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Influence of the use of ICTs on the development of reading comprehension in Primary Education

Iris-Orosia Campos iD
Universidad de Zaragoza, Spain
icamposb@unizar.es

Paula Rivera-Alegre iD
School San Vicente de Paúl (Barbastro), Spain
priveraalegre@gmail.com

Abstract

In a context of increasing use of Information and Communication Technologies (ICTs) during childhood, recent research has opened a discussion regarding the potential harmful impact of unmediated overexposure to these tools on the development of reading competence. Given this situation and considering the relevance of the family as a literacy context, a quantitative *ex post facto* research was conducted with students from the second and third cycles of Primary Education (*N*= 410). The aim was to explore the level of parental mediation in the use of ICTs by students and analyse the potential link of this variable with their reading comprehension level. The results reveal a predominant use of ICT for recreational purposes and deficiencies in parental mediation, with a higher number of risky situations as the age increases. Additionally, an association is found between the level of parental mediation in the use of ICTs and the level of reading comprehension among sixth-grade students, mainly in inferential and critical levels, thus confirming the potential negative impact of abusive and unmediated use of ICTs on this competence.

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Influencia del uso de las TIC en el desarrollo de la comprensión lectora en Educación Primaria

Iris-Orosia Campos iD
Universidad de Zaragoza, Spain
icamposb@unizar.es

Paula Rivera-Alegre iD
School San Vicente de Paúl (Barbastro), Spain
priveraalegre@gmail.com

Resumen

En un contexto de uso creciente de las Tecnologías de la Información y la Comunicación (TIC) durante la infancia, investigaciones recientes han abierto un debate respecto al posible impacto nocivo de una sobreexposición no mediada a estas herramientas en el desarrollo de la competencia lectora. Ante este panorama, y habida cuenta de la relevancia de la familia como contexto de alfabetización, se desarrolló una investigación de tipo *ex post facto* con estudiantes de segundo y tercer ciclo de Educación Primaria (*N*= 410) enfocada a explorar el grado de mediación parental en la utilización de las TIC por parte del alumnado y a analizar el vínculo de esta variable con su nivel de comprensión lectora. Los resultados evidencian un uso de las TIC mayoritariamente lúdico y carencias en la mediación parental, con la existencia de un mayor número de situaciones riesgo conforme aumenta la edad. Además, se encuentra una asociación del índice de mediación parental en el uso de las TIC y el nivel de comprensión lectora entre el alumnado de sexto curso, fundamentalmente en los niveles inferencial y crítico, lo que corrobora el potencial impacto negativo de un uso abusivo y no mediado de las TIC sobre esta competencia.

Palabras clave: Alfabetización familiar; comprensión lectora; entornos digitales; entorno familiar; Tecnologías de la Información y la Comunicación; Educación Primaria.

INTRODUCTION

After a period of exaltation of the potential of technological tools in the field of education, scientific progress regarding the contact of children and adolescents with these devices has called into question the conception of this part of the population as "digital natives" (Prensky, 2001), pointing to the need to implement "digital literacy" processes (Cassany, 2012) based on the development of the already curricularly consolidated "digital competence". In this sense, Granado (2019) argues that, although the term coined by Prensky was widely used two decades ago, his thesis lacked a scientific basis and suggested a kind of "biological determinism" regarding the ability to use Information and Communication Technologies (hereinafter ICTs) by the generations born in the new millennium. Consistent with this discourse, Cassany (2012), Reig and Vilchez (2013) or Lluna and Pedreira (2017) have denied the idea that children born in the digital age are *per se* trained for efficient and appropriate use of ICTs, and studies such as those by Delgado et al. (2018), Salmerón y Delgado (2019), L'Ecuyer (2019) or Gil-Pelluch *et al.* (2020) have provided solid evidence for the opening of a debate on the potential harmful impact of unmediated overexposure to these devices on the development of different communication skills among the younger population.

