

Article

Challenges and Opportunities in Inclusive Education with ICT: Teachers' Perspectives in the Canary Islands during the COVID-19 Pandemic

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Abstract: This study intends to explore the challenges and opportunities in inclusive education using Information and Technologies (ICTs) during the COVID-19 pandemic from the perspective of teachers based in the Canary Islands. It focuses on the digital division and the implications involved while examining the impact of health on students with special needs (SEN) and Specific Educational Support Needs (SENS). For this research, a validated questionnaire was used to assess educators' perceptions and attitudes toward the use of ICT in inclusive education practices. It reveals insights into the need for enhanced ICT training, age and gender disparities perceived in ICT proficiency, and the essential role of continuous professional development for teachers. The study highlights the importance of developing inclusive and comprehensive training strategies, as well as the need for educational institutions to provide effective digital resources and platforms. The findings show that students perceive both their ICT skills and the effectiveness of remote teaching methods as moderate, thus emphasizing the necessity for strategic interventions and collaborative efforts to enhance digital competencies in this educational sector.



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1. Introduction

The recent health crisis caused by COVID-19 has instigated a pivotal reassessment of the educational system's response to the needs of all learners. In this setting, educational inclusion must address the "totality" of human diversity, encompassing a range of abilities, learning styles, intrinsic motivations, languages, beliefs, emotions, and the unique personal, familial, and social circumstances of each individual. Groups identified as more vulnerable, often termed "the others" and referred to as minorities, unusual, special, atypical, or diverse, have experienced a disproportionate impact due to the pandemic.

From a legislative perspective, the education system is obliged to provide inclusive education tailored to meet specific educational needs. In the Canary Islands, the educational response to SENS and SEN is carried out with an inclusive approach that adapts the environment, pedagogical practices, and curriculum to address the diversity of students. This model encourages early identification and appropriate intervention for each need, including specialized teacher training and the involvement of families and the educational community. Personalized resources and technologies are used to ensure that all students participate fully and equally in their educational process.

The United Nations Educational, Scientific and Cultural Organization [1] encourages an educational approach that caters to the needs of students with SENS and SEN. This approach intends to eliminate any circumstances of exclusion in educational settings. However, it is recognized that the integration of SENS and SEN students into mainstream class-

rooms cannot be achieved solely through prescriptive and normative means [2]. Therefore, educators are challenged to ensure the holistic development of these students' potential [3], fostering educational, attitudinal, and procedural support to promote inclusive education [4]. The latter was imperative even before COVID-19 [5], but the need to enhance accessibility and promote a sense of belongingness for all students was enhanced and became critical while navigating through the uncertainties brought on by the pandemic [6].

The declaration of a state of emergency due to COVID-19 resulted in the suspension of face-to-face educational activities globally, propelling schools to transition toward "distance education" [1]. The shift in digital education modalities has had diverse impacts on students, increasing the digital divide [7]. This division, in essence, has brought to the forefront the inequalities embedded within various societies [8–10], spanning from advanced to economically underdeveloped nations [11]. This situation in educational settings has been shaped by a complex array of factors, including difficulties such as access to digital platforms, access to computer equipment, and connectivity for students, families, and educators, some of the challenges already related to the academic trajectories of students. Additionally, educators' training, attitudes, and perceptions in applying suitable pedagogical models with diverse digital materials, essential for maintaining the educational link in varied institutional contexts, are significant [12]. Given the importance of these developments, research has proliferated to examine how these and other factors have impacted groups with SENS during this health crisis [4,13–15] and the extent to which the digital educational response has reached these students.

Resources related to ICT, encompassing tools, programs, and digital materials, play a crucial role in facilitating access to and the transmission, processing, and management of information [16]. In recent decades, the gradual implementation of digital teaching in educational institutions [17,18] has opened up a surplus of opportunities for the innovation, flexibility, and adaptation of educational processes, particularly for augmenting active methodologies in conventional classrooms. As outlined by [19], inclusive virtual education is feasible under flexible, accessible, and motivating pedagogical approaches, contingent upon the provision of adequate technological resources and effective teacher training. In this regard, [20] draws attention to an increasingly explored yet occasionally neglected research domain that scrutinizes organizational competencies and the collaborative culture in schools essential for the advancement of digitalization and educational transformation. Post-crisis, [21] underscores the urgency to align educational strategies with a key goal of the 2030 agenda: bridging the digital divide. This entails connecting each learner (estimated to reach approximately 3.5 billion by 2030) to digital solutions that offer personalized and relevant education.

