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Connecting families and schools of students with deafness: describing the ICT and internet use in education

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Abstract

The use of ICT, namely of internet-based solutions, on de education of students with deafness promotes their access to a wide variety of information and experiences, by decreasing the communication barriers implied in those special needs individuals. In this study was used a self-administered questionnaire, with closed-set questions, validated through the contribution of a team of experts and a prior pilot study. Then, the families and professionals that take part of the educational community of these students were asked to share their knowledge about their ideas concerning ICT and internet roles in the education of students with deafness. Results show that these subjects have access and frequently use a wide range of technologies and web services, being more frequently used the ones concerned with online search, productivity tools and e-mail. The need for more training in this area is referred by most of the subjects. Although acknowledging the positive influence that the internet can have in both the academic achievement and future career of the students with deafness, the subjects also express that these individuals are also in need of more training to make a critical use of the internet.

Keywords: internet, families, school, students with deafness.

1. Introduction

The technological evolution and its application in education has been a growing reality over the years. In the case of special needs students, it provides new opportunities of participation. It's given an easier access to information but is also provided the use of a whole new set of technologies and tools that constantly emerge.

For students and adults with deafness, it's in the communication area that most of the needs and limitations to the full inclusion and participation in the general society activities are felt [1]. The

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communication options in deafness are various and may involve the use of sign language and writing (in a more visual based communication), the use of audition and speech (provided by the use of hearing aids), and/or the use of both and all the available communication modes, given the context, situation, and the specific needs of the individual [2]. Those needs can be felt in the school setting but also in the family: only around 10% of the children with deafness are born of parents who are themselves also deaf [3]. Therefore, the communication barriers can exist in the family when parents feel and are unprepared to deal with the specific needs of their newborn and unexpected child with deafness and when there isn't shared language proficiency between parents and children [4-6]. The same can happen in the case of the teachers and professionals working with those students and their families. Being aware of the strengths and weaknesses of the student and family, and of what are their main needs in a regular bases, is essential for the success of the education, intervention and improvement of the student over the years [7]. Schools should develop and implement policies that promote the parental engagement, so that there is and effective communication and sharing between family and school, and parents can become empowered and enabled to advocate for their child throughout life [8].

Several authors have identified the potential of web tools and services in the improvement of the society inclusion and participation of the person who is deaf and hard of hearing [1, 9, 10]. Various communication possibilities arise, since image is used to spread various contents and information. Also, there are enhanced reading and writing interactions through meaningful situations, such as in chats, forums, blogs, social networks. The use of mobile phones, instant messaging and other electronic means of communication have gained popularity among people who are deaf or hard of hearing. People who are deaf are becoming more and more able to communicate with each other and with people with normal hearing in an equal manner. In the educational setting, these tools an services can give new opportunities to an easier conception and use of curricular contents in a more visual style, a more simple personalization of contents to the specific needs and motivations of each student or class, and a greater autonomy and engagement of each student in its own learning process. The families and schools are also becoming closer, since the limits of time and space tend to be set aside with the use of web services and tools as another resource for the communication between the two. Parents can have access to the contents that are talked about in the class, know about their child progress, work and behavior, share doubts and suggestions with school professionals, and be more aware of what happens with their child so that they can engage in meaningful conversations at home, therefore facilitating communication [11-13].

In the search for the best education to those students, in 2008, the Portuguese government created a set of reference schools for the bilingual education of deaf students [14]. In those schools one can find specialized professionals such as teachers who are hearing, deaf adults that teach sign language, speech and language therapists and sign language interpreters. The student's classes can be organized in classes with only students who are deaf or hard of hearing or though the inclusion of the students who are deaf or hard of hearing in regular classes with peers who are hearing. Those schools exist from kindergarten to secondary level [15].

