology; suspension of clinical placements which may put students at a disadvantage due to missed opportunities [Sani et al. 2020]
- Acquiring, retaining, and improving technical skills in social isolation and online learning; use of telehealth interactions in outpatient care and medical education [Adesoye et al. 2021; Chick, Clifton, Peace 2020]
- Creation of virtual video platforms to implement formal case review "show and tell" sessions [Madrazo 2020]

Analysis of limitations imposed on medical education by distance learning is followed by specifying the ways of mitigating their effects, with a focus on new technology (video platforms and telemedicine) and compensatory teaching strategies to compensate for the limitations.

Analysis of management practices to adapt universities to online learning is especially optimistic in assessing voluntary engagement in the organization of student-faculty interactions [Klyagin et al. 2020].

Researchers recommend using advanced technologies, such as multi-modal learning [Skulmowski, Rey 2020], virtual reality, augmented reality, the Internet of things, etc. for the digitalization of university education. In this regard, the COVID-19 crisis becomes an unprecedented accelerator of technological development in higher education.

The study of consequences of the emergency and involuntary integration of online learning during the pandemic catalyzed not only experimental and empirical research but also the search for an adequate theoretical framework to conceptualize the new reality. Speculating on post-pandemic pedagogy, Michael P. A. Murphy draws attention to the rhetoric of emergency transition to online learning, specifically to representations of face-to-face schooling as a threat. The author suggests using securitization theory to analyze the post-pandemic situation in educational institutions [Murphy 2020]. Ryan Burns considers it important to reexamine the role of ethics in post-pandemic pedagogy, refuse the COVID-induced neoliberal transformation of education, and inject online pedagogy with a praxis of care and compassion [Burns 2020].

Learning Disruption and Reproduction of Inequality in Education

Reproduction of inequality in education is one of the key areas of research in Russia and abroad [Froumin 2006; Konstantinovskiy 2010; Nieto 2005]. Research on pandemic-induced changes in education is dominated by projects focusing on digitalization as a means of achieving social isolation that is necessary to break the chains of transmission. Publications exploring the effects of emergency digitalization and social isolation through the lens of educational inequality are much less numerous and usually represent pilot studies or programs of research (for example, [Omelchenko 2020]).

The first wave of research on inequality in education during the COVID-19 pandemic (based on data from Russia, the United States, Finland, and other countries) dealt with the most obvious problems of socioeconomic deprivation of children from low-income families, who used to receive support from educational institutions pre-pandemic, and the impossibility for such families to meet the requirements of "digital education". The lockdown shut students off from the publicly-funded resources, including technological infrastructure, increasing parents' responsibility for their children's learning. Families with low socioeconomic status turned out to be extremely unconducive distance learning environments [Iivari, Sharma, Ventä-Olkkonen 2020]. Furthermore, children from low-income families also lost other types of school support, such as free meals [Morgan 2020].

During the pandemic, just as before, the most vulnerable groups in terms of access to education include students from low-income families [Aucejo et al. 2020], children from migrant backgrounds [Omelchenko 2020], and students with disabilities [Meleo-Erwin et al. 2020]. As for developing countries (e. g. Guyana), unavailability of computers, poor Internet connection, and even inconsistent power sup-

ply inhibit the education process completely, especially in rural areas [Oyedotun 2020].

The use of television as an alternative to "inaccessible online education", according to research, equalizes access to educational products in distance learning. In Los-Angeles, a partnership between local PBS stations and schools spawned a remote-learning initiative tied to documentaries and popular science TV programs [Noonoo 2020].

"Collective trauma" inflicted by the COVID-19 pandemic became one of the factors promoting the reproduction of inequality in education. A study conducted in Smolensk Oblast shows that high school graduates of 2020 shifted their strategies of academic mobility toward "local higher education" [Artemenkov, Sukhova 2020]. This can be explained by increased attractiveness of regional universities (extended enrollment quotas for government-funded places), but the authors also assign a lot of significance to the factor of the coronavirus pandemic: the threat of infection radically increased the value of safety for high school graduates. Therefore, refusal from academic mobility (from regions to megapolises in quest of "high-status education") as a result of the pandemic psychotrauma can be analyzed in the context of the reproduction of educational inequality.

New studies will show whether high school graduates realize the reduction in the range of their post-graduation choices. University students who studied during the pandemic perfectly realize and even describe their losses in sociological surveys. Due to COVID-19, 13% of American students have delayed graduation, 40% have lost a job, internship, or job offer, and 29% expect to earn less at age 35 [Aucejo et al. 2020].

Pandemic-induced disruption of the educational process affects not only students and faculty but also universities as institutions. Financial constraints caused by the pandemic inhibit their activities in various dimensions: construction, institutional support for students, and faculty training [Palvia et al. 2018]. Meanwhile, the most vulnerable groups, such as international students, are badly in need of additional support from host universities during the pandemic [Pletneva, Ochirova 2020].

Research has also been facing huge challenges, mostly due to reduced funding and mandatory social distancing requirements [Rashid, Yadav 2020]. The latter are difficult to meet in a research setting, particularly in the areas requiring physical laboratories and fieldwork, which causes significant losses to research studies. The recruitment of international staff and the exchange of skilled researchers are a huge challenge due to travel restrictions. In addition, the universities and funding bodies will be under financial strain in the coming months, and the non-COVID projects may lose importance and focus from these agencies.

Researchers justify the necessity of providing government support to universities, as the pandemic has undermined the mechanisms of promoting academic mobility and internationalization, thereby wors-

ening the positions of national universities in global rankings [El Masri, Sabzalieva 2020].

Global Rankings and Academic Research: Specific Aspects of Constructing the Pandemic Context

Comparative analysis of the discourse on education during the COVID-19 pandemic between scientific literature and reports of international organizations shows that both types of sources emphasize the challenges of digitalization and learning disruption as increasing the reproduction of inequality in education. Emergency transition to distance (online) learning is seen as the greatest challenge for education during the pandemic in international reports and digests [Department of International and Regional Cooperation of the Accounting Chamber of the Russian Federation 2020; Arzhanova et al. 2020], just as in research publications.

Analytical reports of international organizations provide a thorough and comprehensive analysis of online learning, paying due regard to its impact on students and faculty's health (working on computer, negative psychological aspects of isolation, etc.) and the need for enhancing schools' technological infrastructure (access to portable computers instead of smartphones, which is closely related to the problem of educational inequality) and recommending the development of an integrated portal for all programs, apps, platforms, and materials required for distance learning as well as relevant tutorials for students, their parents, and teachers.

As for the academic discourse, researchers acknowledge that the emergency form of online learning imposed today on all schools and universities meets neither public expectations nor high-quality learning standards [Tishchenko 2020; Yakobyuk 2020; Jan 2020].

Although universities were more prepared for the transition to online technology in education, the pandemic factor complicated the situation of accepting the digitalization, largely due to the negative psychological context [Ozkaral, Bozyigit 2020; Kerres 2020]. At the same time, a number of researchers point to the resources that have become available thanks to the "emergency digitalization" of education. They discuss the need for fundamentally new multimodal approaches to course content design [Bao 2020; Mishra, Gupta, Shree 2020], which is especially critical in areas implying the development of psychomotor skills, such as medicine [Adesoye et al. 2021]. Academics have no doubts that the trend for digitalization of education will persist in post-pandemic reality, yet it will shift toward blended learning formats [Hiep-Hung, Tien-Thi-Hanh 2020; Osman 2020].

International reports provide quite a brief overview of learning disruption and the reproduction of inequality in education during the pandemic, giving the most basic recommendations on providing social and digital support to vulnerable social groups.

