The construction of meaning and collaboration in interactive media

discussion from the Libras Glossary

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INTRODUCTION

Due to the convergence of media and the development of technologies for accessibility, many people with disabilities have access to digital media. Regarding deaf individuals, the technologies integrated to social media (videos, messages, translators, etc.) have helped these users communicate. Thus, people with different skill sets have the conditions necessary to produce and diffuse videos, images, sounds, among other contents, reappropriating the traditional media productions, giving it new meanings.

The convergence phenomenon, according to Jenkins (2015), defines the technological, marketing, cultural and social transformations and it must be understood mainly as a process that goes beyond technologies that gather multiple functions in the same devices. Instead, the convergence represents a cultural transformation that depends strongly on the consumer's active participation, as they are encouraged to seek new information and make conections among dispersed media contents.

According to Flor et. al (2009), multimedia is a form of media convergence that integrates texts, images, videos, sounds and animations in a new media form, which results in the concentration and grouping of these different means in a harmonic and redundant manner that reaches the user in a larger spectrum of their senses. Regarding the hypermedia by convergence of hypertext and multimedia, it is formed by a communication technique that stores data in a digital environment in a way that permits the user to navigate and seek information of their interest, which may be presented in the form of texts, diagrams, still images, animated images, sounds, animations, all supported by the non linear navigability and by new semantic relations (SILVA, 2006) (Flor, et al., 2009).

The hypermedia has set a new paradigm of information, given that, historically, textual language has subdued visual language. According to Bonsiepe

(2011), the study of visuality and the distribution and assimilation of knowledge and also the understanding of complex subjects elevates the image status within sciences: "the new digital techniques will end the supremacy of the text, so strongly ingrained in Western tradition. For this new field of activities, the term 'Information Design' is used" (BONSIEPE, 2011, p. 40). Information Design works to reduce the cognitive complexity and contributes to present information in a useful manner, developing the adequate interfaces between the information and the user/reader (Bonsiepe, 2011).

According to Frascara (2011), Information Design must ensure the effectiveness of communication by facilitating the processes of perception, reading, understanding and memorizing and the use of the information presented. The author suggests that the essence of the Information Design is focused on the user and his needs, which causes a shift in the primary purpose of the activity from the production of the object itself to the production of meaning for and by the public.

From a production standpoint, the Information Design process occurs in two distinct moments: the organization of the information and the coding-implementation of their visual presentation. These tasks require interdisciplinary skills to process, organize and present the information in both linguistic (written) and non linguistic forms (the image in its broader sense) (Frascara, 2011).

The traditional view of information suggests a message transmitted unidirectionally to a passive receiver who will have their behavior directly and immediately affected (PASQUALL, 2005). However, Dervin (2000) criticizes this imposed and functional relation that the term has acquired and defends a negotiated and constructive logic of information, called Sense-Making, which, in its turn, establishes a bidirectional communicational approach to the exercise of Information Design. Thus, individuals, in an isolated or collective manner, take part in the production of meaning as they explore the information in an interactive dialogue (Dervin, 2000 apud Gianella and Souza 2015).

Nonetheless, there are many virtual environments that still depend a great deal on written language for communication and, consequently, for the production of meaning to a large amount of users, as well as the unavailability of interactive qualities. Thus, many interfaces exclude the deaf individuals who use sign languages, as the communication of this group is of visual, spatial and kinetic origin. The hypermedia and the digital means of communication need appropriate and adapted interfaces that broaden the access by these individuals, and also that make sense to them, with the potentiality to acquire knowledge.

Therefore, the purpose is to discuss the importance of the construction of meaning for the development of interactive media oriented towards deaf users, once it is observed an increase in the importance of the use of image, video and active interaction and participation of the user/reader-author in cyberspace.

Thus, this literature revision is corroborated by the Social Media integrated Libras Glossary. The glossary project is the result of a sponsorship announcement provided by the brazilian research funding agency CNPq[1], carried out through a partnership between the Palhoça Bilingual Campus of Santa Catarina Federal Institute, the Deafs Project of Rio de Janeiro Federal University and the Florianopolis' Association of the Deaf. The first and second topic present the literature revision on Construction of Meaning in Hypermedia and Collaboration, evoked from the signification approaches that describe the user's active role in choosing his reading paths in the hypertext and the user's participatory logic in the cyberspace interactions that grant them a reader-author role. The third part presents a discussion on Deaf Users and the Information and Communication Technologies. Then, the methodology and the Libras Glossary example are presented followed by the due discussions on the topics and final considerations.