This study is enrolled in a PhD project that aims to study the potential of social web to promote the parental engagement in the educational community of one of these reference schools for the bilingual education of deaf students. The team of professional is multi-disciplinar and includes teachers, teachers of the deaf, deaf adult teachers and speech and language pathologists. The families are enrolled in the planning and development of the individual education plan, and some of them participating in activities developed by the school. However, the parents still feel the need to access more specific information about their children experiences, needs and development, and also to improve the ability to communicate effectively with their children in daily routines. Here we present the preliminary results of the questionnaires applied to both the families and the professionals of this community concerning their knowledge and use of the ICT to support the learning of their students who are deaf or hard of hearing. Concerning a group of adults involved in the education of students who are deaf or hard of hearing, this study aims to answer the following research questions:

- How do professionals and parents/caregivers describe their knowledge and use of the ICT?

- To which technologies do professionals and parents/caregivers have access?
- Where and how often do professionals and parents/caregivers use the computer and the internet?
- How do professionals and parents/caregivers acknowledge the internet value in their students education?
- Do professionals and parents/caregivers feel the need of training about the ICT use for the education of their students?

2. Methodology

2.1. Procedures

This study's main interest is to understand and find answers that allow action in this educational context towards its improvement. Thus, it does not end in an interpretative paradigm, but evolves into a critical paradigm. It's also characterized as being naturalistic since it focuses on a social reality whose knowledge and meaning attributed to the events are the result of the individual and the community consciousness. Data was collected through a self-administered questionnaire to the subjects of the selected educational context. A pilot study was conducted to ensure that the questionnaire measured the target constructs and was language appropriate for the subjects understanding. The three phases of the pilot study included the finalization of the Portuguese questionnaire, the review of three experts in the areas of education sciences, educational technology and education of deaf students, and the application of the pilot questionnaire to a convenience group of subjects. The criteria for the selection of this group was having similar characteristics to the participants in the main study, therefore being elements of a reference school for the bilingual education of deaf students in another geographical area. Therefore this pilot group of participants included parents, teachers of regular classes, specialized teachers of the deaf, deaf adults that teach sign language and speech and language therapists, from both kindergarten and primary school, in a total of 13 participants. The subjects shared doubts and suggestions as how to improve of the instrument with the investigator that were taken in account when developing the final questionnaire used in the study here presented.

2.2. Instrument

The first section of the questionnaire was built in order to characterize the subject's access and use of the internet and information and communication technologies. It was based on the work of Ticiana Trez, and there were made the due adaptations concerning the expert's suggestions and the pilot study results. Concerning the enrollment of these questionnaire in a broader PhD study, in the same instrument are included two more sections that have the purpose of gathering information about parental engagement and also about the needs of information about deafness. The first section of the questionnaire is made up of closed set questions. Most of the questions were answered using a Likert scale of 5 items. Two of the questions implied yes/no answers.

2.3. Participants

The participants were the parents/caregivers and professionals of the students who are deaf or hard of hearing from kindergarten to primary school in a Portuguese school of reference for the bilingual education of deaf students. After gathering the due authorizations for the study with the school board, the questionnaires were distributed to all the parents/caregivers and professionals of that school, in a total of 32 parents/caregivers and 25 professionals. It should be noted that there are cases of students that don't live with their parents or that have other caregivers engaged in their education either than the parents, such as aunts, grandmothers or even brothers, and therefore this group is characterized as "parents or caregivers". Each family decided who would

be the member answering the questionnaire, given it's content and purpose. The participants self-administered the questionnaire, taking around two to three weeks returning it in most cases. In the case of a deaf mother, given the difficulties in understanding the written language of the questionnaire and the low proficiency in sign language, the investigator arranged a meeting in order to help and clarify some issues. Another mother couldn't take part in the study due to the fact that she was illiterate, and that no other member of the family was available to answer the questionnaire. The number of subjects that answered the questionnaires is shown in Tables 1 and in Table 2, according to the type of class of the corresponding students. In the case of the group of parents/caregivers (Table 1) the distribution is made also considering the education level. Since some of the professionals attend to students in several levels of education (as is the case of the school principal and the speech and language therapists) the distribution in Table 2 is shown considering only each of the professionals role and the type of class.

Table 1. (a) on the left side: Parents/caregivers subjects absolute distribution through educational students level and type of class. *One of the parents has two children who are hard of hearing, one in the 1st grade and one in the 4th grade, and therefore was only counted as one in the total of parents/caregivers, although corresponding to two students. (b) on the right side: Professional subjects absolute distribution according to the school role and type of class.

