The new classmate: an exploration of how CoVid-19 affected primary schools activities in Italy

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ABSTRACT

Among all the others, one of the groups of persons most affected by the restrictions applied to contrast Corona-Virus spread is surely represented by children. In particular, closing school has been an action applied by several countries (195 at the beginning of April 2020), involving 1,600,000,000 students all over the world. In Italy, distance learning activities have been adopted all over the country, at each educational stage, but with substantial differences (i.e., in terms of modalities and digital platforms). With the aim of investigating the most adopted technologies, didactic methodologies, as well as the impact on schools population, we have involved families of more than 1,000 Italian students, asking them to fill a survey. This paper presents the analysis of the results we have obtained, focusing on a delicate group of students: the ones attending primary schools, where kids learn fundamental knowledge and basic skills.

CCS CONCEPTS

• **Applied computing** → **E-learning**; **Distance learning**;

KEYWORDS

Distance Learning, CoVid-19, Primary School, Technologies for Education

1 INTRODUCTION

The CoVid-19 pandemic is affecting human activities all over the world, in a way that has marked our life as nobody could ever expected. With the aim of contrasting the virus spread, countries and

territories around the world have imposed different levels of lockdown (in terms of curfews, quarantines, and similar restrictions), involving more than half of the world's population by the first week of April 2020 [14]. Such a totally unexpected situation has dramatically changed our lives, forcing new ways to conduct our daily activities. In this sense, a strategic role has been played by ICTs, which have emerged as essential and indispensable [11]. In particular, already existing and available technologies and infrastructures have been exploited in a new and totalizing way, becoming the primary tool to accomplish tasks, instead of being, in many cases, an additional and optional equipment [6].

Smart and home-working have shown the need of identifying videoconferencing tools, platforms for sharing documents, synchronous and asynchronous communication applications [4]. Video call functionalities on social networks have become the new way to meet friends and relatives. Social networks have substituted squares and popular meeting points, as places where people chat and discuss about any topic of interests [12]. Indeed, all these activities and situations have let emerged as urgent the need for speed and stable Internet connection [7] and for adequate personal technological equipment [3].

One of the most important activities that has been strongly affected by the lockdown restrictions, involving billions of individuals all over the world, is represented by school and education [16]. In fact, according to Unesco, at the beginning of April 2020, schools, universities and colleges were closed on a nationwide or local basis in 195 countries, affecting approximately 1,600,000,000 learners, representing circa 91.3 per cent of the world's enrolled learners population [15]. This represents an earthquake in the education, marking a deep and serious crisis, which has forced the adoption of online and remote learning at each educational stage all over the world [1].

In Italy, schools and universities were first closed in 7 Regions (in the north, the hardest hit area by the contagious) by February 24th, and, then, in the rest of the country by March 4th [9]. In particular, schools will be kept closed until the end of the school year (June 2020), according to a following National Act, issued on April 8th 2020 [8]. Such an Act defined also official distance teaching and learning modalities, which were managed by singular and volunteer initiatives until that moment (in same cases managed by the Regions, or by the schools, or at least by the singular teachers). This means that there was a wide range of different approaches, technologies, and modalities, ranging from giving online streamed

lectures everyday (with the same timetable of the school activities) to avoiding any form of distance learning in the worst cases.

In such a context, which have been the most adopted technologies? Which have been the most used online platforms? Which have been the didactic methodologies adopted to support teachers and students in this emergency situation? How these new modalities have impacted on students and on their families (also in terms of availability of hardware equipment, Internet connection from home, quiet rooms for the connection)? In order to answer these questions, we have involved families of more than 1,000 Italian students by means of a survey, that has been filled by parents of school students. This paper presents the results we have obtained, focusing the attention on primary school students (totally families answered for 490 children in our study), since that is a very critical group, being in the process of acquiring basic and fundamental knowledge and skills, such as reading, writing, and counting. Moreover, because of the age of these students, their families have been particularly involved, as we further discuss in this manuscript. To anticipate some results of our analysis, a general negative sentiment emerged from the parents involved (mainly due to a significant increased load in caring kids' school activities and homework or to those cases where no distance learning activity has been provided), while, on a positive side, we can observe that most of the students were provided with all the necessary tools and equipment, and this has guaranteed the continuity of the education activities.