Academic researchers investigate the factors spurring the reproduction of educational inequality during the pandemic, paying spe-

cial attention to social isolation of students and the lack of access to government support in this situation [Iivari, Sharma, Ventä-Olkkonen 2020; Morgan 2020]. In publications, vulnerable social groups include children from low-income families, children from migrant backgrounds, students with disabilities, and those from rural areas of developing countries [Omelchenko 2020; Oyedotun 2020].

The pandemic has negative effects on students' behavior and educational/career trajectories [Aucejo et al. 2020]. In addition, researchers raise the problem of possible psychological trauma inflicted on students by the pandemic, its behavioral manifestation being high school graduates refusing from opportunities offered by academic mobility [Artemenkov, Sukhova 2020]. The COVID-19 crisis also affects universities, which suffer from pressure and reduced funding and face limitations in research projects and academic mobility [Pletneva, Ochirova 2020; El Masri, Sabzalieva 2020].

The challenges of education management during the pandemic—in the context of both learning disruption and digitalization—are analyzed from various perspectives in international memoranda as well as academic publications [Palvia et al. 2018; Rashid, Yadav 2020].

Theoretical inquiry is a distinguishing feature of the scientific discourse compared to the discourse of expert and analytical reports of international organizations on the problems of education during the COVID-19 pandemic. Research studies are aimed at not only describing and classifying the empirical facts but also finding a conception—a theory to explain empirical data, a logic of analysis—that will enhance the explanatory and predictive capacity of research. Securitization theory proposed by Garry Gordon Buzan can be a promising theoretical framework for analyzing education during the pandemic, as it explains how education becomes part of the process of constructing a "secure society" [Murphy 2020].

Conclusions   A substantial number of publications devoted to education during the first months of the COVID-19 pandemic are based on data from universities, while school education remains less explored in this regard.

Emergency transition to online learning is the overarching theme in international reports and scientific publications on education during the coronavirus pandemic. Researchers suggest making not just a formal transition to distance digital learning but a real technological turn (use of multimodal interaction tools of virtual reality, including augmented reality, the Internet of things, etc.).

Research on disruptive changes to the learning process makes it possible to reconstruct the direct and indirect, as well as latent, threats of the pandemic. Such studies therefore have a predictive value that is crucial for post-pandemic society and education.

Memoranda and digests of international organizations summarize best practices and thus mostly act as a reflection of the reality analyz-

ed. If, however, such analytical reports claim to conceptualize a problem, draw conclusions, or propose solutions and practical recommendations, they may outline areas of research that will be significant in the future.

Translated from Russian by I. Zhuchkova.

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Perceptions of Feedback among Russian Adolescents

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Received in
September 2020

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Abstract
Despite the obvious significance of the feedback phenomenon for school practice, there is a lack of valid analysis of student perceptions of feedback. This article explores how Russian adolescents conceptualize and perceive feedback as an educational tool. Descriptive research was conducted using an anonymous survey based on a questionnaire composed of open-ended questions. Seven hundred and three adolescents from large cities of Russia were asked questions about how they understood "feedback", what kind of feedback they would like to receive, and what kind of feedback they actually received from teachers. This was followed by a field study that involved an overt observation and analysis of feedback manifestations in a secondary school program for gifted students (n=140). Most senior students understand the range of problems associated with feedback, yet they perceive feedback itself as a tool for teaching, not as a tool for learning. In their beliefs about feedback, adolescents intuitively rely on either "behavioral" or "existential" perspective. In the former case, feedback is perceived only as an external stimulus and the resulting response. In the latter, students regard feedback as a tool for dialogue, support, engaged communication, relationship development, and direct or indirect request for evaluation or assistance. The more complex interpretation may stem from students' prior participation in situations of assistance and cooperation as well as their perceived need for a dialogue with the teacher or tutor.
Since the sample was unrepresentative, the conclusions made in this study should be deemed preliminary. Nevertheless, they allow designing further research of feedback literacy in Russia's school education.

Translated
from Russian by
I. Zhuchkova.

The limits of language determine the limits of experience and perception in present-day school students: the broader the semantic field of the phenomenon of feedback, the easier it is to extend the array of communication tools in the classroom. Modern school students rarely use the term "feedback", interpreting it as assessment in the first place, not as a cooperative exchange of opinions. This study aims at identifying the reasons for such perception of this indispensable component of learning by students.

John Hattie, defining feedback as one of the most powerful influences on learning and achievement, demonstrates that feedback effectiveness is directly associated with communicative competence of teacher and student. In his model of "ideal feedback", teacher motivates student to answer three major questions: Where am I going? (What are the goals?), How am I going? (What progress is being made toward the goal?), and Where to next? (What activities need to be undertaken to make better progress?) [Hattie, Timperley 2007].

As ideas of constructivism and humanistic approach to feedback in education developed, the concept of feedback literacy came into use [Sutton 2012]. Studying the motives behind feedback manifestation or non-manifestation by learners is critical as it allows engaging teachers in the discourse on the changing assessment practices, communication skills, tutorship, and lesson design.

This study is an attempt to answer the following questions:

- How do modern school students overcome behavioral barriers to uptake of feedback?
- Do they want to provide feedback to teachers while doing an assignment?
- To what extent are they prepared for using feedback tools for personal growth?

The general hypothesis of this study is that senior school students perceive feedback mostly as part of formal communication, not as a tool for seeking support or resources in order to optimize their learning behavior and achieve better educational outcomes. We also hypothesize that school students' demand for feedback may be mediated by the quality of educational dialogue in which they are engaged.

1. Current Discourse on the Limits of Feedback in Learning

1.1. The Role of Feedback on Learning and Education

The term "feedback" is used by contemporary scholars when analyzing the structure of learning process. Having synthesized hundreds of meta-analyses relating to the influences on achievement in school-aged students, Hattie concludes that not all feedback contributes to positive changes in learning or solves the problems of education quality [Hattie 2017:243.].

The phenomenon of feedback is studied in the context of encouraging interaction in the classroom [Starichenko, Egorov 2011; Rzun

2013; Borovskikh 2011; Chin 2006] and improving the quality of teacher–student communication [Bessonov 2016; Tishchenko 2010; Kuryan 2017]. In the recent years, the idea of "feedback loops", where assessment and comments initiate and promote teacher–student dialogue as well as peer dialogue, has been actively advocated both in research and in teaching [Carless 2019]. In addition, feedback is part of monitoring and evaluation processes in education as well as the academic motivation aspects of subject didactics [Maksimenkova, Neznanov, Podbelsky 2014; Titova 2017; Teleshev, Rezaykin, Blyakhman 2012; Evans 2013; Barabasheva 2017]. The concept of feedback is also actively used in studies analyzing behavioral patterns of participants in the educational process [Hattie 2017; You et al. 2019]. Finally, feedback is addressed in publications relating to educational management tools as a strategy to improve the quality of education [Latova 2011; Sushchenko, Sandler 2017].

Dutch and German scholars demonstrated how widely understanding of feedback and feedback processes may vary depending on the learning theory adhered to: behaviorism, cognitivism, social culture theory, meta cognitivism, or social constructivism [Thurlings et al. 2013]. Russian researchers use reflex (biological feedback), behaviorist, cognitivist, cybernetic, and communicative theoretical models of feedback [Lukyanenko 2007]. Feedback in education is conceptualized as "information received by a learner in response to their learning performance and relating to learning processes and outcomes" [Korenev 2018:118] or as "information provided by an agent (e. g., teacher, peer, <…> parent, self) regarding aspects of one's performance or understanding" [Hattie, Timperley 2007:81]. However, such interpretations do not require the learner to use the information to change their learning behavior [Mapplebeck, Dunlop 2019].

