Artigo Original

Deaf Education in Parallax: The Development of a Collaborative Learning Model

A Educação de Surdos em Paralaxe: O Desenvolvimento de um Modelo Colaborativo de Aprendizagem

La Educación de Sordos en Paralaje: El Desarrollo de un Modelo de Aprendizaje Colaborativo

Dirceu Esdras[1] e Bruno Galasso[2]

Abstract

The present paper introduces the designing process of the first bilingual learning platform directed to deaf students through the description of several tools specifically developed for this group. This platform is part of an innovative educational model capable of uniting deaf and non-deaf students in a single learning ecosystem. With the intention of placing deaf students in the vanguard of education, we have developed a remarkable methodological project that advances the use of a platform accessible through Sign Language, which includes learning tools such as Mental Map, Bilingual Forum, Personal Learning Environments, Digital Repository, among others. Past more than one year since the students started to make use of the platform in Brazil's five macro-regions, it is possible to conclude that the array of resources described in

[1] Instituto Nacional de Educação de Surdos (INES). Rua das Laranjeiras, nº 232 – 22240-003 – Rio de Janeiro – RJ – Brasil / Instituto Politécnico do Porto (IPP). Rua Dr. Bernardino de Almeida, nº 431 – 4249-015 – Porto – Portugal. diresdras@gmail.com

[2] Instituto Nacional de Educação de Surdos (INES). Rua das Laranjeiras, nº 232 – 22240-003 – Rio de Janeiro – RJ – Brasil / Instituto Politécnico do Porto (IPP). Rua Dr. Bernardino de Almeida, nº 431 – 4249-015 – Porto – Portugal.

this paper works as a catalyst for the teaching and learning of deaf and non-deaf students.

Keywords: Virtual Learning Environments. Deafness. Brazilian Sign Language. Bilingual Education. Social Inclusion.

Resumo

O objetivo deste artigo é apresentar o desenvolvimento do primeiro Ambiente Virtual de Aprendizagem bilíngue para educação de surdos a partir da descrição de diversas ferramentas específicas para esse público, bem como a construção de um modelo de ensino inovador, capaz de gerar um ecossistema de aprendizagem que integra estudantes surdos e ouvintes em todo o Brasil. Com o propósito de colocar os estudantes surdos na vanguarda da aprendizagem, foi desenvolvida uma proposta metodológica pioneira mediante o uso de uma plataforma totalmente navegável por meio da língua de sinais, incluindo ferramentas como Mapa Mental, Fórum Bilíngue, Ambiente Pessoal de Aprendizagem, Repositório Digital, dentre outras. Após mais de um ano de utilização da plataforma por estudantes das cinco macrorregiões do Brasil, é possível concluir que a gama de recursos descritos neste trabalho potencializa variados procedimentos didático-pedagógicos nos processos de ensino e aprendizagem de estudantes surdos e ouvintes.

Palavras-chave: Ambiente Virtual de Aprendizagem. Surdez. Língua Brasileira de Sinais. Educação bilíngue. Inclusão social

Resumen

El objetivo de este artículo es presentar el desarrollo del primer Ambiente Virtual de Aprendizaje bilingüe para la educación de sordos, basado en la descripción de diversas herramientas específicas para esse público, así como la construcción de un modelo de enseñanza innovador, capaz de generar un ecosistema de aprendizaje que integra estudiantes sordos y oyentes en todo Brasil. Con el propósito de colocar a los estudiantes sordos a la vanguardia del aprendizaje, se desarrolló una propuesta metodológica pioneira mediante el uso de una plataforma

totalmente navegable a través de la lengua de señas, incluyendo herramientas como Mapa Mental, Foro Bilingüe, Ambiente Personal de Aprendizaje, Repositorio Digital, entre otras. Después de más de un año de utilización de la plataforma por estudiantes de las cinco macro regiones de Brasil, es posible concluir que la gama de recursos descriptos en este trabajo potencializa variados procedimientos didáctico-pedagógicos en los procesos de enseñanza y aprendizaje de estudiantes sordos y oyentes.

Palabras clave: Ambiente Virtual de Aprendizaje. Sordez. Lengua Brasileña de Señas. Educación bilingüe. Inclusión social.

1. Introdução

The last decades have been marked by advanced disruptive processes, transforming all domains of human activity, so that the terminologies society and technology are necessarily conceived in integrated fields of knowledge. In the educational field, the innovations that made possible the expansion of communication mechanisms made methods, contents and forms of interaction alternative to those usually practiced.

The digital practices engendered in educational acts expanded the relationship with knowledge, promoting pedagogical innovations with accessible, integrated and personalized learning models. In the case of deaf education, characterized by a visuospatial language (Libras - the brazilian sign language), the references of multimedia learning created several lines of development of bilingual digital teaching materials, with innovation and interdisciplinary methods (GALASSO *et al.*, 2018).

In this sense, online models of education have shown the potential to change not only the curriculum content and the role of the teacher in interacting in virtual environments, but mainly, the effective participation of the student in the teaching and learning process, resulting in the increasing withdrawal of the role of passive spectator (COOK; GRANT-DAVIE, 2017). These proposals based on collaboration between peers and the emancipatory autonomy of students meet the needs of deaf education in Brazil, since the constitution of new modes of representation,

unrelated to the traditional therapeutic concept of deafness and the deaf, as well as the proposition of a bilingual education (Libras / Portuguese) and its political-pedagogical developments are still new phenomena in the Brazilian educational scenario (GUARINELLO, 2007).

