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DESIGN OF A RECREATIONAL INDIGENOUS HUT (OCA) AT THE EARLY CHILDHOOD EDUCATION CENTER – CEI/UFGD IN THE MUNICIPALITY OF DOURADOS-MS

PROJETO DE UMA OCA LÚDICA NO CENTRO DE EDUCAÇÃO INFANTIL CEI-UFGD DO MUNICÍPIO DE DOURADOS-MS

PROYECTO DE UNA OCA LÚDICA EN EL CENTRO DE EDUCACIÓN INFANTIL CEI-UFGD DEL MUNICIPIO DE DOURADOS-MS

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Abstract: Ocas are typical indigenous constructions made with natural elements such as wood, bamboo, thatch, among others. Several indigenous peoples already inhabited Brazil before the arrival of the Portuguese in 1500, with ocas being used essentially as collective dwellings. Over the years, due to urban expansion, deforestation, and the evolution of construction systems, the number of these ocas has significantly decreased. Thus, building an oca for early childhood education students is a way to bring back

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memories that represent the large number of indigenous peoples in Brazil, valuing their culture and making it possible to connect socio-environmental education with exploratory pedagogical environments and leisure. In this scenario, the objective of this work was to develop the project for a playful oca at the CEI "Maria Alice Silvestre" (formerly CEI-UFGD) with a wood and bamboo structure. The project methodology consisted of a preliminary analysis, the creation of a physical model of the oca, a study of the materials used, the dimensioning of the wood structure, and monitoring of the execution and guidelines on the care for its use and maintenance. The oca project was designed according to the needs presented by the institution's team and executed with the approval of the school's indigenous families. After completion, the project's level of service in relation to the expectations of the pedagogical proposals was evaluated as satisfactory. In addition, the extension provided interaction between academics and the community, with the application of knowledge learned in class to directly benefit it.

Keywords: Wood structures, Bamboo, Indigenous culture, Sustainable materials, Early childhood education.

Resumo: As ocas são construções típicas indígenas feitas com elementos naturais, tais como, madeiras, bambus, sapê, entre outros. Diversos povos indígenas já habitavam o Brasil antes da chegada dos portugueses em 1500, sendo que as ocas eram utilizadas essencialmente como moradias coletivas. Com o passar dos anos, devido ao processo de expansão urbana, desmatamento e evolução dos sistemas construtivos, a quantidade dessas ocas vêm diminuindo significativamente. Desse modo, construção de uma oca para alunos da educação infantil é uma forma de trazer memórias que representam a grande quantidade de povos indígenas do Brasil, valorizando sua cultura e tornando possível uma conexão entre a educação socioambiental no ambiente pedagógico exploratório e lazer. Neste cenário, objetivo deste trabalho foi o desenvolvimento do projeto de uma oca lúdica no CEI "Maria Alice Silvestre" (antigo CEI-UFGD) com estrutura de madeira e bambu. A metodologia do projeto foi composta por uma análise preliminar, elaboração de uma maquete física da oca, estudo dos materiais empregados, dimensionamento da estrutura de madeira e acompanhamento da execução e orientações sobre os cuidados com a utilização e manutenção. O projeto da oca foi concebido de acordo com as necessidades apresentadas pela equipe da instituição e executado com a aprovação das famílias indígenas da escola. Após a conclusão foi avaliado como satisfatório o nível de

atendimento do projeto em relação às expectativas das propostas pedagógicas. Além disso, a extensão proporcionou uma interação entre os acadêmicos e a comunidade, com aplicação dos conhecimentos aprendidos em aula para beneficiar a mesma de forma direta.

Palavras-chave: Estruturas de madeira, Bambu, Cultura indígena, Materiais sustentáveis, Educação infantil.