Education Level	**Class**		
	Regular	Bilingual	*TOTAL*
Kindergarten	1	6	7
1st grade	2*	1	3*
2nd grade	1	There is no class	1
3rd grade	1	2	3
4th grade	6*	0	6*
TOTAL	11*	9	**19***

School Role	**Class**			
	Regular	Bilingual	Both	*TOTAL*
School Principal	0	0	1	1
Teacher	5	0	0	5
Specialized Teacher	4	1	1	6
Deaf adult	1	5	0	6
Speech Language Therapist	0	2	3	5
TOTAL	10	8	5	**23**

Of all the 32 parents/caregivers considered only 19 participated as subjects of this study. Of the 9 that didn't participate 3 are from the kindergarten bilingual class, 3 are from the 1st grade bilingual class, 1 is from the 2nd grade regular class and 3 are from the 3rd grade bilingual class. In the group of professionals only two didn't answer the questionnaire,1 being a specialized teacher and 1 a deaf adult that teaches sign language.

3. Results and discussion

After gathering the data, it was coded and prepared for statistical analysis. Data analysis was made using SPSS 17.0 software and involved the use of descriptive statistics to analyze the data obtained from the questionnaires with the specific purpose of answering the research questions.

3.1. Professionals results

In this section the results of the group of professionals that work with the students with deafness in kindergarten and primary school will be described.

Concerning the first research question, data was obtained to characterize how the subjects evaluate their knowledge of several ICT (Figure 1.a), complemented with the use they make of those ICT (Figure 1.b). The professionals describe having more knowledge of productivity tools (such as Word, Excel, Power Point), and online search tools and e-mail, which are mainly web 1.0 services, being those the ones that they use more frequently. In the case of the knowledge about social networks, blogs and instant messaging, most of the subjects described it as being very poor, poor or average, which matches with the little use made of those web services and resources, described as being almost never or once a month by the majority of the subjects.

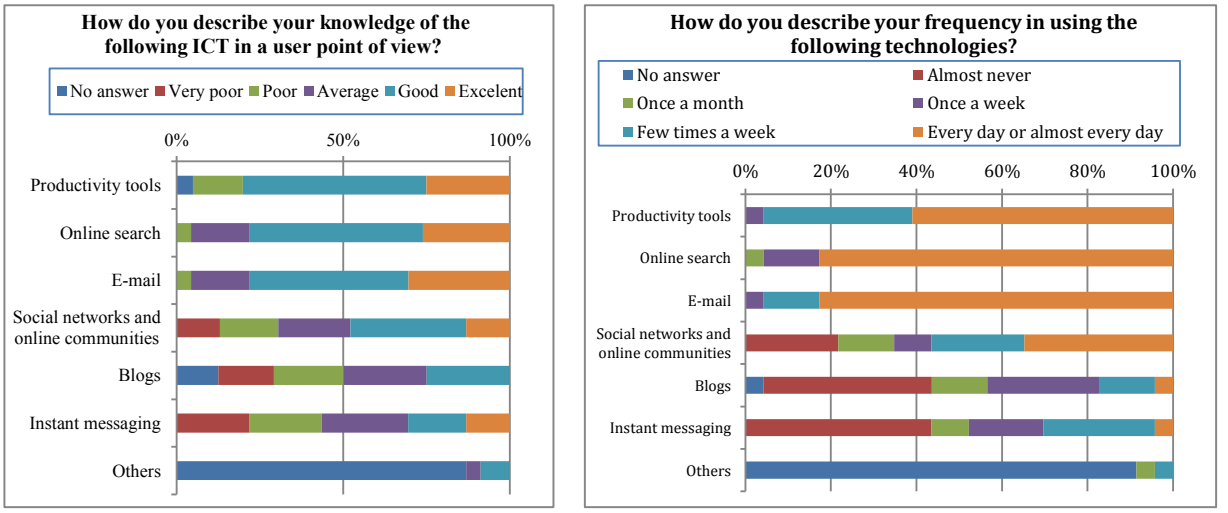

Fig. 1. (a) Relative distribution of professionals answers to the question "How do you describe your knowledge of the following ICT as user?"; (b) relative distribution of professionals answers to the question "How do you describe your frequency in using the following ICT?".

