


## **APOI@ INDIGENOUS EDUCATION: DIGITAL PLATFORM FOR SHARING OPEN EDUCATIONAL RESOURCES**

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**Cristina Isabel Acosta<sup>1</sup>, Juarez Bento da Silva<sup>2</sup>, Simone Meister Sommer Bilessimo<sup>3</sup>,  
Leticia Sophia Rocha Machado<sup>4</sup>, Marina Carradore Sérgio<sup>5</sup>, Evandro Machado  
Pereira<sup>6</sup> and Lorenzo Mendes Rodrigues<sup>7</sup>**

### **ABSTRACT**

The research addressed the development of a differentiated school education for indigenous communities in Brazil, with an emphasis on a pedagogy that values and preserves their cultural heritage. The study highlighted the need for educational resources adapted to indigenous cultural specificities, especially bilingual teaching materials, in accordance with the guidelines of the Federal Constitution of 1988 and the Law of Guidelines and Bases of National Education of 1996. The objective of the research was to create a digital platform for the sharing of Open Educational Resources (OER), including bilingual teaching materials and reports of pedagogical experiences specific to the Guarani language and culture. Using Maker Culture as a methodology, teachers from the Nhu Porã School, in Torres, RS, participated in workshops to build these resources. The research was qualitative, with the researcher carrying out intense fieldwork. Bibliographic research and action research procedures were used, promoting cooperation between the researcher and the community to solve the identified problem. The results indicated the importance of indigenous protagonism, community participation and cooperation between different social actors in solving the shortage of bilingual teaching materials. The construction of the OER by the indigenous participants, the implementation of the digital platform and the sharing of bilingual materials and pedagogical reports achieved the objectives of the research. The results underscore the importance of the active participation of indigenous people in the creation of culturally relevant educational resources, expanding access to bilingual materials, and promoting a culture of collaboration and sharing in the context of indigenous education. The digital platform expanded access to indigenous bilingual educational resources, contributing to the preservation of cultural identity and the promotion of educational inclusion.

<sup>1</sup> Master in Information and Communication Technologies - UFSC  
Nhu Porã Indigenous School in the Nhu Porã Village – Torres/RS

<sup>2</sup> Dr. in Engineering and Knowledge Management – UFSC  
Federal University of Santa Catarina – Araranguá Campus

<sup>3</sup> Dr. in Production Engineering – UFSC  
Federal University of Santa Catarina – Araranguá Campus

<sup>4</sup> Dr. in Education – UFRGS  
Federal University of Rio Grande do Sul – Porto Alegre

<sup>5</sup> Dr. in Engineering and Knowledge Management – UFSC  
Federal University of Santa Catarina – Araranguá Campus

<sup>6</sup> Bachelor in Information and Communication Technologies – UFSC  
Federal University of Santa Catarina – Araranguá Campus

<sup>7</sup> Bachelor in Information and Communication Technologies – UFSC  
Federal University of Santa Catarina – Araranguá Campus

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## INTRODUCTION

The indigenous population in Brazil, according to the 2022 Demographic Census, is made up of 1,694,836 people distributed among 271 ethnic groups. However, many indigenous languages were lost due to the colonization process and the imposition of external cultural values, resulting in the extinction of several of them. Today, only 180 of the 1,078 original languages are in use in the country (IBGE, 2022). This loss reflects a significant decrease in Brazil's linguistic and cultural diversity.

The preservation of indigenous languages is an urgent challenge, as they represent more than means of communication; they constitute the basis of cultural identities and ancestral knowledge. According to UNESCO (2020), these languages carry ecological, medicinal, and spiritual knowledge, much of which has not been documented in other languages. As languages disappear, this knowledge, passed down orally from generation to generation, is in danger of being lost.

This research focuses on the Nhu Porã community, where the Guarani M'bya is spoken, one of the three main variants of modern Guarani, recognized as a cultural reference by the National Institute of Historical and Artistic Heritage (IPHAN) and by the Ministry of Culture. In addition to Guarani M'bya, the other main varieties are Nhandeva and Kaiowá, spoken in Brazil, Paraguay, Bolivia and Argentina. The 2016 Continental Guarani Map estimated about 282,709 speakers of the Guarani language, of which 83,019 are in Brazil. These numbers reflect the importance of preserving this language in a broader context of South America (ISA, 2017).

The 1988 Constitution brought significant advances for indigenous peoples, recognizing the right to self-determination, the possession of traditional lands, and the maintenance of their cultures and languages. The 1996 Law of Guidelines and Bases of National Education also reinforced these rights, ensuring a bilingual, intercultural and specific indigenous school education. However, the effective implementation of these guarantees is still insufficient. One of the main obstacles is the scarcity of bilingual teaching materials. According to the 2023 School Census, only 53.5% of indigenous schools have teaching materials in their native language (INEP, 2023).

