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SIGN LANGUAGE AND ORAL LANGUAGE UNDERSTOOD AS COMMUNICATION TECHNOLOGIES ARTICULATING BILINGUAL TEACHING FOR THE DEAF

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ABSTRACT

INTRODUCTION: This work is part of the dissertation entitled "Graphic representations of sign language in bilingual didactic materials for the education of deaf children: the paths of the graphic designer". Among the objectives of this research, in which the didactic material is intended for bilingual teaching in which these two linguistic modalities walk together in the teaching-learning process of the deaf child, we seek to understand the nature of oral and sign language since its creation as technologies of communication, expression and intelligence. This study covered the history of sign language and compared the advancement of each language through a timeline.

Keywords: Sign Language. Bilingual Education. Communication for the Deaf.

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INTRODUCTION

This work is part of the dissertation entitled "Graphic representations of sign language in bilingual didactic materials for the education of deaf children: the paths of the graphic designer". Among the objectives of this research, in which the didactic material is intended for bilingual teaching in which these two linguistic modalities walk together in the teaching-learning process of the deaf child, we seek to understand the nature of oral and sign language since its creation as technologies of communication, expression and intelligence. This study covered the history of sign language and compared the advancement of each language through a timeline.

The continuous and cumulative development of techniques is part of human nature, instrumentalizing the human being to dominate the environment that surrounds him, from the creation of tools and utensils, to the linguistic signs for interaction between individuals (KENSKY 2008). Thus, Information and Communication Technologies (ICT), such as oral, written, digital language, among others, promote the acquisition of knowledge for cognitive and social evolution, transforming culture and shaping a new society (GABRIEL, 2018; SANTAELLA, 2003).

The study made it possible to analyze the media cultural eras triggered by technological advances from oral language (in face-to-face communications) since prehistory, generating the leaps of connection produced by the increase of new media, to the present day and established a parallel with the history of sign language (since face-to-face communications). It demonstrated through a timeline how these languages were constituted and their importance for human development. For Santaella (2003, p.13), cultural eras were defined in six types of formations: oral culture, written culture, printed culture, mass culture, media culture and digital culture, in order to place the speech apparatus as the first media used as a communication and information technology until the current digital networks with the phenomenon of hybridization or convergence of media. In parallel, we find in Strobel (2008, p.12) the remarkable periods in the history of the deaf, which begins with face-to-face communications that awakened the possibilities of using gestures and signs for the education of the deaf, which are classified as: cultural revelation, cultural isolation and cultural awakening.

The research found historical evidence that contributed to the paradigmatic changes in relation to the social representation of the deaf. The first around the sixteenth century, when religious educators identified the use of a sign language (gestural-visual) in face-to-

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face communications between deaf people. As in the case of the barons (Spain) and the Melissas twins in France (STROBEL, 2008). From that moment on, the possibility of using a sign language as a technology for their education was verified. As a result of these facts, sign language has developed in educational institutions, as well as printed teaching materials, containing graphic representations of signs, used in the methodology for both student and educator use.

Languages are established by different means of communication to transmit information that influence the way human beings act and think, and create new cultural environments (SANTAELLA, 2003). Sign language is articulated through gestures and visuals (QUADROS, 2017), just as oral language is made through the speech system (SANTAELLA, 2003). These media, which started the evolution of the language, also generated technologies for its production and reproduction, such as the creation of the alphabet for oral language and the typescript alphabet for sign language, and dictionaries that seek to standardize the lexical signs of the respective languages.

