

# Lessons from the Pandemic: Analyzing the Experience of Distant Learning in Secondary Schools

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As a result of the COVID-19 pandemic, educational institutions switched to distance learning in March 2020. The study focuses on how the sudden transition affected the level of teachers' anxiety and professional burnout. A total of 282 teachers from general education schools participated in the study. The results showed that the teachers successfully coped with the transition: the level of anxiety and burnout was similar to the results of previous studies of teachers before the pandemic. A significant role in the adaptation of teachers to the urgent transition to online education was played by their attitudes. In particular, those who adapted to the change and were able to get used to the distance format of work showed the lowest levels of anxiety compared with other groups who resisted the change and experienced difficulties. An important condition for successful distance learning, according to teachers, is the detailed regulation of infrastructural aspects of the educational process by the administration. The article discusses the next steps to improve the quality of distance learning based on experience.

**Keywords:** activity-related experience, quality of motivation, self-determination theory, intrinsic motivation, extrinsic motivation, academic motivation.

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## Уроки пандемии: анализ опыта перехода на онлайн-преподавание в средней школе

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Представлены материалы работы, посвященной тому, как внезапный переход образовательных учреждений на дистанционное обучение, вызванный COVID-19, отразился на уровне тревожности и профессионального выгорания педагогов. В исследовании приняли участие 282 педагога общеобразовательных школ. Полученные с помощью опроса результаты показали, что педагоги успешно справились с произошедшим переходом: уровень тревожности и выгорания был схожим с результатами предыдущих исследований педагогов, проводимых до пандемии. По мнению авторов, значимую роль в адаптации педагогов в этой ситуации сыграло их отношение к экстремному переходу на онлайн-формат. В частности, те, кто адаптировались к изменениям и смогли привыкнуть к дистанци-

онному формату работы, продемонстрировали самый низкий уровень тревожности по сравнению с другими группами, которые сопротивлялись переменам и испытывали трудности. Установлено, что, по мнению педагогов, важным условием успешного дистанционного обучения является детальная регуляция инфраструктурных аспектов образовательного процесса администрацией. Обсуждаются дальнейшие шаги к повышению качества дистанционного обучения на основе полученного в проведенном исследовании опыта.

**Ключевые слова:** дистанционное обучение, преподавание, тревожность, эмоциональное выгорание, пандемия COVID-19.

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## Introduction

In March 2020, educational institutions in many countries, including Russia, switched over to remote work due to the COVID-19 pandemic. Unlike the global epidemics of past centuries, this epidemic happened in the era of onrush of technology, which made it possible to keep the educational process going even during the period of overall isolation and quarantines. By the time of the pandemic, new technologies had already begun to be integrated everywhere into the education system. By 2020, many teachers have already completed refresher courses in PC literacy: according to the TALIS-2018 study, 95% of young teachers who received education in the last five years and 70% of teachers with longer experience shared that the use of digital technologies was included in their training program (for example, federal project — “HR for the Digital Economy”<sup>1</sup>); educational institutions are implementing the programs to equip schools with mod-

ern equipment for educational events (national project — “Education”); electronic journals and other electronic resources are incorporated [9].

Despite this, forced and rapid change of the form from traditional to remote at the beginning of the pandemic led to load increase of teachers. The use of digital technologies has led to a range of challenges for teachers, including the installation of new software; connection of peripheral devices, use of various digital platforms to conduct classes, etc. [27].

According to some studies, the situation of urgent switch over to a remote form was associated with a deterioration in mental state of teachers [10]. For example, a study by Sokal, Trudel and Babb (2020) showed that, on average, teachers demonstrated increased emotional exhaustion and anxiety in the first three months of the pandemic [28]. Such feelings, accompanied by self-doubt and anxiety about possible failures, are defined as anxiety in the scientific litera-

<sup>1</sup> <https://digital.gov.ru/ru/activity/directions/866/#section-faq>

ture [29]. Continuous anxiety may trigger not only anxiety, but also professional burnout, which is characterized by depersonalization (negative attitude towards colleagues and students), reduction of personal achievements (negative professional self-perception) and emotional exhaustion (feeling of persistent tiredness and depletion of emotional resources) [2].

Another study conducted in April 2020 was focused on mental condition of 2,250 participants from the UK during the e-learning period [14]. The researchers identified three groups that differ in their attitudes towards changes associated with the pandemic: “accepting change” (48% of participants), “experiencing difficulties” (43% of participants) and “resisting to change” (9% of participants). The “accepting change” group demonstrated the lowest levels of anxiety and depression. The participants in this group were the least worried that they might lose their jobs and experience financial difficulties, and most easily adjusted to the online form. The “experiencing difficulties” group demonstrated the highest level of anxiety, but in all other indicators: adjustment to the online form, fear of losing a job and financial difficulties — was between the other two groups. The values of anxiety in the “resisting to change” group turned out to be average, however, the participants in this group were the worst adapting to the online form and were more confident than the others that they would lose their jobs and experience financial difficulties.

Not all studies have pointed to the negative effects of the transition. For example, a study by Talidong and Toquero (2020) demonstrated that the teachers used e-learning opportunities had no feeling of increased anxiety. The study showed that teachers began to communicate more actively with the professional community and share experience with colleagues [31]. Moreover, the studies have shown that

various aspects of e-learning can have both positive and negative effects, depending on the support provided to the teachers and other conditions.

Thus far, several works have been published about the effect of digitalization on the education system in the Russian Federation (see, for example, [1; 5; 6]).

In a recent qualitative study involving Russian teachers, it was shown that support from the school administration, a well-balanced workload, match between work and private life are the core factors in stress control during e-learning [4]. However, such jobs are rare and rarely consider the transition to e-form in a comprehensive manner.

The study was focused on establishing the characteristics of mental condition of teachers in the Russian Federation during the transition to e-learning during the COVID-19 pandemic. The following tasks are solved in the work:

- analyze the level of anxiety and burnout of secondary school teachers during the transition to e-learning form;
- select groups based on the experience of transition of teachers to e-learning and study the level of burnout and anxiety in these groups;
- study teachers’ assessment of the infrastructure available to them, resource provision and administrative support after the transition;
- analyze the possibilities of using the acquired experience of teachers to improve education in the future.

### **Methods of Study, Participants and Procedure**

The study involved 282 teachers from Russia aged 25—55 years (262 women, aged 46—55 years; 20 men, aged 36—45 years), of which 195 participants were teachers of general education schools in the town of Tobolsk (185 women aged 46—55; 10 men aged 36—45) and

87 participants of the Next-Pedagog<sup>2</sup> program (77 women and 10 men aged 36—45) from the towns of Tobolsk, Svo-bodny and Blagoveshchensk. The two groups of participants did not differ significantly in age.

