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Innovation Technology and Education: New Opportunities or New Inequalities? The Italian Experience

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Abstract

This work focuses on the role that Innovation and Communication Technologies (ICT) played in the Italian education system, during the COVID-19 pandemic, when face-to-face lessons were suddenly substituted by remote teaching. Distance learning to be effective requires connectivity, digital devises, digital skills and, at the same time, suitable housing conditions. All these issues are analyzed leading back to a unique picture of Italy: a country deeply divided between the North and the South, where the household socio-economic background continues to be a key determinant of students' schooling performance as well as of their unequal access to ICT.

Keywords: ICT, remote teaching, digital divide, educational poverty

Paper Type: Research paper

1. Introduction

This work focuses on the role that ICT played in the Italian education system, especially during the COVID-19 pandemic, which has determined a boost in digitization to face the new imperative requirement of social distancing. The digitization overwhelmed also the whole Italian education system that in the middle of the school year 2019-20 had to suddenly switch from the traditional face-to-face teaching to the remote teaching mode. At that time, the Italian government sanctioned, by a decree law dated 2020.03.04, those educational institutions of any level and grade on the whole national territory had to suspend any teaching activity in-person. Schools remained closed to face-to-face teaching for the following months until the end of the school year. In the subsequent school year 2020-21, online teaching remained predominant but alternated with short periods of teaching in-person, often in a blended mode by rotating or subgrouping students according to the maximum space capacity of school buildings and classrooms. There were a lot of differences in the use of remote teaching across regions[1], because decisions about school lockdowns passed into the hands of regional governors who had the task of monitoring local pandemic statistics.

In principle, remote teaching/distance learning represents a great opportunity in terms of learning growth. New methods of teaching based on ICT foster new ways of learning in real time, with possible stronger interactions between teachers and students, thanks to online education platforms, multi-device videoconferencing tools and chats. Nevertheless, is this really a true chance given to all students to the same extent?

Education systems must ensure equity and the same opportunity for all young people to develop their talents and realize their full potential in a world of continuous and rapid change. As the EU Commission states: "Education institutions, such as schools and universities, have to evolve and adapt to achieve their core mission: to educate students to be successful in a complex and interconnected world that faces rapid technological, cultural, economic and demographic changes". Does ICT favor the challenge of education institutions to improve their social function, by supporting a system in which starting socio-cultural conditions become less decisive for the achievement of the highest levels of education and social mobility? Does distance learning enhance the Italian education system by favoring equity among students?

The aim of this work is to take stock of the experience of remote teaching during the COVID-19 pandemic. On-line teaching to be effective requires: i) connectivity and PCs or tablets availability; ii) suitable domestic spaces; iii) support for young children or students with disabilities; iv) digital skills. Therefore, in this work, connectivity, availability of digital devises and digital skills of students in Italy are discussed. The living conditions in which remote teaching took place are then analyzed in

[1] Bovini G. and De Philippis M. (2021), using a survey conducted by the Bank of Italy, analyze the differences among Italian regions in terms of length of time spent on remote teaching by students of any grade and level in the school year 2020/21, distinguishing between exclusive and blended modes, synchronous and asynchronous lessons. They find that in regions where remote teaching was used mostly, synchronous lessons prevailed (as it happened in Campania, that had the primacy of suspending teaching in-person for longer than any other Italian region).

terms of lack of support for early grade pupils and students with disabilities, and overcrowded housing, so widespread among Italian households with minors.

Data on digitization and remote teaching lead back unequivocally to a unique picture of Italy, that of a country deeply divided between the North and the South[2], where the socio-economic background continues to be a key determinant of students' schooling performance as well as of their unequal access to innovation technologies. Therefore, in the context of an increasing weight of remote teaching, the digital divide risks to undermine the fundamental principle of equity that is at the base of our education system, reinforcing old educational inequalities and generating different levels of school dropout (implicit or explicit) across the country. The technological and digital backwardness of some areas can determine new types of educational poverty and social exclusion.