Following an extensive review of international research, L'Ecuyer (2019) concludes that, although schoolchildren often show a preference for digital media in reading activities, the comprehension achieved through this medium is lower than when the medium is analogue. In addition, it highlights the results of research conducted between 1992 and 2017 (Singer & Alexander, 2017; cited in L'Ecuyer, 2019) which lead to the conclusion that comprehension of texts longer than one page in length is superior when the format is in print. In a similar vein, Delgado *et al.* (2018), analysed 54 empirical studies published between 2000 and 2017 with more than 170,000 learners at different educational levels in 19 countries, concluding on the validity of the "Paper Superiority Effect" (ESP, as per its Spanish acronym) thesis, finding that readers achieve better comprehension levels when they read on paper than when they read on screen. For their part, Gil-Pelluch *et al.* (2020) argue that, although the inclusion of ICTs in schools has been a priority for most teachers, recent results from the Programme for International Student Assessment (PISA) (OECD, 2017) with more than half a million students from the 65 participating countries show that the use of ICT in the classroom is not significantly linked to better academic results and that, moreover, there is sometimes even a negative association between the use of these tools and performance in certain skills.

These discourses, in any case, are not aligned with a negationist stance regarding the inclusion of ICTs in the classroom, but rather, in line with Wolf's discourse (2020), they appeal to the role of the adult as a mediator in the construction of a brain that the aforementioned author calls "bioliterate"; that is, capable of reading and writing in both analogue and digital contexts, which, in coherence with cognitive development at an early age, requires the achievement of a basic reading competence in analogue media prior to the inclusion of screens under the mediation of the adult. The positive impact of the incorporation of ICTs at ages when reading competence in analogue media has already been achieved, and from a mediated approach, is evidenced in research such as that conducted by Marchal-López et al. (2018) with two groups -experimental and control- of students in the third cycle of Primary Education, where it was found that the use of ICTs -interactive whiteboard, laptops, digital players, Internet connection, interactive applications and educational websites- during 25 sessions of Spanish Language and Literature in an active, interactive and dynamic way for the development of teaching-learning tasks reported significant differences in scores in oral and written comprehension in the pre-test and post-test in the experimental group -being higher in the second group-, The results showed significant differences in the scores in oral and written comprehension in the pre-test and post-test in the experimental group -being higher in the second test-, but not in the control group, where only traditional tools had been used.

From an educational point of view, the inclusion of ICTs is linked to the concept of "digital competence", which not only refers to the skills, knowledge and attitudes with and towards ICT, but also to their effective and critical application for a given purpose (Esteve & Gisbert, 2013). The curricular consolidation of this competence in recent years has led to a proliferation of studies focused on the analysis of different aspects linked to training in the use of ICTs in the classroom, Macià-Bordalba (2016)

highlights for the case of Spain that most of the research on ICTs in the pedagogical field has focused on the use of different digital tools for curricular purposes. Nevertheless, it is still necessary to delve into aspects that transcend the school scenario such as, for example, those related to the attitudes of teachers and parents towards this type of tools. Therefore, given the influence of the family as a literacy context (De-la-Peña et al., 2018; Jiménez-Pérez et al., 2020) and following in the wake of recent works such as those by Salmerón and Delgado (2019) or Campos and Marco-Sisamón (2021), we are interested in finding out how legal guardians act with respect to the use of ICTs at home by students in the 3rd (N= 142) and 6th (N= 268) years of Primary Education, and also in the potential link between this mediation and their reading comprehension level.

Authors such as Gubbels *et al.* (2020) or Kong *et al.* (2022) have highlighted the need to study the link between access to ICTs and reading achievement in children and adolescents, taking into consideration both the time spent using these tools and the purpose of their use. In this sense, in a cross-national study with adolescents, Kong *et al.* (2022) found a negative link between the use of ICTs in leisure time and reading achievement, but, however, a positive association between the use of these tools specifically for leisure reading and reading achievement. *In the same spirit*, Gubbels et al. (2020) found significantly lower performance among Dutch adolescents who used ICTs excessively for leisure-based purposes, but nevertheless found that the highest reading scores were found among those who showed moderate use of ICT at home for schoolwork.

In line with these findings, our study aims at shedding new light in the Spanish context on the previous research by Campos and Arantegui-Benedí (2022), in which the focus was on exploring the link between the degree of parental mediation in ICT access perceived by sixth-year students and their level of reading comprehension. Using a similar research design, we addressed new variables in order to study comparatively in a wider population -3rd and 6th year of Primary Education- the link between time, purpose and perceived parental mediation in the use of ICTs at home and the degree of reading comprehension achieved by students, paying attention also to their different levels -literal, inferential and critical-.

METHOD

Objectives and assumptions

The research had three objectives in which the exploration of possible differences according to the grade (3rd or 6th year of Primary Education) was taken into consideration:

– To explore the degree of parental mediation perceived by students in the use of ICTs in their free time and to identify the presence of possible risk situations.