In addition to the scarcity of materials, the curriculum of indigenous schools often resembles that of urban schools, ignoring the traditions and modes of teaching of indigenous communities. Western educational practices tend to prioritize writing and the standardization of knowledge, to the detriment of oral transmission, which is fundamental in

many indigenous cultures. This progressively devalues indigenous languages and cultures in the school environment, threatening their continuity.

In response to these challenges, the Ministry of Education (MEC) created in 2024 the National Commission for the Evaluation and Support of the Production of Indigenous Didactic and Literary Material (CAPEMA). This commission aims to advise public policies aimed at the literacy of indigenous students, focusing on the production of teaching materials in native languages. Rosilene Tuxá, general coordinator of Indigenous School Education, stressed the importance of the active participation of the indigenous people themselves in the development of these materials, ensuring that they respect cultural and linguistic specificities (MEC, 2024).

Another critical point in the preservation of indigenous languages is the way knowledge is transmitted. In the Nhu Porã community, as in many others, knowledge is mostly oral, which generates a significant loss when the elders die and this knowledge is not recorded. The lack of bilingual teaching materials in schools compromises both children's knowledge and cultural identity, aggravating the discontinuity of traditions (Silva *et al*, 2018).

Faced with this scenario of linguistic and cultural loss, the lack of bilingual teaching materials in indigenous schools, including the Nhu Porã Indigenous School, compromises both student learning and the continuity of traditional knowledge. Although the legislation ensures bilingual and intercultural education, its implementation is still inadequate to the cultural realities of the communities (Silva *et al*, 2018).

To fill this gap, this research proposes the development of a digital platform to provide bilingual teaching materials adapted to the needs of the Guarani M'bya community. In addition to addressing the lack of educational resources, this platform promotes indigenous protagonism in the creation and dissemination of pedagogical content, respecting the cultural and linguistic specificities of the community (Silva *et al*, 2018).

The lack of bilingual teaching materials in indigenous schools has direct impacts on the school performance of students and the preservation of their culture. The absence of adequate resources compromises learning and can generate demotivation and school dropout, in addition to weakening the transmission of traditional knowledge. The preservation of the Guarani M'bya language, recognized as intangible cultural heritage, depends on educational practices that value its use and preserve culture (Silva *et al*, 2018).

Therefore, this research becomes of immediate practical relevance, as it proposes a digital platform that, in addition to offering bilingual materials, encourages the collaborative creation of content by the indigenous people themselves. This will contribute both to the improvement of school performance and to the preservation of the Guarani M'bya culture, strengthening the use of the language in formal teaching environments. For the Brazilian indigenous educational scenario, this initiative represents an advance towards a truly intercultural, bilingual and inclusive education, in accordance with current legislation (Freire, 2018).

This OER proposal not only facilitates access to educational materials, but also contributes to the preservation and appreciation of the M'bya Guarani language, reinforcing its continuity both in Brazil and in other neighboring countries. The use of digital technologies and the development of collaborative platforms are seen as an effective way to democratize access to knowledge, promote the pedagogical autonomy of indigenous communities, and ensure the preservation of their linguistic traditions and identities (Machado; Bilessimo; Silva, 2021).

The following sections detail the Methodology of the research, which includes maker workshops carried out with the participation of the community for the production of bilingual teaching materials and pedagogical reports. Then the results are presented, focusing on the educational resources created, such as didactic games and electronic books, and on the development of a digital platform for sharing these materials. Finally, the Final Considerations highlight the social relevance of the project, proposing future expansions to other communities and the development of new educational materials.

## **METHODOLOGY**

This research followed a qualitative approach, whose purpose is to study phenomena in their natural context, with emphasis on the interpretation and understanding of the meanings attributed by the participants to their social and cultural processes. Qualitative research is appropriate to investigate complex phenomena, especially in contexts that demand a deep analysis of social, cultural, and educational interactions, such as the Guarani M'bya community. This approach allows obtaining a holistic view of the cultural dynamics and educational practices within that specific community (Sampieri; Collado; Lucio, 2013).

The methodological design adopted was that of action research, as outlined by Thiollent (2011). Action research is characterized by the combination of scientific investigation and practical intervention, promoting the active participation of the subjects involved in the search for solutions to real problems. This methodology was selected due to its participatory and flexible character, allowing the integration of the community in the formulation of responses to its own demands, especially in the development of bilingual teaching materials. Such an approach is especially pertinent in research that requires an understanding of cultural and linguistic specificities, which was essential in the context of the Guarani M'bya community.