CONSTRUCTION OF MEANING IN HYPERMEDIA

According to Carvalho and Pereira (2017), the interactive digital environments can be viewed as a pre-linguistic analogous means, in a superior technological level, and the digital interfaces can be viewed as devices that are capable of establishing cognitive relations that do not depend on the linguistic perspective for communication to occur. Therefore, interfaces based on visual, sound and kinetic languages can enable environments that are rich in meanings and with less excluding potential for the deaf users in question.

The interface is the space in which the body, tool (object or sign) and action goal are structured (Bonsiepe, 2015), in a way that fulfills the role of a filter between humans and the digital world, presenting as a translator of some sort, mediating both parts and rendering them sensitive to each other.

These interfaces permeate the hypermedia, which, to Santaella (2009, p. 48) is "the integration, without any sutures, of data, texts, images and sounds, within a single digital information environment". For this author, this constitutes a language hybridization, in such a way that the sum of these elements results in the formation of a distinct semantic context, which requires a reorganization of the cognitive model of the traditional reader's user. This concoction of languages makes it possible for the user to perform a "synesthetic reading" tied not only to the intended message, but also anchored to his own repertoire of cultural and sensory experiences.

This reading mode is enabled by the hypertext, a basic cyberspace[2] language constituent. The hypertext assigns a more active role to the user, as he himself decides which link groups he will go through. According to Theodor Nelson, who coined the term in the 60's, the hypertext is "a unified concept of ideas and data that are interconnected, in such a way that the data can be edited in a computer. Thus, it is an instance that highlights not only a data organization system, but also a form of thinking" (Nelson, 1992).

According to Koch (2007), the term hypertext designates a non-sequential and nonlinear writing branching out in a way that gives the virtual reader unlimited access to other texts, as he proceeds to make local and successive choices in real time. According to Levy (1993, p. 40) apud KOCH (2007), human memory is structured in a such a way that the individual better understands and retains what is organized in a spatial relation, as is the case of the schematic representations. As the hypertext proposes access and reading paths under the form of networks, diagrams or dynamic and manipulable concept maps, it favors a dominance of the matter that is quicker and easier than the classic audiovisual or the traditional printed media.

According to Falsi (2008), the act of cybertext reading is the act of a player, of someone who bets on certain construction strategies on the web. Each reading choice generates a new set of significations in the cybertext. Therefore, the first signification process is the one in which the reader makes the choice of which significants will be a part of the work that he will read. In the case of a work in digital media, the significants go from a word on the screen to an animation in which images mix with sounds and other words. Moreover, for the same author, every and any cybertext would also have an interpretative function related to the several meanings the reader can find within the text.

According to Santos (2003), quoted by Falsi (2008), in the process of navigating from one text to the other, through links, there would be, not a first and a second texts, but a relation in which the second text is read according to the extent to which it evokes or not the text from which it arose. From the process of differentiation and from the actions taken by the reader between the two texts, a third text would arise, which would be the text as productivity, a text that the reader provides himself to read.

Thus, in the cyberspace there would be an initial requirement to build the setting of the narrative first and this task would also be the reader's task, or primarily the reader's, since the authorship would be linked to the disposition of the

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[2] Space of communication through computer networks. In: https://www.dicio.com.br/ciberespaco/.

prefigured structures for this reader. The author should be able to create a work in which the stories (still) untold appear as stories in a latent state. There would be, in the cyberspace, the need for the reader to be able to dislocate himself not only in the reading process, but in a process of reading-writing. In other words, it is up to the receiver-participant to create the work that he will experience (SANTOS, 2003 apud FALSI, 2008).

HYPERMEDIA COLLABORATION

The web collaboration environments are enabled through chats, forums, open encyclopedias and other forms of sending and receiving messages, in which the individual contacts other people and other cultures, and it is also possible to contact people who are closest to their interests. Furthermore, these environments favor problem solving in a collective manner, as they allow for the knowledge to circulate freely and to be fed both by apprentices and by experts (Flor, et. al, 2009).