In the intricate landscape that has emerged following this health crisis, it is imperative to meticulously examine the factors that may have influenced the evolution of digital teaching aimed at including diversity and inclusive education. The validated questionnaire by [22], suitable for the context of the international pandemic, scrutinizes four dimensions related to educators' perceptions and attitudes toward the use of ICT in fostering inclusive practices. These encompass the pedagogical implications and opportunities of implementing ICT in response to the needs of SENS students, the educators' perceived training requirements, attitudes toward the application of ICT in an inclusive setting, and the actualization of inclusive teaching practices via these digital resources.

Transposing this analysis into the COVID-19 context, in regard to the pedagogical implications of ICT use in inclusive classrooms, evidence suggests that digital teaching methodologies can facilitate distinct educational approaches [23]. It is acknowledged that the digital divide and the journey toward the systematic integration of ICT into inclusive settings, accentuated during the state of emergency in many countries, are still ongoing [24]. Concurrently, another study [25] suggests that despite the widening digital gap among students with disabilities, there has been a surge in educational innovation and creativity among teachers, enabling a portion of students to adjust to the use of social communication networks, thereby enhancing their learning experiences and social

inclusion prospects. Furthermore, various researchers have underscored the significance of collaborative online learning involving educators, families, schools, and governments. These studies show collaboration to be a critical factor for the success of online learning pedagogies [26], emphasizing that the use of ICT during COVID-19 requires the strengthening of networks and social connections and the creation of structures that offer opportunities and resources for increased accessibility through these technologies. All stakeholders in the educational ecosystem (including families, educators, and students) are called upon to pull their resources—values, knowledge, skills, and expertise—to facilitate the inclusion of individuals with disabilities in virtual learning environments [27]. In this context, a review by [13] corroborates that ICTs are indispensable tools in meeting the educational needs of students with SENS and SEN. While the need for enhanced ICT competencies among teachers and students is emphasized, the collaborative support of families is also identified as a crucial component in solidifying e-learning methodologies as practical resources in the educational journey of these students.

Exploring the professional development aspect of educators concerning ICT, research undertaken during the COVID-19 pandemic coincides with the necessity for extensive teacher training. This need has been identified as a constraint in addressing the challenge of implementing digital teaching during the pandemic [9]. Alba (2022) [28] indicated that educators acknowledged that the educational support provided to students with SENS during the confinement period was suboptimal. Insights from this study stem from an analysis of internal factors, notably the insufficient training of educators in managing ICT and their challenges in adapting sessions and materials to virtual settings. Additionally, the study emphasized significant findings related to external factors that impeded the digital educational response. These included responding to the multifaceted demands of educational institutions, students, and families and utilizing materials, activities, and platforms tailored to the student's needs. According to the study, this situation culminated in a reduction in educational attention, characterized by limited, expository, and repetitive teaching methodologies. This observation aligns with the principal findings of a study conducted in Spain by [29], which revealed that, during the confinement period, educators predominantly employed ICT in a reproductive rather than a constructive manner, thereby hindering the effective integration of digital technologies. The determining factor for these disparities was the prior usage of digital technologies. As further explained by [30], the pandemic has underlined the imperative need to cultivate a digital culture within educational institutions and among educators, one that genuinely supports the cognitive, affective, and social needs of each student. Ref. [31] also delved into educators' perceptions of ICT practices with students with disabilities, exploring the resources available and their relevant training. The findings suggest that despite proficient usage and preparation among educators, resource availability has been limited, requiring an enhancement in teacher training.

When examining the dimension related to educators' attitudes toward ICT utilization in inclusive classrooms during the pandemic, research such as [32] reveals a prevalent negative perception among teachers. This pessimism is attributed to the economic and time constraints imposed by the situation of confinement while teaching. Furthermore, educators perceived online teaching as challenging due to a lack of emotional connection with each student. These findings suggest that the abrupt transition to remote teaching, compelled by COVID-19 school closures, demanded a substantial adaptation process from educators, compelling them to rapidly revise their educational strategies.

Concerning the dimension relating to the application of digital resources in inclusive education, various studies have indicated the need to enhance, develop, or upgrade competencies for virtual instruction in post-COVID-19 inclusive classrooms. The research conducted by [33] highlighted that the pandemic-induced shift impaired educators' capacity to support digital teaching, primarily due to unequal student access to technological tools, materials, and resources, thereby affecting student motivation and engagement.

This scenario led educators to question the efficacy and future sustainability of online learning methodologies.

