

The Impact of Post-Pandemic Learning Loss on Education Development: A Systematic Review

Ignacio Aguaded
University of Huelva, Spain
aguaded@uhu.es

Arantxa Vizcaíno-Verdú
University of Huelva, Spain
arantxa.vizcaino@dedu.uhu.es

Victoria García-Prieto
University of Seville, Spain
vgarcia8@us.es

Patricia de-Casas-Moreno
University of Extremadura
pcasas@unex.es

Abstract

The Covid-19 pandemic constituted a critical issue for education, impacting the teaching-learning processes. Educational institutions, families and teachers faced unique challenges to ensure quality education supported by the Internet and technology. This study aims to review the latest literature on learning loss in different contexts to understand how this phenomenon could potentially impact the educational development due to the lack of technological and digital possibilities for learning. We found that even though the learning loss occurred during periods of physical disconnection between teachers and students, the pandemic resulted in an unexpected shock in which the gap between them was digital. This study underlines the factors contributing to this digital learning loss, on which educational and governmental agencies should focus on media literacy to prevent the absence of technological resources, the limited involvement of the family, and the lack of digital competences of the citizenship.

Highlights

- Learning loss is a symptom of physical disconnection between teachers and students.
- Learning loss represents a consequence of the digital divide in education.
- The Covid-19 pandemic made visible the structural problems of media literacy.
- Post-pandemic learning loss is related to digital disconnection between teachers and students.
- Media literacy must coordinate quality digital education between school and society.

Suggested citation: Aguaded I., Vizcaíno-Verdú A., García-Prieto V., & de-Casas-Moreno P. (2023). The Impact of Post-Pandemic Learning Loss on Education Development: A Systematic Review. *Review of Communication Research*, 11, 172–189. <https://doi.org/10.5680/RCR.V11.7>

Keywords: Learning loss; e-learning; pandemic; online education; digital divide; media literacy.

Editor: Camiel J. Beukeboom (Vrije Universiteit Amsterdam, The Netherlands).

Reviewers who accepted to sign their review: The reviewers prefer to stay blind.

Received: September 12, 2022 **Open peer reviewed:** October 21, 2022 **Accepted:** November 25, 2022 **Published:** May 10, 2023

Content

INTRODUCTION173
 Pandemic Impact for Education Development.....174
 METHOD175
 Literature Search175
 Inclusion Criteria.....175
 Coding Procedure.....176
Figure 1. Diagram of the article selection and inclusion process based on the PRISMA methodology by Page et al. (2021)176
Figure 2. Topic frequency in the analysis sample177
 RESULTS AND DISCUSSION.....178
 The Effect of Summertime on Learning Loss178
 The Effect of Learning Loss in Technological Environments.....180
 The Effect of Learning Loss During the Pandemic180
 DISCUSSION AND CONCLUSION181
 CONTRIBUTIONS AND FUTURE PERSPECTIVES.....183
 REFERENCES184

Introduction

The Fourth Industrial Revolution introduced by Schwab (2016) described a technological change in which the lines between the physical, biological and digital spheres blurred. In contrast to previous revolutions, which were devoted to economic and social transformation associated with gas, oil, electricity, machines, telephone, radio or science, the fourth stage motivated interest in an innovative metamorphosis based on artificial intelligence, data and digital systems. This last scenario continued evolving until the present day, leading us to significant socio-economic inequalities more related to a regression than a revolution (Pittman et al., 2021). We experienced this phenomenon particularly during and after the Covid-19 pandemic (Qureshi, 2021), which impacted the educational system. The health emergency prompted the need to reconstruct teaching curricula to ensure quality learning from people’ homes worldwide (Martin, 2020).

The suspension of face-to-face teaching activities in favour of virtualization as a consequence of the pandemic resulted in the exposure of teachers and students to high loads of pressure, related to both the performance of their functions, as well as the adaptation to this new scenario. The transition to online education was challenging, considering the training processes, course redesign and infrastructure required for such online education. In fact, it seems that

in several cases the forced implementation of Information and Communication Technology (from now on, ICT) highlighted the existing digital divide between teachers and a new generation of students. Thus, institutions, teachers and families realized the importance of strengthening ICT skills inside and outside of the classroom (Feng & Wang, 2021). This incident, which could potentially have become the fifth transhumanistic and digital revolution, lacked knowledge nomads able to face and adapt to the new challenges (Moravec, 2013). In this context, many countries faced negative effects in their learning processes, given the lack of investment in virtual scenarios, and the lack of ICT training for teachers and students to properly develop their education (Xiong et al., 2021).

This study presents a systematic review within these events to analyze the impact of learning loss, understood as the decrease in skills and knowledge learned (Hevia et al., 2022) during the transition from face-to-face to online learning due to Covid-19. Some studies point towards the impact of this educational transition as a consequence of the absence of technological tools or minimal training in digital skills (Hamdan et al., 2021; Stanistreet et al., 2020). For this reason, our research question involves understanding how this process of learning loss may impact the educational development of students according to earlier studies related to loss of knowledge.

Pandemic Impact for Education Development

On March 11th, 2020, the World Health Organization (WHO, 2020) declared an international state of emergency due to the Covid-19 outbreak. This turning point resulted in critical situations at the international level and in every context (political, social, economic, and educational). Also, the confinement derived from this health crisis caused social distancing, the paralysis of activities, as well as problems in people's day-to-day life (Ordorika, 2020).

The pandemic also impacted on education. The social actors who comprise it (students, teachers, administrators, and authorities), re-structured their activities so that the academic year could continue normally (Cucinotta & Vanelli, 2020). The cancelation of face-to-face classes led to processes of exclusion and marginalization, promoted by the widely analyzed digital divide (Gomez, 2014). Different communities were marginalized from the mainstream technology education process, raising a socioeconomic stigma and power imbalance which was sometimes even inadvertent (Sevelius et al., 2020). This means that most homes were not equipped to face the educational transition from face-to-face to online, as noted by UNESCO's experts (2020). Emergency remote education, so named by its precipitous adoption, led to some contradictions at the educational level in segments of the population with a high risk of social and digital exclusion (Raza-Chohan & Hu, 2020). This situation, intensified by the social and digital divide, has raised questions about the right to receive quality education (Iglesias-Vidal et al., 2020). On its part, a study conducted by Orgiles et al. (2020) showed the existence of a minority group of students who confirmed having great difficulties in maintaining their learning rhythm in a virtual environment. Among the existing deficiencies, we must point out the lack of technological equipment; inadequate and limited physical space at home; scarce cultural capital or digital means by the student's parents or family; or lack of knowledge of the vehicular language at school, and therefore, difficulties in establishing communication with the teachers (OECD, 2020).

After describing these limitations, it is necessary to reconsider the home as a socialization context, becoming a source of resources and learning. In this sense, and after more than four decades of deep research on the subject, it is critical to highlight that every family, beyond their condition, origin, or social diversity, should be recognized in the practice of education. For this reason, the relationship between the family

and the school is thought to be significant (Murillo & Duck, 2020).

The International Association of Universities conducted a study on educational trends during the pandemic. According to its results (Marinoni et al., 2020), 80% of the higher education institutions pointed out that the health crisis would have an effect on the enrolment of national and international students. Likewise, 48% of the participants indicated that their governments provided support to mitigate the effects and to complete the academic year. The study confirmed that this context had affected teaching-learning processes, where online education was highly relevant. This change has created great technological, pedagogic, and competence-related challenges, and has also proposed more flexible education methods (hybrid, mixed, synchronous and asynchronous). Considering this entirely virtual methodology, many institutions have reported an increase in the deployment of virtual modalities after the confinement at a global scale.

