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Artigo

Bilingual Virtual Learning Enviroments for deaf Distance Education students

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ABSTRACT

Information and Communication Technologies (ICT) are strategic tools in the interaction between individuals, social groups and means of knowledge organization in contemporary society. The popularization of internet presents the challenge of a paradigm centered on respect for differences and potential development of all kinds of people. Looking for contributing to an increasingly inclusive society, this paper presents systematic literature reviews and discusses how the deaf community is placed in our society, together with its main learning problems and its insertion in the use of ICT. To do so, within an inclusive Virtual Learning Environment (VLE), it was tested different narratives for teaching Descriptive Geometry to both deaf and hearing students. Subsequently, focus groups discussed the experience. After that, the discussions were analyzed based on Critical Discourse Analysis, developed by Norman Fairclough. The results indicated that the virtual environments used for bilingual learning Education (DE) may offer the deaf students accessibility and sharing with hearing friends.

Key Words: Accessibility, Deaf Community, Virtual Learning Environments

RESUMEN

Tecnologías de la Información y Comunicación (TIC) se constituyen en herramientas estratégicas en la interacción entre los individuos, los grupos sociales y las formas de organización de conocimiento en la sociedad contemporánea. La popularización de la internet presenta el desafío de un paradigma centrado en el respeto a las diferencias y en el desarrollo de las potencialidades de todas las personas. Buscando contribuir en una sociedad cada vez más inclusiva, este artículo presenta revisiones sistemáticas de la literatura, discute como los sordos están colocados en nuestra sociedad, sus principales problemas de aprendizaje y su inserción en el uso de las TIC. Para ello, a partir de un Ambiente

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Virtual de Aprendizaje (AVA) inclusivo, se evaluaron diferentes narrativas para la enseñanza de Geometría Descriptiva junto a alumnos sordos y oyentes. Posteriormente, grupos focales discutieron las experiencias. Luego, las discusiones fueron analizadas con base en el Análisis Crítico del Discurso, propuesto por Norman Fairclough. Los resultados indicaron que los ambientes virtuales de aprendizaje bilingües utilizados en Educación a Distancia (EAD) podrán ofrecer al alumno sordo el poder tener acceso y compartir con colegas oyentes.

Palabras claves: Acceso, Sordos, Ambientes Virtuales de Aprendizaje.

RESUMO

Tecnologias da Informação e Comunicação (TIC) constituem-se em ferramentas estratégicas na interação entre os indivíduos, os grupos sociais e as formas de organização de conhecimento na sociedade contemporânea. A popularização da internet apresenta o desafio de um paradigma centrado no respeito às diferenças e no desenvolvimento das potencialidades de todas as pessoas. Procurando contribuir para uma sociedade cada vez mais inclusiva, este artigo apresenta revisões sistemáticas da literatura, discute como os surdos estão colocados em nossa sociedade, seus principais problemas de aprendizagem e sua inserção no uso das TIC. Para tanto, a partir de um Ambiente Virtual de Aprendizagem (AVA) inclusivo, foram testadas diferentes narrativas para o ensino de Geometria Descritiva junto a alunos surdos e ouvintes. Posteriormente, grupos focais discutiram as experiências. Após, as discussões foram analisadas com base na Análise Crítica do Discurso, proposta por Norman Fairclough. Os resultados indicaram que os ambientes virtuais de aprendizagem bilíngues utilizados em Educação a Distância (EAD) poderão oferecer ao aluno surdo acessibilidade e compartilhamento com colegas ouvintes.

Palavras-Chaves: Acessibilidade, Surdos, Ambientes Virtuais de Aprendizagem .

INTRODUCTION

Among 190 million Brazilians, 305 thousand people form a small country (IBGE, 2010). They are deaf who have total inability to hear do not hear and are distinguished by this condition, not only from the hearings of hegemonic speech, but also from the 9 million people who consider themselves hard of hearing in the country. Thinking Distance Education (DE) for this population of people with profound and / or severe deafness implies breaking the paths of language, the history of deaf people in context over time and the shape or educational methods that empower deaf to acquire knowledge, at a time which new standards of alterity and in which concepts of accessibility and inclusion are being claimed and put to the test are gaining space.