The paper is structured as follows. Section 2 contains an overview of ICT in Italy, with an attention to the issues of connectivity and devices availability. Section 3 considers domestic spaces where distance learning takes place, by discussing the limitations due to overcrowding and the lack of family members support for those who need it. Section 4 provides an overview of the education system by considering students' literacy and their school performance assessed by OCSE PISA. In Section 5, students' participation to remote teaching during the first national lockdown is illustrated. Finally, Section 6 concludes.

2. Overview of ICT in Italy

In order to track digital progress, since 2004 the European Commission monitors Member States' digital performance through the Digital Economy and Society Index (DESI). The DESI index is a composite measure that combines 37 indicators to evaluate the competitiveness of Member States. The index considers five main dimensions:

1) *Connectivity*, which summarizes the deployment of broadband infrastructure and its quality;

2) *Human capital*, which captures the internet use and basic and advanced digital skills in the country;

3) *Use of Internet services*, which measures the variety of activities performed by citizens online;

4) *Integration of digital technology*, which measures business digitalization and e-commerce;

5) *Digital public services*, which measures the degree of public services digitalization and e-government.

DESI figures for 2020[3] show that Finland is the digital leader with a score of 72.3, followed by Sweden and Denmark. Italy, with a score equal to 43.6, lags behind being 25th out of 28 EU Member States, ahead only to Romania, Greece and Bulgaria. With regards to the first two DESI dimensions, more relevant for education, the digital status of Italy is mixed: the "Connectivity" score

[2] Italy is divided in 5 NUTS-1 macroregions: North West (which includes the following NUTS-2 regions: Aosta Valley, Liguria, Lombardy, Piedmont); North East West (which includes: Emilia-Romagna, Friuli-Venezia Giulia, Trentino-Alto Adige/Südtirol, Veneto; Centre: Lazio, Marche, Tuscany, Umbria); South (which includes: Abruzzo, Apulia, Basilicata, Calabria, Campania, Molise); Islands (which includes Sardinia, Sicily). Hereafter, "North" is intended as the union of the North-West and North-East and "South" as the union of the South and Islands macroregions).

[3] European Commission, Shaping Europe's digital future - Digital Scoreboard, https://digital-agenda-data.eu/

is 50, just below the EU average, ranking Italy 17th among EU countries; whereas in the "Human capital" dimension, Italy has the worst performance in Europe. As a matter of fact, only 42% of people aged 16-74 years have at least basic digital skills (58% in the EU) and only 22% have digital skills above the basic level (33% in the EU). The number of ICT specialists and ICT graduates is also well below the EU average. As expected, gaps in digital skills are reflected in the low use of online services, including digital public services. Only 74% of Italians are regular internet users. Although the country ranks relatively high in its offer of e-government services, public take-up remains low. Similarly, Italian enterprises lag behind in the use of technologies such as cloud and big data, as well as in the uptake of e-commerce.

2.1. Connectivity and ICT devices: regional and socio-economic disparities

The disappointing picture provided by the DESI index for Italy hides great differences between regions. The ISTAT (the Italian Central Institute of Statistics) multipurpose survey on "Aspects of the quality of life" includes a section on "Citizens and ICT" providing percentage of households with a broadband connection[4]. Data for 2018 and 2019, suggests an overall improvement in the connectivity with an increase in the average number of households with a broadband connection from 72.7% to 74% (the increase is stronger for Central regions), but also a slight increase in the differences between macro-regions (Table 1).

