

# Salabil bilingual education platform

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**Abstract**—This article introduces the Student Portal of Salabil bilingual education platform. Salabil was designed to assist teachers with the development of instructive resources for the education of deaf students. The platform was developed in PHP. Salabil enables the creation of four types of activities: texts, memory games, connect the dots games and quizzes. The activities have several configurations, achieving the creation of simple and complex tasks that are adaptable in consonance with each class abilities. Both teacher and student portals are available online on the website [www.salabil.com.br](http://www.salabil.com.br) that can be accessed on computers and mobile devices. Salabil differentials include the possibility of sharing and reuse of teaching materials as well as the registration of all the activities executed by the students. Its application enables the reinforcement of the educational material in a ludic approach while providing the digital literacy to the students who often do not have access to these technologies in their homes. Salabil was developed by means of a partnership with the Special School for the Deaf Frei Pacifico. The school participated in the project from the planning of the functionalities until its implementation.

**Keywords**—Libras, bilingual education of the deaf, accessibility, digital technologies, digital literacy.

## I. INTRODUCTION

This article introduces the Student Portal of Salabil bilingual education platform that was designed to assist teachers with the development of instructive resources for the education of deaf students. Salabil platform was developed by means of a partnership with the Special School for the Deaf Frei Pacifico. Based in the city of Porto Alegre, Brazil, the school participated in the project from the planning of the functionalities until its implementation. Frei Pacifico is a Bilingual School and its curriculum includes Brazilian Sign Language (Libras) and Sign Writing (SW). The definition of the scope of Salabil project was based on interviews with deaf teachers and listeners, speech therapists and Libras interpreters. These results have shown the difficulty of finding quality materials to use with deaf students.

The data collected from the interviews has established the necessity of an environment where it would be possible to store the contents created by the teachers. In this way, they could be quickly and easily accessible. Additionally, they might be shared and reutilized by all the teachers. Thus, the primary idea was to develop a dictionary for the storage of the entries, so the teachers could prepare their classes and the students could carry out their activities in an entertaining way.

Salabil Portal empowers the students to pleasingly learn through texts and games created by the teachers directly on the platform. Thus, students can play using the language they are learning, within the context addressed in class. They can learn Libras or Portuguese, as well as mathematics, science,

history, geography, or any other subject, as they will be reinforcing reading and writing in Portuguese and in SW.

## II. BILINGUALISM

Salabil focuses on bilingual education according to the pedagogical proposal of the partner school as well as to the result of the bibliographic research. Bilingualism prepares the deaf individual to express himself in his mother tongue that corresponds to his process of seizing the visual world [1].

The child needs to be exposed to his or her mother tongue as early as possible, in order to learn it naturally in the first years of life, such as what happens with listening children. Therefore, the child can interact socially with the community, and so being able to develop his or her own identity, as well as cognitive, linguistic, affective and political capacities [2].

Likewise, the child needs to be encouraged to communicate. In the event of repression of the usage of sign language or stimuli given entirely for the oralization, the child may have an incomplete acquisition of language and may present flaws in the linguistic base. Access to sign language allows the development of language naturally and spontaneously, and can occur in a manner analogous to the process of children acquiring any other languages [3].

Preceding acquiring the mother tongue, the child uses homemade signs with parents and family. However, more frequently the child is neglected and left out of family conversations and becomes deprived of language. To obtain fluency, Libras education should take place up to three years of age [4]. Nonetheless, many children arrive at school not knowing Libras around the age of six. "Deaf people with late acquisition rely on efforts to encode, organize and recognize signals, implying difficulties in interpreting and integrating meaning" [5]. Meanwhile, deaf children of deaf parents "have the privilege of having access to a sign language in equal conditions that hearing children have to an oral-auditory language" [3]. However, 95% of deaf children have hearing parents and due to their lack of sign language, they are tardily lettered in Libras, meaning that the school ends up teaching children and their families [4].

The deaf child is inserted in a linguistic context can be decisive in the process of language acquisition. Even when the language is present in a natural and normal way, such as what happens with hearing children, there is a possibility of linguistic delay and/or sequelae due to the lack of input in a language to which the child has complete access as soon as possible [3].