Action research proved to be appropriate to address the scarcity of bilingual teaching materials, for several reasons:

- a. Active community participation: The collaboration of Guarani M'bya community members in the development of teaching materials ensured that these resources were culturally appropriate, while respecting their traditions. The identification of needs was done together with the researchers, ensuring contextualized solutions.
- b. Co-construction of knowledge: In the context of this research, the creation of didactic materials was conducted in accordance with the pedagogy and cultural values of the community, avoiding the imposition of exogenous contents. Collaboration between researchers and the community allowed the materials to be designed in a way that reflected their own educational perspective.
- c. Practical problem solving: The research sought to identify the problem of the absence of bilingual teaching materials and propose a viable solution. The creation of a digital platform to disseminate these materials was a practical and sustainable response, born from the participatory process and the active contribution of the community.
- d. Reflective and continuous improvement cycle: As proposed by Sampieri et al., the process followed continuous cycles of planning, action, observation and reflection, ensuring the improvement of teaching materials over time. This cycle was adjusted according to community feedback, which was essential in a dynamic educational context such as that of indigenous schools.

## TECHNICAL PROCEDURES

The technical procedures adopted included:

- a. Bibliographic research: A systematic review of the literature was carried out, seeking to theoretically support research in the areas of preservation of indigenous languages, use of Open Educational Resources (OER) in school environments and bilingual pedagogy in contexts of indigenous education.
- b. Field research: An ethnographic approach was conducted with the school community of the Nhu Porã village. Participant observation allowed us to capture the cultural and pedagogical particularities of the indigenous educational context, enabling the collection of empirical data through direct contact with teachers and students.
- c. Semi-structured interviews: Interviews were conducted with teachers, community leaders, and other community members. The interviews, recorded and transcribed, allowed the identification of the educational needs and technological challenges faced in bilingual education. Content analysis was applied to the transcripts, seeking to identify emerging patterns and themes.

## STAGES OF THE RESEARCH

The research was conducted in several interconnected stages, ranging from raising awareness in the school community to creating a digital platform for sharing bilingual teaching materials. Below, the steps are detailed:

1. Awareness and presentation of the project: aimed to present the research project to the school community, indigenous leaders and teachers of the Nhu Porã Indigenous School, ensuring the engagement and support of the participants. Face-to-face meetings were held with the chief, professors and other members of the community to discuss the objectives and importance of the research for the preservation of the Guarani M'bya language.
2. Data Collection: data and information were collected about the village's digital infrastructure, as well as the needs for specific teaching and pedagogical materials for bilingual education were identified. Activities included:
  - 2.1. Semi-Structured Interviews: conducting interviews with teachers, community leaders and village members to understand the demand for teaching



materials and their expectations regarding the project. The interviews were conducted in a way that respected the culture and values of the community.

2.2. Bibliographic Research: review of relevant literature on topics related to indigenous education, language preservation and open educational resources (OER). This survey theoretically supported the research and served as a basis for the production of bilingual materials.

3. Continuing education of teachers: aimed to train the school's teachers to produce bilingual teaching materials that respect the culture and specificities of the Guarani M'bya language. Workshops and trainings were organized for teachers, focusing on bilingual indigenous education, the multicultural curriculum, and OER-guided pedagogy. The maker culture was introduced as a methodology to encourage the collaborative creation of teaching materials.
4. Production of bilingual teaching materials: was related to the development of bilingual teaching materials adapted to the reality and culture of the Guarani M'bya community, using pedagogical approaches that promote teaching in an intercultural and inclusive way. Activities included:
  - 4.1. Maker Workshops: workshops held with teachers, students and other members of the community for the collaborative production of teaching materials. These meetings promoted the creation of pedagogical content in OER format, with a focus on the preservation of the Guarani M'bya language and culture.
  - 4.2. Cultural and linguistic adaptation: during the production of the materials, the particularities of the mother tongue, cultural values and traditional ways of learning of the Guarani M'bya community were taken into account.
5. Construction of the digital platform: contemplated the development of an online platform to store, consult, disseminate and share the bilingual teaching materials produced. Activities included:
  - 5.1. Technical development: the RExLab/UFSC technical team created a digital platform that is easily accessible to the community. This platform was designed to be collaborative, allowing other indigenous communities to also use it in the future.
  - 5.2. Usability testing: The platform was tested by teachers and community members to ensure that it was intuitive and met the needs of the community.



6. Insertion and socialization of materials on the platform: it was related to the insertion of didactic and pedagogical materials produced during the workshops on the digital platform and disseminating them among teachers in the school community. It included the following activities:
  - 6.1. Sharing of resources: the materials produced were inserted into the digital platform and made available to the entire school community of the Nhu Porã village.
  - 6.2. Experience reports: in addition to the teaching materials, pedagogical experience reports were also included in the platform, recording the teaching practices and challenges faced by teachers in the implementation of the bilingual curriculum.