The literature consistently emphasizes aspects related to macro-social-environmental factors, framing the analysis around the challenges and crises brought about by confinement. This perspective has influenced the perception of online teaching's potential contributions to inclusive education [23]. It is crucial to note that Emergency Remote Teaching (ERT) emerged as a rapid response to the demands arising from the crisis [34–37], with quality online teaching requiring deliberate instructional design [38,39]. Therefore, there is a need to prioritize micro-social variables by concentrating on the experiences and perceptions of individual educators and professional groups composing educational institutions. This study aims to delve in-depth into educational agents' perceptions and attitudes regarding ICT, in conjunction with their competence and effectiveness in using digital tools to facilitate educational inclusion during COVID-19. This approach entails an analysis focused on personal, competency, and professional variables amidst the overwhelming impact of the pandemic.

Ref. [40]'s study documented a significant correlation between educators' affinity for technology, the perceived efficacy of learning through ICT, and the use of digital teaching methods during the pandemic. Before the health crisis, [41] identified a positive correlation between the frequency of ICT use and educators' attitudes toward it, although notable disparities were observed across countries based on ICT availability, collaborative practices among educators, and professional development opportunities. The authors of [42] emphasized that positive attitudes, skills, and adequate technical infrastructure are fundamental to effectively integrating digital technology into classroom practices. In [43], the six key competencies essential for educators in 21st-century educational settings, as outlined by the European Framework for the Digital Competence of Educators (DigCompEdu), are described. In the Spanish context, the "Plan España Digital 2025" [44] aligns with the European Commission's Digital Education Action Plan 2021–2027 [45], emphasizing student connectivity and the implementation of digital vouchers to advance the digital transformation of education through comprehensive changes in methods and content. Consequently, alongside providing technological resources and ensuring accessibility in classrooms, enhancing the digital competence of both educators and students is prioritized to further bridge the digital divide and achieve key Sustainable Development Goals (SDGs): ensuring quality education (SDG 4) and reducing inequalities (SDG 10). In line with [9]'s research in the Basque autonomous community, it is essential to explore educators' self-perception of their digital competencies, examining how their level of digital competence influenced the quality of Emergency Remote Teaching during the confinement period and how this varies by gender, age, and the educational stages taught. Their study in the Basque community revealed various digital divides among educators, including gender disparities, with female teachers demonstrating lower digital competence and experiencing more negative emotions and workload during confinement, and age-related differences, suggesting that older educators may feel limited in their technological expertise concerning digital instruction, consistent with findings from various psychological studies [46].

Undoubtedly, the pandemic posed significant challenges for educators and other stakeholders in enhancing education. It is unrealistic to expect all professionals to be fully prepared for such a specific and intensive use of ICT, despite recommendations made by the European framework. This study concentrated on professionals working with students with SEN and SENS, who likely encountered heightened challenges due to the diverse needs of their students. The study used a questionnaire [22] to measure these factors post-COVID-19 health crisis. The objective was to describe the use of ICT during the pandemic, alongside the perceived level of ICT competence. It anticipated variances among educators based on personal characteristics (age, gender), the educational level taught, and environmental factors (rural versus metropolitan areas with expected differences in ICT resource access).

This study aims to (1) describe the utilization of ICT, perceived competence, and attitudes toward ICT in teaching students with SEN and SENS during the COVID-19 pandemic and (2) compare the outcomes based on educators’ personal characteristics, the educational levels taught, and the population of their municipalities.

2. Methodology

2.1. Participants

The sample for this study comprised 166 educators from the Canary Islands who engaged in remote teaching during the COVID-19 pandemic and had students diagnosed with Special Educational Needs (SEN) or Specific Educational Support Needs (SENS). The breakdown of participants by educational level was as follows: preschool (n = 13), primary school (n = 75), secondary school and vocational education (n = 67), and A-Level (n = 11). The age of the participants ranged from 23 to 64 years, with a mean (M) age of 45.3 and a standard deviation (SD) of 9.9. Of these participants, 70.5% were female. Geographically, their workplace distribution was varied: 50.6% of the participants worked in metropolitan areas, 18.7% in medium-sized towns, and 30.7% in rural or small towns. The detailed characteristics of the sample, categorized by island, are presented in Table 1. Informed consent was obtained from all participants before commencing the study.

Table 1. Sample characteristics.