In the context of convergence, to Jenkins (2009), consuming has become a collective process, and the author understands this as collective intelligence, an alternative to media power, in a way that by piecing together the parts of individual knowledge, the individuals unite resources and skills. The participative culture consists in the consumer's interaction with the communicational forms. The consumer stops watching merely as a passive receiver and starts participating, creating and sharing their project in a collective manner. Thus, participative culture is based on the appropriation of elements belonging to a certain media product by people who did not orginally produce it – fans, for instance – and who, from this product, create their own.

Still according to Jenkins (2015), each individual's choices regarding passing on media texts or not – such as tweeting, sharing a video or forwarding something via e-mail – are remodeling the very scenery of the distribution for circulation media, signaling a more participative model of culture, in which the public is no longer viewed as a group who consumes pre-built messages, but as people who are shaping, sharing, reconfiguring and remixing media contents. And furthermore, people are not doing so in an isolated manner, but as members of broader communities and networks that allow them to diffuse content beyond their geographical area.

The collaborative creation processes require that the frontiers between author and reader are tenuous enough so that the emphasis of the relationship is on the process itself, and not on the product of which it derives. According to Couchot (2003) apud Falsi (2008), the ideal is that these participants share the same communicational logic, the same will of crossing, the same sensitive space, the same temporality.

Thus, to Bittencourt and Ribeiro (2016), the hypermedia enables learning and exchange of information from its nonlinear network and its multiple interaction possibilities, promoted by the hypertextual structure and the integration of different modalities.

Therefore, the construction of sense in hypermedia is associated to the user's active role, which puts him in the place of a reader-author, as he builts his text from the choices and paths that he will travel through the hyperlink. Also, the hypermedia signification is tied to a collaborative and constructive process, which can lead the user to the production of a possible meaning within his cognitive and cultural repertoire.

DEAF USERS AND THE COMMUNICATION AND INFORMATION TECHNOLOGIES

According to Carvalho and Pereira (2017), the gesture language is considered the man's first tool of communication, while the speech is defined as a secondary resource. The voice entonation in speech, gestures and body language are commonly used in everyday life, it is non verbal communication, wherein sounds, images and movements are also considered pre-linguistic.

Historically, language has become the main cognition modeling system, to which different classes of signs are subordinated - visuality, sonority, spatiality and kinetics. Thereafter, a major part of the technological advancements were based on this evolutionary process of the communication, leading to the dissemination of information and knowledge on written language level (Carvalho and Pereira, 2017).

Regarding the severely deaf population who use Sign Language, this process of greater appreciation of verbal language to the detriment of visual language in several communicative systems eventually isolated this community of access to information, to knowledge, on television, in educational institutions, movies, public services, courseware, etc.

Also, for many years, sign languages were prohibited to deaf people for being considered a lesser and inconvenient mean of communication, devoid of scientific rigor. Since the 60's, sign language started to be taken under consideration as an actual language and not only as mere gesture. The sign languages are essentially different from oral languages due to their visual-spatial modality, which causes them to be perceived through sight and produced by the hands and facial and body expressions. The oral languages, on the other hand, are characterized in a oral-hearing manner (Gesser, 2009).

Bilingualism is the acquisition and use of two languages, in the case of a deaf person, the Sign Language is the mother tongue and the second language is the

one used in their country, in written form. In this sense, the bilingual proposition understands the deaf subject as a participant of two realities, living at the same time the culture of his mother tongue, in which he has his worldview built, and the one used in the everyday life of the community to which he belongs (MORAES, L. et al., 2017).

However, for a long time, the deaf communities were closed and isolated, due to barriers of physical distance or barriers to access the traditional means of communication and technologies used by the hearing majority. With the access to the Information and Communication Technologies (ICTs), which favor the communication and the exchange of information, the deaf or impaired hearing population has found a new form of communication. (MORAES, L. et al., 2014).

Before long, with the use of digital medias, photographic cameras and videos, webcam chats and text messaging apps, the communication between sign language users has been considerably widened, as well as the propagation and acknowledgement of this language by most users of oral languages (MORAES, L. et al., 2017).

According to Saito (2016), the sign language is a constituent element of the deaf individuals' reality and given that it is present in their everyday life, in the material world, it also needs to be present in the virtual environments. The technological changes have contributed in a meaningful way to include the deaf individual in social, cultural and learning channels by presenting innovative strategies to interact and communicate, creating the possibility to strengthen connections between deaf individuals. The possibility of uploading videos generated by the users now allow deaf people to share their videos and register their language and culture (Schallenberger, 2010 apud Saito, 2016), and vlogs and websites such as YouTube are the most widely used for this purpose.