Resumen: Las ocas son construcciones típicas indígenas hechas con elementos naturales, tales como maderas, bambúes, sapé, entre otros. Diversos pueblos indígenas ya habitaban Brasil antes de la llegada de los portugueses en 1500, siendo que las ocas eran utilizadas esencialmente como viviendas colectivas. Con el pasar de los años, debido al proceso de expansión urbana, deforestación y evolución de los sistemas constructivos, la cantidad de estas ocas ha disminuido significativamente. De este modo, la construcción de una oca para alumnos de educación infantil es una forma de traer memorias que representan la gran cantidad de pueblos indígenas de Brasil, valorizando su cultura y haciendo posible una conexión entre la educación socioambiental en el ambiente pedagógico exploratorio y de ocio. En este escenario, el objetivo de este trabajo fue el desarrollo del proyecto de una oca lúdica en el CEI "Maria Alice Silvestre" (antiguo CEI-UFGD) con estructura de madera y bambú. La metodología del proyecto fue compuesta por un análisis preliminar, elaboración de una maqueta física de la oca, estudio de los materiales empleados, dimensionamiento de la estructura de madera y acompañamiento de la ejecución y orientaciones sobre los cuidados con la utilización y mantenimiento. El proyecto de la oca fue concebido de acuerdo con las necesidades presentadas por el equipo de la institución y ejecutado con la aprobación de las familias indígenas de la escuela. Después de la conclusión, se evaluó como satisfactorio el nivel de atención del proyecto en relación con las expectativas de las propuestas pedagógicas. Además, la extensión proporcionó una interacción entre los académicos y la comunidad, con aplicación de los conocimientos aprendidos en clase para beneficiar a la misma de forma directa.

Palabras clave: Estructuras de madera, Bambú, Cultura indígena, Materiales sostenibles, Educación infantil.

INTRODUCTION

Analyzing the historical-territorial context in Brazil, prior to the arrival of European colonizers in 1500, there were approximately five million natives (DELGADO; JESUS, 2018). According to the IBGE census (2010), the last census conducted, there are more than 250 indigenous peoples, totaling a population of 817,963, with 315,180 (38.5%) living in urban areas and 502,783 (61.5%) in rural areas, mainly in Indigenous Lands, many of which are not recognized by the Brazilian State.

Since antiquity, humans have protected themselves against weather, edaphoclimatic conditions, and wild animals. Thus, their dwellings were designed to protect them. It is in this context that indigenous architecture follows the same principle, and thus, despite being lightweight, the structures use tree trunks that meet all the needs of the population. The roofing is made of taquara, palm leaves, and guaricanga. The sealing, in turn, is done using wattle and daub, hand-molded mud, bamboo, and straw, thus being responsible for air circulation and removing excess heat, as it has no windows, only a door (CARRINHO, 2010).

Furthermore, Ferreira (2016) states that villages have always been spaces that sought communion between people and nature. Therefore, the use of ocas also had affective meanings, in that their people felt direct contact with nature, knowing that their dwellings were made of materials provided by it. Thus, it was not only a natural resource but also a sociocultural one.

The construction techniques and processes of ocas are carried out by a community system based on reciprocity, which regulates the social relations of the entire community, using "know-how" techniques (CARRINHO, 2010). Thus, according to Carrinho (2010, p.28), indigenous cultures:

> "Possess local knowledge, experiencing sustainable socio-environmental principles in daily practice, demonstrating intrinsic knowledge through subsistence agriculture, values, customs, beliefs, traditions, and construction processes that inherently provide answers to the severe energy crisis faced by contemporary society".

Nowadays, there is much discussion about multidisciplinary in pedagogical themes, and practical and theoretical ideas are sought to achieve better school development, without neglecting the playful aspect. Thus, to obtain a space for dialogue,

educational processes, and participatory teaching, ideas are sought to better serve the public in a creative, educational, cultural, and social way.

According to Nóvoa (1993, apud SANTOS; MIGUEL, 2019, p.56), the teacher is responsible for promoting student learning, so that they "can build their knowledge in an environment that challenges and motivates them to explore, reflect, and discover concepts related to problems."

Therefore, considering that the school environment, in addition to teaching, helps individuals develop socially and environmentally, environmental education is an important pedagogical process that stimulates critical awareness of ideologies and environmental problems.

In this context, ocas are not just "simple constructions." Due to the political-social organization of the villages, ocas also represent an important symbolic space based on collectivity, unity, and solidarity, filled with socio-emotional meaning in the school environment, providing effective and more humane learning.

The realization of this work was opportune due to the pedagogical interest in interrelating social, environmental, cultural, and children's leisure studies with the practical application of Civil Engineering concepts, which provided important experiences for the students to find solutions for the community through the knowledge acquired during the course and research related to construction systems not studied in it.