The demand for the training of bilingual teachers to work in the education of deaf students, whether at the level of undergraduate courses or in continuing education across the country, is increasing, as public policies aimed at this population are recent, such as the Brazilian Law for the Inclusion of Persons with Disabilities (Law No. 13,146), instituted in 2015 (BRASIL, 2015). Thus, the significant increase in deaf students in the regular school system and the growing need for specific training for teachers able to work with deaf students, evidence the social need for new undergraduate courses in a bilingual perspective. (MACHADO; TEIXEIRA; GALASSO, 2017).

In this context, the National Institute of Deaf Education (INES), a direct administration body of the Ministry of Education (MEC), responsible for subsidizing public policies in the area of deafness, implements the online course of Bilingual Pedagogy throughout the country, offering 13 teaching centers in the five macro-regions. To accomplish this task, among other challenges, it was necessary to create a virtual teaching and learning environment entirely in sign language, in order to promote a locus of interaction for deaf students in Brazilian sign language (Libras).

This article, therefore, aims to present the development of the first bilingual platform for deaf education, built over four years (2014-2018), referred to through the description of several specific tools for this audience, as well as the proposal of a model innovative teaching, capable of generating a learning ecosystem, integrating deaf students and listeners across the country.

2. The Conception of the Virtual Bilingual Learning Environment

The online education proposal for the Bilingual Pedagogy course is conceptually outlined in the ontology of cyberspace[3], characterized by a means of socialization that does not present a concrete realization field, but is constituted from the visual media ambience, of what circulates in what we understand it as a new public sphere, mediated by digital media.

In the formulation of this Virtual Learning Environment, the means are characterized as instruments for the production and dissemination of deaf culture (LADD, 2003) which comes into circularity. If, on the one hand, the bilingual virtual environment is a producer and product of culture, on the other, students experience the immersion of cyberculture based on an interactionist perspective in sign language.

The fact of providing varied spaces for online learning characterizes the platform developed for the Bilingual Pedagogy course as a collaborative place, in which each user (student) is connected to others. This collaborative work eliminates hierarchies and strengthens the coordinated effort to achieve integrated goals (ARAUJO *et al.*, 2014). In this way, learning tends to evolve more in its qualitative than in its quantitative form, as it favors mutual commitment and responsibility towards the group, stimulating "initiative, attention to details and commitment to the activity, where [...] the most capable colleagues can mediate the learning of the weakest without being harmed by it" (NEUMAN; ROSKOS, 1997, p. 17).

The basic structure of learning worked on in the course is one in which the shape of the digital networks constitutes communicative possibilities of free circulation, no longer edited only by a teacher, but disseminated in a transversal and vertical, random and associative way.

---

[3] The term "cyberspace ontology" was coined by author David R. Koepsell, in the book entitled *The Ontology of Cyberspace: Philosophy, Law, and the Future of Intellectual Property*, in which it presents philosophical approaches to cyberspace, bringing conceptual solutions to existing practical problems. The concept proposes a rational alternative to myths in relation to cyberspace and all computer-mediated phenomena, an indispensable tool today.

Considering the target audience of the course, the proposal for the development of the first Virtual Learning Environment (VLE) in Libras is characterized as an emancipatory tool for deaf students, in which sign language always appears as the first language.

This locus of achievement is the instrument for the production and dissemination of diverse contents (digital bilingual learning objects) of the course curriculum and is characterized by the deterritorialization common to cyber space, integrating teaching agents through a potentialized cognitive interaction (games, wikis, mind maps, forums, etc.). For Molina (2007), the predicates of participatory and collaborative concern a critical educational science, towards which educational practices, understandings and values have been moving.

As it is a teacher training course, the training process is valued, as students interact, share and mutually build learning using sign language. The tools that instrumentalize the online education proposal of the Bilingual Pedagogy course are facilitators of the establishment of privileged relationships between students and teacher, encouraging the construction of new visual schemes and cognitive structures. Such changes are gradually incorporated into daily life and result in a new context of interaction and exchange, through sign language and information sharing.

