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ACCESSIBLE MALOCA PROJECT: EXPERTISE DEVELOPED IN THE ADAPTATION OF DIDACTIC AND PARADIDACTIC MATERIALS

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ABSTRACT

In the state of Amazonas, approximately 253 thousand people with disabilities (PwD) face barriers to access education, work and leisure, demanding inclusive initiatives. In this context, the Accessible Maloca project, developed by the Federal Institute of Amazonas (IFAM), Manaus Centro campus, emerges as an extension action aimed at adapting didactic and paradidactic materials with accessibility resources such as audio, audio description and Libras, following the principles of universal design. The project is part of the Apoema Assistive Technology Center and has the participation of volunteers, students and servers. This study aims to report the experience of scholarship students involved in the adaptation of materials between August 2023 and April 2024, highlighting the stages of the process and the challenges faced. The research, with a qualitative approach, descriptive and exploratory, used bibliographic and documentary sources. The results contribute to improving accessibility practices and fostering new inclusive actions in the educational field.

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1 INTRODUCTION

In Amazonas there are about 253 thousand people with disabilities (PwD), who need some type of support to participate in various social environments, such as: school, work and leisure areas. Thus, in the search to promote the social inclusion of this group, society uses Assistive Technology (AT), a mechanism that provides resources, services and products to this portion of the population, while promoting autonomy and independence in different situations of daily life. However, despite the existence of these alternatives, not everyone is able to take advantage of these tools, due to logistics, technical and/or financial difficulties, which directly affect the area of education and other environments (Brasil, 2009; IBGE, 2022).

In this way, the Accessible Maloca project, whose name refers to a large indigenous housing that houses several families – Maloca, and to which one can have access – Accessible, sought to adapt didactic and paradidactic materials (available on the internet, printed and on DVD), equipped with accessibility resources in audio, audio description and Libras, which follow the principles of universal design. It is part of a set of inclusive actions, developed by the Federal Institute of Amazonas, Manaus Centro campus (CMC), which promotes social inclusion and guarantees the right to education, culture and leisure.

This project is developed by the Assistive Technology Center of the Federal Institute of Amazonas: Apoema – of Tupi-Guarani origin, which means "To see in the distance", with the collaboration of volunteers, interns, servers and students of the higher education course of Technology in Advertising Production (TPP/IFAM), providing the development of technical and social skills of those involved. In this way, in addition to enabling access to the knowledge of PwD in the learning environment, the Accessible Maloca serves as a reference in AT and university extension practices.

In this scenario, this study has as its general objective, to report the expertise of the Accessible Maloca Project to the students participating in the action, from August 2023 to April 2024, in order to serve as a reference in the adaptation of didactic and paradidactic materials offered to students who are the target audience of special education. Thus, it was sought to raise the steps used by the scholarship students in the adaptation and present the difficulties faced by them, so that future actions can improve the accessibility process and be able to respond to possible causalities.

Finally, this study is characterized by a descriptive and exploratory approach, which used for its data collection: bibliographic and documentary research to collect information, such as principles and legislation that serve as the basis for the project, the resources used in the preparation of its works and collection of reports about the challenges encountered by scholarship students.

2 OBJECTIVE

2.1 GENERAL OBJECTIVE

- Report the expertise of the Accessible Maloca Project to the students participating in the action, from August 2023 to April 2024.

2.2 SPECIFIC OBJECTIVES

- To survey the steps used by scholarship students in the adaptation of the works; and
- Present the difficulties faced by students during the adaptation of each work.

3 METHODOLOGY

3.1 CHARACTERIZATION OF THE RESEARCH

In the search to meet the proposed objectives, a research classified as descriptive was carried out, as it sought to expose the process of adaptation of works, so that it can serve as a reference in the accessibility of educational materials in other initiatives. As well as exploratory, because it sought to clarify the ideas and principles of the Accessible Maloca Project, enabling the elaboration of hypotheses for future studies and more precise problems (Gil, 2022).

As for the type of approach, it is characterized as qualitative, since it presents data that were necessary for the authors' interpretation, such as the reports of their experiences in the project and the presentation of the adaptation stages (Nascimento; Souza, 2015).

Regarding the technical procedures used, this research is characterized as bibliographic because secondary sources of materials (books, magazines, scientific articles) already published in relation to the Maloca project, the Legislation that serves as the basis for it, universal design and Assistive Technology were used. And documentary, due to the consultation of materials that did not receive analytical treatment or that were reworked according to the research objectives (Gil, 2022; Marconi; Lakatos, 2017).

3.2 DATA COLLECTION AND ANALYSIS

Data collection was carried out through bibliographic and documentary consultations on the Legislation and Principles that serve as the basis for the Maloca Project; accessibility features that must be included in the adapted materials; the adaptation stages used by students in the process of adapting didactic and paradidactic materials. Regarding the survey of the challenges faced by the students of the action, it was decided to present the reports of experience by adapted work, presented in their reports, with the purpose of serving as a reference for the elaboration of schedules, development of techniques and learning of equipment necessary for accessibility.

