Opinions of Special Educators and Special Therapists on the Use of Information and Communication Technologies (ICT) in Learning Social Skills in Students on the Autism Spectrum

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Abstract

The present study aims to explore the views of special educators, speech therapists and special education psychologists on the use of Information and Communication Technologies (ICT) in learning social skills in students with autism spectrum disorders. More specifically, it is studied how the use of ICT can help and enhance the social skills of these children and what barriers may be created. The research methodology used is qualitative and the data collection tool is semi-structured interviews. The sample consists of sixteen participants, of which six are special educators, six speech therapists and four psychologists. The findings of the present study highlighted the positive attitude of all participants towards the use of ICT in the social skills of students with autism. Although the participants are classified into three different branches of special education, they presented many common answers and views on the subject. The majority of participants stressed the importance of ICT in teaching as they had the ability to provide students with autism with a variety of stimuli.

Subject Areas

Special Education

Keywords

Information and Communication Technologies (ICT), Autism Spectrum, Special Education Teachers, Learning Social Skills

1. Introduction

In other words, social skills, verbal and non-verbal communication skills and social interaction are one of the areas where people belonging to the autism spectrum have a higher degree of difficulty. For this reason, a set of specialized intervention measures is required to alleviate these difficulties, which helps the child to integrate [1]. The term ICT refers to the technology which allows the transmission and processing of information in a variety of ways (software, images, audio, video, etc.) [2]. So by linking ICT to the specialized interventions for people with autism, the results observed by the science industry are remarkable.

According to previous research, there is a strong need for knowing how feasible and effective it is to use ICT in the process of learning social skills of children on the autism spectrum. In addition, there is a debate about whether teachers and therapists are willing to use these tools and whether they help them in teaching. Research indicates that many technological tools are not provided to educational organizations, which hinders the integration of ICT in their work [3]. According to research by Grunberg and Summers [4], it is argued that external factors, including technological means, influence the educational process and bring positive results.

The benefits of this research will help both the educators and therapists involved in special education and the parents of people with autism spectrum disorders who seek solutions to facilitate and interact in their daily lives to raise these children. This study aims to investigate the views of special educators and specialist therapists on the use of ICT in teaching social skills to children with autism spectrum disorders. The main purpose of this research, then, is to study how the use of ICT can help or even hinder the development of social skills in students belonging to the autism spectrum.

The research questions that the researcher will try to answer reliably are the following:

➢ What are the views of special educators on the use of ICT in learning the social skills of children with autism spectrum disorders?
➢ What are the views of special education therapists on the use of ICT in learning the social skills of children with autism spectrum disorders?
➢ What are the views of special educators on ICT training opportunities and documentation of their qualifications?
➢ What are the views of special therapists on ICT training opportunities and documentation of their qualifications?
➢ Are there factors that appear to negatively or positively affect the successful integration of ICT in the teaching of learning social skills to children with autism spectrum disorders?

The topic chosen for the research is an important part of improving the education of children with autism and especially, of the social skills which are the area where the most difficulties are presented. In fact, observing the literature and similar research that has been conducted shows the need and importance of

offering ICT in the education of these children [5] [6] [7] [8] [9]. The present study concerns both special educators and special education therapists and more specifically, speech therapists and psychologists. This interdisciplinary approach enriches the existing bibliography. Especially in the field of therapists, there is no reference to their own field in the research presented in the literature review.

The structure of the research is initially based on the literature review, which explains the important concepts that concern the study such as autism, the field of social skills in people with autism and information and communication technologies. Also, various researches that have dealt with a similar issue are presented. This is followed by the chapter with the analysis of the qualitative methodology and the tool of the present research which is the semi-structured interview. In addition, the ethical issues, the research ethics and how the researcher adapted these principles to her study are presented. In the next chapter, the general conclusions are formulated.

2. Theoretical Framework

Autism is a developmental disorder that significantly affects social behavior, emotional behavior as well as verbal and non-verbal communication. It is analyzed as a spectrum of disorders, since there is great variability in the severity and types of deficits that each person manifests. Autism is characterized by difficulties in social communication and interaction and by repetitive patterns of behavior, activities, or interests [10]. In addition, autism is characterized as a neuropsychiatric developmental disorder that alters the way information is processed in the brain. Autism is a congenital disorder but the clinical symptoms become apparent after the age of 1.5 - 2 years. Therefore, it is a chronic neuropsychiatric condition that affects the individual's perception of himself and the world [11].