Along the same line, Perez-Lopez et al. (2021, p. 2) confirmed that "the negative assessment of distance learning is explained by the apparent reverse relationship between time spent studying and academic performance and the lack of teachers' adaptation to students' personal and academic circumstances". Communication between teachers and students in this context becomes a determinant factor for avoiding negative effects on the development of informational and technological competences.

In the weeks following the interruption of face-to-face classes, the number of people affected grew exponentially. In March 2020, the pandemic affected the classes of approximately 300 million students, from early childhood to higher education. In less than a month, this figure increased to 1.5 billion in 188 countries, with 60 million professors added to this figure. More than 70% of the students in 186 countries were affected by the closure of the centers, creating a true deficit due to the cancelation of socialization and physical interaction processes. These evidences emphasized the need for universal Internet access (Tarabini, 2020).

According to the report by the OECD (2020), the consequences on education were alarming. The closure of education centers in the first half of 2020 created significant learning losses, especially those related to the development of cognitive skills. It is difficult to precisely estimate the class time periods affected in every country, but it hovers around 8 to 18 weeks. The effects of these learning losses could

include problems in the correct incorporation of students in the labor market, which in turn could lead to problems in the economy (Bradley & Colin, 2020). As an effect of this phenomenon, teachers may have to face greater consequences for the development of learning strategies (Chipdza & Leidner, 2019). This health crisis has provided evidence of the multiple deficiencies and inequalities in the education system (Reimers, 2022). The students have always attended their centers to partake in inspirational debates, collaborate, and cooperate. Faced with this, the institutions must re-invent their learning environments in such manner that the didactic digitalization helps to replace the attractiveness provided by face-to-face education (Engzell et al., 2021).

Likewise, the Covid-19 crisis has strongly hit the education systems included in the Programme for International Student Assessment (PISA). According to the OECD report (2020), a quarter of school principals and headmasters pointed out that the scarcity or deficiency of technology hindered learning. Considering the current context and the educational issues involved, the present review aims to highlight the effects of learning loss in other environments to encourage measures that ensure quality online education in the post-pandemic era.

Method

The study proposes a qualitative methodology through a systematic review of the literature, which will enable us to identify, evaluate and interpret studies related to a specific thematic area (Ramirez-Montoya & Lugo-Ocando, 2020). Our aim was to analyze the impact of learning loss in the development of online education after the international pandemic. Precisely, we tried to answer the following research questions: (RQ1) How do these studies define learning loss from the field of the education development?; (RQ2) Is there a relationship between learning loss and online education?; (RQ3) What implications and recommendations do these studies offer to deal with learning loss in the pandemic and post-pandemic context?

Literature Search

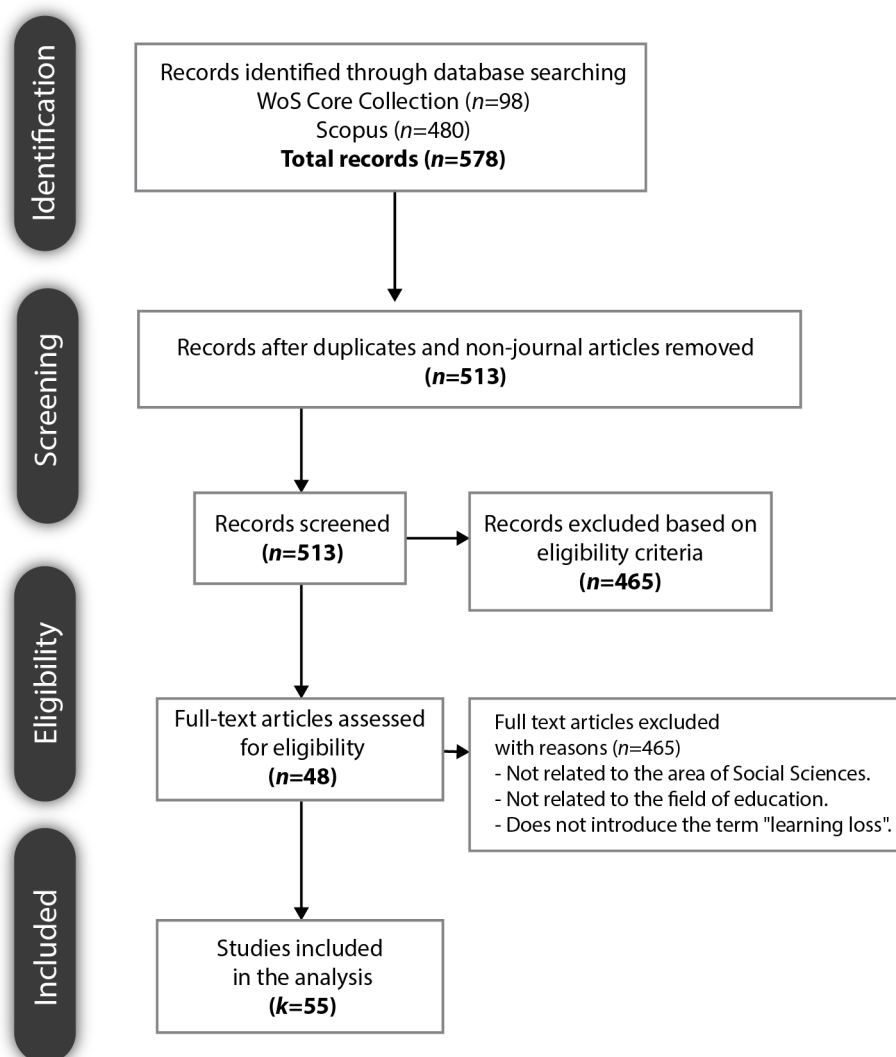
The literature search was performed on December 7th, 2021, in Web of Science or WoS (Clarivate Analytics) and Scopus (Elsevier). These are two internationally leading databases

with a wide variety of scientific publications in the fields of Science and Social Sciences. The search included peer-reviewed articles published between 1990 and 2020 written in Spanish, English or Portuguese, which are the languages spoken by the researchers. The alignment of the term “learning loss” was fundamental in the three languages, following the previous OECD definition (2020), which refers to the decrease in skills and knowledge learned due to external factors.

Then, we delimited the concept of “learning loss”, relating to the education field, and using the wider filter in both databases: “Topic” in WoS and “All fields” in Scopus. This procedure did not require the translation of the keyword into English, since all the papers indexed in both databases include their title and abstract in English, regardless of their content. Due to the large number of articles that did not correspond to the education field described previously, we filtered the search strategy to find “learning loss” in the title or abstracts. We delimited search terms on purpose to associate the effect of “learning loss” to educational characteristics inside and outside the classroom. After removing the duplicates, we collected a total of 506 items in all areas. We screened the title and the abstract from this data record to generate relevant exclusion criteria. Articles were excluded due to: (1) not specifically referring to any learning events; (2) not introducing in any way the concept of “learning loss”. In addition, we excluded manuscripts that did not correspond to the specific Social Sciences area. The full texts of all the resulting articles were reviewed to verify if they were in line with the inclusion criteria (see article selection process in Figure 1).