3. Personalization of Distance Education: Learning Trails

In order to place deaf students at the forefront of learning, an innovative methodological proposal was developed from the creation of a platform with several learning paths (Figure 1). In this way, pedagogical relationships are established through the knowledge networks that are woven throughout the course. The training activities are based on interaction and dialogue between students, forming a multimedia network in the connection of experiences.
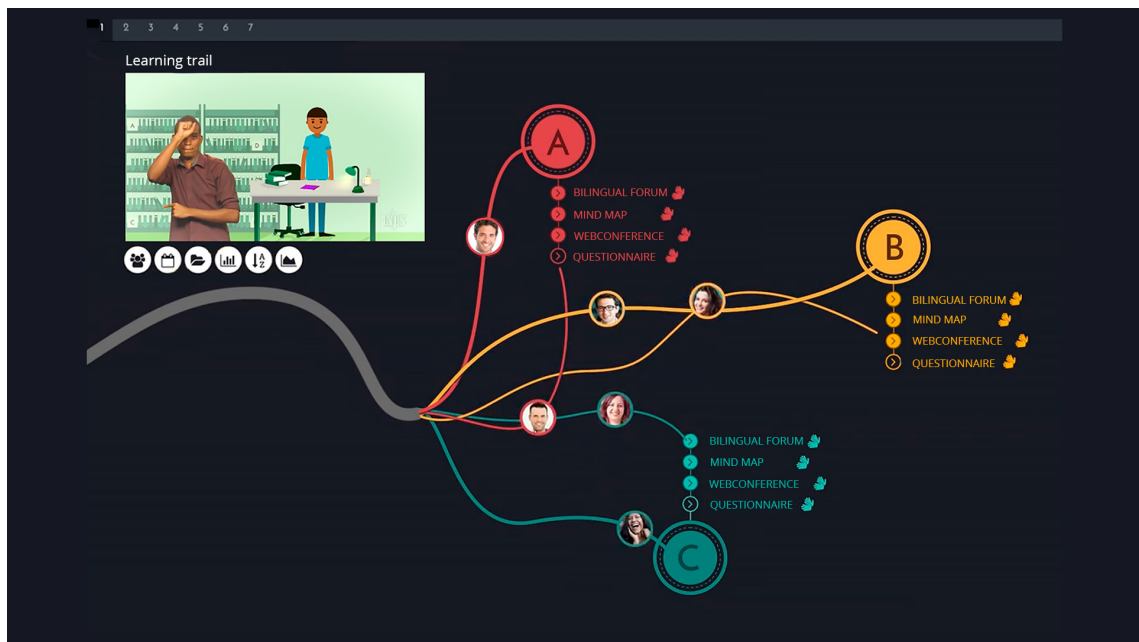
Figure 1 - Example of the layout of the Virtual Learning Environment presenting the three learning tracks (A, B and C) and their tools. In the upper left corner, there is the introductory summary video of the unit and, below, the tools to support the study.

Source: Created by the author.

In the Virtual Learning Environment of the Bilingual Pedagogy online course, each class with 30 students is divided into three groups of 10 students. Such procedure facilitates pedagogical mediation between teachers and students, as well as promoting the creation of a learning community in which ties are strengthened by continuous interactions. For each group, specific learning paths (A, B and C) with different tools (games, videos, texts, audiovisual productions, among others) are proposed, so that each student can learn and build both an individual path and group paths.

The trails, therefore, correspond to virtual paths of personalized learning, capable of promoting and developing new competences and skills in students according to their learning styles. As each student learns in their own way, an environment is offered that enables personalized education. In this environment, the student performs specific multimedia activities, using the tools of each unit within its track. Even when they are on a specific trail within the LMS, the student can access and monitor the participation of others in other trails, strengthening community ties and increasing social presence in the environment.

Thus, the developed proposal is able to work subjectivity in the act of learning, with the internalization of proposals and collective debates for the construction of the singular path, traced according to the choices made by the student in the LMS.

4. The Bilingual Forum: Bidirectional Communication Proposal

The discussion forum is an important tool for interaction between students and teacher-mediators. Asynchronously, the tool enables the debate on a certain topic among participants on the same learning path, the same teaching pole or even the entire course. This tool provides the group, during the course, application in research with greater density and time on indexed scientific platforms, fostering complex debates organized around the central theme of the unit studied. When analyzing different teaching narratives with deaf and hearing students, Quevedo, Vanzin and Ulbricht (2014, p. 15) indicate that bilingual Virtual Learning Environments "[...] can offer the deaf student comfort in learning and sharing with students. fellow listeners, contributing in an unimaginable way to improving the quality of life of the person with deafness".

The visual identity and functionalities of the Bilingual Forum were designed to provide the best experience for deaf and hearing students. The interface is composed of two divisions, as shown in Figure 2.
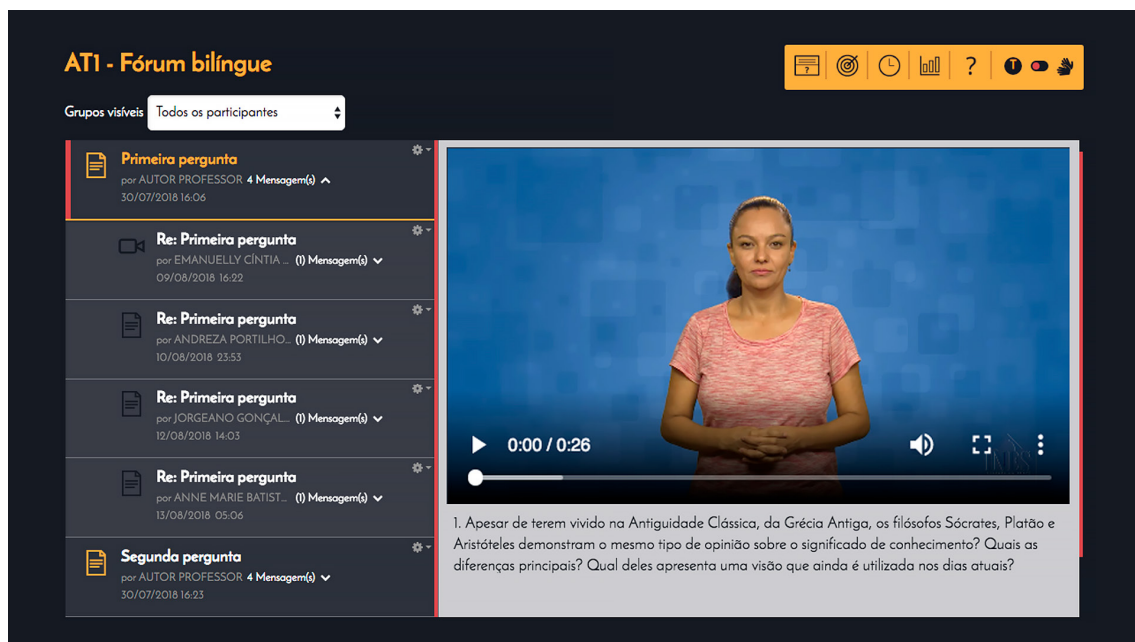
Figure 2 - Bilingual Forum layout example.