The study was approved by the ethical committee of Tomsk State University and was conducted online in April—May 2020. All participants of the study were engaged by the organizers of the Next-Pedagog program. The participants were sent the links to complete the inquiry, which they could fill out at any time. Participation in the study was voluntary and participants were told that they could refuse to participate in it at any time.

The data were analyzed using R-Studio 3.0.1 software. The descriptive statistics was carried out by evaluating the distribution of data in the Gaussian distribution; in addition, Pearson's correlation test, Fisher's one-way analysis of variance and Ward's cluster analysis were used in the work.

### **Tools**

The online inquiry included the generalized anxiety disorder questionnaire [30], professional burnout questionnaire [2; 23]; questionnaire about the experience of transition to e-learning, developed as part of this study; and demographic characteristics (gender and age). The choice of instruments is because these methods have demonstrated high internal consistency and convergent validity. See more detailed description of the methods and their psychometric characteristics in Annex 1.1

#### **Generalized Anxiety Disorder Questionnaire**

The questionnaire is designed to assess the symptoms of generalized anxiety

disorder. The participants are asked to give score to 7 statements about how often over the past 2 weeks they were disturbed by such feelings as anxiety and fear, how often they fail to relax and stop worrying.

#### **Professional Burnout Level Assessment Questionnaire**

The burnout questionnaire is an adaptation of the questionnaire based on the model of K. Maslach and S. Jackson into Russian [2; 23]. The questionnaire contains 22 statements, which are divided into three subscales: emotional exhaustion, depersonalization and personal achievement. The participants are asked to give points to the statements on a 7-point scale (from 0 — “never” to 6 — “always”). The points scored for each of the subscales are interpreted based on the norms and threshold values to determine the level of professional burnout. The questionnaire was proposed to the participants at the very end of the study and was filled out voluntarily. See the detailed research methods in Annex 1.1.

#### **Questionnaire of Experience of Transition to E-learning**

The questions were phrased by a review group of researchers and teachers from several schools and universities in Russia. The questionnaire went through several stages of piloting. The final list of questions included 5 categories: preparation for classes, hardware, characteristics of the e-learning form, support from the institution, positive / negative aspects, attitude to change. Examples of questions for each category and their total number are available in Annex 1.2.

<sup>2</sup> Next-Pedagog program – e-learning qualification upgrade program of the SIBUR holding developed by Tobolsk pedagogical institute named after D.I. Mendeleev.

## Data Analysis and Study Results

### Descriptive Statistics and Correlations

The results of descriptive statistics showed that the data are normally distributed (kurtosis and skewness do not exceed +/-2 values) [19]. Descriptive statistics: 1) Generalized Anxiety Disorder Questionnaire: number of responses 282; mean=5.34; standard deviation=4.73; 2) Integral indicators of the professional burnout questionnaire: the number of answers is 155; mean=5.74; standard deviation=2.31. The Pearson correlation between generalized anxiety disorder and burnout was 0.45 ( $p < 0.05$ ).

### Cluster Analysis

As a result of hierarchical cluster analysis [32] of three questions about the attitude of teachers to the transition to e-

learning from using the Ward method (see Annex 1.2, paragraph 6), three groups of teachers were involuntarily identified (following the above British study [14], only those participants who completed both the anxiety disorder questionnaire and the burnout questionnaire (total number of participants 155) were grouped. These groups were also named after this study (see Fig. 1).

The results are consistent with those shared by the British researchers, where the majority of the “experiencing difficulties” group demonstrated that they were experiencing anxiety (93%), and “accepting change” demonstrated the lowest percentage of participants experiencing anxiety (8%). However, unlike the previous study, where only gr. 2 “Resistance to change” demonstrated a low level of adaptation to the remote form, in our study and gr. 2, and gr. 3 demonstrated simi-

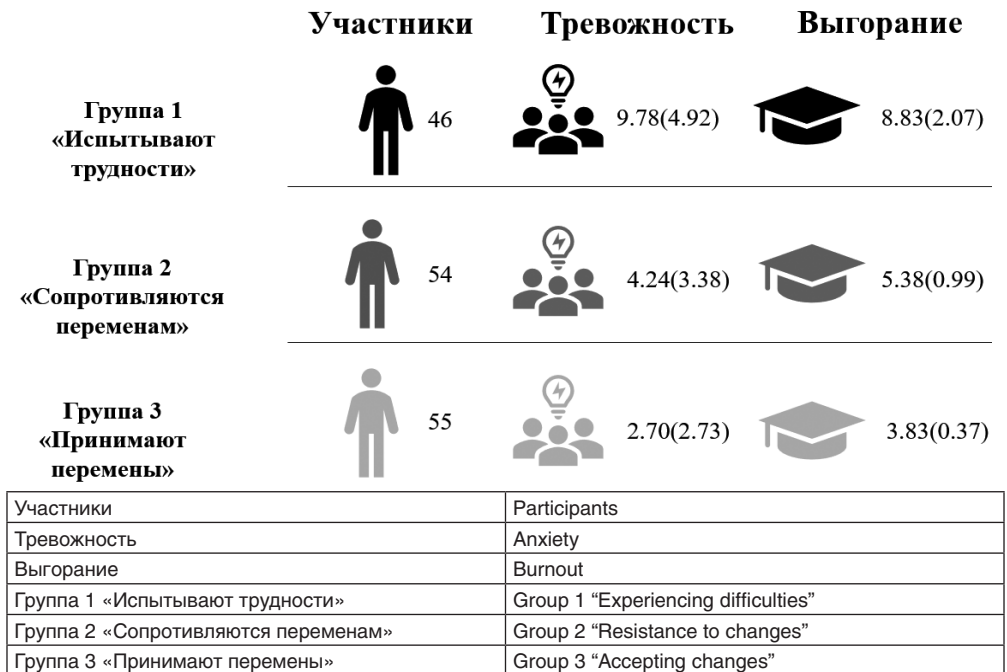


Fig. 1. Descriptive statistics for three groups of teachers: the graph shows the number of participants — participants; mean values (standard deviations) — anxiety and burnout; the number of participants who completed the burnout and anxiety questionnaire was 155 people