The construction of an oca at the "Maria Alice Silvestre" Children's Education Center (CEI MAS) of the Federal University of Grande Dourados, also known as CEI-UFGD, is further justified by the importance of indigenous culture in the Dourados-MS region, as there are two regularized indigenous lands in the municipality, according to records from the National Indian Foundation (FUNAI, 2019), such as the Dourados Indigenous Reserve with 3474.5957 ha, occupied by the Guarani Nhandeva and Terena ethnicities, and the Panambizinho Indigenous Reserve with 1272.8935 ha, occupied by the Guarani Kaiowá ethnicity, in addition to several other indigenous lands in nearby municipalities.

Furthermore, the oca in question was part of a pedagogical project of CEI-UFGD named "My backyard is bigger than the world," which aimed to build a pedagogical environment in the external space. Therefore, its construction will follow the multicultural and interdisciplinary concepts proposed by the project.

Thus, this action aimed to develop, dimension, and monitor the execution of the project for a playful oca at CEI MAS, with a wood and bamboo structure and the use of other natural elements.

MATERIALS AND METHODS

The methodology of this action consisted of the development of a project in 6 main stages, as shown in the flowchart in Figure 1.

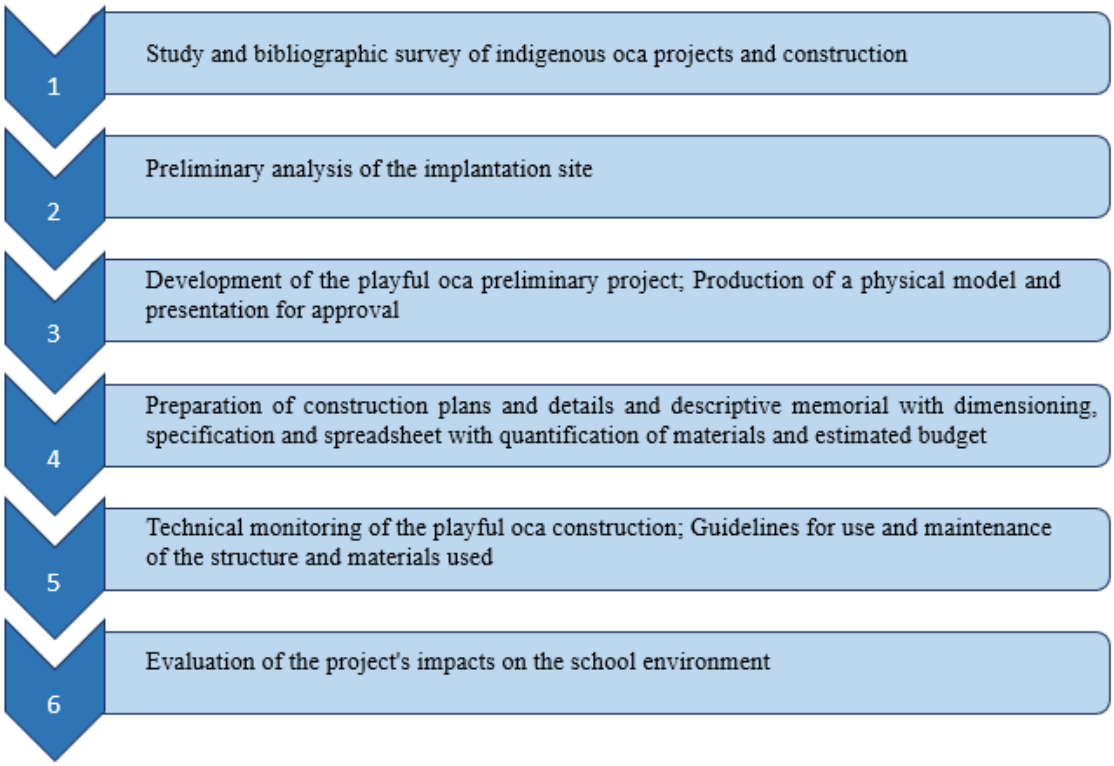

Figure 1. Flowchart of the development stages of the playful oca project at CEI MAS.

All stages of the extension action were carried out by students of the Civil Engineering course at UFGD, with the assistance of the teachers involved in it. For the elaboration of the oca at CEI MAS, initially a study and bibliographic survey of projects and construction of indigenous ocas in Brazil was carried out.

In the second stage, a preliminary analysis of the site was carried out, in order to obtain the characteristics of the land, the implantation, the location, the template and the needs of the target audience (students and teachers of CEI MAS). After fulfilling all these premises, the third stage comprised the initial conception of the oca with the development of a preliminary project and elaboration of a physical scale model with the objective of

presenting it to the school community of the institution. So that, after presenting the model to the referred community, especially to indigenous families and teachers of the institution, it was possible to verify that the expectations of the pedagogical and cultural proposal were met and to make changes to the oca project before it was executed. For the construction of the model, materials with physical characteristics close to those of the real materials were used, obeying the specifications of the governing standards on construction.

