

Romanian E-Learning Effects After The COVID-19 Outbreak. The Case Of The Gymnasium Students

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Abstract

Due to the fact that the last three years have been defined by an overlapping series of crises having the disruptive effect of full lockdown, the digital transition to the online learning environment has been immediately adopted as the sole solution of the Romanian authorities. The main purpose of this research paper is to study what type of consequences has produced the e-learning conducted during the pandemic years for the middle-school students, using both qualitative and quantitative methods. Hence, the questionnaire-based survey has been used in order to collect primary data from 333 participants and measured the perception of middle school students from a low-income unit school of Bucharest with regard to a series of nine variables. Thereupon, a comparative analysis of the research findings and both officials and NGOs reports was conducted, with the aim of addressing the research hypotheses and providing a set of recommendations for an increasing satisfaction of both students and teachers towards the education quality. The results reveal that the online learning period is the major factor behind the excessive use of online devices of more than a half of the children asked, which can have very negative effects on their psychological development.

Keywords: e-learning, COVID-19, online education, blended learning, middle-school students.

JEL Classification: I20, I21, I24.

1. Introduction

In the light of the recent COVID-19 outbreak, key pedagogical principles have been eclipsed by the planetary continuously growing health issues that emerged in the spring of 2020. Since many states have immediately applied forced lockdown, the adoption of digital technology has gained traction (Michigan, 2020). As a result, the pandemic has become a major incentive for educational institutions worldwide to find ingenious solutions in a very small amount of time (Tam & El-Azar, 2020). Without any previous warning or preparation, all learning has been deflected online as self-isolation became the new rule (Sloan, 2020), with almost one billion students being affected by school and university closures worldwide (UNESCO, 2020).

As of March 10, 2020, the Romanian educational system has suspended schooling for all pre-university education units and the Ministry of Education and Research (MER) adopted a series of measures in order to overcome the obstacles linked to the pandemic context. Despite the government's prompt reaction to the health crisis, it was only on April 27th that the MER, together with specialists from the Ministry of Health, made the decision to continue the safe school year for students, teachers, school staff and parents online (Romanian Parliament, 2022).

Shifting from face-to-face learning to virtual classes was the only solution for the education to continue its course under a new paradigm remodelled by Industry 4.0. Soon, the worldwide adoption of digital technologies in all aspects of human interaction set the stage for the implementation of modern ITC solutions which have the potential to support individuals in developing connections between their behavioural patterns (Schroder, Prockl, & Constantiou, 2021). In addition, technological innovations could solve humanity's problems concerning the transition toward net zero emission (Miller, 2020) by changing the human attitudes and behaviours toward sustainability (Dwivedi, 2022).

Experts agree that Romania's education system needed a change a long time ago, but a crisis can be converted into an opportunity only if a proper preeminence of staff development for online learning has been put in action (Almpanis, 2022). Given the fact that both Romanian teachers and students lacked previous experience in using online platforms in the learning process, the second semester of 2019-2020 has been postponed to be recovered in the next school year. Moving the school to the online environment generated a new kind of problem associated with the learning process: the psychological disease of technostress, that provokes harmful

repercussions for the life of the young generation educated online (Rodideal & Marinescu, 2021).

Since there is little prior knowledge on the effects of virtual learning on middle school students' behavioural patterns, this paper aims to identify how the lockdown period has impacted gymnasium students in comparison with their teachers and parents' opinion on them, or even other age groups students, but also to draw useful conclusions for pedagogical practices and regulators.

2. Literature review

Nowadays, digital technologies offer the premises for blended learning to be referred to as “the new traditional model” or the “new normal” of teaching and learning (Dziuban, Graham, Moskal, Norberg, & Sicilia, 2018), since all universities have been using it for more than a decade. If blended learning consists in the integration of digital platforms with face-to-face classes, virtual learning distinguishes by offering a purely online learning environment through which students can benefit from the teaching process (Chaeruman, Wibawa, & Syahrial, 2018).

Taking into account universities' past experience with blended learning, many of them acknowledged the need of replacing traditional face-to-face teaching with an online learning environment.

On one hand, Müller and Mildemberger (2021) state that the reduction of classroom time to almost 80 percent does not imply poorer learning outcomes, being equivalent to conventional classroom instruction. Additionally, the study by Müller et al (2021) revealed that students who were otherwise silent during in-person classes seemed to present a higher level of engagement throughout hybrid learning.