Source: Created by the author.

Analyzing Figure 2, it is possible to distinguish:

1. 1.   The right-hand division, initially making up 60% of the screen area destined to the forum, is responsible for clearly displaying videos and texts selected by the students in the left-hand division of the forum, according to user interaction. It is important to highlight the bilingual presentation, as the audience is made up of deaf and hearing students.

2. The left-hand division shows the representation of all the students' answers, in the form of video and text boxes, so that they exercise both the Brazilian sign language (Libras) and the Portuguese language. Each answer can be commented on by the students or by the forum moderator, can be edited by the student / author or deleted by the moderator.

   2.1. The lower subdivision is responsible for creating or editing texts and videos for submission to the forum. If the user wants to send a text, he must enter the title and a message or block of text. If you want to send a video, you must enter the title and click on the button corresponding to the video creation. In this case, a modal window will be displayed to which the user can

send a video already recorded on his computer (upload) or record it on the spot, and then submit it to the forum.

Unlike most traditional distance learning forums, which use only textual language, the INES online bilingual forum presents, as a differential, the option of debate in Libras through videos. In a simple way, it is possible to select the type of message - textual or visual. Thus, the discussions are centered on textual language and Libras, facilitating the participation of all as it replicates a way of natural interaction for deaf and hearing students: conversation. In addition, when choosing to discuss Libras, the student favors his learning of sign language.

The LMS has two layout options for the Bilingual Forum: (1) in the form of a thematic playlist, in which, in an organized way, students have access to the questions and answers of each topic, thus avoiding the overflow of videos; and (2) in the form of a waterfall, in which all posts are organized chronologically. That way, participants don't have to click on each topic to check the post. In both formats, publications are stored on each topic and can be retrieved at any time.

Another tool used in the course, web conferencing, makes synchronous communication possible, in real time, enabling video and/or audio interaction between two or more people who are in different locations. The web conferencing communication model of INES's online Bilingual Pedagogy course is fully accessible through LMS, without the need for a video conference room with specific equipment, such as a Multipoint Control Unit (MCU) - from English, Multipoint Control Unit.

This tool allows communication with up to 390 participants in the same room, that is, it gives voice to each student in the course. Thus, it is possible for students to participate in the web conference regardless of their location, requiring only an internet connection and access to LMS. Considering the scope of this tool, web conferencing is used for several purposes, such as to conduct weekly debates on a topic with students from other learning paths; meetings with pole coordinators and external collaborators; directed navigation to aid in the performance of tasks; chat between students and mediating teachers; team building courses, among others.

5. Skills Development: Personal Learning Environment (Social Network)

In order to enrich the experiences and exchanges between those involved in the teaching and learning process, we developed, specifically for the course, the Personal Learning Environment, allowing each student to organize their own social network of knowledge, with the expansion of the curriculum proposed in the course through the construction of a personal portfolio. This important training tool allows the insertion of animations, infographics, videos and other materials to enrich the virtual community, as well as transforming each student into a content promoter. Like the most used social networks in current times (Facebook, Instagram, Twitter etc.), the PLE has a series of features, such as: viewing the profile of the user and other users; publishing messages with insertion of media (including integrated video / audio recorder) and tags; sharing, likes and comments for each message posted; and finally, filters by groups and tags.

The PLE icon brings notifications (and quantities) regarding the actions performed in the tool. This tool was created with the objective of breaking with the hierarchy of knowledge, promoting the production of curricular content by students and expanding exchanges between peers. Such action contributes, above all, to opening and enriching the virtual learning community, as well as promoting linguistic exchange between the most distant regions of the country. It is noticed, in fact, the possibility of expanding the curriculum worked in the most diverse contributions of students in daily publications.

