

A week dedicated to the Cerrado: Scientific communication in health and environment through games and art

Uma semana dedicada ao Cerrado: divulgação científica em saúde e ambiente com jogos e arte

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ABSTRACT Every year, FIOCRUZ Brasília takes part in the National Week of Science and Technology (SNCT), a key public policy aimed at the dissemination and popularization of science. In 2024, the theme of the SNCT was ‘Biomes of Brazil: diversity, knowledge, and social technologies’. FIOCRUZ Brasília organized an event aligned with the local territory – the Cerrado biome – and especially aimed at children and adolescents. Studies have shown that young people still know little about the biome they inhabit and fail to recognize the Cerrado’s natural and cultural richness, which hampers conservation efforts. To address this situation, the 2024 SNCT at FIOCRUZ Brasília offered a series of playful and interactive activities focused on the Cerrado. This report aims to describe and analyze the program, which incorporated science, art, and games. The event was successful, drawing visitors from several regions of the Federal District (DF). Attendees were engaged and expressed satisfaction with the activities. However, it is essential to increasingly involve researchers in the field of science communication and to develop more dialogical practices grounded in active listening and public participation.

KEYWORDS Scientific communication and diffusion. Environment and public health. Environmental health education. Play and playthings. Art.

RESUMO A Fiocruz Brasília, anualmente, participa da Semana Nacional de Ciência e Tecnologia (SNCT), importante política de divulgação e popularização da ciência. ‘Biomos do Brasil: diversidade, saberes e tecnologias sociais’ foi o tema da Semana em 2024, quando a Fiocruz Brasília realizou um evento alinhado ao território em que está localizada, o Cerrado, e dirigido, em especial, a crianças e adolescentes. Estudos têm mostrado que os jovens ainda conhecem pouco o bioma onde vivem e não reconhecem a riqueza natural e cultural do Cerrado, o que dificulta ações de conservação. Com vistas ao enfrentamento dessa situação, a SNCT 2024 na Fiocruz Brasília realizou uma série de atividades lúdicas e interativas sobre o Cerrado. O presente relato busca descrever e analisar essa programação, que incluiu ciência e arte, além de jogos. O evento obteve êxito, tendo recebido visitantes de diferentes regiões do Distrito Federal. O público se mostrou engajado e se declarou satisfeito com as atividades. Entretanto, verifica-se a importância de envolver cada vez mais os pesquisadores com a área da divulgação científica, bem como de desenvolver práticas cada vez mais dialógicas, pautadas pela escuta e a participação do público.

PALAVRAS-CHAVE Comunicação e divulgação científica. Meio ambiente e saúde pública. Educação em saúde ambiental. Brincadeiras e brinquedos. Arte.

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Introduction

The Cerrado is Brazil's second largest biome: it corresponds to nearly one quarter of the national territory and covers the entire Federal District (DF), more than 90% of Goiás and Tocantins, and more than half of Maranhão, Mato Grosso do Sul, and Minas Gerais, in addition to portions of other states (Mato Grosso, Bahia, Piauí, Rondônia, São Paulo, and Paraná)¹.

Besides its rich diversity of fauna and flora, the Cerrado is also known as the 'cradle of waters', as it contains the headwaters of 8 of the country's 12 major hydrographic regions². Also noteworthy is the cultural richness of Indigenous peoples, quilombola communities, and other traditional peoples and communities living in the Cerrado, "with centuries of experience in sustainable coexistence with the biome"². Yet all of this heritage is under serious threat. About 50% of the Cerrado's native vegetation cover has already given way to cities and agribusiness, with its vast monocultures and pasturelands².

The conservation of the biome faces some obstacles, including a lack of knowledge, even among its own inhabitants. Rehem and Bizerril³ conducted an investigation with high school students from three public schools in the Federal District (DF) and found that these young people had "a simplistic and limited view"³⁽¹⁾ of the Cerrado, which they did not recognize as an environment of abundant diversity. The authors affirm that this perspective has persisted over the last two decades. In the study, some students associated the Cerrado with terms such as 'bad' and 'sad'. Such a perception tends to hinder conservation attitudes toward the biome, since "the lack of affective ties between the population and the Cerrado leads them to see it as worthless and not to take a stand in its defense"³⁽¹²⁾.