Moreover, the study conducted by Raccanello et al (2022) on higher education students from 13 countries highlighted that both the environmental and proximal antecedents of achievement emotions are connected to students' perception in relation to their learning activities. Also, the authors of this study emphasised the advantages of digital technologies which offered students the opportunity to access online learning while physically isolated, in spite of numerous difficulties encountered while using the online mode.

On the other hand, the sudden transition to online learning has only accelerated the exclusion of low-income students from the concept of open access education, hence all individuals that benefited from the virtual learning should have met several criteria (own room, Internet access, personal laptop/ tablet/ PC) in order to attend their classes. Consequently, the digital divide is most noticeable in developing countries, where social and cultural differences are fortified by poverty and a scarcity of educational acquisitions amidst the population (Barnes, 2020; De' et al., 2020; Fahey & Hino, 2020).

Despite the fact that the migration to e-learning implied dire innovations in the education systems all over the world because neither the teachers, nor the students were prepared for this new experience, only few studies focused on the repercussions of virtual learning on undergraduate students. For instance, in the study by Maqableh (2021) the majority of the undergraduate students declared that they have confronted both psychological and financial issues throughout the lockdown. Furthermore, students stated to have dealt with many other problems during online classes held in the pandemic, such as: technical difficulties, time management, or balance between life and education.

Moreover, the impression of being compelled to conduct a behavioural turnaround such as forcibly staying at home and connecting to online learning could also lead to chronic stress, which would only accelerate the burst of a depression (Ogawa et al, 2021). Without former notice, all undergraduates have been forced to adapt their life to the online environment, which eventually contributed to the emergence of technostress, which has negative consequences not only for their quality of life, but also for their whole development (Rodideal & Marinescu, 2021). Considering the Romanian educational system, the important influence of ICT on the learning process has been foreseen since the beginning of the pandemic, with various alterations in both future curricula, that experts agreed it should include e-Learning tools and classes to be held online in a blended format, but also adapt the testing process to the online setting (Edelhauser & Lupu-Dima, 2020).

With regards to the impact of the drastic change provoked by the switch to online learning to middle-school students, there were no scientific preoccupations manifested by the Romanian pedagogical actors towards a regional assessment of children's perception regarding their behavioural changes caused by this.

3. Methodology

The main objective of this research is to analyse what type of consequences has triggered the e-learning conducted during the pandemic years for the middle-school students, using both qualitative and quantitative methods.

Firstly, the primary database used for the literature review was Science Direct. Keywords such as “e-learning” or “online learning” or “online school” or “virtual learning” or “blended learning” were combined (AND operator) with the following keywords “pandemic”, “COVID-19”, “lockdown” and “middle-school”. The search taxonomy retrieved almost 600 articles that had the combination of keywords in the article title, author keywords, or abstract, from which a total of 472 articles remained after a process of filtering to eliminate non-relevant studies. These articles were evaluated after a thorough lecture in order to assess their suitability against the scope of the research.

Secondly, a survey based on a questionnaire was administered to a representative sample of 340 respondents with the purpose of collecting primary data and comparing the final results with those of non-governmental and governmental official reports on the implications of e-learning on gymnasium students. The questionnaire has been sent to middle-school students (11-14 years old), studying at School No. 117 from Bucharest, which is located in a low-income region of the capital city. Thus, all the children included in the study were children with special educational requirements, as the National Law of Education No 1/2011 regulates the way of granting their rights in the pre-university education system.

The questionnaire-based survey entitled “How has the pandemic reshaped your education?” was conducted between May 2 and May 24 of 2022 via Google Forms and generated 333 valid answers for all the questions. Further, an analysis of the collected data has been provided using bottom-up Excel tables, outlining the results for the nine dependent variables included in the questionnaire: online learning participation, type of device used for e-learning; level of difficulty of homework; students’ self-assessment of their knowledge development; main need for help during this period; amount of time spent on a daily basis online; favourite post-pandemic leisure activities; issues and risks encountered online, and also during online courses.

Thirdly, the results provided by the meta-analysis and the questionnaire-based survey were compared to the newest reports in the field of Romanian education published by authorities and non-profit organisations, such as World Vision Romania. The research of World Vision was conducted online in January - February 2022, including 3040 children, 1.314 parents of school-age children and 546 teachers from 118 units.