"Interaction" is another key word in conceptualizing feedback as an educational tool [Gamlem, Smith 2013]. In this regard, feedback is described as "the product of analysis, reflection, and observation that teachers receive from themselves and their partners in cooperation" [Bessonov 2016:8] or as "a means to initiate and develop cooperation" [Kuryan 2017]. Quality interpersonal interactions are believed to be critical to feedback in education [Evans 2013; Tanaeva 2010]. In this case, a teacher's job is to articulate comments and advice via dialogue using a tone that encourages learners to correct their own learning behavior [Teleshev, Rezaykin, Blyakhman 2012].

A number of faculty practitioners propose their own models of teacher–student feedback [Carless et al. 2011; Lyster, Saito, Sato 2013; Henderson et al. 2019] with a reservation that every model should be calibrated for specific educational goals and objectives.

1.2. Feedback as a New Literacy
Students' inability to receive and use feedback to achieve better learning outcomes is a pending issue in educational practice [Sadler 2010]. Furthermore, a lot of students find it difficult to produce comprehen-

sive peer reviews [Anker-Hansen, Andrée 2019] and are more interested in their grade or mark than in detailed feedback on their performance [Weaver 2006]. On these grounds, researchers emphasize the need to promote feedback literacy in students. Paul Sutton conceptualizes feedback literacy as an integral component of a broader academic literacy, emphasizing that it should not be reduced to the ability to read and write and that it requires teacher's and learner's personal involvement [Sutton 2012].

Following Sutton, Carless and Boud elaborate the idea of feedback literacy by proposing four interrelated features as a framework underpinning this skill: appreciating feedback; making judgments; managing affect; and taking action [Carless, Boud 2018]. Effectiveness of students' feedback literacy depends on the teacher's expertise [Hattie 2017; Evans 2013; Barabasheva 2017; Lyster, Saito, Sato 2013; Oleshchuk 2011].

Along with teacher feedback research, there are also studies examining the potential of student feedback [Borovskikh 2011; Lukyanenko 2007]. In particular, student feedback has been the focus of such initiatives as Student Voices [Korenev 2018; Cremin, Mason, Busher 2011; Halliday et al. 2019]. Student feedback is analyzed more often in the context of higher education than secondary schools [Winstone et al. 2017]. Available findings indicate problems in student perceptions of feedback, which researchers believe to have deteriorating effects on educational outcomes and effectiveness of lifelong learning [Weaver 2006].

2. Sources of Empirical Data: Descriptive and Field Research

This study aims at exploring how present-day adolescents conceptualize feedback as an educational tool. Research of two types was performed to achieve this purpose: (1) descriptive research on a sample of 703 adolescents from large cities of Russia and (2) field research of 140 gifted, academically motivated students enrolled in Sirius Educational Center programs. The two studies yield a non-representative, yet large experimental sample that allows using approximate models to formulate conclusions.

2.1. Descriptive Research Design

Since 2014, All-Russia Plenary Session of Senior School Students has been conducted within the framework of St. Petersburg International Educational Forum.[1] Most of the schools represented in this conference are ranked among the top 500 schools of Russia. The session was conceived to establish dialogue between adolescents and the teaching community. The format was partially borrowed from Mitchell and Elwood's publication on the development of school democratic communities [Mitchell, Elwood 2012]. Anonymous surveys of senior school students are administered annually as part of the plenary ses-

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[1] http://www.eduforum.spb.ru/eng/

sion, their results being then discussed by school education researchers and policymakers. One of such surveys was described in a publication on school loyalty [Ilyushin, Azbel, Gladiboroda 2018]. In 2020, the questionnaire consisted of dichotomous questions only and involved 703 school students.

2.2. Field Research Design

In March 2020, 140 school students aged 14–18 from 56 regions of Russia participated in the Literary Art dedicated program at Sirius Educational Center. The program consisted of 14- to 16-hour modules, each taking from 3 to 5 days. The whole program was delivered within 24 days. Many students regard participation in this program as an important work experience and as a resource for a more informed choice of further study and career trajectories in literary scholarship, humanities, or teaching [Kuchina 2017]. Therefore, the study was conducted on a sample of adolescents with excellent writing skills and high levels of linguistic awareness who were interested in intensive learning.

Research was administered within the module that developed students' research skills for humanities and taught them to apply the cross-cultural approach. At the end of Day 4, when the module had been completed, students were asked to provide written answers to open-ended questions as part of an anonymous questionnaire survey designed to collect student feedback on the module. The quality of students' responses allowed assessing the comprehensiveness and constructiveness of their feedback on module assignments. The questionnaire also asked how learners understood feedback. In addition, field research involved an overt observation and an analysis of feedback manifestations.

3. Is There a Demand for Feedback among Russian School Students?

As part of descriptive research, school students of grades 9–11 ($n = 703$) were asked to choose between two statements by picking the one that sounded more like them. Figure 1 shows the distribution of students' choices in four feedback-related questions.

Questionnaire results show that most school students would like to receive detailed comments on their performance from teachers. In students' opinion, teachers are much more likely to point out the gaps in their knowledge than focus on their possible growth areas.

The nearly even distribution of answers on Item 4 about the lack of teacher–student and student–teacher's feedback allows assuming that senior school students barely distinguish between these two directions of feedback.

The obvious desire of most students to receive detailed private comments on their performance at the end of the term may indicate a high level of trust in teachers' opinion but at the same may derive from the lack of such experience in the past.

The statement "Teachers tend to point out the gaps in my knowledge" (63.70%, $n = 703$) deserves special attention. SPSS Statistics soft-

Figure 1. **What Russian school students think about feedback**, % (*n* = 703)

1. Teacher's feedback
Teachers tend to point out the gaps in my knowledge
Teachers tend to focus on my possible growth areas

63.7
36.3

2. Teacher's feedback
I would like to receive detailed comments
I am normally good with marks as a review of my performance

75.5
24.5

3. Private written feedback
Such letters would be motivating and helpful to me
Such letters would be disturbing and bothering to me

74.3
25.7

4. Mutual understanding and cooperation
In our school, teachers lack feedback from students
In our school, students lack feedback from teachers

53.5
46.5

Table 1. **Correlations between questionnaire items on the lack of feedback** (*n* =703).

Teachers' feedback	Mutual understanding and cooperation	
	In our school, teachers lack feedback from students	In our school, students lack feedback from teachers
Teachers tend to point out the gaps in my knowledge	29.2%	34.6%
Teachers tend to focus on my possible growth areas	24.3%	11.9%

ware package was used to analyze correlations between students' answers to different feedback-related items of the questionnaire as well as between feedback-related and other items. Differences were examined using a chi-squared test at the 99% confidence level (Table 1). Students who report that teachers tend to point out the gaps in their knowledge are more likely to lack feedback from teachers (34.6%), while those regarding teachers feedback as an opportunity to identify their growth areas (24.3%) are more likely to report a lack of student feedback in their school ($\chi^2 = 29.63$, $p < 0.001$, $n = 703$).

Among the students choosing the option "Teachers tend to point out the gaps in my knowledge" (Figure 1), 49.8% would like to receive detailed comments on their performance, and 45.7% believe that private feedback letters from teachers could motivate them to apply more effort ($p < 0.005$, $n =$).

On the one hand, school students admit that their feedback to teachers is insufficient; on the other hand, they perceive teachers' feedback mostly as criticism. We hypothesize that students' demand

Table 2. **Examples of statements reflecting student perceptions of feedback** (*n* = 137)**.**

Perception of feedback	Exemplifying quotes	Proportion of responses
Positive	"A reciprocal response, when someone responds to you by giving you a hand" "Reactions and perceptions of participants aimed at improving performance and making progress"	25.7%
Neutral	"A response to an event" "Reply comments and additions"	72.1%

for feedback may be mediated by the quality of educational dialogue at school as such. To further explore and test this hypothesis, a field study was performed, which involved an overt observation and open-ended questions for a more detailed analysis of students' perceptions of feedback as an educational tool.