Wing [12] identified the three main characteristics of people with autism. The first area that these people face problems is in communication. More specifically, there is a delay or absence of language skills, lack of playing skills and difficulties in starting and maintaining conversation. Another area mentioned by Wing is the limited and/or repetitive stereotypical behaviors of people with autism. More specifically, their behaviors are characterized by intense and lasting interest in a particular object or topic or activity. The third area refers to the disorders of social interaction which show a lack of verbal and non-verbal behaviors as well as an absence of emotional reciprocity.

Some additional characteristics, according to Genna [13], of people belonging to the autism spectrum are language deficiency since many cases of children, especially in severe forms of autism, fail to acquire complete speech. In addition, the absence of eye contact and sensory problems (hearing, visual and tactile) are characterized as the main symptoms from infancy. Obsessive and stereotypical behaviors are considered important as well as in some cases the aggressive and/or self-destructive manifestations of children with autism in any changes of

daily life or in intense emotional conditions. In addition, peculiarities in relation to objects, eloquence in the use of speech and the lack of development of symbolic thoughts hinder the development of cognitive skills of children belonging to the autism spectrum [13].

At this point more emphasis will be placed on the social skills of children with autism spectrum disorders as this area is the focus of this research study. More specifically, in this area children with autism present serious difficulties in managing their social relationships, in understanding emotions, in interacting with those around them and in perceiving both verbal and non-verbal communication. The consequences, therefore, on the social skills of people with autism are diffuse and are based on how each person processes and experiences stimuli [14]. According to the ICD-10 diagnostic criteria [14] qualitative attenuation in the mutual social interaction of people with autism is a key criterion.

Social skills consist of some basic characteristics, one of them is closeness, *i.e.* the ability of the individual to be close to others. In this case, children with autism spectrum disorders face difficulties as they do not tolerate physical contact. In addition, the quality of social interactions of people with autism is a significant difficulty as there is a lack of their ability to share attention. More specifically, these individuals find it difficult to grasp the conceptual perspective of the other, that is, what the other knows or understands and perceives. An important area in which people with autism spectrum disorders have deficits in terms of social skills is that of emotional sharing, *i.e.* empathy or emotional involvement [15].

Despite the great involvement of the scientific community with the phenomenon of autism, the causes remain unknown. However, after several researches, some criteria were presented, where they state that autism comes from a biological, organic dysfunction and is a neurological disorder that concerns the function of the brain. The causes of autism are investigated in genetic, biochemical, environmental factors and problems during pregnancy or childbirth. In conclusion, autism cannot be attributed exclusively to a specific factor, since there are indications in all areas studied to date by science [16].

Another term studied in the present study is Information and Communication Technologies (ICT). Technology has become essential in human activity both as a means of entertainment and as a means of professional convenience. ICT is defined as the technologies that provide the processing and transmission of information which can be in various forms such as symbols, images, sounds, videos as well as all devices and applications that transfer information such as TV, telephone, computer, satellite communication systems etc. [2].

Information and communication technologies are characterized as one of the most powerful tools in the daily life of both the teacher and the student to support the educational process. The pedagogical utilization of ICT contributes substantially to the learning process, since each student is involved in processes that he directs according to his needs, capabilities and their learning profile [17]. According to the European Organization for Special Education [18] ICT contri-

butes to a number of functions in its field. More specifically, they can be used as a tool for teaching and learning to children with disabilities. Also, the use of ICT in the field of communication can help significantly, especially in students who face socialization problems such as children with autism spectrum disorders. In addition, ICT services can assist in the treatment and diagnostic process with the multiple software available.

In recent years the use of technology has become a key support tool for cultivating skills for children with autism spectrum disorders. Assistive technology is defined as "*an electrical appliance, application, or virtual network used to enhance, maintain, and/or improve the daily living, work/productivity, and leisure/leisure skills of adolescents with Autism Spectrum Disorders*" [19]. According to research [20] the use of information and communication technology by people with autism spectrum disorders has brought positive results since their proper use helps in all areas where these people face difficulties.

Over the last decade, many studies have been conducted related to teachers' attitudes towards the use of information and communication technologies in students with autism spectrum disorders. More specifically, Riala [21] presented a research study in which she explored the views of Special Educators regarding the cultivation of emotions in children with autism, through technology. Based on the quantitative research methodology and the use of a questionnaire, she collected data from one hundred and six primary and secondary, special and general education teachers. The findings of this study are, on the one hand, the positive attitude of teachers towards the use of technology in teaching emotions to children with autism. On the other hand, teachers describe obstacles to practical application such as insufficient classroom equipment and lack of access to technological tools.