– To analyse the possible correlation between the degree of parental mediation perceived by students in the use of ICTs in their free time and their level of reading comprehension.

– To explore possible differences in the level of reading comprehension according to the time spent using ICTs in their free time and the main purpose -educational, communicative or recreational- of such use by girls and boys.

As for objectives 2 and 3, and in coherence with the revised theoretical framework, the aim was to verify the possibility of rejecting the following null assumptions in reference to the link between the use of ICTs at home and the level of reading comprehension achieved by students:

– Null assumption 1. There is no positive link between the degree of parental mediation perceived by students in their access to ICTs and the level of reading comprehension achieved.

– Null assumption 2. There are no significant differences in the level of reading comprehension achieved by students according to the main use of ICTs in their free time -educational versus other uses-.

Design and participants

The research was conducted under a quantitative and *ex post facto* design in which 410 students of 3rd (N= 142) and 6th (N= 268) years of Primary Education from nine schools in Aragón (Spain) participated.

The sampling applied was non-probabilistic and by convenience, following the request for participation sent to different educational centres. The criteria for inclusion in the study were the willingness of the children and their legal guardians to participate in the research and the absence of reading difficulties that could affect both the comprehension of the questions in the questionnaire and the reading comprehension test conducted.

50.6% of the participants were boys and 49.4% were girls. 68.8% attended public schools and 31.2% attended private schools (publicly funded, but privately run).

Data collection instruments and procedure

Data were collected using two validated tools. To analyse the variables linked to student use of ICTs, we applied the questionnaire used by Campos and Arantegui-Benedí (2022) -which, in turn, is an adaptation of the tool by Berrios-Valenzuela et al. (2015)–, and for the measurement of the level of reading comprehension, two tests of linguistic communication competence in Spanish published by the Ministry of Education and Vocational Training of Spain (Ministerio de Educación y Formación Profesional, 2018a; 2018b).

The first questionnaire made it possible to collect data corresponding to: socio-demographic variables, the frequency and purpose of students' use of ICT sin their free time and the degree of parental mediation perceived in the use of these tools (table 1). Regarding the latter variable, 17 items were presented on a Likert-type scale with five response levels that contemplated different dimensions of parental mediation in the use of ICTs. Table 1 shows in brackets the number of items incorporated for each of the dimensions. The reliability of this scale was calculated using Cronbach's test, which yielded an alpha value of .862, showing good internal consistency of the scale (Hernández-Samperi & Mendoza-Torres, 2018).

The reading comprehension tests involved reading an expository text and answering a set of multiple-choice questions that made it possible to assess the application of different cognitive processes involved in reading comprehension competence: the ability to locate and obtain information, the ability to integrate and interpret information, and the ability to evaluate and reflect on it. The tests selected were "Las aventuras de Lucy, la niña pintora" for 3rd year (Ministerio de Educación y Formación Profesional, 2018a) and "El origen de algunos símbolos tecnológicos" for 6th year (Ministerio de Educación y Formación Profesional, 2018b).

Both the questionnaire and the reading comprehension test were completed in analogue format with the presence of one of the researchers, which favoured the control of possible biases. Students were given 60 minutes to respond.

Table 1

Summary of the structure of the questionnaire

Type of variable	Variable	Type of response
Socio- demographic	Gender	Closed-ended with two options

Type of variable	Variable	Type of response
	Year	Closed-ended with two options
	Age	Open-ended
	Age of legal guardians	Open-ended
	Education of legal guardians	Closed-ended with three options (primary education, secondary education and/or vocational training and university studies).
	Occupation of legal guardians	Open for further categorisation
Frequency of ICT use	Time spent per day on weekdays	Open-ended
	Time spent per day on weekends	Open-ended
Purpose of ICT use	First purpose you use them for most	Open for further categorisation
	Second purpose you use them for most	Open for further categorisation
	Third purpose you use them for most	Open for further categorisation
Perception of parental mediation in the use of ICTs	Parental support in their use (1)	5-level Likert scale (Never, Hardly ever, Sometimes, Almost always, Always)
	Extent of use in situations or places not recommended during childhood (3)	5-level Likert scale (Never, Hardly ever, Sometimes, Almost always, Always)
	Use for primarily recreational purposes (1)	5-level Likert scale (Never, Hardly ever, Sometimes, Almost always, Always)
	Setting hours for parental use (3)	5-level Likert scale (Never, Hardly ever, Sometimes, Almost always, Always)
	Possibility of access to content unsuitable for child users (4)	5-level Likert scale (Never, Hardly ever, Sometimes, Almost always, Always)
	Access to risky situations or activities for child users (5)	5-level Likert scale (Never, Hardly ever, Sometimes, Almost always, Always)