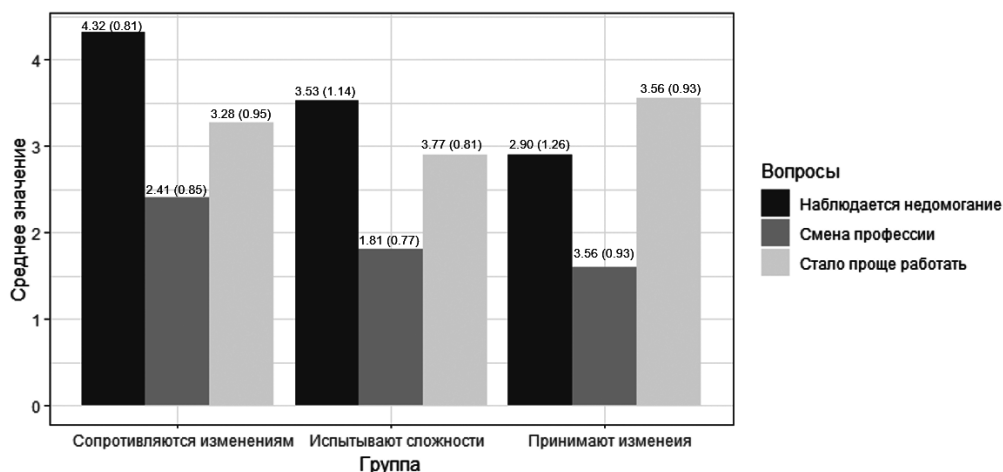
lar results. In addition, gr. 1 “Experiencing difficulties” demonstrated the highest desire to change profession (see Fig. 2). See analysis details in the Annex 2.

The average values for anxiety are not high in comparison with previous studies (from 15 points). The average values according to the professional burnout questionnaire are not high for groups 2 and 3, but exceed the high burnout threshold for gr. 1 (from 7 points), demonstrated in previous studies [2]. A detailed comparison of our results with those of previous studies is demonstrated in Annex 3.

### Frequency Analysis of Answers to Questions Related to the Transition to E-learning Form

As part of the frequency analysis, the experience of teachers in connection with

the transition to online education was analyzed. Because of the analysis, it was observed that “adapting the materials for lessons” (70%) and “checking homework” (79%) began to consume more time. More than 50% of participants noted that they do not need additional equipment for online lessons. Continuing the phrase “From online education ...”, the majority of teachers (65%) chose the option “there is a benefit.” Most teachers think that school administration should regulate the platform used for online classes, working hours, attendance, adapt the schedule and workload norms. The question about the disadvantages of distance education, the following answers were most frequent: “hardware problems” (51%) — here teachers indicated problems associated with the hardware of students



Среднее значение	Mean value
Спротивление изменениям	Resistance to changes
Испытывают сложности	Experiencing difficulties
Принимают изменения	Accepting changes
Вопросы	Questions
Наблюдается недомогание	Feeling unwell
Смена профессии	Change of profession
Стало проще работать	It became easier to work

Fig. 2. Answers to three questions for the cluster analysis (means and standard deviations are indicated); number of participants — 155



and poor quality of the Internet connection; and “lack of live communication” (39%). The most common responses from the participants to the question about the benefits of e-learning were “*independence of students*” (22%), “*more flexible hours*” (19%) and “*comfort*” (17%). 21% of teachers did not choose any option. Figures and descriptions are disclosed in Annex 4.

### Discussion of Results

In this study, we studied how the changes caused by the COVID-19 pandemic affected the psycho-emotional state of teachers of the educational institutions. The results of the study demonstrated that the average values of anxiety are comparable to the results of studies conducted before the pandemic. The results of this study on burnout also correlate with previous studies.

The results of the cluster analysis identified three groups of teachers: those who are resisting to changes, those who are experiencing difficulties, and those who are accepting changes. As in the study by Duffy and Allington (2020), these three groups differed significantly in anxiety and burnout levels [14]. The “experiencing difficulties” group demonstrated the highest level of anxiety and burnout. In addition, the teachers in this group more often than others felt some discomfort since they started working from home and demonstrated the highest desire to change the job. These results confirm that about one third of teachers experience various emotional problems when they switch over to a remote form. These results correlate with previous studies [16].

During the transition to online education, the teachers faced additional difficulties. According to the study, the main difficulty was hardware related problems and increased workload. Also in our study, teachers noted the lack of support from the administration of the educational institu-

tion is one of the core problems. Teachers pointed out the need to comply with the workload standards; control of communication with students and their parents, including the observance of working hours for students and parents to communicate with the teacher; and the existence of a school-wide policy for the lessons on online learning platforms.

Despite all the identified difficulties, the teachers demonstrated good adaptation to working in online form, which is matching the results of previous studies, for example, those teachers who did not have computer skills before the pandemic were able to quickly adapt to new conditions and were ready to continue using online-resources in their work in the future [33]. In our study, the teachers also noted a number of positive aspects of the transition to e-learning. For example, they shared that the students who do not have the opportunity to attend classes personally are able to connect remotely. The teachers also observed that communication with the students through digital technologies opens up new opportunities for them, including interactivity, individual approach, availability of education and a variety of remote work methods. For example, in addition to synchronous classes (for example, group classes), asynchronous e-learning is especially effective — a form, when the participants independently choose comfortable time for classes [17]. The use of online interactive whiteboards in class (such as Smart Boards) allows you to visualize the material, post comments, ask questions and etc. [11; 20]. Online education also gives ample opportunities for different lesson forms, including a flipped classroom technology (presentation of material by students) or grouping students (student-student interaction) [18]. The use of such techniques is an effective way to improve the quality of e-learning and excellent opportunity for professional development of teachers [15].



### Conclusion

This study has a number of limitations. The small sample range does not allow us to draw more detailed conclusions about the connection between the transition to e-learning depending on stage of education. The burnout questionnaire was offered to participants at the very end of the study, so the number of participants who completed

this instrument was lower than in other parts of the study. The limitations of the study do not allow making definite conclusions about the nature of the connection between the transition to online form and the stages of education. However, the results suggest that, in general, the teachers who participated in the study managed to successfully cope with the transition to online form.

### Annex to “the Pandemic Lessons Learned: Analysis of the Experience of Transition to E-Teaching in a Secondary School

#### Annex. 1.1 Research methods description.

##### Generalized Anxiety Disorder Questionnaire

The response scale ranges from “never” (0 points) to “almost every day” (3 points). The questionnaire has high internal consistency (Cronbach’s Alpha = 0.92), test reliability (ICC = 0.83) and convergent validity (high correlation with the Beck Anxiety Inventory,  $r = 0.72$ ) [22]. The questionnaire was adapted by the authors of the study for use in the Russian-speaking population and demonstrated good reliability (Cronbach’s alpha = 0.92). The result is calculated by the sum of all answers (from 0 to 21). To determine the general level of generalized anxiety disorder, the following norms are proposed: 5 — weak anxiety; 10 — moderate anxiety; 15 — high anxiety [30].