It is important to understand that deaf people do not learn Portuguese language in a natural way like they learn sign language. Deaf people with deep and / or severe deafness need to acquire the language, structuring elements of thought (GODLFELDT, 1997) through vision, more precisely by the acquisition of Brazilian Sign Language (LIBRAS). Thus, both in presence-based modality, as in DE, new challenges are set to specialists and educators because there is no way to ignore the enormous potential of minds, creativity

and condition, even in a society that consider them "disabled", that something they "lack" and they have a chance to "cure". If there are new challenges to presence-based education in this regard, what about DE, in which Virtual Learning Environments (VLEs) are the "flagships" of digital platforms, in which the learning objects, forums, calendars, chats and activities are elaborated in Portuguese and taught by professors and tutors virtually present.

That, for the deaf, constitutes advances and digressions in learning, as will be seen in this article. The same Portuguese that the deaf acquire like a foreign language, and that hinders their development, also appears as a point of contact with the advent of Information and Communication Technology (ICT). Although at first glance this may represent a paradox – since how can a foreign language, in the sense of "non-native", permits the establishment of connections with the hearing culture? – As we shall see, DE symbolizes an immense field to be unveiled and improved when it comes to issues such as deafness, accessibility, learning and new technologies.

It can be also said that in DE a deaf person has numerous barriers to overcome, because the way he/she decides to learn or the educational philosophy, here understood in the conception of Saviani (2009) as a set of reflections and thoughts with social and historical implications in the area pedagogy, will define his/hers qualifications to the labor market. No doubt that all teaching material (AVAs, books, booklets, articles) are hegemonic n the case of what is offered in Portuguese, in comparison with sign language. The researcher Ronice Quadros (2010) has no doubts that deaf people need to learn Portuguese, because live in a hearing world where "the one that dictates orders, speaks". The author argues that the whole process of education goes by the Portuguese language, access to texts and books, which inserts the deaf as implied in Brazilian education.

Thereby, the school now has a key role in deaf education in Brazil, because it will ensure a more active access to LIBRAS, that the deaf do not have at home. The school will have to fill in this gap, so that the deaf can acquire language and learn Portuguese as a second language. On the other hand, to have exactly the same materials of other deaf students assures the possibility of not feeling discriminated: "The simple fact that the material already taught and establishes the school routine, giving a sense of organization and the notion of time", said (CAMPBELL, 2008, p.118). Likewise, access to virtual environments with the same content for deaf and hearing people offers the chance of inclusion.

However, the most serious barriers to Portuguese language, which refer to misunderstanding and a sense of isolation for those who do not master it, prevent access of deaf students on equal terms with the hearing. What to do? Would the virtual learning environments inclusive structured to meet the demands of bilingual situations? The answer to these questions could be evaluated under the Accessible WebGD VLE, which seeks to structure the teaching of Graphic Representation for deaf and hearing through different genres of narratives. The intersection of work and systematic creation and implementation of content revisions allowed

the construction of the environment within a truly inclusive perspective, as discussed in this article.

1. METHODOLOGY

The systematic review method is adopted in the academic as reference of evidence through the analysis of relevantreserches and focused on a particular subject. To compose a comprehensive conceptual basis of the subject, it was necessary to conduct systematic reviews along the databases interdisciplinary nature beyond traditional reviews (manuals) held with the databases of institutions representing the deaf community.

According to the theoretical framework proposed by the Cochrane Collaboration (2012) to the orientation of research in a systematic review, we aimed to review, determine, select, analyze and synthesize empirical, theoretical and relevant studies to the topic of this paper.

Initially, it was necessary to identify the characteristics of learning and teaching deaf people. Thereby, the relevant concepts here considered for the formulation of the question from the Literature Systematic Reviews research came from the word "deaf". Next, we aimed to describe the words that "identify" or "activate" the concept in the context of research, which for Wives (2004) is a difficult task, because it can only be assumed what words used in the texts will be analyzed.

Associated with the word "deaf", the words “learning” and "spatial representation" are grouped, therefore, by recommendation of an expert in the area of Graphic Representation, aiming to investigate aspects related to the following question: "How do deaf people learn?". Based on this formulation three Literature Systematic Reviews were made (LSR 1, 2 LSR 2, LSR 3) with the *Portal de Periódicos Capes* (Improvement Coordination of Higher Education Personnel; http://www.capes.gov.br) and with Scielo bases (http://www.scielo.org), Scopus (http://www.scopus.com/home.url) and Web of Knowledge (https://m.webofknowledge.com).