METHODOLOGICAL PROCEDURES

The present study is characterized as a theoretical and empirical scientific research, that seeks to discover new knowledge on the construction of meaning in hypermedia, more specifically for the development of bilingual interfaces (Libras/Portuguese).

Regarding the purposes, the research is of the exploratory and descriptive type, since it explores reality in search of greater knowledge to be described posteriorly. According to Gill (2008) "the reality is explored in search of knowledge" and "the object of the study, the facts and phenomenon are described, with the maximum accuracy possible". The approach is qualitative, for the starting point is a bibliographic research and the conceptual basis to intermediate the discussion of findings was researched in books, articles, thesis and dissertation databases, etc.

For the purpose of discussion with the literature revision, the example presented here is the construction of a Libras Glossary integrated to Social Media, which enabled the relation of the construction of meaning in hypermedia.

LIBRAS GLOSSARY PRESENTATION

The Libras Glossary[3] is a web platform destined to the search and organization of entries in Libras. Linked to social networks, it allows the user to research the words in portuguese and, in the results, videos with the sign and meaning in Libras will come up.

It is a collaborative platform, in which the users take part by sending videos to register signs of different study areas and different regions of the country, where there is linguistic variation. The evaluation and ranking of the entries is performed through the likes[4] and shares, which allow to evaluate which signs will be more accepted by the deaf community. The prototype is still in testing phase and a few functionalities are still not available, but it can be accessed at: www.palhoca.ifsc.edu.br/glossario.

The proposition is a system based on Web technology for the operationalization of a Libras glossary integrated to social media, therefore boosting its functioning in the molds of Communities of Practice or CoPs. These communities are characterized by "gathering people with a common interest, a passion for a certain subject, with this interest being the responsible for creating true connections between people and propitiating the sharing of opinions and thoughts" (Saito, 2016, p. 81).

The construction of glossaries is very important, since the Brazilian Sign Language (Libras) was only acknowledged in 2005 and it is in full development, with efforts towards building and formalizing vocabulary in this language (Gesser, 2009). According to Saito (2016):

> The scientific and technological evolution has provoked the appearance of new terminology (in oral languages) to approach the knowledge generated. However, there is a lack of scientific terminology in Libras in several knowledge areas, which hampers communication, since the literature already re-

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[3] The Libras Glossary project is the result of a research sponsorship announcement by CNPq-SETEC/MEC Nº 17/2014 carried out through a partnership between the Palhoça Bilingual Campus of Santa Catarina Federal Institute, the Deafs Project of Rio de Janeiro Federal University and the Florianopolis' Association of the Deaf.

[4] Method of interaction on the social network Facebook, that registers a positive evaluation. www.facebook.com.

ports the shortage of SL registries, as well as the need of communication between communities. (Saito, 2016, p. 41).