Table 1. Broadband connectivity of the Italian households

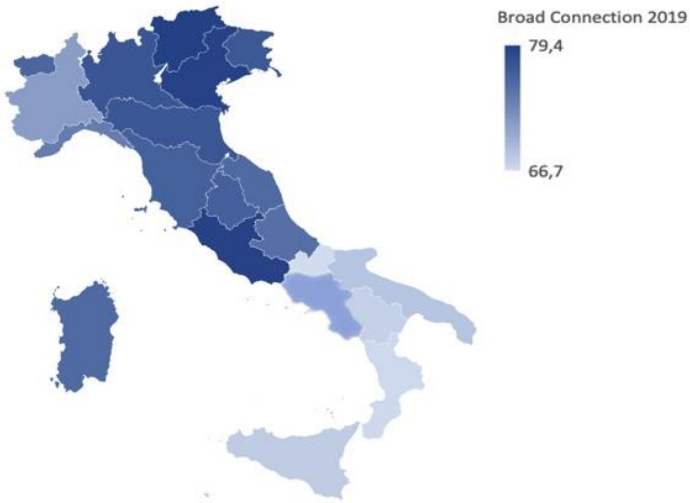
Italy	2018	2019
μ	72.7	74.0
North	75.5	76.5
Centre	75.1	77.0
South	68.6	69.5
Islands	71.0	71.8

Source: ISTAT

Consistently, the map of connectivity in Italy, reported in Figure 1, indicates that there is a clear regional divide in the diffusion of broadband connection. All southern regions (with the exception of Abruzzo) lag strongly behind the northern and central regions, with a gap that reaches 12.7 percentage points between Trentino (the region with highest connectivity) and Molise (the region lowest percentage of household with a broadband connection).

[4] Istat (2019) Report: Cittadini e ICT, https://www.istat.it/it/files//2019/12/Cittadini-e-ICT-2019.pdf

Figure 1. Regional levels of connectivity in year 2019



Source: Elaboration of the author on ISTAT data.

The percentage of households with a broadband connection varies with the average education level of household members as well as with their age[5]. Only 5.9% of households in which at least one member is graduate does not have a broadband connection, whereas this share is 53.9% among the households in which members have just a lower secondary school title. 66% of households composed exclusively of elder people is without connection, but this share drops to 4.9% in the presence of at least one minor.

A second issue to assess the potential effectiveness of remote teaching is the availability of computer and tablet, which should be a device per person, ideally. According to ISTAT[6], in the years 2018-2019, 33.8% of households have neither computer nor tablet (41% in the South); this share drops to 14.3% among households with at least one minor. More relevant, in Italy 12.3% of children between 6 and 17 years old does not have a computer or tablet at home (in absolute terms this means 850 thousand boys and girls), and this share reaches almost 20% in the South (470 thousand students, that is more than a half of the total student population without devices). Only for 22.2% of households each component has got its own pc or tablet (14.1% in the South). Personal devices are hold by only 6.1% of children who live in families where at least one computer for each component is available.

In synthesis, although about 95% of households with minors is connected, distance learning is associated with an insufficient number of PCs and tablets compared to the number of family members, suggesting that a significant part of student population had to share the hardware with other family members or even worst used smartphone to attend on-line lessons. Moreover, significant inequalities between the North and the South do exist either in terms of connectivity or ITC devices.

[5] Istat (2019) Report: Cittadini e ICT, https://www.istat.it/it/files//2019/12/Cittadini-e-ICT-2019.pdf
[6] Istat (2020) Report: Spazi in casa e disponibilità di computer per bambini e ragazzi, https://www.istat.it/it/files//2020/04/Spazi-casa-disponibilita-computer-ragazzi.pdf

3. Domestic Spaces / Overcrowding and Family Member Support

The transition from face-to-face to remote teaching mode has changed the space where the learning process. On the one hand, distance learning gives students the opportunity to attend school and university from any place reducing the costs of mobility. On the other hand, the freedom of being able to be connected from any place finds limit in the quality of spaces available; students do not always have suitable environments due to overcrowded housing or lack of support from adult family members.

Eurostat definition of overcrowding is based on the so-called Bedroom Standards, which associates more and more stringent house space requirements to the greater age of children and their gender differences[7]. In 2019, in Italy 28.3% of population live in overcrowded housing. This share gets much worse for minors[8], especially if belonging to low-income households. As the Table 2 shows, by distinguishing population between poor (those with an income below 60% of the median equivalized income) and non-poor (those with an income above 60% of the median equivalized income), more than half of minors suffers from overcrowding. For non-poor children under the age of 6 this share is 34%, but it becomes 45% for non-poor adolescents, due to the more stringent Bedroom Standard for this age group.