Inclusion Criteria

Studies collected for analysis should: (1) Addressing the phenomenon of “learning loss”; (2) Being related to educational issues inside and outside the classroom, so that the “learning loss” phenomenon may be the effect or the cause of learning activities; (3) Introducing studies with coping measures or theoretical analysis of the effect of “learning loss” on students. This means that the studies could be correlated with qualitative and quantitative empirical data, as well as reviews and theoretical papers, given the innovation of the concept in terms of the impact of the pandemic; (4) Discussing issues related to the pandemic from the perspective of learning loss.

Figure 1. Diagram of the article selection and inclusion process based on the PRISMA methodology by Page et al. (2021)

After these inclusion criteria, we obtained a total of 48 articles for analysis (see Table 1 in <https://doi.org/10.6084/m9.figshare.14125529.v1>).

Coding Procedure

In order to define the literature coding, we first identified the main terms and dimensions discussed in the framework of learning loss. For this purpose, we included all the titles and abstracts of the 48 articles using the WordCounter tool. Our aim was to detect the key words (terminological dimensions) that were most frequently mentioned in relation to learning loss to structure the literature analysis.

The words that were most-often used in these studies were as follows, in order of occurrence: school, students, learning loss, reading, summer, performance, Covid, skills,

deep learning, literacy, effects, grade, technology, disparities, and family investments (Figure 2).

Based on this terminological background, we identified those words that, outside the school environment, could impact the teaching-learning process. For example, “school, student, reading, literacy”, among others, were concepts closely associated with education. However, “summer”, “Covid” and “technology” were miscellaneous topics. Departing from our aim, which was to identify learning loss in other scenarios to analyze it in relation to the impact of the pandemic, we highlighted three dimensions to be discussed in the results: (1) The effect of summertime on learning loss (35 articles); (2) The effect of technological environments on learning loss (3 articles); (3) The effect of the pandemic on learning loss (10 articles).

Table 2. *Classification of articles reviewed by educational stage, country/region, method, subject and skills studied*

	Summer	Technology	Covid-19	Total
Education Level				
Kindergarten	5			5
Elementary school	17	1	3	21
Middle School	8	1	1	10
High School	3		1	4
College	3	1		4
Cross-sectional	7		7	14
Country/Region				
USA	29	1	3	33
Canada	2	1		3
Latin America		1	1	2
Europe	3		3	6
Africa	1			1
International study	2		4	6
Method				
Pre-post test	28	2	1	31
Test or posttest	2		2	4
Review/theoretical study	5		7	12
Interview	1	1		2
Other	5	1	1	7
Subject				
Maths	6			6
Reading	14			14
Vocabulary	1			1
Literacy	1			1
Science/Technology	1			1
Chemistry			1	1
Communication	1			1
Transversal	14	3	10	27
Skill studied				
Cognitive skills (students)	30	2	6	38
Social-emotional (students)	3			3
Both (students)	1	1	2	4
Teacher training	2		3	5

Note: The same article may appear in several subcategories if, for example, it focuses on elementary and middle school students, but it is not cross-sectional research.

These issues have been discussed in depth in Kerry and Davies (1998), advocating its implementation through multitasking, which consists of dividing the student body into groups and establishing rotating shifts.

In spite of this, one of the most discussed topics in the literature was the implementation of summer programs to reduce SLL (Defeyter, 2017; Graham et al., 2011; Paechter et al. 2015; Scarborough, 2017; Thus et al., 2013). This is not a new topic, as Mikulecky (1990), decades ago, analyzed the benefits of the STEP summer program on 14- and 15-year-olds, consisting of reducing SLL in reading and mathematics skills, as well as to increase graduation rates. Also, Smith (2011) described the summer Horizons National program that provided clear benefits in slowing SLL and differences based on SES. Some summer programs focus exclusively on reading and provide interesting findings such as the benefit of including a one-on-one intensive reading intervention (Contesse et al., 2020) or the importance of parental involvement to ensure that children attended and took full advantage of the program (Borman et al., 2005).

Other studies have focused on how SLL affects students in rural areas. Moore (2010) found an obvious drop in the mathematical knowledge of rural U.S. students transitioning from third to fourth grade, as well as a link between SLL and economic status (measured through free and reduced lunch). Shinwell and Defeyter (2017) also focused on rural areas of Scotland and Northern England where there are no summer programs, but shorter vacations. Similarly, Paechter et al. (2015) focus on rural areas, but of Austria. These authors conclude that the main factor causing SLL is children's prior achievement and not their location in a rural area. According to this study, the first weeks of school after the summer are affected by SLL, but later these deficits recover.

In addition, two of the articles reviewed focused on learning loss in science fields. This is the case of Todd and Romine (2018) who studied learning loss in modern genetics knowledge. These researchers found that students remembered reasoning-related skills, but forgot contents that were simply memorized. Similarly, Van-de-Sande and Reiser (2018) studied the effect of summer break on engineering students' calculus studies, concluding that the longer the summer break, the more learning decayed.

Another more minor topic, but also addressed in the articles reviewed, was the impact of SLL on students with special needs. This was the case of Greshenson and Hayes (2017), who showed that these students made significantly

greater reading gains during the summer vacation because they were more likely to attend summer school and practice math with a parent. Also, Menard and Wilson (2014) discussed SLL in elementary school children with reading disabilities. These authors agreed with others reviewed in that the effects of SLL accumulated over the years (Atteberry & McEachin, 2020; Beach & Traga-Philippakos, 2020), and that a school calendar reform was needed to make out-of-school periods shorter.

The articles reviewed focused on cognitive learning loss, except Travis (2019), who studied the relationship of SLL and social and emotional needs during the summer. The author showed how Hip Hop and Empowerment (HHE) and Therapeutic Beat Making (TBM) strategies, added to a summer program for youth from low-income families, reduced symptoms of depression and anxiety.

From another line of research, Kraft and Monti-Nussbaum (2017) studied the potential for schools to enable parents, through text messaging, to promote literacy skills in children and reduce learning loss. Likewise, Coley et al. (2020) analyzed whether parental investments in learning resources both at home and outside home could partially explain socioeconomic disparities in children's academic skills. Authors stated that activities encouraged by parents could enrich their children's academic achievement, decreasing the knowledge gap between the summer period and the school year.

Finally, some articles reviewed dealt with how to measure SLL through tests (Hooker & Denker, 2014; McNeish & Dumas, 2020; Sandberg-Patton & Reschly, 2013). We highlight the contributions of the studies by Greshenson and Hayes (2018), and McEachin and Atteberry (2017), who explained how SLL influenced tests and led to biased results on teacher effectiveness. These authors proposed two tests per year (fall and spring) instead of one, but this would increase the economic cost.

The Effect of Learning Loss in Technological Environments

Following the analysis, we continue with another highlighted issue, the learning loss in technological environments. Rizk and Hillier (2020) suggested that summer learning programs could provide families and educators with opportunities to integrate technologies into their home and school life, considering three main issues about digital technology: comfort

with technology; connections between home and school; and perception of children as digital natives.

Malamud et al. (2019) reached a different conclusion after conducting an experimental study in Lima, Peru. This research pointed out that the use of laptops and the Internet declined once the tests were finished, so they found “no evidence of improvements” when they surveyed children 8–9 months after internet provision following the summer vacation.

We found it particularly interesting how, from different perspectives, the studies by Li and Titsworth (2015), and Rizk and Hillier (2020) suggested a direct link between communication with teachers and students’ learning. The first one identified that the lack of communication with teachers had a negative influence on the students’ cognitive learning, while the latter one established that the coordination between children, parents and teachers was positive for the reduction of the digital gap and learning loss. Specifically, it appeared that students who did not maintain a communicative relationship with teachers during the summer was due to their laziness during this period and their lack of access to the technological-digital environment. While those who kept such a relationship was because they enjoyed digital comforts that connect their home with the school. Therefore, Malamud et al. (2019) agreed with Li and Titsworth (2015) in that providing children with laptops and internet access reduced the digital skills gap, but had no influence on academic achievement or summer learning loss.