Data analysis procedure

In order to analyse the differences in the dependent variable -reading comprehension- as a function of parental mediation in the use of ICTs, first of all, it was calculated: 1) the score in the reading comprehension test after coding each correct answer with a point and each wrong answer with a zero; 2) the index of parental mediation perceived by students in the use of ICTs during free time, calculated by assigning a code between 0 and 4 to the answer given to each item on the five-level Likert scale -giving the highest score to the most desirable answer- and then obtaining the arithmetic mean of all the items corresponding to this scale. For the interpretation of this index, it was understood that scores below 2 points - the central measure of the scale - implied situations of risk with respect to ICT use.

Once these indices had been calculated, mean comparison tests were applied after analysis of the behaviour of the data in terms of normality and homogeneity of variances in terms of each independent variable, which led to the application of the non-parametric Kruskal Wallis test -and its corresponding post hoc test- and the Mann-Whitney U test. In addition, Spearman's non-parametric correlation test was also applied to analyse the association between the scale-type variables corresponding to the score obtained in the reading comprehension test, the index of parental mediation in the use of ICTs and the time spent on these tools in free time. The operations were performed with SPSS version 24.00 and the significance level for rejecting the null assumptions was .05.

RESULTS

Perceived parental mediation of ICT use

The first objective was to explore the degree of parental mediation perceived by students in the use of ICTs in their free time and to identify the possible presence of risk situations. As mentioned above, the index of parental mediation in ICT use was calculated by coding the answers given to the 17 items of the scale. Specifically, each response was coded between 0 and 4 points, with the highest score corresponding to the most desirable response. Subsequently, a mean between 0 and 4 was obtained for the set of items and, for qualitative interpretation, it was estimated that scores below 2 points would imply insufficient parental mediation, scores between 2 and 3 points would imply acceptable or average mediation, and scores above 3 points would reflect high or good mediation. Similarly, it was understood that scores below 2 on the different items would indicate risk situations with respect to ICT use.

The parental mediation index among third year students reflects an acceptable value of 2.61 points (*SD* = 0.658), half a point above the sixth year students (*M* = 2.13; *SD* = 0.642), which has a mean of about 2 points, thus at the lower limit of acceptable parental mediation. In order to explore the existence of significant differences between the two groups, the Mann-Whitney U test was applied, the result of which (U= 10014.00; p= < .001) showed a significantly higher index among third year students (Median= 2.735; Range= 3.41) than among sixth year students (Median= 2.176; Range= 2.94).

Consistent with this, and as can be seen in table 2, the responses to the items on the scale of perceived parental mediation in the use of ICTs show a greater number of situations with potential risk among sixth-year students, with scores below 2 points in nine of the 17 items on the scale compared to the five found in third-year students. The analysis of these results shows that the most problematic aspects among third-year students are related to the support of parents in the use of ICTs, its use mainly for recreational purposes and the establishment of hours for its use. However, in the case of sixth-year students, five of the nine items corresponding to access to risky situations or activities through ICTs and inappropriate content for children are also added.

