

Assessment of the effectiveness of the “ICT Student Helper” programme in the context of digital coexistence

Evaluación de la eficacia del programa “Alumnos Ayudantes TIC” en el contexto de la ciberconvivencia

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Abstract

Technologies have changed both the ecologies of teaching-learning processes and interpersonal relationships, while at the same time highlighting the numerous risks to which children are exposed as a result of daily technology use. For this reason, the development and implementation of initiatives that use technology to acquire skills is an important challenge. This research analyses the effectiveness of the ICT Student-Helper programme in skill-based learning and the mediating effect between the competences assessed (linguistic (LC), digital (DC) and citizenship (CC)). This study employed a retrospective ex post facto single-group design and involved a total of 369 students between the ages of 13 and 16 ($M = 14.71$, $SD = 0.68$) in compulsory secondary education (53% girls) from two Spanish Autonomous Communities. The students showed improvement in the three skills analysed, with these improvements being directly and statistically correlated. In addition, the relation between DC and CC was partly explained by the acquisition of LC. This research highlights the effectiveness of this program to acquire competences, values and skills and the responsible use of ICT in the digital coexistence framework, especially given that schools and families face significant challenges in preventing the online risks faced by young people in this digital age.

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Keywords: digital citizenship; online safety; service-learning methodology; media education.

Resumen

Las tecnologías han transformado tanto las ecologías de los procesos educativos como las formas de interrelación, evidenciando múltiples riesgos a los que quedan expuestos los y las menores en su uso cotidiano. Por ello, implementar actuaciones que utilicen las TIC como medio de adquisición de competencias supone un reto necesario. Esta investigación analiza la eficacia del programa “Alumnos Ayudantes TIC” en el aprendizaje competencial y el efecto mediador entre las competencias evaluadas (lingüística -CL-, digital -CD- y ciudadana -CC-). Se utilizó un diseño ex post facto retrospectivo de grupo único. Participaron 369 estudiantes receptores del programa entre los 13 y los 16 años ($M = 14.71$, $DE = .68$) de Educación Secundaria Obligatoria de dos provincias españolas. El alumnado mejoró en las tres competencias analizadas que correlacionan entre sí de manera directa y estadísticamente significativa. La relación entre la CD y la CC se explicó de manera parcial por la adquisición de la CL. Se evidencia la eficacia del programa en la adquisición de competencias, valores y habilidades relacionadas con el uso responsable de las TIC en el marco de la ciberconvivencia. La escuela y la familia tienen un importante desafío en la prevención de los riesgos a los que se enfrentan las generaciones de jóvenes digitales.

Palabras clave: ciudadanía digital; seguridad en internet; programa aprendizaje-servicio; educación mediática.

Introduction and objectives

Technological progress and the increasingly naturalised use that children and young people make of digital technologies and devices have led to new interpersonal relationships in schools. Indeed, as the virtual world has become a wide showcase with endless possibilities for building collaborative knowledge (Moreno-González et al., 2026), this has brought with it new ecologies for teaching and learning. In this regard, Monsalve-Lorente and Aguasanta-Regalado (2020) have defined the characteristics of these new ecologies from which to approach the challenge of virtualised education, such as the importance of acquiring key and transversal competencies that enable learning in different scenarios. All the above leads to new challenges, while at the same time demanding new approaches to digital coexistence between peers inside and outside the school environment. It also highlights the multiple risks to which children are exposed when using technology. In this regard, recent research highlights the huge impact of online violence on adolescents' well-being and mental health. Several studies have focused on phenomena such as Problematic Internet Use (PIU) to refer to the compulsive use of Internet, which significantly interferes in daily life, physical health, emotional well-being, cognitive development and interpersonal relationships (Gómez et al., 2025; Marcos et al., 2025). Examples of these risks include the loss of social skills (Dobado-Castañeda et al., 2026); loneliness, as a lack of presence rather than a lack of people (Sun & Wong, 2024); phubbing, which involves