4 THEORETICAL FRAMEWORK

4.1 ACCESSIBLE MALOCA PROJECT

The Accessible Maloca Project is part of the Assistive Technology Center of the Federal Institute of Amazonas (APOEMA/IFAM), all housed in Espaço Curupira, which aims to promote studies related to inclusion, promoting both the development of strategies to facilitate the use of Assistive Technology (AT), as well as the production and adaptation of educational materials with audio resources, audio description, Libras and subtitles. In this way, the project seeks to promote the autonomy, independence, quality of life and social inclusion of people with disabilities, ensuring accessibility in learning.

According to Melo and Pupo (2010), accessibility is considered, in Decree Law 5.296/04, as a vital condition to ensure full or assisted autonomy of people with disabilities or reduced mobility in urban spaces, furniture, equipment, buildings, transport services, devices, systems, as well as means of communication and information. Thus, communicational accessibility seeks to make communication accessible in various dimensions, eliminating obstacles that hinder the expression or reception of information by people with disabilities.

In the educational sphere, inclusion is not merely physical, it also encompasses the adaptation of methodologies, resources and structures to ensure that every student enjoys a learning experience. According to Galery (2014), the Brazilian standard NBR 15.599/2008, established by the Brazilian Association of Technical Standards (ABNT), guides that printed materials must be made available in at least four modalities: visual, sound, tactile and digital.

The Maloca project is in line with the Brazilian Law of Inclusion (Brasil, 2015), which designates the recognition of the right to communication and information as one of the essential pillars for the realization of citizenship. In addition, it is also based on the pertinent legislation that addresses the guidelines in force, following the Quality Benchmarks established by the MEC in collaboration with the education systems, as shown in Chart 1.

Table 1 - Legal Basis of the Accessible Maloca

LAWS	
Law No. 13,146/2015	Brazilian Law of Inclusion
Law No. 10,845/2004	Program to Complement Specialized Educational Assistance to People with Disabilities
Law No. 10,436/2002	Brazilian Sign Language (Libras)
Law No. 9,394/1996	Guidelines and Bases of National Education
Law No. 10,098/1994	Promoting accessibility for people with disabilities or reduced mobility
Law No. 8,069/1990	Chapter IV – Statute of the Child and Adolescent
Law No. 7,853/1989	CORDE – Support for people with disabilities
DECREES	
Decree No. 7,611/2011	Provides for Specialized Educational Service
Executive Decree No. 6,949/2009	International Convention on the Rights of Persons with Disabilities (UN - 2006)

LAWS	
Law No. 13,146/2015	Brazilian Law of Inclusion
Law No. 10,845/2004	Program to Complement Specialized Educational Assistance to People with Disabilities
Decree No. 5,626/2005	Brazilian Sign Language (Libras)
Decree No. 914/1993	National Policy for the Integration of Persons with Disabilities
OTHER LEGAL BASES	
ABNT NBR 9050/2020	Accessibility to buildings, furniture, spaces and urban equipment
MEC, 2008, updated in 2014	National Policy on Special Education from the Perspective of Inclusive Education
CNE/CEB RESOLUTION 04/2009	Operational Guidelines for Specialized Educational Service in Basic Education

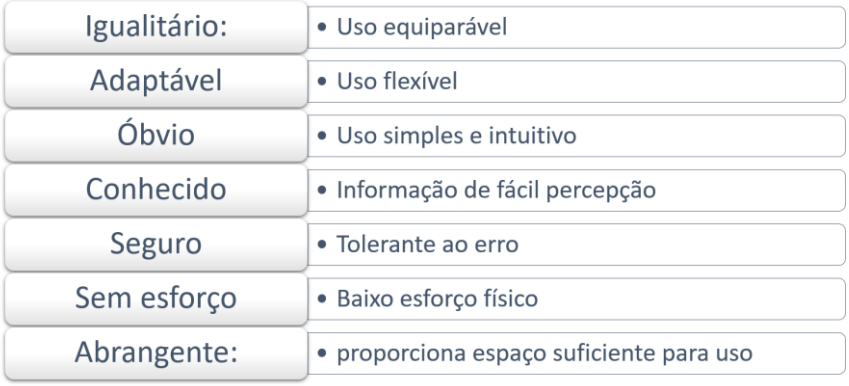
Source: Adapted from the Maloca Project, 2025.

4.2 UNIVERSAL DESIGN AND ACCESSIBLE BOOKS

Accessibility has achieved significant visibility in the country in recent years, especially with the emergence of laws, decrees, and technical standards aimed at accessibility for all. Thus, in order to meet the needs of all people, it is essential to follow the concept of Universal Design, which according to item IX of article 8 of Decree No. 5,296, of December 2, 2004, refers to the elaboration of spaces, artifacts and products that simultaneously serve all people, regardless of its anthropometric and sensory characteristics, so that safety and comfort are guaranteed, in addition to the constitution of the elements that make up accessibility (Brasil, 2004).