Amaral et al.⁴ also found that a narrow view of the Cerrado prevailed among public high school students in Goiás, although they observed that awareness of the biome's

destruction and the need to protect it was associated with previous participation in environmental events. Working with elementary and high school students from a school in Piauí, Araújo et al.⁵ identified limited knowledge about the Cerrado. However, the authors observed that even relatively simple interventions, using images and conversation circles, can awaken students' interest and sense of environmental care.

Textbooks are often the main or only resource available to students and teachers⁶. With regard to the Cerrado, textbook content is considered insufficient because it does not highlight the biome's critical importance for sustaining life on the planet and also reinforces stereotypes: the Cerrado has been reduced to a dry climate and trees with twisted trunks.

There is a clear need to strengthen formal and non-formal education initiatives about the Cerrado. In this sense, science communication actions stand out, as they use appropriate languages and formats to address scientific topics with non-specialists, seeking to expand their knowledge and participation in issues that may affect their lives⁷.

Coordinated by the Ministry of Science, Technology, and Innovation (MCTI) and held annually in October since 2004, National Science and Technology Week (SNCT) is Brazil's main science communication event, in which research institutes, universities, schools, governments, organizations, and others from across the country promote a wide range of science popularization activities open to the general public⁸. In 2024, the Week's theme was 'Brazilian Biomes: diversity, knowledge, and social technologies'. During SNCT 2024, the Oswaldo Cruz Foundation in Brasília (FIOCRUZ Brasília) opened its doors from October 14 to 18 for a science communication event aligned with the territory in which it is located, the Cerrado, and aimed especially at children and adolescents. This experience report seeks to describe and analyze this event, entitled 'Expedition Through the Cerrado with FIOCRUZ Brasília', highlighting the strengths

and challenges of science communication in public health research institutions.

Material and methods

This qualitative, descriptive, and analytical study conducted a documentary analysis of the records available on the event ‘Expedition Through the Cerrado with FIOCRUZ Brasília’: publications on the institution’s website and social media, press clippings, and activity reports. These documents were consulted in order to collect and systematize data on characteristics of the program offered, working team composition, and the visiting public profile. The data were then analyzed in light of the frameworks of science communication and public communication of science.

We should emphasize that data collection and interpretation were permeated by the

author’s own experience and testimony as a member of the event’s coordination team. Although proximity to the object of study may compromise the objectivity of the report, it is important to underscore the value of the critical perspective of a worker-researcher on her professional activities⁹.

In addition to the program, team, and visitors, a fourth axis was added to the study: evaluation. Everyone who participated, whether as part of the working team or as visitors, was invited to complete an electronic form with open- and closed-ended questions about their perceptions of the event. The responses were compiled and analyzed in order to assess the extent to which the event succeeded in bringing science and society closer together, and how this bond can be strengthened in future initiatives. *Table 1* synthesizes the methodological approach of the study.

Table 1. Methodological approach

Event ‘Expedition through the Cerrado with FIOCRUZ Brasília’			
Data sources	Study areas	Theoretical frameworks	Subjective dimension
<ul style="list-style-type: none"> • Publications on the institution’s website and social media • Press clippings • Activity reports • Forms completed by participants 	<ul style="list-style-type: none"> • Offered programming characteristics • Work team composition • Visiting public profile • Avaliation 	<ul style="list-style-type: none"> • Science outreach and public communication of science 	<ul style="list-style-type: none"> • Experiences and testimony of the author, a working researcher