The rest of the paper is structured as follow. Section 2 briefly presents some distance learning modalities that have been adopted by Italian schools during the lockdown. Section 3 describes the survey we have prepared that has been filled by school students' parents. Section 4 presents the analysis of the data we have collected, while Section 5 discusses the obtained results from a qualitative perspective. Finally, Section 6 concludes this paper with some final remarks and future work.

2 DISTANCE LEARNING MODALITIES

This section briefly reports the main distance learning modalities adopted by Italian schools during the lockdown related to the CoVid-19 pandemic. The rest of the paper refers to such modalities, being one of the aim of this study investigating the ones most commonly exploited in such a context.

The most interactive and engaging distance learning form is represented by the online lesson. This requires that teachers and students exploit a video-conference tool (i.e., Microsoft Teams, Zoom, Google Meet), being connected at the same time, by means of a computer, a tablet, or a smartphone, equipped with a webcam, a microphone, and speakers. Usually, such video-conference tools let the user share documents, speaker's desktop, and they could also be provided with blackboard features, enriching the explanation.

An asynchronous form of didactic activity is the video lecture [10]. The teacher records a video while explaining the lesson topic, eventually adding and showing content and exercises on books or notebooks. The video content is then shared with the students (by sending an email, a message on a chat, or by sharing on a cloud repository, or by posting it on the digital class logbook).

Another asynchronous form that has been adopted is represented by preparing (or identifying already existing) didactical materials

(i.e., textual documents, audios, pictures, links to online resources), that teachers send to their students.

These modalities are usually exploited to assign homework that students have to send back to teachers for checking them.

3 THE SURVEY

In the following section we will discuss the main characteristics of the survey administered to the users that agreed to take part in our research project. The questionnaire was implemented using Google Forms, so it can be answered using both computers and mobile devices.

We engaged participants, on a voluntary basis, through social networks (such as, posting the questionnaire link in Facebook public/private groups) and using the snowball sampling method, inviting the respondents to recruit future subjects from among their acquaintances. Before starting the questionnaire, the participant was provided with information about the data collection and usage, according to the General Data Protection Regulation[1] (GDPR) EU regulation. We asked the participants to fill in the questionnaire separately for each child.

3.1 Main structure

The survey is based on a classic structure. It contains 32 questions divided into 6 groups. First group can be considered the demographic section. It does not contain questions about age or gender of the users, but questions about region and province of origin. The second group also contains demographic questions since it asks information about the attended school and year, and whether the distance learning was activated or not.

If distance learning was not activated, the participant is moved to a section asking about the motivation for this decision. Otherwise the third section contains 14 questions and enters into details about the distance learning. The information collected are: percentage of teachers that started distance learning (DL), when the DL was started, with which modality, if the students were divided into groups, which platforms were used, the number and duration of lessons in a day, students' and parents' satisfaction, problems, etc.

The fourth section asks questions about the learning environment. The section contains 11 questions about the used device (if it is shared with other people, if the device was bought for the particular situation or if the students already had it, etc.), the room (if it is shared or not, with whom, if the environment is noisy, etc.), the type of connection to the network, the level of children's computer literacy before and after the introduction of the DL.

In the last section, we give the possibility to leave comments. Finally, the last question asks if the participant has other children. We included this question to remind the participant to fill in the survey separately for each child.

The entire list of questions is presented in Table 1. Based on the survey questions, we provided participants with different typologies of answers, including multiple choices (with the possibility to select one or more options), rating scale, Likert scale, and open-ended questions. This allowed us to collect quantitative and also qualitative data.