In order to understand if the access to technology influenced the use subjects make of it, professionals were asked to choose from a list to determine what devices they owned: computer, printer or scanner, web connection, mobile phone, digital camera, digital camcorder or webcam, or other. All the professionals reported having computer and mobile phone, and almost all of them had a printer or scanner (91%), a web connection (96%) and a digital camera (91%). In the case of the digital camcorder or webcam only 57% described having access to this technology. This information shows that there is no access limitation to the use of the ICT and web services, but the lack of a digital camcorder or webcam can limit the conception of digital resources for the students, and even the communication with them through videoconference, which is essential in the case of sign language and speechreading.

Given the benefit described by several authors in the use of the ICT, the internet services and tools in the education of students who are deaf and hard of hearing, professionals were was asked to describe the places and how often they use the computer and the internet (Figure 2 (a) and (b)). The computer and the internet are both used very frequently at home and at school to work with the students.

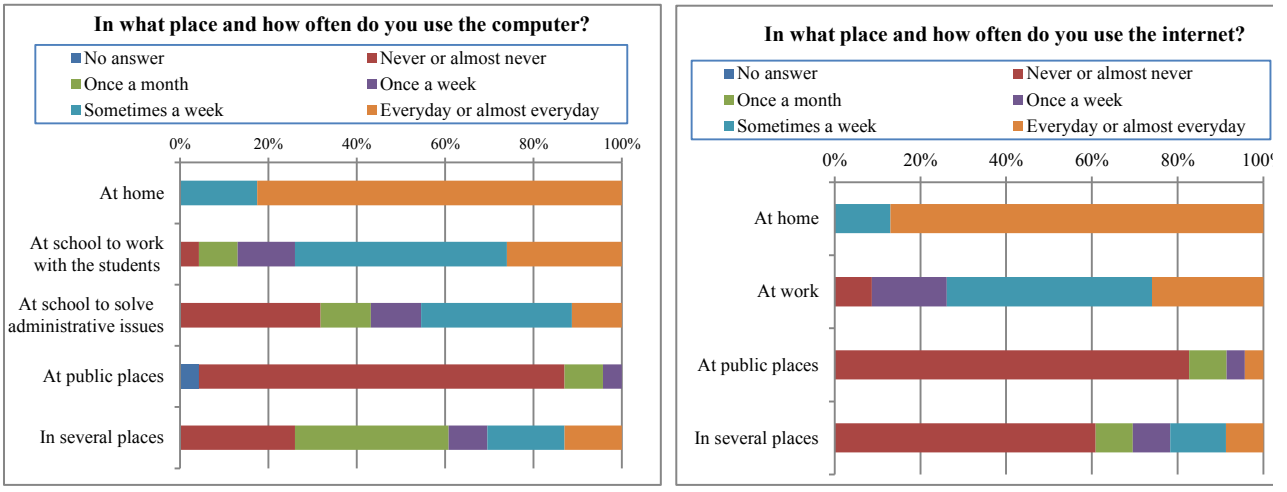

Fig. 2. (a) Relative distribution of the professionals answers to the question "In what place and how often do you use the computer?"; (b) Relative distribution of the professionals answers to the question "In waht place and how often do you use the internet?".

In order to understand how the professionals face the internet potential in the education of students with deafness they were asked to express their level of agreement with a series of statements. The results illustrated in Fig. 3 reveal that the three statements that describe positive aspects of the internet use by those students obtained agreement of the majority of the professionals. Also most of the professionals share the opinion that students need more training for making a more critical use of the internet. About the possibility of the internet being a means of isolation of the students with deafness the professionals showed different opinions, with many of them placing themselves agreeing with the statement.