Another study conducted by Rossiou [8] studied "the views of special education teachers on the possibility of developing social skills and empathy in children with autism using a robotic tool." The sample of the study consisted of ten primary school teachers who had experience with students with autism. The research methodology used was qualitative as the researcher divided the teachers into focus groups. The data collection tool was the open discussion but before that a presentation on the topic was given to the participants. In conclusion, the teachers expressed positive impressions and considered it possible to develop social skills using a robotic tool in children with autism. On the contrary, they mentioned that the interventions in autistic children are better done directly by the special educator/therapist because, in this way, they help in the socialization of the child, therefore, something like this can negatively affect this process.

In addition, Economopoulou [5] conducted a study related to the views of special education teachers on the use of technology as a learning tool in children with autism. The researcher used the qualitative research for the collection and her sample consisted of fifteen special education teachers. Therefore, through the interviews, the researcher concluded that the use of technology contributes positively and enhances the education of people with autism as it helps them in

the social, cognitive and communication fields. However, the results of the research highlighted various difficulties such as lack of staff training and lack of infrastructure, materials and software.

In the study of Georgaki [6] the attitudes of one hundred and six teachers of Special Education of primary education regarding the use of ICT to support students with autism were investigated. At the same time, she compared the results with the views of ninety-eight General Education teachers on the same subject. The researcher used the quantitative research methodology and the tool she used to collect information was the questionnaire. The results of the research showed that both general and special education teachers use ICT in the teaching process. However, it was observed that gender, years of service and computer skills greatly affect the results.

Researcher Giolda [7] used the methodology of systematic literature review which is based on the model of Barbara Kitchenham. More specifically, this research attempted the systematic evaluation of 12 studies related to the development of social skills of children with autism spectrum disorders using ICT and in particular with robotic tools. From the analysis of the data it was concluded that the effect of robotic tools has a positive effect on the improvement of social skills. However, the researcher observed that in most studies the study and reference to whether students have the ability to generalize social skills after interventions with robotic tools was omitted. Another researcher who used the methodology of systematic literature review is Stefani [22]. Her research concerned the use of ICT for the development of communication, social and professional skills of people with autism spectrum disorders. The results of the research highlighted the significant use and assistance of ICT in the learning process of these individuals.

In addition, Moutogli [23] investigated the use of ICT in teaching mathematical skills to a student belonging to the autism spectrum. The research methodology was mixed, and the tools she used to collect the qualitative data were the systematic observation throughout and after the special didactic intervention and the interviews with teachers. In addition, it provided questionnaires to students and teachers to collect quantitative information. Its sample concerned students and teachers of both general and special education as it focused on the inclusion of a student with autism with the support of ICT. The results were mixed as there were intense difficulties. However, the researcher reported that there were significant improvements in both the student's math skills and the social ones.

Another research that concerns the development of social skills of students with autism is that of Emmanouilidou [24]. In more detail, it examined the combination of teaching social stories with the use of ICT and specifically the tablet. The methodology of her research was qualitative and the tool was the systematic observation after the specialized intervention that was done with the use of the tablet. Also, the sample concerned two primary school students with autism with high functionality. This study showed positive results regarding the use

of the tablet for teaching social stories. In fact, both participants showed an increase in the use of social skills in their environment.

The above research comes to almost similar conclusions since the results refer to the positive attitude of teachers to the use of ICT in the learning process of people with autism either in the social field or in the emotional or cognitive field. The results of the research are mainly the lack of training of teachers and the non-existent structures and the lack of materials and software.

The present research study is an important research phenomenon since the social skills of people with autism spectrum disorders are one of the main characteristic deficits. At the same time, ICT has been integrated into everyday life and is a multifactorial and useful tool. It is therefore important to consider whether ICT can help people on the autism spectrum, especially in the area of social skills. In addition, the bibliographic gap that the current research tries to fill is the opinions of therapists and more specifically of speech therapists and special education psychologists in comparison with the special educators but also with findings of similar researches.