Table 2. Overcrowding rates by age and economic conditions

Minors	Above 60% of the Median Equivalized Income	Below 60% of the Median Equivalized Income
Less than 6 years	34.1	46.2
From 6 to 12 years	36.5	51.6
From 12 to 17 years	44.9	53.0

Source: Eu-Silc

A further aspect that can make distant learning difficult is the lack of family member support for early grade primary school students or students with disabilities, for whom the education system is normally meant to provide for assistance of personnel with specific skills, be they the teachers themselves or support teachers. Distance learning has increased the childcare burden especially for women (Bovini and De Philippis, 2021), intensifying women's workloads at home. However, not always family members have skills and free time required to be of help. A Survey conducted by the ISTAT on the integration of pupils with disabilities[9] shows that the students with disabilities who attend Italian schools are almost 300 thousand (3.5% of enrolled pupils). Between April and June 2020, over 23% of them (about 70 thousand) did not attend remote lessons (this share is 29% in the South).

[7] Precisely, Eurostat definition of overcrowding states that an overcrowded household is one which has fewer rooms than the sum of: one room for the household; one room per couple in the household; one room for each single person aged 18 or more; one room per pair of single people of the same gender between 12 and 17 years of age; one room for each single person of different gender between 12 and 17 years of age; one room per pair of children under 12 years of age.

[8] Source: European Union Statistics on Income and Living Conditions (Eu-Silc), Overcrowding rate by age, sex and poverty status (ILC_LVHO05A).

[9] ISTAT (2020), Report: L'inclusione scolastica degli alunni con disabilità - A.A. 2019-2020, https://www.istat.it/it/archivio/251409

The survey provides several motivations behind this behavior: the severity of the pathology (27%), the difficulty of collaborating family members (20%); socio-economic distress (17%); the difficulty in adapting the "Plan of Education for Inclusion" to distance learning (6%); the lack of technological tools (6%); the lack of specific teaching aids (3%).

4. Overview of the Education System in Italy

A comprehensive assessment of the impact of remote teaching on student population attending Italian schools is made difficult by the lack of representative data for the whole Italian education system. This does not allow to have accurate information that takes into account the functional and geographical complexity of the overall Italian education system. However, at least a partial picture can be drawn from the few, sparse pieces of information publicly available. This allows us to reconstruct the state of students' learning performance in which the pandemic emergency and the spring 2020 school lockdown take place, allowing us to understand the scenarios that open up to distance learning.

4.1. Students' skill assessment

In order to evaluate education systems, in 2000 OECD started the Programme for International Student Assessment (PISA) by measuring performance on mathematics, science, and reading of 15-year-old school students. The survey, repeated every three years, aims to provide comparable data for many countries worldwide to improve their education policies and outcomes.

In Italy, further data are collected by the Invalsi (Istituto nazionale per la valutazione del sistema educativo di istruzione e di formazione) with the specific aim of assessing students' competences that cover all levels and grades of the Italian school.

In 2018, Italy scored below the OECD PISA average in reading and science, and around the OECD average in mathematics[10]. The average scores in Italy declined, after 2012, in reading and science, and remained stable (and above the level observed in 2003 and 2006) in mathematics. Reading performance declined, in particular, amongst girls (and remained stable among boys). Science performance declined most markedly amongst the highest-achieving students, by a similar amount for both boys and girls.