Section	Question
1	In which region do you live?
1	In which province do you live?
2	What school does your child attend?
2	What year is your child?
2	Has your child's school activated distance learning?
2bis	Why hasn't distance learning been activated in your child's school?
3	Did distance learning start immediately for all subjects or was the start more gradual?
3	How many teachers of your child are offering distance learning?
3	What distance learning methods have your child's teachers activated?
3	Have the students been divided into groups?
3	What platforms is your child using?
3	Compared to the school before the Corona Virus, is your child attending more or less hours (video/online) of lessons?
3	On average, how many hours of online lessons (in distance learning) does your child attend each day?
3	On average, how long does an online lesson last?
3	On average, how long does a video lesson (video content) last?
3	Compared to the perceived load during school attendance before the Corona Virus, how is your child's workload perceived now?
3	How would you define the parents' workload in following the children during lessons?
3	Grade your appreciation for the distance learning
3	Grade the appreciation of your child for the distance learning
3	Have you/your child encountered any problems? If so, what kind?
4	Which devices does your child use to attend online lessons?
4	Is the main device (computer, tablet, ...) used by your child in sharing?
4	If it is shared, who does your child share the device with?
4	Is your child alone in the room during online lessons?
4	If you answered "No" to the previous question, who does he/she share the room with?
4	Is the presence of other people in the same room perceived as a disturbing element?
4	Do teachers require the presence of an adult to supervise the activities?
4	What kind of Internet connection do you use from home?
4	How confident was your child in using computers (or other devices) before the CoVid-19 outbreak?
4	Was the computer (or other device) bought for this occasion or did you already have it at home?
4	How confident is your child in using computers (or other devices) now?
5	More comments?
6	Do you have other children attending school?

Table 1: Survey questions in details

4 DATA ANALYSIS

As anticipated, in this paper, we restricted our attention to the analyses of the answers related to primary school students. Adding more details, we analyzed 490 responses (out of 1,073), representing almost 50% of the total number of collected answers. Considering this sample, we have almost an equal distribution of responses,

spread in the 5 years have been designated as the primary school in Italy.

Considering the first section of questions (i.e., info about regions and provinces) the majority of the participants who answered the questionnaire were living the lockdown in the North of Italy, with 170 (34.7%) from Veneto, 173 (35.3%) from Emilia-Romagna (with 102 from the Bologna province), and 63 (12.85%) from Lombardia. Nonetheless this output can seem expected (since the authors are from Veneto and Emilia-Romagna, and we exploited personal contacts to start the snowball sampling procedure), it provides us an interesting overview of the three regions hardest hit by the pandemic in our country. Still, we obtained answers from parents living in 17 out of 20 Italian regions, confirming a clear interest in the investigated topic.

Surveying in the second section, it is possible to notice an important outcome: in 22 (4.5%) cases (out of 490), the child's school didn't activate distance learning. This represents a critical finding, since with distance learning we intend any kind of activities related to learning, from passive activities, such as sending/checking homework via email, to active ones, such as online teaching. The motivations are variegated, including: "*the school was not ready*"; "*some teachers think it is not a good way to approach learning for young children*"; "*technological inability*", "*need of technological support not available*"; "*no clue*"; "*it was the easier solution*". Interestingly, a few of them declares that, at the time of the questionnaire, some distance learning activities were planned for the upcoming weeks. Five participants declared that a few teachers are sending materials/homework via app messages or email. This reveals that, at least, some feeble attempts of activating distance learning have been carried out. The participants who answered positively to the question related to the activation of distance learning (468 out of 490) were able to access the third section of the questionnaire to enter into details of how the distance learning was activated. Accordingly, in the following analysis, we consider 468 as the sample size (i.e., the 100%). We found out that: in 148 cases (31.62%), the school took care of coordinating and activating the distance learning; in 151 cases (32.26%), the class took the initiative; in 146 cases (31.20%), the teachers came forward organizing the distance learning activities. We provided the possibility to include a customized answer (using a text field as the "*Other*" option). This has let us collect an interesting number of relevant details. Different participates complained about the slow, graduate, and in some cases, delayed, start of the activities. As positive results, the majority of the respondents (296, 63.25%) claimed that all the child's teachers are performing distance learning, while in 121 (25.85%) cases, the majority of teachers are involved in distant learning. The remaining answers are more negative: 19 (4.05%), half of the teachers; 32 (6.84%) a few teachers, and so on.

Investigating the different modalities of distance learning, we obtained variegated answers. It is worth noticing that, answering this question was possible to select more than one answer, and, in addition, to include other options (using a text field). The most popular solution seems to be sending homework in textual/PDF format and then the related corrections (351, 75%). In 51 cases (10.90%), online lessons have been activated, and in 48 (10.26%), teachers recorded materials to share with students. Interestingly, it emerges that several different options has been activated simultaneously.
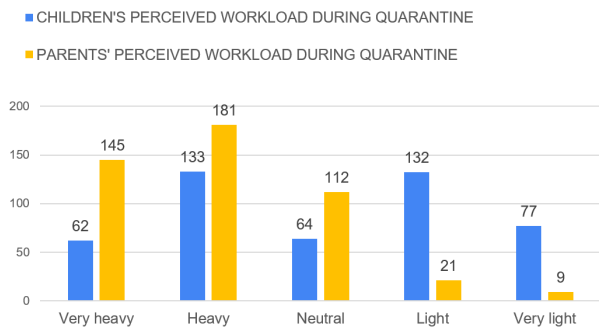
Figure 1: Children and parents' perceived workload (compared with the pre-quarantine workload).