Carletto and Cambiaghi (2008) point out that the terminology Universal Design was created by Ron Mace in 1987, with the thought that things designed and produced by human beings should be used by all people. In addition, they were to follow the seven principles established by Ron's group in the 1990s:

Figure 1 - The seven principles of universal design



Source: Adapted from Carletto and Cambiaghi (2018).

In this way, the books of the Maloca project sought to meet the criteria of universal design. Books perform a crucial social function, constituting a fundamental tool for access to information accumulated over decades. According to Machado (2014), not all people are able

to access the information in books in their conventional format, remaining in social exclusion. And despite the advances made, it is still an area in need of solutions.

People's relationship with books is impacted by the popularization of information technology, digital books favor communication for readers with different characteristics and skills. For Melo and Pupo (2010), books in digital versions make it possible to read on various devices, especially those specialized in transforming text into audio, in the expansion of fonts and in those that adapt to Braille.

Such resources allow accessibility and are used by people with different types of disabilities or some type of difficulty. In this way, the Specialized Educational Service plays a significant role in this process, seeking accessibility according to the needs of the student, elements of informatics, serving as an alternative to instruments of daily school life and having their access facilitated by the resources of Assistive Technology (Melo; Pupo, 2010, p.7).

Assistive Technology (AT) results from the action of several professionals in different areas of activity, who collaborate for the restoration of human function, standing out as a distinct entity in relation to medical or rehabilitation technology. This discipline is intrinsically linked to personal supports or methods, aimed at satisfying the immediate needs of the end user, with the purpose of promoting their independence and autonomy. Thus, AT refers to the research, manufacture, use of resources or strategies to enhance the abilities of people with disabilities (Galvão Filho, 2009; Moresi et al., 2018; Dick; Dolzan; Gomez, 2018).

Information and Communication Technologies (ICTs) help the production of digital books in texts, which are read by screen readers. Sold in bookstores with digital support or available for free through digital libraries, as long as there are no problems with copyright. Thus, the production of a book from the perspective of universal design must have a variety of formats that can be read by all people, adapting to the needs of readers. In this way, the Accessible Maloca seeks to meet precisely the demands of accessibility in books that will be used in schools in the metropolitan region of Manaus.

4.3 BOOK LAYOUT

Diagramming is an area of graphic design that consists of distributing and organizing the graphic elements that will make up a page, whether they are texts, images, illustrations, and graphics (Rock Content, 2017). Its objective is to ensure the readability, clarity of information, hierarchy and continuity of information, so that each and every reader is able to go through and understand the content with ease.

According to Machado (2014, p. 27), people with visual (low vision), intellectual (mild and moderate) and/or physical disabilities are those who have access to reading books in

their conventional format. Therefore, all the works diagrammed by the project followed guidelines for the elaboration of an accessible work.

Regarding the margins, Machado (2014, p. 52) establishes that the internal and external margins should be at least between 2cm and 3cm wide, while the upper and lower margins should be of a reasonable height, avoiding too much flexion of the neck. To facilitate readability, the works were produced in high contrast, with a light background in dark texts, and vice versa; the spacing between letters and lines was delimited in a regular way, with the application of sans-serif fonts, which are the most suitable for the visually impaired, as they make reading more understandable (Machado, 2014, p. 59).

For example, *"Space Squadron: Main Geometric Figures"* and "*Geography for Children: Main Types of Relief"* are children's books that complement the content seen in the classroom, aimed at children from 6 to 8 years old, in the literacy phase. Therefore, in addition to having illustrations that lead the story in a playful way, the text diagrammed in the works was written in capital letters, seeking to facilitate the identification of words and letters by the public. In particular, the geometry book, in its printed format, has activities at the end of each chapter, so that the child can do the basic learning exercises, strengthening the content of the book.

4.4 AUDIO DESCRIPTION AND NARRATION

Audio Description (AD) is one of the tools used to make literary works accessible to people with visual impairments − taking into account that there is a spectrum that ranges from total blindness to low vision or low vision. According to Pacheco et al (2014), this Assistive Technology also benefits in the classroom the learning of people with intellectual disabilities, as well as ADHD, dyslexia, attention deficit, among others and because it is an activity that makes use of hearing and vision, DA also collaborates significantly for the learning of those students who see, but do not perceive details of what is being presented.

As defined by Sá et al (2020), DA seeks to translate non-verbal signs – fundamentally images – into verbal signs, primarily for people with visual impairment. These descriptions must be made in a clear and objective manner, without interference from the opinions, impressions or personal interpretations of the author of the audio description. According to Lima and Silva (2010), the image must be translated with objectivity, fidelity and reliability, always transmitting the content without censoring or editing, not making value judgments in relation to the content, without emitting opinions, sounds or any expressions that induce disapproval of the content described.

The main support material and source of information to carry out audio description, especially of literary works, was the book "Audio description: First steps in the classroom" (Pacheco, 2014), from which the main references of the AD model to be applied to the works of the Accessible Maloca Project were taken. In the description of the images, a structuring model elaborated exclusively in this book was used, which consists of an inverted pyramid with an order of what should be prioritized in the description, as a pattern, starting at the top, where the image in question and the description of its general plan are included; going through the description of the protagonist(s) of the scene, their actions, who or what suffers their actions, and finally, it ends in additional information of "when" or "where", for example.