##### Professional Burnout Level Assessment Questionnaire

Cronbach’s Alpha coefficient for “burnout” — 0.74, “depersonalization” — 0.72, “personal achievement” — 0.50. Scale scores varies from 0 to 54 for burnout (9 items); 0 to 30 points for depersonalization (5 statements); and from 0 to 48 points for personal achievements (8 statements). The scores scored for each of the subscales are interpreted based on norms and threshold values to determine the level of professional burnout (see Table 1). In accordance with the general integral indicator, the degree of professional burnout is assessed as low (3—4 points, where 1 point is assigned for low performance in each of the subscales), medium (5—6 points), high (7—9 points) and extremely high (10 points or more).

Table 1

Correspondence of integral indicators and subscale values [2]

Subscale	Groups	Low level	Average level	High level	Very high
<b>Integral assessment indicators</b>		<b>3—4</b>	<b>5—6</b>	<b>7—9</b>	<b>10 and more</b>
Emotional burnout	Men	5—15	16—24	25—34	34 and more
	Women	6—16	17—25	26—34	34 and more
Depersonalization/ Cynicism	Men	2—4	5—12	13—15	15 and more
	Women	1—4	5—10	11—13	14 and more
Professional Success	Men	37—48	36—28	27—23	22 and less
	Women	36—48	35—28	27—22	21 and less

## Annex 1.2 Description of research approach.

### Questionnaire of experience of transition to e-learning

Category	Question example	Variants of reply
<b>1. Preparing materials for classes.</b>	What type of work started to consume more time?	<i>Participants could choose several options from the proposed</i> 1. Material preparation 2. Methodical work 3. Explanation of new material 4. Adaptation of materials etc. (see Fig. 2 for details)
<b>2. Hardware.</b>	Do I need additional hardware in order to fully engage in e-learning?	Yes No Other (please write your variant)
<b>3. Brief description of the e-learning.</b>	From e-learning	1. There is benefit 2. There is harm 3. No benefit at all (see Fig. 5 for details)
<b>4. Support from the educational institution.</b>	What should the school regulate?	<i>Participants could choose several options from the proposed</i> Timetable Selection platform Attendance (see Fig. 6 for details)
<b>5. Positive and negative aspects of e-learning.</b>	What are three advantages of e-learning / What are three main problems of e-learning	Open form, participants may list their options or prefer not to answer (answers are shown in Figures 7—8)
<b>6. Attitude to changes.</b>	1. Since we switched to e-learning, I have been feeling unwell (back pain, headache, eyes, etc.) as I spend much time at PC. 2. I am seriously considering changing my career if e-learning continues for next academic year. 3. After several weeks of e-training, it became easier for me to work in this form.	1. Completely disagree 2. Disagree (disagree) 3. Difficult to answer 4. Agree 5. Completely agree (agree)

## Annex 2. Cluster analysis.

Distribution of data in groups: anxiety<sub>group1/group 2/group 3</sub>: kurtosis = -0.81/-0.38/0.70; asymmetry = 0.43/0.53/1.16; burnout<sub>group1/group 2/group 3</sub>: kurtosis = -0.40/1.93/-0.52; asymmetry = 0.52/0.90/0.62. The data in each group were distributed regularly and homogeneously (Levin's test  $p < 0.05$ ).

Anxiety:

One-way analysis of variance demonstrated significant differences between the selected groups in at the anxiety level ( $F(2,155)=48.88$ ;  $p < 0.001$ ;  $\eta^2=0.39$ ).

Also, the results of post-hoc analysis (Tukey's test) demonstrated significant differences between group 1 and group 2,  $t(155) = -7.07$ ,  $p < 0.001$ , and between group 1 and group 3,  $t(155) = -5.52$ ,  $p < 0.001$ . Groups 2 and 3 did not differ ( $p = 0.07$ ).

Burnout:

Analysis of variance showed significant differences at the professional burnout level between groups ( $F(2,155) = 142.7$ ;  $p < .001$ ;  $\eta^2 = 0.65$ ). The results of post-hoc analysis (Tukey's test) demon-

strated significant differences between all groups: groups 1 and 2  $t(155) = -2.30, p < 0.001$ ; groups 1 and 3  $t(155) = -3.94, p < 0.001$ ; groups 2 and 3  $t(155) = -0.92, p < 0.001$ .

However, unlike the previous study, where only group 2 “Resistant to change” demonstrated a low level of adaptation to the online form, in our study and Group 2 ( $F(2,155) = 20.55, p < 0.001, \eta^2 = 0.21$ ; between groups 1 and 2 ( $t(155) = -0.78, p < 0.001$ , 2 and 3 ( $t(155) = -0.62, p < 0.001$ ), 1 and 3 ( $t(155) = -1.41, p < 0.001$ )), and group 3 demonstrated similar results ( $F(2,155) = 3.73, p < 0.05, \eta^2 = 0.04$ ), only differences between groups 1 and 2 were significant ( $t(155) = 0.49, p < 0.05$ ). In addition, Group 1 “Experiencing difficulties” demonstrated the highest desire to change of profession ( $F(2,155) = 13.71, p < 0.001, \eta^2 = 0.15$ ), between groups 1 and 2 ( $t(155) = -0.59, p < 0.001$ ), groups 1 and 3 ( $t(155) = -0.81, p < 0.001$ ), while the differences between groups 2 and 3 are not significant ( $t(155) = -0.21, p = 0.33$ ).

### Annex 3. Comparison of methods.

Comparison of mean values of anxiety:

For example, in two studies in 2008 and 2021 using the same anxiety measurement method — GAD7, the following results were demonstrated: mean = 2.95 (standard deviation = 3.41) [13]; and mean value = 8.0 (standard deviation = 5,5) [25]. In this study, mean anxiety score was 5.34 (standard deviation = 4.52), within the range of past study values. These results are also consistent with a 2020 study that demonstrated that the rates of anxiety and depression among teachers were not exaggerated during the pandemic [14].

