Article

The Online Education System: COVID-19 Demands, Trends, Implications, Challenges, Lessons, Insights, Opportunities, Outlooks, and Directions in the Work from Home

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Abstract: The aim of this exploratory research is to identify how working from home and the consequent social isolation interfered in teachers' work and students' learning and to identify the challenges, difficulties, advantages, opportunities, demands, trends, implications, outlooks, lessons, directions, and feelings of students and teachers in the teaching processes during the COVID-19 pandemic period. To reach its aim, the authors of this paper developed searches and scientific databases and they also sent an email questionnaire to Rio de Janeiro city schools. The descriptive analyses were made by descriptive statistics (proportions, rates, minimum, maximum, mean, median, standard deviation, coefficient of variation—CV). The results show that working from home and the consequent social isolation interfered in the students' and teachers' feelings and sensations and highlight the words “frustration”, “hope”, and “strangeness”. From the sample, 96.4% of the teachers affirmed that working from home and the social isolation interfered in their work and 97.4% of the teachers affirmed that working from home and the consequent social isolation interfered in the students' learning. This research is the starting point to boost discussions on the subjects of COVID-19, working from home, social isolation, and education. This paper will support researchers in the development of future studies related to the subjects.

Keywords: COVID-19; education; social isolation; work from home

1. Introduction

The COVID-19 pandemic period has brought unprecedented challenges and opportunities for teachers and students. They have had to adapt themselves to new teaching modalities and to face the work from home and the consequent social isolation that interfered in their emotions and feelings. This instability disturbs teachers' work and learning conditions. For Bodenheimer and Leidenberger [1], the COVID-19 pandemic has changed worldwide human practices, while Dente and Hashimoto [2] noted that the COVID-19 has brought uncertainty in many sectors like, goods, services, and innovation.

In addition to the health implications, the COVID-19 pandemic brought restrictions that result in daily activity interruption like travel, sports, arts, entertainment, restaurant, retailer, and public service reductions, and schools' closures [3–7], aiming to promote social isolation and forcing people to work from home. The strategy was implemented with the idea of avoiding contagion, but authors associate the social isolation and the consequent

working from home with traumatic stress and depression growth [4,8–19]. Among the insidious impacts of social isolation are smoking and mental health disorder [20] and feelings of despair [3,21]. For this reason, COVID-19 is a disease that affects the mental health [4,17,22,23], and it provides a huge clash between public health and the economy [24]. The adoption of social isolation and the implementation of hygiene etiquette improvement saved lives during the COVID-19 pandemic period [8,25,26].

The COVID-19 pandemic obliged schools and universities to close, teachers to work from home [6,16,27–33], and the migration to the online education system [31,33–39]. To overcome the problems faced by the interruption of the in-person educational systems, governments proposed strategies such as the one outlined by the Chinese government with the slogan “Suspending Classes Without Stopping Learning” [40]. The strategy has changed teachers’ work [28,37,41] and represented an increase in the importance of technology and a decrease in the importance of the physical location of work [38,42]. Authors discuss the necessity of maintaining children outside of school [27,43,44]. For VanderWeele [42], the mortality rate among children is extremely low. According to the study developed by Gandolfi [26], the opening of a typical in-person school would represent an increase of COVID-19 cases among school’s individuals. The study affirmed that the only exception would be if there were a rigid control of the virus in the region around the school. Classrooms have characteristics that can favor the spread of the virus such as overcrowded rooms, poor air condition, and inadequate ventilation. Schools should consider the installation of air decontamination filters for the re-opening of in-person schools after the COVID-19 pandemic [44].

Before the COVID-19 pandemic, online systems were considered as a strategy for a particular group of students [41]. The online education system must be improved to reduce disparities and to increase parents’ involvement [30,33]. Kim and Asbury [45] identified six themes that represent teachers’ experience in turning to an online system in the short period during the COVID-19 pandemic period. The themes are uncertainty, finding away, worry for the vulnerable, relationship importance, teacher identity, and reflections. For Aguilera-Hermida [30], for the students, the online education system caused a drop in motivation, self-efficacy, and cognitive engagement, while for Holt et al. [35], the students appreciated the flexibility, novelty, and the possibility to interact with the outside world proposed by the online education system. For Scavarda et al. [46], the innovative technologies and the new teaching procedures are a challenge faced by teachers and students.

The social isolation and the consequent staying at home affects not only the students’ health but also the health of the institution they are a part of [47,48]. Colao et al. [49] and Dias and Reis [50] affirm that schools do not fulfill only education needs but also socialization needs as well. In the case of online education systems, the students do not develop self-confidence, friendship, empathy, participation, respect, gratitude, compassion, and responsibility. Educators must rethink the education process after the end of the COVID-19 pandemic [51]. For Zhang et al. [52], among the problems faced by the educational online systems are the lack of structure for online classes, the teachers’ inexperience in online classes, and the complex home environment. This exploratory research has as a main goal to identify how working from home and the consequent social isolation interfered in teachers’ work and students’ learning and to identify the challenges, difficulties, advantages, opportunities, demands, trends, implications, outlooks, lessons, directions, and feelings of students and teachers in the teaching processes during the COVID-19 pandemic period. To reach its goal and aiming for adequate conduct in research development [53], the authors of this paper outlined theoretical and empirical research. Including this introductory section, this paper is organized into five sections. Section 2 presents the theoretical framework, Section 3 shows the materials and methods, Section 4 notes the results and discussion, and Section 5 concludes and presents the study’s limitations and directions for further research.