The word "technology" originated from the Greek "TECHNE", which means technique, along with "LOGOS", which can be interpreted as argument, reason or discussion. In other words, technology is the entire set of knowledge, reasons around something and/or ways to change the world in a practical way, with the aim of satisfying human needs. For KENSKY (2018, p.18) "technology" can be understood as "the set of scientific knowledge and principles that apply to the planning, construction and use of equipment in a given type of activity (...) in the search for better ways of living". The author also highlights the role of technological evolution in human development:

> Technological evolution is not restricted only to the new uses of certain equipment and products. It changes behaviors. The expansion and trivialization of the use of a certain technology imposes itself on the existing culture and transforms not only individual behavior, but that of the entire social group. (KENSKI, 2018, p. 21)

The technologies created diversified to meet the demands of human needs, generating knowledge, techniques and objects: for communication between group members, such as tools for body extension, increased productivity, increased strength, displacements and others. From the need to live in a group, man starts to use gestures and sounds to interact with each other. As they began to share sound signs, they developed speech through the use of the speech apparatus as a means of communication. Before this communication, knowledge was limited to one individual only, there was no exchange of

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information between the members of the group and knowledge was lost along with the individual. As the authors clarify:

> The process of sophistication of these communication mechanisms was broad and progressively culminated in the complex language systems in man, making it possible to map them in different species. The development of multiple gestural, facial and sound-verbal processes, accompanied by elaborate hemispheric specializations, already clearly present in the lower primates, provided, throughout evolution, the emergence of human language in the patterns we know and use today. (FERREIRA, SANTOS, SILVA, FARIA, 2000, p. 189)

The importance of communicational exchanges between individuals is verified, favoring their continuous development of linguistic and cognitive skills, both for the individual and for the social group to which he belongs. And over time in this process a culture crystallizes that transfers the accumulated knowledge to future generations. Thus, the advancement of human beings is verified when appropriating this technology, as explained below.

> Before speaking, the discoveries and learning acquired by each individual had extremely limited possibilities for sharing – brains worked individually and most knowledge died with individuals. From speech, information begins to flow between us, connecting brains, expanding collaboration, exchange, and dissemination of knowledge. (GABRIEL, 2018, p. 15)

With the emergence of speech, knowledge began to be shared by the human group, and consequently was improved and expanded. Speech, therefore, was a form of technology that emerged to connect the brains of the social group, promoting the exchange of information and communications, and increasing interaction between community members, while also allowing this knowledge to be taught and transmitted to new individuals. Speech was a form of technology that allowed the extension of human knowledge beyond the individual's brain. Regarding language as a technological instrument, we consider the observations of QUADROS (2004):

> Thus, language is a standardized system of arbitrary signs/sounds, characterized by dependent structure, creativity, displacement, duality, and cultural transmission. This is true of all the languages of the world, which are recognizably similar in their main traits.
> [...] Possibly it began because humans need a greater degree of cooperation with each other in order to survive, and this cooperation requires efficient communication. Consequently, the primary function of language is the communication and expression of thought. (QUADROS, 2004, p. 28-29)

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LEVY (1993, p. 9) in his studies on "The Technologies of Intelligence" shows that "(...) It is enough for some social groups to disseminate a new communication device, and the whole balance of representations and images will be transformed, as we have seen in the case of writing, the alphabet, printing, or the means of communication and modern transportation." In the case of speech, language and language, we can understand how technologies of communication and expression of ideas and thoughts, through which the exchange of experiences and knowledge is processed, and in this way, boost cognitive development. KENSKY (2008, p.21) adds that technologies are not only made of products and equipment, they can be articulated as "constructions internalized in the spaces of people's memory and that were created by men to advance knowledge and learn more, such as oral language, writing and digital language".

As technologies of intelligence, speech, language and language[3] are indispensable in the teaching/learning process, acting on social, linguistic, emotional and cognitive development. As we can observe in Goldfeld's (1997) studies on "The deaf child: language and cognition from a socio-interactionist perspective".

> Several authors, [...] when considering that language delay causes social, emotional and cognitive damage, these authors, explicitly or implicitly, show that they are using a broader concept of language, which encompasses not only the communicative function but also the function of organizing thought, assuming an essential role for cognitive development. Otherwise, language delay would not cause harm beyond communicative difficulties. (GOLDFELD, 1997, p. 47)

From these statements about the concept of technology, and the characterization of intelligence technologies, we consider speech, language and language as technologies that act in communicational, social, linguistic and cognitive development and that act in an essential way in the teaching-learning processes.