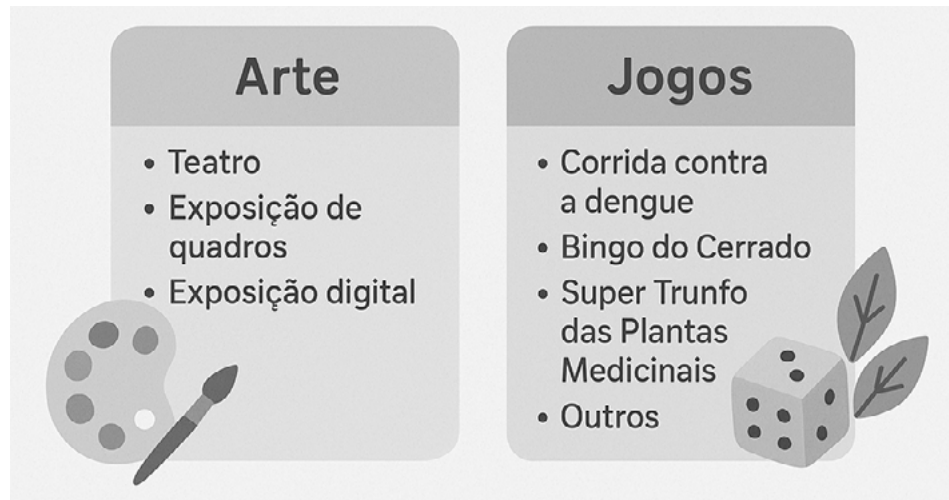
Source: Prepared by the authors.

Results and discussion

The event ‘Expedition Through the Cerrado with FIOCRUZ Brasília’ featured a program that presented scientific topics to visitors through two main strategies: art and games (*figure 1*). The choice of these types of activity

is part of a historical movement toward a more dialogical public communication of science¹⁰, in contrast to traditional lectures and short courses, in which scientific knowledge is transmitted in a unidirectional manner from scientists to the so-called lay public.

Figure 1. Summary of the SNCT 2024 program at FIOCRUZ Brasília



Source: Prepared by the authors (design generated with ChatGPT).

In its conception, therefore, the event did not seek to teach science to a public assumed to be devoid of knowledge (deficit model), but rather to engage visitors with science through activities that valued their prior knowledge, fostered identification, and made sense to them in daily life (public engagement model)¹¹. Through art and games, science is not only recognized as part of culture, but conditions are also created to stimulate experience exchange, reflection, and a shared construction of responses to social concerns and demands.

Science and art

Artistic expressions can capture attention and sensitize, sharpening the public's perspective and perception regarding the topics at stake¹². However, care must be taken to ensure a balance between science and art, avoiding the trap of activities that reduce art to a mere instrument in the service of science education. The more an activity incorporates art in its creative essence, the greater its potential to stimulate critical and reflective thinking¹².

The SNCT 2024 program at FIOCRUZ Brasília included two exhibitions, in addition to the theatrical performance 'Little Red Riding Hood and the Little Cerrado Wolf'.

"Some see in the interface between science and theater a way to provoke, to make people think and act, and perhaps even to transform"¹³⁽³⁵⁾. FIOCRUZ Brasília invested in an environmentally themed theater to foster behaviors of appreciation for and protection of the Cerrado.

Inspired by the classic 'Little Red Riding Hood', the play was already part of the portfolio of the Fábula company. FIOCRUZ Brasília did not intervene in the play in any way; the institution was responsible only for curation – after analyzing the portfolio of different theater groups, it considered this play to have the most appropriate approach and selected it for presentation at SNCT.

At the end of seven of the ten performances, a previously invited researcher was called onto the stage for a brief conversation about the theme of the play, and the audience proved highly participatory. This shows that art can "aesthetically and emotionally affect people in such a way as to engage them more meaningfully in different scientific themes"¹³⁽²⁷⁾.

Another science-and-art activity included in the program was the exhibition 'Zé Gotinha do Brasil', (A popular vaccination promotion mascot) from the Ministry of Health, which gathered 20 paintings featuring reinterpretations of this famous character created by artists

from various regions of Brazil. FIOCRUZ Brasília became the first institution to host this traveling exhibition, which portrays the importance of vaccination and the country's cultural diversity, aligning with SNCT 2024 insofar as the paintings bring health, art, nature, and culture into dialogue. Visitors who appreciated the exhibition were also pleasantly surprised to encounter Zé Gotinha himself, who interacted with the public and posed for photos.

