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The Use of Smartphones by Brazilian Deaf Students in the Process of Learning Portuguese as a Second Language

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Abstract*—*Sign languages are usually the mother tongue of deaf people. The official language spoken in a given society is learned as a second language by them. The process of learning this second language is something hard and complex because deaf individuals are not able to hear sounds of any oral languages. Actually, they use such languages only through written messages. This study discusses how the use of smartphones by teen deaf students contributes to the acquisition of Portuguese as a second language, identifying how deaf individuals use smartphones to interact with other deaf and with hearing people through written Portuguese. The research was developed in a qualitative approach with five deaf participants from high school in Brazil. Data were collected through interviews and observations and showed that the use of smartphones has provided multimodal tools that enable the deaf to overcome linguistic and cultural barriers related to the use of Portuguese. Through digital devices they can learn the language with the help of translator apps, images, videos and texts, becoming more proactive and independent in the learning process.

***Keywords*—Deaf learners, deaf studies, second language learning, sign language, smartphones.**

I. INTRODUCTION

Portuguese is the major official language of Brazil and, therefore, the most widely spoken language by a population of more than two hundred million people in that country. However, for a minority group formed by Brazilian deaf people, Portuguese is not easily acquired as a mother tongue. Due to their hearing impairments, these people usually learn Brazilian Sign Language (Libras) as their first language (L1). Since 2002, Brazilian government consider Libras an official language and its use has been encouraged in educational system, teacher training programs and government communications, but it does not have the same prestigious place as Portuguese in everyday communication.

Learning Portuguese is something that demands a long time for deaf people just because they cannot hear spoken languages. In fact, they have usually acquired Portuguese as a second language (L2) after being a fluent user of the sign language. Besides, deaf individuals are not expected to speak Portuguese orally, but they have to learn how to read it and write it.

When deaf do not master Portuguese, they have problems in their academic life as well as in the work environment. Libras is an effective means of communication; but, it can be understood only by those who have mastered it. Sometimes deaf people can count on Portuguese-Libras interpreters to interact with hearing people who have no idea about the sign language they use, but these interpreters are available just in specific situations. Actually, acquiring Portuguese as a second language empowers the deaf, giving them autonomy to access educational, professional and cultural aspects of the society where they live.

A deaf individual does not learn how to read and write Portuguese the same way hearing individuals do. The deaf need to have access to special pedagogical methodologies based on images rather than sounds. For a long time deaf children were sent to school but did not achieve the same academic skillsachieved by hearing children. The problem was not on the deaf who did not learn, but in the way they were taught (Sá, 2011; Salles, Faulstich, Carvalho, and Ramos,2004). For most of deaf students, Portuguese language seemed to be something unreachable. For them, reading and writing were boring activities related to school with nothing to do with everyday life.

However, since smartphones become more and more popular in Brazil, deaf people have found out that written Portuguese in something useful, actually indispensable, for everyday communication. In fact, the access to internet and the use of apps for interaction in different situations have created a favorable environment for the

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deaf to use the major language of the country. For them, not reading or writing this language may implicate in a barrier for social interaction.

This article presents the results of a research which tried to understand how the use of smartphones by teen deaf students contributes to the acquisition of Portuguese as a second language, identifying how deaf individuals use smartphones to interact with other deaf and with hearing people through written Portuguese. The research was developed in Senhor do Bonfim, a small city located in Bahia State, Brazil. Five teen deaf students, from high school, took part in the study as subjects.

II. MATERIALS AND METHODS

This research was developed on a qualitative approach, which considers values, ideas and the worldview of individuals as elements to be analyzed as a whole. Deaf participants were contacted at a government school and invited to take part into the study. They were explained how the research would be developed and agreed to collaborate. In this text they are not identified by their names, instead, we use a code to refer to them through the text: Deaf Student 01, Deaf Student 02, Deaf Student 03, Deaf Student 04, Deaf Student 05. We did not take into consideration any questions related to specific age or gender.

The interviews were carried individually in Libras and Portuguese. A Portuguese-Libras interpreter helped with the interaction between researchers and deaf participants. The interviews were recorded in videos and were transcribed in Portuguese. Some excerpts from the interviews were taken to illustrate the analyses in this work.