In the light of the main objective of this scientific paper, the research questions were grouped around the following three issues:

1. Is there a significant difference between the perception towards e-learning of middle-school children from a poor neighbourhood of the capital city of Romania compared to the national average?
2. How different is the middle-school students' opinion from the teachers' opinion with regards to the online learning period?
3. How did the COVID-19 pandemic affect middle school students' habits and preferences for leisure activities?

This research paper addresses the above questions and provides a set of practical information that both teachers and parents can use to increase interest and satisfaction of their children for online activities.

4. Results and Discussion

Due to the fact that the number of respondents who participated in the research was 333 middle school students, which represents 35% of the total gymnasium students (950 middle school students enrolled in 2020-2021) studying in School No. 117, the results offer relevant information about all the nine variables analysed by the survey. Thus, data interpretation allowed the conclusions to be drawn according to the objectives of the research paper: the importance of support and special help during crisis, shortcomings of online learning, or types of behavioural alterations in students' own perception.

A. Students' participation in online classes during the pandemic

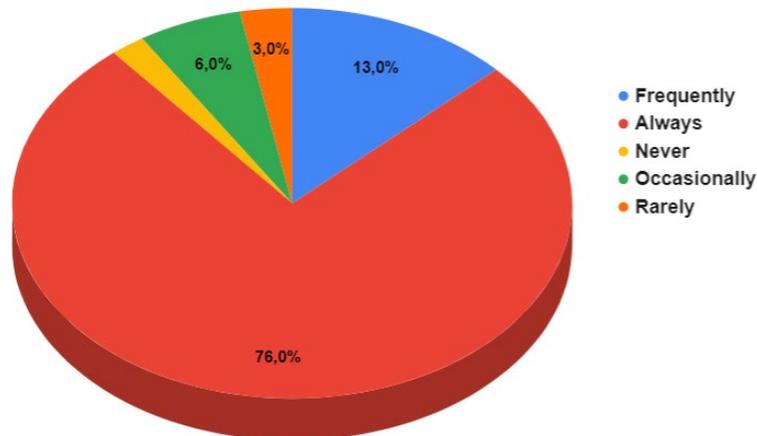


Fig. 1. Students' own evaluation regarding their attendance in online courses during the suspension of school courses

Most of the respondents (76%) claim that they have always attended online courses during the suspension of face-to-face school, while only 4% have rarely or never attended online classes (**Fig. 1**). In addition, only 6% of the students included in this research declared to occasionally connect to online classes, which means that 10% of the students claim to have been absent from e-learning classes.

B. Students' usage of devices for e-learning

Taking into account the fact that the lack of Internet connected devices has been one of the biggest problems encountered by students during the suspension period, three quarters of the participants in the survey (75%) stated that they had had access to a computer, tablet and cell phone during the online school classes (**Fig. 2**). Moreover, students included in this research come from low-income families that also faced many other types of difficulties during the pandemic (financial, psychological, social or health issues), whose families made drastic sacrifices in order to assure their children the proper learning environment.

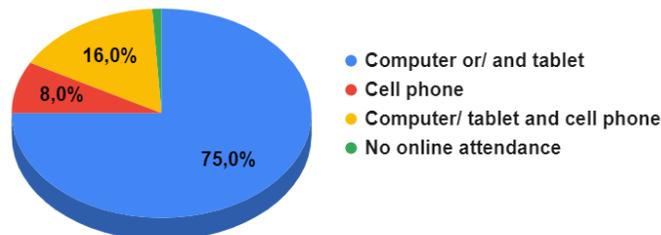


Fig. 2. Students' opinion regarding the devices used by them to participate in online courses

In contrast, 16% admitted that they used only the computer or/and tablet, while 8% of the students claimed that they had used solely the cell phone.

C. Students' assessment of homework difficulty level

The burst of the COVID-19 pandemic forced the Romanian authorities to take unprecedented measures in order to save as many lives as possible from hospitalisation. Thereby, the Ministry of Education decided that the second semester that was not completed after March 11, 2020 will be addressed in the next school year, and students' average grades were completed with at least two grades. Also, students could not be expelled or forced to participate in online classes, due to the impossibility of providing free access to education in the absence of devices connected to the Internet- which were handed to children only in 2021.