ignoring the person you are face-to-face with to attend the mobile phone instead (Cebollero et al., 2022); FOMO (fear of missing out; De Caro et al., 2026); nomophobia (Tomczyk & Lizde, 2022); dependence on digital social validation such as “likes” (Gutiérrez-Martín & Ordóñez-Olmedo, 2026); grooming, as a form of psychological manipulation used by an adult in the digital environment with the aim of gaining a minor’s trust for sexual purposes (Schittenhelm et al., 2026); sexting (exchange of messages, photographs or videos of a sexual or erotic nature via mobile devices or the internet; Ojeda et al., 2026); sextortion, as a form of blackmail in which an attacker threatens to release intimate material of the victim unless the victim makes a payment, sends further content or complies with other demands (Patchin & Hinduja, 2026); phishing (technique used by cybercriminals to deceive people into revealing confidential information; Ferreiro et al., 2025); distraction, multitasking and superficial learning (Basterra-González et al., 2026); sleep disorders (Navalón-González, 2025); and digital procrastination (Martín-Puga et al., 2022).

The most important consequences of these experiences are depression, anxiety, social phobia, panic attacks, suicidal ideation, and lack of personal satisfaction (Gámez-Guadix et al., 2023; Stevens et al., 2021; Tomczyk & Lizde, 2022). In addition, the overuse of social networking sites like TikTok, Facebook or Instagram impacts on academic performance whilst also being directly related to cyberbullying in adolescents and university students (Rasool et al., 2024). Violent or antisocial online behaviour is not only an adolescents’ reality but is also widespread throughout higher education. For example, Zahínos et al. (2024) found that cyberbullying and problematic internet use are common among Brazilian, Spanish and Portuguese university students, with high scores of depression and anxiety.

An excessive and uncontrolled use of the internet, social networks and mobile phones is currently a major problem with severe consequences for the personal and mental wellbeing of minors (Montag et al., 2024). A clear example of dysfunctional use is cyberstalking, which is defined as intentional and repeated harassment (Stevens et al., 2021) and has become a common practice among adolescents aged 12 to 18 years, with reported rates of cyber-aggression of between 6% and 46.3% and cyber-victimisation of between 14% and 57.5% (Zhu et al., 2021). In Spain, Rojo-Ramos et al. (2022) reported an 11% rate of cyber-victimisation in adolescents, mostly females. Moreover, the increase in cyber-violence in couples through cyber-controlling behaviours is worrying (Cava et al., 2022). In this risk scenario, minors are the most vulnerable. As such, it is proposed that working on the key competences associated with ICT (digital competence, linguistic competence and citizenship competence) will raise students’ awareness of the conscious and responsible use thereof.

Digital literacy and digital coexistence among secondary school students

School is one of the main agencies for digital literacy as it involves both the instrumental use of technological media and the reflective, critical and safe use of the content and information that is used and published (Peñalva, 2019). Regarding the digital competence in primary students, Paredes-Labra et al. (2019) have shown that widespread exposure to, and use of, ICT is not linked to better digital compe-

tencies if these students are not trained in the specific abilities needed to interact with technology. In the same way, although adolescents have certain skills inherent to digital competence, they usually experience difficulties being critical when evaluating information on the internet (Tirado & Rodríguez, 2019; Valverde-Crespo et al., 2020). In terms of digital competence, a key aspect in the current era is privacy and safeguarding one's identity and image on social networks. In this regard, Hernández-Serrano et al. (2021) have noted that adolescents share personal information without being fully aware of the risks involved. The question therefore needs to be asked as to what educational content do programmes include to provide children with the foundations to become digitally responsible and civic-minded citizens? To combat violence in the classroom, cyber-violence and encourage the responsible use of ICTs, various initiatives have been implemented within the framework of peer-to-peer support. In this type of interventional programme, students take a leading role in preventing problems while developing social-emotional skills. One of the first examples was the "Peer Support Programme" (Martín-Criado & Casas, 2019), which aimed to generate peer-support networks in the school for conflict management. A subsequent evaluation thereof showed the acquisition and development of digital competence and a reduced involvement in bullying dynamics among adolescents. Another example is the "Prev@cib 2.0" programme (Ortega-Barón et al., 2022). After participating in this programme, lower rates of cyber aggression were observed among its participants, and helping behaviours among peers and teachers increased.

Many studies have focused on the relationship between digital technologies and the acquisition of social skills in children (Martín-Criado & Casas, 2019; Ortega-Barón et al., 2022; Sandia & Montilva, 2020). However, no research or educational programmes have been found that analyse, in this relationship, respectful and inclusive communication with others as an element in favour of the acquisition of values and attitudes in the framework of digital coexistence at school and the prevention of online risks.