Subsequently, in the fourth stage, the construction and detailing plans (floor plan, implantation and structural) were developed from the dimensioning and with specification and listing of the materials to be used, aiming at their quality. For the dimensioning, part of the knowledge of wood structures and construction budgeting, acquired in the Civil Engineering course, was used.

Then, in the fifth stage, the construction of the playful oca was carried out by an indigenous person with experience in the construction of ocas, father of a child from CEI MAS, obeying all project specifications and safety standards, so that the execution was technically accompanied by students and teachers of the action.

In order for the useful life of the construction to be prolonged, periodic maintenance is essential, since materials such as wood and bamboo are more susceptible to weathering. In this case, studies were carried out on maintenance procedures for the materials used and these guidelines were passed on to the institution's coordination.

Finally, in the sixth stage, the evaluation was developed through a meeting with the pedagogical team. After they had evaluated the impacts of the project on the development of activities with the children, it was possible to verify whether the expectations of the pedagogical proposal of the CEI MAS teachers were met.

SITE CHARACTERIZATION – "MARIA ALICE SILVESTRE" CHILD EDUCATION CENTER (CEI MAS)

The CEI MAS, also known as CEI UFGD, is located on Campus II of UFGD, Rodovia Dourados - Itahum Km 12, S/N. The institution's facade is shown in Figure 2.



Figure 2. Front facade of CEI MAS
Source: https://portal.ufgd.edu.br/secao/centro-educacao-infantil-proae/index.

The CEI MAS was established through an agreement between the Municipality of Dourados - MS and UFGD, which serves children from 4 months to 5 years old, children of residents of the local community, as well as children of employees and student children of UFGD and UEMS. The location used for the construction of the playful oca was a space located in the school's sand park, as can be seen in Figures 3A and 3B.



Figure 3. Location of the playful oca construction. (A) View of the park area. (B) Detail of the back of the park, highlighting the area where the oca was built.

RESULTS AND DISCUSSION

This extension action was the result of a demand requested by teachers and the coordinator of CEI MAS, to contribute to the social and cultural pedagogical proposals

that aim to address indigenous culture in a playful way with all the children who study at the institution, in addition to ensuring greater reception for indigenous children, providing a place of reference for their culture.

One of the requests from the teachers was that the oca not be in contact with the ground, to facilitate the development of children's activities and ensure safety in relation to venomous insects. Therefore, the name "playful oca" was given, due to the fact that adaptations to a conventional oca project were necessary to meet the aforementioned pedagogical reasons and because it is a park area, a place where playful activities with children are encouraged.

Students from the UFGD Civil Engineering course, participants in the action, began developing the action with studies and bibliographic surveys on indigenous culture and on oca constructions in Brazil and regions of the State of Mato Grosso do Sul. Next, they went to the site to carry out an on-site technical visit to verify the local dimensions and other possible interferences from the surroundings (see Figures 4A, 4B and 4C), such as the height restriction due to the existing roof, in addition to suggesting that the tarp (which was already damaged in some places) be removed during the construction period, as it could create difficulties for the installation of some structural elements.



Figure 4. (A) (B) (C) Local Measurement.

Having completed the data collection stage, a preliminary project was then developed and a physical model of the playful oca was built (Figures 5A and 5B), in order to promote a realistic representation on a reduced scale, which aimed to facilitate spatial visualization and understanding of the project by the entire school community, including children and families with any level of education or instruction.

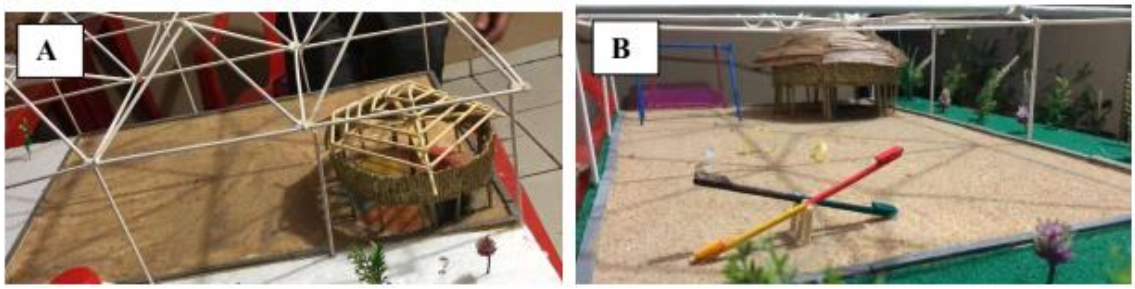

Figure 5. Details of the construction of the reduced-scale physical model of the playful oca. (A) Model under construction with details of the wooden roof structure of the oca. (B) Completed model.