In the case of the latter two, according to its international aspect, the descriptors were written in English: "spatial representation" AND "deaf" AND "learning". There was no restriction on the publication date or scientific knowledge field.

2. ANALYSIS AND SYNTHESIS

Statistics have shown that at least one in each thousand of children born is profoundly deaf and that many people develop hearing problems throughout life because of accidents or illnesses (INES, 2011). This establishes another difference. Who becomes deaf before contact with the oral language has a level of deafness classified as "pre-linguistic"; who becomes deaf after is considered "post-linguistic". This determines conceptions of models that reflect different discourses, with implications in the life of a deaf person, as we shall see in this work of analysis and synthesis.

Researchers are unanimous in pointing out two models or concepts established by the way the deaf acquires language: by means of sign language or by trying to adapt to the oral language, which established numerous studies that aim to highlight differences between these two public (FERNANDES, 1990; BOTELHO, 1998; SANTOS & DIAS, 1998, MEIRELLES & SPNILLO, 2004).

These models do not fit in the issue of elderly people, who throughout life is likely to have diminished hearing, which is another public with their specificities and characteristics. Among the deaf, to have acquired the language by signs or orally demarcates a controversial and unfinished debate among educators, researchers and professionals in the health field.

The polemic was established since the eighteenth century, when the abbot De l'Epee (1712-1789), founder of the first public school for the deaf people in the world, in France, and educator Samuel Heinicke (1727-1790), Germany, became public their respective beliefs in public education for the deaf. The first one developed the sign language associated with French grammar creating what he called "methodical signs", while the second created a systematic instruction based on strictly oral methods.

Common sense says that, generally, people with partial hearing loss refer to themselves as having a hearing impairment, while those with total hearing loss prefer to be called Deaf (Manual of Writing of the Assembly of the State of Rio Grande do Sul, 2011).

Born deaf and had never heard sounds place the person in a "pre-linguistic" status. Become deaf after acquiring the faculty of speech gives the person a "post-linguistic" condition, that is, he will make use of oralization resources and try to hear with the help of hearing aids, the cochlear implant or prosthesis type.

This peculiarity of the deaf world determines opposing concepts in education, culture, politics, in short, of existential human development. It all starts with the language. While there are different theories of how humans acquire language, there is consensus among researchers about their important role in the structuring of thought (CHOMSKY, 1994; CAMPBELL, 2009). The contributions of Vygotsky (1896-1934), since the 1980s, that claim that the development of the deaf child should be understood as a social process, will also introduce the basis for new perspectives in relation to deafness.

2.1. Deafness and language: narratives of deaf history

Physical and neurological limitations establish a pre or post-lingual deafness, which in itself determines differences, deaf since birth is infinitely different than become deaf after learning to speak a language. Language is the gateway to the establishment of language as the thought a structuring factor. Language includes the function of thought (GODFELD, 1997).

While hearing people associate the sound to the image, defining names and being able to establish communication and sharing processes increasingly large, pre-linguistic, deaf cannot know what the sound means (SACKS, 2010), because they cannot activate the part the brain that has to do with the sound, which makes them deficient in expression of the language that comes from the mouth, what may compromise cognitive processes.

It is only through the language that we communicate freely with the others, we acquire and share information (CAMPBELL, 2009). The effects of deprivation of language acquisition, expressed by the language in

the case of the hearing, can lead humans to several effects.

"Hearing is a key factor in maintaining intellectual exchanges, gives sense of belonging and security and many deaf people demonstrate aggressiveness when wanting to communicate and not being able to or because they do not understand what others say to him (CAMPBELL, 2009, p.97). And, in fact, "we can just be a little bit able to perform our intellectual abilities that we will seem mentally disabled" (SACKS, 2010, p.19).

However, deafness is not related to serious mental illness, as evidenced the researcher Neil S. Glickman (2009) when he conduct a case study about the boy called Bil, who showed hostility and relationship problem. Glickman (2009) describes him as " deaf and slightly mentally ill" (GLICKMAN 2009, p.354).