Figure 2: Grade of appreciation for distance learning of parents and children.

Analyzing the answers typed in the "*Other*" field, it is clear that, in the most of the cases, the distance learning is the result of a mix of asynchronous activities, such as homework sent using WhatsApp, email or the school platform, videos shared via YouTube or recorded by the teachers, and, only in few cases, online teaching/learning activities. The use of different tools has the side effect of overloading the child's parents who need to be constantly up-to-date, checking all the platforms. Besides this negative effect, it lets also emerge a strong difference in how distance learning has been activated school by school (or even class by class). This becomes very visible analyzing the tools used (to note that also in this case it was possible to select or include different options): Google Suite for Education (221, 47.22%); WhatsApp (87, 18.59%); Nuvola (62, 13.25%); Zoom (61, 13.03%); Weschool (36, 7.70%), just to name the most used ones.

In the majority of the cases (277, 59.19%), the hours of lessons (considering online teaching and e-learning) have been halved compared to the pre-CoVid-19 crisis. A critical result is represented by the fact that 130 (27.78%) parents answered "*zero*" hours, while only 7 (1.50%) declared that children are attending the same number of hours. Narrowing the analysis considering only online (synchronous) classes, it emerges that, on average, 200 (42.74%) children are attending zero hours of online lesson per day, 140 (29.92%) one hour per day, 79 (16.88%) two hours per days, 25 (5.34%) three hours per day, and so on. Very surprisingly, two declared to attend 7 hours per day of online lessons, and others two to attend 8 hours per day. With the intent to explore the relationship that exists between lessons in the classroom and online, we asked participants how long an online lesson lasts, and the most voted option (107, 22.86%) was *one hour*. While, considering the duration of shared videos, the most voted option (149, 31.84%) was *20 minutes*, while 115 (24.57%) participants declared to not use videos. It is worth mentioning that pedagogical studies suggest to keep video and online lectures shorter than the in presence ones, that was the reason behind these questions [5]. Considering online lessons, students have been divided into groups in the 36.32% (170) of the cases.

An interesting issue to investigate concerns the load resulting from the activation of distance learning during the pandemic, considering children, but also parents (who need to assist the children). The results are shown in Figure 1. Started analyzing children, 133
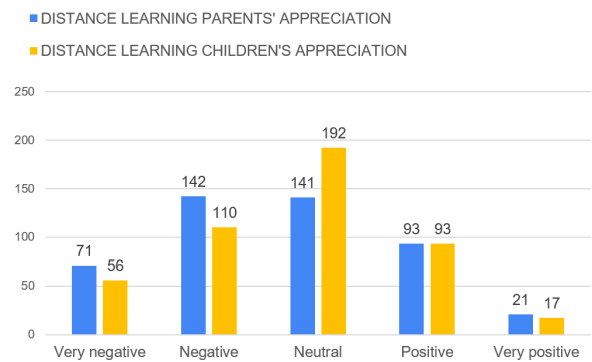
(28.42%) of the parents have the perception that the child's load is heavier than before the pandemic, but, at the same time, almost the same number of parents (132, 28.20%) think that the child's load is lighter, 77 (16.45%) said "*a lot lighter*", 64 (13.67%) "*as before*", and 62 (12.65%) "*a lot heavier*". On the other side of the spectrum, parents perceive their load in assisting children: 181 (38.67%) "*heavy*"; 145 (30.98%) "*really heavy*"; 112 (23.93%) "*neither heavier or lighter*" (and so on) than before the disease crisis.