[3] Definitions and concepts presented according to Goldfeld's research (1997, p.27) Language, (Saussure) – systems of abstract rules composed of interrelated significant elements. Language, (Bakhtin) – semiotic system created and produced in the social and dialogical context, serving as a link between the psyche and ideology.
Language – codes that involve signification and do not necessarily need to encompass a language. Speech (Vygotsky) – language production by the speaker in moments of social and inner dialogue, can use both the audiophonatory channel and the visual-manual space.
Oralization – use of the speech system to express words or phrases in the language.
Signaling – speech produced by the visual-manual channel.
Sign – lexical element of sign language.
Sign – an element of language, marked by the history and culture of its speakers, has numerous possibilities of meanings, which are created at the moment of interaction, depending on the context and the speakers who use them.

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Although speech represented a leap in human cognition, according to Gabriel (2018, p.16) the geographical and temporal limitations of orality were great: it was not possible to talk to someone who was not present in the same place and time. Communication was possible only face-to-face, and therefore restricted in time and space.

Thus, writing emerges as a form of recording speech, representing a new technological advance in the area of communication and information. Gabriel (2018, p.16) says that "The second great leap in connection comes with writing, which in addition to freeing us from geographical and temporal limitations, increases accuracy and reduces losses in the information transmitted". In face-to-face communication promoted by speech, the recording of information does not occur through a fixed media, the information was subject to the human conditions of memory and cognition, and could be altered or forgotten. Writing made it possible to record information in a fixed media (information support),[4] reducing noise and loss of information during the exchange process between individuals.

With information in a fixed media, it was possible to expand the dissemination of information that could be taken to other spaces without undergoing changes, overcoming the temporal barrier, unlike speech, which is an instantaneous communication. Both speech and writing were technologies that allowed the development and expansion of knowledge for man, but mainly through writing, the knowledge acquired by man began to be recorded beyond the human brain, thus expanding social memory and increasing the degree of connection between the most distant communities and human groups.

With the development of the media, it was possible to improve, disseminate and record information in an increasingly effective way. Santaella (2010, p.13), presents "six cultural eras characterized by the means of communication that provide the emergence of new sociocultural environments: 1 – Oral culture, 2 – Written culture, 3 – Printed culture, 4 – Mass culture, 5 – Media culture and 6 – Digital culture". These eras are not linear periods and cannot be analyzed by the exclusion method, according to the author "(...) a new

[4] Media "means, object or support of information" (co) A set of means of communication existing in an area, or available for a given communication strategy. Anglicized spelling of the Latin word *media,* as it is pronounced in English *média,* in Latin, the plural of *medium,* which means medium. In advertising, it is customary to classify vehicles into two categories: print media (newspaper, magazine, brochure, *billboard,* direct mail, *displays*, etc.) and electronic media (TV, radio, CD, video, cinema, etc.). Source: RABAÇA, C. A.; BARBOSA, G.G. Dictionary of Communication. Elsevier, 2002.

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communicative and cultural formation is integrated into the previous one, provoking readjustments and refunctionalizations" (SANTAELLA, 2010, p. 13).

Since the emergence of writing, man has created and developed new technologies to enhance the registration and transmission of information, thus generating the expansion of knowledge as well as the level of connection between individuals on the globe. An example of this was the "Gutenberg mobile press in the fifteenth century, (...)" as it allowed the replicability of writing in a much more efficient way.

Nowadays, even speech and images can be replicated countless times and transmitted in real time across almost the entire globe. The limitation that speech had in terms of geographic and temporal registration and transmission was then overcome.

HISTORY OF SIGN LANGUAGE

As explained above, man began to evolve because he developed technologies for the dissemination and recording of information and communication, such as speech and writing. However, if man does not have the sense of hearing, how would he communicate and develop the speech apparatus to interact with other individuals?

Until the middle of the fifteenth century, deaf people were considered sub-human, as beings who did not have sufficient cognitive capacity to learn and communicate with other individuals. The deaf person was a social outcast, considered incapable of performing any function. Because he was immersed in a world of listeners, with communicational limitations, he was classified as a disabled person. Until the fifteenth century there was no information transmission technology that could be used by the deaf to communicate and for the development of their learning. The great problem faced by deaf people throughout history was due to the fact that they were generally isolated in their family and social environments due to the lack of conditions to share meanings through a language.