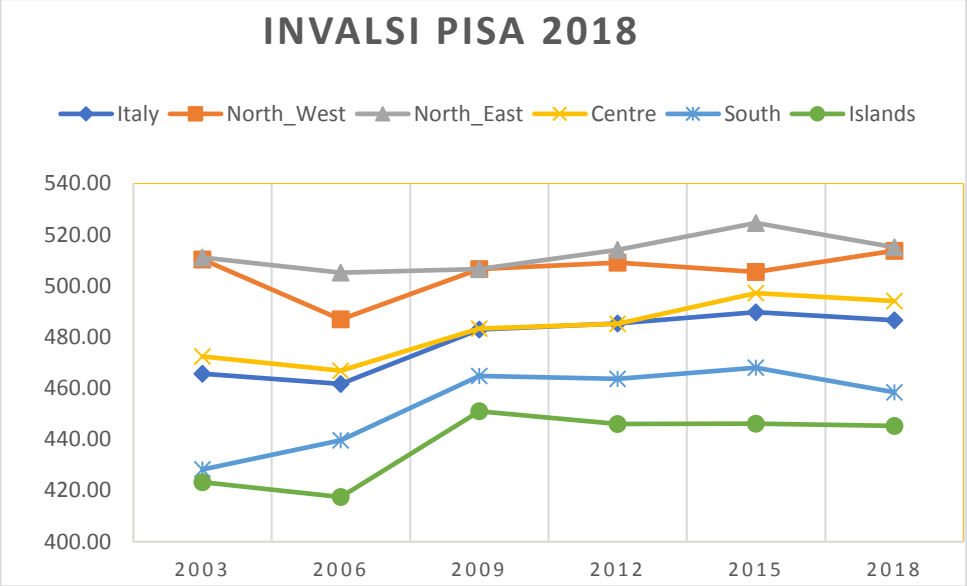
The career expectations of the highest-achieving 15-year-old students reflect strong gender stereotypes. Amongst high-performing students in mathematics or science, about one in four boys in Italy expects to work as an engineer or science professional at the age of 30, while only one in eight girls has the same work expectations. Only 7% of boys and almost no girls in Italy expects to work in ICT-related professions (thus providing an additional clue of the ICT backwardness).

Students' performance depends on family socio-economic background, as lower scores are strongly correlated to low incomes and low education titles of parents. Moreover, poorer educational profiles are often associated with migrants, thus revealing difficulties in the integration process that can lead to their economic and social exclusion.

[10] OCSE PISA 2018, https://public.tableau.com/app/profile/invalsi/

Figure 2 depicts the Italian scores in mathematics since the beginning of OCSE PISA, showing strong geographical differences (that characterizes similarly also the other outcomes in reading and science). Northern students are systematically above the average, Southern and Islands students are systematically below, while Centre students place always in middle position.

Figure 2. Students' performance by Italian macro-regions



Source: Elaboration of the author on OCSE PISA data

Following among others the Potter and McDougall (2017) notion of digital literacy, in the latest PISA report (OCSE, 2021) it is stated that "Literacy in the 20th century was about extracting and processing pre-coded and usually carefully curated information; in the 21st century, it is about constructing and validating knowledge". Hence, the OCSE PISA has decided that it is now fundamental to assess students' digital skills too, but in order to have sufficient time to implement the new analyses, the survey due in the 2021 has been postponed to 2022. Some preliminary results about the strict relationship between reading performance and digital skills are discussed in the report, where evidence is found that the digital divides mirror prevailing economic gaps and often even amplify the disadvantages of students from less wealthy backgrounds, widening existing differences in learning achievements.

Similar results are obtained by Save the Children (2020) in a pilot study on the digital educational poverty of thirteen years old students[11] in selected Italian provinces[12]. Precisely, the study documents that about 20% of the children who participated in the survey are unable to perform simple operations using ICT tools, such as sharing a screen during a call with Zoom (11%) or downloading a document shared by a teacher on the school platform (29.3%). Overall, 20.1% of the minors are unable to correctly answer more than half of the questions proposed to assess basic skills in the use of digital tools, and this percentage is higher for males than for females, evidencing a gender gap in digital skills detrimental for males. Finally, consistent with PISA findings, the higher the educational qualification of parents, the lower the incidence of digital educational poverty is.

4.2. Explicit and implicit dropout

Learning difficulties and school failures create educational poverty and social exclusion through the dropping out phenomenon, that is basically students quitting school. There are two types of dropping out: i) the explicit dropout, commonly estimated by the Early Leavers from Education and Training (ELET), that is the percentage of young people between 18 and 24 with a qualification lower than the upper secondary title; ii) the implicit dropout, estimated by the Low Achievers, that is the percentage of students that does not reach minimum competences.