## THE PARTICIPATING UNIVERSE

The study was carried out in the Nhu Porã Indigenous Reserve, located in the municipality of Torres, on the north coast of Rio Grande do Sul, with the participation of the entire school community, including parents, students, teachers and the school board. Due to the particularity of the group studied, it is important to contextualize the participants for the correct interpretation of the results.

The Mbya Guarani are described by Meliá (2008) as a walking people, whose migration is closely linked to a worldview that values their territoriality, even if it has been fragmented by colonization. The privatization of the lands and the consequent usurpation of their sacred territory forced the Guarani, like other indigenous peoples in Brazil, to fight for a dignified space, developing strategies of resistance to face the pressure of the surrounding society.

Archaeological evidence indicates that the Guarani migrated to South America before European colonization, occupying vast areas of tropical forests and riverbanks that are now part of Brazilian states, Argentina, and Paraguay. Today, they seek to reconnect with their ancestral lands, respecting the land as a living organism, created by Nhanderu (God), maintaining a sacred relationship with nature (Silva *et al*, 2018).

The Nhu Porã community, composed of approximately 129 inhabitants, preserves its cultural traditions and the Guarani language, despite contact with non-indigenous people. They survive by selling handicrafts, small services and donations, and some members work as teachers and health agents. Initially camped on the side of BR 101, they acquired a 1.5-

hectare plot of land, and were later relocated to an area of 97 hectares due to the duplication of the road. Although the new area is intended for the plantation of eucalyptus and pine, the community faces a shortage of natural resources and seeks to strengthen its cultural traditions, led by chief Mário Lopes.

Indigenous education was one of the main focuses of the community, with the first classes taught in 1997 in a black canvas shack, next to a fig tree, by indigenous teacher Hugo França, in Guarani and Portuguese. This initiative highlighted the need for schooling for indigenous children, culminating in the construction of the Guapoy Porã School, made official in 2002. Over time, the school was transferred to the village and underwent significant renovations in 2013/2014 and 2022, gaining adequate physical and technological structure. Currently, the school offers kindergarten to the 9th grade and is awaiting authorization to operate independently, consolidating indigenous school education and the strengthening of cultural identity in the Nhu Porã community (Silva *et al*, 2018).

## **RESULTS: BILINGUAL TEACHING MATERIALS AND PEDAGOGICAL PRACTICES**

The creation of educational resources for the initial introduction and presentation of the functionalities of the digital platform was carried out in the Nhu Porã community, located in the Campo Bonito reserve, located in the municipality of Torres/RS. This community, which has a resident population of 129 inhabitants, according to the 2022 IBGE Demographic Census, is composed entirely of indigenous residents, with an average age of 13 years.

The predominant language is Guarani M'bya, which is part of the Tupi trunk, of the Tupi-Guarani family. Guarani M'bya is recognized as one of the three modern variants of the Guarani language, along with Nhandeva or Chiripá/Txiripa/Xiripá or Ava Guarani and Kaiowa.

The elaboration of didactic materials and bilingual pedagogical practices was carried out through *maker workshops*, which resulted in bilingual didactic materials produced and reports of pedagogical experiences and also through the creation and application of didactic games, in addition to the creation of a book in electronic format (*ebook*) about indigenous legends. Five workshops were held and two didactic games were created, which will be presented in the next sections.

## WORKSHOPS HELD

The workshops were carried out based on the methodology of the *maker* culture, through which the participants, indigenous teachers and non-indigenous teachers, together with students and community participants, met to plan and build the bilingual didactic material. Initially, the construction was done in physical format and later digitized, so that it could be inserted into the sharing platform. Each workshop resulted in an open educational resource: didactic material or experience report. The following workshops were held:

- 1) School Garden.
- 2) Construction of the house of culture.
- 3) Making jewelry and dream filter.
- 4) Archery.
- 5) Making models with scrap.

Below will be presented more information about the workshops held.

### School Garden

The School Garden workshop was created with the purpose of encouraging healthier eating among students, presenting the benefits of food and promoting knowledge about agriculture, sustainability and organic cultivation. The workshop was developed from March 15, 2022 and students from the Nhu Porã Indigenous School attending the 1st and 9th grades of Elementary School, in the day (morning and afternoon), participated in the workshop. Figure 1 shows one of the moments of the workshop.