After finalizing the model, a meeting was scheduled with some teachers from the institution, along with the executing team and indigenous families, on which occasion they were represented by two mothers of children from the school.

At this meeting, the mothers and teachers approved the project. Everyone highlighted its importance regarding the representation of indigenous culture.

Subsequently, the students developed the project (with details) and dimensioning of the playful oca at CEI MAS with a wood and bamboo structure, applying the theoretical concepts already studied in civil construction and structures disciplines of the UFGD Civil Engineering course and specific study on oca construction. The sketch of the floor plan of the project is presented in Figure 6.

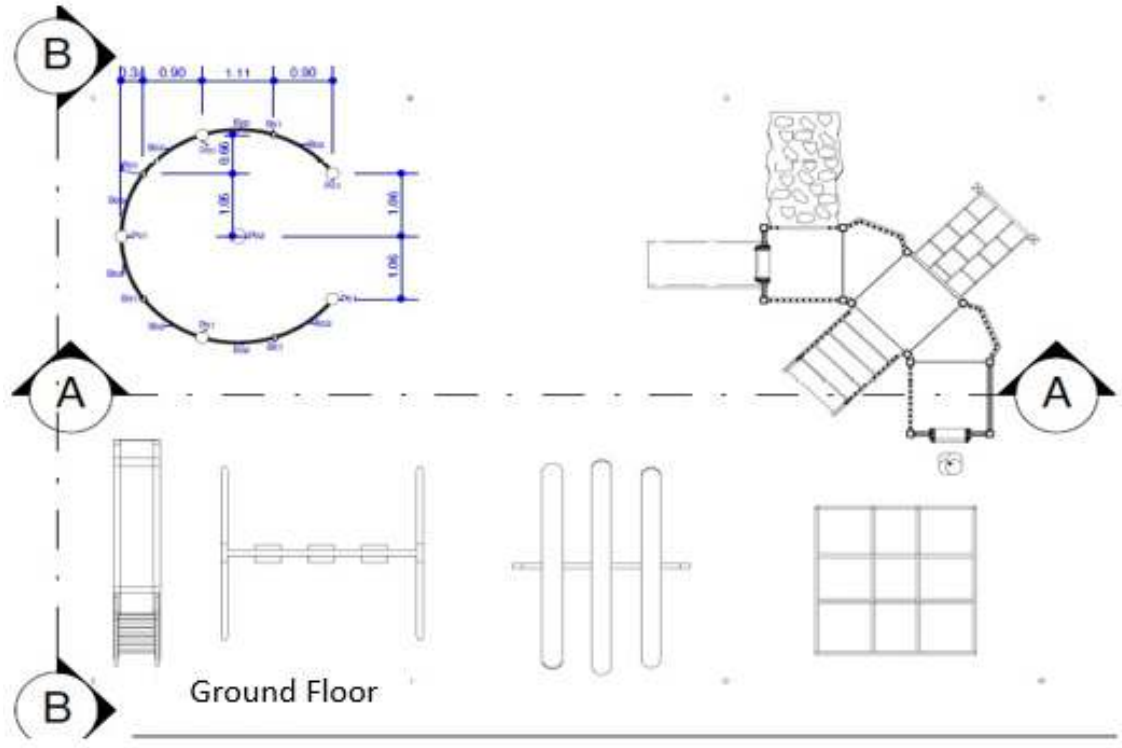

Figure 6. Sketch of the floor plan with dimensions and location of the oca in the park space.

With the dimensioning, it was possible to specify, list, and quantify the materials necessary for the construction of the oca. Stage 4 was completed in February 2020, and the following month the pandemic was declared, with the suspension of in-person activities. Thus, the return of in-person activities at CEI MAS was awaited to continue the project. When in-person activities at CEI MAS were resumed in August 2021, the coordinator, along with parents and the school team, mobilized to provide the materials, with the supervision of the action's teachers to ensure their quality and assist in meeting the technical specifications.