3. Research Methodology

Educational research is a process in which some basic steps are followed in order to collect and analyze data. This results in an understanding of an issue or issue. This process brings many benefits to both teachers and the scientific community [25]. In the present study the research methodology used is qualitative research. According to Latinopoulos [26], qualitative research is any kind of research that is mainly related to the perception of phenomena, events and situations. This method is characterized by the subjective perceptions, experiences and beliefs of specific individuals regarding an event. This results in a deeper and holistic interpretation of the research phenomenon. More analytically, the qualitative method differs as a methodology because it aims at the verbal analysis of the data and emphasizes the flexible design and the personal experience of the participants. Each individual experience of the research sample is important for the collection of information. At the same time, the qualitative method bases research on the historical, interpersonal, social and political context that differs and varies from research to research, with the result that the understanding of the phenomenon is more effective. This research methodology cannot be generalized, since its main element is subjectivity in the description of events [27].

The qualitative method was chosen by the researcher because no mathematical logic is used at all, but it records the exact words and events as narrated by the participants [28]. This research methodology helped the researcher to understand in depth the environment, feelings and motivations of the participants according to the phenomenon being researched [27].

The tool used for data collection is the interview which is one of the main tools of the quality method. It is the communication and interaction between the researcher and participants that is mainly directed by the researcher in order to

extract information about the research phenomenon. More specifically, the definition of an interview is dialogue between at least two people [29]. According to Woods [30], the interview "is the only way to approach people's perceptions, but at the same time a way to cause situations to happen and move the flow of data". The types of interview are three (3), fully structured, semi-structured and unstructured. In this research proposal the semi-structured interview will be used which will consist of 18 questions (See Appendix). This research tool was chosen by the researcher because there is more flexibility in the structure of the questions so that it can draw more information more easily. In addition, it is possible to select any question that the researcher deems necessary to continue the dialogue with the participant, without being limited to a specific order that should be followed. Also, the researcher has the opportunity to ask additional questions, which are not scheduled to be asked, in order to clarify some information [27].

The tool of the respective research must be reliable but at the same time valid. The validity of methodology tools is related to accuracy and clarity and is a key principle to ensure their reliability [31]. The research tools for conducting the present research were drawn from the existing literature. Indicatively, it should be noted that for the present interview questions the research studies of Economopoulos [5] and Georgaki [6] were utilized. As a result, the ratios of the validity and reliability of the tools have increased, since they have already been checked. All personal data collected from the interviews were used solely for the purpose of conducting the investigation and were not disclosed to other individuals.

The sample of the present work consists of six (6) special pedagogues, six (6) special education psychologists and six (6) speech therapists. However, there was difficulty in finding psychologists due to the pandemic—COVID 19 that Greece is in at the moment, resulting in a discrepancy in the participation of psychologists, where in the end it was four (4) instead of six (6). The sample, therefore, consists of sixteen (16) participants, where two (2) of them are men and the rest are women. All participants are employed in the special education sector and have attended postgraduate studies or training. The years of previous service related to special education range from 2 to 12 years and all participants have worked with children belonging to the autism spectrum.

Based on the qualitative research methodology, the researcher relies on two necessary rules for sampling, those of suitability and adequacy. In particular, the sample must be sufficient for the correct provision of quality data and be suitable for their interpretation. This method of sampling is characterized as a sample of expediency, *i.e.*, the researcher does not randomly select the participants but, selects those that he/she considers to be most important for the specific research [32]. Therefore, the researcher in the present study will use expediency sampling because it was considered appropriate to select specific individuals with the necessary knowledge and characteristics that will give more complete and in-depth answers to the research topic. The conditions that the sample meets are the special educators, psychologists and speech therapists to have at least one (1) year of

professional experience in the field of special education. Also, the special educators who took part in the research have either a basic degree in special education or some specialization in the field of special education. More specifically, the research may involve a general education teacher who has attended either certified special education seminars or has completed postgraduate studies. The researcher selected the sample for the study from her environment and from the treatment center where she conducts her internship.

The present research process started on February 10, 2021 and ended on March 10, 2021. The first contact with the participants and the interviews were made through internet communication platforms. Regarding the analysis of the results, the method of thematic analysis was chosen by the researcher. According to Clarke and Braun [33] the analysis is based on six basic steps. First, the researcher should be familiar with the data and then, codify the answers of the participants. At this stage codes were generated based on the data collected which helped to categorize the responses. Then, based on the above, larger thematic units were created in the answers of the participants. These topics are then re-examined and renamed. In this process the researcher identifies the essence of each topic and creates a short title for each topic. Finally, the data is reported and the findings are written, where with the help of the thematic units that have been created, a presentation is made in a logical order and the results are connected.

