

Sign Language for all: a framework to inform the design of games to teach Deaf children and their non-Deaf mothers

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ABSTRACT

This article discusses the difficulties the Deaf child faces to acquire the sign language - its emotional, social, psychological and citizenship consequences. It is noted that there is a lack of pedagogical and educational approaches in Deaf education. The research presents a framework with which to inform the Design of Learning Objects that have the potential for meaningful learning. As proof of concept, a learning object was created - a digital house - that provides for interactions aimed at developing the cognitive structures (of educators, mothers and learners). Internal validation concluded for the potential of use of the proposed framework to create other learning objects, and that the digital house was adequate for meaningful learning.

Palavras-chave: Sign Language; Meaningful Learning; Learning Object.

1. INTRODUCTION

Bilingual education for the deaf has long been a field where the debates are arduous and heated. There is a cacophony of stakeholders focusing alternatively on the deficiency, on the social and cultural diversity or on the differences between Deaf and non-Deaf as central to the political and educational discussions – each point of view leading to different practices. For example, the medical view of deafness as a pathological deficiency to be removed has permeated current approaches by family members and educators: the goal being to correct abnormalities and avoid differences. The easiest way to achieve such goal is to forbid the deaf to use Sign Language (SL), and to force the Deaf to speak like the hearing. These actions prevent proper language acquisition by the Deaf (SILVA, 2015), with dire consequences.

But, the members of the Deaf community do not view themselves having a deficiency, but rather, as someone who experience human life in a different way. After many years of struggles, they have attained the right to an identity, language and culture. Such aspects should be represented in their social, political, educational and cultural dimensions in order to guarantee inclusion and full exercise of citizenship - the political, economical and social rights. This text follows their practice of using capital “D” in the word Deaf to represent members of the Deaf community.

Skliar (1999) shows the many plights the Deaf child faces: born to a non-Deaf family who don't speak Sign Language (SL) the Deaf child has little to no opportunity to acquire their natural language. The Brazilian Sign Language (Libras) is an official language in the country. However, if the law mandates it, the hard reality is that Libras has yet to make its way in public services, in education centres and, most importantly, in the family environment (PERLIN and STROBEL, 2014). Only later at life will the Deaf child find someone who can utter a few signs in Libras, usually by a non-Deaf educator who is highly indicated to serve as a linguistic and cultural model.

According to Vygotsky (1974), language acquisition is at the heart of human intelligence development. The author says that the child first learns to label concrete objects; later on, she will learn how to ask questions to clarify her processes of signification and meaning attribute, when she starts to form relations between existing knowledge and the new ones, thus expanding her cognitive structure. The lack of language acquisition prevents the Deaf to have access to all of her human possibilities. The Deaf learner arrives at the school system lagging behind the other students. Thus, it is important that the parents participate in this process by learning SL in order to communicate with their child (LANE, 1984).

This article uses a framework proposed by Guimarães, Aquino e Fernandes (2017) to inform the design of educational games for meaningful learning to be used at home and at school, by the Deaf child, her teacher, her mother. Two games were created (one presenting concepts related to a zoo, and another representing a park - the city in which both games were developed has two zoos, and several parks, making these a choice that is meaningful for the Deaf child). Meaningful learning is a pedagogical methodology that uses the learner's motivation to turn teaching and learning into meaningful interactions that are capable of changing cognitive structures (NOVAK, 2003; AUSUBEL, NOVAK and HANESIAN, 1980).

The remainder of the article talks about the plight of the Deaf, the need for SL, the use of games for teaching and leaning, meaningful learning, bilingual literacy. It then presents the framework used to inform the design of two games. Internal validation considered the games to be helpful in teaching SL for parents and the Deaf Child.

2. THEORETICAL CONTEXTUALIZATION

The games are base, first and foremost, that the Deaf child is a member os a linguistic minority, whose rights to a language, culture and community are to be respected. In this section we present some of the theoretical contextualisation that motivated the research. We start with the plight of the Deaf, then we discuss the need for language. Bilingual literacy is the method of choice for Deaf education (SANCHES, 1991; SKLIAR, 1999), and the cognitive theories (NOVA, 2003; AUSBEL, NOVAK and HANENSIAN, 1980).