The project was developed by a multidisciplinary team, formed by researchers of the group "Development of Bilingual Learning and Teaching Objects - IFSC"[5], in which take part a designer, two programmers and a film-maker. The images below show the layouts of the screens of the Libras Glossary.
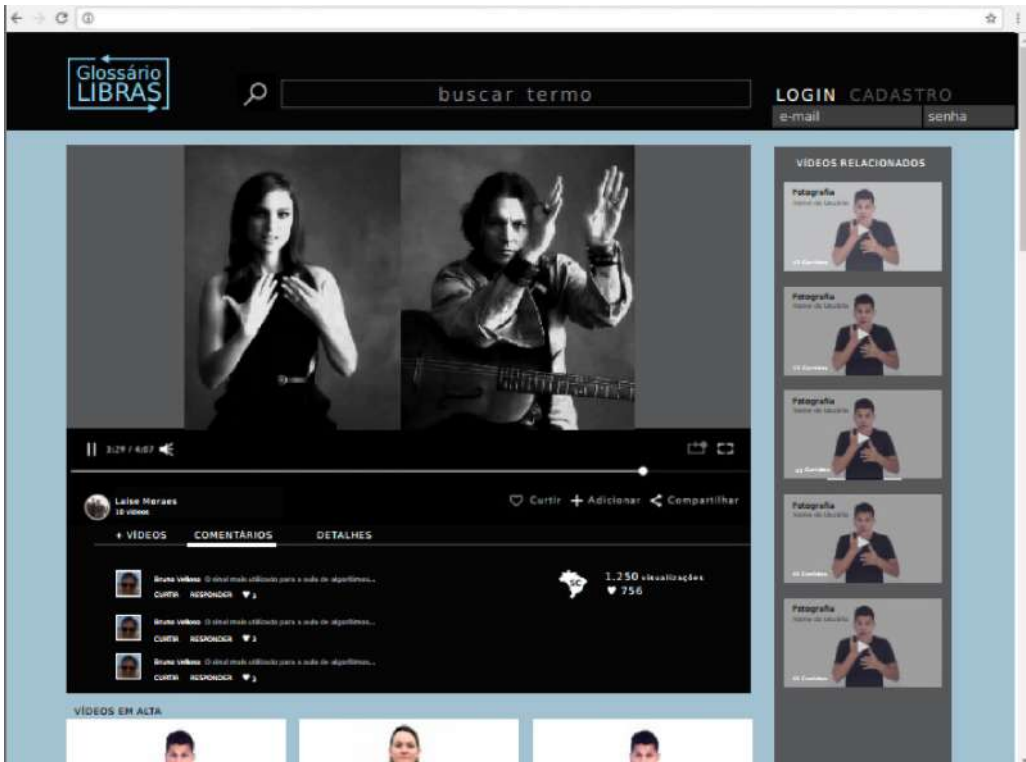

Image 1 - Interface design based on the visual identity created. Text and image are fictitious. Source: image by the authors.

[5] The researchers who take part in the project were omitted for blind review.
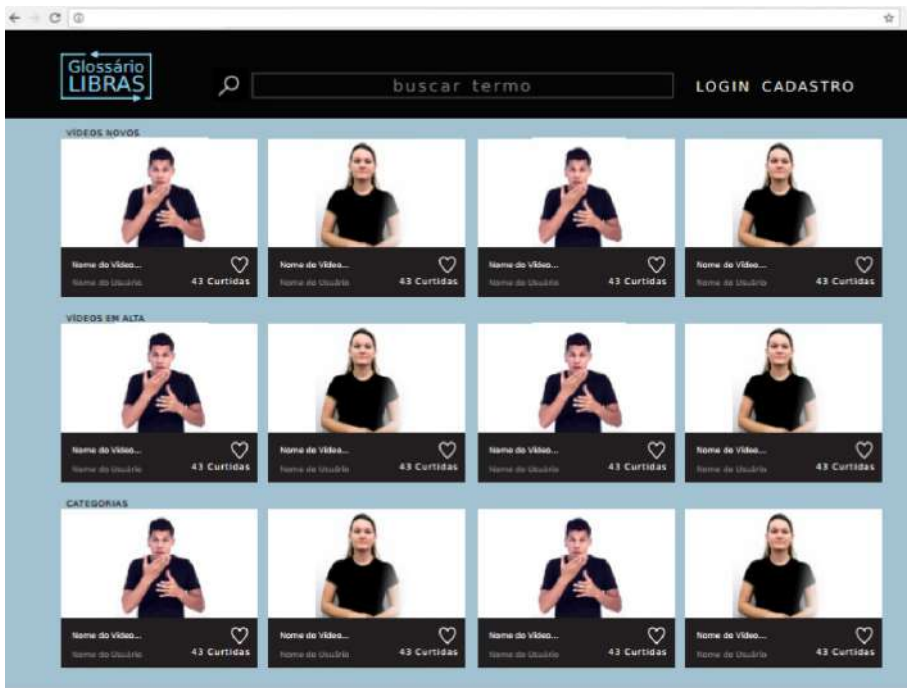
Image 2 - Home screen with links to other entries, the same design is used for search results. Source: image by the authors.
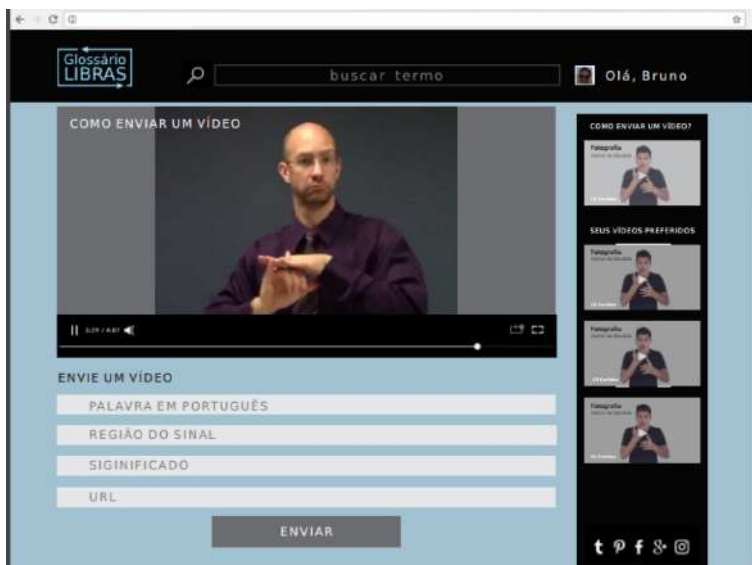