Triangulation is also considered important in a research, which is a technique used in research studies with the main goal of their validity and reliability. This technique is a mix of many methods in the study of a phenomenon. In addition, the method of triangulation provides a deeper and broader understanding of the research phenomenon through the multiple methods, sources and theories that the researcher combines [34]. The percentage of validity and reliability in the present research study increased with triangulation, since the interviews were conducted from three different specialties related to the phenomenon under investigation [35] [36].

4. Ethics

Ethics is a basic principle that must be strictly adhered to when conducting any research or study. Failure to comply with this basic condition by the researcher himself/herself can lead to serious complications in the study he/she is conducting as this research will not work properly. The researcher should be clear and honest with the participants, thus ruling out the possibility of deception [37]. All of the above will be achieved only if there is: trust between the researcher and the people who contribute to the research, ensuring the anonymity of the participants and respect for human rights, as well as the conscious consent of these people [38].

The researcher attracted each participant in person, initially by telephone. This oral communication was done to inform the participants about the content

of the research and what exactly they are called to do. Every researcher is obliged to keep the people involved in this research process informed about how much time will be spent, for the purpose as well as the benefits of the research, for the anonymity and confidentiality of the data [39]. Participants also have the right to withdraw from the survey at any time. For these purposes, a consent form was given at the beginning of the survey which secured the consent of the survey participants. In addition, an information letter was given which informed the participants about the necessary information. These documents fully informed the participants about the purpose and the course followed during the export of the research. The data obtained from the conduct of the research were digitized, transferred to a locked electronic file and the manuscripts were destroyed. To ensure the anonymity of the participants, their real names and no personal information were used [37]. Each of the participants has a code name, for example: "special educator 1", "special educator 2", "psychologist 1", "psychologist 2", "speech therapist 1", "speech therapist 2".

All the above moves were made with the main goal of emphasizing the human rights and anonymity of the participants, since the information is strictly confidential and their use was made exclusively for the conduct of the investigation. Having established all the above valves ensures that there will be no possibility of damage, danger or deception of the participants in the present research study [40].

5. Results

The Ministry of Education and Religions is the body for the special education and training of people with disabilities. This body therefore states that in order to achieve the goals, the implementation of individualized programs for these students must be carried out using various strategies and new technologies by teachers and therapists [41]. The main purpose of using ICT is not to replace the physical presence of teachers but to help and strengthen their work. ICT and all its tools offer opportunities and educational opportunities to children and especially to children with autism who are entitled to an equal place in the classroom [42].

There are a total of sixteen participants, of which six are special educators, six are speech therapists and four are psychologists. More specifically, all six educators have a master's degree in special education, five of them have an initial degree in primary education and one is a philologist. Of these, one is a man and the other five are women and their length of service is about 5 to 12 years. In addition, all speech therapists were women with a basic degree in speech therapy and postgraduate training and special education seminars. Only one of the speech therapists has postgraduate studies in ICT teaching to students with autism spectrum disorders. Their previous service is from 2 to 7 years. Finally, the psychologists who participated in the research were three women and one man, all of whom had a basic degree in psychology and postgraduate studies in special

education. Three of them have 11 to 13 years of experience and one has 2 years. Also, one of the psychologists is certified in sign language.

The method used by the researcher to analyze the results is thematic analysis. According to Brain and Clarke [43] there are some basic steps that were followed to correctly extract the findings.

According to the results of the present study, the opinion of special educators, speech therapists and special education psychologists regarding the use of ICT in learning social skills in children belonging to the autism spectrum, seems to be particularly positive. The answers given and presented below are important, as they relate to the first and second research question of this study. More specifically, all special educators use ICT to enhance social skills in students with autism and the majority consider them as one of the key tools for teaching.

However, despite their positive attitude, speech therapists do not consider that they can be the main tool for learning social skills because they do not have the appropriate infrastructure and knowledge.

Regarding the answers of the participants about the frequency of using ICT and their inclusion in the daily program, it turns out that both 6 (six) teachers and 6 (six) speech therapists apply them almost daily or even most days of the week.