In the Modern Age (1453-1789) in the West, a character will be considered a pioneer in the recognition of Deaf skills, the Benedictine monk Pedro Ponce de León (1520-1584), the first teacher of the deaf people, who introduced education through sign language and hands alphabet (SACKS, 2010).

The change that will allow an extension of this recognition will only occur near the end of that historical period, in 1750, when a young French man, abbot Charles-Michel de l'Epee (1712-1789), determined by philosophical discussions of the time, believed in education through signs. De l'Epee saw the signs that two young deaf sisters used to communicate, a species native language of the poor deaf people roamed the outskirts of Paris. Sacks (2010) has no doubt that the meeting of the ideas of De l'Epee with this form of language and its association with French grammar, creating the "methodical signs", caused a real revolution.

Although the intentions of the abbot, who had studied to be a priest, proceeded from his religious concerns, his work is recognized and even revered by deaf communities. De l'Epee made disciples, among them the abbot Roch-Ambroise Sicard Cucurron (1742-1822), who succeeded him in the direction of the French School. Sicard had a pupil Jean Massieu (1772-1846), who in turn formed Laurent Clerc (1785-1869), a pioneer in deaf education in the United States, where he arrived in 1816, and soon attracted attention with a "remarkable intelligence" that a deaf person could have (SACKS, 2010, p. 31) and that was previously unknown as potentiality for teachers and the general public.

In 1817, Laurent Clerc, with Thomas Hopkins Gallaudet, founded the first permanent school for deaf people in America, the Hartford Asylum, which used as communication form the French sign language, adapted into English. The success in education by signs made all American public schools to begin to move forward ASL (American Sign Language).

This story would have had a "happy ending" if a counter movement, inspired by the trend of the era of oppression and Victorian conformity and intolerance towards minorities, had not strongly vindicated, assuming that the use of signs prevented the manifestation of speaking (SACKS, 2010).

There was then a clear demarcation of the two trends that still keep and preserves political and cultural differences until today: sign language and oralism, the latter considered in the progressive era. The oral method gained emphasys from 1860, with the technological advances that facilitated deaf people to learn how to speak.

At the International Congress on Education of the Deaf, held in Milan in 1880, in which deaf teachers were excluded from vote, oralism was the winner and the teaching of sign language was eventually abolished from schools (SACKS, 2010). Sign language came to be rejected and it was even forbidden. Poket (2011) notes that in the early twentieth century most schools around the world stopped using sign language.

As emphasized by Sacks (2010, p.35), the decision in Milan to ban the use of sign language provoked a regression that until today manifests in education of the deaf. Public opinion began to change in the 1960s, before the failures collected for education through oral language. In 1971, the World Congress of the Deaf in Paris, starts to give importance to sign language again, but its education is still dominated by oralist trend and the thought that deafness can be corrected (SACKS, 2010).

The narratives, as reported by Sacks (2010), have contributed greatly to the appreciation of deaf culture. From there, numerous narratives, the most diverse genres, started to bring deafness as main theme, contributing to the emergence of new discourses about deafness.

2.2. Experiences of language: how deaf people learn

Communication is a key factor in the interaction process that leads to learning. In a hearing class, it is necessary to capture the information and systematizing it, cases which hearing becomes an essential sense. By studying the situation of young deaf people and hearing people from the 1st and 3rd years of elementary school, Botelho (1998) demonstrated that not having a language shared in the classroom defines huge cognitive and interactive inequalities, with prejudice to the deaf student because reduction of content might occur.

According to Botelho (1998), the sign language differs from oral language at all levels: lexical, syntactic and semantic. What said in Portuguese, not always can be tell with signs: it might not have corresponding sign, situation that leads the interpreter to spell words, rather than represent them in signs.

Reitsma (2008) believes that the primary factor to the poor performance of deaf children, compared to the hearing, is a deficiency in the fluency of spoken language. Because of this, the written language is impaired, since the access to the deaf to the phonetic code is limited. The author points out that there is a direct relationship between sign language and spoken language, although some individuals can make use of the spoken language with relative fluency, especially those who are already involved early in an oral culture, although in most cases this does not happen.

In a learning situation with the predominance of spoken language, hearing people still have an advantage (SANTOS AND DIAS, 1998; BOTELHO, 1998). However, there is no cognitive reasons preventing deaf to learn. If, for the hearing, the possibility of structuring of thought occurs through the sounds, researchers are unanimous in emphasizing that the fundamental perceptual organization who have hearing loss occurs from the vision (FERNANDES, 1990; BOTELHO, 1998; QUADROS, 2010). Once sign language is acquired, he only speaks another language.