Image 3 - Loading screen (send video), with the upload instructions in Libras. Source: image by the authors.
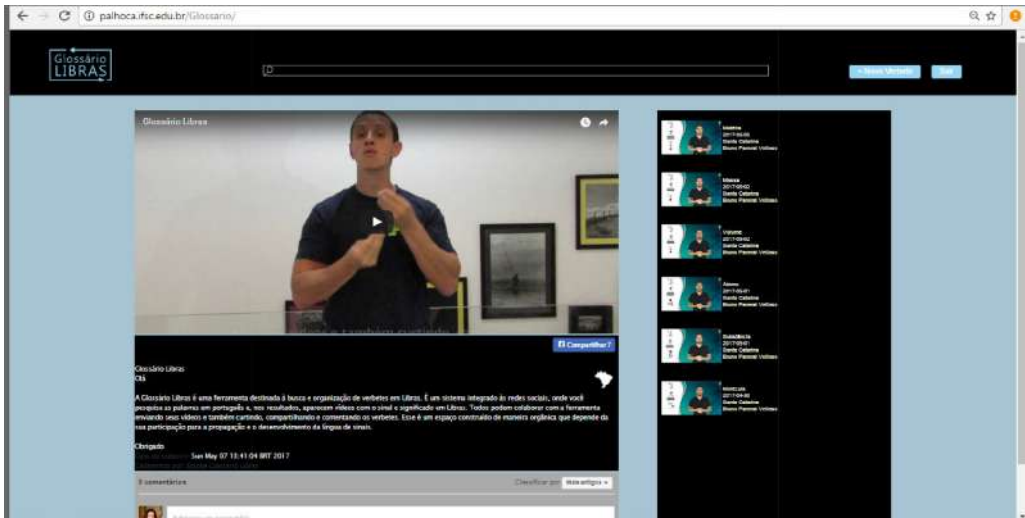
Image 4 - Prototype in testing phase. It can be accessed on: http://palhoca.ifsc.edu. br/Glossario/. Source: palhoca.ifsc.edu.br/Glossario.

Image 1 shows the main aspects related to the functional requisits: integration to Social Medias (Facebook.com), related entries, comments, entry region and textual explanation (meaning of the word). Thus, four types of screen have been defined:

- **Home Screen:** Image 2, the first screen accessed on the system, with links to other entries, it presents the most searched videos and the best ranked videos;
- **Entry Screen:** Image 1, a screen where an entry can be completely visualized. It is the same screen of a logged user;
- **Search Result Screen:** Image 2, a screen that shows the entries list as the result of a search;
- **Uploading Screen:** Image 3, a screen where an entry can be uploaded.

RESULTS AND DISCUSSION

The process of creating new platforms exists due to a social need and is related to the flow of images, texts, ideas, stories and relationships within the culture of convergence. On the other hand, the participative culture and the collective intelligence can be seen as an alternative to media power. Thus, the contextualized and interactive environments, rich in socio-cultural ties, in dynamic images associated to the possibility of navigation offered by the hypertext, have shown to be effective resources in building autonomous and collective knowledge.

In this context, the collective construction of the hypermedia glossary is shown to be relevant in the context of deaf users and in the learning-teaching process. Among the benefits brought by the hypermedia glossary, Nagata (1999) apud Bittencourt and Ribeiro (2016) highlight the following: (1) it is easier to use than a dictionary; (2) it directs the apprentice's attention to the keywords; (3) it helps to immediately connect the words to their meaning; (4) it contributes to perform correct inferences and to retain lexical knowledge, since the glossary encourages the student to go back and forth between the keywords and the multimodal notes, which generates greater engagement of the student in processing the information.