The PLE also works with the concept of the semantic web (CORRÊA; BERTOCCHI, 2012). In this way, students are able to create tags (keywords) on the main learning objects, directing other students to a digital library customized to their interests. Thus, whenever the student types, in a publication, a pre-registered word (tag), that word becomes a link for automatic access to the digital repository of the course (Figure 3).
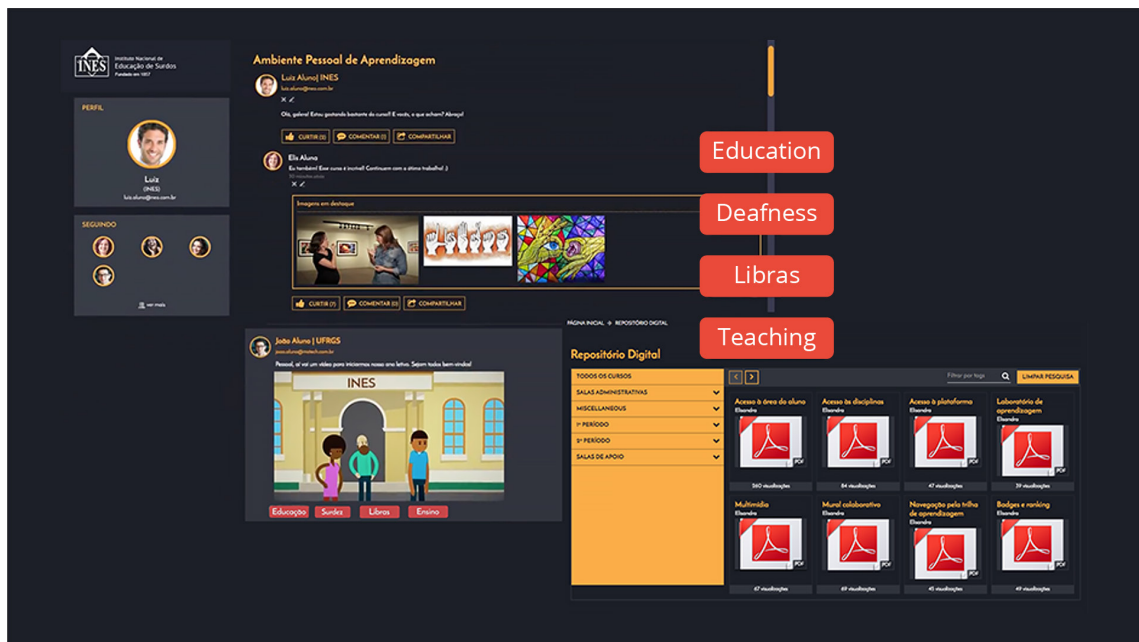
Figure 3 - Example of a semantic web linked to the Personal Learning Environment.

Source: Created by the author.

In this sense, all productions, whether in text or video, are transformed into "nodes" of connection between knowledge, enabling a feedback between digital learning objects inserted in the virtual environment. For each new material inserted, a new path opens up in the LMS' information architecture, creating inexhaustible references over time. This tool is closely linked to the digital repository of learning objects, since the registration of materials is done in the repository and accessed both by PLE and by the repository itself.

From this mechanics, students are directed to objects according to their production, creating themes from the interest of each user of the system.

6. Building a Bilingual Glossary

Currently, many words in the Portuguese language are not represented in signs, especially when they are not part of the universe of deaf people. Thus, in order to guarantee contextualized learning to students, new signs are created continuously, just as it happens in the education of

deaf people in academia. In this way, a Bilingual Glossary was created, in which students can search for entries in Portuguese or for signs in Libras. This last search is done according to three criteria: 1) hand configuration group; 2) configuration of hands; and 3) location of the signal on the body.

The glossary also presents a list of entries with random search and in alphabetical order and field for insertion of supplements on the entries (definition, example and variation), as shown in Figure 4.
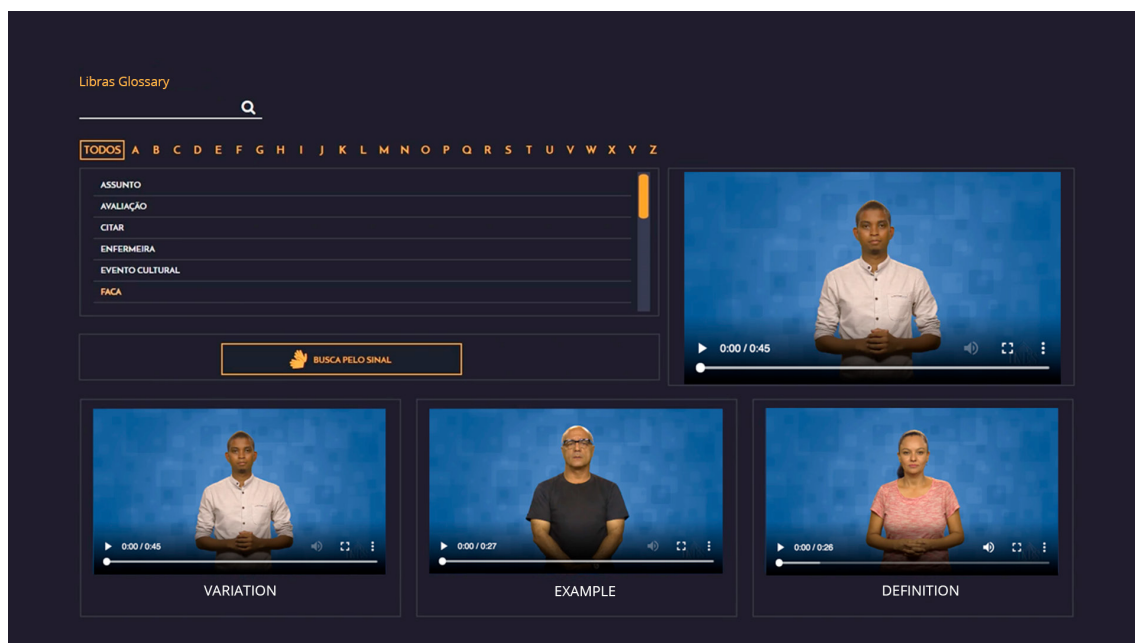

Figure 4 - Example of the layout of the glossary complements field, with variation, example and definition of the entry.

Source: Created by the author.