4. How Students Conceptualize Feedback in Education

4.1. Validity and Linguistic Characteristics of Students' Responses

Substantive responses were obtained from 97.8% of the participants in the questionnaire survey conducted as part of the education module of the Literary Art program delivered at Sirius Educational Center (*n* = 140). As 85.8% of the participants reported having enjoyed doing the assignments (*M* = 4.81 ±1.029; *Me* = 5.0), it can be inferred that they perceived critically their learning experience and that a high level of trust was established during the module.

The question "How do you understand feedback?" implied free-form responses. Statements of 78.5% of the respondents contained on average seven words, although they had enough time to ponder on the matter. Meanwhile, 19.3% of the students gave comprehensive answers in the form of complex sentences or short essays, the length of their statements averaging 17–18 words. Thus, a data pool of 1,256 words in 137 responses was available for content analysis.

Students' statements were grouped into two major categories for variable analysis: (1) positive or neutral perceptions of feedback and (2) conceptualizations of feedback in education.

4.2. Perceptions of Feedback

No negative connotations were identified in students' responses. Table 2 shows the results of content analysis with examples of relevant statements.

We suggest that predominantly neutral student perceptions of feedback revealed in this study result from the lack of understanding what feedback is, which in its turn stems from rare contextual usage of the term in the learning environment as well as in students' everyday language.

Table 3. **Examples of statements in four categories identified for content analysis** (*n* = 137).

Category	Exemplifying quotes	Proportion of responses
Response	Output, reaction	44.5%
Value judgment	Opinion, review	21.9%
Engagement in dialogue	Discussion of what has happened — a dialogue	21.9%
Request for help	When the person you are talking to, your tutor or teacher is getting back to you, trying to help you, etc.	11.7%

4.3. Making Sense of Feedback

The 137 student responses to the question "How do you understand feedback?" can be divided into four content categories (Table 3).

Most often, adolescents interpret feedback as variations of "response" (44.5%). Such answers were short, often without specifying the method or objective of response; they can be classified under the behaviorist perspective on feedback.

Meanwhile, 21.9% of students understand feedback as value/critical judgments. Assessment practices of modern Russian schools are often "subtractive", meaning that teachers lower potentially high grades as they detect flaws or mistakes in a student's work. On the one hand, students acquire a solid experience of negative emotions and resistance to low grades; on the other hand, they get used to thinking that any value judgment should first of all contain information on flaws and mistakes in performance.

An equal proportion of students (21.9%) interpret feedback as a tool for a constructive solution of educational objectives. We suggest that adolescents' perceptions of students' and teachers' feedback are largely contingent on their communication experiences, including self-initiated feedback to teachers. Theoretical studies on teacher communication and feedback in the classroom proceed from the dialogue model of feedback [Mapplebeck, Dunlop 2019; Winstone et al. 2017]. Paradoxically though, the present study shows that only a small portion of academically successful adolescents perceive teachers' feedback as a willingness to engage in dialogue and build trust with students, not to make purely "subtractive" judgments.

The "request for help" category of feedback interpretations turns out to be the smallest one, accounting for only 11.7% of all responses. The reason for this could be that in Russian schools, students are usually offered assistance from teachers when they make mistakes or show low performance. Proactive recipience of feedback can be interpreted as learner's autonomy, openness, trust in the source of feedback, and high motivation for improvement. Furthermore, such learners' qualities as confidence and self-efficacy may increase their willing-

Figure 2. **Adolescents' perceptions and conceptualizations of feedback.**
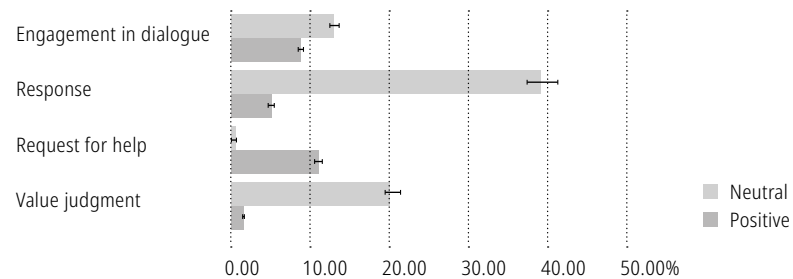
ness to expend effort on engaging with feedback [Winstone et al. 2017].

4.4. Relationship Between Perceptions of Feedback as a Social Phenomenon and as a Learning Tool

SPSS Statistics software package was used to analyze correlations between students' perceptions of feedback (Table 2) and their conceptualizations of feedback in education (Table 3) as two independent variables. Differences were examined using a chi-squared test at the 95% confidence level. Figure 2 shows the distribution of responses (n =137).

Students with positive perceptions of feedback tend to interpret this phenomenon via the categories of "engagement in dialogue" and "request for help" (n =137, χ^2 =53.371, p < 0.001). Given that Russian school students have to deal with psychological barriers in seeking help from teachers, this conceptualization of feedback appears to be an important indicator of students' loyalty and trust. However, motivations behind such requests for help in different educational contexts remain unclear.

4.5. Manifestations of Student Perceptions of Feedback in Real-Life Situations

An overt observation of teams of school students participating in the module revealed three types of typical situations in which learners could use feedback to construct their educational experiences. All of those situations were discussed with tutors at the end of every school day so as to identify problems with module content and make pedagogical decisions.

4.5.1. Responding to Mistakes

This is about mistakes detected by students themselves when processing, entering, or extracting data. Normally, such mistakes occurred through haste or misunderstanding of the instructions. During daily discussions, tutors reported that students in such situations preferred not to seek help and remained passive until the tutor asked them about the reasons and motivations for such behavior. Anxiety about "ruining all the job" was a typical emotional manifestation in such contexts. Sometimes, emotions were so intense that tutors had to calm down the students who were afraid to "mess it all up" if they

went on. Probably out of fear of disapproval or public criticism, adolescents would often opt for the strategy of keeping a low profile and "freezing" as a defensive reaction. On Day 2 of the module, after group-work self-reflection sessions had been organized by tutors for every team, this behavioral response was successfully overcome. In a new pedagogical context, mistakes did not trigger that much anxiety in adolescents anymore.

4.5.2. Seeking Feedback in Process

During the overt observation, there was an obvious increase in students' requests for help and expert judgment in every team. Those requests were manifested in the following:

- Raising a hand to attract the tutor's attention;
- Approaching the tutor in whatever part of the room;
- Contacting the tutor via team chat or social networks.

As adolescents gained experience of communication with the tutor and approached their goals, they exhibited more and more diverse patterns of self-initiated feedback.

4.5.3. Peer Assessment: Lifting the Barriers

Participants receiving critical peer feedback on their interim research project results tended to avoid double-checking peer reviews with the tutor. Motivation for goal adjustment in such students dropped to critically low levels, so that the tutor had to insist on giving them advice or assistance. In discussing such situations (which took place in every team) with the tutors, we emphasized that critical peer feedback had the strongest influence on students working individually, not in pairs or small groups.

5. Conclusion

In Russian education, particularly on the level of secondary school, the term "feedback" is used equally rarely by all participants: teachers, students, and parents. Its usage is also extremely rare in research literature, journalistic articles, and oral speech of adults and school-aged adolescents, especially compared to the English-language discourse. The highest usage of the word "feedback" in Russia has been observed in business and organizational management — and yet it is not even translated, being used as a loan word.