Research Context

This study focuses on the "ICT Student Helper" programme (ICT-SH Programme), which has a long history in Spain (Luengo, 2017). Based on the Service-Learning Methodology and experiential methodology, it combines academic knowledge with service to the community, thereby generating a transfer of knowledge to real situations (Mayor, 2020). The ICT-SH Programme trains adolescents in Compulsory Secondary Education (ESO) in the responsible use of ICT and digital coexistence through the acquisition of skills related to digital competence (DC), citizenship competence (CC) and linguistic competence (LC), which are then transferred to primary schoolchildren as a link and support. The training of the assistant group includes three lines of action: 1) digital literacy; 2) elements of digital coexistence, respect, privacy and dignity on the internet; and 3) training in communication skills. These lines are related to the acquisition of three key competencies:

- CC involves skills for students to interact with others socially through empathy, assertiveness, dialogue and cooperation (line 1).
- DC enables adolescents to link the virtual environment for responsible instrumental use, creating healthy relationships through concepts of intimacy, privacy, respect, security and risk prevention (lines 1 and 2).
- LC is developed through the management of conflicts faced by learners, teaching inclusive, respectful language, such as the creation and presentation of content and effective communication skills (line 3).

Of these three competencies, DC is particularly relevant at the present time as it addresses five elements (information, communication, security, content creation and problem solving) and involves not only the instrumental learning of technologies but also the acquisition of skills and values that enable the development of critical attitudes in an increasingly globalised and networked world (Fernández-Miravete, 2018). Schools, teachers and families are key scenarios in digital literacy to combat internet risks and experiences such as cyberbullying. The ICT-SH Programme is a useful option to contribute to digital literacy in which “individuals understand appropriate online behaviour” (Fonseca & Borges-Tiago, 2024, p. 157) and enable them to take active actions to prevent cyberbullying and other forms of cyberviolence as committed digital citizens.

In accordance with the above, the aim of this study was to test the effectiveness of the ICT-SH Programme for the acquisition of key competencies and to analyse the mediating effect of language competence (LC) between digital competence (DC) and citizenship competence (CC). The contribution of the mediating effect between the competencies emerges as a better explanation of the causal effect of the dependent variable on the independent ones. Considering these research objectives, the following hypotheses were established: 1) students develop the key competencies after being involved in the programme; 2) the competencies analysed are positively related to each other at the end of the programme; and 3) LC will mediate the relationship between DC and CC.

Method

Research design

An ex-post facto retrospective single-group design with pretest/post-test measurements and no control group was planned (Ato et al., 2013) to test the effectiveness of the programme on the acquisition of key competencies in student helpers and the responsible use of ICT. In addition, the acquisition of skills was analysed according to gender, age and geographical location.

Participants

Non-probabilistic intentional sampling was used. Inclusion criteria included volunteering to participate in the study and belonging to the group of student assistants in the programme. The sample was made up of 369 students (44.7% boys; 55.3% girls) aged between 13 and 16 years ($M = 14.71$, $SD = 0.68$). All were ESO students from Spanish public schools in the Community of the Canary Islands (85.6%) and the Community of Madrid (14.4%). Participants in this study were a representative sample of those

involved in the ICT-SH Programme implemented in both geographical communities during the 2023/2024 school year.

Instrument

To assess the skills related to the key competencies (CC, DC, LC), a questionnaire validated (Giménez-Gualdo et al., 2021) in terms of structure and content by experts in the field (10 university professors with expertise in research methodology and educational sciences, and five ESO teachers who had participated in previous editions of the ICT-SH Programme), based on a review of previous studies on competency assessment (Bello & Morales, 2019), an analysis of the contents of the programme itself and the current educational legislation in force, was administered. The instrument has 32 items distributed in three dimensions (CC: 11 items; DC: 11 items; and LC: 10 items), with a Likert-type answer format (1 = strongly disagree, 5 = strongly agree). The instrument showed excellent reliability, with a Cronbach's Alpha of $\alpha = 0.94$, as well as in each of its dimensions (CC: $\alpha = 0.82$; DC: $\alpha = 0.94$; LC: $\alpha = 0.88$).