7. The Virtualization of Collaborative Learning: Mind Map

Considering the visuospatiality of sign language, the development of the Mind Map allows students to organize knowledge in a personalized way, distributing multimedia materials in the virtual space. The Mind Map also allows interaction between students in real time, as well as the possibility to save the main media in their personal galleries.

The Mind Map tool provides the student with the exact representation of group sharing, as its basic requirement is to build a collective knowledge chain, in which each post must necessarily be linked to the previous one. This work methodology requires individual and collective actions simultaneously, as students are evaluated by the publications made and also by the collective authorship of the complete Mind Map (Figure 5).
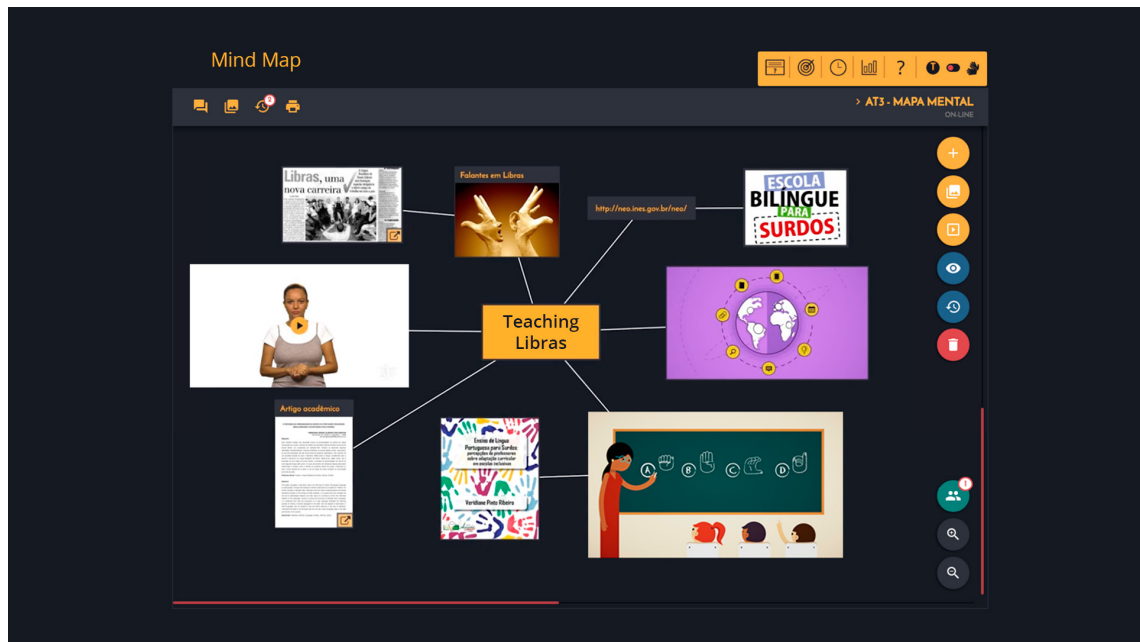

Figure 5 - Sample Mind Map layout.
Source: Created by the author.

8. The Teaching of Libras - Gamified Portfolio

One of the biggest challenges encountered in building the model of the Bilingual Pedagogy course was to create a specific tool for teaching Libras. Piveta, Salto and Ulbricht (2014), when assessing the accessibility of a Virtual Learning Environment for deaf users, suggest the development of new pedagogical tools that incorporate sign language characteristics. Considering the learning of a new language as a discovery of the world, we produced the layout of the tool, named Gamified Portfolio, based on a solar system with planets in orbit, making a reference to our universe.

For each individual production, a new star is inserted in the platform according to the Libras discipline offered.
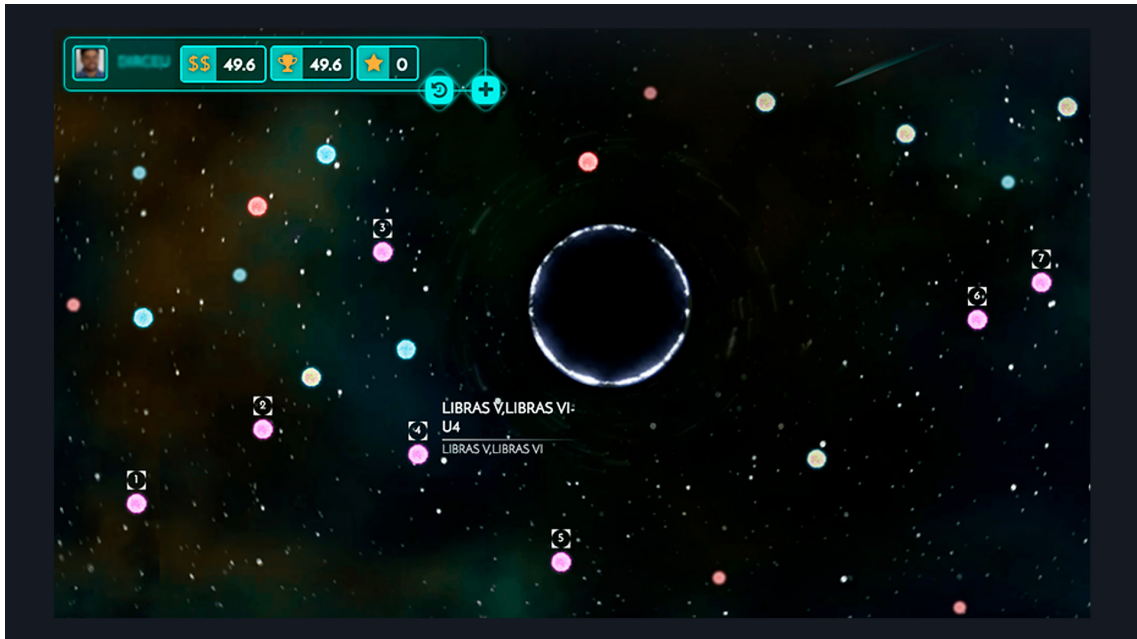

Figure 6 - Virtual Learning Environment for Libras
Source: Created by the author.