The main materials used were 5 eucalyptus pillars and 1 aroeira pillar with a 20cm diameter, bamboos (Figure 7A), guaiçara wood structure, and thatch (Figure 7B) for filling the roof.



Figure 7. (A) Bamboos and aroeira and eucalyptus pillars. (B) Thatch.

The execution of the oca was carried out by an indigenous builder and father of children from CEI MAS with the accompaniment of UFGD teachers and students involved in the project. However, before starting construction, a review of the project was carried out with the builder's guidance, in order to adapt the characteristics of the oca.

The construction of the oca began in December 2021 and ended in February 2022, as it was carried out according to the builder's availability. Some phases of it are presented in the sequence of Figures 8 to 12.

Figure 8 shows the phase of locating the pillars and opening approximately 0.40m to 0.50m in diameter by 1.00m in depth to fix them. The openings were manually executed using a post hole digger (Figure 8A and 8B).



Figure 8. (A) View of the oca space with the openings of the holes for the foundation. (B) Detail of the openings for fixing the pillars.

For the foundation, the pillars were fixed with concrete at a depth of 1.00m. This part of the pillars was treated with a high-adhesion and resistant asphalt paint (Figure 9), with the function of waterproofing it, in addition to using spaced nails (18x27) to promote greater adhesion between the wood and the concrete.



Figure 9. Pillars with asphalt paint application.

The pillars were fixed, so that the central one was 2.5m high above the ground and the surrounding pillars were 1.0m high and spaced 2.4m apart, as shown in Figure 10. They were then varnished to ensure an increase in their useful life.

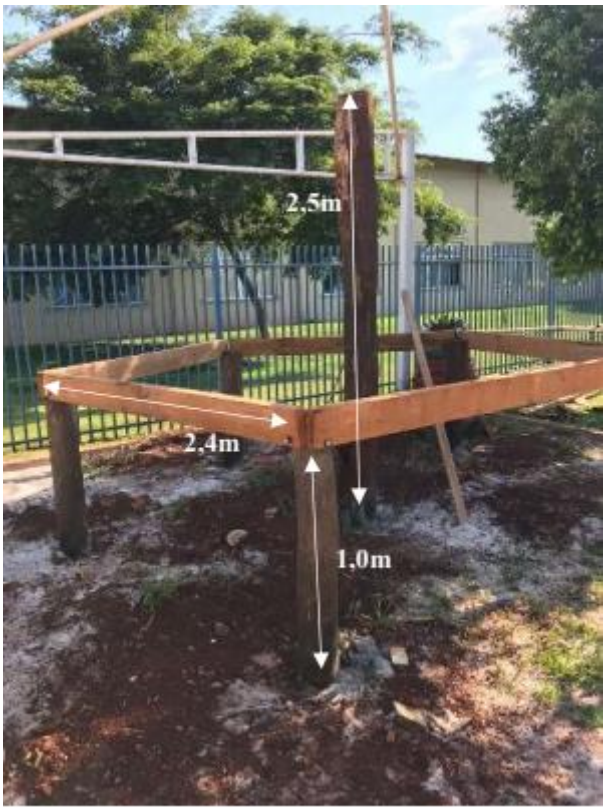

Figure 10. Detail of the execution of the oca pillars.

Subsequently, the wood and bamboo structure for the roof was executed, as illustrated in Figure 11.



Figure 11. Detail of the execution of the oca roof structure.

As soon as the roof structure was finished, the thatch placement began. The sequence for placing the thatch was from the bottom to the top, as can be seen in Figure 12A. Galvanized wire was also used to ensure fixation. Figures 12B and 12C show the finished oca, so that in Figure 13B you can see the external part and in Figure 12C how the internal part turned out.