The first three works – "22: difficult and magical times", "Tutorial: communicational accessibility in didactic and paradidactic works" and "Audio description: first steps in the classroom" share a simple and adult language, taking into account the audience for which they are intended, the latter two being the only ones to have in some of their ADs the inclusion of words of a technical nature, since certain images present in them are computer screen captures (screenshots) in which you focus on windows and certain icons or commands within the program. These images in question were a separate challenge because they did not follow the pattern of images that is usually taught in books or video audio description classes. In a practical way, there were no people, animals, or any animated being in these images, and that was the challenge, to audio describe something unconventional, using common sense and analyzing which way would be coherent and understandable for the listener to describe that screenshot, still using the pyramidal structuring method mentioned above as a basis.

Since this method has been used throughout all five works, it can be said that there is a pattern or coherence between them, however, it is important to note that there is a substantial feature in the last two works – "Space Squadron: Main Geometric Figures" and "Geography for Children: Main Types of Relief": these are children's stories. Therefore, it is necessary to work with an easy-to-understand language, which is simple and direct for the audience for which these two works are intended, however, without using diminutive terms, as Pacheco et al (2014) warn.

Because these last two works are children's stories, care had to be taken to think about the continuity of the story and animation, as there was a concern that the children would lose interest or feel tired if the ADs were too long or extensive, so there was a need to make them as succinct and direct as possible, avoiding disturbing the continuity of the stories.

In audio recordings, the environment plays a significant role, so we opted for an acoustic room in which a clear distinction is made between the narration area and the capture

location, called the "aquarium". This space is equipped with various devices, including microphones, speakers and monitors. In audiovisual production, several stages contribute to obtaining excellent results, in this specific context, during the initial phase of each production, we proceed to pre-production, covering the alignment of the elements to be addressed, the determination of the length of the pages to be narrated, the vocal warm-up essential to prevent discomfort in the vocal cords, and the testing of the equipment to be used.

According to Galetto (2021), the specific type of microphone has four fundamental characteristics: high sensitivity, low mechanical saturation, high electrical saturation, and relative operational complexity. Another equipment of significant importance is the soundboard, which, in contemporary times, transcends its primary function, incorporating signal processors, effects and individual or group parallel outputs.

4.5 POUNDS AND ENGRAVINGS

The UN Convention on the Rights of Persons with Disabilities provides products, environments, programs and services for all people. In Brazil, these concepts were already regulated by specific laws that deal with accessibility, in addition to the insertion of Libras in audiovisual products not only complies with the principles of accessibility and inclusion established internationally, but also meets national legislation that aims to guarantee the rights and full participation of deaf and hard-of-hearing people in society, democratizing access to culture and information, as the Ministry of Culture says:

> Such concepts were already regulated by Brazil through the aforementioned Laws No. 10,048/00 and 10,098/00 and Decree No. 5,296/04, which deal with accessibility and Law No. 10,436/02 and Decree No. 5,626/05, which provide for Libras (Brazilian Sign Language) as the country's second official language and organize the provision of care. goods and services aimed at deaf and hard of hearing people (Brasil, 2016, p.13).

Thus, the insertion of Libras in the products of the Maloca Project was carried out as follows: the audio containing the narration and audio description of each work was edited and sent to the interpreters responsible for its translation. In the context of works 04 and 05, entitled "Space Squadron: main geometric figures" and "Geography for children: main types of relief", both by the author Claudenilson Batista, the performers received the animation corresponding to the work along with the audio. This approach made it possible to better understand the signs needed for each work. The recordings went through coordinated adjustments between the recording team and the performers.

Unlike the traditional methods used in recording sets for series or movies, we opted for a recording process that involves the use of a green background, known as chroma-key,

which makes it possible to superimpose several visual elements in a composition. This method is based on the identification of a specific color, called "key color", which is removed from the image to compose a new scene. Typically, the image is divided into two layers: one with the objects in the foreground and one with the background. In the context of translation into Libras, *Chroma key* plays a crucial role, allowing the translator/interpreter to record their interpretation in a virtual setting, in which the background can be replaced by different visual elements.

An EOS Rebel T7 camera with EF-S 18-55mm IS II lens and 4 light points was used. Of these, 2 were directed to illuminate the green background, while the others were strategically positioned to provide adequate lighting for the interpreter. Watts (1999) postulates that "when working with the camera, it is recommended to film to edit". Before the recordings begin, a detailed *checklist is made* that covers the position of each crucial element, such as the location of the camera, the arrangement of the *softboxes,* and the precise marking of the point where the interpreter must position himself to maintain proper focus.

To organize the material, a clapperboard was used at the beginning of each recording, marking sequences or scenes; the scenes in takes and the shots in shots (Rey, 2006, p. 49). At the beginning of the planning of the productions, it was determined to use the Medium Shot as the standard for all recordings. This plane is recognized for focusing on the person from the waist up (Rey, 2006, p. 51). This choice ensures the sharpness of the signs made by the interpreter on the screen, making it easier to see for the audience that requires this accessibility feature.