The Effect of Learning Loss During the Pandemic

Among the articles reviewed for this section, the most interesting fact found was that before the pandemic the term “learning loss” was mainly used to talk about the loss of knowledge during non-school periods such as summer. However, after the Covid-19 pandemic, the term began to be used to talk about knowledge that could not be taught to students due to school closures and lack of resources, especially among the poorest and most vulnerable (Li et al., 2020). In fact, the issue of inequality associated with socioeconomic status was one of the most studied topics.

In this line of research, Andrew et al. (2020) studied the “time use” during lockdown and found that children from low-income families were most affected by school closures, not only because they had fewer resources and space at home

for learning, but also because their schools were less likely to provide them with support such as online classes, video conferencing or chats. Also, Chapman and Bell (2020) agreed that the reasons for the inequality in learning loss were due to families having fewer resources for online learning, and suggested that this disadvantage could have been compensated by adding instructional time when schools reopened.

In addition to access to online resources, Jæger and Blaabæk (2020) determined that Covid-19 increased inequality in learning opportunities because better-off families were more successful at using libraries during the pandemic than worse-off families. The authors understood that the lack of access to books and digital resources in libraries negatively affected the learning of children from low-income families and immigrants.

Whether they are traditional resources such as libraries or technological resources, these are learning tools that are not a substitute for excellent teaching and, for this, teacher training is also fundamental. In fact, the lack of preparation of teachers and the lack of standardization in teaching will have consequences on the national test scores for at best the next two years, according to Middleton (2020). Therefore, the article by Darling-Hammond and Hyler (2020) dealt with how to prepare educators in Covid-19 times to address the emotional and educational needs of students. This paper reinforced the position that communication and coordination between political institutions, teachers, and families is essential. Specifically, these authors proposed several initiatives that politicians and educators could adopt to meet the social, emotional, and academic needs of students. These strategies included investing in high-quality teacher training, including teacher and leader residencies in high-need communities.

Another topic explored in the articles reviewed was whether summer programs could alleviate some inequalities and loss of learning. Kuhfeld et al. (2020) proposed summer reading programs at home, which provided students with additional access to reading materials, and free book distribution programs, which are also a good way to get books for low-income families who have access to fewer literacy supports. In addition, these programs provided guidance to parents and teachers to encourage continued reading throughout the summer.

However, in the specific context of the Covid-19 pandemic, these courses were online and did not significantly reduce the inequalities observed according to socioeconomic resources (Middleton, 2020). In fact, some districts

offered smaller face-to-face classes for migrants, for example, allowing for more practical experiences. Also, from Brazil, Oliveira et al. (2020) supported a face-to-face teaching model with online guidance, for which it is essential to close the digital gap. Similarly, when schools reopen, a diagnosis of students would be necessary as a basis to resume teaching programs.

Furthermore, extending learning time, as also proposed by Chapman and Bell (2020), is an outstanding option especially for struggling students during the 2020–2021 school year and the summer afterward. Finally, to alleviate the emotional impact, Kuhfeld et al. (2020) highlight the importance of contact with educators and the collaboration of teachers with each other, as also suggested by Darling-Hammond and Hylar (2020).

From an international perspective, Lazaro-Lorente et al. (2020) spoke of learning loss due to the Covid-19 crisis, which especially affected the most disadvantaged within each country – low-income families, immigrants, rural populations racial minorities, children with special needs – but also the poorest countries at a global level. This article analyzed issues such as the lack of electricity, which does not appear in studies focused on the U.S. and other developed countries. Another aspect not mentioned in other papers was the use of radio, television, or video platforms as a resource for avoiding learning losses during school closures.

Finally, Turner et al. (2020) focused on students aged 16–18 who were out of school for six months just before entering college because of the pandemic. This situation caused weaknesses in knowledge compared to previous cohorts. As the most appropriate solution, nearly half of the teachers surveyed chose additional small group instruction, preferably prior to courses starting or in the early weeks of undergraduate courses.

Discussion and Conclusion

This study provided us with the opportunity to discuss how technology and information are a key factor in the educational development of society, and how the absence of competences in these matters may result in unexpected consequences such as learning loss. Starting with the prevalent summer learning loss studied in the scientific literature, we could assume, just as some studies have shown, that its effect was greatly due to the socio-economic status

of the students (Borman et al., 2005; Bowers & Schawrz, 2018; Lynch & Kim, 2017; Ready, 2010; Gresherson, 2013). Within the framework of Covid-19, the loss of learning was also emphasized among families with a low socioeconomic status, immigrants, rural areas, special-needs children, and at the global level, and under-developed countries – scarcity of electricity (Chapman & Bell, 2020). In fact, during the international health crisis, the cancelation of face-to-face classes gave way to processes of exclusion and marginalization, accentuated by the underlying contexts of the digital divide (Gomez, 2014; Hawash & Lang, 2020).

As the UNESCO (2020) declared, the world was not ready for this kind of educational disruption, and homes were not prepared with the necessary resources or tools to face these pedagogic needs (Ordorika, 2020). In this situation, it is important to emphasize the undeniable learning loss, not only due to the reasons related to the institutional-education area, but the family and day-to-day environment (Van-Lankveld, 2011). This is the reason why scholars insist on highlighting the importance of the family unit in its multiple expressions beyond their condition, origin or social diversity, as a key element in the education development (Murillo & Duck, 2020).

The review of this phenomenon has provided evidence that the analysis of learning loss focused on different subjects – languages, reading, and math, where we found the worst results in vacation periods. Likewise, the reiteration of ‘non-educational’ periods inside or outside the classroom – for example, prolonged non-teaching periods (Dills et al., 2016), had a strong effect on the loss of developmental learning (Chipdza & Leidner, 2019). In contrast, the primacy of non-programmed educational activities designed for virtual settings, suggests a long-term learning loss – as we have observed during the pandemic – in cases where the use of technological resources is not the only culprit.

We also observed that learning loss had an influence on the students, provoking symptoms of depression and anxiety (Travis, 2019). Perez-Lopez et al. (2021) noted that the success or failure of the students during the pandemic was sustained by the inverse relationship between the dedication to their studies and their performance perceived, as well as the lack of agreement between the teacher and the student. Communication in this context becomes a determinant factor for avoiding the negative effects on the acquisition of knowledge and the development of competences. In this sense, we should note that the development of digital competence was

relegated to the interests of some agencies such as UNESCO or the OECD, or to local educational authorities. The regulation of these skills for both teachers and students seemed to be a utopian concern of experts that did not assume significance until the emergence of the pandemic. We then found that online communication between teachers and students was fundamental to enjoy and standardize virtual education, avoiding unexpected consequences and risks not related to pedagogical curricula.

This need for communication stems from motivation as a gateway for meaningful learning, which influences how students act, think, and feel when they acquire knowledge. This means that online learning requires more self-regulation and independence by the students, and more interaction skills by the teacher to connect with them. In fact, we noted that some of the didactic approaches used to solve these learning losses, such as the implementation of multitasking (Kerry & Davis, 1998), which consists in rotating the students according to groups so that each group has non-teaching periods without losing the rhythm of the education program. These are similar to class splitting formats with students who intersperse their physical and online presence during the pandemic.