Without any purposeful experience of using feedback as an educational tool, students rely on their intuitive interpretations when answering the questions about how they conceptualize and perceive feedback, "response" being their most popular definition, and "request for help" being the least frequent one.

Adolescents tend to apply either the "behavioral" or the "existential" approach in describing their perceptions of the concept and manifestations of feedback. Quotation marks are necessary here, as perception implies not academic knowledge of the definition of feedback

but an intuitive attachment of meaning to this word by learners based on their personal experiences and social horizons. Under the "behaviorist" perspective, feedback is perceived straightforwardly as an obligatory (external) stimulus and a person's response to it. The more complicated "existential" approach interprets feedback as a combination of various tools for dialogue, support, engaged communication, relationship development, and direct or indirect request for evaluation and/or assistance.

Overt observation and analysis of cases involving adolescents with high levels of academic motivation and learning-to-learn skills revealed a few patterns of using feedback in education. The conclusions drawn below are preliminary and will be elaborated as a result of further research on feedback in secondary education.

In situations of data processing mistakes or hardware/software usage failures, a typical behavioral pattern was to ignore feedback opportunities for seeking help from the tutor. Not infrequently, students would stop doing their work and passively wait for the tutor to ask them about the problem.

At the initial stage, one or more adolescents in a team would sometimes vigorously defend their judgments or visions of the team strategy. This relationship scenario was defined as "excessive feedback for emotional domination". Such behavioral patterns were mostly demonstrated by clear intellectual leaders who had probably already acted in this role before. Those patterns changed at the following stages of team work in the module, the leaders adopting more constructive positions in trying to convey their viewpoints to other team members.

On the first day of the module, there were only isolated instances of request for an expert opinion on the project. However, such requests were growing more and more numerous during the following days, and feedback initiated by students often evolved into detailed discussions of specific actions in the learning process. By the end of the module, adolescents' perceptions of feedback exchange between tutors and students had shifted from avoidance to initiation.

An extremely small proportion of school students expressed their feelings and emotions in situations of feedback. This could be due to the lack of relevant experience during the previous years of schooling. In addition, a lot of students probably do not regard emotions and impressions from obtaining new knowledge as a significant educational outcome.

The overall conclusion of this study is that school students mostly understand the range of problems associated with feedback, yet they perceive feedback itself as a tool for teaching in the first place, not as a tool for learning.

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Assessment of School Student Achievement in Traditional vs Developmental Education: Psychological and Pedagogical Analysis

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Abstract   This study is a theoretical analysis of two student assessment systems that are most common in Russian schools: traditional performance grading and evaluation within the developmental education paradigm proposed by Daniil Elkonin and Vasily Davydov, which implies a set of assessment criteria for different types of achievement, self-assessment, peer assessment, and no focus on assessment results or comparisons.

Elementary school students enrolled in traditional and developmental education systems became participants in two empirical studies. Projective techniques (Three Wishes and Three Questions to a Wise Man) were used to measure grades' related anxiety among third- to fourth-graders in traditional (TE) and developmental classes (DE). Content analysis of children's spontaneous wishes and questions to a wise man (N(TE) = 327, N(DE) = 153) shows that students in traditional classes are more anxious about their grades than those in developmental classes. In addition, only children in the traditional education system focus on formal assessment at the expense of mastery-based learning outcomes.

The second study measured the relationship between grades and academic perseverance, motivation, and self-concept (N(TE) = 309, N(DE) = 78). The value and role of grades may vary in the structure of intrinsic and extrinsic academic motivation and perseverance, as their motivational function differs between the two systems of student assessment. Findings support the idea of organizing school assessments in the logic of developmental education, which is more differentiated, mastery-oriented, and objective. Furthermore, it is originally implemented in cooperation with children, supports the values of enquiry, initiative, independent thinking, and collective discussion, and is less focused on external control and diligence.

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Emerging Research University in Africa: Divergent Views on Relevance and Experiences

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Received in
November 2020

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Abstract

This article provides an analytical literature review on the emerging research university in Africa. Specifically, we advance a deliberation of whether a research university is relevant and various experiences that denote its emergence. Notably, there is a global acknowledgement of universities as major centres for knowledge production. However, commitment to teaching with a minimum focus on research function seems to be a noticeable feature of most African universities. In the last 15 years, some African universities have indicated aspirations and efforts to become research universities. Exploring both theoretical and empirical studies, while reflecting on their rhetoric and real perspectives, we establish that there are divergent views on relevance and experiences of the emergence of a research university in Africa. Relating to the backdrop of this study, which is the link between knowledge and economic advancement, we discuss these divergent views. To date, few studies have provided an in-depth understanding of the emerging research universities in Africa. We advance a wider outlook on African higher education initiatives and directions on constructing research universities and suggest novel avenues for future research.

1. Introduction

In this paper, we review literature exploring emerging research university in Africa with special deliberation on their relevance and experiences. The backdrop of this exploration is the contemporary conditions of the global economy place knowledge as important productive force [Evoh, Mugimu, Chavula 2013; Kaur, Singh 2016; Khalil, Marouf 2017; WBI 2009]. These conditions in the global economy are rooted

in the knowledge economy notion meaning production and services base on knowledge-intensive activities, and the key is a reliance on intellectual capabilities than on physical inputs or natural resources [Powell, Snellman 2004].

Therefore, there is an emergence of higher education reforms globally to strengthen research as a result of expectations on universities as core knowledge producers in society to play a crucial role in economic development [Altbach 2011; Kahsay 2017; Marozau, Guerrero 2016; Salmi 2003].

A research university is a concept that a Prussian philosopher Wilhelm von Humboldt originated in the 19th century in Germany, describing universities that closely intertwine research and education in one place [Morgan 2011]. Altbach [2009; 2013], professor of higher education and former director of the Centre for International Higher Education (CIHE) at Boston College, argues that research universities are at both the centre of the global knowledge economy and the pinnacle of the national higher education system.

Since the establishment of the Humboldtian ideal in the early 19th century, many institutions have embraced the concept of linking science and research to national goals of modernisation [Mohrman, Ma, Baker 2008]. Notably, the world has changed since von Humboldt's time, advanced nations seem to be moving away from the manufacturing-based economies they esteemed throughout the 20th century, towards knowledge-based economies [Nicolaides 2012].

A research university is seemingly a transforming notion, meaning that different nations adapted it uniquely to suit their contexts. Literature present how universities evolved into research universities in different parts of the world for example, [Clark 1993; Altbach, Balán 2007; Altbach, Salmi 2011].

Research universities seemingly being the centre of the global knowledge economy, its analysis appears to ignore developing and middle-income countries [Altbach, Balán 2007]. Conversely, there is the emergence of research universities in recent studies from different parts of the world including developing and middle-income nations for example [Shin, Lee 2015; Zohreh, Nadergholi, Ali 2011; Rungfamai 2017; Ramli et al. 2013; Hladchnko, de Boer, Westerheijden 2016; Huang 2015]

Focusing on the African context, the culture of African universities after independence did not support research as most universities started as teaching institutions often allied with a metropolitan university of colonial power [Zeelen 2012]. Post-independence African universities were expected to be key producers of the human resource of their countries to address the critical shortages and gross underdevelopment of universities under colonialism after the departure of colonial administrators and professionals [Cloete et al. 2011].

Despite the arguments that African universities continue to be teaching universities, the last decade depicts that some African uni-

versities are trying to achieve research university status [Altbach 2013; Teferra 2016; Bunting, Cloete, Schalkwyk 2017; Cloete, Bunting, Schalkwyk 2018; MacGregor 2015; Juma 2016; Kahsay 2017].