4.6 ILLUSTRATION AND ANIMATION

From the beginning, even before the conception of the illustrations, the accessibility that should also be present in these illustrations was discussed and treated with extreme importance, with the need to research, learn and employ universal drawing in all the production of the material, so that the drawings, illustrations and other elements were easy to understand and avoiding characteristics that could bring some difficulty in understanding the illustrations, or even in its own visualization, such as the case of people with some type of visual impairment and color blindness.

Visual impairment covers a spectrum ranging from total blindness to low vision, and therefore shares distinct characteristics. According to Machado (2014), each person with low vision has unique characteristics, making it impossible to standardize font sizes, colors, contrasts, distance from objects, lighting, among other attributes. In addition, there are color-

related visual impairments, such as color blindness, which presents a wide range of cases, including people with difficulties distinguishing shades of colors and other elements. Therefore, when crafting illustrations, covers, etc., it was also necessary to consider these aspects to avoid losing important information or difficulties in understanding for these people.

During the production of illustrations for children's stories, the main references of strokes, drafts and techniques were manga, given the illustrator's familiarity with this type of work, therefore, the drawings were initially thought of in this way. However, it would be unfeasible to make this the style adopted for the last two works, as it was necessary to bring regionality to the lines of the illustrations, especially to the lines of the characters, since the entire plot of the penultimate work and parts of the last one take place in the Amazon, with other parts taking place in different regions of Brazil. These illustrations were also concerned with making them accessible and easy to understand in strokes, formats and colors so that all children could enjoy it.

4.7 VIDEO EDITING AND ANIMATION

The program used to carry out the post-processing and finalization of the works was Adobe Premiere Pro 2023. After gathering all the material, the process of decoupage of the videos began to identify what would be used and what could be discarded. The performers' videos were then added to the Timeline, along with the narration and audio description. To remove the green background from the videos, the "Ultra Key" effect was used, available in the editing software itself. In addition, a color correction was applied to the performers, making them as visible as possible to those watching. Captions have also been added to support understanding of the material.

All works followed an established production pattern: starting with the introduction, displaying the main logos, followed by the work produced and, finally, the credits that list all the people involved in the project. The production of works 04 and 05 was carried out using the Adobe After Effects software. The animation process was conducted based on the material provided by the illustrator and layout artist. This stage required the animation of a total of 80 screens, giving life to the characters, scenic elements such as clouds, water and other components present in each scene. After the completion of the animation, the audio containing the narration and audio description was integrated. Then, the complete material was rendered for further treatment in Adobe Premiere, where the post-production process took place.

5 ANALYSIS OF RESULTS

5.1 ADAPTATION STAGES OF THE MALOCA PROJECT

The structure of the project consisted of seven stages, with the main focus on optimizing the time allocated to the layout of the books produced, covering the correction of the texts, development of illustrations, layout, audio capture, sound treatment, recording of Libras interpreters, post-production and approval of the material.

Adopting a meticulous and integrated approach to multimedia production, the process adopted by the project ensures the accessibility and understanding of the works produced. The collaboration between different stages resulted in a final material that meets the established quality standards, and provides an enriching experience for different audiences.

5.1.1 Correction of texts

In order to optimize the time allocated to the layout of the books produced by the Accessible Maloca project, the contents of the books (the texts) were initially reviewed by the person responsible for this function. In this initial stage, the content was adjusted according to the needs presented, correcting grammatical errors and rewriting and updating parts of the material if necessary, maintaining an easy-to-read and comprehensible standard in all works.

The works *Tutorial: communicational accessibility in didactic and paradidactic works* and *Audio description: first steps in the classroom* were updated and revised to be released again, as a second edition. The works *22: Difficult and magical times, Space squadron: main geometric figures* and *Geography for children: main types of relief* are new works, which are being published for the first time within the project. With the conclusion of the first stage, the text moved on to the illustration and layout stages.

5.1.2 Illustrations

The illustration work was carried out in four works, namely: "Tutorial: communicational accessibility in didactic and paradidactic works", "Audio description: first steps in the classroom", "Space Squadron: Main Geometric Figures" and "Geography for Children: Main types of relief".

These four works can be divided into two stages, considering that the first two works, "Audio Description" and "Tutorial" are books that had already been published in 2014 and 2018, respectively. In these, there was a need to reformulate their covers, as well as to produce new illustrations for their content, in view of the need for updating, as well as the fact that there was no image file of the illustrations that appeared in the books in their old versions, which would be necessary for their updating.

The software used for its elaboration was *Adobe Illustrator*. In particular, the works *Space Squadron: Main Geometric Figures* and *Geography for Children: Main Types of Relief* had the planning of illustrations for each page of the book, considering that both works are for children. For these works, unlike the previous books, the conception of illustrations was made from scratch, without any type of previous reference or pre-established creation, the entire texts were divided into small paragraphs, seeking to have a large number of illustrations, with shorter texts so that the children could associate the images with the actions described on the pages. Illustrations were essential to bring the books to life, associating text and image. After being finished, they were sent to the layout stage.