FIGURE 1 - PHOTOS OF THE SCHOOL GARDEN



Source: Authors' collection (2023)

## Construction of the House of Culture

The Nhu Porã indigenous community identified the need for a Cultural Center to promote community activities, such as an exhibition of students' work, handicraft exhibitions, meetings in conversation circles, dances and artistic presentations. The proposal was to build a house of culture in partnership with the students, respecting the Guarani architecture and using sustainable materials from the Village. The objective was to benefit children, young people and strengthen indigenous identity.

The workshop was developed during the year 2023 and students from the Nhu Porã Indigenous School attending the 1st and 9th grades of Elementary School, during the day (morning and afternoon), participated in the workshop. Figure 2 presents one of the moments of the workshop.

FIGURE 2 – PHOTOS OF THE CONSTRUCTION OF THE HOUSE OF CULTURE



Source: Authors' collection (2023)

## Handicrafts: Jewelry Making and Dream Filter

The beaded jewelry workshop and dream filter aimed to promote handicraft activities at the school and community, generating income for the inhabitants. Taught by experienced women and girls, the classes taught traditional techniques to stimulate the production of pieces for sale, raising funds for the school and the Village.

The workshop was developed during the year 2023 and students from the Nhu Porã Indigenous School attending the 1st and 9th grades of Elementary School, during the day (morning and afternoon), participated in the workshop. Figure 3 shows moments of the workshop.



FIGURE 3 – MAKING JEWELRY AND DREAM FILTER



Source: Authors' collection (2024)

### **Archery Handicraft Workshop**

The planning of the workshop involved a previous meeting in the community with teachers, students, chief and indigenous teacher. The theme addressed was indigenous culture, with emphasis on the manufacture of bow and arrow. The materials were selected by the indigenous teacher, who also guided the participants in the making and use of the instruments. The activity provided an initial contact with this type of hunting artifact, culminating with all participants launching the arrows built. The production process was detailed by the indigenous teacher and later recorded in a collective text by the students.

The workshop was developed during the year 2023 and students from the Nhu Porã Indigenous School attending the 1st and 9th grades of Elementary School, during the day (morning and afternoon), participated in the workshop.

Figure 4 shows moments of the workshop.

Figure 4 – Archery Crafts



Source: Authors' collection (2024)

The following is a collective text produced by the school's students during the archery workshop taught by the indigenous teacher.

Chart 1 - Collective text produced by the school's students

Archery	Archería rehegua
<p>Our ancestors were responsible for creating the first bows and arrows, but these first models were not of good quality. They experimented with various plants until they found the ideal raw material to manufacture resistant and effective bows and arrows: bamboo and ciriva. While the bamboo was used to make the arrows, the ciriva was used to make the bow and arrowheads.</p> <p>Both the bow and arrow were produced as needed, being used for hunting, fishing and defense. Bows and arrows were also made for entertainment, but with the same materials. To make the bow, it was necessary to extract the ciriva from the forest and slice it, leaving it to soak to facilitate the manufacturing process. The arrow, on the other hand, required the extraction of bamboo and the use of bird feathers, honey wax and tucum threads.</p> <p>The ciriva bow was resistant due to its fibers, providing strength to stretch and speed to launch arrows. The quality of the arrow was critical to achieving speed and accuracy on target. To use the bow and arrow safely, it was essential to have skill and technique, as improper handling could result in accidents.</p> <p>In the Mbya Guarani culture, only men were allowed to use and make bows and arrows, and it was forbidden for women.</p>	<p>Nande pyykuéra oguereko kuri responsabilidad omoheñóivo umi bow ha flecha pykue, ha katu ko'ã modelo pykue ndaha'ékuri calidad porã. Oñeha'ã hikuái opaichagua ka'avo rehe ojuhu peve materia prima ideal ojapo haguã bow ha arrow resistant ha effective: bamboo ha ciriva. Ojepuru jave bambú ojejapo hag'ua flécha, ciriva ojepuru ojejapo hag'ua bow ha flecha punta.</p> <p>Moköive bow ha flecha ojejapo oñeikotevêháicha, ojeporu caza, pirakutu ha defensa-frog. Avei ojejapo va'ekue arco ha flécha ojediverti hağua, péro umi mba'e ojepurúva ojejapo hag Ojejapo hagua pe arco, tekotevêkuri ojeipe'a pe ciriva ka'aguýgui ha oñemboja'o, ojeheja oñemokõ haguã ikatu haguãicha ojejapo porãve. Pe flecha oikotevê ojeipe'a bambú ha ojeporu guyra rague, cera de eíra ha rosca tucum.</p> <p>Pe arco ciriva ningo irresistible umi fiber orekóva rupi, ome'ẽ mbarete ojeestira hağua ha pya'e ojepoi hağua umi flécha. Pe calidad orekóva pe flecha ha'e fundamental ogehupyty hağua velocidad ha precisión blanco-pe. Ikatu hağuaicha jaipuru peteĩ arco ha flécha segúro, iñimportanteterei jareko katupyry ha technique, pórkpe pe manejo naiporãiramo ikatu oiko aksidénte.</p> <p>Mbya Guarani rekohápe kuimba'ekuérante ojeheja oipuru ha ojapo bow ha arrow, kuñanguéra katu oñembotove.</p>