The main reason for the deaf learning process is vision. It is how a deaf person guides himself. To hearing people, hearing is the basis of language development, for the deaf is activated in the brain, as a language, the same way that people hear and speak, only via visual expression. The visual expression activates language to a deaf person (QUADROS, 2012).

Martins (2005) clarifies the differences: the hearing language occurs through oral and auditory channels, to the deaf vision and space, requiring the deaf student to learn a lot of image. Instead of hearing and speaking, the deaf uses spatial-visual communication as a primary means of knowing the world (PORTAL OF THE DEAF, 2011), that's the importance of acquiring a language is by visual means.

To oppose the deficit with writing and reading Reitsma (2008) suggests the prevalence of images in learning the deaf. The author argues that images can be more easily handled by beginners or readers with limited abilities. Therefore, the association of photos to words favor the evaluation of semantic skills of deaf children, thereby avoiding total dependence of word recognition skills.

Image allows a child to understand the meaning of the word, even when she does not know the signal space to build the word. The image, however, offers a "disadvantage" in the words of Reitsma (2008, p. 180). When not all words can be easily represented in this way: the abstract expressions, such as "friendship" or "below" (REITSMA, 2008, p. 18).

According to Quadros (2010), the sooner deaf children are exposed to the acquisition of a language, the better their performance. Researching the performance of deaf children in narratives in Nicaragua, Morgan and Kegl (2006) found that deaf children exposed to sign language before 10 years old perform tasks significantly better than deaf children who have acquired the language after 10 years old.

Relate is still a big challenge, because as the deaf never heard the native language of the hearing, did not assimilated nor intuitively its meaning, something that hearing children do naturally from birth. Hearing people come to school with the Portuguese already structured elements; the deaf with only fragments. More than a physical difference, deaf and hearing people have a linguistic difference.

Tables (2010) states that professionals involved in the education of deaf admit the failure in teaching Portuguese language, not only as the language used for written expression, but as a language that allows the development of language. And the problems with Portuguese language are many.

2.3. Understanding of writing and visual-spatial language

The different ways of seeing deafness does not relieve the deaf to face their limitations in coping with hearing society. The oral or visual understanding is different from reading comprehension that is in turn directly related to reading. The more one reads, the more one learns to write and vice versa. According to Campbell (2009), deaf children have two specific needs: understanding language and articulate the word.

The limitations on the acquisition of oral language involve difficulties to comprehend writing. The ones who have not passed trough oralization process can not comprehend texts. By reading magazines, for example, the deaf understand "an image, a fast 'talking', a key word, but the rest of the context they lose all" (Martins, 2005, p.112).

Research shows catastrophic effects on relationships with deaf to the Portuguese language, particularly with writing (FERNANDES, 1990; GÓES, 1996; CONTE, RAMPELLI E VALTERRA 1996; SANTOS E DIAS, 1998; MEIRELLES E SPINILLO, 2004; CAMPBELL, 2009; QUADROS, 2010). Although, as the hearing, deaf people are able to reason from syllogistically contrary and unknown facts – that is, deduct from two logical propositions a conclusion implied in them – the deaf have much trouble with writing than with oral or LIBRAS (FERNANDES, 1990).

While working with 40 students of 18 years old or more, from 4th to 8th grade elementary school with profoundly deafness, Fernandes (1990) concluded that deaf people are not prepared to conduct reading comprehension activities due to the absence of this activity in school situations. The researcher found that 50% of participants understood the text or the main idea, but most did not express the same understanding in writing reproduction, considered quite limited.

Barriers also mapped by Góes (1996) point to numerous problems as composing texts related to deviations from the rules of construction of Portuguese, as inappropriate use and omission of prepositions, verb ends that does not correspond to the subject and the verb tense, inconsistency past and present, inadequate genders flexion (adjective and articles) and incorrect use of the personal pronoun.

Campbell (2009) points out other obstacles: for the deaf there is no difference between noun, adjective and verb. There are no articles and verbs have only the infinitive. Deaf suppresses most part of linking verbs, which converts text (and communication) in a telegraphic language. In addition to the problems with verb agreement, verb use, lack of punctuation and capital letters, the deaf presents many difficulties to produce texts in the absence of pictures, even when a theme is provided.