5.1.3 Layout

Aimed at organizing and preparing the files for publication, the layout stage was divided into two parts: printed books and digital books. The layout was done in *the Adobe InDesign software*, limiting margins for each work, lines and columns to guide the position of graphic and textual elements.

Upon receiving the illustrations and the previously revised text, the layout began with the printed book model, where each work has a *QR Code* to access the adapted video material; in particular, *Audio Description: first steps in the classroom* also presents *Qr Codes* throughout the book, intended for access to complementary materials to the work. Digital books, on the other hand, have an interactive summary and a clickable icon to be redirected to the *YouTube* channel, where all the videos of the books can be found. After the completion of the layout, the material was reviewed and corrected again, ensuring its writing within the rules of normative grammar.

5.1.4 Audio Capture

To capture the audio for narration and audio description, it was necessary to have the book of the work properly diagrammed. This approach made it possible to mention the page number during the narration. The team used the Audio and Video Laboratory (LAV) of the Advertising Production Technology course at IFAM/Campus Manaus Centro to conduct the audio capture.

The capture was carried out in a single day in the shorter works, to maintain consistency in the tone of voice. However, for more extensive works, it took 3 days or more to complete the material. In the context of audio capture, it is crucial to know the most appropriate microphone, capable of offering maximum sensitivity for the narration without causing discomfort to the narrator, being used in the productions of the Accessible Malloca, the condenser microphone.

In the realization of the three initial works entitled "Difficult and Magical Times", "Tutorial" and "Audio Description", the audio capture was based on recordings on two different days. Given the extensive nature of these works, it was imperative to take breaks in order to preserve the vocal cords of the narrators. In works four and five, entitled "Space Squadron: Main Figures" and "Geography for Children: Main Types of Relief", the recordings took place on the same day. This choice was motivated

by observation throughout the process, revealing that recording on different days caused variations in the voice, resulting in an inconstancy of the audio in tune with the emotions. In all productions, the team was composed of four members: audio editor, proofreader, narrator and social media. The role of the reviewer was to collaborate with the narrator to ensure consistency in the narration, aligning it with the intended target audience, and correcting errors that might be made.

5.1.5 Sound Treatment

After the completion of the revision and full editing of the material, an audio treatment was carried out in order to eliminate noise, remove reverberation and other undesirable sound elements. The software adopted for audio treatment was *Adobe Audition*, a step of paramount importance for the progress of video production. This phase was subdivided into three stages: error correction, noise elimination and the final mixing. After the elaborate pre-mixing process, all recordings (narration and audio description) were consolidated into a single session. In the final mixing stage, the focus was on balancing the volume of the audios with subtle equalization adjustments. With the completion of the audio, it was forwarded to the Libras interpreters, who proceeded to train the corresponding signs.

5.1.6 Recording of the Sign Language Interpreter

The team in charge of recording the Libras interpreters made use of the following equipment: a green background (*chroma-key*), an EOS Rebel T7 Camera with EF-S 18-55mm IS II Lens, 4 light points and a speaker so that the interpreter could audit the work. For larger works, the recording process required 4 days, while for shorter works it was possible to complete the video capture in just one day.

5.1.7 Final Review and Approval of Material

In order to edit the material, the recordings of the Libras interpreter together with the audio containing the narration and audio description, were sent to the video editing team, responsible for conducting the entire post-production process. The software used to edit the material was Adobe Premiere 2023. During the editing process, the following steps were carried out: separation of the material suitable for use, creation of the sequence combining video and audio, color correction, addition of subtitles, images, resulting in the final rendering.

To enable the export of the final material, review materials were generated, submitted to the evaluation of the project coordinator. After the coordinator's approval, the final video was ready to be exported.

5.2 WORKS PRODUCED AND THEIR DIFFICULTIES

5.2.1 22: Hard and magical times

The first work published and adapted by the Maloca Acessível project is a collection of personal poetry written by the author Rebeca Arcanjo. The book brings together twenty-two poems — and extra

texts — written by the author throughout her 22 years of life, where she shares with readers her experiences, ideas and feelings, as a personal diary. As in *A Teus Pés* (2016), by Brazilian author Ana Cristina Cesar, the book *22: Difficult and magical times* brings prose and poetry texts written in a confessional and intimate tone of voice.

Figure 2 - Cover and QR code: Difficult and magical times

Source: Prepared by the authors, 2025.

This work was considered challenging, as it was the first experience with the function performed and with the equipment that was used in the production, according to the students' reports: "The difficulty we faced was due to the fact that it was our first work, which deprived us of a reference for guidance. This experience represented our debut in the context of recordings"; "At first I didn't know much about the works, the use of materials, how to handle the camera and so on. That was more of a learning experience."