In Table 3, the explicit dropout is analyzed through the ELET by macro-regions and gender. The usual geographical pattern repeats here again as the South has the highest dropout percentages, with Sicily on top. With regard to gender, dropout is systematically smaller for females but there is a significant disadvantage for females of southern regions compared to others.

Table 3. Italian Early Leavers from Education and Training

ELET	Male	Female	Total
North	13.1	8.8	11.0
Centre	14.4	8.4	9.3
South	19.9	14.5	17

Source: Istat (2020)

As a consequence of a worrying share of upper secondary students that abandoned remote teaching, the Save the Children (2021) report estimates the potential dropping out of 34 thousand upper secondary students in the next future.

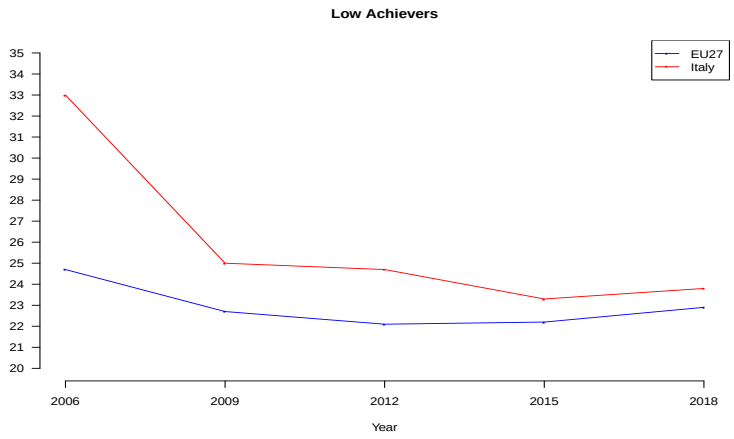
[11] This group age is targeted also by the ICILS (International Computer and Information Literacy Study) promoted by IEA (International Association for the Evaluation of Educational Achievement) to assess digital skills of 13-year-old pupils with computer-based tests. The 2018 ICILS countries are: Canada (Alberta); Chile; Denmark, Finland; France; Germany; Italy; Kazakhstan; Republic of Korea; Luxembourg; Portugal; Russian Federation (Moscow); Uruguay and United States of America. In Italy, the Invalsi carries out ICILS study. According to the latest results (Fraillon et al., 2020), in Italy students have an average score equal to 461 points, considerably lower than their peers in other European countries (553 points for the Danes, 531 for the Finns, 518 for the Germans, 516 for the Portuguese, 499 of the French and 482 of the Luxembourgers). Furthermore, 24% do not reach the minimum digital skills, again the distance between our country and the other EU countries is great (Denmark 3%, Portugal 7%, Finland 8%, France 10%, Germany 13%, Luxembourg 19%). Notice that although similar, the two studies have different objectives since Save the Children focuses mostly on educational poverty whereas ICILC on students' performance.

[12] The "Autovalutazione di base delle Competenze Digital" (AbCD) questionnaire was administered to a sample of 772 children who attend the last class of lower secondary school, in 11 italian cities and provinces: Ancona, Chieti, Mestre, Milan, Naples, Udine, Palermo, Rome, Turin, Velletri, Sassari.

A measure of the implicit dropout is provided in Figure 3 that displays the percentage of Italian 15-year-old students who does not reach minimum competences compared to the average performance of European students[13]. After a slow but substantial reduction of educational poverty recorded between 2006 and 2012, the percentage of low achievers has increased since 2015, keeping the implicit dropout in Italy always above the EU-27 average.

Again, given that the low grades of students are mostly associated with low-income households, not surprisingly, the share of low achievers (and, therefore, the implicit dropout) is significantly greater in Southern regions (Save The Children, 2021).

Figure 3. Implicit dropout from 2006 to 2018



Source: Elaboration of the author on OCSE PISA data

The risks of increasing disparities in distance learning delineated so far, suggest that a worsening in the achievement of minimum competences of the Italian students is likely. Education poverty is clearly associated with absolute poverty and according to the latest ISTAT estimates, the number of children and adolescents who live in absolute poverty in Italy has increased by 200 thousand units in the last year, reaching the figure of 1 million 346 thousand (equivalent to 13.6% of minors in Italy)[14].