As a consequence, the homework received during the suspension period seemed to have remained the same for 55% of the students included in the survey (Fig. 3), whilst 20% admit they were simpler/ it took them less time to solve the homework, and 20% affirm they were heavier or it took them longer.

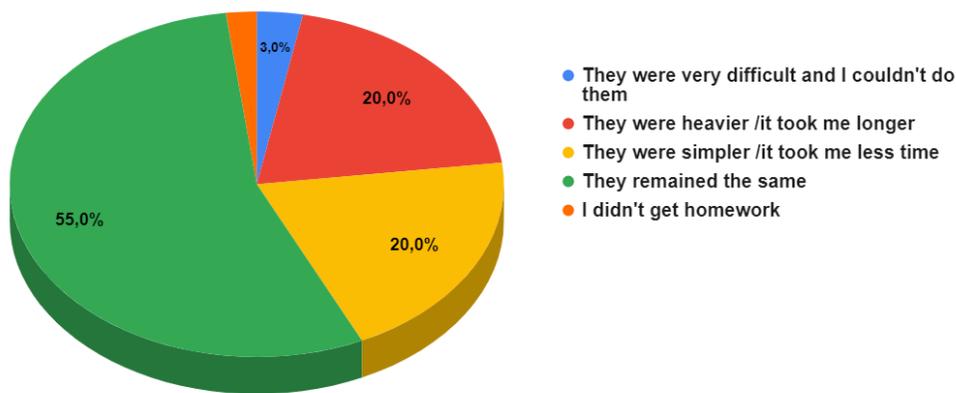


Fig. 3. Students' opinion regarding the homework received during the online school courses
Merely 3% of the children stated that the homework was very difficult and they couldn't solve it, while six children declared that they didn't get any homework (2% of the students).

D. Students' assessment of homework difficulty level

Even though 76% of the students reported that they have always attended online classes (Fig. 1), just half of them (36%) state that they went through all the matter without any problems (Fig. 4).

In addition, almost 27% of the middle school students affirm that there were also lessons they didn't take, and 28% claim that they have left behind the studied subject.

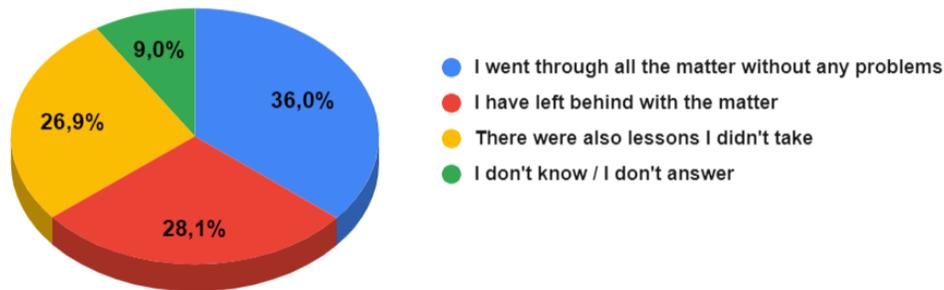


Fig. 4. Students' own evaluation regarding their knowledge accumulation during the online school courses

All questions were clearly formulated so children would find the questionnaire easy enough to complete it during their recreational pause at school (five to ten minutes). Still, 9% of the children (27 students) claim to not be able to answer this question, which means they most likely lack self-assessment competencies.

E. Students' assessment of type of help needed during online classes

Although the shift from face-to-face classes to online learning took all children by surprise, when asked what type of help they would have needed during this hard period, just 10% claim to be unsatisfied with the lack of support in finding and using online learning via websites and platforms, whilst almost 24% of the students do not know the answer (**Fig. 5**).