2. The Theoretical Framework

The COVID-19 pandemic has compelled changes in daily human activities. Having a home office, or the possibility of working from home, was one of them [3]. Social distancing has hindered the economy and imposed social isolation [13–19,54,55]. Social distancing is an essential strategy to avoid the spread of the COVID-19. Nevertheless, it is associated with depression and traumatic stress [8,10–16,19].

Schooling has been among the most affected activities by the COVID-19 pandemic. According to UNESCO (United Nations Educational, Scientific, and Cultural Organization) [56], 130 countries have closed their schools because of the pandemic. This has affected 990,324,537 students, i.e., 56.6% of all students enrolled in formal education [56].

The progression of the COVID-19 pandemic has forced the closure of schools and universities [16,26–36] and migration to online platforms [31–37]. Online education platforms were used to overcome the lack of in-person classes over the COVID-19 pandemic [16,26,27]. Kaden [27] points out that the preparation of online platforms is an important step for the success of the strategy. The author also detaches the impossibility of having all the students engaged in the online platforms mainly due to the difficulties in Internet access.

The COVID-19 pandemic brought significant opportunities for education [42] such as the introduction of new technologies to its methodologies. Abuhammad [15] revealed four challenges for distance learning during the COVID-19 period: personal, technical, logistical, and financial. The author states that a great number of parents believe that distance learning should never be a substitute for in-person lessons. For Owolabi [57], the COVID-19 pandemic has changed the nature of formal education. To meet new requirements and guarantee the success of this new school, improvements in infrastructure, technology, assessment, quality assurance, teaching material and resources, and teaching pedagogy are necessary. Industry 4.0 concepts and technology could be the key to this change [7,50,57,58].

Armstrong-Mensah et al. [16] showed that, even with distance learning, students are motivated to complete their assignments. In addition to that, to overcome the new demands imposed on traditional schools, teachers are creating assignments to communicate with the students and their parents through Internet platforms to offer the best education that is possible during the COVID-19 pandemic period [18]. For Uka and Uka [43], the online system was a challenge to institutional leadership, teachers, and students. For Shyu [59], valuing politics, education, and health services is a way of providing equity to all.

For Walwyn [21], not only will the format of universities and schools change, but also everything else after the COVID-19 pandemic has been defeated. One positive point of the COVID-19 pandemic is that it has led humanity to reconsider its responsibility towards the pandemics [60]. For Galvani et al. [61], the experience of the COVID-19 pandemic is one of the most significant for mankind in the 21st century, and it is an opportunity to build a fairer, more cooperative, and more sustainable world [1,62,63].

The Brazilian educational system, which already suffered from neglect, received a great blow during the COVID-19 pandemics period as mentioned by the Brazilian higher education institution the Getulio Vargas foundation [64]. The setback in Brazilian education due to the COVID-19 pandemics period is estimated at four years and the greatest victims were the elementary school students [64]. It was also noticed that, although some students are fine with this situation, most are having difficulty studying at a distance, they are anxious, sad, and unmotivated. They miss school, friends, and teachers [65].

3. Materials and Methods

Data Collection and Population

The definition of the study population is based in the total number of teachers from kindergarten, elementary, and high schools in Rio de Janeiro city. Data from the 2018 School Census [66] showed that Rio de Janeiro has 66,999 teachers, distributed in 3934 schools, 2010 being private, 1439 municipal, 457 state, and 28 federal schools. With the impossibility of interviewing the entire population, the authors of this paper sent an email questionnaire to the schools from Rio de Janeiro asking their teachers to answer the

questionnaire (Appendix A). The schools' email addresses were found through the Internet. A group of 116 teachers answered the questionnaire, 42% being from municipal, 35.7% from state, 11.6% from private, and 10.7% from federal schools. The data analysis of this paper considered the Questions 1, 2, 3, 4, 9, 16, 17, 18, 19, and 39 of the questionnaire submitted and answered by teachers from Rio de Janeiro city schools, that refer to how working from home and the consequent social isolation interfered in the teachers' work and students' learning, according to teachers' perception, and to identify the main challenges, difficulties, advantages, opportunities, demands, trends, implications, outlooks, lessons, directions, and feelings of students and teachers in the teaching processes during the COVID-19 pandemic period.