> The defense and protection of sign language, more than signifying self-sufficiency and the right to belong to a particular world, seem to mean the protection of the traits of humanity, of what makes a man be considered a man: language. (MOREIRA, SILVA, 2013, P.54)

Taking into account the impact of new media generating "cultural eras" by Santaella (2010, p.13) and "technologies recreating reality" by Gabriel (2018, p.7). The initial comparison can be established that just as the speech apparatus is for the listeners in the articulation of oral language, the hands and sight are for the deaf in the articulation of sign

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language, in such a way that when it manifests itself as a communication technology among the deaf, sign language emerges as the first great leap of connection between the brains of the deaf, thus marking the beginning of the first era of this culture, in the fifteenth century (beginning of the Modern Age), considered by Strobel (2009, p. 19) as the *Cultural Revelation*[5], we can say: era of face-to-face communications. Since for Santaella (2005.p.14) (...) "For each historical period, culture comes under the domination of the most recent communication technique or technology."

It was necessary to observe communications between two deaf people, face to face, to identify the use of gestures, mimics, signs that began to be shared, generating dialogical exchanges that evidenced the deaf person's ability to think or reason.

From these facts, the importance of signs for the beginning of the education of deaf people was identified, which reveals a technology that emerges from face-to-face communications not using the speech apparatus, but vision and gestures. However, the educational proposal at this stage was to teach the oral and written language to the deaf person so that they could have their citizenship recognized.

In the course of this study, two remarkable facts in the history of deaf education stand out that justify the title "Sign language as technology: from face-to-face communications to communications in the digital age. It is the observation of deaf siblings who naturally developed signs to communicate, the phenomenon was observed by religious educators who started to use the sign method to teach the deaf and were very successful and changed the reality of deaf people. We describe the facts below.

The first was in 1648, John Bulwer published "Philocopus", where he stated that sign language was capable of expressing the same concepts as oral language, after studies with two deaf people: the barony Sir Edward Gostwick and his brother William Gostwick. In 1644 he realized that there were signs used by the brothers to communicate. The author believed that sign language was universal and its constituent elements were

[5] In the history of the deaf we divide it into 3 major phases:
1. *Cultural revelation*: At this stage, deaf peoples had no problems with education. Most deaf subjects mastered the art of writing and there is evidence that before the Milan congress there were many deaf writers, deaf artists, deaf teachers and other successful deaf subjects.
2. *Cultural isolation:* there is a phase of isolation of the deaf community as a result of the Milan congress of 1880 that prohibits the access of sign language in the education of the deaf, in this phase the deaf communities resist the imposition of oral language.
3. *Cultural awakening*: from the 60s onwards, a new phase for the revival in the acceptance of sign language and deaf culture begins after many years of listening oppression towards deaf peoples.

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natural (iconic) sign language as a complex system, used by men who were born deaf and mute (JOHN BULWER, 1648).

The second was in Paris, when Abbé L'Epée (Charles Michel de l'Epée: 1712 - 1789), began the work of formal instruction with two deaf twins from the Sign Language that was spoken in the streets of Paris, typed/manual alphabet and created signs and was very successful. According to records of the time, the meeting between Abbé L'Epée and the two deaf sisters took place on a night of heavy rain in 1760 in France. Abbé L'Epée, seeking refuge, saw behind a door two girls talking by means of signs. Intrigued, he asked to enter the house and offered to the girls' mother to take charge of the education of her deaf daughters, as shown in Figure 1[6]:

Figure 1- Abbot L'Epeé and the deaf sisters (1760)

Source: La revista digital de las Bibliotecas de Vila-real, 2015.