Table 2

Mean of each item of the scale of perceived parental mediation in ICT use

Reactive	Dimension	3rd year	6th year
When I use my tablet, smartphone or computer, I do it with my parents.	*Support*	**M = 1.70** *SD*= 1.167	**MN = 1.30** *SD*= 1.002
I use my tablet, smartphone or computer during meals (breakfast, lunch, snack, dinner).	*Use in inadvisable locations or situations*	N = 3.13 *SD*= 1.174	M = 3.33 *SD*= 1.000
When I go out, I usually take a technological device (tablet, smartphone, computer, etc.) with me to entertain myself.	*Use in inadvisable locations or situations*	M = 3.16 *SD*= 1.236	M = 2.21 *SD*= 1.543
I use my tablet, smartphone or computer before I go to bed.	*Use in inadvisable locations or situations*	M = 2.43 *SD*= 1.406	M = 2.16 *SD*= 1.321
The main reason I use my tablet, smartphone or computer is for fun/entertainment.	*Primary use for leisure*	**M = 0.95** *SD*= 1.132	**M = 0.93** *SD*= 0.921
My parents set time limits on when I can use my computer or tablet to surf the Internet.	*Setting the hours of use*	**M = 1.68** *SD*= 1.657	**M = 1.97** *SD*= 1.535
My parents set hours for when I can use my smartphone to search for or watch what I want.	*Setting the hours of use*	**M = 1.62** *SD*= 1.637	M = 2.04 *SD*= 1.578
My parents set times for me to play video games.	*Setting the hours of use*	**M = 1.73** *SD*= 1.668	**M = 1.79** *SD*= 1.561
My parents let me play violent video games (fighting, war...).	*Access to inappropriate content*	M = 3.29 *SD*= 1.257	**M = 1.86** *SD*= 1.607
My parents let me play with strangers online.	*Access to risk situations*	M = 3.39 *SD*= 1.231	**M = 1.88** *SD*= 1.719
My parents let me buy things online	*Access to risk situations*	M = 3.51 *SD*= 1.057	M = 3.17 *SD*= 1.166

Reactive	Dimension	3rd year	6th year
My parents allow me to access social networks (TikTok, Instagram, etc.).	*Access to inappropriate content*	*M* = 2.62 *SD*= 1.542	***M* = 1.45** *SD*= 1.614
My parents let me upload photos and videos to social networks.	*Access to risk situations*	*M* = 3.44 *SD*= 1.246	*M* = 2.84 *SD*= 1.485
My parents let me send photos and videos via Whatsapp.	*Access to risk situations*	*M* = 2.51 *SD*= 1.610	***M* = 1.57** *SD*= 1.625
My parents let me contact strangers on the Internet (social networks, forums…).	*Access to risk situations*	*M* = 3.77 *SD*= 0.814	*M* = 3.67 *SD*= 0.871
My parents let me watch adult programmes or things.	*Access to inappropriate content*	*M* = 3.25 *SD*= 1.211	*M* = 2.88 *SD*= 1.304
My parents let me watch every video on Youtube.	*Access to inappropriate content*	*M* = 2.12 *SD*= 1.560	***M* = 1.18** *SD*= 1.391

Perceived level of parental mediation in ICT use and reading comprehension

Our second aim was to analyse the possible relationship between the degree of parental mediation perceived by students in the use of ICT and their level of reading comprehension.

The results of the Spearman's correlation test show, for both third and sixth-year students (table 3), a significant correlation (*p*= .019 and *p*= < .001 respectively), although weak (*r*= .199 and *r*= . 235 respectively), between the reading comprehension test score and the index of parental mediation in the use of ICTs, so that those who perceive greater parental mediation in the use of these tools in their free time, in turn, have higher scores in reading comprehension.

Table 3

Correlational analysis of reading comprehension score and: Parental mediation index in ICT use and time spent using ICTs during the week and weekend.

		ICT parental mediation	Weekday ICT time	Weekend ICT time	Reading comp. score
Spearman's Rho	Reading comp. score 3rd year				
	Coefficient	.199*	-.130	-.037	1000
	Next (bilateral)	.019	.123	.659	.
	Comp. score 6th year				
	Coefficient	.235**	-.109	-.096	1000
	Next (bilateral)	.000	.255	.320	.

* The correlation is significant at the level of 05 (2-tailed).

** The correlation is significant at .01 level (2-tailed).

For further analysis, three groups were created according to the parental mediation index:

– the first group, made up of students who scored less than 2 points, which would correspond to inadequate mediation;

– the second group was made up of students who scored between 2 and 3 points - which would correspond to an acceptable or average mediation;

– the third group, made up of those who scored above 3 points - reflecting high or good mediation.

Considering this ordinal variable, the Kruskall-Wallis test was used to detect possible differences in the scores obtained in the reading comprehension test. The results show statistically significant differences

in the reading comprehension scores of the sixth-year students [H(2)= 14.333, p= .001] between the inadequate mediation group and the acceptable mediation group (p= .001). Furthermore, a comparison of the means of the two groups shows a gap of almost one point (table 4). However, no significant differences were found between the groups for third-year students [H(2)= 4.679, p= .096].

Table 4

Average score in the reading comprehension test for sixth-year students according to the established ranges in terms of the parental mediation index in the use of ICTs.