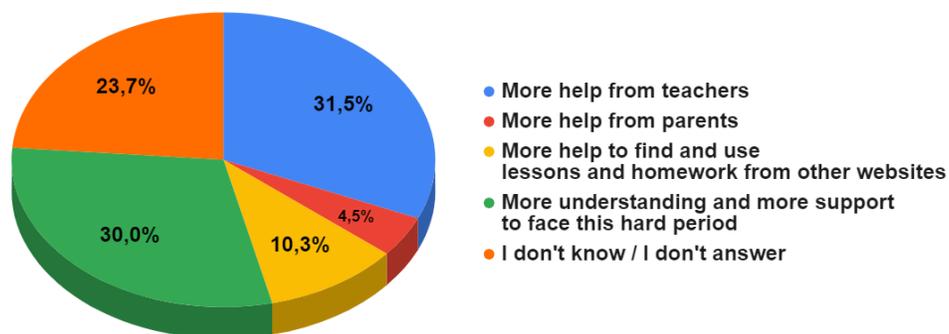


Fig. 5. Students' opinion regarding their unsatisfied needs during the online school courses

Very few students claim to have needed help from their parents (4.5%), but a third of them affirm their teachers should have helped them and another third state that they wished for more understanding and support to face the hard period of lockdown.

F. Students' assessment of the amount of time spent daily online

The transition to online learning also transformed parents' attitude towards their children's access to online connected devices, since children of all ages were suddenly constrained to utilise for educational purposes the same gadgets they were previously used for fun and entertainment.

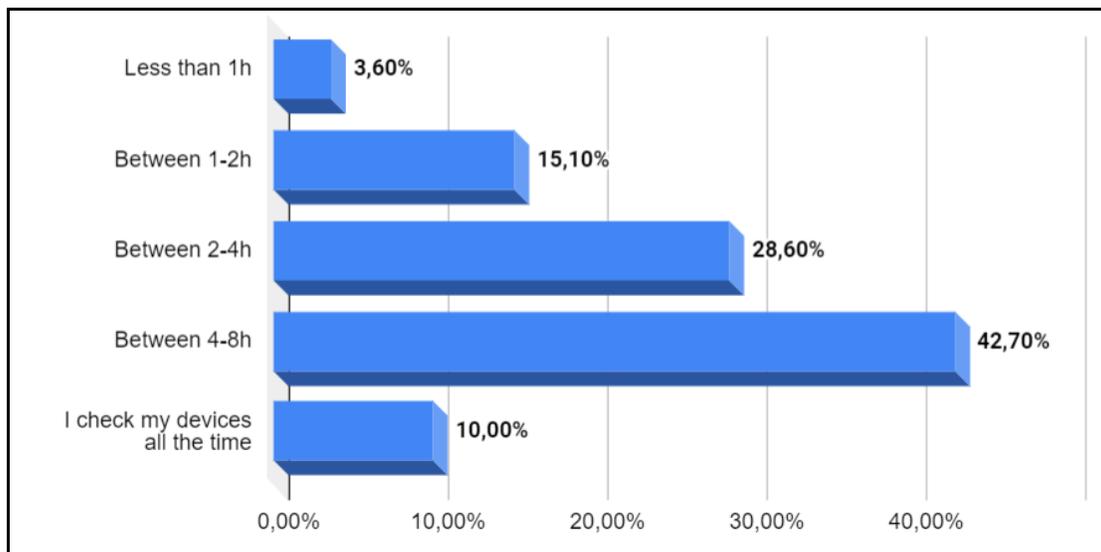


Fig. 6. Students' own evaluation regarding the amount of time spent daily on the Internet during the online school courses

Under these circumstances, the amount of time spent online on a daily basis has severely increased, with 10% of the middle school students claiming to check their devices all the time and almost 43% reporting to spend between four and eight hours per day on the internet (**Fig. 6**). At the same time, almost 29% of the students declared that they have spent between two and four hours on the Internet during the online school courses, suggesting that more than 80% of the children stated that they have dramatically augmented their online activities due to the new COVID-19 measures.

G. Students' top three preferences for leisure time in post-COVID era

As teleworking and e-learning gained popularity amidst different societies all over the world, socialising was only possible through maintaining the social distance of one and a half metres. As a consequence, it was very interesting to evaluate the impact that e-learning activities have had on the children's preferences for leisure activities after the suspension of school ended.