	Island							Total
	Tenerife	Gran Canaria	Lanzarote	Fuerteventura	La Palma	La Gomera	El Hierro	
Teachers in sample, n (%)	104 (62.65)	48 (28.92)	1 (0.6)	6 (3.61)	2 (1.2)	4 (2.41)	1 (0.6)	166 (100)
Gender, n (%)								
Male	33 (31.73)	13 (27.08)	–	3 (50)	–	–	–	49 (29.52)
Female	71 (68.27)	35 (72.92)	1 (100)	3 (50)	2 (100)	4 (100)	1 (100)	117 (70.48)
Age								
Mean (SD)	44 (9.3)	48.1 (10.7)	51 (–)	43.7 (10.2)	47.5 (10.6)	51.3 (5.7)	32 (–)	45.3 (9.9)
Min, Max	23, 62	27, 64	51, 51	34, 62	40, 55	43, 56	32, 32	23, 64
Educational level taught, n (%)								
Preschool	6 (5.77)	3 (6.25)	–	1 (16.67)	2 (100)	1 (25)	–	13 (7.83)
Primary education, first cycle	21 (20.19)	3 (6.25)	–	–	–	–	–	24 (14.46)
Primary education, second cycle	17 (16.35)	5 (10.42)	1 (100)	–	–	–	–	23 (13.86)
Primary education, third cycle	23 (22.12)	5 (10.42)	–	–	–	–	–	28 (16.87)
Secondary and vocational education	32 (30.77)	27 (56.25)	–	5 (83.33)	–	2 (50)	1 (100)	67 (40.36)
Baccalaureate	5 (4.81)	5 (10.42)	–	–	–	1 (25)	–	11 (6.63)
Municipality population, n (%)								
<30,000	15 (14.42)	23 (47.92)	0 (0)	6 (100)	2 (100)	4 (100)	1 (100)	51 (30.72)
30,000–100,000	25 (24.04)	5 (10.42)	1 (100)	–	–	–	–	31 (18.67)
>100,000	64 (61.54)	20 (41.67)	–	–	–	–	–	84 (50.6)

Note: Municipality population of teacher’s school was categorized based on 2021 publicly available census data.

2.2. Procedure

The procedure involved inviting all publicly financed schoolteachers from the specified educational levels in the Canary Islands to participate in an online survey. This survey focused on their experiences using ICT, their self-perceived competence, and their attitudes toward employing ICT in teaching students with Special Educational Needs (SEN) and Specific Educational Support Needs (SENS). To initiate this process, a project introduction letter was distributed to all educational centers in the Canary Islands. Collaboration was sought from the General Directorate of Educational Planning of the Ministry of Education, Universities, Culture, and Sports of the Government of the Canary Islands. A professional responsible for coordinating the orientation teams in the Canary Islands circulated an email detailing the study’s objectives. This correspondence also included a link to the online questionnaire. All data collected were stored on a secure server and analyzed with strict anonymity.

2.3. Ethical Statement

This study received approval from the Ethical Committee of the University of La Laguna, as indicated by the reference number CEIBA2021-0462. In adherence to the principles outlined in the Declaration of Helsinki (1964–2013), all participants were thoroughly informed about their rights and involvement in participating in the questionnaire. Informed consent was obtained from each participant before they partook in the study. To ensure privacy and confidentiality, all statistical analyses were performed on anonymized data.

2.4. Instruments

The primary instrument used for data collection in this study was the “Questionnaire on Perceptions and Attitudes of Future Educators toward ICT for the Development of Inclusive Practices”, initially developed by [22]. This questionnaire is structured as a Likert scale with four levels of response, ranging from 1 to 4 (1 = strongly disagree, 4 = strongly agree). In this study, we utilized an updated and validated version of this questionnaire, as outlined in [47], which refines the assessment for the specific context of the COVID-19 pandemic and its impact on students with Special Educational Needs (SEN) and Specific Educational Support Needs (SENS). The questionnaire evaluates the following factors:

1. Didactic Implications of ICT for Inclusive Education: This factor assesses the educational possibilities of ICT resources in the teaching and learning process for students with Special Educational Needs (SEN), and it encompasses 13 items.
2. Professional Development of Educators towards ICT: Focused on understanding teachers’ perceptions and training needs for the application of ICT in inclusive classrooms, this factor includes 10 items.
3. Teachers’ Attitude towards Inclusion through ICT: This factor analyzes educators’ perceptions of inclusive education and attention to students with Specific Educational Support Needs (SENS) through ICT, and it comprises 7 items.
4. Inclusive Teaching Practice through ICT: This factor is based on examining the role of teaching practice in the response to students with SENS and SEN in the classroom through the use of ICT, and it consists of 6 items.