Procedure and data analysis

Schools were contacted through the management teams and the guidance department responsible for implementation of the ICT-SH Programme. An information note was sent to families informing them of the purpose and scope of the research to obtain consent for participation of their children. Schools that were implementing the ICT-SH Programme in the Community of Madrid, and the Canary Islands were selected. The research team participated in person as spectators in some of the training sessions and during implementation of the project, as well as in the collection of data from the schools in Madrid. The questionnaire was distributed in paper and digital format through Google Forms during school hours. This coincided with the tutoring sessions. In the schools located in the Canary Islands, data collection was carried out by the teachers responsible for the project. During the design, implementation and analysis of the data, the guidelines set out in the Declaration of Helsinki (2013) were followed. A standardised procedure was used to ensure that the instructions were the same for all participants, with a response time of 20–25 minutes. The confidentiality of the information collected was guaranteed. Implementation of this research was approved by the Ethics Committee of the University of Granada (3776/CEIH/2023).

Descriptive statistics (M and SD) were calculated for student scores in DC, CC and LC, which were measured before and after implementation of the programme. After testing for variance homogeneity, parametric techniques were applied. Student's t-test was used for the mean difference and Cohen's d was used to measure the magnitude of the effect (high above 0.80; moderate between 0.50 and 0.80; small between 0.20 and 0.50; Cohen, 1988). The relationship between variables was analysed using Pearson's correlation coefficient. To determine the direct and indirect effects between the study variables, a simple and multiple mediation analysis was carried out using the PROCESS 4.2 beta macro applied to SPSS (Statistical Package for Social Sciences)

version 27.0. For the mediation model (number 4), bootstrapping for the indirect effects was set at 5,000, and the confidence level for the confidence intervals was set at 95%, with an estimation via Ordinary Esquires (OLS) and Maximum Likelihood (ML). The total effects of the mediation model were also calculated.

Results

Effectiveness of the ICT-SH Programme

To test the effectiveness of the ICT-SH Programme, differences before and after implementation of the programme were analysed. Table 1 shows the descriptive statistics for each competence assessed. The students improved their average score in all three skills, thus showing the impact of the ICT-SH Programme for the acquisition of key competencies. In the post-test, CC obtained the highest mean ($M = 45.25$; $SD = 6.02$), followed by DC ($M = 44.94$; $SD = 5.99$). Statistically significant differences were observed for DC after programme implementation, with a moderate effect size ($p < 0.001$; $d = 0.50$), and for LC ($p < 0.01$; $d = 0.31$), with a low effect size.

Table 1

Descriptive statistics and mean difference of the ICT-SH Programme

		M (SD)	t (₃₆₈)
CC	Pre	44.49 (6.42)	- 1.69
	Post	45.25 (6.02)	
DC	Pre	42.85 (6.72)	-4.45***
	Post	44.4 (5.99)	
LC	Pre	38.75 (7.18)	2.97**
	Post	40.26 (6.8)	

Note. *** $p < 0.001$; ** $p < 0.01$; CC = Citizenship Competence; DC = Digital Competence; LC = Language Competence.

In terms of sex (Table 2), after implementation of the programme there was a significant improvement in the mean scores in all three competencies for males, as well as in the LC for females. Among males, statistically significant differences with moderate effect sizes were detected in all three competencies: DC ($p < 0.001$, $d = 0.58$), CC ($p < 0.01$; $d = 0.50$) and LC ($p < 0.01$; $d = 0.50$). Females had significantly higher DC scores ($p < 0.05$, $d = 0.36$), with low effect sizes. In addition, they improved their CL scores after the programme, with lower post-test scores on the CC. However, these differences were not statistically significant.

Table 2

Descriptive statistics and mean differences according to gender

		Males M (SD)	t (₁₆₄)	Females M (SD)	t (₂₀₃)
CC	Pre	43.18 (6.63)	-3.146**	45.54 (6.06)	0.707
	Post	45.40 (5.85)		45.14 (6.17)	
DC	Pre	42.01 (6.76)	-3.731***	43.53 (6.62)	-2.554*
	Post	44.81 (6.08)		45.05 (5.94)	
LC	Pre	38.02 (7.19)	-3.136**	39.34 (7.13)	-1.215
	Post	40.36 (6.21)		40.19 (7.36)	

Note. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; M = Mean; SD = Standard Deviation; CC = Citizenship Competence; DC = Digital Competence; LC = Language Competence.