Their stories are composed of short sentences and elementary syntactic structure. They do not capture the cohesive links in phrases such as conjunctions, pronouns and prepositions, for example, that "sew" the phrases in Portuguese and give meaning to a text in what is called "textual cohesion" (CAMPBELL, 2009).

Cohesion is a semantic relation between a text element and some other element essential to its interpretation, it is one of the principles of textuality expressed through linguistic marks on the surface of the text, assuring continuity, sequence and unit senses (FÁVERO & KOCH, 2000). Each of these features is called a links or cohesive bond. They are linguistic elements that go into a text taking up the ideas, to continue the textual meanings.

Besides connecting ideas or information, the elements of sequential cohesion cause expectations of continuity of senses and instruct the reader on how these should be interpreted senses. The use of pronouns and conjunctions and prepositions are, for the deaf, the main limiters cohesive links to their Portuguese understanding.

If the cohesion of the text can be a problem for a hearing, it is a bigger problem for the deaf, which makes use of ambiguous references in relation to personal and possessive pronouns, thus causing trouble to interpretation (GÓES, 1996). It lacks him information to enable understanding the meaning and function of production linkages in writing and reading as research and Spnillo Meirelles (2004). Committed to understanding the text becomes harder to inappropriate construction of cohesive links by including invented words with unconventional meanings and the lack of connection between the parts of the text (GÓES, 1996).

When a person who hears identify a written word, use an alphabetic principle, which graphemes represent the phonological structure of a specific word. Associating sounds, syllables and letters, the written word can be transformed into spoken, it becomes familiar in one learning context.

However, for those who were born deaf, this process is not readily available. Moreover, to decode a written word phonological form is not useful when the deaf person does not know the meaning associated with this word. Thus, the author believes that deaf people must learn to decode the sign language to written form.

Santos and Dias (1998) observed the behavior of 48 teenagers (oralized deaf, LIBRAS users and hearing people) between 12 and 20 years old, in the 8th grade of elementary school, by a narrative. The study found that users of LIBRAS had a higher percentage of success superior to the oralized deaf in relation to questions about the narrative.

They produced a higher percentage of accurate titles, having a performance closer to hearing adolescents, while oralized deaf conceived titles considered incongruent, unrelated to the presented narrative.

The research made by Santos and Dias (1998) showed that oralized deaf have more difficulty understanding a text than LIBRAS users and hearing people. To Quadros (2010, p. 1) there is a "heightened concern" based on the acquisition of oral-auditory languages and through oralization methods.

According to the author, educators and researchers presuppose the acquisition of sign language as L1 acquisition and the proposed acquisition of the writing ability as auditory-oral language acquisition of L2, ignoring and bypassing the written representation of sign language called SignWriting, one writing

system for sign languages created by Valerie Sutton in 1974, in the United States.

"The writing of sign language captures the relationships that the child establishes naturally with the sign language. If children have access to this written form to build their assumptions about writing, literacy would be a consequence of the process" (QUADROS, 2010, p.12).

By associating the SignWriting to computer use in 1996, the researcher Antonio Carlos da Rocha Costa (PUC-RS) contributed to the dissemination and recognition of the importance of this kind of writing in Brazil, although the issue is still quite incipient in the country.

The vision of the deaf is his guide. So texts, words and stories (including sound representations) should be visually offered from the beginning of schooling, although it is not being the target of literacy for children to develop a natural input of written Portuguese (QUADROS, 2010) and they have the possibility interacting with the Portuguese language in various ways, at all favorable times.

Quadros (2010) considers essential to make written language possible to the the deaf student, so that it evaluates its development and for the teacher to interfere in the process of language acquisition. She argues that writing occurs in sign language and not in Portuguese, disagreeing with educators and researchers presuppose the acquisition of sign language as L1 (equivalent to the native) and the acquisition of writing the oral-auditory language as an L2 (the equivalent of a foreign language).

According to the author, when the deaf child reaches the syllabic level of writing production, relies on lip reading the word and the problems are repeted. "The process takes place until the child goes through the level of the word level to the textual level, when problems with written Portuguese remain considering the difficulty of the lip reading" (QUADROS, 2010).