Source: (collective text omoheñóiva temimbo'ekuéra mbo'ehaópe taller de arco ombo'éva mbo'ehára indigenous)

### **Scrap model making workshop**

Through this workshop, students understood the importance of garbage collection and recycling, avoiding environmental pollution. The sustainable action of transforming recyclable materials into models enriches the observation of geometric shapes and stimulates the artistic and creative sense of children, addressing topics such as recycling, countryside and city.

The teachers followed a script for the construction of the models, using varied materials and stimulating the practical and interactive learning of the students. The workshop was developed during the year 2023 and students from the Nhu Porã Indigenous School attending the 1st and 9th grades of Elementary School, during the day (morning and afternoon), participated in the workshop. Figure 5 shows the moment of the workshop.

FIGURE 5 – MAKING MODELS WITH SCRAP METAL



Source: Authors' collection (2024)

### **Workshop for the creation of a digital ebook on indigenous legends**

In this workshop, the students researched with the elders of the tribe, indigenous legends of their culture and created a digital ebook with the writing of the legends in both languages, first in Guarani, later translated into Portuguese. Figure 6 shows moments from the creation and the ebook about indigenous legends.



FIGURE 6 – CREATION OF THE DIGITAL EBOOK ON INDIGENOUS LEGENDS



Source: Authors' collection (2024)

The book in electronic format is available for download on Apoi@ open platform for Indigenous Education. Below is the qr-code for direct access to the publication



## DEVELOPED GAMES

During the workshops, two bilingual didactic games were planned and created. One of them was elaborated from a practical experience, a trail through the village to collect specimens of medicinal plants, and the other was a board quiz game about garbage and recycling.

### **Village Trail: Plant Gathering and Animal Watching**

In this workshop, a trail was carried out inside the forest of the Village, where the children were able to observe the native plants existing there and collect samples, to later research their medicinal function for the tribe. From the experience, a "Memory Game" was produced with the plants found in the village (image, name of the plant and medicinal function in Portuguese and Guarani). Figure 7 shows teachers and students on a trail through the village to collect plants and observe animals.









FIGURE 7 – TRAIL THROUGH THE VILLAGE TO COLLECT PLANTS AND OBSERVE ANIMALS



Source: authors' collection (2024)

The game is available for download on the open platform Apoi@ Indigenous Education. Figure 8 shows some cards in the game.

FIGURE 8 – EXAMPLES OF CARDS PRODUCED FOR THE GAME

<p><b>BOLDO</b></p> <p>O boldo é uma planta muito utilizada na medicina popular brasileira para o tratamento de problemas digestivos e hepáticos. O chá de boldo também é eficiente no combate a prisão de ventre e gases em excesso.</p> 	<p><b>BOLDO</b></p> <p>Ma pave kova'e Brasil oiporu ve va'e onhepoano agux hye pypy haxy ramo, omboaeveve aguã aguy owhembo'e va'e pegua avi hye rupi haxy ramo, nda'evei reiju py ha'e ramo onhembo'e va'e kuery pe.</p> 	<p><b>GUINÉ</b></p> <p>A Guiné possui ação anti-inflamatória e analgésica e antitérmica, porém é recomendado acompanhamento médico para uso interno. Já para banhos e infusões possui a finalidade de limpeza energética</p> 	<p><b>GUINÉ</b></p> <p>Pipi ma mba'e mba'e axy pegua kaku nhandepy'a raxy, hakã raxy pegua ha'e gui mba'eaxy mboape havi ha'eve.</p> 
<p><b>ALECRIM</b></p> <p>O alecrim serve para melhora da digestão, alívio da dor de cabeça e combate ao cansaço</p> 	<p><b>ROSEMARIA REHEGUA</b></p> <p>Romero oipytyvô omoporã haguã ñande digestión, ombogue hagua akárasy ha ombohová hagua kane'ô</p> 	<p><b>CAMOMILA</b></p> <p>A camomila possui função ansiolítica, calmante, indutora do sono, anti-inflamatória e antioxidante.</p> 	<p><b>MANZANILLA</b></p> <p>Opamba'e pe avi haeve, weipy tyvo avi pono ndetujai' i pya'c nemoke porã ve.</p> 

Source: <https://apoieducacaoindigena.netlify.app/recursos/jogo-de-memoria-plantas-medicinais>

## Recycling game

The students created from the *maker planning* a trail of numbers from 1 to 29 with questions on the theme of garbage and recycling and cards of chance and luck, 1 dice, 1 board, small dice, colored pins and cards with the questions in Portuguese and Guarani (as it is a bilingual school). The objective of the game is to assess the students' knowledge when answering the questions and challenges on the cards and to assess their engagement, creativity and interest in the proposed activity.