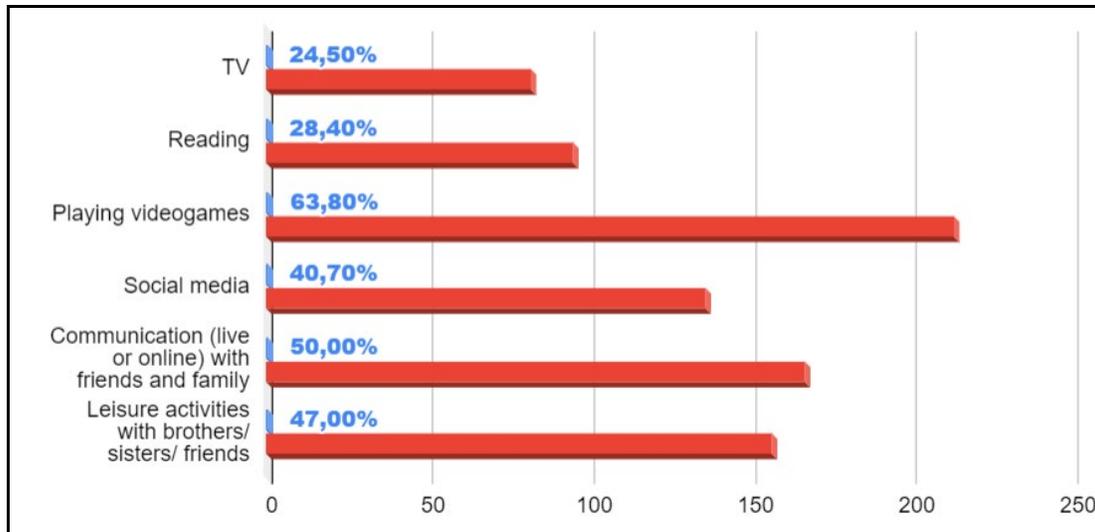


Fig. 7. Students' opinion regarding their three main leisure activities, since the suspension of classes in schools

With regard to the top three main leisure activities, children state that for almost 64% of them playing video games remains their favourite activity (**Fig. 7**), half of the middle school students prefer to communicate with friends and family -live or online, and 47% declare to enjoy leisure activities with their brothers, sisters or/and friends. On the fourth place, children state to appreciate social media (40%), while reading is mentioned by 28% of the children, with watching TV being the least favourite activity (24.5%).

H. Students' biggest problems encountered online

Without any previous coherent instructions from their teachers or their parents (many of them lacked digital competencies so they were also forced to adapt to the digital universe) , many children affirm to have confronted various types of problems. For instance, primary school students from grade 0, 1, or 2 required assistance from a grown-up person (or their older brother/sister) during their online learning activities, so that they could connect and assist virtual classes using digital platforms. Moreover, according to the framework plan for secondary education, approved by OMENCS no. 3590/2016, the subject of Informatics and ICT is taught in the 5th, 6th, 7th and 8th grades, as a subject of common trunk, with an allocation of one hour / week.

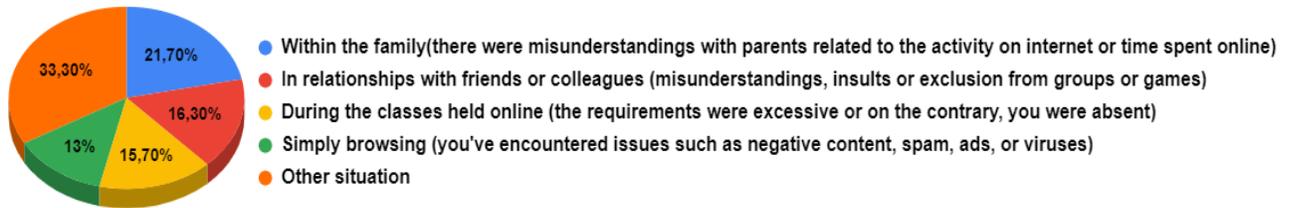


Fig. 8. Students' opinion regarding the biggest problems encountered while on Internet

Therefore, middle school students should have encountered less problems while using the Internet than their younger counterparts enrolled in primary school. Nevertheless, 22% admit there were misunderstandings with parents related to the activity on the Internet or time spent online (**Fig. 8**), and 16% state the requirements were excessive or they were absent, or they've experienced issues such as negative content, spam, ads, or viruses. However, the majority of students (33%) declare they've confronted other situations, but refused to exemplify in the filling of their form.

I. Students' most common risks encountered online

With the transition to the digital economy accelerating the worldwide adoption of digital technologies, so has the number of risks encountered online, with children being the most vulnerable to experience the negative consequences of the digital universe.