The Glossary project had, as the main purpose, to develop a graphic interface that met the semantics in other social media already used by the deaf public, Facebook and YouTube, for instance, being more intuitive and sensorial, corroborating what is highlighted by Carvalho and Pereira (2017), for "the mixture of languages provides the user a synesthesic reading", tied not only to the image volunteered, but also anchored to the user's repertoire of cultural and sensorial experiences.

The fact that a mediatic and interactive interface was chosen for the glossary facilitates the transmission of knowledge to mixed receiver groups, as pointed out by Storrer (2000) quoted by Koch (2007). Thus, regarding the deaf and hearing community related to bilingualism, each receiver goes through the web of modules and links in individual reception paths, in other words, each user decides, in accordance with their previous knowledge, interest and preferences, which modules they wish to access and in which order and combination: his freedom of choice is only delimited by the links installed by the author and by the functionality of the system (Storrer, 2000 apud Koch, 2007).

In accordance with the study conducted by Falsi (2008) on the construction of meaning in cybertext reading, in the Libras Glossary, the author (meta-author) and reader (receiver-participant) alter their places, not setting defined roles, since content production (the entries) in texts and videos is ofter originated by a person, who exposes their own information repertoire. This new entry will be read by another, who will then ressignificate it according to their own context; and from this, they can enlarge their knowledge ou propose new meaning, producing a new entry, with a new hypertext.

It is important to highlight that feeding the Glossary depends on the meanings that it will have for its users (readers-receivers), since the author who programmed the platform has only forseen the possibility of receiving content in videos and texts, therefore, the forms in which the contents will appear, which entries will come up first or which will be more accessed and popular, depend exclusively in the users' actions, guided according to each reader's repertoire.

Lastly, the construction of sense depends on the collaborative processes that will be generated by and between users. For a new entry to remain active on the platform, this new video depends on the following two conditions: first, that the readers validate, access and share this entry on their networks, through the "like" or "share" features. Secondly, that they collaborate with the platform, since it needs the participation of several users to evaluate and share the entries and feed it again with new contents.

Therefore, according to Falsi (2008), the narrative is in constant organization and reorganization, which does not need to be done in a material form. A new reader can build a new texture, a new narrative, as well as make it available as more than one possible configuration: "experimenting the work that arises according to his own combinations".

FINAL CONSIDERATIONS

This research has highlighted the importance and the complexity of hypermedia, in view of the way the user interacts, a fundamental factor for the constitution of interfaces that are rich in meaning. The example adopted for the discussion meets the literature revision of this research, by showing that the interfaces with interactive and visual qualities enable environments that are rich in meanings and adequate to deaf users.

In this context, the digital interfaces are layers capable of establishing cognitive relations that do not depend on the linguistic perspective (dominant) for communication to occur. The richness of the construction of meaning in hypermedia is in the bilaterality of the production of information, carried out both by the "writer" and by the "reader". Thereby, more interfaces with the possibility of producing collective knowledge can be designed, with organic development and more accessible to different users.

The publication of this Libras Glossary openly throughout the internet provides an almost endless dissemination and sharing, and the user is active wherever he may be, enabled by the hypertext and by the very own participative and collaborative model of the environment.

Thus, the approaches of the Construction of Meaning in Hypermedia are relevant in building multimedia interfaces oriented towards deaf users, here exemplified by the Libras Glossary, once they allow the user's active interaction with other readers and with the platform/interface. Out of this interaction, the construction of meanings takes place through the construction of different narratives in the hypertext reading, as well as of the collaboration with the actual content production.

Lastly, the Libras Glossary is in the phase of prototype improvement for the final version. It is expected that this new platform can assist in the development of sign language, in the process of teaching and learning by deaf students, in the relationship between deaf and hearing individuals and that it might be capable of setting up a community of practice, developing in an organic manner, expanding its use and access to other communities.

For future researches, this theoretical referential can be used for new multimedia artifacts that go towards more accessible and user-focused designed interfaces. Moreover, the interaction of the deaf users with the Libras Glossary is to be evaluated and the dissemination of this tool is to be enhanced.

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