To conclude the analysis related to third section of the questionnaire, we asked parents to estimate the level of liking (using a 5 value-Likert scale, from "*very positive*" to "*very negative*"), considering both the child and her/his point of view. Concerning the (parent's perceived) child point of view, we obtained the following results: 142 (30.34%) negative, 141 (30.12%) neutral, 93 (19.87%) positive, 71 (15.17%) very negative, 21 (4.50%) very positive. Considering the parent point of view, we can report the following data: 192 (41.02%) neutral, 110 (23.50%) negative, 93 (19,87%) positive, 56 (11.97%) very negative, 17 (3.64%) very positive. These findings reveal a similar trend considering the perceived students' and parents' point of view in terms of distance learning level of liking, as shown in Figure 2.

The fourth section of the survey aimed at gathering some more detailed information about the physical environment of the students and accessibility of the – essential for this studying modality – technology tools. With lessons moving from the classrooms to the digital space, fast and stable Internet connection, and availability of properly functioning hardware cannot be overstated. Therefore, we wanted to explore how many students, whose scholastic situation has been assessed, has a guaranteed access to those necessities.

Out of the total number of 468, parents of 322 primary school students (68.80%) claim that their children attend online classes using computers. Oftentimes, however, various types of devices are being used in combination, hence 178 (38.03%) of children are declared to be using tablets, and 139 (29.70%) mobile phones. Only 11 (2.36%) of the students are not using any technological devices to follow their classes. Although we cannot determine with certainty the motives of reaching for different technological tools, the
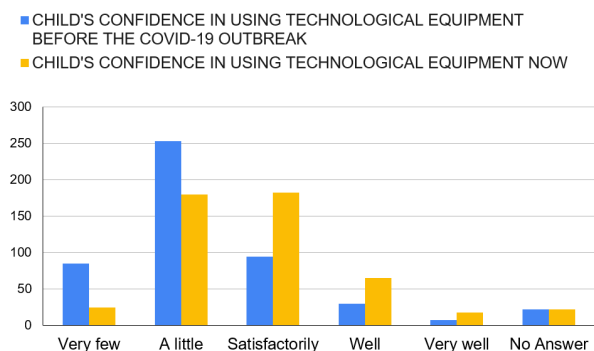
Figure 3: Comparison between the ability to use a computer, or an adopted device, before and after this emergency.

reason for doing so - especially in times of widespread smart and home-working - may not always be voluntary. As revealed in the survey, 345 (73.71%) of children share the device used primarily for educational purposes with other family members, among which 238 (68.99%) with their parents, and 189 (54.78%) with siblings.

In the context of distance learning, electronic devices are not the only components of the environment that often must be shared with others. Limited physical space within a household may force the proximity of different family members in the same room. According to the collected data, 249 (53.21%) of the students usually have someone's company during online lessons, while 90 (19.23%) of the students have to share their studying space from time to time. Whilst sometimes the presence of adults is requested by the teachers (163, 33.27%) in order to offer direct help or supervision to the kids when needed, it is also relatively common to study in the same room with brothers or sisters (39.53% of the answers indicating shared studying space). Even though the presence of others can undoubtedly be of a great help for children in their early stage of education, or even indispensable to those ones whose degree of familiarity with technology does not allow them to operate a device independently, it can also be an element of disturbance. In fact, 195 (41.67%) of the respondents admit that the presence of others can be perceived as distracting by the students, compared to 253 (54.06%) of parents claiming the opposite and 15 (3.21%) declaring that it can be a problem every so often (remaining 5 respondents did not choose any of the answers). It is worth bearing in mind that, as the questionnaire has been filled in not by the students themselves, but by their parents, responses to this particular question rely on the ability to attribute mental states to others. Therefore, children's subjective perception of the disruptive character of other people's company may differ from the perception of their parents.

As the CoVid-19 pandemic and the sudden transition to distance learning forced students of all ages to exploit new technologies in their daily knowledge acquisition, we have been curious to investigate the impact of this transition on computer literacy of the primary school students. As can be observed in the Figure 3, there

appears to be a significant improvement in the children's competency in using technology before and after the introduction of distance learning.

The vast majority (86.32%) of the students did have sufficient technology equipment to participate in the online education even before the outbreak, and therefore there was no need for the family to buy any new devices. However, 45 (9.62)% of the parents had to buy new equipment as a response to the emergency. Taking into account that the modality of distance learning can vary and several different approaches can be used even by one individual teacher, it is not only the hardware that has to fulfil various requirements, but also the Internet connection. While exchanging textual/PDF files between students and the teachers does not call for particularly fast and reliable connection, it becomes crucial if one must access virtual classrooms, online courses or display videos shared or recommended by teachers. Even though the question about the type of Internet connection used in the respondents' houses seemed to cause some difficulties in giving a valid response, the data we gathered allow us to claim that most of the students in question have access to the Internet connection of rather good quality. The most commonly appearing answers about the Internet services included: Fiber Internet (40.17%), ADSL (36.75%), and mobile internet (16.24%), to name but a few.