Another finding was related to the type of activities implemented during the periods most affected by learning loss (non-teaching period such as the summertime and the pandemic). For example, Romine (2018) highlighted that reasoning activities were easier to remember than those based on memory alone. This proposal requires materials that are designed for both face-to-face students and virtual students, as each profile has a series of learning needs, as well as different motivations, availability, and conditions. Teachers must keep in mind the development of proactive methodologies that involve the students (Romero, 2018). Faced with this, it is indispensable to re-enforce teacher training programs related to education inside and outside the classroom (Feng & Wang, 2021). Re-considering the social approach of Moravec (2013), the current digital society demands 'knowledge nomads' who are able to face these unforeseen challenges and circumstances. Students, teachers, families, and institutions require a certain understanding of the technological-digital media for a creative, motivational and empowering use (Sharma et al., 2022). This aims at the management of quality knowledge from every public and private environment.

Digital technology is a mechanism that can be used to mitigate learning loss during non-teaching periods in a

family-school symbiosis (Risk & Hillier, 2020). However, some authors were critical when considering that these mixed technologies were not equally effective during the entire academic year: having an Internet connection did not seem to improve learning and academic efforts (Malamud et al., 2019). Many of the students took advantage of these technologies for other entertainment-based activities – related to multitasking– fomenting learning loss. However, Ralph et al. (2021) point out that the rise of online education is unstoppable for promoting decentralization, multitasking, convergence, and livestreaming, which increase the possibilities of keeping the attention of the student, in competition with other Web-based stimuli.

This study brings to light that before the pandemic, the concept of "learning loss" was only associated to non-school periods (vacations and holidays). However, the health emergency provoked by Covid-19 increased again concerns around this phenomenon in the research field due to the lack of technological and digital resources, and the enhancement of socioeconomic inequalities in terms of access to quality education –i.e. having technological devices and the Internet to ensure a full and successful learning experience. In many cases, this learning loss was not only due to the difficulty of families for accessing digital resources, but to the inability of the different education institutions to offer teacher-training programs through the use of videoconferences, tools, and platforms. The dystopian present of the pandemic has shown the need for a pedagogic reconstruction of the curriculum in digital terms and in terms of mixed processes of face-to-face, hybrid, and distance learning, highlighting the importance of the teacher training and innovation as a guarantee of quality education for global society (Martin, 2020). Against learning loss, Chapman & Bell (2020) described the radical substitution of face-to-face learning with virtual sessions during the pandemic, which derived in counterproductive effects of fatigue and depression in students. Likewise, it is interesting that some of the authors' proposals related to learning loss during the pandemic online academic year, additional courses and activities were proposed for longer non-teaching periods such as summer – which was the main learning loss period observed in previous literature (Middleton, 2020; Oliveira et al., 2020), or that the phenomenon of content not taught due to school closure was conceived and described as learning loss, so that the term was not solely related to the loss of learning chances by the students (Lorente et al., 2020).

Contributions and Future Perspectives

This study showed some limitations which in part contribute to the improvement and development of future research. First, the choice of databases limited our sample. Although we started from two international scientific databases, we consider that learning loss is an issue that is likely to be addressed by newspapers and government reports. This means that it would be reasonable to introduce in future reviews additional scenarios that could examine, once the post-pandemic era is advanced, the possible effects of learning loss in the wake of technology and Internet educational standardization attempts. A further relevant issue concerned the reading of documents in three European languages. This vision proper to the global Northeast should be extended and compared with that of other contexts in the global South or Asia-Pacific, considering their cultural and socio-economic development.

Based on the literature, we now share a series of proposals and future lines of action and education contingency against learning loss in the pre, during, and post-pandemic eras with prospects for the informational and technological development of the population. For example, we highlight the need to involve the families in the day-to-day context to establish an ecological learning space, starting with the difficulties associated to family diversity and the digital divide. This means, for example, that governments should propose training, information and consciousness-raising initiatives on media education for citizenship, whereby not only students or teachers improve their digital competences. The involvement of the family is crucial for the educational development of students to be successful, as the new generations experience their pedagogical development in an era where technology and the Internet are part of their daily lives. Understanding their context, what platforms they use and why, and the risks and opportunities of the Internet must be a priority in order to guarantee quality online education

from the family context. Also, we insist on the need to study strategies that contextualize and individualize the content and activities to the needs of the students during hybrid learning from diverse multi-platforms. By this we mean that teachers should rely on the institutional support to understand the socio-economic background of the families. The objective is not to follow a closed curriculum with delimited competencies without flexibility, but to adapt Internet access, resources and technological devices to the family's circumstances. Greater attention should be paid to the socio-economic limitations of the families and the scarce training, paradoxically, of teachers in these hybrid scenarios.

Along the same line, the studies placed special emphasis on beginning with the concept of students as digital natives, who can comfortably adapt to the physical technology and programming environments – hardware and software. That is, new student generations are able to use, understand, learn and handle technological devices and digital platforms easily. For this, it is necessary to implement training plans for teachers on media competences which create meaning and usefulness in the different online learning modalities on which their students already often navigate. Other strategies proposed establish the need for collaboration spaces between peer teacher for improving the online teaching-learning methodologies, which implies the analysis and innovation in the online implementation and didactic management of educational institutions. In other words, institutions should promote discussion forums in which teachers share resources, experiences and educational dynamics using technology and the Internet. This kind of horizontal cooperation among peers could generate an innovative environment in which didactic content and pedagogical methods adapt to the reality of both students and their families. In short, an “education-digital revolution” will be needed in post-pandemic periods, to coordinate school-society, and to provide new didactic resources that promote equality and progress for a sustainable educational development for all.

References

- Aguaded, I., Jaramillo-Dent, D., & Delgado-once, A. (2021). *Currículum Alfamed de formación de profesores en educación mediática*. Octaedro.
- Alvarez, M., Gardyn, N., Iardelevsky, A., & Rebello, G. (2020). Segregación educativa en tiempos de pandemia: balance de las acciones iniciales durante el aislamiento social por el Covid-19 en Argentina. *Revista Internacional de Educación para la Justicia Social*, 9(3), 25–43. <https://doi.org/10.15366/riejs2020.9.3.002>