On the other hand, psychologists said that the use of ICT is liberating, it helps, in the preparation of teaching material and activities for the strengthening of the social. However, two out of four do not consider it a basic learning tool but use it in addition to traditional methods. The same two said that they do not use ICT often and this has the effect of being limited either to the preparation of teaching material or to the projection of video-social history, so that students can see examples of reactions. Only the other two stood in favor of ICT using it as a key tool in the private sector.

Looking at other research conducted on a similar subject the results seem to be similar. According to Bauminger, Gal, Goren-Bar [20] and the results of Economopoulou's research [5] it seems that the views of special educators close with the findings of the present study as they also argue that ICT can be the main tool in teaching students with autism. Also, according to the study of Georgaki [6] the special educators who participated in the research showed a positive attitude towards the use of ICT and the majority stated that the technological means respond to the interests of students with autism. In addition, in the study of Georgaki [6] the participants stated frequent use of ICT, a fact that was highlighted in the present study. In addition, comparing the results of the research of Georgaki [6] and Economopoulou [5] with the present research, it seems that the participants emphasized the use of ICT in the preparation of teaching and how much it serves and helps them. It seems that the therapists participating in the present study have several common views both with the present participating special educators and with the respondents of the other similar studies mentioned above.

The following results address the third and fourth research question of the present study. More specifically, they concern the skills of special educators, speech therapists and psychologists for the use of ICT in teaching children with autism both on a personal level and their views on their colleagues are closing. All participants report that both they and their colleagues have the ability to use ICT empirically, without any specific training aimed at autism and general educational needs in general. Most of them have a general computer certification (ECDL) certification. In addition, the participants mentioned the negligible opportunities for their training and education by the State in this area.

It is worth noting that the majority in Econopoulou's [5] research expressed similar views on ICT skills, few reported attending ICT seminars and training for students with autism.

Of course, three of the special education teachers report that there is interest and mobilization for ICT training but not specifically for autism, in contrast to the others who claim that there is no active interest for further training. This seems to be supported by the participants in the research Georgaki [6], Golda [7] and Riala [21]. It should be noted that of all the participants, only one speech therapist said that he has completed postgraduate studies, training seminars and that he collaborates with similarly trained therapists as he has his own center that deals exclusively with people belonging to the autism spectrum.

The views of psychologists do not differ from the views of other respondents. Neither in their own field there is sufficient training and care from the state (apart from some seminars mainly from private bodies) while, all rely on their experience either through the relevant literature or from the various incidents. In terms of equipment it exists but it is limited while the development of special software is far behind.

The last research question of the study concerns the benefits but also the obstacles and difficulties that the use of ICT can bring in the teaching of social skills to students with autism. The special education teachers who participated in the present study enumerated several benefits of ICT in terms of students with autism and the development of their social skills. It is worth mentioning that all 6 (six) participants presented as a significant benefit of ICT the diversity they provide. That is, they are given the ability to use audiovisual material and even the student's interaction with them. The respondents in the studies of Economopoulou [5] and Stefani [22] seem to agree with this view, where they presented as the main advantage of ICT the provision and the possibility of using various materials and stimuli. However, while all presented common benefits, each specialist educator in the present study showed a distinct benefit.

The six speech therapists, who use ICT as an alternative method of communication and treatment, come to agree with them as they respond to a large extent to the interests and peculiarities of children with autism. In fact, speech therapists have demonstrated the benefits of ICT in terms of social skills with daily goals set according to the child's profile.

Cultivating empathy, practicing memory, understanding abstract concepts

and creating an alternative collaboration with the therapist are some of the benefits that psychologists have shown to result from the use of ICTs as they put students in a multitasking process.

Despite the benefits mentioned, the participants were asked to respond and present the negative effects that the use of ICT can bring to students with autism in terms of developing their social skills. In their view, the risk of children with autism becoming addicted to ICT is high as everyone has highlighted the obsessive tendencies of these children. In addition, twelve of the participants stressed that there are chances that the student will rest in the security of the virtual world and will find it difficult to integrate what he learns in real life. As social skills alone are very difficult to develop, ICT overdose can create barriers to their development, said some educators.

To the negative characteristics of ICT are added some obstacles and difficulties. Initially, as far as children with autism are concerned, they find it difficult to understand the usefulness of ICT in the learning process and take it as a game, as well as do not understand that the medium they use is fragile and there is a risk of destruction. However, one speech therapist pointed out that because so far he has worked with children with high functionality he has not encountered any difficulty.