Comparison of average value of professional burnout:

In our study, the integral burnout score was 5.74, which almost coincides with the results of the meta-analysis by Rothstein and colleagues (2019), where the integral burnout score was 5 (depersonalization = 2, emotional exhaustion = 2, personal achievement = 1) [26]. This level of burnout is within the normal range and indicates that the pandemic did not cause elevated burnout for most teachers. Perhaps the degree of burnout depends on the stage of education. For example, one study of a Russian sample of teachers demonstrated that the level of professional burnout of elementary school teachers was lower than that of secondary school teachers ( $U = 429.5; p < 0.05$ ), possibly due to more complicated organizational process of transition to e-learning mode [8]. This study involved teachers teaching at both primary and secondary schools. However, the sample size does not allow us to determine the existence of the effect of the level of education on the level of burnout.

In this study, the Pearson correlation coefficient between the level of anxiety and burnout of teachers was 0.45, which is matching to previous studies. For example, in two studies on samples of Russian teachers, the correlations between the level of anxiety and various aspects of burnout ranged from 0.30 to 0.72 [3, 7]. According to a meta-analysis and review summarizing the results of 34 studies with more than 40 thousand participants, there is a stable relationship between burnout and anxiety ( $r = 0.46$ ) [21]. According to the authors of the meta-analysis, burnout and anxiety are different constructs with some common characteristics. It is likely that they develop in parallel and are mutually interrelated. Longitudinal studies are required to establish their baseline mechanisms. The studies suggest a range of reasons for the prevalence of teacher burnout, including negative work environments, overload and lack of support.

### Annex 4. Replies to frequency analysis.

Figures 3—8 analyze the experience of teachers associated with the transition to e-teaching. The number of participants who answered the questions was 282 people.

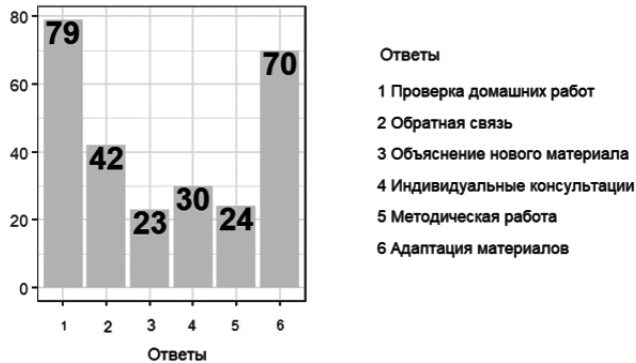


Fig. 3. What kind of work has become more time consuming?

Ответы	Replies
1 Проверка домашних работ	1 Homework check up
2 Обратная связь	2 Feedback
3 Объяснение нового материала	3 Explanation of new materials
4 Индивидуальные консультации	4 Personal consultations
5 Методическая работа	5 Methodological work
6 Адаптация материалов	6 Material adaptation

The teachers could mark several answers. All types of activities shown in the figure began to consume more time for at least 20% of teachers. Two types of activities: 70 and 79 percent of teachers noted “adapting materials for lessons” and “checking homework”.



Fig. 4. Which hardware was missing?

Процент участников	Percentage of participants
Ответы	Answers
1 Скоростной безлимитный интернет	1 High speed unlimited Internet
2 Графический планшет	2 Graphic tablet
3 Гарнитура (наушники, микрофон)	3 Headset (headphones, microphone)
4 Камера	4 Camera
5 Компьютер	5 PC
6 МФУ (принтер,сканер)	6 MFPs (printer, scanner)

Participants mentioned whether they needed additional hardware for e-learning by choosing one answer option “Need” or “Not needed”. More than 50% of participants mentioned that they did not need additional funds. Slightly more than 30% of teachers answered that they lacked some hardware and additionally mentioned what hardware was missing. There was no limit to the number of items that participants could enter. Figure 4 shows the results of the analysis of teachers’ answers to this additional question.

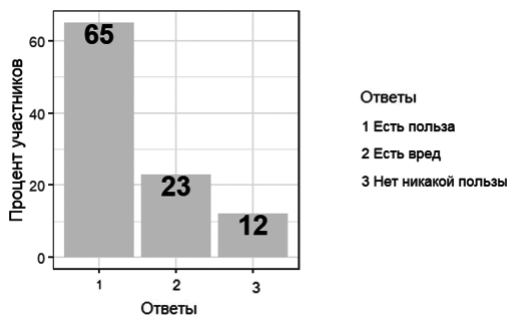


Fig. 5. From e-learning...

Процент участников	Percentage of participants
Ответы	Answers
1 Есть польза	1 There is benefit
2 Есть вред	2 There is harm
3 Нет никакой пользы	3 No benefit

As shown in Figure 5, continuing the phrase “From e-learning...”, the majority of teachers (65%) chose the option “there is benefit”. Half as many (23%) teachers noted that “there is harm” and even fewer (12%) — “there is no benefit.”

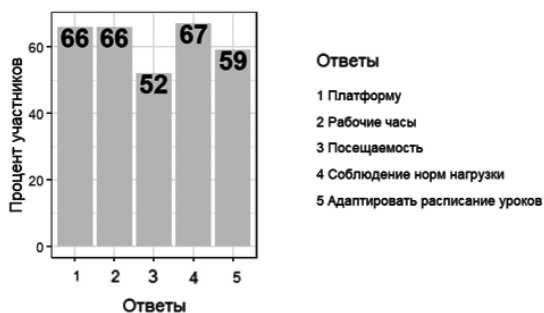


Fig. 6. A school should regulate ...

Процент участников	Percentage of participants
Ответы	Answers
1 платформу	1 Platform
2 Рабочие часы	2 Working hours
3 Посещаемость	3 Attendance
4 Соблюдение норм нагрузки	4 Compliance with the work load norms
5 Расписание уроков	5 Timetable

Teachers chose several answers for question — “What should the school regulate?” Many teachers think that the school should regulate all these aspects of e-learning.