The statistical evaluation of this paper was performed using IBM SPSS Statistics for Windows (Version 22.0. Armonk, NY, USA: IBM Corporation). The descriptive analyses were carried out with descriptive statistics (proportions, rates, minimum, maximum, mean, median, standard deviation, coefficient of variation—CV). Statistical significance was assumed at the 5% level. To check the association between two qualitative variables, comparing the frequency distribution of a qualitative variable in independent groups, the Chi-square test was used. When the Chi-square test was inconclusive, Fisher's exact test was used instead. In the inferential analysis of quantitative variables, the hypothesis of normality of the distribution was verified by the Kolmogorov–Smirnov and Shapiro–Wilk tests. The distribution of a variable was considered normal when the two normality tests concluded this way. Student's *t*-test was used for the distributions of two independent groups when the variable followed normal distribution in all groups. For variables that had the hypothesis of normality rejected in at least one of the groups, and for ordinal variables, the comparison of two independent groups was performed using the Mann–Whitney nonparametric test. The distributions of a quantitative variable from more than two independent groups were compared by ANOVA if the variable under test followed a normal distribution in all groups, or by the Kruskal–Wallis test when the variable under test did not follow normal distribution in all groups. The methodology was based on Triola [67], Favero et al. [68], and Medronho et al. [69].

In addition, the authors of this paper developed a descriptive analysis of all the teachers' responses, analyzing the association of the answers by the teachers' sex, age, length of experience, the type of learning, the type of school, the education level, and the subject area. Table 1 shows the main characteristics of the teachers.

Table 1. Characteristics of teachers who responded.

Variable	Global		Female		Male		<i>p</i> -Value *
	F	%	F	%	F	%	
Age (years)							
28–33	2	1.7	1	1.2	1	2.9	0.061 (a)
33–38	7	6.0	6	7.4	1	2.9	
38–43	15	12.9	12	14.8	3	8.6	
43–48	13	11.2	10	12.3	3	8.6	
48–53	28	24.1	20	24.7	8	22.9	
53–58	20	17.2	14	17.3	6	17.1	
58–63	17	14.7	11	13.6	6	17.1	
63–68	14	12.1	7	8.6	7	20.0	

Table 1. Cont.

Variable	Global		Female		Male		<i>p</i> -Value *
	F	%	F	%	F	%	
Time of experience (years)							
1–7	3	2.6	2	2.5	1	2.9	0.506 (a)
7–13	24	20.7	16	19.8	8	22.9	
13–19	24	20.7	18	22.2	6	17.1	
19–25	22	19.0	17	21.0	5	14.3	
25–31	26	22.4	18	22.2	8	22.9	
31–37	14	12.1	9	11.1	5	14.3	
37–43	3	2.6	1	1.2	2	5.7	
Type of learning							0.627 (b)
No information	16	13.8	12	14.8	4	11.4	
Distance learning	14	12.1	10	12.3	4	11.4	
In-person learning	86	74.1	59	72.8	27	77.1	
Type of school							
No information	4	3.4	4	4.9	0	0.0	0.001 (c)
Municipal school	47	42.0	40	51.9	7	20.0	
State school	40	35.7	26	33.8	14	40.0	
Federal school	12	10.7	3	3.9	9	25.7	
Private school	13	11.6	8	10.4	5	14.3	
Education level							
No information	3	2.6	3	3.9	0	0.0	
Elementary school I	34	29.3	33	40.7	1	2.9	<0.001 (b)
Elementary school II	29	25.0	18	22.2	11	31.4	0.293 (b)
High school	45	38.8	25	30.9	20	57.1	0.008 (b)
Youth and adult education	3	2.6	2	2.5	1	2.9	1.000 (c)
Preparatory for competition	2	1.7	0	0.0	2	5.7	0.089 (c)
Subject area **							
Portuguese, English, Spanish	50	43.1%	37	45.7%	13	37.1%	0.421 (b)
Pedagogical/Education/Philosophy / Sociology/History and Geography	22	19.0%	13	16.0%	9	25.7%	0.302 (c)
Mathematics/Chemistry/Physics	18	15.5%	13	16.0%	5	14.3%	1.000 (c)
Science/Biology	13	11.2%	8	9.9%	5	14.3%	1.000 (c)
Physical Education	8	6.9%	3	3.7%	5	14.3%	0.053 (c)
Primary Grades	3	2.6%	3	3.7%	0	0.0%	0.553 (c)
Art/Design	2	1.7%	1	1.2%	1	2.9%	1.000 (c)
Administration	1	0.9%	1	1.2%	0	0.0%	1.000 (c)
Computing	1	0.9%	0	0.0%	1	2.9%	0.984 (c)

* *p*-value of the adequate test to compare the distributions of the female and male subgroups: (a) Student's *t*-test, (b) Chi-square test, (c) Fisher's exact test. ** the sum of frequencies exceeds the sample size 116 because some respondents teach more than one subject.

As can be seen in Table 1, in the distribution of the type of school for female and male teachers, *p*-value = 0.001 of the chi square test, comparing the frequencies, it was observed that the main differences between the groups are in the frequency of teachers in

the municipal school, which is higher in the female group, and in the frequency of teachers in the federal school, which is higher in the male group. The frequencies of elementary school teachers (higher in the female group) and the frequencies of high school teachers (higher in the male group) were also different. When the subjects taught were evaluated, none of them were associated with the sex of the teacher (all p -values greater than 5%).

The teachers' age and the professional experience followed normal distribution in the female and male subgroups (showed p -values greater than 5% in Kolmogorov–Smirnov and Shapiro–Wilk normality tests). The distributions of these variables in independent groups were compared by Student's t -test. Student's t -test did not show any significant difference between the mean age and the mean length of teachers' experience in the female and male subgroups (p -values greater than 5%). The teachers' age was on average 47.8 years old and they had on average 20.4 years of teaching experience. The age variability was low ($CV < 0.20$), but the length of professional experience showed high variability among teachers ($CV > 0.4$).