2.1 The plight of the Deaf

Historically, the main hegemonic narrative has been that of the pathological deafness, a narrative that produces subjects who are deficient, limited and incapable, defined by the experience of absence – of hearing and oral communication. This medicalisation of the deafness is deemed unquestionable, and relegates the Deaf to a subaltern role within the hearing culture in which the Deaf had to learn the oral language in order to be accepted – and the degree of her intellectual development is thus conditioned by her experiences via the oral (SKLIAR, 1999). Wether the alternative is cultural, or social, there is even greater division due to the fact that neither the families nor the educators are able to provide adequate linguistic and cultural models in SL.

Language is action on others; it is power and transformation, a tool that provides communication and content; it is an instance of experience construction through a process of reflection and meaning creation about reality: language is more than its linguistic symbols and it includes ideological and concrete forces of real life they convey in intertwined socio-political and cultural processes (FERNANDES and MOREIRA, 2014). Therefore, social, political and pedagogical aspects are important and should be considered.

According to Weaver (1996), acquisition is unconscious, and leads to functional rules of the language without the need to know strict rules: given comprehensible input from social environment that is rich enough for abstractions, and an affective involvement with the language, the learners will acquire the language naturally. The non-Deaf learn the oral language as a mother tongue, with which they can have access to a variety of information; a language used for hypothesis construction, categorisations, generalisations, knowledge acquisition about the world, and to develop judgment of values, among other high level cognitive activities. All of those elements are not available for the deaf children born to hearing parents (90% of the cases) who don't know SL.

The lack of language acquisition is detrimental to intellectual development (VYGOTSKY, 1974). And Silva (2015) tells us of the grave consequences for the Deaf child: there is a lack of the ability to perform tasks for the development of intelligent action; the deaf does not learn how to plan and how to overcome impulsive action; the deaf does not become independent of the visual, concrete situation and has difficulties to control herself and to socialize; the Deaf do not create emotional and affective ties. Additionally, the lack of language is detrimental to full citizenship: in regards to power relation, the lack of language is the most perverse way to deny access to intellectual development (PERLING and STROBEL, 2014).

Despite recent efforts to value Libras as an official language of the country, and a series of studies geared towards Libras teaching and learning, the reality is still that of struggles: there is a lack of Deaf schools, families and educators don't know the language, there is a lack of educational materials etc. There are very little or no opportunities for the Deaf child to communicate and learn SL; almost no place for the Deaf to create affective ties, to participate in social integration, intellectual development, participation - even at the simplest family functions and chores. Mostly, the Deaf child does not establish trust bonds within her family. According to Giammelaro, Gesueli and Silva (2013), the lack of participation in the Deaf community affects the identity formation of the Deaf.

Jung and Matins (2012) recognise the several predicaments the Deaf face, and question the approaches that do not consider the Deaf condition (approaches that are reductionist in nature). The authors call attention to the fact that the hearing model is still strong - many educators defend the need for the Deaf to learn the oral language. This research was conducted with the participation of members of the Deaf community.

2.2 The importance of Libras acquisition by the Deaf child

Human beings use signs, codes and language to communicate, socialize, to expand social and cultural aspects of their lives, and the use of Libras by the Deaf child is paramount: it represents a specific relation between her and the world around - a different way of being, living and learning. The lack of Libras acquisition and the lack of a linguistic, social and cultural model prevents the child to understand, create and transform knowledge and culture. Language is both genetically and culturally determined by principles of form, content and communication environment (CHOMSKY, 1986). Language is not only for communication: it includes thought regulation functions that gain meaning only when socially used (BRITO, 1993).