The bilingual-bicultural proposal, which includes competence and performance in two languages, is currently the most accepted by the deaf community. Moreover, it is secured in Brazil by Decree No. 5,626, dated December 22,

2005 [6]. This modality considers sign language or signaled as the mother tongue to the deaf. Due to its visual ability, it is the first language, known as L1. In Brazil, Portuguese is considered the second language for the deaf, or L2, and will be used for reading and writing, as provided by Federal Law No. 10,436, dated April 24, 2002. This law sanctioned Libras as a legal instrument of communication and expression [7].

Some schools teach the SW, which according to [8] "is a visual system of sign language registration. The symbols used in this writing seek to express movements, forms of hands, non-manual expressions and points of articulation" [8].

This brief summary of the accomplished bibliographic research intended to explain the importance of bilingualism for the deaf child and the importance of becoming proficient in both Libras and Portuguese.

### III. DIGITAL GAMES

Games appear as a solution to gain the attention of students and motivate them to exercise the contents learned in the classroom in a playful way. Digital games were developed in the context of computing and ended up extrapolating that field. A digital game can be seen "as a digital object of a postmodern culture and its inherent characteristics are not only to participate in culture but, above all, to re-signify it" [9].

The player learns, in the act of playing, more than what was intended to teach, such as social affective skills, motor skills, concentration, creativity, school contents such as languages, history, mythology, logical-mathematical reasoning. In addition, games unravel children's curiosity about game themes and it is common for them to research in order to learn more about it [9].

Considering that deaf people have a highly evolved visual capacity, the interface design of a tool aimed at this audience should be well studied to ensure satisfactory usability, thus providing digital inclusion [10].

During the research, some games intended for the deaf were discovered. However, the teachers had difficulty in finding materials and games on the precise subjects that would be addressed in the classroom. Furthermore, it is more difficult to find materials that use the same signals utilized in school.

### IV. PLATFORM FUNCTIONALITIES

Salabil features two distinct environments: a Teacher Portal and a Student Portal. Both portals can be accessed on computers and mobile devices. Salabil is available online on the website [www.salabil.com.br](http://www.salabil.com.br).

The Teacher Portal was developed first since it would not be possible to validate the Student Portal if the teacher had not prepared all the configurations and designed the initial lessons of each class. This module consists of a login, school records, teacher, classes, student, dictionary, lessons and activities. The dictionary enables the inclusion of images, videos and keywords associated with each entry. The materials produced are shared with all teachers of the school and can be reviewed by the students. All of these are the basis for the elaboration of the activities that will be available in the Student Portal.

The first step in creating a new lesson on the Teacher Portal is a query to verify if all the entries that were planned for use in the activities are included in the dictionary. If they are not, the teacher has to do this insertion, which can lead to a search or creation of materials for the dictionary. In Fig. 1, the query of the bee entry is presented. If the teacher wants an image or a video different from what is previously available, he is obliged to arrange it.

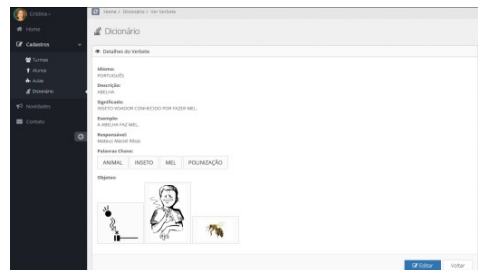


Fig. 1. Query screen of the dictionary, Salabil, Teacher Portal.

Registration of lessons must begin solely after having checked and complemented the necessary information in the dictionary. At that moment, the class and the day of the lesson is defined, as well as the objective, the teaching plan, the skills and the abilities that will be worked on. Then, the teacher will insert as many activities as he wants, starting with the definition of the type of activity that can be composed of texts, memory games, connect the dots games and quizzes. It is up to the teachers, based on the knowledge of their students, to adapt the level of complexity of the activities to the skills and abilities of each group.