When comparing the age distributions of teachers by type of school they teach in, the Kruskal–Wallis test showed no significant difference between the age distributions of teachers of different types of school (p -value = 0.233). When comparing the distributions of time of experience by type of school they teach, the Kruskal–Wallis test showed a significant difference (p -value = 0.023). In a post hoc analysis using the Tukey test, it was concluded that teachers at federal schools were significantly less experienced than in the other types of schools.

4. Results and Discussions

The data analysis of this paper considered Questions 1, 2, 3, 4, 9, 16, 17, 18, 19, and 39 of the email questionnaires submitted and answered by teachers from Rio de Janeiro schools. The questions referred to how working from home and the consequent social isolation interfered in teachers' work and students' learning, according to teachers' perceptions, and to identifying the challenges, difficulties, advantages, opportunities, demands, trends, implications, outlooks, lessons, directions, and feelings of students and teachers in the teaching processes during the COVID-19 pandemic period.

Procedure and Sample

Considering the question of how working from home and the consequent social isolation interfered in teachers' work and students' learning during the COVID-19 period, the results showed that for 3.6% of the teachers, working from home and the consequent social isolation did not interfere in their work. For the remaining 96.4%, the main interferences of social isolation in the teacher's work were the lack of contact and interaction with the student (40.5%), the negative influence on student learning (9.5%), the accumulation of domestic tasks (8.6%), the increased workload (7.8%), the lack of resources for some students to access the online class (6.9%), and the increase of anxiety and depression (6.0%). The results showed that social isolation and remote teaching offered families the opportunity to take on their educational role. Parents are working hard to the point of being exhausted to help their children academically and maintain the entire routine of the house, reconciling household chores with formal work or their home office.

Considering the students' learning, for 2.6% of the teachers, working from home and the consequent social isolation did not interfere with student learning; for the remaining 97.4%, the main interferences in their learning were the students' difficulty accessing the technologies used (13.8%), the stress, the psychological state, the depression or the emotional distress of the students (13.8%), the absence of face-to-face contact with the teacher (11.2%), the restriction of exchanges between students (9.5%), the low participation of students in classes (6.0%), the absence of routine, habit, or maturity of studying alone (5.2%), and the effect of distance in the dialogue and impossibility of discussion (5.2%). It was also noticed that, although some students are fine with this situation, most are having

difficulty studying at a distance; they are anxious, sad, and unmotivated. They miss school, friends, and teachers.

Considering the question of identifying the difficulties, advantages, and feelings of students and teachers in the teaching processes during the COVID-19 pandemic, 29 different difficulties were mentioned by the teachers. The most relevant difficulties mentioned by more than 5% of the teachers were the difficulties with technology (34.5%), the problems in accessing the media, the Internet, and the digital resources (29.3%), the lack of full participation, interest, and commitment of the students (10.3%), digital exclusion (10.3%), the impossibility of reaching all the students (7.8%), the lack of feedback from the students (6.9%), the lack of interest or willingness of the family to help the students (6.9%), the adaptation of the students to distance learning (6.9%), the social distance, the lack of contact and affection (6.0%), the social and economic conditions and lack of resources of families (5.2%), the online system (5.2%), and the absence of materials to carry out a diversified pedagogical practice (5.2%). Table 2 shows the frequency distribution of the number of difficulties pointed out by each teacher. Most of the teachers, 60.3%, cited only one difficulty, but one of the teachers declared “all existing difficulties”, considering the 29 difficulties mentioned.

Table 2. The frequency distribution of the number of difficulties pointed out by each teacher.

The Number of Difficulties Pointed out by Each Teacher	N	%
0	3	2.6
1	70	60.3
2	27	23.3
3	11	9.5
4	4	3.4
29	1	0.9

As mentioned, the second relevant difficulty faced by the teachers was related to problems with Internet access and digital resources, which represents 29.3% of data collected from the questionnaire. According to the research presented by Painel TIC COVID-19 [70], during the COVID-19 pandemic period, the Internet reached a higher volume of access. The problem with the Internet and technology access accentuated inequalities in education.

In the sample, 10.3% of the teachers declared that they were able to overcome the difficulties and challenges in the teaching process during the COVID-19 pandemic period, without reservations. The remaining 87.9% of the teachers declared that they were not able to overcome the difficulties and challenges in the teaching process during the COVID-19 pandemic period.

Table 3 shows the frequency distribution of teachers’ actions and practices trying to overcome and adapt themselves to the difficulties and challenges in the teaching process during the COVID-19 pandemic. The variety of actions and practices were high (34 different actions) and the most cited actions, with frequencies greater than 5%, were the use of more popular and simple tools like social networks, Facebook, and WhatsApp (9.5%), and asking for help (10.3%). The teachers mentioned that they asked for help from other colleagues, pedagogical coordination, children, spouses, and friends.

Table 3. The frequency distributions of the teachers' actions and practices trying to overcome difficulties and adapt themselves to the challenges of the teaching process during the COVID-19 pandemic.