McNamara (1982) tells us that the lack of language heavily interferes in the full citizenship possibilities. Among these possibilities, the Deaf is denied the possibility of making sense of her surrounding, to form her identity, to participate in the community etc. Languages are social constructs and they reflect the identity and culture of a certain group, and serve various functions such as communication (FERNANDES and MOREIRA, 2014). Brito (1993) adds to these already fearful list the inability to perform tasks, to participate in meaningful actions, to develop intelligence. Deprived of her natural language, the Deaf does not learn how to plan, to organize, to control impulses.

Libras, therefore, is necessary for communicational, cultural, social, linguistic and educational interactions. Libras is a complete linguistic system, fully conventionalised (with grammar, lexical and syntactical structures etc.). Libras is of visual-spatial modality, capable to provide the Deaf child the necessary means with which to develop all her linguistic potentialities (SANCHES, 1991).

2.3 Bilingual literacy

Skliar (1999) tells us of centuries of the hearing culture over the SL, imposing on the Deaf their beliefs that only the spoken word has value. Only later in life, when the Deaf enters the school system will the Deaf child have some incipient contact with a precarious form of Libras. One can deduce that very rarely the desired process of intellectual development starts in the family. Bilingual education should start at home.

The present research aligns itself with Skliar (1999), Sanchez (1991) and many others by choosing the pedagogical process of bilingual literacy of the Deaf who identifies with SL and the visual culture, in a bilingual citizenship. Bilingual education says that Libras should be the language of knowledge acquisition, and the use of both languages are to become a symbolic system and a technology in specific context, for specific goals. It opposes the traditional methods of alphabetisation which relies heavily on the sound - an oral-dependent function that is not accessible to the Deaf. But the written language can be acquired by the Deaf if the methodology used takes into account visual strategies based on SL. Literacy is the resulting process of social practices of the use of the written form of the oral language in specific contexts, for specific goals - this way, it is pleasurable, motivating, it is leisure, it allows for access to information, it is communication, and it is a way to exercise citizenship in different social practices.

The deaf does not have access to the oral language but can become a “non-alphabetized reader” who dominates the written form of another language without knowing the sounds of its writing. This requires that the learning is not imitative and mere mechanical memorisation, but rather that the learning takes place in meaningful practices that allow the apprehension of the language: Deaf children will establish meaning from symbolic relations captured by visual significant (namely, SL). If the Deaf child does not have this privileged platform at home, she hardly will have a more favourable condition at the school system. Marchesi (1991) tells us that, because of this, the Deaf child lags behind her friends, and comes to the school with very little previous knowledge from which to learn (LANE, 1984). Usually, the mother does not know of Libras, or any school for the Deaf or any other way to communicate with her child. It is thus justified an educational game to teach Libras.

2.4 Edutainment - education and entertainment

The power of information and knowledge have changed society in uneven and unfair way. Entire groups and communities have been excluded. Among those excluded we can count the Deaf people (SORJ, 2003; CASTELLS, 2003). The collective intelligence is mediated by language, with the purpose of allowing the citizens to use information to make decisions, solve problems etc. The process of knowledge creation is dependent on the choices society makes (BEHAR, BERNARDI and SILVA, 2010). To learn via new technologies is an immersive experience that offers room for exploration and a cognitive transformation (CILELA, 2011). The use of such approach should consider the visual manner in which the Deaf acquire knowledge (CARVALHO and MANZINI, 2017). Oliveira (2017) tells us that educational tools should not merely transpose the traditional form of teaching, where the educator holds all the power, and the learner is a passive receiver of information.

To play is the natural manner children manifest themselves, and by recognising this one understands that children are human beings today - not some project into the future. The world experiences are

mediated by language: games, painting, dancing etc. that allow for the human being to live their opportunities to comprehend, re-signify and to live with different social and cultural experiences. Therefore, playing is a powerful cultural learning tool. Playing is the time and space where knowledge is transferred. It is fundamental part of human development, and should be valued, with games that are tailored for children, related to their environment. This way, children are the actors in their own learning (NICOLIELO, SOMMERHALDER and ALVES, 2017). This research uses a framework to inform the design of two games to teach Libras and Portuguese.