To access the portal the student must log in. Then, he will be directed to a page where the last four classes will be presented by their teachers. He will also be able to navigate to view and redo previous classes as shown in Fig. 2. Thus, he can repeat the activities at home to study or play, and even show them to his relatives, thus disseminating the knowledge acquired in the classroom.

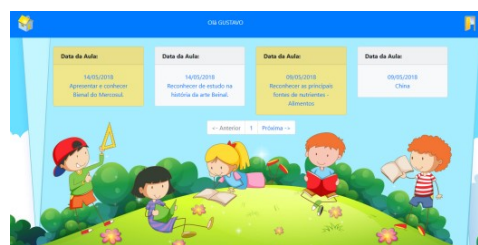


Fig. 2. Lesson selection screen, Salabil, Student Portal.

After selecting the desired lesson, the screen with the activities planned by the teacher will be displayed, as shown in Fig. 3. If there are more than four activities, the navigation bar will appear.

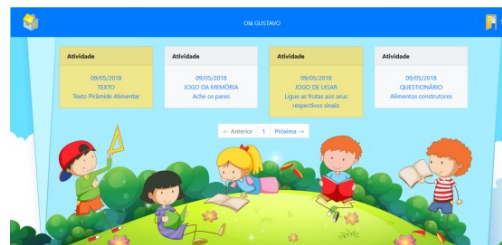


Fig. 3. Activity selection screen, Salabil, Student Portal.

Text activities can be composed of texts in Portuguese or SW and images, as shown in Fig. 4. Consequently, the teacher can conceive a screen with a text, another one with two texts side by side, or with a text and an image next to it, or even with two images. These images may be a drawing, a sign, a written sentence with fingertips, or an SW text as shown in the example in Fig. 4. The goal is to give the teacher flexibility to create lessons, simple or according to the class for which the activities are intended.

A dictionary bar appears in the lower left corner in all activity screens, as shown in Fig. 4. In this way, the student can open the dictionary at any time if he needs to consult a word he does not know. The significance and the examples registered in the dictionary will be presented in the search results, as well as all the images and videos.



Fig. 4. Text activity screen, Salabil, Student Portal.

The dictionary is the foundation of creation of all activities and must be sustained by the teachers. All entries of the dictionary are available for consultation and use by everyone. Fig. 5, for example, shows the query of the bee entry in the student's view, which shows the definition, the example and all associated objects that can be images or videos.



Fig. 5. Dictionary, Salabil, Student Portal.

Memory and connect the dots game activities have a similar dynamic, as shown in Fig. 6. The game images are the same as those entered in the dictionary. The teacher will be able to add two equal images as in a normal memory game, exploring only the student's remembrance. Contrarily, the teacher can insert different images of the same entry adding a greater complexity to the game. In this case, in addition to memorizing, the student will have to analyze the different images in order to compare them. In Fig. 6, the left column of the connect the dots game displays images and the right column displays the sign illustration. The memory game was assembled with images and the sign illustration. These examples were intended to demonstrate that games can be configured in many ways, giving flexibility to the teacher to create simple or more complex lessons.



Fig. 6. Connect the dots and memory games activities, Salabil, Student Portal.

Quizzes support specific guidelines for questions and answers. The question can be a sentence in Portuguese or an image. Examples can be seen in Fig. 7, where there is a statement with what has to be done in the exercise. In addition, an SW image is displayed. It could also be a drawing or a signal. Therefore, the teacher can design interesting activities, alternating the behavior of the games, thus creating dynamism.

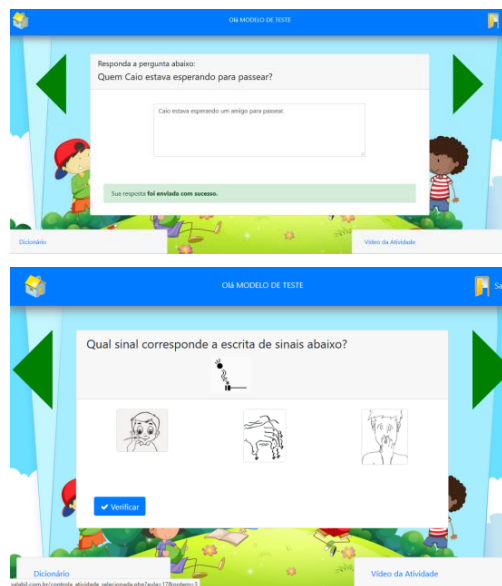


Fig. 7. Quiz activity, Salabil, Student Portal.