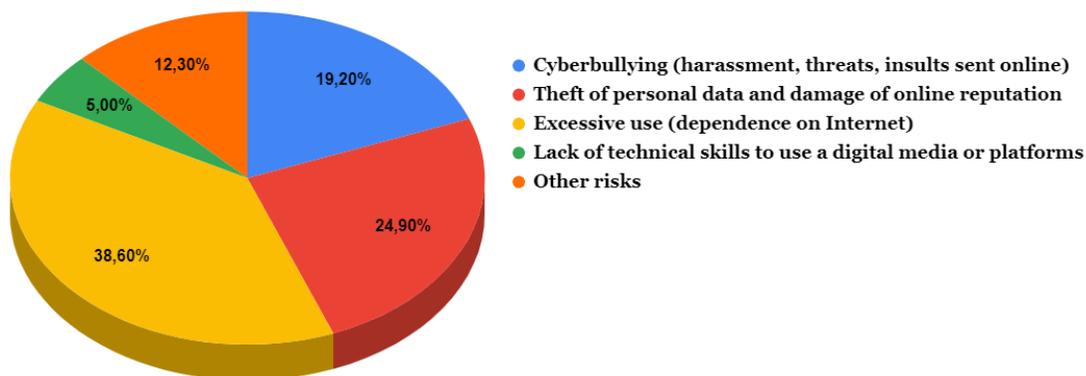


Fig. 9. Students' opinion regarding the most common online risks encountered during the suspension of courses

Consequently, the participants in this study also confronted many risks during the online courses: almost 39% of the students claim to be aware of the excessive use (Internet addiction); a quarter of them (25%) state to have experienced theft of personal information and damage of online reputation; 19% of the participants affirm they were victims of the cyberbullying phenomena -

harassment, threats, insults received online; while only 5% of the children declare they had lacked the technical skills to use digital platforms.

J. Comparative analysis of governmental and non-governmental statistics

Taking into consideration that the Romanian Education Law No. 1 of 2011 stipulates the allocation of 6 % of GDP provided for the educational system, the authorities have been annually postponing the implementation of the law, with the biggest funding in 2015 when the education received 3.24% of the gross domestic product. While in the first pandemic year the Romanian government adopted a share of 2.5% of GDP for education, in the draft budget for 2022 authorities provided 2.28% of GDP for the education sector (Romanian Parliament, 2022), the lowest allocation in the last four years. Consequently, the number one problem of the Romanian school system is underfunding.

Furthermore, in the most recent report concerning the state of the education system published by the Romanian authorities, the officials acknowledge their ignorance towards the pandemic impact on the education stakeholders (students, teachers and parents), by presenting the only two measures they've adopted in order to facilitate teaching activities at distance for both students and teachers: 1. Five webinars for the teachers to be informed about digital platforms organised in May 2020; 2. The approval of the National Program "Home School", implying the acquisition of electronic devices with internet connection necessary for the children from disadvantaged backgrounds from the pre-university school units.

On the other hand, the latest World Vision Romania Report (2022b) including more than 3.000 children, 564 teachers and 1.314 parents from 118 school units outside the capital city describes a very tragic reality of the education system that was left behind in the alignment process to a digital transformation. For example, 31% of the parents declared they have received online devices one year after the epidemic started, $\frac{2}{3}$ of the children have focus issues, and $\frac{1}{3}$ of kids became more aggressive or shy.

Since the beginning of the COVID-19 crisis, Romanian children have lost on average 24 weeks of school, equivalent to a third of a school year. Also, according to official statistics about a quarter of children entering the first grade do not graduate from the eighth grade, with the

highest abandonment rate in the first and the fifth grade. As a result, Romania is on the third position in the EU on the list of countries with the highest dropout rates, after Malta and Spain.

However, the government has revised the National Recovery and Resilience Program 2021-2026 in order to increase the grants allocation to a total of 500 million euros to improve the infrastructure in sixty educational institutions (consolidation, thermal insulation, electronic equipment), and another 538 million euros for the National Program for Reducing School Dropouts.