5 THERE IS MORE TO SCHOOL THAN STUDYING

Considering the extraordinary circumstances under which this survey has been conducted, we believed it to be of great importance to give parents the possibility to express their thoughts, feelings and concerns in a more elaborate form than only by checking a response box. We wished to assure them that they are being listened to and leave some room for discussion, hence the inclusion of the comments section in the questionnaire. Despite the study being highly focused on exploring different modalities of distance learning, the impact of availability and adoption of various technologies and online platforms, a wider aspect of psychological, emotional and social impact of the pandemic cannot be overlooked.

The most prominent message deriving from the collected comments is the lack of social interactions, the need for peer relationships. The importance of socialisation, being a part of a group, but also the magnitude of direct communication with teachers, have been the most frequently recurring themes. The significance of face-to-face interactions has been emphasised not only in terms of fulfilling social needs of the children, but also with regards to maintaining students' enthusiasm and motivation on a high level. It has been expressed very clearly by one of the parents who stated: "*They [the children] cannot learn anything, since young kids need to attend lessons in the classroom and meet their teacher in person everyday, so as to keep interest and enthusiasm.*"

Another important concern revealed by the parents has been the difficulty of such a young child to remain focused while looking at the screen for an hour or so. The primary school in Italy lasts 5 years, from 6 to 11 years of age, therefore students of this category need constant stimulation and interaction. Distance learning does not always enable it with its requirements of muting the microphones

or not even providing the possibility of entering a virtual classroom (i.e., via online teaching).

As a consequence of the distance learning not being perfectly adapted to the needs of the youngest groups of students, parents appear to feel overwhelmed, overload and frustrated by the difficulty of combining their work-related obligations with helping children complete their online learning assignments. Statements such as: "*Distance learning is an excessive burden for parents, who must replace school in everything*"; "*As a parent, I feel a huge weight on my shoulders*"; "*I believe it would be needed to have more online/video lessons with explanations coming from the teachers and less homework assignments which leave all the load to the parents. In order to assist our children, we are forced to work in our spare time or late in the evening*" were commonly appearing in the comments section.

Despite most of the comments being negative, certain level of understanding of the difficulties faced by schools and teachers emerged from the data. Some of the participants admitted that in spite of their dissatisfaction, they understand that most probably it was not possible to organize the process of distance learning better in such a rapid development of events. Therefore, among the comments, there were also some statements expressing gratitude and comprehension, i.e.: "*We are happy to be able to continue education, even from a distance*"; "*Apart from the didactic purposes, I would like to thank the school and the teachers for all the efforts [they make] to make children feel good*". It is also worth bearing in mind that there is a natural human tendency leading towards the negativity bias [2] [13], which can often be observed e.g. in the customers reviews of products or services. On average, a negative experience is more likely to produce a review than a positive one.

6 CONCLUSION

Strong response to the administered survey, indicated by a high response rate, sheds light on how important the topic in question is. The interest and willingness to participate in the study exceeded our expectations.

Not surprisingly, the general sentiment of the respondents towards the novel teaching modality was rather negative. Even though, given the circumstances, there is a certain level of understanding of the low preparedness of the national education system to a rapid change of learning modality, the lack of coordinated planning and organization of the distance learning have left the majority of parents disappointed. While many of the respondents appreciate the attempts of the teachers to carry out the core curriculum, the vast majority finds it confusing and overwhelming to navigate between different platforms, various digital tools, and constantly changing time schedules. The lack of clear guidelines and decision-making at the local or school board level led to leaving the initiative of activating the distance learning and choosing the most appropriate form of it to individual teachers.

An alarmingly high percentage of children not attending any or very few hours of online classes, results in a heavy burden on the parents remaining at home. With no direct communication between teachers and their students, it is left in the hands of parents to clarify any doubts or ambiguities, and help in case of lack of understanding of a new material. Together with a general stress and uncertainty

induced by the CoVid-19 emergency, this overload inevitably pose an overwhelming emotional burden on the parents. The feeling of despair and helplessness emanate from the statements written by the parents, as many of them feel as if they were left alone. With gradual easing of the lockdown restrictions, a significant number of them face a problem of having to go back to work, without being able to provide their children with care and assistance they require.