In terms of autonomous communities (Table 3), it was found that students from the Canary Islands presented better mean scores in the post-test for all three competencies evaluated: DC ($p < 0.001$, $d = 0.57$), CC ($p < 0.05$, $d = 0.22$) and LC ($p < 0.01$, $d = 0.31$), whereas their peers from Madrid recorded lower means in the post-test, except for LC, with no significant difference. The correlation analysis between the three competencies studied showed statistically significant, positive and high relationships (with a high effect size) between them at the end of the programme. After carrying out Pearson correlations, it was observed that if DC increased, so did CC ($r_{xy} = 0.68$; $p < 0.001$) and LC ($r_{xy} = 0.62$; $p < 0.001$), and there was also a correlation between CC and LC ($r_{xy} = 0.676$; $p < 0.001$).

Table 3

Descriptive statistics and mean differences by autonomous region

		Canary Islands		Madrid	
		M (SD)	t (₃₁₅)	M (SD)	t (₅₂)
CC	Pre	44.10 (6.54)	- 1.99*	46.81 (5.08)	0.54
	Post	45.09 (6.15)		46.26 (5.16)	
DC	Pre	42.40 (6.78)	- 5.07***	45.53 (5.69)	0.49
	Post	44.95 (5.96)		44.91 (6.23)	
LC	Pre	38.62 (7.22)	- 2.78**	39.57 (6.99)	-1.04
	Post	40.16 (6.91)		40.89 (6.60)	

Note. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; M = Mean; SD = Standard Deviation; CC = Citizenship Competence; DC = Digital Competence; LC = Language Competence.

Mediation model between skills-based learning

Simple and multiple linear regression analyses were carried out to estimate the mediation relationships (Table 4). In the first one, the influence of the predictor variable (DC) on the mediating variable (LC) was analysed to obtain the coefficient a . The model obtained an adequate fit ($F(1, 37) = 229.43$; $p < 0.001$), which explained 39.0% of the variance of the LC ($R^2_{\text{corrected}} = 0.39$). The DC had a positive and significant impact on the LC. Thus, for every point that the DC score increased, the LC score increased by 0.71.

The second step was to predict the value of the outcome variable (CC) by determining two effects: 1) the effect of the mediator variable (LC) on the outcome variable (CC), and thus the coefficient b ; and 2) the direct effect of the independent variable (DC) on the outcome variable (CC) in the presence of the mediator, which gave the coefficient c' . For this purpose, LC and DC were taken as predictor variables, both of which were statistically significant within the model. The model obtained an adequate adjustment ($F(2, 37) = 241.47$; $p < 0.001$), thus explaining 57% of the variance of the CC ($R^2_{\text{corrected}} = 0.57$). The CC score increased by 0.43 for each point that the DC score increased, and the coefficient was 0.36 when the CL score increased by one point.

Third, the total effect (coefficient c) of the predictor variable (DC) on the outcome variable (CC) was analysed. Thus, DC was found to be a significant predictor variable as it explained 47% of the variance ($R^2_{\text{corrected}} = 0.47$; $F(1, 366) = 318.74$; $p < 0.001$). In the prediction of CC, there was an increase of 0.69 for each point increase in the DC score. Finally, the indirect effect (coefficient ab) of the predictor variable (DC) on the outcome variable (CC) was calculated. DC had a positive and significant impact on CC mediated by LC of 0.256 ($\beta = 0.26$; $SE = 0.04$; 95% CI [0.191 – 0.32]).