Deaf and hearing, according to research conducted by Richardson and Woodley (2001), are capable of engaging with the underlying meaning of disciplines to be learned. However, deaf students find it harder to relate when they need ideas on different topics, and this is intensified for those who have restrictions regarding communication by sign language. One hypothesis is that this may be related to interpreters who have low technical knowledge of the discipline.

Another issue to be considered is that deaf students can express more fear of failure in academic activities than the hearing. Richardson and Woodley (2001) consider that the deaf's fear of failing can be interpreted, paradoxically, as a factor for their success in academic activities, leading him to get more attention during the process of teaching and learning.

The authors searched that the deaf students showed greater use of memorization and a focus on details, instead of a general understanding of the subject. But who uses sign language has to bear an additional volume in relation to colleagues: they need to read and write in a second language, especially when preparing assignments and activities. They need to "devote time and effort to monitor

audiovisual materials and group discussions" (RICHARDSON AND WOODLEY, 2001).

Lack of access to the complete language, written and gestural, in the first years of the deafs lifes, postpones the development of semantic categorization. The authors understand that sign language is the most natural and accessible to the vast majority of deaf and therefore should be encouraged since the early age.

For deaf children, more than for the hearing, the development of semantic categorizations play an important role in reading comprehension. Therefore, the use of pictures and words can encourage the evaluation of semantic skills of deaf children, avoiding total dependence of word recognition skills.

2.4. The deaf and the digital world

Technology has changed the lives of the deaf. The development of ICT has boosted the interaction of the deaf with all the elements of contemporaneity. There are differences from the way he receives, produce and re-pass the information.

The emergence of internet take the deaf to another level of life, since it potentiated the possibilities of communication with other deaf and hearing people. He is not a passive agent anymore who receives information, he may produce it, re-pass it and also interact.

The technology comes to the lives of the deaf through various means. Tools that enable conversations using LIBRAS represent for the deaf the same as phone represented to the hearing (MARTINS, 2005). Melca and Ferreira (2005) emphasize that the multisensory approach of virtual learning environments stimulates different senses, becoming a facilitator factor of learning.

The National Federation of Deaf Education and Integration (FENEIS, 2011) presents on its website the various technologies available to the deaf: phone, lighted alerts, and closed captions and apps that offer the possibility of translation. The phone for deaf is a device indicative display in which incoming messages are read. It has a keyboard for sending messages, received from an identical device

Deaf people also use lighted alerts installed in bells, phones and "electronic babysitters". They can also count on watches with alarm and vibrating pulse, which vibrate when configured for this purpose.

The participation of the deaf in social networks contributes to the acquisition of language, their learning and communication, encouraging construction of their identity and the acknowledgment of their struggles as linguistic minority. Disengaged from a formal language, testimonies and comments are received and relevant forms of communication in the process of information transmission and, consequently, the systematization of knowledge.

According to data from the Association of the Deaf of Grande Florianópolis (2011), the most used apps by the deaf community are: Messenger, Orkut, Facebook, Exccel, LIBRAS Skype and OVOO, an app that allows interaction with image of various participants a group in real time. The webcam is also widely used.

According to Martins (2005), on TV, the deaf can access closed caption (CC), also called subtitles, available in Brazil through open television networks, but restricted to certain parts of the programming, especially the journalists. This is a transmission caption through the TV signal that has this function.

Subtitles can be activated by a menu, it can describe the speech of presenters, dialogues and other noises and sounds in the scene, like laughter, applause, music etc. The two most common ways of producing hidden subtitles are computerized estenotipia and voice recognition.

Regardless of how the technology will also improve the lives of the deaf, is already proven that use of computer improves their language skills, which is attributed to the possibility of communication through different tools, as ascertained by Conte, Rampelli and Valterra (1996).

When conducting a case study with an oralized 13 year-old deaf girl, the authors found that, although the difficulty in spontaneous writing has persisted, there was an increase of understanding and writing in relation to the presented texts.

The use of ICT also enables the approach of the deaf with other deaf communities, with other hard of hearing and hearing people, it broadens their cultural lexicon, their sense of "belonging" and creates opportunities for political organization in a more decentralized way and with greater coverage space (MARTINS, 2005).