Of course, the most important obstacle mentioned is the attachment, the difficulty of concentration as well as the sensory problems that characterize children with ASD. This is confirmed by the research of Riala [21] which concerns the development of emotions of children with autism using ICT where the majority presented the above as key obstacles.

A speech therapist and a specialist educator presented another obstacle, which seems to be the student's family environment where either the parents have a negative attitude towards the use of ICT or they have a lack of knowledge about it and the student is unfamiliar.

In Economopoulou's research [5], the participating special educators also referred to the lack of cooperation with the general education teacher and how the use of ICT is affected and reduced. This can be seen from the present research where one of the respondents who works as a parallel support pointed out that obstacles are created in the general classroom by both the other students and the general teacher.

Turning now to the negatives, the views of psychologists coincided with those of special educators and speech therapists, namely the addiction to the virtual world and the difficulty of integrating into reality, the wrong and irrational use by parents and teachers. They also mentioned obstacles such as the child's resistance to something new, especially if the student is not aware of the use of ICT, as a result of which the goal is lost. Still, the therapist's lack of knowledge and inadequate technological means complicate the process.

6. Conclusions

The analysis of the qualitative research data, as shown above, showed that both

pedagogues and speech therapists and special education psychologists are positive about the use of ICT in learning social skills in students belonging to the autism spectrum, but stressed several difficulties and obstacles. Participants considered ICT a useful and reliable tool for teaching, however, most argued that especially for social skills the use of ICT should be combined with experiential activities, otherwise the goals would not be completely successful.

Participants also referred to limited public and private support, as well as financial, educational and cooperative support. More specifically, the respondents presented the lack of training in ICT and in particular in autism, as well as the insufficient equipment both in the public body and in the private centers as the main obstacles. In fact, this is confirmed by most of the bibliographic research in both qualitative and quantitative research; especially the special educators pointed out the insufficient equipment and the lack of training in this field [5] [6] [7] [8]. In conclusion, the attitudes and views of special educators, speech therapists and psychologists towards the use of ICT in learning social skills and the benefits created for students with autism are particularly encouraging and optimistic.

Students with autism spectrum disorders appear to be interested in and enjoy the use of ICT in the learning process, as all participants agreed that technology tools and software meet the majority of these children. In addition, despite the different specialties of the participants, common benefits and negative effects that the use of ICT could have on the learning of social skills were identified [44] [45].

In summarizing, with the results of the research but also with the data of the literature, it is understood that with the correct use, with the appropriate materials and infrastructures as well as with the necessary training of the special educators and therapists, the use of ICT helps and enhances the social development of the child with autism spectrum disorders.

The present study concerns the design of a study that aims to investigate the views of special educators and therapists on the use of ICT in learning social skills in children belonging to the autism spectrum. However, the research was limited to a small sample size. This prevents the generalization of data to the general population of special education. For this reason, it would be necessary for the sample to be larger in future research, so that the results are varied. In other words, it would be important to use quantitative or even qualitative research but to have various variables and conditions that the sample should meet. An example is the age of the participants which plays an important role in the use of ICT in the learning process. In addition, the situation the country is currently experiencing with the COVID-19 pandemic has made it difficult to conduct research both to find participants and to conduct interviews. It is worth noting that a suggestion for future research is family collaboration and how they could be involved in the learning process using ICT. Besides, it appears from the literature review as well as from the findings of the present study the necessity for cooperation of parents and teachers, and therapists for the perfect education

of students with autism [46].

This research study aimed to explore the views of special educators and therapists regarding the use of ICT in the process of learning social skills in children belonging to the autism spectrum. The goal was achieved to a large extent since the results of the research presented cover the range of research questions that had been asked. The projection and comparison of the views of special educators and special education therapists on this subject is an important contribution to the literature.

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Conflicts of Interest

The author declares no conflicts of interest.

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Appendix A: Interview Questions for Special Educators

1) Would you please tell me what your academic studies are?

2) How many years have you been a special educator?

3) Have you worked with children on the autism spectrum? And more specifically, have you dealt with the social skills of these children?

4) What is your opinion as a special educator on the use of ICT in general in the education of children with autism in the field of social skills?

5) Is ICT used in the process of learning social skills? If so, how is it included and how often is it included in the daily schedule?

6) Could you tell me some of the goals that have been achieved through the use of ICT in terms of enhancing social skills in students with autism?

7) Is ICT considered to enhance or not enhance the development of social skills in students with autism in relation to traditional teaching?