While research universities have been widely acknowledged for their potential, research about them in Africa is still in its infancy. Additionally, studies on the evolvement of research universities and its perceived relation to the knowledge economy, the focus is largely on advanced nations and emerging economies from Asia and Latin America, with few focusing on Africa [Asongu 2015; Teferra 2017].

The focus of this article is stirred by some universities in Africa indicating aspirations to become research universities [Altbach 2009]. Therefore, we explore two main questions in this article. Firstly, what is the relevance of research universities in the African context? Secondly, what are the experiences denoting the emergence of research universities in Africa? We begin by describing the review methods and provide a brief theoretical background on a notion of a research university.

2. Search Methods   A broad base of literature has emerged on the topic of a research university and its role to economic development, both from African and non-African context and scholars. To ensure that our literature review covered a wide range of sources incorporating both local and international perspectives, we started the search in 2017 from different databases. We searched EbscoHost Web, ERIC, and SCOPUS, African journals online (AJOL), and the wider Internet with Google Scholar. We conducted all searches using a mix of the keywords [Ridley 2012]. The keywords included African universities, transition, research-intensive, knowledge production, knowledge economy, knowledge production in Africa, knowledge economy in Africa, higher education transformation in Africa, research universities, research-intensive universities, African universities research capacity, African universities research performance and research universities in Africa.

We used the keywords interchangeably and found 144 sources related to the topic. By reviewing the abstracts of these sources, we remained with 94 related articles by eliminating irrelevant literature based on exclusion criteria, meaning studies with very broad coverage or did not relate to research universities or African universities transition to research universities. Out of 94, we reviewed 77 sources that seemed relevant for our topic [Jesson, Matheson, Lacey 2011].

We aim to explore the relevance and experiences of the emerging research university. Through a process of, reading, summarising and reviewing, divergent views emerged around the topic of relevance and experiences emerging research universities in Africa, and it was through these that the ultimate format of the review began to take shape. We discuss these views in turn and suggest areas for further research.

3. Brief Theoretical Background
3.1. Research University Definition

Altbach [2007; 2009; 2011; 2013] defines a research university as an academic institution dedicated to the creation and dissemination of knowledge in an array of disciplines and fields; it has the suitable laboratories, libraries, and other infrastructures that lead to teaching and research of the excellent levels. A research university priorities discovery of new knowledge and the production of PhDs in a wide range of disciplines [Mohrman, Ma, Baker 2008].

3.2. Foundations of a Contemporary Research University

Since their origins in medieval Europe, universities were concerned with the transmission, preservation, and interpretation of knowledge, not primarily with the creation of new knowledge [Altbach 2007]. For centuries, universities were known to play the role of teaching institutions but later in the 19th century, German universities began to bring in scholars for research activities to produce new knowledge. Consequently, American universities started to include 'research universities', following the German model [Atkinson, Blanpied 2008].

The trend of a research university came about in the American higher education system to fulfil the government's needs for new scientific knowledge and the production of well-trained human resource in the areas of health, economy and the military [Duderstadt 2004]. This trend together with establishment of partnership between the government and universities was later followed by other countries due to globalisation and the rise of the market-driven economy [Ibrahim, Mansor, Amin 2012].

The popularity of the research-oriented university is associated with the success of American university system models. While this model is now vastly imitated throughout the world, it is very specific to America [Castells 2017]. Mohrman, Ma, and Baker [2018] describe what they refer to as an emerging global model of a research university. They also argue that many of the features of this model are rooted in the American experience and is embraced globally.

America was influenced by the Germany model [Rhoads 2018], as a result, the German university model still pervades some elite American institutions today [Baker, Lenhardt 2008]. However, the model of American universities is too diverse to be described as a product of a model imported from a single country [Ash 2006]. The new US research university model has proven to be a huge success and other countries started to duplicate the graduate school model [Ramli et al. 2013].

3.3. Defining Attributes of a Research University

Globally research universities seem to possess the following key features. The features we present are not all-inclusive but are those present across extant studies.

First, most research universities are public institutions with few exceptions such as private research universities in the United States and other countries such as Japan and Chile [Altbach 2009]. Second, research universities engage in intensive knowledge production and wide dissemination [Mohrman et al. 2008; Altbach 2007]. Third, re-

search universities produce new Ph. Ds. with high quality [Altbach 2009; Mohrman et al. 2008; Chirikov 2013].

Also, research universities possess high-quality faculty meaning staff with PhD [Altbach 2007; 2009; 2011]. Furthermore, research universities have appropriate facilities and infrastructure such as laboratories and libraries [Altbach 2009, 2011]. Most importantly research universities have Sufficient and diversified research funding [Altbach 2009; 2011; Lavalle, Nicolas 2017].

Collaboration with government, industry and other universities globally is another attribute of research universities [Rhoads 2011; LERU, AAU, G08, C9 2013]. Autonomy and academic freedom are important requirement for research universities to shape their programs and practices [Altbach 2011; 2013; LERU, AAU, G08, C9 2013].

4. Findings and Discussion

In our review, we focus on the debates that are informing the relevance of research universities in Africa and experiences denoting its emergence in the global knowledge economy context.

4.1. Africa and the Knowledge Economy

In the introduction of this paper, we highlight the link between knowledge and economic advancement and consequently the role of universities in the knowledge economy. Therefore, it is worthwhile to feature the position of Africa in the knowledge economy. We do not discuss the knowledge economy in this paper as it is not our focus. For the definitions, dimensions, and different issues on the knowledge economy see [Chen, Dahlam 2005; Kaur, Singh 2016; Olssen, Peters 2005; Powell, Snellman 2004; World Bank 2008a; World Bank 2008b].

Comparing to other regions in the world Africa lags regarding its knowledge economy [Asongu, Kuada 2020]. This is associated with numerous factors one being the knowledge-application gap. Africa has a minimal emphasis on research and development activities in general and cannot convert research and development activities into manufactured products [Evoh et al. 2013]. There is weak institutional framework for an adequate flow of knowledge between scientific research and technological applications, as well as upright information flow between knowledge users and researchers [Andrés, Asongu, Amavilah 2015].

For other challenges hindering African nations towards knowledge economy see [Asongu, Kuada 2020; Kolo 2009; Oluwatobi et al. 2020]. Amidst different challenges, the experiences of some developing nations such as India, China, and South Korea shows that it is possible for Africa to leapfrog and catch up with developed economies by using knowledge as a driver for development [Oluwatobi et al. 2020]. In our view this can be bolstered by simultaneously revising the structure of African economies, which currently human capital only play a complementary role while physical capital driving long term growth [African Development Bank Group 2020].

4.2. The Relevance of Research Universities to African National Economic Advancement

For large part knowledge for the economy is an accepted rationale behind the pursuit of research university globally. But most nations in Africa are still dependent on the agricultural and industrial economy and have an elusive connection between knowledge and economy. Then why is research university relevant in Africa? We review extant studies and various documents to address this question

In the early 2000s, international organisations like the World Bank (WB) and regional agencies such as the African Union (AU) and the African Development Bank (AfDB) championed the agenda of revitalising African higher education specifically to align the system with the economic development needs and strategies of national governments [Molla, Cuthbert 2016]. Noting that the WB is one of the main drivers of knowledge economy initiatives in the world, through education, resource sharing, and its online Knowledge Assessment Methodology (KAM) tools [Weber 2011].