Additionally, the study incorporated five ad hoc items to evaluate ICT usage during the pandemic:

- Students with SEN and SENS have sufficient IT skills for remote learning.
- Remote care has enhanced the abilities of each student with SEN and SENS.
- Distance learning has addressed the individual needs and guidance of students with SEN and SENS.
- The institution is equipped with an efficient and specific platform for online teaching.
- The use of IT resources has promoted students’ independent work.

Furthermore, one item was used to assess self-perceived ICT competence levels:

- Mastery of IT skills to adapt educational responses to the virtual needs of students with SEN and SENS.

All these items were measured using a 1–5 Likert-type scale (1 = totally disagree, 5 = totally agree).

2.5. Statistical Analysis

The sample’s characteristics were detailed using the frequency (percentage) for categorical variables and the mean (standard deviation) for interval variables, with the age range specified. Teachers’ workplaces were categorized based on official public population data into three types: small rural towns (fewer than 30,000 inhabitants), medium-sized towns (30,000–100,000 inhabitants), and metropolitan areas (over 100,000 inhabitants). For analytical purposes, participants’ ages were grouped into three categories: young (23 to 39 years), middle-aged (40 to 49 years), and older (50 to 68 years).

Building upon the previously described questionnaire (Section 2.4), four factor scores were derived from teachers’ responses: Didactic Implications, Professional Development,

Teacher Attitude, and Teaching Practice. These scores represent the average of responses within each dimension, consistent with Pegalajar’s methodology [22], and were standardized to a 1–5 scale for analysis.

Additionally, the scores from the five ad hoc items assessing ICT usage during the pandemic were analyzed individually and collectively as an average, summarized as a mean (95% Confidence Interval). Comparative analysis by gender employed the two-sample Wilcoxon’s rank-sum test. The Kruskal–Wallis nonparametric test was used to evaluate differences based on age, the educational level taught, and the size of the municipality. When significant differences between groups were identified, pairwise comparisons were made using Bonferroni-adjusted Dunn’s test.

The significance level was established at $p < 0.05$. All statistical analyses were conducted using Stata 15.1 (StataCorp, College Station, TX, USA).

3. Results

Overall, teachers perceived that students with Special Educational Needs (SEN) and Specific Educational Support Needs (SNES) moderately possessed the ICT skills necessary for remote learning, scoring an average of 2.41 (95% CI = 2.27, 2.55) on a 1 to 5 scale. Similarly, during the COVID-19 pandemic, remote teaching was seen as only somewhat effective in enhancing the abilities of students with SEN and SNES, with an average score of 2.39 (95% CI = 2.25, 2.52). When asked if distance learning had enabled individualized care and guidance for these students, teachers gave moderate scores: 2.54 (95% CI = 2.4, 2.68). However, their perception of the institution’s preparedness, particularly regarding an efficient and specific platform for online teaching, was more positive: 3.03 (95% CI = 2.87, 3.19). A similar trend was observed in their views on the use of IT resources to encourage autonomous student work: 3.07 (95% CI = 2.92, 3.22). Generally, teachers felt competent in using ICT, with a self-perceived mastery of 3.33 (95% CI = 3.18, 3.48), indicating their confidence in adapting educational responses to the virtual needs of SEN and SNES students.

Teachers exhibited very positive attitudes toward using ICT for developing inclusive practices. The questionnaire revealed high scores across all four dimensions: Didactic Implications scored 3.9 (95% CI = 3.81, 4.00); Professional Development scored 4.36 (95% CI = 4.27, 4.44); Teaching Attitude scored 4.07 (95% CI = 3.97, 4.16); and Teaching Practice scored 3.85 (95% CI = 3.76, 3.93).

When analyzing responses based on age, younger teachers (23–39 years) perceived themselves as more proficient in the ICT skills necessary for adapting educational responses to SEN and SNES students compared to middle-aged (40–49 years) and older groups (50–68 years), as detailed in Table 2. They were also significantly more optimistic, particularly compared to the oldest age group, about how ICT facilitated autonomous work among students and had better attitudes regarding ICT’s didactic implications and impact on teaching attitudes. No other significant age-based differences were observed.

Table 2. Differences by age group.

	Age Group (Years)			Dunn’s Tests		1 vs. 2	1 vs. 3	2 vs. 3
	23 to 39 (n = 43)	40 to 49 (n = 61)	50 to 68 (n = 62)	χ^2	<i>p</i>			
Ad hoc items								
1. The students with SEN and SNES have sufficient IT skills. . .	2.4 (0.9)	2.5 (0.9)	2.3 (0.8)	0.34	0.84			
2. Remote care has allowed me to enhance the abilities. . .	2.4 (0.9)	2.3 (0.9)	2.4 (0.9)	0.64	0.72			
3. The distance learning situation for students with SEN and SNES. . .	2.6 (0.9)	2.5 (0.9)	2.5 (0.9)	0.07	0.96			

Table 2. Cont.