It assigns to the internet a greater understanding among people with and without disabilities, the unbinding deaf from "linguistic aggression" processes that most of them are exposed to in their life story. Written Portuguese on the internet does not require a mandatory form to the language standard, does not require sophisticated syntactic structure, there is unobligation to write well". It follows the expansion of relationships, vocabulary, information and knowledge (MARTINS, 2005).

ICTs, especially the Internet, are shown as important means of expression. As noted by Garcêz, Rousiley and Maia (2009), for being linguistic minority, the deaf constitute a public with little opportunity for face to face discussion.

Even if they can speak, most of them communicate by sign language and participation in expanded forums depends on a translator for this language, there is always a mediator. On the internet, the deaf people are producers and reporters of their own narratives, without any intermediation (GARCÊZ, ROUSILEY E MAIA, 2009).

Among the recommendations of Torres, Mazzoni and Mello (2007), there is the precept that the information to be received by a person with sensory disability should be transmitted with redundancy, in different ways, according to his preferences. In this aspect, they consider essential to remember that such preferences are associated with what one already knows and can use. It is worth remembering, with Perassi (2012), the communication skills of an individual increases as it develops new forms of expression.

3. VIRTUAL LEARNING ENVIRONMENT, TESTS AND ANALYSIS

The accessible WebGD is being developed with support from CAPES and CNPq since 2009 by researchers from Federal University of Santa Catarina (UFSC). On November 2012, the AVA has been tested by 26 students between deaf students that know LIBRAS, hearing students who also knew LIBRAS and hearing students who did not know the sign language. Students tested the narrative genres in Comic Books, Short stories and Essay that ends an academic, scientific text.

The 26 students, all colleagues from the same classroom (except for the hearing people who knew LIBRAS), were divided into small groups for the tests, conducted over four nights. After each test session a focus group was conducted with the presence of a mediator, two interpreters, observers and a support group for the recording of discussions with three different video cameras. Subsequently, the videos were edit and conversation was submitted to Critical Discourse Analysis proposed by Norman Fairclough (2001).

The analysis generated numerical and qualitative tables, demonstrating that the deaf can express the thought, as Wittgenstein (2001), with elaborate concepts in the same way and sometimes much more often than the hearing. But since their voice is not expressed in many situations their attempts to interfere are unnoticed to the colleagues and even to the interpreters. Thus, in many instances, the deaf students who tried to interfere in the discussion and were not noticed, stayed quiet, until another opportunity was given.

Despite this difficulty, it was noticeable participation and understanding between deaf and hearing students who knew LIBRAS. Some tried to help the others in discussions so that the group could understand. LIBRAS served as "moderator" between the forces that made up the group, reducing the distance between deaf and hearing. It was also proven that the narratives in inclusive virtual environment for teaching Descriptive Geometry work with deaf students and hearing people fulfilling proposed activities after each reading. Hearing students had slightly higher result about of the problems.

FINAL CONSIDERATION

Deaf who acquire language through sign language may not have cognitive disabilities. If exposed to early language development through sign language, the deaf have every chance to develop their skills and expand them freely through culture.

In learning situations, the hearing still perform better, especially when it comes to situations of reading and writing in Portuguese language. However, LIBRAS acts as an inclusive factor in Virtual Learning Environment.

Numerous researchers of social anthropology sciences attribute the difficulties with Portuguese to the historical and social context of the deaf, facing secular prejudice. Advances allowed by ICTs take life of the deaf to a new level. Through new technologies he can speak freely, express thought, learn and write without concern about the formal Portuguese. However, the teaching material

available is hegemonically in Portuguese and in not in the native language of the deaf.

Here is where the problems begin. The deaf only partially understands what he reads in Portuguese. The barriers the deaf face in relation to Portuguese are numerous. Without it, the deaf can not establish the relationship between the meaning (semantic meaning) and the signifier (the object to which the meaning refers) that they need especially if they want to interact with the hearing society. Virtual learning environments for distance learning are no exception.

While in Brazil it is discussed the inclusion of the deaf into the hearing majority in presence-based classroom, with a place designed for the interpreter of sign language of what teacher talks, the Distance Education courses available in both languages, Portuguese and signs, can provide deaf students with comfort in learning and sharing with their hearing friends, contributing in an unimaginable way to improve the individuals with deafness quality of life.

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