To conclude on a positive note, it should be noted that the prevailing majority of the youngest students, despite the unexpected character of events, were provided with access to the necessary tools and equipment, some form of distance learning, and education continuity. As a side effect of this emergency, we can also observe a significant improvement in the children's computer literacy and general competency in technology use.

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REFERENCES

[1] Wahab Ali. 2020. Online and Remote Learning in Higher Education Institutes: A Necessity in light of COVID-19 Pandemic. *Higher Education* 10, 3 (2020).
[2] Roy F. Baumeister, Ellen Bratslavsky, Catrin Finkenauer, and Kathleen D. Vohs. 2001. Bad is Stronger than Good. *Review of General Psychology* 5, 4 (dec 2001), 323–370. https://doi.org/10.1037/1089-2680.5.4.323
[3] Elisabeth Beaunoyer, Sophie Dupéré, and Matthieu J Guitton. 2020. COVID-19 and digital inequalities: Reciprocal impacts and mitigation strategies. *Computers in Human Behavior* (2020), 106424.
[4] Hanifa Bouziri, David RM Smith, Alexis Descatha, William Dab, and Kévin Jean. 2020. Working from home in the time of covid-19: how to best preserve occupational health? *Occupational and Environmental Medicine* (2020).
[5] Cynthia J Brame. 2016. Effective educational videos: Principles and guidelines for maximizing student learning from video content. *CBE—Life Sciences Education* 15, 4 (2016), es6.
[6] Massimo Candela, Valerio Luconi, and Alessio Vecchio. 2020. Impact of the COVID-19 pandemic on the Internet latency: a large-scale study. *arXiv preprint arXiv:2005.06127* (2020).
[7] Lesley Chiou and Catherine Tucker. 2020. *Social distancing, internet access and inequality.* Technical Report. National Bureau of Economic Research.
[8] Gazzetta Ufficiale della Repubblica Italiana. 2020. Misure urgenti sulla regolare conclusione e l'ordinato avvio dell'anno scolastico e sullo svolgimento degli esami di Stato. *Available at https://www.gazzettaufficiale.it/eli/gu/2020/04/08/93/sg/pdf* (2020).
[9] Gazzetta Ufficiale della Repubblica Italiana. 2020. Ulteriori disposizioni attuative del decreto-legge 23 febbraio 2020, n. 6, recante misure urgenti in materia di contenimento e gestione dell'emergenza epidemiologica da COVID-19, applicabili sull'intero territorio nazionale. *Available at https://www.gazzettaufficiale.it/eli/gu/2020/03/04/55/sg/pdf* (2020).
[10] Marco Furini, Giovanna Galli, and Maria Cristiana Martini. 2019. An online education system to produce and distribute video lectures. *Mobile Networks and Applications* (2019), 1–8.
[11] Matthieu J Guitton. 2020. Cyberpsychology research and COVID-19. *Computers in Human Behavior* (2020).
[12] Xenia Rochelle Jones and Milton Keynes. [n.d.]. Digital Society: A mini auto-ethnographic exposition On the utilization of the digital while living life under the Covid-19 lockdown (UK). ([n. d.]).
[13] Paul Rozin and Edward B. Royzman. 2001. Negativity Bias, Negativity Dominance, and Contagion. *Personality and Social Psychology Review* 5, 4 (nov 2001), 296–320. https://doi.org/10.1207/S15327957PSPR0504_2
[14] Alasdair Sandford. 2020. Coronavirus: Half of humanity now on lockdown as 90 countries call for confinement. *Euronews* 3, 04 (2020), 2020.
[15] UNESCO. 2020. COVID-19 educational disruption and response. *Available at https://en.unesco.org/covid19/educationresponse* (2020).
[16] Russell M Viner, Simon J Russell, Helen Croker, Jessica Packer, Joseph Ward, Claire Stansfield, Oliver Mytton, Chris Bonell, and Robert Booy. 2020. School closure and management practices during coronavirus outbreaks including COVID-19: a rapid systematic review. *The Lancet Child & Adolescent Health* (2020).