	Age Group (Years)			Dunn's Tests		1 vs. 2	1 vs. 3	2 vs. 3
	23 to 39 (n = 43)	40 to 49 (n = 61)	50 to 68 (n = 62)	χ^2	<i>p</i>			
4. The institution is prepared with an efficient and specific...	2.9 (1.1)	3.1 (1)	3.1 (1)	1.13	0.56			
5. The use of IT resources has favored the autonomous work...	3.4 (0.9)	3.0 (1)	2.9 (1)	5.59	0.06			
6. I master IT skills to adapt the educational response to the...	3.7 (1)	3.3 (0.9)	3.1 (1)	10.3	0.00 *			
Questionnaire factors								
F1. Implications on didactics	4.0 (0.7)	3.9 (0.7)	3.8 (0.5)	5.28	0.07 ***			
F2. Professional development	4.4 (0.7)	4.4 (0.5)	4.3 (0.5)	3.27	0.19 *			
F3. Teaching attitude	4.2 (0.6)	4.1 (0.6)	4.0 (0.6)	4.86	0.08 *			
F4. Teaching practice	3.8 (0.6)	3.9 (0.5)	3.8 (0.5)	1.79	0.40			

Note: Chi-squared and *p* values were calculated using Kruskal–Wallis test. Dunn's pairwise tests were Bonferroni-adjusted. * *p* < 0.05; *** *p* < 0.01.

Gender-based differences were also noted. Male teachers perceived greater benefits from remote teaching, with both male and female teachers showing average scores and a moderate effect size of the difference (*d* = 0.43). Compared to female teachers, male teachers had a more positive view of how ICT usage facilitated students' autonomous work (*d* = 0.79) and reported moderately higher confidence in their ICT competence levels (*d* = 0.44) (Table 3). Moderate differences were noted in Didactic Implications (*d* = 0.38) and Teaching Attitude (*d* = 0.43).

Table 3. Differences by gender.

	Gender		<i>z</i>	<i>p</i>	<i>d</i>
	Male (n = 49)	Female (n = 117)			
Ad hoc items					
1. The students with SEN and SNES have sufficient IT skills...	2.6 (1)	2.3 (0.8)	1.6	0.104	0.2
2. Remote care has allowed me to enhance the abilities...	2.7 (0.9)	2.3 (0.8)	2.4	0.014	0.4
3. The distance learning situation for students with SEN and SNES...	2.6 (1)	2.5 (0.9)	0.8	0.394	0.1
4. The institution is prepared with an efficient and specific...	3.2 (1.1)	2.9 (1)	1.4	0.157	0.2
5. The use of IT resources has favored the autonomous work...	3.6 (0.9)	2.9 (0.9)	4.1	<0.00	0.7
6. I master IT skills to adapt the educational response to the...	3.6 (1)	3.2 (1)	2.5	0.012	0.4
Questionnaire factors					
F1. Implications on didactics	4 (0.7)	3.8 (0.6)	2.2	0.025	0.3
F2. Professional development	4.4 (0.7)	4.4 (0.5)	0.6	0.535	0.1
F3. Teaching attitude	4.2 (0.7)	4 (0.6)	2.4	0.013	0.4
F4. Teaching practice	3.9 (0.7)	3.8 (0.5)	2.0	0.046	0.3

Note: *Z* and *p* values were calculated using Wilcoxon's rank-sum test. *d* = Cohen's *d*.

No statistically significant differences were found in the responses based on the educational level taught (Table 4) or the population size of the municipality (Table 5).

Table 4. Differences by educational level taught.