2.5 Meaningful learning

In meaningful learning, Ausubel, Novak and Hanesian (1980) consider the previous knowledge of the learner as the most important fact in the teaching and learning process. This way, the new information is combined with the existing one to change cognitive structures, signification and meaning attribution. One does not memorise, but learns by the logic and meaningful signification. According to Cilella (2011), playing is a crucial process in intellectual development, in which one understands ideas, develop skills and assume a social role. Narratives, long used as pedagogical approaches in human education, are powerful tools to convey content, enhance motivation and promote interactions. Social interactions help the learner to internalize thoughts, to create and share knowledge, and to form concrete and abstract thoughts (VYGOTSKY, 1974). Cognitive management during game playing create a net of thought strategies used to make sense of the world.

Dessaintes (1960) tells us that the situation, the environment, the social interactions and communication channels combine to give form to content and its meaning, leading to intellectual development. The author tells us that nothing is isolated, but everything is always associated to the memories, previous knowledge, memories. This research presents two games that contain elements familiar to the daily life of a Deaf child.

3. THE FRAMEWORK

We now present the framework to be used to inform the design of educational games to teach Libras to a Deaf child and her interlocutors. As a proof of concept, the framework was used to create two games where the child has to match the elements (i.e. animals in a zoo, such as a zebra, and elements in the park, such as the flower or the butterfly). In order to create the games, these aspects are used:

- 1 – The general area of knowledge that will determine the contents and the general representation of a real world situation (e.g. health, hygiene, transportation system, etc.);
- 2 – The format of the game;
- 3 – A concrete representation, in the form of an illustration, of a scenario of real interaction and situations of daily life, part of the context of the Deaf (e.g. a visit to the zoo and to the park).
- 4 – The use of cognitive motivations – a process in which the Deaf is invited to make sense of the experience. There is also the use of shared common knowledge, related to life, customs, beliefs, situations, etc.(i.e. knowledge creation, information seeking and use, communicational interactions, comparisons, etc.).
- 5 – The educators should select elements that are part of the context and the chosen area of knowledge.
- 6 – The previous process will guide the nature of the game and the selection of its components. It will impact the way information will be presented and the manner in which knowledge will be cre-

ated.

7 – Educators should create a scenario for both the creation and the use of the LO. This way, they will create richer interactional environments (Carroll, 2003).

8 – Iconicity is used to represent the lexicon, and the concrete elements in Libras to form the spontaneous knowledge.

9 – Narrative creation, according to Giombini (2006), and the pleasure of the narrative (usually acquired by non-Deaf children in their first infancy) requires the children to have intent, and that they have something to say, and also that they have the instrumental tools to say it (i.e. using Libras, in the case of Deaf children). The narrative created by the use of LO and the interactions with their interlocutors will aid the children to create links between a new information and pre-existing cognitive structures. (Ausubel, Novak & Hanesian, 1980).

10 – The game should make substantial use of ludic elements. According to Vygotsky (1974), game playing is a crucial process, one in which the individual understands ideas, develop linguistic, cognitive and other skills, get motivated and involved.

4. CREATING THE GAMES

As proof of concept, two games were developed following the proposed framework. The research team was composed of a Deaf psychologist, 4 Deaf Educators and 3 game designers. First, the area of knowledge was chosen - a visit to a zoo, and a visit to a park. Both are common features of the city in which the game was developed and used.

The educators participated in 3 brainstorming sessions, of 2 hours each. Before deciding on the zoo and on the park, some of the themes proposed were: a) personal hygiene habits (i.e. shower, brush teeth, wash hands etc.); b) social interactions (e.g. bodily functions and noise, behaviour etc.); c) social interactions outside of the family group (know the world, respect people, friendships, sharing etc.); d) children stories (literature, fantasy, comic books etc.). All of these ideas are to be implemented at a later time. Figure one shows the Libras representation of the elements, and the



knowledge about them:

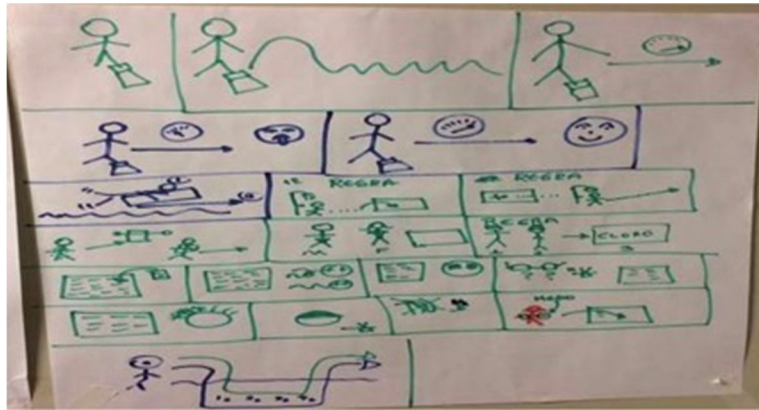


Figure 1 - The elements in a visual Libras representation

Figure 1 shows the visual representation that the Deaf used to store the knowledge of each element. This strategy was used to value Libras during the game creation. Figure 2 shows the zoo and its presentation.

Figure 2 - The zoo and its general presentation

Figure 2 shows the zoo and each animal in its place. The text in Portuguese says: “my first animals - a project for Deaf children to have fun e learn. The zoo has twelve animals”. Each animal is in its own environment, mounted on a shape fitting platform. Beneath each platform, and on the board, there is a Libras sign for that animal. The game is played by showing the child the animals, and teaching her the Libras sign. Some additional knowledge may be presented. Then the child is encouraged to find the home of the animal, that is, the one that matches the Libras sign and the shape.



Figure 3 shows one example of the platform, the Libras sign and the matching home:

Figure 3 - The giraffe, its libras sign and its home, with matching shape and Libras

Figure 3 shows the mother playing with the giraffe. She can tell a story about the giraffe, point out that the Libras sign for the giraffe is related to its long neck, show the matching Libras and shapes to allow the child to safely put the animals in their places. The text in Portuguese says: “the animal are removable parts, and contain the Libras sign both on the platform and on the board”.

The second game is composed of an illustration of a park, and the child is invited to recognise its elements (e.g. the butterfly, the sun, the cloud). Each element is cut in a visual-spatial and geometrical shape. Accompanying the board, there are a set of cards with the corresponding shapes, and the



Libras sign and written Portuguese. Figure 3 shows the board and its elements and the cards:

Figure 4 - The park and the cards: the worm, the grass and clouds

Figure 4 shows one of the boards, its elements and the accompanying cards. Note that the worm, the grass, and the clouds have been removed and placed in the correct cards as per the shapes. In the cards there is an utterance of the Libras for the object. Figure 5 shows another board of the park:



Figure 5 - The park and the cards: the bird, the water and the sun

The mother helps the Deaf child to recognise the elements, their placements on the board, their relations with each other. This time the mother should help the child to create a narrative. Then, by matching the shapes, both mother and child find the Libras in the cards. The zoo and the park are part of the daily lives of Deaf children. The games allow for meaningful interaction and learning. Not all the elements on the board have a corresponding place in the zoo or sign in the cards for the park: this invites the children to ask about the other elements and their relations. This curiosity motivates the child, and promotes interactions with the mother. The choice of elements were made in a way that there would be a relation (e.g. the fish lives in the water; the bird flies etc.). This way allows the Deaf child to create her own signification of the proposed environment. There are a lot of others aspects that can be explored in each game: colours, size, other elements (e.g. the trees).

For example, in the zoo game, the mother can explain why each animal has its own place; the material on the ground; information of their natural habitat; eating habits. The same goes for the park: the mother can discuss rules, such as to not enter the water alone; a rule that allows or not the child to bring her pet to the park; where the dog must stay; the mother can show that there is a need for protection from the sun; how the child can play on the grass etc. in a meaningful way (NOVAK, 2003; AUSUBEL, NOVAK and HANESIAN, 1980). This way, the games provide for representations of daily interactions the Deaf child has.