Action/Practice	N	%
To ask for help	12	10.3
To use more popular and simple tools (social networks, Facebook, and WhatsApp)	11	9.5
To be creative	5	4.3
To work with adaptations	4	3.4
To research	4	3.4
To make pedagogical adaptations	3	2.6
To make families aware of the importance of accompanying their child	3	2.6
To make video lessons	3	2.6
To use Zoom	2	1.7
To use hybrid teaching	2	1.7
To ask the help of the coordination	2	1.7
To learn to learn	2	1.7
To start online chats and guidelines	2	1.7
To research and to seek for colleagues help	2	1.7
To encourage students	2	1.7
To receive a pedagogical notebook	2	1.7
To make tutorials	2	1.7
To encourage students by sending emails	2	1.7
To start meetings on Meet	2	1.7
To invest private resources	2	1.7
To offer printed material	2	1.7
To invest in explanatory classes	1	0.9
To work with interdisciplinarity	1	0.9
To use other teaching strategies such as applications (SOCRATIVE, Kahoot!, etc.)	1	0.9
To invest in personal and professional qualification	1	0.9
To have classes in WhatsApp	1	0.9
To share life and health care experiences from childhood to current ages	1	0.9
To use new resources and new strategies	1	0.9
To not look at email and WhatsApp at certain times of the day	1	0.9
To search for videos to send to the students	1	0.9
To make more learning assessments	1	0.9
To use various tools	1	0.9
To send theoretical papers	1	0.9
To produce handouts	1	0.9

Table 4 shows the frequency distribution of the number of actions taken by teachers trying to overcome and adapt themselves to the difficulties and challenges in the teaching process during the COVID-19 pandemic. Typically, the teachers cited only one action (44.8%) and only 17 teachers (14.6%) declared more than one action trying to overcome and adapt themselves to the difficulties and challenges in the teaching process during the COVID-19 pandemic. It is worth mentioning the proportion of teachers who have taken no action regarding the difficulties they have encountered during their online teaching

(40.5%). It was not possible to explain this phenomenon, because there was no object in this questionnaire to question the teachers on it.

Table 4. The frequency distribution of the number of actions taken by teachers to overcome and adapt themselves to the difficulties and challenges in the teaching process during the COVID-19 pandemic period.

The Number of Actions	N	%
0	47	40.5
1	52	44.8
2	13	11.2
3	4	3.4

Even with so many difficulties and challenges in the teaching process during the COVID-19 pandemic, the teachers were able to cite facilities and opportunities that they found in the teaching practice during the period, the most important of which, mentioned by more than 5% of the teachers, were the opportunity to study, the free courses available, the opportunity to learn and to expand knowledge about the use of technologies and thus obtain professional improvement (26.7%), and the practicality and ease of digital tools (12.9%), as can be seen in Table 5.

Table 5. The frequency distribution of facilities and opportunities found in the teaching process during the COVID-19 pandemic period.

The Facilities and the Opportunities	N	%
The opportunity to study, take free courses, learning about the use of technologies and professional development	31	26.7
The practicality and the use of digital tools	15	12.9
The social isolation	4	3.4
The time	3	2.6
The flexibility in making working time	3	2.6
The bibliography material on the Internet	2	1.7
The help from colleagues	2	1.7
The use of WhatsApp	2	1.7
The municipality of Rio makes auxiliary material for classes available every week	1	0.9
The contact with students	1	0.9
The opportunity for future hybrid education	1	0.9
The theoretical issues	1	0.9
The online classes on Meet	1	0.9
The opportunity of maintaining virtual contact with the students	1	0.9
The lesson preparation is better than before	1	0.9
The speed in the preparation of the classes and the fact that the work is being done at home	1	0.9

From the questionnaire, 60.7% of the teachers affirmed that they took advantage of the opportunities found in the teaching process during the COVID-19 pandemic, while 39.3% affirmed that they did not take advantage of the opportunities found in the teaching process during the COVID-19 pandemic period. For 80.7% of teachers, the main ways of taking advantage of the facilities and opportunities found in the teaching process during the COVID-19 pandemic period were using resources, digital strategies and various

technologies that were not used in classroom teaching and improving practice (18.8%), obtaining training, learning, and developing new skills (7.8%), and researching (6.9%).

Considering the frequency distribution of the students' difficulties and challenges with the new teaching modalities practiced in the COVID-19 pandemic period, for 5.2% of the teachers there were no difficulties for the students. The remaining 94.8% of the teachers pointed out as the dominant difficulty the lack of resources to access and monitor online education (64.7%). In addition to this difficulty, more than 5% of the teachers mentioned as student difficulties and challenges the lack of motivation and interest (13.8%), the difficulty in organizing a study routine (12.1%), the need for help (11.2%), the lack of support, encouragement, and responsibility of the families (8.6%), the difficulty or lack of technological knowledge (6.9%), the difficulty adapting to the new (5.2%), and the lack of family structure (5.2%).