5. Students 'Participation to Lessons during the Pandemic

In the spring 2020, AlmaDiploma (an association of upper secondary schools) in collaboration with AlmaLaurea (an inter-university consortium) carried out a survey[15] on students of last and penultimate year of upper secondary school to better understand their experience with distance learning experience.

The survey was conducted on more than 70 thousand students with an response rate of 32% (23.305 respondents in total). However, since the questionnaire was undertaken by using the CAWI

[13] Source: OECD PISA 2018; here EU-27 (that excludes Great Britain) is considered to make comparable EU data before and after the Brexit.
[14] Istat (2021), Rapporto: La povertà in epoca di pandemia, https://www.istat.it/it/files//2021/06/REPORT_POVERTA_2020.pdf
[15] AlmaDiploma (2020), Rapporto: Indagine sulla Didattica a Distanza https://www.almadiploma.it/info/pdf/indagini/altro/2020/AD_IndagineSullaDidatticaADistanza.pdf

mode, the survey is severely biased against the weaker part of the students population because respondents belong exclusively to the group of students who have ICT devices and Internet access.

That said, the survey considers three dimensions of distance learning: remote teaching tools; study load and teaching organization; effectiveness of study.

5.1 Remote teaching tools

Almost all of the respondents (93.6%) declared that they did not receive any kind of support from the school about hardware devices or internet connection, but they relied only on the resources available in their family. 56.6% of students had his/her own personal device (with a range from 43.8% among professional institute students to 59.5% among high school students). This suggests that the availability of a personal PC or tablet is much higher for older students, if compared to the ISTAT estimate equal to 6.1% but referred to all students in general (see section 2.1). However, 4.9% of students declared that they did not have access to a tool with a large screen and that they participated in remote teaching only through a smartphone (with a range from 3.3% for high school to 15.3% for professional institutes)

The quality of the connection was considered "very good" or "fairly good" by 79.7% of the students with slight differences by type of diploma (to the benefit of high school students: 81.4%).

Despite the high number of those who were able to use ICT tools only in sharing, 89.6% of students responds to have access to adequate tools to attend school at a distance (with differences by type of diploma that range from 91.4% among high school students to 82.9% among professionals)

For 72.5% of students the school provided distance learning every day for at least half of the hours set by the school timetable. Only in 38.4% of cases, interviewed students stated that parents played an important supporting role during distance learning only (precisely, "definitely yes" for 13.1% of students and "more yes than no" for 25.3%). This confirms that one student out of three needs to be better supported for an effective learning process, a ratio that is conceivable to be much higher for younger students who are certainly less autonomous than those participating in the survey.

Finally, critical issues were related to the limits of distance learning and interpersonal relationships, as well as to expectations on future employability.

5.2 Study load and teaching organization

With regard to the study load, 79.6% of students declared that during distance learning the tasks increased compared to the traditional face-to-face school lessons: out of these, 24.7% stated that the study load was not sustainable, while 54.8% stated that, although increased, the load was nevertheless sustainable.

77.6% of interviewed have assessed the organizational efficiency of the school in planning distance learning positively (for 22.5% very positive and 55.2% moderately positive). The continuity of classes guaranteed by teachers was also evaluated more than satisfactorily by the great majority of students (90.6%).

5.3 Effectiveness of study

The last part of the AlmaDiploma survey is dedicated to the effectiveness of remote learning. 75.1% of students declared that they were able to pay less attention to teachers' lessons, without getting distracted, in remote than in-person teaching. Only 29.6% of students considered remote teaching effective for learning new topics and for 16.7% of students remote teaching improves the understanding of study subjects compared to face-to-face lessons. Overall, 31.6% of students believe that it would be useful to continue using distance learning, together with classroom lessons, even after the Covid-19 emergency.