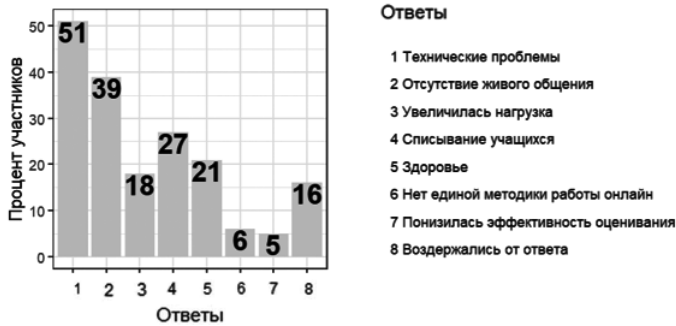


Fig. 7. Disadvantages of e-learning named by the teachers

Процент участников	Percentage of participants
Ответы	Answers
1 Технические проблемы	1 Technical issues
2 Отсутствие живого общения	2 No live communication
3 Увеличилась нагрузка	3 Load increased
4 Списывание учащихся	4 Students are copying off
5 Здоровье	5 Health
6 Нет единой методики работы онлайн	6 No unique methods of online work
7 Понижилась эффективность оценивания	7 Assessment efficiency has decreased
8 Воздержались от ответа	8 Preferred not to answer

The figure demonstrates the frequency distribution of answers related to the issue of the disadvantages of the online form. The most common answers were: “hardware problems” (51%) — here teachers pointed out problems with hardware of students and poor quality of the Internet connection; and “no live communication” (39%).

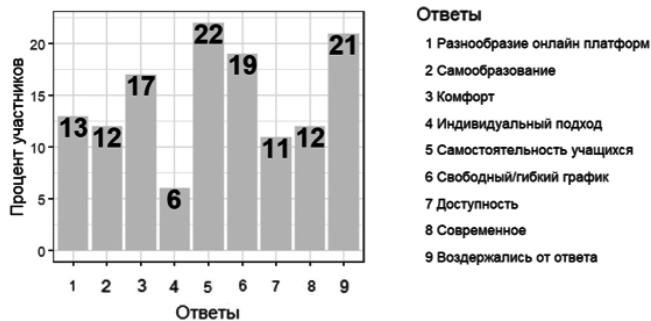


Fig. 8. Advantages of the e-learning form named by teachers

Процент участников	Percentage of participants
Ответы	Answers
1 Разнообразие онлайн платформ	1 Variety of online platforms
2 Саморазвитие	2 Self-development

3 Комфорт	3 Comfort
4 Индивидуальный подход	4 Individual approach
5 Самостоятельность учащихся	5 Independence of students
6 Свободный/гибкий график	6 Free/flexible schedule
7 Доступность	7 Accessibility
8 Современное	8 Timely
9 Воздержались от ответа	9 Preferred not to answer

The graph shows the most common responses from participants to the question about the benefits of the remote format. The most popular replies were: “*independence of students*” (22%), “*more flexible hours*” (19%) and “*comfort*” (17%). 21% of teachers did not choose any option.

For example, several studies have identified a number of important conditions for e-learning: willingness of students to study remotely, expertise of the teacher, support from the educational institution [12]; and the availability of hardware for classes in a remote form and other resources [11]. Studies has also demonstrated that a higher skill of the use of technologies was associated with a low stress level and readiness to apply technologies in work [24]. The studies have shown a significant improvement in digital competence among teachers with 5—10 years of experience associated with motivation for professional development in new conditions [8].

## References

1. Arendachuk I.V., Klenova M.A., Usova N.V. Kharakteristiki obrazovatel'no-razvivayushchei aktivnosti studentov v usloviyakh vyzhdennoi samoizolyatsii [Features of Educational and Developmental Activity of Students Under Forced Self-Isolation] *Psikhologicheskaya Nauka i Obrazovanie = Psychological Science and Education*. 2022. no. 2 (27). pp. 82—95. (In Russ).
2. Vodop'yanova N.E., Starchenkova E.S., Nasledov A.D. Standartizirovannyi oprosnik «Professional'noe vygoranie» dlya spetsialistov sotsionomicheskikh professii [Standardised questionnaire “Professional burnout” for professionals in the socio-nomic professions]. *Vestnik Sankt-Peterburgskogo universiteta [Bulletin of St. Petersburg University, Seriya 12. Psikhologiya. Sotsiologiya. Pedagogika]*. 2013. no. 4. pp. 17—27. (In Russ).
3. Verchenko I.A. Vliyanie trevozhnosti na professional'noe vygoranie pedagogov [The impact of anxiety on teacher burnout] *Mir nauki. Pedagogika i psikhologiya [World of Science. Pedagogy and Psychology]*. 2021. no. 3 (9). p. 21. (In Russ).
4. Petrakova A.F., et al. Osobennosti psikhologicheskogo stressa u uchitelei v usloviyakh distantsionnogo prepodavaniya vo vremya pandemii COVID-19 [Peculiarities of psychological stress among teachers in distance learning settings during the covid-19 pandemic]. *Voprosy Obrazovaniya*. 2021. no. 1. pp. 93—114. (In Russ.).
5. Sorokova M.G. Elektronnyi kurs kak tsifrovoy obrazovatel'nyi resurs smeshannogo obucheniya v usloviyakh vysshego obrazovaniya [E-Course as Blended Learning Digital Educational Resource in University] *Psikhologicheskaya Nauka i Obrazovanie = Psychological Science and Education*. 2020. no. 1 (25). pp. 36—50. (In Russ).
6. Sorokova M.G. Tsifrovaya obrazovatel'naya sreda universiteta: komu bolee komfortno v nei učit'sya? [Digital Educational Environment in University: Who is More Comfortable Studying in It?] *Psikhologicheskaya Nauka i Obrazovanie = Psychological Science and Education*. 2020. no. 2 (25). pp. 44—58. (In Russ).
7. Stepanova A.E., Poteryaeva E.L., Semenova V.N. Otsenka sostoyaniya psikhicheskogo zdorov'ya uchitelei [Mental health assessment of teachers]. *Meditsina truda i ekologiya cheloveka [Occupational health and human ecology]*. 2021. no. 4 (28). pp. 106—128. (In Russ).
8. Cherdyn'tseva E.V., Yakubenko O.V. Issledovanie dinamiki razvitiya kognitivnogo komponenta tsifrovoy kompetentnosti pedagogov v usloviyakh distantsionnogo obrazovaniya (na materiale Omska i Omskoi oblasti) [Research into the dynamics of development of the cognitive component of teachers' digital competence in distance education (based on Omsk and Omsk Oblast)]. *Vestnik Omskogo gosudarstvennogo pedagogicheskogo universiteta. Gumanitarnye issledovaniya. [Omsk State University Bulletin. Social Science]*. 2021. no. 31 (2). pp. 200—204. (In Russ).
9. Bers M., Strawhacker A., Sullivan A. The state of the field of computational thinking in early childhood education. *OECD Education Working Papers*. no. 274, OECD Publishing, Paris. DOI: 10.1787/3354387a-en.
10. Boyraz G., Legros D.N. Coronavirus Disease (COVID-19) and Traumatic Stress: Probable Risk Factors and Correlates of Posttraumatic Stress Disorder. *Journal of Loss and Trauma*. 2020.