When the authors of this paper asked about the students' facilities and opportunities with the new teaching modalities practiced during the COVID-19 pandemic period, for the most of the teachers, there were no facilities and opportunities for students (48.3%). Among the few facilities and opportunities recognized for students, listed in Table 6, the opportunity to obtain new technological knowledge (21.6%) and the access to different forms of learning and audiovisual resources (15.5%) stand out.

Table 6. The frequency distribution of the students' facilities and opportunities with the new teaching modalities during the COVID-19 pandemic period.

Students' Facilities and Opportunities	N	%
There is no facility or opportunity	56	48.3
The opportunity to obtain new technological knowledge	25	21.6
The access to different forms of learning and audiovisual resources	18	15.5
The family participation	5	4.3
The research training	4	3.4
The autonomy development	4	3.4
The time flexibility	4	3.4
The comprehensive knowledge	3	2.6
The video lessons	3	2.6
The online tests	2	1.7
The not needing to go to the teaching unit	2	1.7
The ability to intern	1	0.9
The participation in virtual meetings	1	0.9
The dedicated teachers and organized school	1	0.9

Table 7 shows the frequency distribution of teachers' feelings and sensations in this period of working from home and the consequent social isolation. The dominant feelings in the teachers' statement, cited by more than 50% of them, were frustration (cited by 62.1% of teachers) and hope (cited by 51.7%).

Table 7. The frequency distribution of teachers' feelings and sensations in the social isolation period.

Feeling/Sensation	N	%
Frustration	72	62.1
Hope	60	51.7
Strangeness	51	44.0
Tension	49	42.2
Sadness	43	37.1
Love	37	31.9
Compassion	34	29.3
Calm	33	28.4
Surprise	30	25.9
Fear	27	23.3
Satisfaction	27	23.3
Despair	23	19.8
Nostalgia	21	18.1
Gratitude	21	18.1
Boredom	16	13.8
Joy	15	12.9
Rage	15	12.9
Happiness	11	9.5
Humor	11	9.5
Guilt	11	9.5
Excitement	7	6.0
Indifference	6	5.2
Euphoria	4	3.4
Missing	2	1.7
Hostility	2	1.7
Dread	2	1.7
Empathy	2	1.7
Anxiety	1	0.9
Concern	1	0.9
Indignation	1	0.9
Hate	1	0.9
Discomfort with the use of technologies	1	0.9
Mental tiredness and insomnia	1	0.9
Acceptance	1	0.9
Overcoming	1	0.9
A mixture of emotions that alternate and agglutinate each moment	1	0.9

Table 8 shows the frequency distribution of teachers' perception on the students' feelings during the COVID-19 pandemic. The dominant feelings of students in the teachers' statement were strangeness (quoted by 61.2% of the teachers) and frustration (cited by 58.6%).

Table 8. The frequency distribution of students' feelings and sensations perceived by teachers in this period of social isolation.

Feeling/Sensation	N	%
Strangeness	71	61.2
Frustration	68	58.6
Indifference	52	44.8
Boredom	51	44.0
Despair	49	42.2
Sadness	39	33.6
Voltage	32	27.6
Fear	32	27.6
Surprise	26	22.4
Hope	23	19.8
Joy	22	19.0
Excitement	20	17.2
Gratitude	19	16.4
Rage	15	12.9
Hostility	14	12.1
Euphoria	14	12.1
Satisfaction	14	12.1
Nostalgia	13	11.2
Love	12	10.3
Happiness	11	9.5
Dread	11	9.5
Humor	9	7.8
None	8	6.9
Compassion	7	6.0
Hate	6	5.2
Guilt	4	3.4
Calm	4	3.4
They are not enjoying staying at home so long	1	0.9
I do not know	1	0.9
Jealous	1	0.9
They are special students, and their feelings are very varied	1	0.9

The great demand and challenge were to keep the students' motivation and interest during the COVID-19 pandemics period and to help them overcome the feeling of strangeness and frustration over the period. Everyone was taken by surprise so there was no time for transition to the new reality.

In terms of directions and trends, the authors of this paper believe that it is possible to take advantage of learning during the COVID-19 pandemic period by bringing positive experiences to the post COVID-19 pandemic period. The offer of online courses and the use of social networks to reduce the distance caused by the social distancing imposed by COVID-19 are among the strategies to be maintained.

This research has shown that even during the COVID-19 pandemic period and with the social isolation and all the additional difficulties presented in the period, the teachers

and the students made all the effort to do their job well. Some teachers used their own resources in this regard. There is hope that at the end of this period of uncertainty and insecurity, standards will be changed, and it will be an opportunity to rethink education, especially regarding issues of quality, equality, and the access to different forms of learning and audiovisual resources.

5. Conclusions

This exploratory research had as main purpose to identify how working from home and the consequent social isolation interfered in teachers' work and students' learning and to identify the challenges, difficulties, advantages, opportunities, demands, trends, implications, outlooks, lessons, directions, and feelings of students and teachers in the teaching processes during the COVID-19 pandemic period. According to the data collected in this research, 96.4% of the teachers affirmed that working from home and social isolation interfered in their work and the main interferences were the lack of contact and interaction with the students and the negative influence on students' learning. For the students' learning, 97.4% of the teachers affirmed that the main interferences were the students' difficulties in accessing the technologies used, the stress, the psychological state, and the depression or the students' emotional distress.