In addition, other difficulties in the production of Work 1 were the definition of the stages of product design and the environment used, as pointed out by the project participants:

> The main difficulty was in the narration of the book, which was done by me, we did not have such an adequate space, which greatly hindered the whole process and my lack of experience also in narration was a difficulty in the beginning. As it was the first work, it was still a phase of discovering the best way to work in each stage, such as audio description, revision, etc., so in the other works this was more organized and consequently with a better quality. However, I learned a lot in this process.
>
> The difficulties of work 1 focus on the fact that it was my first experience in life exercising the function (and I believe that of the colleagues with whom I worked together as well) and dealing with all the necessary material to make the audio recordings, such as what would be the best soundboard to use, What would be the best microphone, what would be the best audio configuration on the soundboard to have a pleasant and cohesive sound that does not change as the recordings go on as the days go by. Our biggest difficulty was being able to find a middle ground in the audio settings and make sure that the sound did not suffer from external sounds. Other than that, one thing I also had to condition myself to do is soften the accent with hiss as much as possible.

Another point to highlight was the experience and development of skills by the team members, according to the reports: "As a social media I only participated in the monitoring of the recordings, where everything was recorded and posted on social networks. But it was amazing to follow

everything and know how everything was done"; "The experience on the site was very positive. We started handling audio capture equipment, operating professional cameras and developed skills in the relationship with the team, in addition to exploring practical ways of working [...]".

5.2.2 Tutorial: communicational accessibility in didactic and paradidactic works

In order to share their experiences regarding the application of accessibility in didactic and paradidactic works, the Tutorial book was originally prepared by the authors Dalmir Pacheco, Airton de Oliveira Rodrigues Júnior, André Cesar Lemos Soares, Breno Luy Quintanilha Franco, Bruna Marcia Nobre Soares, Caroline da Silva Barbosa, Lucas da Silva Oliveira, Tássia Patrícia Silva do Nascimento, and Yani Saionara Pinheiro Evangelista; all eight writers were members of the Motirõ Project — Communication Accessibility.

The first edition of this work was launched by the Motirõ Project in 2018, being reformulated and updated for the launch of its second edition, by the Accessible Maloca Project in 2024. The work seeks to encourage teachers, students and technicians, as well as the community in general, to understand and apply accessibility resources, designing adapted materials. *Tutorial: Communicational accessibility in didactic and paradidactic works* teaches how to transform didactic and paradidactic works into books accessible to people with disabilities; also within the area, there is the book *Theater and Accessibility: Mediations and Practices with Actors and Spectators with Visual Impairment* (2022), written by Juliana Partyka, where the author seeks to teach the inclusion of people with visual impairment within theatrical practice, either as artists or as spectators.

Figure 3 - Cover and QR code: Work of the adaptation tutorial

Source: Prepared by the authors, 2025.

With the experience obtained in the production of the first work, the difficulty decreased, however, adversities were pointed out, such as: time to prepare the product — "Our main challenge was the time constraint, given the brevity of the deadline. We chose to record on a Saturday, which

proved to be very fruitful"; size of the work — "The experience in the second work was even more satisfactory, since we already had the established standard and a more in-depth knowledge of the equipment. The main difficulty that I highlight occurred during the recording of Libras, which required 4 days of work due to the extension of the work"; and, the question of vocal technique — "It was a fun and challenging experience, because there were mistakes, since it was the first time I was doing narration. I had a lot of difficulty with technical issues, such as breathing and intonation."

5.2.3 Audio description: first steps in the classroom

The third work launched and adapted by the Accessible Maloca Project is also the publication of the second edition of a book released by previous projects within Espaço Curupira. "*Audio description: first steps in the classroom",* was originally released in 2014, by Apoema — Assistive Technology Center/IFAM, authored by Maria Lúcia Tinoco Pacheco, Fabiana Ferreira da Silva and Jamile Galvão Sampaio.

Organized in four chapters, the book brings general notions about audio description, and how to apply it as a tool within pedagogy, directing the application of this resource to students with visual impairment, the first audience of this resource, but also covering those who have attention deficit and intellectual disability. Another work that seeks to disseminate the application of audio description in the school and university environment is *Audio description at school: opening paths for reading the world* (2016), by the author Lívia Maria Villela de Mello.

Figure 4 - Cover and QR code: Work on Audio Description

Source: Prepared by the authors, 2025.

The third work proved to be less challenging, mainly due to the experience of the students in the previous works. However, as pointed out in the students' reports, there were difficulties, such as: recording schedule, which was affected by the long holidays — "[...] The audio capture process was

more agile. However, the main difficulty faced was to find a date for the recording of Libras, since there were two weeks with a long holiday, which ended up postponing the recordings"; and, different days of recording, which compromises the essence of the work — "As in the second work, the main challenge was time. In this project, we realized that making recordings on different days compromises the essence of the work".

5.2.4 Space Squadron: Major Geometric Figures

Aimed at children, the work "*Space Squadron: Main Geometric Figures",* by Claudenilson Pereira Batista, a visually impaired person, seeks to promote the understanding of the main geometric figures, for children with or without disabilities, in a playful and pedagogical way.