III. THE USE OF SMARTPHONES BY DEAF INDIVIDUALS

The use of mobile devices like smartphones by Brazilian people, according to some data from the National Telecommunication Agency (ANATEL), has been increasingly growing, with numbers that surpass the use of personal computers. Although there are no data about the use of such devices by deaf population, it is possible to infer that deaf people in Brazil follow this tendency in the use of that kind of technology.

Information collected among the deaf in this research revealed that all of them use smartphones connected to the internet; what means that the deaf have access to technological devices that enable them to communicate, helping them to overcome some hearing impairments, and giving them autonomy to learn wherever they are. After all, as it has been said by Santaella (2013, p. 137) “with mobile devices we can move in the physical world and, at the same time, access the space of informational cloud the surrounds us, it can be said that the horizon of ubiquity is opened up for us”.

During the interviews we did,teen deaf students were questioned about the main apps or social network they usually used to communicate through their smartphones. WhatsApp and Facebook were mentioned as the most commonly services used in everyday communication. According to Mobile Messaging Report (available at https://mobileecosystemforum.com/mobile-messaging-report-2016/) released in 2016, WhatsApp was the most common app for instant messaging among Brazilians (76% used this app and 64% of them used Facebook). As we could infer, deaf people do not use the mentioned services because of anything special about their deaf identity; in fact, deaf individuals have to deal with the same social and cultural issues and tendencies that are related to society as a whole. It is important to highlight that the combination of the use of smartphones, by the deaf, with instant messaging services and apps, enhances the perspective on inclusion of such individuals in social life, and enables them to understand the complex use of Portuguese language for social communication.

Deaf people tend to use technological resources that are available in their community, as it was noticed by Power, Power and Hortsmanshof (2007). But, such availability depends on economic issues and public policies developed for telecommunication systems in the country where deaf people live as showed by Agboola and Lee (2000). Increasingly, mobile devices have become tools for empowerment and autonomy of deaf people in learning and communication processes (Poçani, 2015). Communication through smartphones has not been limited to sound (like in traditional callings) or text (like in SMS (Short Message Services). This kind of device has provided what can be called multimodal communication processes, involving sound, text, image, video, etc, enabling deaf people to use sign languages through video call or to use any otherlanguages, like Portuguese, through written texts, with the support of images.

Technological devices have provided new ways of producing, organizing and sharing social and cultural knowledge. Somehow, they have enhanced the use of languages beyond oral and written forms. This is especially important for deaf people, who speak sign languages and are usually challenged to learn the oral language spoken by society. Deaf participants of the research used smartphones to interact even in face-to-face communication, especially when they were talking to someone who was not able to speak in sign language.

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They not only use the smartphone to type in Portuguese what they were trying to say, but also illustrated their ideas showing to the interlocutor some images they took from the internet in order to make themselves understandable.

IV. SMARTPHONES AT SCHOOL

School became in western countries an institution suited to industrial society, being traditionally organized like a factory. This can explain why some of its pedagogical patterns are based on order and discipline.Class orientation and teaching methodologies are hardly changed. For this kind of school, books and paper, boards and notebooks are perfect tools to be used in pedagogical programs. In our research, when we asked deaf students about the use of smartphones at school they stated that such devices were prohibited items at the institution they attended. In the interviews we asked the participants: "Do your teachers allow you to use smartphones at school?" These were their answers:

"No, it's forbidden." (Deaf Student 01)

"No, they didn't permit it. They are very strict about this." (Deaf Student 02)

"It is prohibited". (Deaf Student 03)

"No. It's very strict; it's forbidden. We cannot get into school with a cellphone." (Deaf Student 04)

"They are strict when it comes to cellphones, but sometimes they permit the use of them." (Deaf Student 05)

Despite the pedagogical potentialities of smartphones, such devices have not been used for teaching purposes at school. By contrast, these technological apparatus have been present in most of everyday activities. Ribeiro (2016) discusses about this issue, showing through an action-research developed in a Brazilian school that is possible, and very often desirable, to bring smartphones and other mobile devices into classes. These devices may widen the possibilities of communication with the world, interaction between individuals and the access and development of new knowledge. When deaf students are not allowed to use this kind of technology, they have been denied the possibility of surpassing barriers that oral languages impose to them.

Mobile devices, like smartphones, may bring important changes in the way deaf individuals become part of society, helping them to overcoming linguistic and cultural barriers. When the use of such equipment is forbidden at school, some learning processes are limited to traditional teaching patterns that are historically little effective in deaf people education. Information and communication technologies have been providing the rising of teaching-learning processes which are very different from those ones traditional schools are used to.