Table 4

Coefficients and regression indices

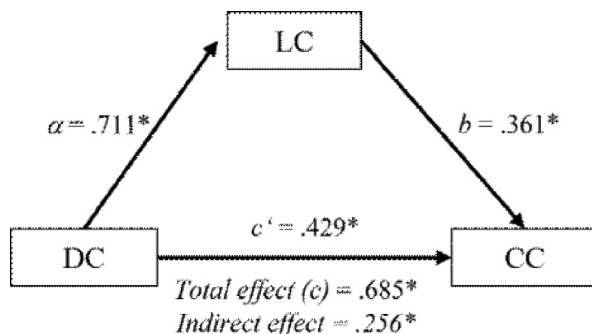
	B	SE	t	p	LLCI	ULCI
Relationship between CD and CL						
Constant	8.37	2.13	3.91	0.000	4.14	12.51
DC -> LC	0.71	0.05	15.15	0.000	0.62	0.80
Relationship between LC and CC and DC and CC						
Constant	11.48	1.60	7.19	0.000	8.34	14.62
DC -> CC	0.43	0.04	9.75	0.000	0.34	0.52
LC -> CC	0.36	0.04	9.39	0.000	0.29	0.44
Relationship between DC and CC						
Constant	14.48	1.74	8.33	0.000	11.06	17.90
DC -> CC	0.69	0.04	17.85	0.000	0.61	0.76

Note. β = Beta coefficient; SE = Standard error; LLCI = Lower Levels of Confidence Interval; ULCI = Upper Levels of Confidence Interval; CC = Citizenship Competence; DC = Digital Competence; LC = Language Competence.

From the results obtained, partial mediation was observed in the relationships analysed (Figure 1), with LC (mediating variable) being responsible for part of the relationship between the predictor variable (DC) and the outcome variable (CC) ($ab = 0.26$). If the mediating variable is removed, there is still a relationship between DC and CC, even in the absence of LC ($c' = 0.43$).

Figure 1

ICT-SH Programme mediation competencies model



Discussion

Technology use has opened up new teaching-learning settings, a process which is now supported by the widespread emergence of Artificial Intelligence (Delgado-Algarra et al., 2025), thus raising important questions about its inclusion in the educational context. Alongside the advantages and opportunities of the virtual world, a less friendly side is evident, as highlighted by the different risks that threaten civic use and digital coexistence. Effective programmes that support competency-based learning and the acquisition of civic values are therefore required to work in this direction. To this end, this study analyses the effectiveness of the ICT-SH Programme, which is aimed at helping students attain key competencies, while also testing the mediating effect of language competence (LC) on the relationship between digital competence (DC) and citizenship competence (CC), which are the main pillars of this programme.

According to the first hypothesis, it was expected that, after implementation of the ICT-SH Programme, students would acquire the mentioned competencies, a fact that was confirmed. Students improved their average score, thereby supporting the effectiveness of the programme in terms of acquisition of the different skills that make up the three competencies, with statistically significant differences in two of them (DC and LC). Similar findings were reported by Martín-Criado & Casas (2019) and Romera et al. (2022), who observed an improvement in social competence in primary and secondary school students after implementation of a peer support programme.

Regarding gender, males improved in all three skills, with statistically significant differences in all measurements taken before and after the programme. However, this was not the case for females since, although there was an improvement in CC and DC,

statistical differentiation was only observed in the case of DC. In this regard, females started with higher scores than males in the pre-test, which may have resulted in a greater improvement in scores in the skills analysed than for males. Previous studies have also shown differences in favour of females in the overall assessment of digital competence (Regueira & Alonso-Ferreiro, 2022), while males show more skills in management, technical problem-solving and content sharing (Pérez-Escoda et al., 2021). Regarding the students’ place of residence, student participants in the Canary Islands improved significantly in all competencies, while this trend was not observed in the Community of Madrid. The latter may be due to the small sample size in Madrid. Moreover, a significant and positive relationship between the three competencies was expected (second hypothesis). Statistically significant, positive and high correlations were observed between the competencies at the end of the programme. Therefore, the hypothesis was confirmed, with the highest value in absolute terms for the relationship between DC and CC.

Although the importance of improving digital competence in the classroom has been clearly justified by its impact on digital coexistence in all current modalities (Martín-Criado & Casas, 2019; Ortega-Barón et al., 2022), LC has tended not to be addressed as a specific part of intervention programmes. With the mediation model presented, the aim is to justify the relevance and importance of its inclusion in the ICT-SH Programme. Based on these results, the third hypothesis, namely that LC would mediate the relationship between DC and CC, is also confirmed. For practical purposes, this translates into the fact that, as students make responsible use of ICT (acquisition of DC), they relate to others with skills and certain values in favour of digital coexistence (acquisition of CC), while this relationship is partly explained by the management of conflicts through effective and respectful communication (acquisition of LC). These results show not only the importance of DC, given its direct and significant influence on the acquisition of CC, but also the role of LC in the framework of assertive dialogic learning to mediate conflicts from the balance of the intervening parties.