The story features seven beings with superpowers that represent the main geometric figures: rectangle, rhombus, circle, square, trapezoid, triangle and pentagon. The forms are presented to the children through the playful beings of the book, individually, with a specific chapter for each. The physical work also features children's games inside, to strengthen the identification of each geometric figure. Similarly, *Bichológico* (2023), by author Paula Taitelbaum, also introduces children to geometric shapes, which make up the look of the animals present in the book.

Figure 5 - Cover and QR code: Space Squadron

Source: Prepared by the authors, 2025.

The fourth work had mixed opinions about the challenges faced, since half considered it challenging — "work 4 was the first children's work, so it was necessary to delve deeper into the subject, seeking to provide a comfortable reading for all children"; and the other did not — "In this work, we practically faced no difficulties, since it was a small project". Reports that prove the

experience in making the work accessible and the commitment to produce a quality product for the public.

5.2.5 Geography for children: main types of relief

The last work included in the Accessible Maloca Project, "*Geography for children: main types of relief",* also by the author Claudenilson Pereira Batista, aims to teach the types of geographical reliefs to children, so that children with or without disabilities can understand and recognize the main differences between them.

Divided into eight chapters, the book presents the main characteristics of a relief through playful stories, presenting at the end of each one, examples of where each type of relief can be found in reality, reinforcing its images and characteristics to children in a didactic way. *Geografia de Dona Benta* (2020), by Monteiro Lobato, also seeks to teach geography to children in a fun way, featuring the character Dona Benta, who travels through all the continents of the world, teaching each one of them to children.

Figure 6 - Cover and QR code: Geography for children

Source: Prepared by the authors, 2025.

In the fifth work, half of the scholarship students did not consider the production as challenging, as mentioned in one of the reports: "because it is by the same author and the same genre as work 4, it was a little easier to layout work 5". However, due to the 5 works presenting different styles, some scholarship holders had difficulties, as presented: "This was the work that I had the most difficulty with, although it was not so big. It was focused on children, and I had to make different intonations in each part of the stories so that they would have an easy time understanding what was going on. It was complicated, because it was very different from the other work I narrated before".

In general, the students were satisfied with the production of the fifth work, since the experience obtained during the project contributed to the dynamics of the work, with the use of tools more efficiently, with the adequacy of the environment and techniques used, as mentioned in the reports: "Think about the characters, the environment, the details and colors. I had to research a lot about the reliefs, so that they were not wrong, in addition to finding the best shape and angle to represent them"; and, "In the last production, the experience was completely satisfactory for us, as the audio capture, the handling of the equipment and the production of the animation became more familiar [...]".

6 FINAL CONSIDERATIONS

Initially formulated to be implemented from 2018, as an initiative of SETEC/MEC, the Accessible Maloca project suffered from the untimeliness caused by bureaucratic reasons and discontinuities in actions aimed at social inclusion policies. Once the reasons mentioned above were overcome, it was possible to start the execution of the action. First, however, we had to select the team, define the works to be adapted, train the staff, acquire adequate equipment, adapt appropriate space for specialized work.

It was a long and tiring process, but with a very positive result and great social reach, specifically for people with disabilities sheltered in the learning space. The idea was not only to present products with communicational accessibility, but to propose an idea, a referential model, which can, and should, be improved, especially with the use of artificial intelligence, which will constitute a great resource of autonomy for people with and without disabilities.

Regarding the stages of adaptation of didactic and paradidactic materials, the importance of training and knowledge of *editing software* and applications was perceived , as they are the basis of these educational products, especially with regard to the addition of accessibility features. It is also noteworthy that the model developed by the Maloca team, as it is a reference, can be improved in future actions, making it possible for more works to be adapted for use in the classroom and other environments in the area of education.

Regarding the reports of the students of the action about their challenges, it was observed that they went through a constant process of improvement and practice, which enabled the development of *soft skills* (sociobehavioral skills) and *hard skills* (technical skills), fundamental elements in the professional environment. In addition, these difficulties can serve as a reference for future adaptations, as they show possible adversities that may occur in the accessibility process, especially in the construction of a schedule and in the time necessary for the team to obtain knowledge about the work to be adapted.

The final educational products of the project were presented in printed format and with a DVD, consisting of video in Libras, audio description, subtitles and narration. In addition, it was decided to make the printed and digital work available with QR code and clickable link, so that when accessed, you can have access to the Espaço Curupira/IFAM channel, with the online version, which presents elements of Communicational Accessibility (narration, Libras, audio description and subtitles). In this

way, it becomes possible for the entire public, without distinction, to have access to the reading of several books, meeting what is recommended by the principles of Universal Design.

Finally, with this initiative, IFAM/CMC strengthens its inclusive actions, provided by several internal policies of respect and appreciation of the human being. And by housing projects of this nature, it provides students, servers, interns and volunteers with direct contact with the pressing needs of people with disabilities, and thus can offer accessibility conditions to different services, products and resources. It is enough to take a close look at the reports of the students directly involved in the action, when they emphasize the challenges, but then praise how much they learned during the process of conception, development and completion of the works. Coexistence provides opportunities for learning, learning makes us see and respect diversity.

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