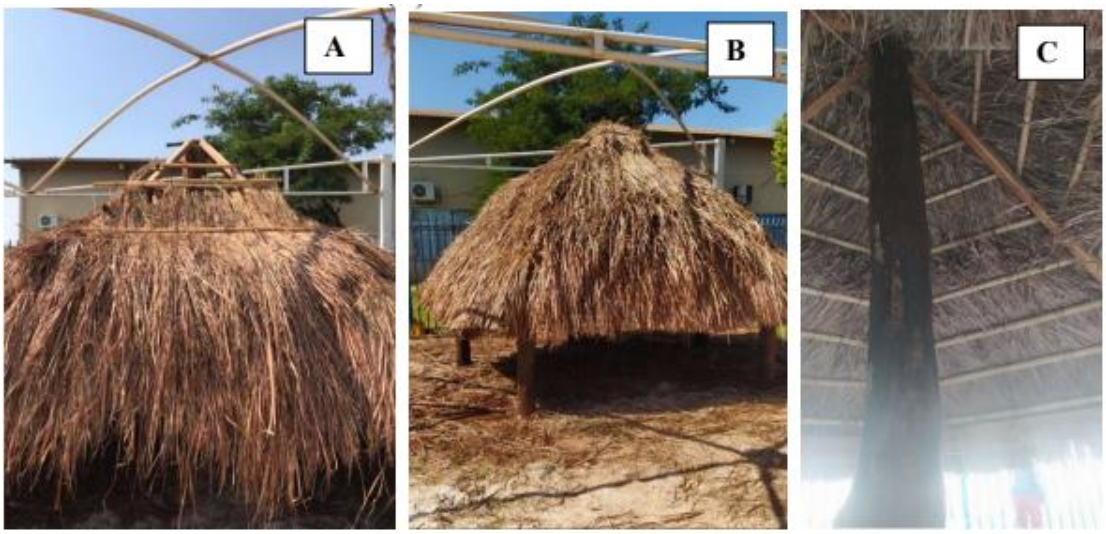

Figure 12. (A) Detail of the execution of the thatch on the oca roof. (B) External view of the finished oca. (C) Internal view of the finished oca.

The teachers and students of the project followed all stages of the oca construction from conception to completion, formalized at an inauguration moment with the presence of the entire CEI MAS team, children and families of the institution (Figure 13).



Figure 13. Playful oca and maintenance of the finished park structure.

Finally, the project evaluation was carried out together with the institution's pedagogical team. The project provided important moments of discovery for children and babies. The space made it possible to explore and research through interaction with the environment, materials, resources and natural elements.

The project encouraged collective coexistence between groups, between children from all over the institution. With this interaction, respect and care between them has been growing every day; by putting these possibilities into practice, children are experiencing indigenous culture in a meaningful way. Babies, toddlers and young children, who are served at CEI MAS, establish games with each other, build and deconstruct, explore, manipulate, feel and move, establishing dialogue and interaction, so that the project contributed to these experiences mentioned.

Another factor considered satisfactory was the possibility of listening to the child and observing them, giving voice to the child, their customs, their culture, putting their interest as a starting point, has been relevant to teaching practice.

Another positive point was the greater contact with natural elements and truly significant proposals that the oca makes possible, the active search for sustainable pedagogical experiences, which encompass children, educators, families and the entire school community.

CONCLUSION

In conclusion, it can be concluded that the construction of the playful oca promoted several impacts related mainly to the infrastructure of CEI MAS, contribution to the training of academics, socio-environmental and cultural impacts.

With this extension project, it was possible to affirm that there was an improvement in the institution's infrastructure with the construction of the oca in the park area, whose physical structure is under the domain of UFGD, and will be destined to the development of pedagogical and cultural activities of the institution.

Regarding the articulation between extension, teaching and research, it was noted that students applied concepts studied in disciplines of the Civil Engineering course and related research for the development of the project, also verifying interdisciplinarity with the integration of knowledge from disciplines, such as architecture, civil construction, wood structures, among others, of the UFGD Civil Engineering course, in addition to

studies related to regional indigenous culture and construction techniques of oca construction.

The execution of the project satisfactorily met the expectations of the community involved, since with the construction of the oca, an experience of the children, students of CEI MAS, with indigenous culture was provided, resulting in more effective pedagogical, social and cultural practices.

Therefore, the development of the aforementioned extension action generated a partnership relationship between the institution, the academic community of universities, and the local community, with the perspective of other extension actions being articulated on the site.

As already mentioned in this article, due to the proximity of several indigenous reserves in the city of Dourados-MS, the promotion of actions that provide the dissemination of knowledge about indigenous history and culture is of great importance. Therefore, this project could be adapted and implemented in other educational institutions, especially municipal or state public ones, as it would contribute to the inclusion of children from indigenous families in the school environment, improving their engagement, in addition to providing teachers with other possibilities for playful pedagogical activities related to citizen education with an emphasis on a sociocultural approach.

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