- Andrew, A., Cattan, S., Costa-Dias, M., Farquharson, C., Kraftman, L., Krutikova, S., Phimister, A., & Sevilla, A. (2020). Inequalities in Children's Experiences of Home Learning during the COVID-19 Lockdown in England. *Fiscal Studies*, 41(3), 653–683. <https://doi.org/10.1111/1475-5890.12240>
- Atteberry, A., & McEachin, A. (2020). School's Out: The Role of Summers in Understanding Achievement Disparities. *American Educational Research Journal*. <https://doi.org/10.3102/0002831220937285>
- Bankar, M. A. (2021). Self-directed learning behaviour – Impact of e-learning activity on students. *Journal of Clinical and Diagnostic Research*, 15(1). <https://doi.org/10.7860/JCDR/2021/46274.14419>
- Beach, K. D., & Traga Philippakos, Z. A. (2020). Effects of a Summer Reading Intervention on the Reading Performance of Elementary Grade Students from Low-Income Families. *Reading & Writing Quarterly*. <https://doi.org/10.1080/10573569.2020.1760154>
- Benner, A. D., & Mistry, R. S. (2020). Child development during the COVID-19 pandemic through a life course theory lens. *Child Development Perspectives*, 14(4), 236–243. <https://doi.org/10.1111/cdep.12387>
- Borman, G. D., Benson, J., & Overman, L. T. (2005). Families, schools, and summer learning. In *Elementary School Journal* (pp. 131–150). The University of Chicago Press. <https://doi.org/10.1086/499195>
- Bowers, L. M., & Schwarz, I. (2018). Preventing Summer Learning Loss: Results of a Summer Literacy Program for Students from Low-SES Homes. *Reading & Writing Quarterly*, 34(2), 99–116. <https://doi.org/10.1080/10573569.2017.1344943>
- Bradley, S., & Colin, G. (eds.). (2020). *The economics of education: A comprehensive overview*. Academic Press.
- Chapman, C., & Bell, I. (2020). Building back better education systems: equity and COVID-19. *Journal of Professional Capital and Community*, 5(3–4), 227–236. <https://doi.org/10.1108/JPCCC-07-2020-0055>
- Chipdza, W., & Leidner, D. (2019). A review of the ICT-enabled development literature: Towards a power parity theory of ICT4D. *The Journal of Strategic Information Systems*, 28(2), 145–174. <https://doi.org/10.1016/j.jsis.2019.01.002>
- Coley, R. L., Kruzik, C., & Votruba-Drzal, E. (2020). Do family investments explain growing socioeconomic disparities in children's reading, math, and science achievement during school versus summer months? *Journal of Educational Psychology*, 112(6), 1183–1196. <https://doi.org/10.1037/edu0000427>
- Contesse, V. A., Campese, T., Kaplan, R., Mullen, D., Pico, D. L., Gage, N. A., & Lane, H. B. (2020). The effects of an intensive summer literacy intervention on reader development. *Reading & Writing Quarterly*, 1–19. <https://doi.org/10.1080/10573569.2020.1765441>
- Cucinotta, D., & Vanelli, M. (2020). WHO declares COVID-19 a pandemic. *Acta Biomed*, 91(1), 157–160. <https://doi.org/10.23750/abm.v91i1.9397>
- Darling-Hammond, L., & Hyler, M. E. (2020). Preparing educators for the time of COVID ... and beyond. *European Journal of Teacher Education*, 43(4), 457–465. <https://doi.org/10.1080/02619768.2020.1816961>
- Dills, A., Hernandez-Julian, R., & Rothhoff, K. W. (2016). Knowledge decay between semesters. *Economics of Education Review*, 50, 63–74. <https://doi.org/10.1016/j.econedurev.2015.12.002>
- Engzell, P., Frey, A., & Verhagen, M. D. (2021). Learning loss due to school closures during the COVID-19 pandemic. *Proceedings of the National Academy of Sciences of the United States of America*, 118(7). <https://doi.org/10.1073/pnas.2022376118>
- Feng, H., & Wang, J. (2021). Learning in a digital world: Perspective on interactive technologies for formal and informal education. *Interactive Learning Environments*. <https://doi.org/10.1080/10494820.2020.1870502>
- Florez, S. Y. V., Porrás, A. A., Castilla, I., & Rivera, K. (2017). e-Learning: Rompiendo fronteras. *Redes de Ingeniería*, 91–100. <https://doi.org/10.14483/2248762X.12480>
- Gershenson, S. (2013). Do summer time-use gaps vary by socioeconomic status? *American Educational Research Journal*, 50(6), 1219–1248. <https://doi.org/10.3102/0002831213502516>
- Gershenson, S., & Hayes, M. S. (2017). The summer learning of exceptional students. *American Journal of Education*, 123(3), 447–473. <https://doi.org/10.1086/691226>
- Gershenson, S., & Hayes, M. S. (2018). The implications of summer learning loss for value-added estimates of teacher effectiveness. *Educational Policy*, 32(1), 55–85. <https://doi.org/10.1177/0895904815625288>

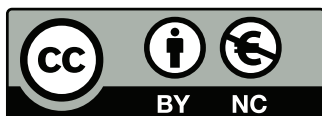
- Gomez, R. (2014). When you do not have a computer: Public-access computing in developing countries. *Information Technology for Development*, 20(3), 274–291. <https://doi.org/10.1080/02681102.2012.751573>
- Graham, A., McNamara, J. K., & van-Lankveld, J. (2011). Closing the summer learning gap for vulnerable learners: An exploratory study of a summer literacy programme for kindergarten children at-risk for reading difficulties. *Early Child Development and Care*, 181(5), 575–585. <https://doi.org/10.1080/03004431003646525>
- Hamdan, K. M., Al-Bashaireh, A. M., Zahran, Z., Al-Daghestani, A., Al-Habashneh, S., & Shaheen, A. M. (2021). University students' interaction, Internet self-efficacy, self-regulation and satisfaction with online education during pandemic crises of COVID-19 (SARS-CoV-2). *International Journal of Educational Management*. <https://doi.org/10.1108/IJEM-11-2020-0513>
- Hawash, R., & Lang, G. (2020). Does the digital gap matter? Estimating the impact of ICT on productivity in developing countries. *Eurasian Economic Review*, 10(2), 189–209. <https://doi.org/10.1007/s40822-019-00133-1>
- Hevia, F. J., Vergara-Lope, S., Velásquez-Durán, A., & Calderón, D. (2022). Estimation of the fundamental learning loss and learning poverty related to COVID-19 pandemic in Mexico. *International Journal of Educational Development*, 88, 1–9. <https://doi.org/10.1016/j.ijedudev.2021.102515>
- Hooker, J., & Denker, K. (2014). The learning loss scale as an assessment tool: An empirical examination of convergent validity with performative measures. *Communication Teacher*, 28(2), 130–143. <https://doi.org/10.1080/17404622.2013.865765>
- Ibáñez, J. S., de Benito-Crosetti, B., Garcias, A. P., & Cervera, M. G. (2018). Blended learning, más allá de la clase presencial. *Revista Iberoamericana de Educación a Distancia*, 21(1), 195–213. <https://doi.org/10.5944/ried.21.1.18859>
- Iglesias-Vidal, E., Gonzalez-Patiño, J., Lalueza, J. L., & Esteban-Guitart, M. (2020). Manifiesto en tiempos de pandemia: Por una educación crítica, intergeneracional, sostenible y comunitaria. *Revista Internacional de Educación para la Justicia Social*, 9(3), 181–198. <https://doi.org/10.15366/riejs2020.9.3.010>
- Jæger, M. M., & Blaabæk, E. H. (2020). Inequality in learning opportunities during Covid-19: Evidence from library takeout. *Research in Social Stratification and Mobility*, 68, 100524. <https://doi.org/10.1016/j.rssm.2020.100524>
- Kerry, T., & Davies, B. (1998). Summer learning loss: The evidence and a possible solution. *Support for Learning*, 13(3), 118–122. <https://doi.org/10.1111/1467-9604.00072>
- Kim, J. S., & Quinn, D. M. (2013). The effects of summer reading on low-income children's literacy achievement from kindergarten to grade 8. *Review of Educational Research*, 83(3), 386–431. <https://doi.org/10.3102/0034654313483906>
- Kraft, M. A., & Monti-Nussbaum, M. (2017). Can schools enable parents to prevent summer learning loss? A text-messaging field experiment to promote literacy skills. *The ANNALS of the American Academy of Political and Social Science*, 674(1), 85–112. <https://doi.org/10.1177/0002716217732009>
- Kuhfeld, M. (2019). Surprising new evidence on summer learning loss. *Phi Delta Kappan*, 101(1), 25–29. <https://doi.org/10.1177/0031721719871560>
- Kuhfeld, M., Soland, J., Tarasawa, B., Johnson, A., Ruzek, E., & Liu, J. (2020). Projecting the potential impact of COVID-19 school closures on academic achievement. *Educational Researcher*, 49(8), 549–565. <https://doi.org/10.3102/0013189X20965918>
- Lawrence, J. F. (2012). English vocabulary trajectories of students whose parents speak a language other than English: Steep trajectories and sharp summer setback. *Reading and Writing*, 25(5), 1113–1141. <https://doi.org/10.1007/s11145-011-9305-z>
- Li, A., Harries, M., & Ross, L. F. (2020). Reopening K-12 schools in the era of coronavirus disease 2019: Review of state-level guidance addressing equity concerns. *Journal of Pediatrics*, 227, 38–44. <https://doi.org/10.1016/j.jpeds.2020.08.069>
- Li, L., & Titsworth, S. (2015). Student misbehaviors in online classrooms: Scale development and validation. *American Journal of Distance Education*, 29(1), 41–55. <https://doi.org/10.1080/08923647.2015.994360>
- Lorente, L. M. L., Arrabal, A. A., & Pulido-Montes, C. (2020). The right to education and ICT during COVID-19: An international perspective. *Sustainability*, 12(21), 9091. <https://doi.org/10.3390/su12219091>
- Lynch, K., & Kim, J. S. (2017). Effects of a summer mathematics intervention for low-income children. *Educational Evaluation and Policy Analysis*, 39(1), 31–53. <https://doi.org/10.3102/0162373716662339>
- Malamud, O., Cueto, S., Cristia, J., & Beuermann, D. W. (2019). Do children benefit from internet access? Experimental evidence from Peru. *Journal of Development Economics*, 138, 41–56. <https://doi.org/10.1016/j.jdeveco.2018.11.005>