This appeal to entertainment fulfills a role in science communication, since it delivers scientific information coupled with a pleasurable experience. "Thus, someone who was merely seeking pleasure ends up learning informally and unintentionally"¹⁴⁽²⁶⁾. The same appeal was present in the exhibition 'Cerrado: from what we have to what we want', which consisted of an immersive and interactive experience designed to sensitize visitors of the characteristics, richness, and challenges of the Cerrado. Created and assembled exclusively for SNCT 2024 at FIOCRUZ Brasília, it was conceived by the institution's team, and its implementation was discussed, planned, and conducted with contracted companies.

In a 16-square-meter space in the courtyard of the FIOCRUZ Brasília School of Government, the exhibition was divided into four modules, each presenting a distinct aspect

of the biome. In each module, a trained mediator was available to talk with visitors about the topics addressed, explaining concepts, answering questions, and guiding the experience.

In the first module (Reception), to immerse visitors, wall and floor projections displayed images of waterfalls, rivers, fauna, and flora of the Cerrado, in addition to scenography with real plants, forest sounds, and the smell of vegetation. In the second module (Basic information), wall projections showed not only fauna and flora, but also highlighted the traditional peoples and communities living in the Cerrado. On devices made available to the public, visitors could navigate an interactive menu with detailed information on the biome's location, biodiversity, economy, risks, and protection practices.

In the third module (Threats), upon entering the room, visitors saw wall projections with images of a healthy and sustainable Cerrado, such as river springs, Indigenous communities, and preserved native vegetation. When positioned in front of these images, they transformed (*figure 2*), beginning to display scenes of environmental degradation, such as water pollution, pesticide use, and forest fires. This interactive dynamic sought to raise awareness about the negative impact of human activities on the Cerrado and stimulate reflection on the consequences of these actions.

Figure 2. Interactive projections in the third module of the exhibition 'Cerrado: from what we have to what we want'



Source: Communications Office/ FIOCRUZ Brasília.

In the fourth module (Solutions), through gamification, the public was confronted with situations of harm to the biome and encouraged to make decisions for its preservation. Through this gamified format, it was possible to introduce reflections on ultra-processed foods, family farming, ecotourism, consumerism, and even excessive screen use.

This digital exhibition format sought to align with the interests of children and adolescents, insofar as “today’s students are all ‘native speakers’ of the digital language of computers, video games, and the internet”¹⁵⁽⁶⁾. More than that, it aimed to show that science is part of social reality and that scientists alone cannot solve contemporary challenges, especially those related to environmental health.

The exhibition, rather than presenting itself as a finished product merely to be consumed by the public, was designed to be open to participation and varied interpretations, engaging different senses, provoking reflection, and calling for decision-making. Considering that knowledge sharing and critical appropriation of science are fundamental to citizenship education¹⁶, it may be affirmed that the public

– understood not as a mere visitor, but as the protagonist of the exhibition – found in this activity conditions favorable to the promotion of citizenship.

Science and games

Games have existed for thousands of years: although there has recently been a marked increase in interest in digital games, this movement has also had repercussions for games in general¹⁷. Understood as a medium of communication, games do not serve to transmit information unidirectionally, but rather to foster dialogue, since “the player is active and participates dynamically, constructing meanings on the basis of their experience”¹⁷⁽⁸¹⁾. When they address an everyday problem within a science or health theme, games allow participants to make mistakes, succeed, deconstruct, construct, and create solutions. It is precisely this freedom provided by games, associated with their playful nature, that makes them so attractive for science communication.