The results obtained in this period were of such importance that it changed the perception of what the deaf person is and his potentials. This proves that the introduction of

[6] Source: https://bibliotecavilareal.wordpress.com/tesoros-digitales/discapacidad-1/l-abbe-de-l-epee-y-las-hermanas-sordas/

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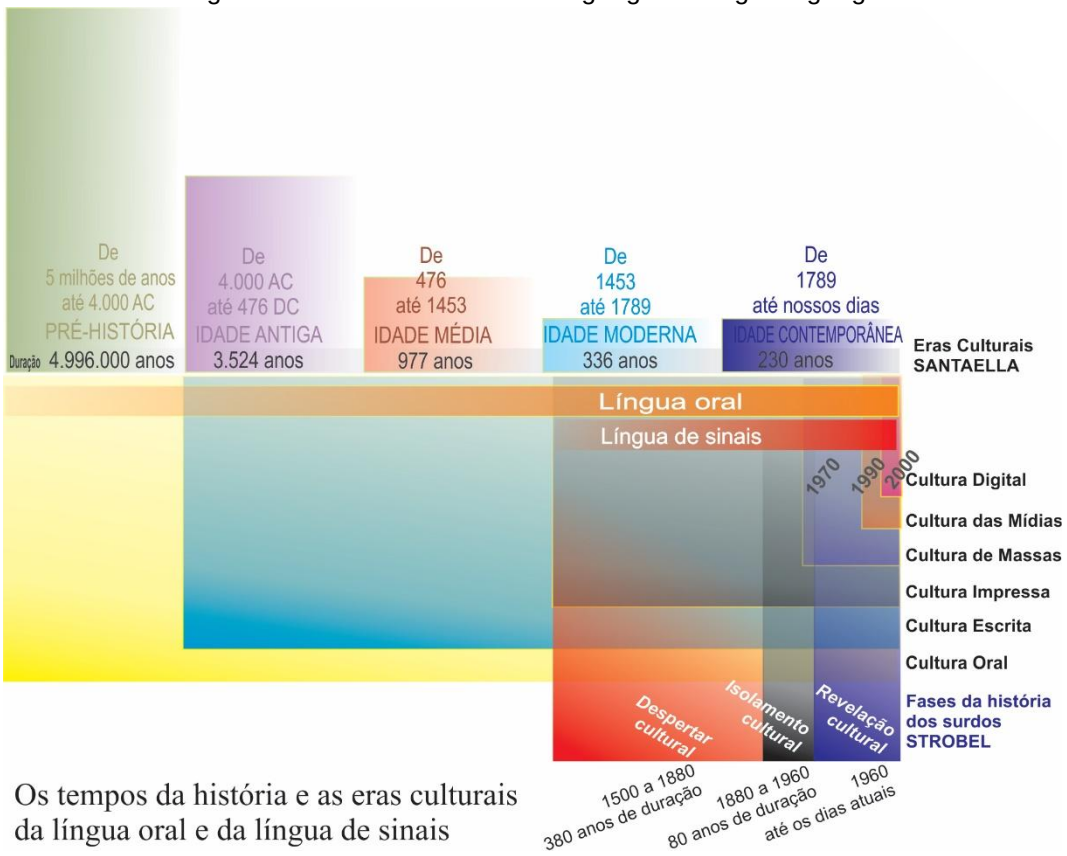
sign technology as a means of communication for deaf people has significantly changed the form of social representation of the deaf, who is now understood as a full human being capable of exercising their rights. Sign language, therefore, changed the reality of the deaf person, expanding their educational perspectives.

TIMELINES: PARALLEL BETWEEN ORAL LANGUAGE AND SIGN LANGUAGE

The timeline allows the visualization of advances in oral language, which have modified reality and promoted the development of humanity to the extent that these technologies (intelligence) have made cognitive leaps and connections[7] between brains, increasing communications, disseminating knowledge and integrating the planetary sphere.

Figure 2 - Cultural eras of oral language and sign language



Source: Prepared by the authors

[7] "Connection jumps" is the term used by Gabriel (2018, p. 16) to refer to *speech* and *writing* as great connection jumps for humanity.
"Cognitive revolution" when referring to the *book* – We can consider the book (the result of the combination of writing technologies and the mobile printing press) the first great cognitive revolution in the history of humanity. The *Internet* has leveraged the second largest cognitive revolution in our history, because in addition to having the potential to allow all human brains to connect to each other, [...] it has the potential to take our cognition to a totally different level...