Quizzes replies can also be configured by the teacher. There are three options for the answers: subjective, or answers composed of images, as shown in Fig. 7, or objective, as shown in Fig.8. When the answer is subjective, the student must write it in Portuguese and save it for teacher examination. When the answer is objective, the teacher must write the options and when the student saves his answer the game will display the correction automatically. If the answer is correct, this will be indicated with an incentive statement: 'Congratulations! The answer is correct! '. If the answer is incorrect, it will be indicated with the expression: 'Try again!'. Finally, the answer can also be an image. In this case



the teacher can insert several options of images that will be corrected in the same way as the objective answers.



Fig. 8. Quiz activity, Salabil, Student Portal.

In the interest of helping the student, the teacher can make a video for each activity including instructions on how to perform them. The video icon will be available in the lower right corner of the screen. The student can click on the icon, maximizing the video for easy viewing.

In this brief explanation of the functionalities of Salabil, a larger emphasis was placed on the Student Portal. It is possible, from the visualization of the classes generated, to get a good idea of the type of activities that can be elaborated, and although only four types are foreseen, they can be configured in several ways, increasing the potential of the platform.

## V. DISCUSSION

In addition to the knowledge that the teacher wants to intentionally disseminate with each activity, the platform will contribute to the Digital Literacy (LD) of both students and teachers. "Elaborate activities that involve the use of educational technologies in the school and collaborate for the Digital Literacy of students and teachers" [11].

The educational platform demonstrated in this article is intended to playfully educate children with diversified levels in Libras. However, each child will evolve within their own pace, and teachers will be able to follow this evolution and create specific activities to stimulate the filling of gaps that are perceived in learning.

The intention in using digital games was to maintain the children's attention and to generate motivation for their learning. In order to achieve this, the platform is visually attractive and enables the development of challenging activities according to the characteristics of each class. In the interest of keeping the attention of the students without losing their interest, the contents and levels of complexity of the activities will be defined by the teacher that will be responsible for creating the lessons and activities.

As a feedback from the teachers of Frei Pacífico, we received the proposal for permitting each class to be able to customize the background design of their games. The arts teacher is responsible for this project. As soon as they finish their drawings, the teachers will be able to change the background of each class. With this fulfillment, students are expected to consider themselves the owners of the platform, thus creating an environment more conducive to their learning.

Salabil was designed to be a reusable object repository that makes it easier for teachers to increase their productivity by planning interesting and tailored lessons for each class. However, at first the task of feeding the dictionary was quite arduous. The teachers received an empty database and, in one month, they have inserted 138 entries, with 344 associated images. Despite of this difficulty, the group understood that this will bring positive results over time, and at each lesson, they will have to add a smaller number of entries.

One benefit that was already perceived is the change of culture regarding the sharing of materials. At first, only 36% of the teachers shared their materials with colleagues. After the adoption of Salabil, all of the teachers are including their materials and complementing those that have been added by their colleagues.

Student's acceptance was immediate. According to the teachers' reports, students usually enjoy classes in the computer lab, and this was not different with the use of Salabil. Already in the opening of the portal, they were happy to see their names in the header. Students were concentrated on the instructions given by the teachers and they were also concentrated doing the activities. They still have difficulty writing in Portuguese and that can fluster the search for a word in the dictionary. Despite this, everyone was interested, asked questions, and managed each in their own time to carry out the proposed activities. These are just a few remarks made by teachers and are not the final results of the research.

The Salabil project is in its final stages of implementation in Frei Pacífico partner school, and is intended to be used by other schools, where each one can create their own dictionary as well as share it in part or totally with other schools. Hence, the knowledge of Libras and SW can be disseminated among them through the sharing of their dictionaries.

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