Stars are visual items that contain videos recorded by students as tasks in Libras subjects. The videos, in turn, are automatically assigned to the star for the activity. Each star is previously registered and, in this way, the videos adjust to the hierarchy of the stars over time.

Libras subjects and curricular activities are previously determined by the course planning, establishing the total number of stars present in the interface for all students (one star for each proposed activity) if necessary, according to the instructions of the teacher responsible for the discipline. Other stars may be added throughout the course if there is an increase in the number of activities.

Just as the disciplines are ranked according to the course prerequisites, the stars are made available in the environment in the same way, with representation of visual information (colors, brightness and pulse of the stars) creating another element that groups the stars according to the discipline , even if the student places them separately.

Video shares also influence the appearance of the stars. In this sense, videos with more shares and likes on PLE will have their respective stars growing in size and brightness.

To highlight student performance, a badge acquisition system (medals or bonuses) was developed, as well as a ranking of these acquisitions per week, per month and for the total. The individual achievements of the students - "golds" and "merits" - can be used as "currency" to customize the layout of the Libras discipline; for example, purchasing personalized stars or other figures. Using this system of merit and gold existing in the disciplines, the student will be able to "buy" different types of stars, acquired and available for application on any star that the student desires, even those that do not yet have linked videos.

9. The Creation of Educational Games

In this virtual bilingual environment, games are prominent objects, as they provide collective moments of learning, with the purpose of working content in a playful way, by reinforcing important concepts learned in the course. The ability of games to engage and challenge players through increasingly complex and demanding stages and the range of cognitive, linguistic and socio-cultural practices generated by games has increased interest in use in the educational environment (BEAVIS; MUSPRATT; THOMPSON, 2015). In most games developed for the course, as the student progresses, the correct answer is scored and displayed, which allows immediate feedback to the student. Thus, daily incentives are created, with the possibility of using different teaching strategies, resulting in greater playfulness during learning. Among the main games developed, we highlight: drag and paste, roulette, multiple choice, scenario composition, memory game, multiplayer, naval battle and simulators.

Due to the specific audience, made up of deaf and hearing students, all games are produced from scratch, that is, there is no adaptation of pre-existing games.

For the development of the course games, the production was divided into stages: planning, scripting, layout, illustration, animation and programming. In this way, the team is able to work on different productions simultaneously, segmenting the process into two major phases: educational design and graphic design. In addition to technical issues, we sought to work on the students' identity formation during the creation of the games, with the use of deaf, implanted, deafblind characters, etc. These elements increase the social presence of students in LMS, as well as enable new learning paths.
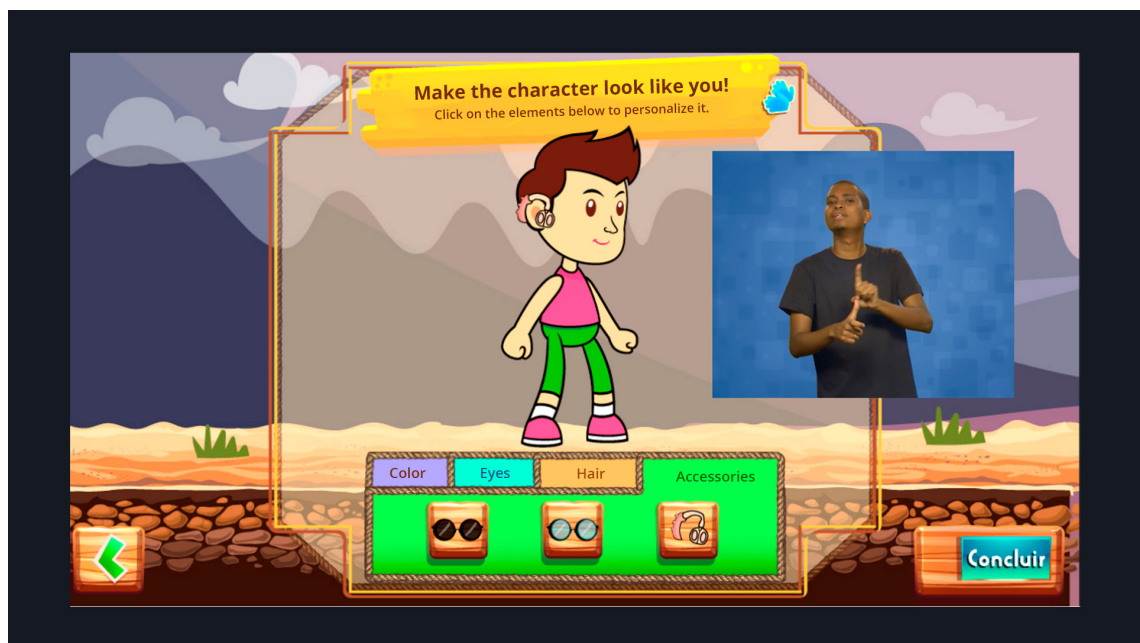

Figure 7 - Example of the multiple choice game "On a tightrope".