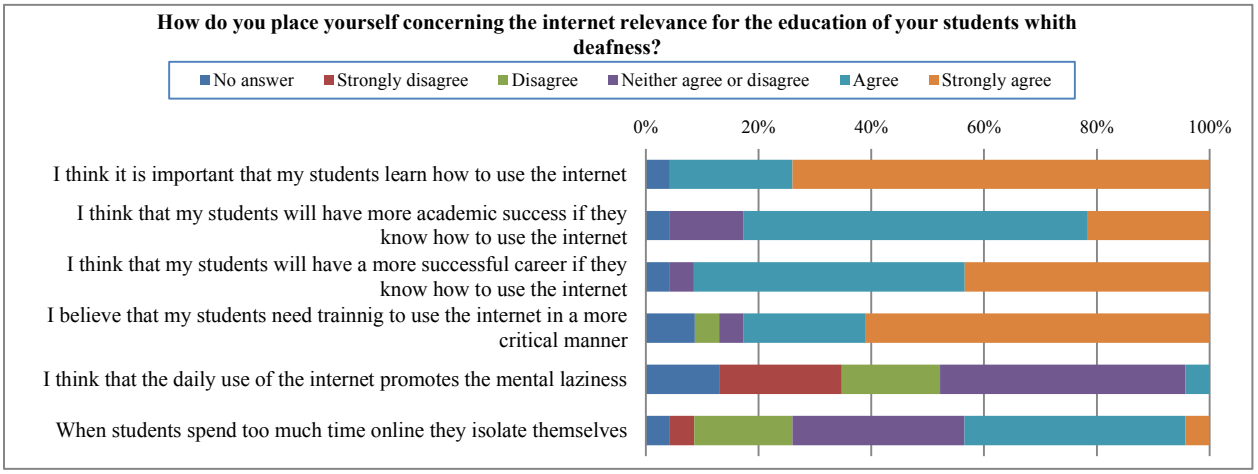

Fig. 3. Relative distribution of the professionals answers to the question "How do you place yourself concerning the internet relevance for the education of your students with deafness?".

The last question approached the subjects concerning their need for training about the use of ICT in the classroom. The data obtained showed that of the 23 professionals only 7 said not having the need for training, 1 didn't answer, and the remaining 15 answered positively to this question.

3.2. Parents and caregivers results

A similar questionnaire was applied to the parents/caregivers of the students with deafness.

In the Figure 4 (a) and (b) are represented the knowledge and use of several ICT are represented, with subjects describing having good or excellent knowledge of the productivity tools, online search tools and e-mail, which are also the ones used more frequently. About 40% also consider having a good or excellent knowledge about the social networks and online communities and blogs, using those less frequently than the other listed technologies.

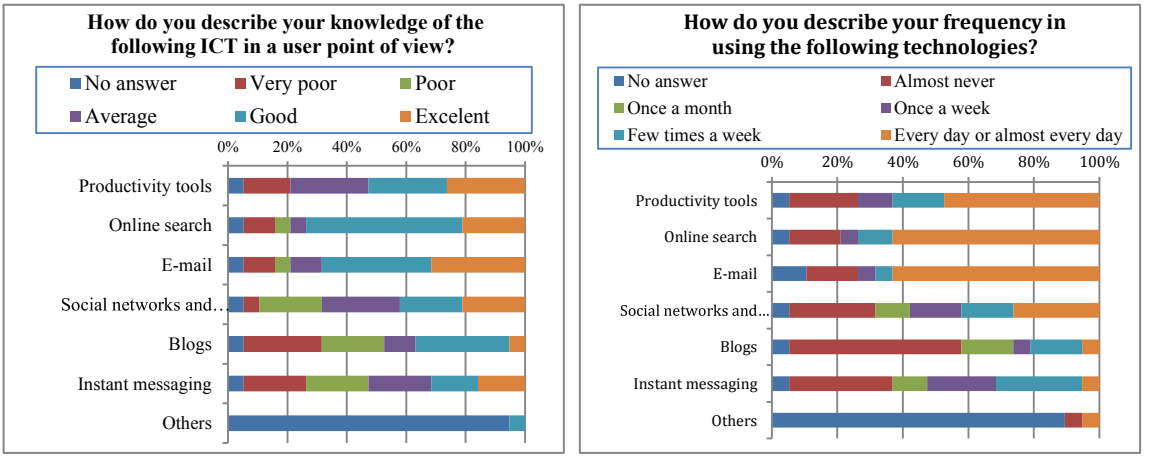

Fig. 4. (a) Relative distribution of the parents/caregivers answers to the question "How do you describe your knowledge of the following ICT as user?"; (b) relative distribution of the parents/caregivers answers to the question "How do you describe your frequency in using the following ICT?".