- no. 6—7 (25). pp. 503—522. DOI:10.1080/15325024.2020.1763556
11. Carrillo C., Flores M.A. COVID-19 and teacher education: a literature review of online teaching and learning practices. *European Journal of Teacher Education*. 2020. no. 4 (43). pp. 466—487.
12. Chang C.-L., Fang M. E-Learning and Online Instructions of Higher Education during the 2019 Novel Coronavirus Diseases (COVID-19) Epidemic // *Journal of Physics: Conference Series*. 2020. No. 1 (1574). P. 012166.
13. Donker T. et al. Quick and easy self-rating of Generalized Anxiety Disorder: Validity of the Dutch web-based GAD-7, GAD-2 and GAD-SI. *Psychiatry Research*. 2011. no. 1 (188). pp. 58—64.
14. Duffy B., Allington D. The accepting, the suffering and the resisting: the different reactions to life under lockdown 2020. URL: <https://www.kcl.ac.uk/policy-institute/assets/Coronavirus-in-the-UK-cluster-analysis.pdf> (Accessed 02.08.2022)
15. Ferri F. et al. Distant Learning: Open Challenges and Evolution. *International Journal of Learning, Teaching and Educational Research*. 2018. no. 8 (17). pp. 78—88. DOI:10.26803/ijlter.17.8.5
16. García-Carmona M., Marino M.D., Aguayo R. Burnout syndrome in secondary school teachers: a systematic review and meta-analysis. *Social Psychology of Education*. 2019. no. 1 (22). pp. 189—208. DOI:10.1007/s11218-018-9471-9
17. Gegenfurtner A., Ebner C. Webinars in higher education and professional training: A meta-analysis and systematic review of randomized controlled trials. *Educational Research Review*. 2019. no. (28). pp. 100293. DOI:10.1016/j.edurev.2019.100293
18. Herrador-Alcaide T.C., Hernández-Solis M., Hontoria J.F. Online Learning Tools in the Era of m-Learning: Utility and Attitudes in Accounting College Students. *Sustainability*. 2020. no. 12. p.5171. DOI:10.3390/su12125171
19. Kim H.-Y. Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis. *Restorative Dentistry and Endodontics*. 2013. no. 1 (38). p. 52.
20. Kim J., Jo I.-H., Park Y. Effects of learning analytics dashboard: analyzing the relations among dashboard utilization, satisfaction, and learning achievement. *Asia Pacific Education Review*. 2016. no. 17(1). pp. 13—24.
21. Koutsimani P., Montgomery A., Georganta K. The Relationship Between Burnout, Depression, and Anxiety: A Systematic Review and Meta-Analysis // *Frontiers in Psychology*. 2019. (10). p. 284. DOI:10.3389/fpsyg.2019.00284
22. Löwe B. et al. Validation and Standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the General Population. *Medical Care*. 2008. no. 3 (46). pp. 266—274.
23. Maslach C., Jackson S.E., Leiter M.P. Maslach Burnout Inventory: Third edition. In C.P. Zalaquett & R.J. Wood (Eds.). 1997. P. 191—218.
24. Quezada R.L., Talbot C., Quezada-Parker K.B. From Bricks and Mortar to Remote Teaching: A Teacher Education Program's Response to COVID-19. *Journal of Education for Teaching*. 2020. no. 4 (46). pp. 472—483.
25. Rehman U. et al. Depression, Anxiety and Stress Among Indians in Times of Covid-19 Lockdown. *Community Mental Health Journal*. 2021. no. 1 (57). pp. 42—48.
26. Rotstein S. et al. Psychiatrist burnout: a meta-analysis of Maslach Burnout Inventory means. *Australasian Psychiatry*. 2019. no. 3 (27). pp. 249—254. DOI: 10.1177/1039856219833800
27. Sangeeta, Tandon U. Factors influencing adoption of online teaching by school teachers: A study during COVID-19 pandemic // *Journal of Public Affairs*. 2021. No. 4 (21). DOI:10.1002/pa.2503
28. Sokal L., Trudel L.E., Babb J. Canadian teachers' attitudes toward change, efficacy, and burnout during the COVID-19 pandemic // *International Journal of Educational Research Open*. 2020. No. (1). DOI:10.1016/j.ijedro.2020.100016
29. Spielberger C.D. State-trait anxiety inventory for adults. APA PsycTests. 1983. DOI:10.1037/t06496-0001983
30. Spitzer R. L. [и др.] A Brief Measure for Assessing Generalized Anxiety Disorder: The GAD-7 // *Archives of Internal Medicine*. 2006. No. 10 (166). P. 1092.
31. Talidong K.J.B., Toquero C.M. D. Philippine Teachers' Practices to Deal with Anxiety amid COVID-19. *Journal of Loss and Trauma*. 2020. no. 6—7 (25). pp. 573—579. DOI:10.1080/15325024.2020.1759225
32. Ward J.J.H. Hierarchical grouping to optimize an objective function. *Journal of the American Statistical Association*. 1963. no. 58 (301). pp. 236-244.
33. Zhang J., Zhao N., Kong Q.P. The Relationship Between Math Anxiety and Math Performance: A Meta-Analytic Investigation. *Frontiers in Psychology*. 2019. no. 10. p. 1613. DOI:10.3389/fpsyg.2019.01613

## Литература

1. Арендачук И.В., Кленова М.А., Усова Н.В. Характеристики образовательно-развивающей активности студентов в условиях вынужденной самоизоляции // *Психологическая Наука и Образование*. 2022. Том 27, № 2. С. 82—95.
2. Водопьянова Н.Е., Старченкова Е.С., Наследов А.Д. Стандартизированный опросник

- «Профессиональное выгорание» для специалистов социномических профессий // *Вестник Санкт-Петербургского университета. Серия 12. Психология. Социология. Педагогика*. 2013. № 4. С. 17—27.
3. Верченко И.А. Влияние тревожности на профессиональное выгорание педагогов // *Мир науки. Педагогика и психология*. 2021. № 3 (9). С. 21.