The majority of students (72.1%) think that the preparation achieved through distance lessons is lower than that they would have had going to school (this independently on the type of diploma), and less than one third of them (31.6%) believes that it would be useful to continue using distance learning, blended with classroom lessons, after the Covid-19 emergency.

In summary, although the AlmaDiploma survey returns an overall positive picture of the ability of adapting and reorganizing teaching demonstrated both by schools and single teachers during the pandemic emergency, critical issues clearly emerge. 8% of students who stopped attending remote lessons, as documented by ISTAT in the Annual Report 2020 (ISTAT, 2021), weighs heavily on the future of the learning process, on the educational wealth of the next generation of adults and on social mobility opportunities. Although not quantified yet for Italy, it can be assumed that a serious learning loss is attributable to remote teaching (Hanushek and Woessmann, 2020, Azevedo et al., 2021), with even more severe losses in the most disadvantaged geographical areas and in the most vulnerable population categories, reflecting the strong inequalities in ICT access opportunities, digital skills and economic conditions discussed so far.

6. Final Remarks

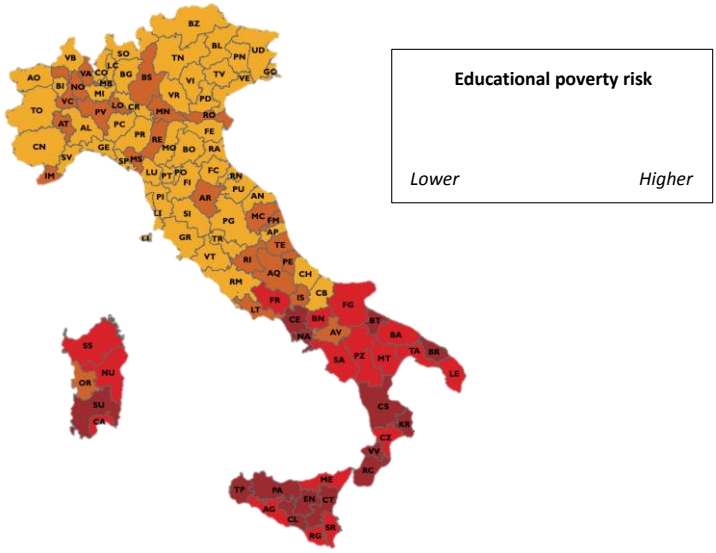
ICT are the infrastructure of this millennium, on which the education system will increasingly rely to benefit from the opportunities and potential advantages of remote teaching. Distance learning has begun to respond to an emergency need that arose in a casual and sudden way, but it seems destined to persist over time, especially for the higher segments of the educational system, such as upper secondary school and universities.

Critical issues associated to remote teaching experienced so far show how important is to implement a learning process that is able to ensure equity and inclusiveness to students. What the data suggest is that new forms of educational poverty emerge from remote teaching if adequate measures are not adopted to contain the digital divide that threatens to amplify pre-existing economic and social inequalities among students.

On the basis of several indicators that include implicit and explicit dropout, socio-economic background of students, Save the Children (2020) presents a map of the Italian educational poverty risk to highlight the areas where interventions are necessary to fill the educational divide (Figure 4). In Italy, there is not a sufficient number of ICT devices for all students, who are often forced to share their tools in overcrowded housing (on average about one adolescent out of two). On all these

dimensions there are deep regional imbalances between the North and the South (even if imbalances are conceivable to apply also at other geographical scale levels, as it happens for example with diverse education services offered in big cities and small towns, or in the central and peripheral neighborhoods of the same city). Like in a vicious circle, inequalities in ICT risk to reinforce inequalities in the education systems, while educational poverty risks to widen the digital divide.

Figure 4. Map of educational poverty in Italy by provinces.



Source: Save the Children, 2020

In conclusion, overlapping pictures of the Italian inequalities emerge from the analysis conducted in this chapter. Increasing access to ICT resources and improving digital literacy of students are the only leverages to combat both the digital divide and educational poverty. Remote teaching without equal access to ICT risks to produce further learning losses compared to the traditional face-to-face education model and this risk will be dramatically higher for the most vulnerable people.

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