5. VALIDATION METHODOLOGY

Both games were created by using the framework. The research team was composed of a Deaf psychologist, 4 Deaf Educators and 3 game designers. The internal validation followed the protocol of Dolz and Schnewly (2004). The researches invited Deaf educators and non-Deaf mothers of Deaf children, who did not know Libras to participate in two workshops of 1 hour each. The workshops were conducted at the school where the games were developed. 8 volunteers agreed and consented to participate - 2 Deaf educators and 6 non-Deaf mothers of Deaf children. The non-Deaf mothers were informed of the importance of learning Libras for the intellectual development of the children, and of the purpose of the games, its pedagogical choices, the manner in which they could be used

with the Deaf children so that they can learn Libras. Additionally, the researchers explained the purpose of validating the games. They were first invited to play with the games freely in order to get used to it. Then they were grouped (1 Deaf educator with 3 non-Deaf mothers) - this way, the mothers who did not know Libras could interact with the Deaf and have a hands on experience of learning Libras. Next, they were invited to learn the Libras. Afterwards, the participants were asked to answer a 10 item questionnaire, using a 5-point likert scale (1 - totally disagree; 2 - disagree; 3 - neutral; 4 agree; 5 - totally agree), adapted from Behar, Schneider and Silva (2011). Next we present the results.

6. RESULTS

The first reactions of the participants was related to the aesthetics of the games - the participants were unanimous in finding the games beautiful, and expressed the sentiment that their students and children would love it and be motivated to play. They asked why there was no Libras for every element on the board - it was explained that the game had its limitations. Nothing else on the subject was said.

After the second workshop, some of the mothers expressed that they feel confident that they can learn Libras together with their children, that they have lost their fear of learning a new language. It is important to say that they found it easy, because the signs were iconic. They agreed that the game and its mechanisms, as well as the ways they could be used were easy to understand (media evaluation of 4.2) and easy to use (4.8). They were unanimous in agree with the affirmation that the games valued creativity (5), communication (5) and interaction (5). As for the concrete knowledge, they found it easy to learn the Libras for the animals due to its iconicity, and that would be helpful when using it with their children (4.3). The respondents found that the games were motivating, and provided means for meaningful interactions to create new knowledge (4).

Some expressed concern whether the children would ask them about the Libras for the other elements and that they wouldn't be able to answer. It was explained to them that the games replicate the fact that they are learning the language at the same time as their children, and that it was important for them to learn more Libras. The respondents found that the fact that the games represented places where they have been before with the children would help to provide social, cultural and linguistic specificities; and that the games would help the children to learn Libras and written Portuguese (4.8). There wasn't much an understanding by the respondents of how the games would allow for flexible interactions (3), but they agreed that it valued communication (5).

7. FINAL REMARKS

A Deaf child, who is born into a non-Deaf family that does not know sign language does not acquire her natural language. Thus deprived of language acquisition, her intellectual development is greatly imperilled. It is often the case that the Deaf child will have her first contact with Libras when she enters the educational system. But, usually, the educators are not Deaf, and not fluent in Libras. They lack training and materials with which to impart knowledge in Libras. The child first has to learn a language. The Deaf child enters the educational system lagging behind their peers. Additionally, the Deaf child does not have a fluent adult Libras speaker, or Deaf family member or friend with whom to model her culture. Therefore, the Deaf child grows without a reference to her language and culture, and has difficulties to form her identity. The few and far between opportunities to participate in meaningful learning brings about serious intellectual, emotional, psychological and cultural consequences.

This article uses a framework to create games to serve as basis for meaningful learning for both the non-Deaf mother and her Deaf child. The validation of the games showed that they are a viable and adequate means to be a part of the teaching and learning process.

In order for the society to change its attitudes towards the need for the Deaf to be allowed to use sign language, a lot of studies and practices are required. Also, the learning of a new language for the mothers presents the usual challenges that learning of a second language usually do. During the validation, new ideas were discussed, the need for more materials, in other formats, with other types of knowledges (that delve into the teaching of a subject such as math, for example) were requested. This motivated the researchers to continue to create.

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