	Educational Level Taught						χ^2	<i>p</i>
	A (n = 13)	B (n = 24)	C (n = 23)	D (n = 28)	E (n = 67)	F (n = 11)		
Ad hoc items	2.1 (0.9)	2.6 (0.9)	2.3 (0.6)	2.4 (1)	2.4 (0.9)	2.7 (0.8)	4.87	0.432
1. The students with SEN and SNES have sufficient IT skills...	2.3 (0.9)	2.6 (0.9)	2.6 (0.8)	2.1 (1)	2.3 (0.9)	2.4 (0.5)	6.82	0.235
2. Remote care has allowed me to enhance the abilities...	2.3 (0.8)	2.7 (1)	2.6 (0.7)	2.5 (1.1)	2.5 (0.9)	2.6 (0.9)	2.36	0.797
3. The distance learning situation for students with SEN and SNES...	3.1 (1)	2.9 (1)	2.7 (0.8)	2.8 (1)	3.2 (1.1)	3.3 (1)	7.53	0.184
4. The institution is prepared with an efficient and specific...	2.8 (0.8)	3.2 (0.8)	3.2 (0.8)	3.4 (1)	2.9 (1.1)	2.9 (1)	6.76	0.239
5. The use of IT resources has favored the autonomous work...	3.3 (0.9)	3.2 (0.9)	3.1 (1.1)	3.3 (0.9)	3.5 (0.9)	3.3 (1.3)	3.28	0.657
6. I master IT skills to adapt the educational response to the...	3.9 (0.5)	4 (0.5)	3.9 (0.8)	4 (0.6)	3.8 (0.6)	3.9 (0.6)	2.69	0.748
Questionnaire factors	4.3 (0.5)	4.5 (0.5)	4.2 (0.8)	4.3 (0.5)	4.4 (0.5)	4.2 (0.6)	5.38	0.372
F1. Implications on didactics	4.2 (0.4)	4.2 (0.5)	4 (0.8)	4 (0.6)	4.1 (0.6)	3.9 (0.5)	3.52	0.621
F2. Professional development	3.9 (0.5)	3.9 (0.5)	3.8 (0.7)	3.9 (0.5)	3.8 (0.5)	4 (0.5)	2.82	0.727
F3. Teaching attitude								

Note: Chi-squared and *p* values were calculated using Kruskal–Wallis test. (A) Preschool; (B) primary education, first cycle; (C) primary education, second cycle; (D) primary education, third cycle; (E) secondary education; (F) vocational education.

Table 5. Differences by municipality population.

	Municipality Population			χ^2	<i>p</i>
	<30.000 (n = 51)	30,000–100.000 (n = 31)	>100.000 (n = 84)		
Ad hoc items					
1. The students with SEN and SNES have sufficient IT skills...		2.4 (0.9)	2.5 (0.8)	3.70	0.158
2. Remote care has allowed me to enhance the abilities...	2.3 (1)	2.5 (0.8)	2.3 (0.9)	1.29	0.526
3. The distance learning situation for students with SEN and SNES...	2.6 (0.9)	2.6 (0.9)	2.5 (0.9)	0.01	0.993
4. The institution is prepared with an efficient and specific...		3.1 (1.2)	3 (1)	0.12	0.944
5. The use of IT resources has favored the autonomous work...	3 (0.9)	3.1 (1)	3.2 (1)	2.43	0.296
6. I master IT skills to adapt the educational response to the...	2.9 (1)	3.5 (1.1)	3.3 (1)	2.13	0.345
Questionnaire factors					
F1. Implications on didactics	3.9 (0.5)	3.8 (0.4)	3.9 (0.7)	1.40	0.496
F2. Professional development	4.3 (0.5)	4.3 (0.4)	4.4 (0.6)	1.41	0.493
F3. Teaching attitude	4.1 (0.6)	4.1 (0.5)	4 (0.7)	0.07	0.964
F4. Teaching practice	3.8 (0.5)	3.9 (0.5)	3.8 (0.6)	0.29	0.867

Note: Chi-squared and *p* values were calculated using Kruskal–Wallis test.

4. Discussion

This study, conducted in the Canary Islands during the COVID-19 pandemic, offers critical insights into the use of Information and Communication Technologies (ICTs) in inclusive education, particularly for students with Special Educational Needs (SEN) and Specific Educational Support Needs (SNES). The moderate scores for teachers' perceptions

of students' ICT skills and the efficacy of remote teaching for SEN and SNES students highlight several significant areas for strategic focus and improvement.

One of the paramount revelations of this study is the pressing need for enhanced ICT training and resources tailored specifically for students with SEN and SNES. This training should encompass not just technical skills but also strategies for effective application in inclusive educational settings [48]. The findings stress the importance of continuous professional development for teachers in digital competencies, a necessity magnified by the rapid evolution of educational technology. Furthermore, the study reveals age-related disparities in perceived ICT proficiency among educators, suggesting the need for professional development programs that cater to digital familiarity and experience [3]. This approach is vital to ensuring that more experienced yet potentially less digitally savvy educators are not left behind in an increasingly digital educational landscape.