Level of parental mediation in the use of ICTs	Reading comprehension score
Insufficient mediation	*M*= 5.98; *SD*= 1.71
Acceptable mediation	*M*= 6.85; *SD*= 1.80
High mediation	*M*= 6.76; *SD*= 1.60

In order to achieve a more detailed analysis of the differences in reading comprehension of sixth-year students according to this variable, the Kruskall Wallis test was applied, considering the mean obtained in the test for each of the cognitive strategies reflected in the questions: 1) locating and obtaining information, 2) integrating and interpreting information and 3) evaluating and reflecting on it. The results show significant differences [H(2)= 15.938, *p*= < .001] in the dimension corresponding to the integration and interpretation of information, and the *post hoc* test indicates that both the group with insufficient mediation and the group with acceptable mediation (*p*= < .001) and the group with high mediation (*p*= .014) are found among the group with insufficient mediation. On the 4 items corresponding to these questions in the test, we found that those with insufficient parental mediation in ICT use are more than half a point apart (*M*= 2.31; *SD*= 1.07) from those with acceptable (*M*= 2.88; *SD*= 1.06) and high (*M*= 2.88; *SD*= 1.07) mediation.

Time and main purpose of ICT use and reading comprehension level

The third aim of the research was to explore potential differences in the level of reading comprehension according to the time spent at home and the main purpose of reading use - educational, communicative or recreational - by student.

With regard to the time spent using ICTs at home, no significant correlation was found in either group between the score obtained in the reading comprehension test and the minutes spent using ICTs during the week or at the weekend (Table 3).

In order to determine the possible association between the level of reading comprehension and the main objective of ICT use, the answers to the question concerning the first, second and third main activity for the use of these tools, formulated as follows, were considered: "Write down the top three things you use your tablet, smartphone or computer for at home: | First purpose you use them for most: | Second purpose you use them for most: | Third purpose you use them for most:". The responses were categorised according to the purpose they reflected as shown in tables 5 and 6, i.e., firstly more broadly and then according to the three broad categories: recreational use, school use and educational use. The results show a similar order in the four activities most frequently mentioned as the first, second or third main activity for ICT use by third- and sixth-year students (the first two focused on leisure and the second two on educational activities). However, in the rest of the frequencies, there is a clear difference with regard to the use of ICTs for communication purposes -messaging and video calls-, which is more frequent among older students.

Table 5

Percentage of responses regarding the three main purposes for which the third-year students said they used ICTs

Purpose	Type of use	1st answer	2nd answer	3rd answer	Total
Video-games	Recreational	33.8	31.7	14.8	80.3
Watch YouTube	Recreational	24.6	30.3	16.9	71.8
Homework	Educational	23.9	12.0	23.9	59.8
Search for information	Educational	8.5	8.5	11.3	28.3
Listening to music	Recreational	2.1	4.2	8.5	14.8
Social networks	Recreational	3.5	4.9	5.6	14
Make video calls	Communicative	2.1	4.9	5.6	12.6
View photos	Recreational	0	0.7	5.6	6.3
Watch series/movies	Recreational	1.4	1.4	2.1	4.9
Messaging	Communicative	0	0.7	2.8	3.5
Shopping	Recreational	0	0.7	2.8	3.5
Total	--	100	100	100	--

Table 6

Percentage of responses regarding the three main purposes for which the sixth-year students said they used ICTs

Purpose	Type of use	1st answer	2nd answer	3rd answer	Total
Video-games	Recreational	29.1	14.5	18.2	61.8
Watch YouTube	Recreational	14.5	20.9	21.8	57.2
Homework	Educational	21.8	10.9	9.1	41.8
Search for information	Educational	5.5	9.1	19.1	33.7
Social networks	Recreational	14.5	9.1	6.4	30
Messaging	Communicative	3.6	14.5	9.1	27.2
Make video calls	Communicative	8.2	10.0	7.3	25.5
Watch series/movies	Recreational	0.9	4.5	4.5	9.9
Listening to music	Recreational	1.8	3.6	0.9	6.3
View photos	Recreational	0	1.8	2.7	4.5
Shopping	Recreational	0	0.9	0.9	1.8
Total	--	100	100	100	--

Due to the variability in the responses, two groups were created for each grade to deepen the analysis. The first consisted of students who used ICTs for less desirable purposes as a priority, i.e., those who reported using them exclusively or mainly for leisure purposes, with their responses reflecting only this type of use or doing so in the majority - in two of the three responses. The second group was made up of the remaining cases, which reflected hybrid uses, albeit among one part of the student body primarily educational and among the other primarily communicative. To analyse possible differences between the two groups, the Mann-Whitney U-test was applied.