During SNCT 2024, FIOCRUZ Brasília launched a game called ‘Race Against

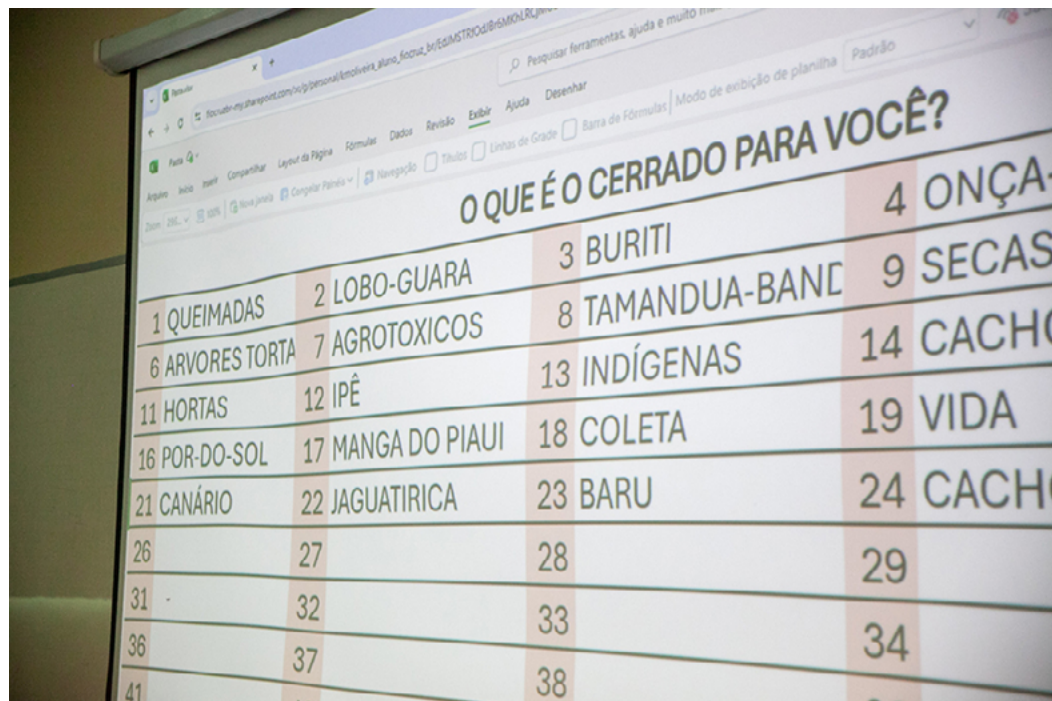
Dengue’, which addressed both the fight against the *Aedes aegypti* mosquito and the importance of waste sorting. Participants were divided into two teams. The match occurred in a room containing various prop waste items, such as glass bottles, food scraps, broken cell phones, and so forth. Some of this waste, such as disposable cups, could accumulate water and hide *Aedes aegypti* breeding sites. The room also contained other breeding sites for the dengue mosquito, such as an uncovered water tank and a plant pot tray filled with water.

Each team’s challenge was, in the shortest possible time, to collect and sort the waste, depositing it in the corresponding bins (recyclables, organic waste, glass, and electronics), while also eliminating the breeding sites (for example, covering the water tank and placing sand in the tray). The mosquito props that were found, at different stages – egg, larva, pupa, and adult – had to be placed on an informational board about the life cycle of *Aedes aegypti*. The teams competed with one another, but in the task of eliminating mosquito breeding sites, they earned more points if they acted collaboratively.

The increase in dengue is associated with environmental degradation, especially in the Cerrado¹⁸. Addressing the problem requires social participation¹⁹, with the shared construction of solutions among the State, science, and society. However, conservative strategies still prevail today, such as campaigns with imposing messages²⁰ or initiatives that do not include community knowledge²¹. Games therefore emerge as opportunities to improve dengue-control strategies, since they “are essentially participatory – it is impossible to play without actively participating in the games”¹⁷⁽¹⁵⁾.

Another game held was the ‘Cerrado Bingo’, inspired by the work of Maxta et al.²². Upon entering the room, visitors found different images related to the natural and social characteristics of the Cerrado hanging from clotheslines with clothespins. They were then invited to select one image and, subsequently, assign one or more words to it. The words were written on a board by the mediators (*figure 3*). Once everyone had spoken, cards similar to bingo cards were distributed, on which each participant had to write down four words from the board of their choice (these could be words they themselves or other players had said).

Figure 3. Example of a board created during a 'Cerrado Bingo' match



Source: Communications Office/ FIOCRUZ Brasília.