According to the World Vision Report (2022a), teachers' online activities have increased from 64% in 2020 to 82% in 2022, while the homework sent via online messaging has decreased by 8%, from 55% in 2020 to 47% in 2022. With reference to the assessment of education's quality, 48% of the teachers included in their study stated that it has remained the same and 39% considered that it has dropped during the suspension period, while the vast majority of parents (73%) affirmed that they consider the education is poorer than before and just 8% considered it has made a progress.

5. Conclusions

The recent unfolding of a series of crisis affecting people all over the world underlined the necessity for the transition to the digital age, which has catalysed the adoption of ICT in sectors of activity where the repercussions could only have been assessed afterwards, since there was no previous experience with many of the eTools (software, programs, applications, platforms, clouding, blockchain) the digital economy has already been using nowadays.

Relating to problems caused by ICT usage in online education during the COVID-19 pandemic, the study of Adam and Metljak (2022) suggests that younger teachers with at most five years of professional experience had less issues than the other two groups included in their research. Also, the study of Maqableh and Alia (2021) showed that more than a third of the surveyed undergraduate students declared they were dissatisfied with the digital platforms' online learning experience functionality, and no single platform was used.

Despite the psychological issues which cannot be addressed in the absence of an efficient cooperation between the authorities and education's stakeholders, digital platforms can represent the perfect environment for the widespread of sustainable solutions to many of the seemingly

intractable societal challenges relating to climate change (George et al, 2021). The dramatic lack of understanding around the topics of the ITC's influence on solving the climate change problem could only be changed by introducing Green IT in the universities' academic curricula (Perkins et al., 2018; Marques et al, 2019; Pan et al., 2020; Dwivedi et al, 2022).

Because the main objective of this research is to analyse what type of effects has generated the online learning directed throughout the pandemic years for the middle school students, the findings of this study are consistent with the aims of the research. However, the limits of this study are to be acknowledged, such as the use of a single scientific database (Web of Science), or the application of the questionnaire-based survey.

The main objective of this research is to analyse what type of consequences has triggered the e-learning conducted during the pandemic years for the middle-school students, using both qualitative and quantitative methods.

Firstly, the findings reflect that there is not a significant difference between the perception about online learning of middle school students from a low-income area of the capital city of Romania and the national average measured by the authorities and NGOs. Thus, 10% of the students state they were absent during the suspension period caused by the pandemic, 23% consider homework has been difficult for them, 28% admit they left behind with the studied subject, 33% affirm they needed more help from their teachers, and more than a half of the participants indicate that they are aware of the excessive use of Internet connected devices.

Also, in the post-COVID era children declare to prefer leisure activities such as video games, communication live or online, and playing with their friends/ sisters and brothers. Nonetheless, a quarter of them (25%) state to have experienced theft of personal information and damage of online reputation; 19% of the participants affirm they were victims of the cyberbullying phenomena (harassment, threats, insults received online); while only 5% of the children declare they had lacked the technical skills to use digital platforms.

Secondly, data analysis shows that middle school students' opinions about the online learning period generated by the pandemic are very similar to teachers' judgments. Romanian authorities have superficially addressed the vital role of education throughout this period and ignored the lack of digital abilities or even Internet connection (or online devices) of both teachers and students. Consequently, the few measures implemented too late by the Romanian government -

one third of the children included in World Vision Report (2022a) received online devices one year after the pandemic started- have only accentuated the social inequities regarding free education.

Thirdly, the COVID-19 pandemic has severely affected middle school students' habits once all educational activities had suddenly shifted to the online universe, with more than 50% of the children included in the study stating that they are conscious of the excessive use of the Internet. Regarding their top three leisure activities, more than half of the students asked declare to prefer video games (64%) and communicate live or online via social media platforms (50%), and almost half of them (47%) enjoy playing with their friends and/ or brothers and sisters.

Therefore, authorities should provide online devices and Internet connection for all pre-university students from low-income families in order to grant equal opportunities to access educational activities. There also should be created a unified learning environment for conducting direct online classes, interaction with colleagues and teachers, sharing materials, and online students' assessment. The future lines of search could consider an assessment of behavioural change in primary and high school students' opinion.

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Credit authorship contribution statement

Alexandra Constantin: Conceptualization, Investigation, Project administration, Formal analysis, Supervision, Methodology, Writing – original draft, Writing – review & editing, Visualization, Validation. **Petrișor-Iulian Chilianu:** Investigation, Methodology, Resources.

Declaration of competing interest

None.

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