Rapid changes in innovation and technology and increasing demand of the labour market for skilled human resource in a global knowledge economy deem investing in African universities critical for developing an inclusive and diverse knowledge society that can progress research, innovation, and creativity to quicken development [Waklaga 2015]. Anyanwu [2012] also concedes that this is the age of incredible pace of knowledge creation, sharing and application in all parts of the economy and society therefore if any nation fails to place itself properly in this global, knowledge-based market place will be unable to compete. With the world moving increasingly toward a knowledge economy, higher education in Africa can help the continent's economies keep up or catch up with advanced societies [Bloom et al. 2014].

United Nations Economic Commission for Africa [UNECA 2012] points out that agriculture and natural resources attributed to the impressive growth of African economies in the past decade. However, the commission contends that Africa's development potential can be set free with the maintenance and development of its intellectual capital. Blankley and Booyens [2010] claim that for developing countries to build their potential as knowledge economies, investments in human capital and a highly skilled labour force, as well as infrastructure for high-technology industries, are essential.

Extant studies depict increased agreement to capitalise on the fact that knowledge is crucial for African economic development [Atuahene 2011]. Pinheiro and Pillay [2016] provide reasons why developing countries need to regard the importance of higher education for national and regional economic development. One is education and training, and research functions enable economic growth and widen participation in the knowledge-based economy. Second, developing countries should not only base their economies through the skills provided by primary and secondary education alone; but also, through skills provided by the higher education system which can raise economic growth rates more quickly.

Despite various challenges facing research activity in African universities [Evoh, Mugimu, Chavula 2013; Fussy 2018; Njuguna, Itegi 2013; Pillay 2015; Salmi 2017; Wangenge-Ouma, Lutomiah, Langa 2015], there is the acknowledgement that Africa's growth needs to be driven by knowledge in the context of growing knowledge-based economies on the continent [Kamara, Bousrih, Nyende 2007].

The empirical analysis of the relationship between the level of knowledge and economic growth across developing economies including sub-Saharan Africa establish that although economic growth is determined by various factors; better educational institutes and more research and development leads to the positive economic growth [Kaur, Singh 2016]. African higher education can assist countries with technological catch-up and thus improve the potential for faster growth [Bloom et al. 2014].

Altbach [2009] argues for the importance of research universities in developing and middle-income countries postulating that knowledge production and dissemination are not to remain a developed nation' domain, convincing that all the regions of the world need a role in the knowledge network. Therefore, identifying, recognising, strengthening, and investing in research universities in Africa is vital and will provide a suitable base to develop Africa knowledge economy [Fonn et al. 2018]. As the post-2015, development agenda of Africa depends on a feasible cost effect and an efficient higher education system that results in relevant and sufficient research output [Pillay 2015].

There is an assumption that educational institutions could support knowledge-driven economic growth and poverty reduction [Evoh, Mugimu, Chavula 2013]. However, evidence to support these claims in African context seems flaccid as African universities and their national governments make claims about their status as pre-eminent research universities on the continent; but the reality on the ground is both uneven and at times even contrary to those claims [Cloete, Bunting, Schalkwyk 2018].

4.3. Research Universities and Africa´s Economic Growth Critic

There are contrary arguments to the relevance of research universities to economic development in Africa and global economic engagement. The few indices that try to measure knowledge economies highlights Africa among other developing countries poor performance in the knowledge economy [Ojanperä, Straumann, Zook 2017; Kaur, Singh 2016].

In evaluating the relationship between universities and development in Africa, Cloete et al. [2011] argue that there no clarity and agreement about a development model and the role of HE in development, at both national and university levels. They add that, there is, however, an increasing awareness, particularly at the government level, of the importance of universities in the global context of the knowledge economy.

Kahsay [2017] portraying the vitality of university research in economic development in Ethiopian context establishes that the contribu-

tion of the Addis Ababa University enhancing the economic growth of the country through research and innovation is minimal due to challenges such as insufficient research funding. Juma [2016], an African scholar and internationally recognised authority in the application of science and technology to sustainable development worldwide, claims that the current level of investment in higher technical training and research is low.

Evoh, Mugimu and Chavula [2013] conducted a study to assess whether the African higher education system is ready to contribute to the competitiveness in the knowledge economy. Using institutions of higher education in Kenya and Uganda as case studies, they contend that Africa is not well equipped to produce knowledge for the advancement of African economies.

Zeelen [2012] discusses the current dynamics at African universities concerning the role of research drawing experiences from some universities in South Africa, Uganda, Tanzania, Mozambique, and Ghana. Highlighting the common functional orientation towards excellence in teaching, research, and community outreach, she points out that African universities are predominantly teaching institutions with weak connections to the labour market.

Similarly, Sall and Oanda [2014] two African scholars at the Council for the Development of Social Science Research in Africa (CODESRIA) argue that despite many policy initiatives to revitalise higher education and strengthen its critical role in the continent's development, there is still a question on its impact. Research in Africa is still characterised by low technical skills and competencies of the faculty, financial constraints and brain drain contributing to ill-prepared research graduates and poor research culture [Njuguna, Itegi, 2013].

Fussy [2018] exploring the Tanzanian context argues that development of research in universities face various barriers comprising a fragmented connection among key research stakeholders, insufficient research funding, lack of reading and writing culture and heavy teaching and administrative workload. He argues that these barriers present a weakening impact on the production, dissemination and utilisation of research-based knowledge and skilled researchers, which could subsequently foster the country's socio-economic development.

There are differing views regarding the vitality of the research role of universities and its relevance to economic development. African universities seem to be at the crossroads, therefore more empirical studies are required to build on current debates to shed more light to this paradox.

4.4. Experiences Denoting the Emergence of a Research University in Africa

The prevalent university education in Africa is in essence, a postcolonial occurrence except for North Africa, which has a different history [Sawyer 2004]. However, after independence universities in Africa have been taking different shapes and serving different purposes, as Aina [2010] presents the experience of reforms in African higher edu-

cation linked with the economic and political crises of the 1970s and 1980s that headed them.

Since the end of the 1990s, higher education in Africa regained interest among donors [Assie-Lumumba 2006]. Therefore, the agenda of revitalising African higher education to serve economic needs and government strategies emerged in the 2000s, driven mainly by the WB and AU [Molla, Cuthbert 2016].

Various discourses and the role played by universities at different times in history are accounted for in various studies [Aina 2009; Cloete, Bunting, Schalkwyk 2018; Woldegiorgis, Doevenspeck 2013]. With examples we analyse the continental, regional and national initiatives that have been geared to improve the research role of universities in Africa hence denoting emergence of research universities in the continent.

Studies we review portray conflicting experiences about the emergence of research universities. One side portrays the optimistic stance that African universities are strengthening their research role. While some studies argue otherwise; that African universities are far away from being research universities. We present both sides of arguments discussing various continental, regional, and national initiatives reflect the experiences of African universities and its research role.

4.4.1. Continental Initiatives

In 2005, the African Union Commission (AUC) and the secretariat of the New Partnership for Africa's Development (NEPAD), currently renamed the African Union Development Agency (AUDA) launched the African Science and Technology Consolidated Plan of Action. Articulating the use of science and technology for the socio-economic transformation of the continent and its integration into the world economy, the plan emphasized the development of an African system of research and technological innovation [AU2005].

The AU also put forward the Agenda 2063 in 2015, which in its first aspiration highlights the intention of Africa to develop its human capital through sustained investments at various levels of education including sustained investments in higher education, science, technology, research and innovation. It also aspires to expand access to post-graduate education and ensure world-class infrastructure for learning and research and support scientific reforms that underpin the transformation of the continent [AUC2014].

Another initiative is the AU's 10-year Science, Technology, and Innovation in Africa Strategy 2024 (STISA-2024) of 2014, which aims to respond to the need of transforming Africa into a Knowledge-based and Innovation-led society [STISA 2014]. Discussing how to forge strategic linkages economic transformation, Juma [2016] argues that the achievement of the objectives of STISA-2024 will entail aligning education, research, and innovation with long-term socio-economic objectives.