4. *Петракова А.* [и др.]. Особенности психологического стресса у учителей в условиях дистанционного преподавания во время пандемии COVID-19 // Особенности психологического стресса у учителей в условиях дистанционного преподавания во время пандемии COVID-19. 2021. № 1. С. 93—114.
5. *Сорокова М.Г.* Электронный курс как цифровой образовательный ресурс смешанного обучения в условиях высшего образования // Психологическая Наука и Образование. 2020. Том 25, № 1. С. 36—50.
6. *Сорокова М.Г.* Цифровая образовательная среда университета: кому более комфортно в ней учиться? // Психологическая Наука и Образование. 2020. Том 25, № 2. С. 44—58.
7. *Степанова А.Э., Потеряева Е.Л., Семенова В.Н.* Оценка состояния психического здоровья учителей // Медицина труда и экология человека. 2021. № 4 (28). С. 106—128.
8. *Чердынцева Е.В., Якубенко О.В.* Исследование динамики развития когнитивного компонента цифровой компетентности педагогов в условиях дистанционного образования (на материале Омска и Омской области) // Вестник Омского государственного педагогического университета. Гуманитарные исследования. 2021. № 31 (2). С. 200—204.
9. *Bers M., Strawhacker A., Sullivan A.* The state of the field of computational thinking in early childhood education. OECD Education Working Papers, No. 274, OECD Publishing, Paris, DOI:10.1787/3354387a-en.
10. *Boyrac G., Legros D.N.* Coronavirus Disease (COVID-19) and Traumatic Stress: Probable Risk Factors and Correlates of Posttraumatic Stress Disorder // Journal of Loss and Trauma. 2020. No. 6—7 (25). P. 503—522. DOI:10.1080/15325024.2020.1763556
11. *Carrillo C., Flores M.A.* COVID-19 and teacher education: a literature review of online teaching and learning practices // European Journal of Teacher Education. 2020. No. 4 (43). P. 466—487.
12. *Chang C.-L., Fang M.* E-Learning and Online Instructions of Higher Education during the 2019 Novel Coronavirus Diseases (COVID-19) Epidemic // Journal of Physics: Conference Series. 2020. No. 1 (1574). P. 012166.
13. *Donker T.* [и др.] Quick and easy self-rating of Generalized Anxiety Disorder: Validity of the Dutch web-based GAD-7, GAD-2 and GAD-SI // Psychiatry Research. 2011. No. 1 (188). P. 58—64.
14. *Duffy B., Allington D.* The accepting, the suffering and the resisting: the different reactions to life under lockdown 2020. URL: <https://www.kcl.ac.uk/policy-institute/assets/Coronavirus-in-the-UK-cluster-analysis.pdf> (дата обращения: 02.08.2022)
15. *Ferri F.* [и др.] Distant Learning: Open Challenges and Evolution // International Journal of Learning, Teaching and Educational Research. 2018. No. 8 (17). P. 78—88. DOI:10.26803/ijlter.17.8.5
16. *García-Carmona M., Marino M.D., Aguayo R.* Burnout syndrome in secondary school teachers: a systematic review and meta-analysis // Social Psychology of Education. 2019. No. 1 (22). P. 189—208. DOI:10.1007/s11218-018-9471-9
17. *Gegenfurtner A., Ebner C.* Webinars in higher education and professional training: A meta-analysis and systematic review of randomized controlled trials // Educational Research Review. 2019. No. 28. P. 100293. DOI:10.1016/j.edurev.2019.100293
18. *Herrador-Alcaide T.C., Hernández-Solis M., Hontoria J.F.* Online Learning Tools in the Era of m-Learning: Utility and Attitudes in Accounting College Students // Sustainability. 2020. No. 12. P. 5171. DOI:10.3390/su12125171
19. *Kim H.-Y.* Statistical notes for clinical researchers: assessing normal distribution (2) using skewness and kurtosis // Restorative Dentistry & Endodontics. 2013. No. 1 (38). P. 52.
20. *Kim J., Jo I.-H., Park Y.* Effects of learning analytics dashboard: analyzing the relations among dashboard utilization, satisfaction, and learning achievement // Asia Pacific Education Review. 2016. No. 17(1). P. 13—24.
21. *Koutsimani P., Montgomery A., Georganta K.* The Relationship Between Burnout, Depression, and Anxiety: A Systematic Review and Meta-Analysis // Frontiers in Psychology. 2019. (10). P. 284. DOI:10.3389/fpsyg.2019.00284
22. *Löwe B.* [и др.] Validation and Standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the General Population // Medical Care. 2008. No. 3 (46). P. 266—274.
23. *Maslach C., Jackson S.E., Leiter M.P.* Maslach Burnout Inventory: Third edition. In C. P. Zalaquett & R.J. Wood (Eds.). 1997. P. 191—218.
24. *Quezada R.L., Talbot C., Quezada-Parker K.B.* From Bricks and Mortar to Remote Teaching: A Teacher Education Program's Response to COVID-19 // Journal of Education for Teaching. 2020. No. 4 (46). P. 472—483.
25. *Rehman U.* [и др.] Depression, Anxiety and Stress Among Indians in Times of Covid-19 Lockdown // Community Mental Health Journal. 2021. No. 1 (57). P. 42—48.
26. *Rotstein S.* [и др.] Psychiatrist burnout: a meta-analysis of Maslach Burnout Inventory means // Australasian Psychiatry. 2019. No. 3 (27). P. 249—254. DOI: 10.1177/1039856219833800
27. *Sangeeta, Tandon U.* Factors influencing adoption of online teaching by school teachers: A study during COVID-19 pandemic // Journal of Public Affairs. 2021. No. 4 (21). DOI:10.1002/pa.2503
28. *Sokal L., Trudel L. E., Babb J.* Canadian teachers' attitudes toward change, efficacy, and burnout during the COVID-19 pandemic // International Journal of Educational Research Open. 2020. No. (1). DOI:10.1016/j.ijedro.2020.10001629.

29. Spielberger C.D. State-trait anxiety inventory for adults // APA PsycTests. 1983. doi:10.1037/t06496-0001983.
30. Spitzer R.L. [и др.] A Brief Measure for Assessing Generalized Anxiety Disorder: The GAD-7// Archives of Internal Medicine. 2006. No. 10 (166). P. 1092.
31. Talidong K.J. B., Toquero C.M. D. Philippine Teachers' Practices to Deal with Anxiety amid COVID-19 // Journal of Loss and Trauma. 2020. No. 6—7 (25). P. 573—579. DOI:10.1080/15325024.2020.1759225
32. Ward J.J. H. Hierarchical grouping to optimize an objective function // Journal of the American Statistical Association. 1963. No. 58 (301). P. 236-244.
33. Zhang J., Zhao N., Kong Q. P. The Relationship Between Math Anxiety and Math Performance: A Meta-Analytic Investigation // Frontiers in Psychology. 2019. No. 10. P. 1613. DOI:10.3389/fpsyg.2019.01613

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