Considering the difficulties, advantages, and feelings of students and teachers in the teaching processes during the COVID-19 pandemic period, the most relevant difficulties were the problems in accessing the media, the Internet, the lack of full participation, interest, and commitment of the students, the impossibility of reaching all the students, the lack of feedback from the students, the lack of interest or willingness of the family in helping the students, the students' adaptation to distance learning, and the lack of contact and affection.

Even with difficulties and challenges, the teachers detected facilities and opportunities in the COVID-19 pandemic period. It is worth highlighting the opportunity to study, to take free courses available, and to learn and expand knowledge about the use of technologies. Considering the students' facilities and opportunities, most of the teachers highlighted that there were no facilities and opportunities for them.

Considering the teachers' feelings and sensations in the COVID-19 pandemic period with working from home and the consequent social isolation, the most significant feelings were frustration and hope. For the students, the most significant feelings were strangeness and frustration.

It is a fact that the social isolation made the interaction between students and teachers difficult, but on the other hand, opportunities were also observed in the COVID-19 pandemic period. To maintain what was positive is what is expected in the post COVID-19 pandemic period. Increasing the offer of online courses, stimulating the interaction between teachers and students through Facebook, WhatsApp, emails, and explanatory videos, and the offer of a better Internet access service are some strategies, since Internet access was the main difficulty observed in this study. What is expected is that the education continues to fulfill its role of guaranteeing full individual development, preparing them for citizenship, and qualifying them for the job market.

Limitations and Future Work

The impossibility of interviewing all the teachers from Rio de Janeiro and knowing the students' opinions from the perspective of teachers can be considered the major limitations for this study. Moreover, this was an exploratory study, and it did not aim to confirm the results that were generated. For future studies, the idea is to expand this exploratory research to other Brazilian regions and to Brazilian universities. Another point for the future agenda is to discuss in depth the results presented in this paper, especially regarding the acceptance of the online education system and students' and teachers' feelings and sensations during the COVID-19 pandemic period. Another idea is to verify the effects of the post-COVID-19 pandemic in education and to verify students' opinion for themselves.

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Appendix A

Multidisciplinary Research: Influence of Pandemics on Teaching and Learning

Dear Teacher,

Ana Dias, a colleague of many of us, is doing a multidisciplinary doctoral research in Production Engineering at CEFET/RJ on the influence of the COVID-19 pandemic on teaching and learning processes in Brazilian public and private schools and would like to request your participation in a questionnaire. Any doubts, feel free to contact her by email (missdias@gmail.com).

FILL OUT FORM

Email address

Name:

I authorize the results of this research to be presented and published, knowing that my name and my institution will be kept strictly confidential.

☐ Yes

☐ No

Sex:

Age:

Years as a teacher:

I am answering about the perspective of my performance before the pandemic in:

☐ Classroom Teaching

☐ E-Learning—EL

Type of school I teach at (choose one):

- ☐ Municipal Public School
- ☐ State Public School
- ☐ Federal Public School
- ☐ Private school
- ☐ Other:

Class level I teach (choose one):

- ☐ Child education
- ☐ Elementary School I (First to Fifth Year)
- ☐ Elementary School II (Sixth to Ninth Year)
- ☐ High school
- ☐ Technological graduation
- ☐ Graduation
- ☐ Bachelor's degree
- ☐ Residence
- ☐ Specialization
- ☐ MBA
- ☐ Professional Master's
- ☐ Academic Master's
- ☐ Professional Doctorate (PhD)
- ☐ Doctorate (PhD) degree
- ☐ Post-doctoral
- ☐ Other:

The discipline that I teach and that I would like to use as a parameter for this research is (write only one discipline, for example: administration, biology, law, economics, physical education, nursing, mechanical engineering, philosophy, physics, history, informatics, mathematics, music, nutrition, Portuguese, social work, theology, tourism):

1-The difficulties and challenges I encounter in my teaching practice in the pandemic are (write "NO", if this does not apply):

2-I can overcome and adapt to these difficulties and challenges as follows (write "NO", if this does not apply):

3-The facilities and opportunities I find in my teaching practice in the pandemic are (write "NO", if this does not apply):

4-I can take advantage of these facilities and opportunities as follows (write "NO", if this does not apply):

5-The technology (s) and methodology (s) I use for my teaching practice in the pandemic are (you can choose more than one):

- ☐ Blackboard
- ☐ Email
- ☐ Facebook
- ☐ Google Classroom
- ☐ Google Meet
- ☐ Instagram
- ☐ Microsoft Teams
- ☐ Moodle
- ☐ Skype
- ☐ YouTube
- ☐ WhatsApp
- ☐ Zoom
- ☐ None
- ☐ Other:

6-The technology (s) and methodology (s) that I am creating familiarity with because of the pandemic are (you can choose more than one):

- ☐ Blackboard
- ☐ Email
- ☐ Facebook
- ☐ Instagram
- ☐ Google Classroom
- ☐ Google Meet
- ☐ Microsoft Teams
- ☐ Moodle
- ☐ Skype
- ☐ YouTube
- ☐ WhatsApp
- ☐ Zoom
- ☐ None
- ☐ Other:

7-The training I am doing to work with this (these) technology (s) and these (these) methodology (s) is (write "NO", if this does not apply):

8-I consider myself able to use this (these) technology (s) and this (these) methodology (s) (0% totally unfit and 100% totally fit):

9-The work from home and the consequent social isolation interfered with my work as follows (write "NO", if this does not apply):

10-I try to establish EQUALITY for and among my students in the pandemic as follows (write "NO", if this does not apply):

11-The percentage of EQUALITY that I am managing to establish is (write "NO", if this does not apply):

12-I try to establish QUALITY for and among my students in the pandemic as follows (write "NO", if this does not apply):

13-The percentage that I am managing to establish for QUALITY is (write "NO", if this does not apply):

14-I try to establish JUSTICE for and among my students in the pandemic as follows (write "NO", if this does not apply):

15-The percentage that I am managing to establish for JUSTICE is (write "NO", if this does not apply):

16-The sensations, feelings, and emotions that describe my teaching experience in the pandemic are (you can choose more than one):

- ☐ Joy
- ☐ Love
- ☐ Calm
- ☐ Jealous
- ☐ Compassion
- ☐ Fault
- ☐ Despair
- ☐ Hope
- ☐ Strangeness
- ☐ Euphoria
- ☐ Excitement
- ☐ Happiness

- ☐ Frustration
- ☐ Gratitude
- ☐ Hostility
- ☐ Humor
- ☐ Indifference
- ☐ Fear
- ☐ Nostalgia
- ☐ Hate
- ☐ Dread
- ☐ Rage
- ☐ Satisfaction
- ☐ Surprise
- ☐ Boredom
- ☐ Nervous tension
- ☐ Sadness
- ☐ None
- ☐ Other:

17-The difficulties and challenges of my students with the new teaching methods practiced in the pandemic are (write "NO", if this does not apply):

18-The facilities and opportunities of my students with the new teaching methods practiced in the pandemic are (write "NO", if this does not apply):

19-The work from home and the consequent social isolation interfered with the performance and learning of my students as follows (write "NO", if this does not apply):

20-Defining student performance as the assessment of knowledge acquired in the classroom, the percentage of my students with a drop in school performance in the pandemic is:

21-The percentage of my students with MAINTENANCE of school performance in the pandemic is:

22-The percentage of my students with INCREASED school performance in the pandemic is:

23-I interact with my students with DECREASED school performance as follows (write "NO", if this does not apply):

24-I interact with my students with MAINTENANCE of school performance as follows (write "NO", if this does not apply):

25-I interact with my students with INCREASED school performance as follows (write "NO", if this does not apply):

26-Defining student learning as the process of behavior change obtained through experience built by emotional, neurological, relational, and environmental factors, the percentage of my students with a DECREASED learning in the pandemic is:

27-The percentage of my students with MAINTENANCE of learning in the pandemic is:

28-The percentage of my students with INCREASED learning in the pandemic is:

29-I interact with my students with DECREASED learning as follows (write "NO", if this does not apply):

30-I interact with my students with MAINTENANCE of learning as follows (write "NO", if this does not apply):

31-I interact with my students with INCREASED learning as follows (write "NO", if this does not apply):

32-The percentage of my students with DECREASED learning who were familiar with this (these) technology(s) and this (these) methodology(s) adopted in the pandemic is (0% unfamiliar and 100% familiar):

33-The percentage of my MAINTENANCE learning students who were familiar with this (these) technology(s) and this (these) methodology(s) adopted in the pandemic is (0% unfamiliar and 100% familiar):

34-The percentage of my students with INCREASED learning who were familiar with this technology(s) and this methodology(s) adopted in the pandemic is (0% unfamiliar and 100% familiar):

35-The percentage of my students with DECREASED school performance who were familiar with this technology(s) and this methodology(s) adopted in the pandemic is (0% unfamiliar and 100% familiar):

36-The percentage of my students with MAINTENANCE of school performance who were familiar with this (these) technology(s) and this (these) methodology(s) adopted in the pandemic is (0% unfamiliar and 100% familiar):

37-The percentage of my students with INCREASED school performance who were familiar with this (these) technology(s) and this (these) methodology(s) adopted in the pandemic is (0% unfamiliar and 100% familiar):

38-The training that my students did to use the technology(s) and methodology(s) in the pandemic are (write "NO", if this does not apply):

39-My students' sensations, feelings, and emotions that describe their learning experience in the pandemic are (you can choose more than one):

- ☐ Joy
- ☐ Love
- ☐ Calm
- ☐ Jealous
- ☐ Compassion
- ☐ Fault
- ☐ Despair
- ☐ Hope
- ☐ Strangeness
- ☐ Euphoria
- ☐ Excitement
- ☐ Happiness
- ☐ Frustration
- ☐ Gratitude
- ☐ Hostility
- ☐ Humor
- ☐ Indifference
- ☐ Fear
- ☐ Nostalgia
- ☐ Hate
- ☐ Dread
- ☐ Rage
- ☐ Satisfaction
- ☐ Surprise
- ☐ Boredom
- ☐ Tension
- ☐ Sadness
- ☐ None
- ☐ Other:

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