- Marinoni, G., Van't Land, H., & Jensen, T. (2020). *The impact of COVID-19 on Higher Education around the world IAU Global Survey Report*. <http://bit.ly/3q0tsXy>
- Martin, R. L. (2020). Reflexiones educativas para el posCovid-19. Recordando el futuro. *Revista Internacional de Educación para la Justicia Social*, 9(3), 127–140. <https://doi.org/10.15366/riejs2020.9.3.007>
- McEachin, A., & Atteberry, A. (2017). The impact of summer learning loss on measures of school performance. *Education Finance and Policy*, 12(4), 468–491. https://doi.org/10.1162/edfp_a_00213
- McNeish, D., & Dumas, D. (2020). A seasonal dynamic measurement model for summer learning loss. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 12634. <https://doi.org/10.1111/rssa.12634>
- Menard, J., & Wilson, A. M. (2013). Summer learning loss among elementary school children with reading disabilities. *Exceptionality Education International*, 23(1), 72–85. <https://doi.org/10.5206/eei.v23i1.7705>
- Middleton, K. V. (2020). The longer-term impact of COVID-19 on K–12 student learning and assessment. *Educational Measurement: Issues and Practice*, 39(3), 41–44. <https://doi.org/10.1111/emip.12368>
- Mikulecky, L. J. (1990). Stopping summer learning loss among at-risk youth. *Journal of Reading*, 33(7), 516–521. <https://bit.ly/303ooXb>
- Moore, C. (2010). The effects of summer vacation on mathematical knowledge of rural students transitioning from third to fourth grade. *Journal for the Liberal Arts and Sciences*, 14(2), 58–66.
- Moravec, J. (2013). *Knowmad society*. Education Futures.
- Murillo, F. J., & Duk, C. (2020). El Covid-19 y las brechas educativas. *Revista Latinoamericana de Educación Inclusiva*, 14(1), 11–13. <https://doi.org/10.4067/S0718-7378020000100011>
- OECD. (2020). *A helping hand: Education responding to the coronavirus pandemic*. Retrieved from <https://bit.ly/2VM5N01>. Accessed March 2021.
- Oliveira, J. B. A., Gomes, M., & Barcellos, T. (2020). Covid-19 and back to school: Listening to evidence. *Ensaio*, 28(108), 555–578. <https://doi.org/10.1590/S0104-40362020002802885>
- OMS. (2020). *COVID-19: cronología de la actuación de la OMS*. Retrieved from <http://bit.ly/3somyMp>. Accessed March 2021.
- Ordorika, I. (2020). Pandemia y educación superior. *Revista de la educación superior*, 49(194), 1–8. <https://doi.org/10.36857/resu.2020.194.1120>
- Orgiles, M., Morales, A., Delvecchio, E., Mazzeschi, C., & Espada, J. P. (2020). Immediate psychological effects of the COVID-19 quarantine in youth from Italy and Spain. *Front. Psychol*, 11, 1–10. <https://doi.org/10.31234/osf.io/5bpfz>
- Paechter, M., Luttenberger, S., Macher, D., Berding, F., Papousek, I., Weiss, E. M., & Fink, A. (2015). The effects of nine-week summer vacation: Losses in mathematics and gains in reading. *Eurasia Journal of Mathematics, Science and Technology Education*, 11(6), 1339–1413. <https://doi.org/10.12973/eurasia.2015.1397a>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., & Moher, D. (2021). Updating guidance for reporting systematic reviews: Development of the PRISMA 2020 statement. *Journal of Clinical Epidemiology*, 134, 103–112. <https://doi.org/10.1016/j.jclinepi.2021.02.003>
- Perez-Lopez, E., Vazquez-Atochero, A., & Cambero-Rivero, S. (2021). Educación a distancia en tiempos de COVID-19: Análisis desde la perspectiva de los estudiantes universitarios. *RIED*, 24(1), 331–350. <http://doi.org/10.5944/ried.24.1.27855>
- Pittman, J., Severino, L., DeCarlo-Tecce, M. J., & Kiosoglous, C. (2021). An action research case study: Digital equity and educational inclusion during an emergent COVID-19 divide. *Journal of Multicultural Education*. <https://doi.org/10.1108/JME-09-2020-0099>
- Qureshi, S. (2021). Pandemics within the pandemic: Confronting socio-economic inequities in a datafied world. *Information Technology for Development*, 27(2), 151–170. <https://doi.org/10.1080/02681102.2021.1911020>
- Ralph, B. C. W., Smith, A. C., Seli, P., & Smilek, D. (2021). The relation between task-unrelated media multitasking and task-related motivation. *Psychological Research*, 85(1), 408–422. <https://doi.org/10.1007/s00426-019-01246-7>
- Ramirez-Montoya, M. S., & Lugo-Ocando, J. (2020). Systematic review of mixed methods in the framework of educational innovation. *Comunicar*, 65, 9–20. <https://doi.org/10.3916/C65-2020-01>