Concerning the technologies that these subjects usually have access to, the mobile phone is the one that most of the subjects own (89%), followed by the computer (79%) and the digital camera (79%). In the case of having internet access, 74% of the subjects answered affirmatively, what also happened in 68% of the subjects about the regular access to digital camcorder or webcam. Only 47% have access to a printer or scanner, and 21% named other technologies such as PlayStation and Nintendo.

The following graphs show the results describing the place and frequency of the computer use (Figure 5 (a)) and the internet use (Figure 5 (b)) by the parents/caregivers in the education of their child with deafness. It's at home that both the computer and the internet are mostly and more frequently used for this purpose. Some parents reported using the computer (8,3%) and the internet (5,6%) in several places, which may indicate the possession of a portable computer or of a mobile connection to the internet.

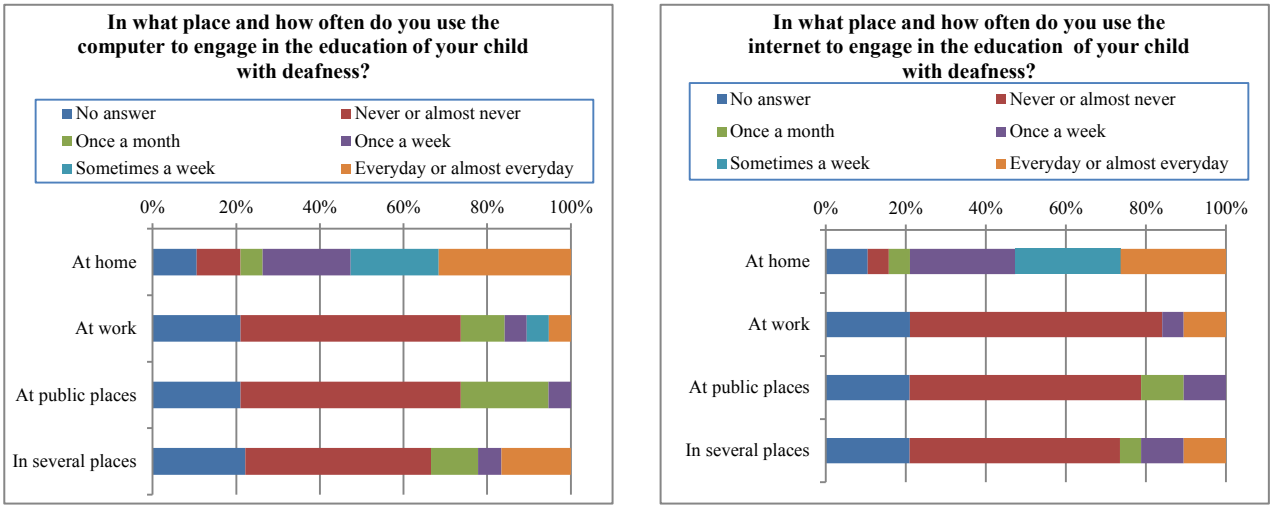

Fig. 5. (a) Relative distribution of the professionals answers to the question "In what place and how often do you use the computer to engage in the education of your child with deafness?"; (b) Relative distribution of the professionals answers to the question "In waht place and how often do you use the internet to engage in in the education of your child with deafness?".

Trying to understand the parents/caregivers opinion about the use of the internet by their children, they were asked about their accordance with a set of statements. The following graph (figure 6) expresses the data obtained, where parents/caregivers agreed or strongly agreed with the statements that express that it is important for these students to learn how to use the internet, that this ability can promote the academic success and the future career, and the need for training towards a more critical use of the internet by the students. Although recognizing the importance of using the internet, 26,5% of the subjects think that if too much time is spent online the students can isolate themselves.