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The illustration shows the established parallel between the historical time of oral language and the historical time of sign language, in which the late time of the *cultural awakening* for the deaf can be visualized due to the lack of a language with which they could make themselves understood and which coincides with the beginning of the era of *print* culture. In this period there were major changes in the way the deaf began to be represented socially, mainly with the sign method created by Abbot Lépee, as described by Sacks (1998).

> [...] for the important thing was that the abbot paid the utmost attention to his pupils, that he learned their language (which had probably not been done before by any listener). And then, associating signs with pictures and written words, the abbot taught them to read; and with that, at a stroke, he gave them access to the knowledge and culture of the world. De l'Epée's "methodical" sign system—a combination of native sign language and French grammar translated into signs—allowed deaf students to write what was said to them through an interpreter who communicated by signs, a method so successful that, for the first time, it allowed ordinary deaf students to read and write in French and, for the first time, Thus, they would acquire an education. De l'Epée's school, founded in 1755, was the first to obtain public aid. He trained numerous teachers for the deaf, and by the time of the abbot's death in 1789 they had established 21 schools for the deaf in France and Europe. (SACKS, 1989, p. 16)

With the advent of sign language, the first schools for the deaf emerged. They focused on the teaching of oral language. The first school appears in France, in 1755, with the Abbé L'Epée, the Institute of Young Deaf People in Paris, which had 60 students, and despite the use of signs as a method of communication, the main objective was the teaching of oral and written language, so that the deaf could integrate socially.

According to Rocha (2008, p. 19), the European Institutes for the Deaf trained deaf teachers who were usually hired to found other establishments for the education of the deaf. As in the case of Laurent Clérc, a deaf teacher and brilliant student, invited to form the first school for the deaf in America, in 1815. In addition to the deaf teacher E. Huet, who presented a report to D. Pedro II, revealing the intention to found a School for the Deaf in Brazil, which led to the foundation of the National Institute for the Education of the Deaf in 1857 in the city of Rio de Janeiro.

In addition, it encouraged several educators to study more about the education of the deaf, thus increasing studies on the subject. And the schools enabled the development of sign language because they became a meeting point for the deaf. And in this space of coexistence, the language expanded, expanding the vocabulary and its linguistic structure.

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Just as oral language expanded and spread with the increase in interaction between human beings.

Returning to the timeline, it is observed that in the period called "Cultural Isolation", a Congress began in 1880, in Milan, Italy, in which educators argued that the deaf could learn the oral language, and that sign language would be preventing the deaf from being oralized. The aim was to make the deaf people similar to the hearing ones.

> The International Congress of the Deaf and Dumb was held in Milan – Italy, where the oral method was voted the most appropriate to be adopted by schools for the deaf and sign language was officially banned claiming that it destroyed the speech capacity of the deaf, arguing that the deaf are "lazy" to speak, preferring to use sign language. Alexander Graham Bell had a great influence on this congress. This congress was organized, sponsored and conducted by many hearing specialists in the area of deafness, all defenders of pure oralism (most had already made a long effort before the congress to make the pure oral method prevail in the teaching of the deaf). At the time of voting at the general assembly held at the congress, all deaf teachers were denied the right to vote and excluded, of the 164 hearing representatives present, only 5 from the United States voted against pure oralism. (STROBEL, 2008, p. 26)

However, the oral method was very painful and slow, there was a lot of difficulty in the oral process. Thus, although sign language has been "banned" from the educational method of the deaf, it continued to be used by the deaf in a hidden way in school spaces – the main meeting place for the deaf.

The Cultural Revelation phase came to light in 1960, and lasts until today, as it elevated the status of language itself to Sign Language for presenting all the linguistic requirements. This was due to Stolkoe's research when studying the sign language of a tribe of American Indians, he found that these signs had all the linguistic characteristics of a language such as phonology, syntax, semantics and pragmatics. His studies revealed that sign language was articulated through hand configurations, marked points of articulation on the body, and movements that determined the syntactic aspects of this language. And so the paradigm of orality was broken.