Molla and Cuthbert [2016] discuss some of the recent higher education development initiatives in the continent, which they construe as

a mark of noteworthy re-imagining of Africa as a knowledge economy. We only highlight two of them, one is the AU's establishment of the Pan African University (PAU) in 2010, with the aim of training master's and PhD students to revitalise higher education in Africa. The second initiative is the World Bank's Africa Higher Education Centres of Excellence Project in 2014. Financed by the WB, this project funds 19 university-based centres of excellence in West and Central Africa and emphasise the role of research in providing African nations with knowledge solutions to enhance development.

There are also continental initiatives run by independent non-governmental organisations, for example, the Council for the Development of Social Science Research in Africa (CODESRIA), with headquarter in Dakar, Senegal. It was established in 1973 as an independent pan-African research organisation to focus on social sciences research in Africa. Its objectives among others are to promote and facilitate research and knowledge production in Africa using a holistic, multi-disciplinary approach [CODESRIA 2014].

4.4.2. Regional Initiatives

One example of the regional initiatives is the African Research Universities Alliance (ARUA) established in 2015 to help a subset of institutions evolve into leading research universities. This alliance advocate for strengthening research and postgraduate training in higher education. With the key intention of addressing the development priorities of the African continent, the primary focus of ARUA is to build indigenous research excellence to assert Africa as a powerful global force [MacGregor 2015].

This initiative is an illustration of similar regional initiatives to fostering research in Africa. They are challenges underway, but they demonstrate the efforts to strengthen research in Africa post-independence and mostly in the last decades. They are also devoted to improving the knowledge production by cooperating with faculties of African universities in respective member countries. Lastly, they boost the number of staff with PhDs in African universities in the respective member countries of programmes.

4.4.3. National Initiatives

This section explores efforts at the national level. Research universities in most countries get their financial support largely from public sources [Altbach 2011; Atuahene 2011]. Also, through the allocation of public resources from national councils for science and technology higher education institutions and research centres on the continent have made steps in investing in knowledge production processes [Oanda, Sall 2016].

Using the ARUA member countries as examples, we present the government funding towards higher education from 2012 to 2015 using data from the United Nations Educational, Scientific, and Cultural Organisation (UNESCO). We present only 4 of the 16 ARUA member countries whose data were available by February 2019, from 2012

Table 1. **Government Expenditure on Tertiary Education as a Percentage of Gross Domestic Product** (%)

Country	2012	2013	2014	2015
Ethiopia	2.61	1.92	2.11	2.27
Kenya	0.97	0.77	0.72	0.69
Senegal	1.61	2.43	2.13	2.28
South Africa	0.76	0.75	0.74	0.75

Source: Data extracted from the UNESCO Institute for Statistics (UIS), April 9, 2019.

to 2015. These countries exemplify national initiatives to promote research because they are flagship universities that indicate aspirations to become research-intensive [MacGregor 2015]. We view government funding towards higher education as the national hallmark for strengthening research in African universities.

Research universities cannot thrive based on inadequate funding or severe budgetary fluctuation over time [Altbach 2011]. Table 1 indicates the fluctuation of government expenditure on higher education per Gross Domestic Product (GDP) from 2012 to 2015. Ethiopia and Senegal, despite the fluctuation, maintain their expenditure on higher education above 1.5% of GDP, whilst South Africa and Kenya remain under 1%. One of the agreements of African Science and Technology Consolidated Plan of Action is for African countries to allocate at least one per cent of their gross GDP to research and development by 2020 [AU2005].

However, the trend in Table 1 connotes that the allocation of 1% of GDP to research and development remains rhetorical. We assume this as in Africa University seems to be the only knowledge institution, and hardly any knowledge is produced outside of the university [Cloete, Maassen, Bailey 2015]. So, if less than 1% is spent on overall higher education, research operations inclusive, then it means to research and development alone to get at least 1% from the government is difficult.

4.5. Contrary Views on Emerging Research Universities in Africa

Discussing the importance of postsecondary education Salmi [2017] argues that the research output of African universities is lagging intensely behind that of OECD economies demonstrating the low performance of their research universities. He argues that this situation reflects the absence of ambitious science and technology development strategies in most developing countries, limited funding for research, and the lack of critical mass in the research community.

Wangenge-Ouma, Lutomiah, and Langa [2015] claim that despite an exponential increase in the number of students in African higher education in the past two decades, the research component of the

Table 2. **Shanghai (ARWU) rankings for African universities (2018)**

Region	Top 20	Top 100	Top 200	Top 300	Top 400	Top 500	500–1000
Americas	16	50	79	110	142	167	113
Europe	4	34	80	120	157	195	171
Asia/Oceania	-	16	41	69	99	133	205
Africa's	-	-	-	1	2	5	11
Total	20	100	200	300	400	500	500

Source: Data extracted from the Shanghai Academic Ranking of World Universities (ARWU), April 9, 2019

university has rarely changed. They argue that African universities are still teaching-intensive due to the structural milieu, which portrays inadequate conditions and incentives to drive academics to engage in a more productive knowledge production culture.

Although several African traditional universities are seeking to improve their quality to achieve research university status, with assistance from external funders, their process is behind levels of academic development compared to those in the other continents such as Europe and America [Altbach 2013]. The recent statistics of the performance of African universities in research output reflect this.

In another study, Cloete et al. [2011] argue that research production at the eight African universities that they explored is not strong enough to enable them to build on their traditional undergraduate teaching roles and make a sustainable, comprehensive contribution to development through new knowledge production. They add that these universities lack sufficient funds for staff to engage in research and the incentive regimes do not support knowledge production.

These arguments portray that there is a gap between aspirations, goals and objectives of African universities concerning research performance and the realities of their performance. There is a positive trajectory of research performance exhibited by some African universities, but largely they remain weak in research output.

5. Conclusion Knowledge is associated to economic advancement in different parts of the world. This is truer in most advanced nations but not the case in most developing nations, particularly Africa. However, there is a promise of leapfrogging and catching up with advanced economies as experience shows in some developing nations such as India and South Korea.

With the promise of leapfrogging and catching up there is a need for a holistic approach towards building research universities in Africa, with a goal for research universities to contribute to both the so-

cial and economic development of nations. Developing strong relations between research universities, government and industries is critical to reduce the knowledge-application gap and accelerate innovation.

We propose further investigation of the contextual understanding of emerging research universities in Africa with robust methodologies. To date, few studies have provided an in-depth understanding of contextual realities related to the emerging research universities in Africa. As the literature indicates, although there are similar features to research universities globally, differences exist in how they emerge in different nations. Moreover, studies with empirical evidence to explore the conceptual understanding of the expected role of African universities and its relevance to the realities of the continent is fundamental.

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The Interplay of Law, Economics and Culture in the Modern Era and Its Influence on the Development Prospects of Educational Institutions

The Screeching Wheels of Social Machines

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Received in
October 2020

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Abstract

This article is a response to Georgy Lyubarsky's profound and farsighted speculations about the functioning of educational institutions in the new social context, where conventional approaches cannot be applied anymore. In a situation where mass media take over the school's function of producing meanings for the public, it becomes impossible to speak about the "majority" and, consequently, about any classical culture common for that majority. Meanwhile, it appears a good idea to create a new mythology (perhaps, a university mythology) that would allow elaborating the theory of general education, first of all in universities, at a new level. If the concepts proposed are considered as viable, development models should also be proposed for institutions of secondary education, where it would make sense to use traditional western and pre-Soviet models of school organization, in much the same way that investors in a recession turn to conservative assets.