The gender differences observed in the study, with male teachers reporting greater benefits from remote teaching and higher self-perceived ICT competence compared to their female counterparts, point to a potential gender gap in digital confidence and skills. This finding suggests a need for gender-responsive training and support mechanisms to ensure equitable ICT competencies across all educators.

For educational institutions, these findings emphasize the need to provide platforms and resources that are not only technically adequate but also pedagogically effective. The relatively high scores in institutional preparedness and the facilitation of autonomous work through IT resources are encouraging. Yet, there is an evident need to ensure that these tools are accessible and adaptable to the diverse needs of learners, especially those with SEN and SNES.

The lack of significant differences in teachers' perceptions based on the educational level taught or municipality size indicates that the challenges and opportunities in using ICT for inclusive education are widespread across different teaching environments. This finding calls for a unified and inclusive approach at both regional and national levels to comprehensively address the integration of ICT into inclusive education [1,49].

Participants at all levels, including educational authorities, school administrators, and teacher-training institutions, must collaborate to create an ecosystem that supports the effective use of ICT in education [47]. This includes investing in infrastructure, providing ongoing training and professional development for teachers, and developing a core curriculum that integrates ICT in ways that enhance learning for all students, particularly those with SEN and SNES.

Moreover, the study points to the essential role of considering the socio-demographic context in the implementation of ICT in education. The uniformity in challenges and opportunities across various teaching environments in the Canary Islands suggests that any strategy developed should be adaptable and flexible, capable of addressing the specific needs of different regions and communities.

5. Conclusions

This study offers a global view of the current state of ICT integration into inclusive education in the Canary Islands during the COVID-19 pandemic. The results highlight the need to plan interventions that allow us to respond appropriately to situations such as the one experienced. Furthermore, the need to improve the development of ICT skills, both for teachers and students, is evident. Moderate ratings for teachers' perceptions of students' ICT competencies and the effectiveness of distance learning methods for SEN and SNES students are indicators of the need for improvements in these areas. The requirements not evident until the moment we suffered confinement, being forced to stay at home, represented not only a challenge for the student but a real limitation to learning in alternative contexts such as virtual learning.

This study also shows the need for specific training in ICT skills and resources within the processes of the continuous professional development of teachers who tutor students with SEN and SNES. The differences observed between teachers according to their age

and gender highlight the importance of developing the ICT training and competence of the entire group of teachers and the mastery of strategies and resources to respond appropriately to their needs and the increasingly diverse needs of their students. This training must not only be given in graduate courses that train future teachers but also be implemented and reinforced throughout their professional lives.

Future research must establish longitudinal studies to be able to evaluate the real scope of measures adopted during the pandemic and must focus on resources and strategies based on the use of ICTs, which are still currently implemented to respond to the needs of these students in a post-pandemic scenario like the current one.

Comparisons like these would give us clues to assess the effectiveness and real scale of the measures taken during the pandemic and would help discover areas of institutional improvement regarding interventions with students with SEN and SNES.

Moreover, conducting studies to understand the specific requirements and challenges of diverse population groups (including students with Special Educational Needs and students without these needs across various contexts, such as rural, urban, and international settings) is imperative to accurately evaluate the impact of the ongoing digital transformation progress that is being made.

If, as an educational community, we can address the challenges we face after the experience of the pandemic, we can lay the foundations for a more inclusive and, above all, more effective educational system in the new digital era. The perspective advanced by this study offers an opportunity to consolidate the efforts of the entire educational community and steer the debate toward solutions for addressing student diversity in the innovation and collaboration of the educational community, fostering a more equitable and accessible educational future.

6. Study Limitations and Future Research Directions

6.1. Study Limitations

This study, which focused on the context of the Canary Islands during the COVID-19 pandemic, has some limitations. The uniqueness that could be implied by the fact that the study was carried out in a specific region (Canary Islands) could not reflect the diversity and circumstances of other Spanish regions or communities, which could condition the scope and generalization of our findings.

The use of evaluation tests based on self-reports of teachers' ICT competencies introduces a subjective element that can lead to bias in the results. It is important to consider that the exceptional circumstances of the pandemic could have affected the perceptions and experiences of each of the groups that participated in this study, limiting the generalization of the results to non-pandemic contexts.

6.2. Future Research Directions

We will explore how ICT influences inclusive education beyond the pandemic, expanding the research to different contexts. Longitudinal studies will help us understand the evolution of ICT skills. It is essential to objectively evaluate these skills and their impacts on the learning of students, especially those with special needs. Investigating the psychosocial factors behind the adoption of educational technologies will guide us toward more inclusive practices.

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Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due for privacy reasons and are available from the corresponding author upon reasonable request.

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