At this point, with scientifically proven sign language, it shows the great technology used by the deaf for the development of thought, cognition, language and communication. Thus, the deaf began to claim it in the teaching and learning process, as well as regulation as their natural language.

The timeline in the illustration (Figure – 2) demonstrates that the two languages arose from the need for communication, from the sharing of linguistic sound and gestural-visual signs, from face-to-face dialogues, to the current hypertexts in the digital age.

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Finally, sign language has become equal to oral language in the face of the technological possibilities of the digital age due to the convergence of media.

Just as technology transports text from paper to flow between the screens of electronic media, contemporary society is increasingly interacting in the sphere of virtuality, and with this new forms of reading emerge made possible by hypertexts.

Technological mutations make possible the synergy between text, sound and image, creating hypertexts that dynamize the reading and transit of information in the fluidity of the virtual sphere. Costa (2005, p.40) summarizes the general characteristics of hypertext as follows:

> a) Nonlinearity: a central characteristic, according to Nelson (1991) refers to the flexibility of navigation allowed by the nodes;
> b) Volatility: a characteristic that makes hypertext something essentially virtual, since, according to Bolter (1991, p.31), there is no hypertextual stability because the choices and connections established by readers/writers are fleeting;
> c) Topography: according to Bolter (1991, p.5), hypertext is topographic and not hierarchical or topical, with no defined spatial limits of reading or writing;
> d) Fragmentarity: according to Marcushi (1999), also a central characteristic, which "consists of the constant connection of portions, generally brief, with always possible returns or escapes";
> e) Unlimited accessibility: information can be sought on websites (or sources) as varied as possible;
> f) Multisemiosis: language is no longer just alphabetic and can be worked simultaneously and integrated with verbal and non-verbal language (cinematographic, musical, visual, gestural), according to Bolter (1991, p.27);
> g) Interactivity: a characteristic similar to that of face-to-face communication (such as conversation with one or more interlocutors, in real time), according to Bolter (id.ibid.), refers to the interactive interconnection of the reader-navigator with a multiplicity of texts and authors;
> h) Iterativeness: refers to intertextuality, that is, the various forms of recursion to notes, quotations, consultations of / to other (hyper) texts. (COSTA, 2005, p. 40).

In general, these characteristics make hypertext a tool of great versatility and breadth applied in the life and teaching-learning process of the deaf, who have sight and touch as the main senses of interaction with the environment. In this sense, the interactivity that transcends the use of sign language from the limits of face-to-face communication beyond the screens of virtual media is highlighted, breaking distances, propagating the culture and the deaf identity, no longer being only transitory and instantaneous, to be edited in videos, applied in accessibility links, as well as being stored in virtual libraries, allowing the practice of recursion, production of knowledge and access to information in this visual/gestural language.

In this way, the deaf person exercises L2 by connecting to persuasive hypertexts in their visual communication, in an instigating and pioneering way, going through the texts in

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Portuguese language aiming at reaching communication and information in the context of their interests when navigating cyberspace.

Thus, the synergy that can be achieved in the virtual environment between these two languages, where texts and fixed and moving images interact constituting new languages, becomes a fertile field for a bilingual education, necessary for the formation of the deaf person.

The research found historical evidence that contributed to the paradigmatic changes in relation to the social representation of the deaf. The first around the sixteenth century, when religious educators identified the use of a sign language (visual gestural) in face-to-face communications between deaf people. As in the case of the barons (Spain) and the Melissas twins in France (STROBEL, 2008). From that moment on, the possibility of using a sign language as a technology for their education was verified. As a result of these facts, sign language has developed in educational institutions, as well as printed teaching materials, containing graphic representations of signs, used in the methodology for both student and educator use.

CONCLUSIONS

Sign and oral languages arose from the need for communication, from the sharing of sound linguistic and gestural-visual signs, from face-to-face dialogues, to the current hypertexts in the digital age. Finally, sign language has become equal to oral language in the face of the technological possibilities of the digital age due to the convergence of media.

Thus, the synergy that can be achieved in the virtual environment between these two languages, where texts and fixed and moving images interact constituting new languages, becomes a fertile field for a bilingual education, necessary for the formation of the deaf person.

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