This study highlights the importance of working on key competencies through programmes such as the ICT-SH Programme to avoid the attitudinal aspects of classroom reality. Specifically, in a virtualised coexistence space, both image and word determine the quality of interpersonal relationships. Moreover, teaching skills for effective, inclusive and proactive communication are basic to prevent bullying (Castro & Luján, 2026). Although Spain provides legislative support in terms of coexistence and bullying, as well as specific protocols for e-bullying, there is still work to be done to implement effective actions with students and the educational community as a whole (García-Martínez & García-Zabaleta, 2024). In this respect, teachers are key agents of change for coexistence inside and outside schools and for students. Previous research has shown that there is a significant need in the field of data protection, privacy and security in the context of teachers’ digital competence (Palau et al., 2024), which goes against having competent teachers who contribute to the prevention of risks with ICT in the digital context (Recio-Muñoz & Santoveña-Casal, 2026).

Several previous studies have confirmed the impact and effectiveness of using ICTs as a teaching-learning tool as they promote motivation, involvement, participation and academic performance (Giménez-Gualdo et al., 2021; Pazmiño et al., 2025). They also

favour the acquisition of key citizenship, digital and socioemotional competencies and skills for the construction of a peaceful culture and global citizenship (Luengo, 2017; Martín-Criado & Casas, 2019; Vargas & Bosco, 2023). When using programmes such as the ICT-SH Programme, adolescents learn skills linked to three key competencies (CC, LC, DC), which are essential in today's digital world. Our findings support the idea that curricular learning cannot be limited to merely conceptual learning but must be comprehensive and holistic with and through ICTs for the incorporation of an active and critical global citizenship. Educational institutions must therefore maintain and prioritise preventive and intervention actions, such the present programme, to combat e-problems that arise from the inappropriate, problematic and antisocial use of technology (Álvarez-García et al., 2022; Rojo-Ramos et al., 2022; Tomczyk & Lizde, 2022).

It has been proved that programmes which involve students and their families as active protagonists reduce cyberbullying and online risk significantly. In general, national and international initiatives have worked to reduce cybervictimization among students by focusing more on prevention than intervention (Tanrikulu, 2018). However, intervention as part of students' training in online and internet background is currently required. Previous similar educational programmes, such as "A Convivência Ética On-line" by Bozza & Vinha (2023), were designed to include curricular components as part of students' formative training, as well as online risks, cyberviolence and ethical values for digital coexistence and digital citizenship. With regard to intervention programmes, the anti-cyberbullying e-course by Leung et al. (2019) highlights how a constructivist approach using different types of methods, such as interactive games, simulations, case studies and review of concepts, are effective when it comes to preventing and combatting cyberbullying and enhancing prosocial behaviour among students.

This study is not without its limitations. The design used—a single-group study with pre- and post-test measurements and no control group—does not allow the establishment of causal relationships between the intervention and the changes observed. Our findings should therefore be interpreted as indicative of an association. Moreover, as all variables were assessed using self-reports administered at a single point in time, the influence of common variance within the method or social desirability bias cannot be completely ruled out. It would therefore be interesting for future research to be conducted longitudinally, with the aim of analysing how these relationships evolve over time. The mediation analyses presented here should be interpreted as an exploratory approach to the possible mechanisms underlying the relationship between the variables studied. Finally, non-probability sampling limits the generalisability of the results to other educational, geographical or socio-cultural contexts, and requires confirmation through research conducted with larger and more representative samples.

Future lines of work contemplate the possibility of increasing the sample size to improve the comparison between autonomous communities. A pre- and post-test evaluation with a control group is also needed to verify the effectiveness of the programme both within and between centres. In addition, it is necessary to incorporate a qualitative analysis based on a continuous evaluation of the programme with the aim of reorienting the process to improve it. Through discussion groups, students could share experiences more closely and, through interviews, teachers could go deeper into the data obtained to gain a deeper understanding of the issues addressed.

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