8) Is it considered that ICT can be the main tool in teaching social skills to students on the autism spectrum?

9) Are special education teachers considered to have the skills to use ICT? And if so, are they certified?

10) Have you attended an ICT training program? If so, which one?

11) Do you receive adequate support and training in the use of ICT by government agencies?

12) Are there any difficulties regarding the use of ICT during the training? If so, which ones? Are you considered able to deal with them?

13) Have you noticed if there is interest and mobilization from your colleagues for their further education in ICT for students with autism?

14) Is it considered that there is the appropriate equipment for the utilization of ICT in the context in which you work or in other contexts in which you have worked? If not, what do you think should exist?

15) Have you encountered obstacles in using ICT to develop social skills? If so, what were those obstacles?

16) Is the use of ICT in learning social skills considered to meet the interests of students with autism?

17) Is the use of ICT, in terms of enhancing the social skills of children with autism, believed to have benefits? And if so, what are they?

18) Is the use of ICT, in terms of enhancing the social skills of children with autism, believed to have negative effects? And if so, what are they?

Appendix B: Interview Questions for Special Education Psychologists

1) Would you please tell me what your academic studies are?

2) How many years have you been a psychologist in the field of special education?

3) Have you worked with children on the autism spectrum? And more specifically, have you dealt with the social skills of these children?

4) What is your opinion as a special education psychologist on the use of ICT in general in the education of children with autism?

5) Is ICT used in the process of learning social skills? If so, how is it included and how often is it included in the daily schedule?

6) Could you tell me some of the goals that have been achieved through the use of ICT in terms of enhancing social skills in students with autism?

7) Is ICT considered or not to enhance the development of social skills in students with autism in relation to traditional teaching?

8) Is it considered that ICT can be the main tool in teaching social skills to students on the autism spectrum?

9) Are special education psychologists considered to have the skills to use ICT? And if so, are they certified?

10) Have you attended an ICT training program? If so, which one?

11) Do you receive adequate support and training in the use of ICT by government agencies?

12) Are there any difficulties regarding the use of ICT during the training? If so, which ones? Are you considered able to deal with them?

13) Have you noticed if there is interest and mobilization from your colleagues for their further education in ICT for students with autism?

14) Is it considered that there is the appropriate equipment for the utilization of ICT in the context in which you work or in other contexts in which you have worked? If not, what do you think should exist?

15) Have you encountered obstacles in using ICT to develop social skills? If so, what were those obstacles?

16) Is the use of ICT in learning social skills considered to meet the interests of students with autism?

17) Is the use of ICT, in terms of enhancing the social skills of children with autism, believed to have benefits? And if so, what are they?

18) It is believed that the use of ICT, in terms of strengthening societies skills of children with autism, creates negative effects? And if so, what are they?

Appendix C: Interview Questions for Speech Therapists

1) Would you please tell me what your academic studies are?

2) How many years have you been a speech therapist?

3) Have you worked with children on the autism spectrum? And more specifically, have you dealt with the social skills of these children?

4) What is your opinion as a speech therapist about the use of ICT in general in the education of children with autism?

5) Is ICT used in the process of learning social skills? If so, how is it included and how often is it included in the daily schedule?

6) Could you tell me some of the goals that have been achieved through the use of ICT in terms of enhancing social skills in students with autism?

7) Is ICT considered to enhance or not enhance the development of social skills in students with autism in relation to traditional teaching?

8) Is it considered that ICT can be the main tool in teaching social skills to students on the autism spectrum?

9) Are speech therapists considered to have the skills to use ICT? And if so, are they certified?

10) Have you attended an ICT training program? If so, which one?

11) Do you receive adequate support and training in the use of ICT by government agencies?

12) Are there any difficulties regarding the use of ICT during the training? If so, which ones? Are you considered able to deal with them?

13) Have you noticed if there is interest and mobilization from your colleagues for their further education in ICT for students with autism?

14) Is it considered that there is the appropriate equipment for the utilization of ICT in the context in which you work or in other contexts in which you have worked? If not, what do you think should exist?

15) Have you encountered obstacles in using ICT to develop social skills? If so, what were those obstacles?

16) Is the use of ICT in learning social skills considered to meet the interests of students with autism?

17) Is the use of ICT, in terms of enhancing the social skills of children with autism, believed to have benefits? And if so, what are they?

18) Is the use of ICT, in terms of enhancing the social skills of children with autism, believed to have negative effects? And if so, what are they?