Source: Created by the author.

10. Conclusion

The proposal for the online bilingual Pedagogy course at INES results in new possibilities for distance education models, as well as for the special education area, inhibiting the culture of isolation and the instructional model, so constant in traditional higher education. The interaction, intrinsic to online environments, but incipient in the distance education proposals in the country, is provided by the atopy and

acronym⁴ of cyberspace, stimulating the exchange of information, guaranteeing an opportunity for the social negotiation of the meaning and the construction of knowledge among the interested parties. on the same theme. In addition, the possibility of browsing and performing tasks in sign language fosters the ratification of an educational identity space, in which culture, power and knowledge come together to produce particular social identities, narratives and practices.

In view of the current pandemic scenario due to Covid-19, it is important to differentiate remote education, characterized by the difficulties of inserting the techniques described throughout this work and the lack of adequate preparation for the establishment of dynamics of intense interpersonal relationships, from proposition of online education, planned and promoted by a multidisciplinary team, based on the concepts of interaction and collaboration in different tasks. It is perceived that, for the adequate attendance of people with educational needs, planning must be the central point, because the online processes will only be successful with autonomy and inclusion.

After more than a year of using the platform by students from the five macro-regions of Brazil, it is possible to conclude that the range of resources described in this work enhances various didactic-pedagogical procedures in the teaching and learning processes of deaf and hearing students.

References

ARAUJO, U. *et al.* The reorganization of time, space and relationships in school with the use of active learning methodologies and collaborative tools. **Educação Temática Digital**, Campinas, v. 16, n. 1, p. 84-99, jan./abr. 2014.

BEAVIS, C.; MUSPRATT, S.; THOMPSON, R. Young people, online gaming culture, and education. *In:* WYN, J.; CAHILL, H. (Eds.), **Handbook of children and youth studies.** Singapore: Springer, 2015. p. 815-827.

---

⁴ In the narrative, atopy and achronia are used when two or more events occur in parallel, in undefined / delimited places, as well as actions in cyberspace.

BRASIL. Lei nº 13.146, de 6 de julho de 2015. Institui a Lei Brasileira de Inclusão da Pessoa com Deficiência. **Diário Oficial da União**, Brasília, DF, 7 jul. 2015. Disponível em: http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2015/Lei/L13146.htm. Acesso em: 23 out. 2020.

COOK, K. C.; GRANT-DAVIE, K. **Online education:** Global questions, local answers. New York: Routledge, 2017.

CORRÊA, E. S.; BERTOCCHI, D. A Cena Cibercultural do Jornalismo Contemporâneo: Web Semântica, Algoritmos, Aplicativos e Curadoria. **MATRIZes**, São Paulo, ano 1, n. 2, p. 123-144, jan./jun. 2012.

GALASSO, B. *et al.* Processo de Produção de Materiais Didáticos Bilíngues do Instituto Nacional de Educação de Surdos. **Revista Brasileira de Educação Especial**, Marília, v. 24. n. 1, p. 59-72, jan./mar. 2018.

GIROUX, H. Cultura popular, Disney e política pública: uma entrevista com Henry Giroux. Entrevistadora: Márcia Moraes. Fórum Crítico da Educação. **Revista do ISEP**, Rio de Janeiro, v. 1, n. 2, p. 93-102, 2003.

GUARINELLO, A. C. **O papel do outro na escrita de sujeitos surdos**. São Paulo: Plexus, 2007.

KOEPSELL, D. R. **The Ontology of Cyberspace:** Philosophy, Law, and the Future of Intellectual Property. New edition. Chicago: Open Court Publishing Co., 2003.

LADD, P. **Understanding deaf culture:** in search of deafhood. Clevedon: Multilingual Matters, 2003.

MACHADO, E. E.; TEIXEIRA, D. E.; GALASSO, B. J. Concepção do Primeiro Curso On-line de Pedagogia em uma Perspectiva Bilíngue Libras-Português. **Revista Brasileira de Educação Especial**, Marília, v. 23, n. 1, 21-36, 2017.

MOLINA, R. **A pesquisa-ação/investigação-ação no Brasil:** mapeamento da produção (1966-2002) e os indicadores internos da pesquisa-ação colaborativa. Tese (Doutorado) – Faculdade de Educação, Universidade de São Paulo. São Paulo, p. 177, 2007.

NEUMAN, S.; ROSKOS, K. Literacy Knowledge in Practice: Contexts of Participation for Young Writers and Readers. **Reading Research Quarterly**, v. 32, n. 1, p. 10-32, jan./mar. 1997.

PIVETTA, E.; SAITO, D. S.; ULBRICHT, V. R. Deaf and Accessibility: Analysis of a Virtual Learning Environment. **Revista Brasileira de Educação Especial**, Marília, v. 20, n. 1, p. 147-162, jan./mar. 2014.

QUEVEDO, S. R. P.; VANZIN, T.; ULBRICHT, V. R. Ambientes virtuais de aprendizagem bilíngues para surdos em EAD. **Revista Brasileira de Aprendizagem Aberta e a Distância** – RBAAD da ABED, São Paulo, v. 13, 2014.

Autor Correspondente

Dirceu Esdras
E-mail: diresdras@gmail.com