The board game quiz was developed through the pedagogical practices Makers as part of the course offered by REXLab. Where, from the studies on the Maker Culture and

planning with Design Thinking, a pedagogical plan was created on some SDG objectives and an educational kit was developed planned to apply in the classroom. The planning was inspired by the objectives: Responsible consumption and production and Sustainable cities and communities.

Figure 9 shows moments of application of the game in the classroom.

FIGURE 9 – RECYCLING GAME IN THE CLASSROOM



Source: authors' collection (2023)

The game is available for download on the open platform Apoi@ Indigenous Education. Figure 10 shows some cards in the game.

FIGURE 10 – RECYCLING GAME



Source: <https://apoiaeducacaoindigena.netlify.app/recursos/jogo-da-reciclagem>

From the available documentation it was possible to reproduce the game for use in the classroom. The material about the game can be accessed directly on the Open Platform Apoi@ Indigenous Education through the qr-code below.



## **INDIGENOUS EDUCATION APOI@ PLATFORM**

To support bilingual educational resources, the Indigenous Education platform was developed Apoi@. And thus, make digital educational resources available for sharing that will contribute to greater availability and dissemination.

The digital educational resources made available on the platform are in the form of open educational resources, known by their acronym OER. The movement in favor of OER seeks to contribute to reducing barriers to access, dissemination, and reuse of educational resources (content, tools, instruments). Along with the creation of specific licenses that facilitate this reuse, one of the movement's main strategies is the creation of digital repositories of educational content that ensure access, availability, and maximum dissemination of these resources for all.

Figure 11 shows the access screen to the platform Apoi@ Indigenous Education. Currently, access and registration of two types of digital resources are available: didactic resources and reports. The didactic resources include books; gaming; and, other types of teaching materials developed by teachers. The reports are related to practices of use and other experiences of teachers, such as workshops, mini-courses and other possible practices developed in an educational context.



FIGURE 11 – INITIAL SCREEN FOR ACCESSING THE PLATFORM



Source: <https://apoiaeducacaoindigena.netlify.app/>

Figure 12 shows the categories currently registered for content classification.

Figure 12 – Category of contents



Source: <https://apoiaeducacaoindigena.netlify.app/>

Also on the main screen is available the resource for sending educational resources, to contribute to the repository. Figure 13 shows the content submission feature.

FIGURE 13 – SUBMITTING CONTENT TO THE REPOSITORY



Source: <https://apoiaeducacaoindigena.netlify.app/>

## BILINGUAL TEACHING MATERIALS

The following are the bilingual teaching materials prepared by indigenous and non-indigenous teachers at the Nhu Porã school (Torres, RS) for validation of the Open Platform Apoi@ Indigenous Education. The History of the Indigenous Language is a narrative text, with the history of the country's indigenous people and indigenous languages and access to the resource is shown in Figure 14.

FIGURE 14 – HISTORY OF THE INDIGENOUS LANGUAGE



Source: <https://apoiaeducacaoindigena.netlify.app/recursos/historia-da-lingua-indigena>

Figure 15 shows the screen to access the Recycle Bin. Printable cards and instructions for players are available.

FIGURE 15 – RECYCLING GAME



Source: <https://apoiaeducacaoindigena.netlify.app/recursos/jogo-da-reciclagem>

Figure 16 shows access to the Memory Game – Medicinal Plants. The letters are available for printing in the two languages worked.

FIGURE 16 – MEMORY GAME



Source: <https://apoiaeducacaoindigena.netlify.app/recursos/jogo-de-memoria-plantas-medicinais>

Figure 17 shows the screens to access the reports of the construction of the culture house. The proposal consisted of building a house of culture for cultural presentations and exhibitions, in collaboration with students and the local community. The objective was to use sustainable materials available in the Village, such as bamboo trees, straw, vine ties, wood, nails and palm leaves. The initiative aimed to promote the appreciation of local culture, while adopting ecological practices in the construction of the space [Ko tembiaporã ndaha'êi oipytyvõ haguã mitã ha mitãrusukuérape añónte, omoporãve haguã hekove, sino avei ome'ê haguã peteî espacio común exposición cultural ha oñeñongatu haguã ñe'ê ha tekoha. Ha'e, upévare, movimiento ohekávo autonomía comunidad-pe guarã, ohasáva frontera ha omombaretéva identidad indígena].