- Raza-Chohan, S., & Hu, G. (2020). Strengthening digital inclusion through e-government: Cohesive ICT training programs to intensify digital competency. *Information Technology for Development*, 28(1), 16–38. <https://doi.org/10.1080/02681102.2020.1841713>
- Ready, D. D. (2010). Socioeconomic disadvantage, school attendance, and early cognitive development. *Sociology of Education*, 83(4), 271–286. <https://doi.org/10.1177/0038040710383520>
- Reimers, F. M. (2022). Learning from a pandemic. The impact of COVID-19 on education around the world. In F. M. Reimers (ed.), *Primary and Secondary Education during Covid-19* (pp. 1–37). Springer. <https://doi.org/10.1007/978-3-030-81500-4>
- Rizk, J., & Hillier, C. (2020). Everything's technology now: The role of technology in home and school-based summer learning activities in Canada. *Journal of Children and Media*. <https://doi.org/10.1080/17482798.2020.1778498>
- Rojas-Delgado, J. J. (2017). E-learning y plataformas tecnológicas. *Revista Universidad del Valle de Atemajac*, 89, 14–21. <https://bit.ly/3qYwewM>
- Romero, S. (2018). Entornos flexibles para el aprendizaje: B-Learning. *Techno Review*, 7(1), 9–15. <https://doi.org/10.37467/gka-revtechno.v7.317>
- Rosqvist, I., Sandgren, O., Andersson, K., Hansson, K., Lyberg-Åhlander, V., & Sahlen, B. (2020). Children's development of semantic verbal fluency during summer vacation versus during formal schooling. *Logopedics Phoniatrics Vocology*, 45(3), 134–142. <https://doi.org/10.1080/14015439.2019.1637456>
- Sandberg Patton, K. L., & Reschly, A. L. (2013). Using curriculum-based measurement to examine summer learning loss. *Psychology in the Schools*, 50(7), 738–753. <https://doi.org/10.1002/pits.21704>
- Scarborough, B. (2017). A summer of distinction: Exploring the construction of educational advantage outside the academic year. *Curriculum Inquiry*, 47(5), 481–503. <https://doi.org/10.1080/03626784.2017.1398043>
- Schwab, K. (2016). *La cuarta revolución industrial*. World Economic Forum y Debate & Penguin Random House.
- Sevelius, J. M., Gutierrez-Mock, L., Zamudio-Haas, S., McCree, B., Ngo, A., Jackson, A., Clynes, C., Venegas, L., Salinas, A., Herrera, C., Stein, E., Operario, D., & Gamarel, K. (2020). Research with marginalized communities: Challenges to continuity during the COVID-19 pandemic. *AIDS and Behavior*, 24, 2009–212. <https://doi.org/10.1007/s10461-020-02920-3>
- Sharma, S., Kar, A. K., Gupta, M. P., Dwivedi, Y. K., & Janssen, M. (2022). Digital citizen empowerment: A systematic literature review of theories and development models. *Information Technology for Development*. <https://doi.org/10.1080/02681102.2022.2046533>
- Shinwell, J., & Defeyter, M. A. (2017). Investigation of summer learning loss in the UK—Implications for holiday club provision. *Frontiers in Public Health*, 5. <https://doi.org/10.3389/fpubh.2017.00270>
- Slade, T. S., Piper, B., Kaunda, Z., King, S., & Ibrahim, H. (2017). Is 'summer' reading loss universal? Using ongoing literacy assessment in Malawi to estimate the loss from grade-transition breaks. *Research in Comparative and International Education*, 12(4), 461–485. <https://doi.org/10.1177/1745499917740657>
- Smith, L. (2011). Slowing the summer slide. *Educational Leadership*, 69(4), 60–63. <http://bit.ly/3qYpZcr>
- Stanistreet, P., Elfert, M., & Atchoarena, D. (2020). Education in the age of COVID-19: Understanding the consequences. *International Review of Education*, 66(5–6), 627–633. <https://doi.org/10.1007/s11159-020-09880-9>
- Stewart, H., Watson, N., & Campbell, M. (2018). The cost of school holidays for children from low income families. *Childhood*, 25(4), 516–529. <https://doi.org/10.1177/0907568218779130>
- Tarabini, A. (2020). ¿Para qué sirve la escuela? Reflexiones sociológicas en tiempos de pandemia global. *Revista de Sociología de la Educación*, 13(2), 145–155. <https://doi.org/10.7203/RASE.13.2.17135>
- Todd, A., & Romine, W. (2018). The learning loss effect in genetics: What ideas do students retain or lose after instruction? *CBE—Life Sciences Education*, 17(4), ar55. <https://doi.org/10.1187/cbe.16-10-0310>
- Torres-Manzo, W., Martínez-Ramírez, J. M., & López-Alvarez, L. (2018). Propuesta de entorno de aprendizaje donde predominen las tecnologías educativas: E-learning, m-learning, u-learning. *Redel*, 2(2), 41–51. Retrieved from <https://bit.ly/2NEPJMz>. Accessed March 2021.

- Travis, R., Gann, E., Crooke, A. H. D., & Jenkins, S. M. (2019). Hip Hop, empowerment, and therapeutic beat-making: Potential solutions for summer learning loss, depression, and anxiety in youth. *Journal of Human Behavior in the Social Environment*, 29(6), 744–765. <https://doi.org/10.1080/10911359.2019.1607646>
- Turner, K. L., Hughes, M., & Presland, K. (2020). Learning loss, a potential challenge for transition to undergraduate study following COVID19 school disruption. *Journal of Chemical Education*, 97(9), 3346–3352. <https://doi.org/10.1021/acs.jchemed.0c00705>
- UNESCO. (2020). *¿Cómo estás aprendiendo durante la pandemia de COVID-19?* Retrieved from <http://bit.ly/3q3VdhR>. Accessed March 2021.
- Van-De-Sande, C., & Reiser, M. (2018). The effect of summer break on engineering student success in calculus. *International Journal of Research in Education and Science*, 4(2), 349–357. <https://doi.org/10.21890/ijres.409264>
- Von-Braun, J., Zamagni, S., & Sorondo, M. S. (2020). The moment to see the poor. *Science*, 368, 213–214. <https://doi.org/10.1126/science.abc2255>
- Xiong, F., Zang, L., & Gao, Y. (2021). Internet penetration as national innovation capacity: Worldwide evidence on the impact of ICT on innovation development. *Information Technology for Development*, 28(1), 39–55. <https://doi.org/10.1080/02681102.2021.1891853>

Copyrights and Repositories



This work is licensed under the Creative Commons Attribution-NonCommercial-3.0 Unported License.

This license allows you to download this work and share it with others as long as you credit the author and the journal. You cannot use it commercially without the written permission of the author and the journal (“Review of Communication Research”).

This work was supported by ‘Alfamed’ (Euro-American Research Network), under Grant R+D+I Project (2019–2021), entitled “Youtubers and Intagrammers: Media competition in emerging prosumers”, with code RTI2018-093303-B-I00, financed by the Spanish Ministry of Science, Innovation and Universities and the European Regional Development Fund (ERDF), and the R+D-i Project (2020–2022), entitled “Instagrammers and youtubers for the transmedia empowerment of Andalusian citizens. The media competence of instatubers”, with code P18-RT-756, financed by the Andalusian Regional Government in the 2018 call (Andalusian Research, Development and Innovation Plan, 2020) and the European Regional Development Fund (ERDF).

Attribution

You must attribute the work to the author and mention the journal with a full citation, whenever a fragment or the full text of this paper is being copied, distributed or made accessible publicly by any means.

Commercial use

The licensor permits others to copy, distribute, display, and perform the work for non-commercial purposes only, unless you get the written permission of the author and the journal.

The above rules are crucial and bound to the general license agreement that you can read at:

<http://creativecommons.org/licenses/by-nc/3.0/>

Corresponding author

I Arantxa Vizcaíno-Verdú

University of Huelva, Spain

arantxa.vizcaino@dedu.uhu.es

Attached is a list of permanent repositories where you can find the articles published by RCR:

Academia.edu @ <http://independent.academia.edu/ReviewofCommunicationResearch>

Internet Archive @ <http://archive.org> (collection “community texts”)

Social Science Open Access Repository, SSOAR @ <https://www.ssoar.info/ssoar/>