Researches all over the world have demonstrated how digital technologies have provided new ways for learning and for social interaction to the deaf (Maiorana-Basas&Pagliaro, 2014; Pilling & Barrett, 2008; Power & Power, 2004). In Brazil, there are some successful experiences about the use of technological devices for deaf education, as it can be showed by Nogueira (2009), Carvalho (2011) and Santos (2015). When the use of smartphones is prohibited at some schools, deaf students have been denied the possibility to access knowledge and new ways of interaction. However, while school methodologies have not been integrated with this technology, deaf individuals have used it out of school borders. Some participants of our research highlighted the importance of the use of smartphones for educational purposes. They stated:

"I use cellphone to study at home" (Deaf Student 03)

"Cellphone helps me when I do some kind of research on the internet" (Deaf Student 04)

It is necessary to mention that it is not only the use of smartphones for academic purposes that contribute for deaf people education. Actually, there are some learning processes that are unintentional; that means, they do not happen only when someone is searching for some pieces of information in order to study about them. The digital world deaf people take contact with, through their smartphones, provides them a context that favors unpredictable situations for learning things one sometimes is not intended to. When individuals are connected to the internet, they can be in contact to other individuals, being part of a multidimensional corpus of information and knowledge. This is the perfect context for a kind of learning some researchers would define as ubiquitous. According to Santaella (2014), this kind of learning is "unpredictable, disperse, fragmented, even chaotic, not always linked to memory. However, undeniably learning" (p.19).

Even if schools do not allow students to use smartphones, they have used them in informal contexts, away from restrictions imposed by educational institutions. Traditional school activities are not effective for deaf individuals to learn. Fernandes (2008) has argued that traditional methodologies used to teach deaf individuals have not been effective since they are based only in written texts and memorization. We have claimed that the digital era we live has brought new possibilities for teaching oral languages to deaf people. Smartphones have the technological frame to develop multimodal

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perspectives of interaction and use of languages, both oral and signed. In other words, such devices allow the deaf to be included into society without any special adaptations. After all, everybody has used smartphones and other digital devices for performing innumerable daily activities.

When first communication devices were developed, the deaf were important users, somehow. The telephone, for example, was invented by Alexander Graham Bell at the end of the 19th century as an improvement of devices originally thought for hard of hearing people as we can find in Pilling and Barret work (2008). Nowadays, in a world of digital revolution, the deaf have amplified their communicative and learning skills in a way that has not seen before.

V. PORTUGUESE LANGUAGE AND THE DEAF

According to Ellis (2003), subjective aspects like interest and satisfaction are important elements for a learner who is engaged in the process of acquiring a second language. Considering the subjective approach of our research, we asked deaf participants if they liked to use Portuguese to communicate. Although most of them had answered affirmatively to this question, their statements reveal some caveats about the use of the language. They were asked: Do you like using Portuguese language to communicate?

"So, so. I have a difficult communication with hearing people. When I use Portuguese with deaf individuals, I can understand a little better."(Deaf Student 01)

"I like it. It is important to learn Portuguese. I think it's important." (Deaf Student 02)

"I like it" (Deaf Student 03)

"So, so. But, too long texts, I don't like." (Deaf Student 04)

"Yes, I do." (Deaf Student 05)

Motivation is something one shoulddevelop when learning a second language. The fact of liking the language is a positive attitude for the deaf who are learning Portuguese. However, this aspect itself is not conclusive for a deaf learner to be successful when acquiring that L2. Some participants pointed out that although they liked the Portuguese language they have some difficulties about using it, as remarked by Deaf Student 01 and Deaf Student 04.

Salles, et al. (2004) and Pereira (2014) stated that the way a deaf learner write a sentence in Portuguese is very different from the way a hearing individual does. The first usually put words in a sentence not following the exact rules of Portuguese syntax. For the latter, sometimes, a text written by the deaf may seem a set of chaotic words without any kind of order. Deaf people learn written words as images and the way they organize them in a text tend to follow rules of their L1, Libras, which is a visual language. This is why deaf learners do not follow the linear logicsthe syntax of an oral language is based on.