FIGURE 17 – REPORT: CONSTRUCTION OF THE HOUSE OF CULTURE



<https://apoiaeducacaoindigena.netlify.app/relatos/relato-construcao-da-casa-de-cultura-guarani>



<https://apoiaeducacaoindigena.netlify.app/relatos/relato-construcao-da-casa-de-cultura-portugues>





Figure 18 shows the screens to access the experience report written in Guarani about a pedagogical practice using recipes from an Ebook of Guarani Cuisine with students from the 4th and 5th grades of the Nhu Porã Indigenous School.

FIGURE 18 – REPORT: RECIPES EBOOK IN GUARANI.



Source: <https://apoiaeducacaoindigena.netlify.app/relatos/relato-e-book-de-receitas-em-guarani>

Figure 19 shows the screens to access the reports of the School Garden workshop experience. The School Garden workshop was created with the purpose of presenting the benefits and encouraging a healthier diet among students [Ko taller Jardín Escolar ojejapo hembipotápe opresentávo umi mba'e porã ha omokyre'ỹvo tembi'u hesãive temimbo'ekuéra apytépe]. The school has planted seedlings of at least 20 types of organic food, intended for both school meals and the community. The seedlings were donated by EMATER [Ko mbo'ehao oñotỹ seedlings for at least 20 types of organic food, oñedestináva tembi'u mbo'ehaópe ha comunidad-pe guarã. Umi plánta ra'y ome'ê EMATER].

FIGURE 19 – REPORT: SCHOOL GARDEN



<https://apoiaeducacaoindigena.netlify.app/relatos/relato-horta-escolar-guarani>



<https://apoiaeducacaoindigena.netlify.app/relatos/relato-horta-escolar-portugues>



Figure 20 shows the screens to access the reports of the experience of the Recycling game.

FIGURE 20 – REPORT: RECYCLING GAME



<https://apoiaeducacaoindigena.netlify.app/relatos/relato-jogo-da-reciclagem-guarani>



<https://apoiaeducacaoindigena.netlify.app/relatos/relato-jogo-da-reciclagem-portugues>



Access to the report of the experience with the Literacy Game is shown in Figure 21.

FIGURE 21 – REPORTS: LITERACY GAME



Source: <https://apoiaeducacaoindigena.netlify.app/relatos/relato-jogo-de-alfabetizacao-bilingue>

Figure 22 shows the screens to access the reports of the archery workshop experience.

FIGURE 22 – REPORT: ARCHERY WORKSHOP



<https://apoiaeducacaoindigena.netlify.app/relatos/relato-oficina-de-arco-e-flecha-guarani>



<https://apoiaeducacaoindigena.netlify.app/relatos/relato-oficina-de-arco-e-flecha-portugues>



## FINAL CONSIDERATIONS

This research investigated how traditional processes of knowledge transmission between generations are essential for the sociocultural reproduction of indigenous peoples and why there is a scarcity of educational resources and bilingual teaching materials that consider indigenous pedagogy. The hypothesis was confirmed by evidencing the need for indigenous people to be protagonists in the creation, storage and dissemination of educational resources that respect and reflect their culture.

The main results include the elaboration, with the active participation of indigenous and non-indigenous teachers, of open bilingual educational resources, suitable for the teaching of the Guarani language and culture. The project also implemented a digital platform for sharing these materials, allowing access to pedagogical experiences and bilingual materials that meet the cultural and linguistic specificities of the Mbya Guarani community. The indigenous protagonism in the creation process was central to the success of the project.

Among the limitations found, the scarcity of bibliography on the topics covered, the lack of financial resources, the linguistic and cultural barriers that hindered communication between indigenous students and teachers, and the natural slowness of working with multigrade classes stand out. However, these difficulties did not prevent the adaptation and realization of the proposed activities.

This study has a high social relevance by promoting the digital inclusion of indigenous communities, respecting and valuing their traditions. The creation of a digital platform for the sharing of bilingual educational resources allowed new forms of teaching and learning, contributing to the preservation and strengthening of the Guarani cultural identity. In addition, the research is configured as a Social Innovation by proposing collaborative solutions to educational and social challenges faced by indigenous communities.

Suggestions for future work include training indigenous teachers for the autonomous use of ICT, expanding the project to other indigenous schools and quilombola communities, developing educational apps, games, and videos in open format in the Guarani language, and expanding the virtual environment for teacher training. In addition, the project could be expanded to include other Guarani dialects and other indigenous ethnicities, adapting to their cultural and historical specificities.

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