Among the third-year students - where 83.1% of the cases responded to the group with the highest risk and 16.9% to the other - the test result did not allow us to reject the null assumption of equality in reading comprehension scores between the two groups (U= 1063.500; p= .053).

In the case of the sixth-year students -where 64.4% of the cases responded to the group with the highest risk and 33.6% to the other-, the test result allowed us to reject the null assumption of equality in reading comprehension scores between the two groups (U= 968.500; p= . 014), and we found significantly higher scores among those who make hybrid uses of ICT (Median= 6.666; Range= 8.33) compared to those who make an exclusively or fundamentally recreational use (Median= 5.833; Range= 6.67).

In addition, to further analyse the differences, the test was again applied to each of the cognitive dimensions reflected in the questions of the reading comprehension test: locating and obtaining information, integrating and interpreting information, and evaluating and reflecting on information. The result regarding the dimension of integration and interpretation of information (U= 1001.500; p= .021) shows significantly higher scores among those who make hybrid uses (Median= 0.750; Range= 1.00) compared to those who make an exclusively or fundamentally recreational use of ICTs (Median= 0.500; Range= 1.00). Similarly, significantly different scores are found between the groups in the dimension of reflection and valuation of information (U= 1041.000; p= .043), which are again higher in the case of those who use ICTs in a hybrid way (Median= 0.667; Range= 0.83), compared to those who use them mostly or exclusively in a recreational way (Median= 0.500; Range= 0.83).

DISCUSSION AND CONCLUSIONS

With regard to the habits of ICT use in free time among students in the second and third cycles of Primary School Education, the research conducted shows that most students tend to use ICTs for recreational purposes. Furthermore, in line with previous research (Berrios-Valenzuela et al., 2015; Campos & Arantegui-Benedí, 2022; Giménez et al., 2017), the generalised existence of low parental supervision in the use of these tools was found, with the perception of greater attention from legal guardians among younger students. Thus, among third-year students we find a score below the central measure of the scale in five of the 17 items in the questionnaire referring to parental mediation in access to ICTs, while among sixth-year students this situation occurs in more than half of the items, with deficiencies, moreover, in all the dimensions considered.

As for the link between this variable with the reading comprehension competence achieved by the students, the results of the research corroborate those found in the previous work by Campos and Arantegui-Benedí (2022), although the differences are mainly found among sixth-year students. The evidence is consistent with the thesis of authors such as Kriscautzky (2019), Rojas-Barahona (2019) and Salmerón and Delgado (2019) on the potential negative impact of digital tools when abusive and unmediated use occurs.

It is also relevant to highlight the non-existence -both in third- and sixth-year students- of a significant correlation between the reading comprehension test score and the time spent using ICTs at home during the week or at the weekend, which could reinforce the thesis that the purpose and mediation of access to these tools -and not so much the frequency of use- are of paramount importance in terms of their potential negative influence on the development of reading literacy during childhood (Gubbels et al., 2020; Kong et al., 2022; Petko et al., 2017; Steffens, 2014). In this sense, the results obtained allow us to conclude that those who make hybrid uses of ICTs, not focused exclusively or fundamentally on leisure purposes, have higher levels of reading comprehension than those who use these tools exclusively or fundamentally for recreational purposes.

On the other hand, it should be stressed that the results obtained point to a greater impact of less mediated and non-academic ICT use on cognitive skills linked to reading comprehension at the higher levels - inferential and critical, as opposed to literal - which is consistent with evidence pointing to impaired concentration skills in analogue reading linked to excessive and unmediated screen use during early childhood (Wolf, 2020).

In view of these results, we conclude that there is a need to counteract the deficiencies observed in access to ICTs at home with educational actions aimed at achieving a solid digital literacy, fundamentally among students in the third cycle of Primary Education.

As for the limitations of the study, the main one is common in educational research and derives from the type of sampling implemented, non-probability and convenience sampling. Thus, although the sample was large, as it was not probabilistic, caution is required in generalising the results to students in Aragon or in Spain as a whole. On the other hand, as a result of the research design and the statistical tests implemented, the study does not allow us to infer causal relationships, but only associations between variables. As for proposals for future research, in line with work such as that of Li and Wang (2022), it would be of interest to apply multivariate analysis techniques that would allow complex conclusions to be drawn about the relationships between all the variables considered.

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