For the deaf, the sequence of letters of a word is not learned through the help of sounds of spoken sentences, like most of hearing people do. For them, each word must be understood as a whole image. Unlikely hearing people who learn how to write the language they have been speaking since young age, deaf individuals have to learn a language, for the first time, through its written form. Therefore, the longer a text is, the harder it becomes for a deaf to understand it. In a text, the meaning of a word must be taken considering the context, the whole sentence. For the deaf, this is a real challenge. In the interviews, we asked them if they were able to understand Portuguese language using smartphones. Thesewerethe iranswers:

"Just some words. I understand a little bit of Portuguese, but some words are very long, difficult. Sometimes I showed them to Y. [a hearing relative] and he translates it into Libras." (Deaf Student 01).

"No, it's very difficult. I copy phrases and paste them in an app that translates Portuguese-Libras, and then I understand." (DeafStudent 02)

"Only some words. Some words I don't understand." (DeafStudent 03)

"Some words, some sentences. There are words I don't understand, I don't know how to say them using signs in Libras. I just put them in a Portugese-Libras translator app that gives me the sign. (Deaf Student 04)

"So, so" (Deaf Student 05)

Statements from Deaf Students 01, Deaf Student 02, and Deaf Student 04 highlight the necessity deaf learners have to link Portuguese words to equivalent signs in Libras. Ellis (2003) and Krashen (2002) explained that when individuals are learning a second language, they use the linguistic structures of their mother tongue. In our research, deaf participants revealed that they understand Portuguese a little better when they are able to compare the language to Libras. Deaf Student 01 mentions she uses to ask for someone else help in translating written words into Libras. Alternatively, Deaf Student 02 and Deaf Student 04use technological devices to learn words in Portuguese without the assistance of someone else. Direct interaction, in a person-to-person basis, mentioned by Deaf Student 01 is the oldest strategy one can use to learn a second language: someone who speaks both L1

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and L2 teaches one of these languages to individuals who speak just one of them.

On the other hand, Deaf Student 02 and Deaf Student 04 mention technological mediation as a means of learning Portuguese. This is something that must be taken into consideration when we talk about the way deaf people learn a second language. Mobile devices, like smartphones, are part of everyday life. Their digital platform embrace multiples functions, making the access to words, texts, images and apps something practical and fast, what is helpful for someone learning languages. Bellow, we have deaf students' answers to the question: Does the use of smartphones help you in learning Portuguese?

"Yes, a little bit." (Deaf Student 01)

"I think so" (Deaf Student 02)

"It does. Some Portuguese words I ask to *Z* [a hearing person]. But, some words I check through a smartphone" (Deaf Student 03)

"Veryfewthings. I can't make great progresses" (Deaf Student 04)

"Yes. My mother [a hearing person] teaches me some words. She shows me some signs in Libras, translating them into Portuguese. I learn a little better" (Deaf Student 05)

The statements of Deaf Student 03 and Deaf Student 05 reinforce the claim that the mediation of a bilingual speaker in the process of learning a language by deaf individuals strengthens the possibility of doing it faster. Actually, the more deaf students become familiar to Portuguese, the more they improve their reading and writing skills, becoming more and more independent in the use of technological devices. Deaf participants of our research admit their weaknesses related to their performance as Portuguese users, but emphasize the importance of technological apparatus for everyday communication in both Libras and Portuguese.

When deaf individuals use their smartphones to communicate, they can interact with hearing people who does not understand Libras. Besides written text, these devices provide some digital resources for interaction that involve images (like pictures, emoji) or videos to express feelings and ideas. For the deaf, digital supports turn written language less artificial and much more active. Furthermore, they can write and read to communicate the same way most of people have done nowadays through app services and social networks.

VI. CONCLUSION

The use of smartphones by deaf individuals has helped them to learn Portuguese as a second language. The use of such devices favors the existence of a virtual context in which deaf people socially interact regardless of sensorial characteristics. Thus, deaf individuals can use written Portuguese in real process of communication, quite different from those ones often developed in schools where the process of literacy used to begin. The available technology provides the technical conditions for language learning process to occur.

Data collected through interviews suggest that smartphones have been used by the deaf for interaction with other deaf individuals and with hearing people. The use of this technological equipment provides a wide range of communicational possibilities for the deaf, especially for allowing the use of texts, images and videos on integrated basis through multimodal platforms of digital apps. Because they have contact with sign language and written Portuguese language in real contexts of communication, deaf individuals have access to bilingual processes of interaction in a mobile way, which favors them to learn Portuguese out of school context, free from time and space limitations.

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