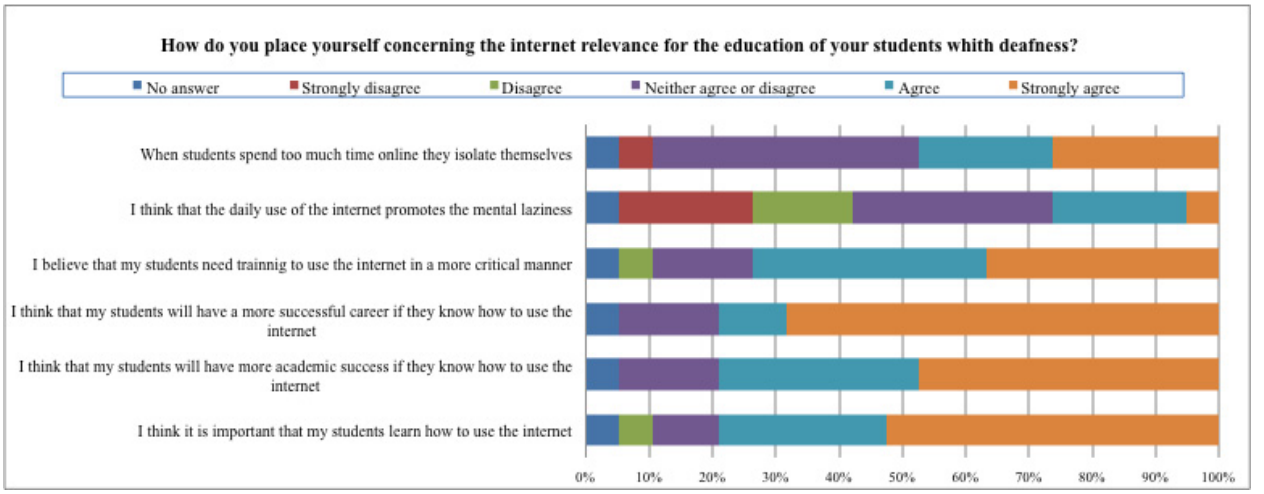

Fig. 6. Relative distribution of the parents/caregivers answers to the question "How do you place yourself concerning the internet relevance for the education of your child with deafness?".

Conclusions

Although the research gives evidence for the emerging ICT and web tools and services potential to this special needs group of children, it was important to explore the knowledge, use and expectations towards the ICT and the internet in the education of those students of the professionals and families involved.

Both the professionals and parents/caregivers have a deeper knowledge and use of the ICT related to productivity tools, e-mail and online search. This shows that the potential use of the internet to promote the communication with other groups of people, that can be other parents, the deaf community, students, using webchats, videoconference, and online communities, is still less frequent. Nevertheless the parents/caregivers placed themselves at higher levels of knowledge and use of social networks than did the professionals. It is, therefore, important to promote training in this area to both the professionals and parents/caregivers, so that they become more able to use the technologies that they already have access to and to become aware of the potential in using other technologies and services to promote the success of their students with deafness.

Both groups of subjects have access to a wide variety of technologies and, therefore, this issue can be excluded as a limitation for their use in educating the students with deafness. The computer and the internet are used by the participants both at home and at work, not being inferred any kind of time and space limitations to the contents and services there provided. However, in the case of the professionals the use that is made is mainly at home or work, probably in tasks as researching or preparing resources for the students, rather than with the students during the classes, promoting their own abilities in using the technology and web services for their own benefit. In the case of the parents, they use the computer and the internet with the purpose of engaging in the education of their child mainly at home. On the one hand, this may mean that they're using it with their children and in communicating with elements of the school team, expanding the spatial boundaries of the school. On the other hand, there is still the influence of time limits as it is mainly when they are at home that parents use the computer and the internet to monitor their children's education. These findings highlight the need to make the elements of the school community more aware of the benefit there would be in using the ICT and the social web services and tools to promote the communication between home and schools and provide more and better support for the education of students with deafness.

The internet value in the education of these students is recognized by both groups of participants. However, although most of the parents/caregivers and professionals report already using the ICT and the internet frequently, they feel the need of more training in this area, for them and for their students.

These results will be of great value in the forthcoming project activities, that involve the creation of an online platform where participants can access and share a variety of information about deafness and the students' experiences in the family and school. Moreover, with these findings there is a greater understanding of the knowledge and use of the technologies of the participants that make it possible to design and foster a training plan that meets their needs, and facilitates the further use of ICT, tools and services of the social web.

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