In the dynamics of the game, the words corresponded to the bingo numbers; that is, once everyone had assembled their cards, the word draw began. The winner was the first player whose four words written on the card were drawn. Through this light and entertaining dynamic, which valued and dialogued with the participants' lay knowledge¹¹, the aim was to contribute to the learning of different characteristics of the Cerrado.

Another game held during SNCT 2024 at FIOCRUZ Brasília was the 'Cerrado Medicinal Plants Super Trunfo', created by two graduates of the University of Brasília (UnB)²³. It is a card game in which each card represents a medicinal plant from the Cerrado and contains its characteristics. As in Super Trunfo decks about cars or superheroes, the cards are distributed among the players, and at each round, the player who presents the plant with the most prominent properties wins the other participants' cards.

Games about the Cerrado have shown good results, motivating children and adolescents to

pay more attention to subjects related to the biome and favoring meaningful learning about it. High school students at a public school in Goiás played a board game in which they had to gather the appropriate cards to solve a challenge about the Cerrado – the experience enabled them to apply scientific concepts in a relaxed way²⁴. The games conducted by FIOCRUZ Brasília during SNCT 2024 were designed to provide a similar experience.

Audience

The 'Expedition Through the Cerrado with FIOCRUZ Brasília' received nearly 2,000 visitors. Attendance was free and open to all audiences, with no need for prior registration (although this was recommended for groups). Most visitors came in scheduled groups, with a total of 29 scheduled groups: 2 from private schools; 7 from social projects; and 20 from public schools.

More than 80% of the visitors came to the event using buses hired by the institution.

The decision to provide this service to groups from public schools and social projects was justified because the institution is located in an area with little pedestrian circulation and poor access by public transportation. In addition, transportation difficulties have been identified as one of the barriers preventing the public from accessing museums and science centers²⁵. This type of barrier affects, above all, residents of peripheral regions far from the majority of these establishments.

The transportation service hired served groups from several regions far from central Brasília, such as São Sebastião, Taguatinga, Brazlândia, Santa Maria, Planaltina, Estrutural, Gama, Ceilândia, Paranoá, Recanto das Emas, and Sobradinho. A snack was also provided to all visitors who used the buses contracted by FIOCRUZ Brasília.

The groups served with transportation and snacks were either invited by FIOCRUZ Brasília or had contacted the institution to request the service. Strategically, the aim was to balance the presence of, on the one hand, schools and social projects with a history of interactions with FIOCRUZ Brasília and, on the other, those that had never before participated in activities with the institution. The scheduled groups consisted of children and adolescents, from early childhood education to high school, except for one group made up of adults experiencing homelessness.

The importance of ensuring access to the event for these groups, especially those in situations of greater social vulnerability, is evidenced by the fact that only 6.6% of Brazilians have the cultural habit of participating in the SNCT²⁶. Even the most popular science and technology spaces, such as zoos, are visited by only 32.7% of the Brazilian population. However, 60.3%, 76.2%, and 77.9% of Brazilians are interested, respectively, in science and technology, the environment, and medicine/health²⁶.

The contrast between high interest and low participation indicates barriers related not only to distance and lack of transportation, but also to the very supply of science communication,

which is often either scarce or not presented “in the right language and in the ideal format for the target audience”²⁷⁽³⁵⁾. Within FIOCRUZ itself, despite all the advances, many activities are still based on the deficit model²⁸.

According to the characteristics of the group (mainly age), the audience followed a personalized visiting itinerary that included at least three activities during a morning or an afternoon. Even though in smaller numbers, the presence of institution employees who brought their children and of walk-in external visitors, who had heard about the event through the media or acquaintances, was visible.

Team

SNCT 2024 at FIOCRUZ Brasília was planned and carried out under the coordination of the Communications Office (Ascom), in close partnership with the Events Unit (Nueve) and the Pedagogical Advisory Office. All sectors of the unit, however, were called upon to take part in the Week's project. The Health, Environment, and Work Promotion Program (PSAT) and the Epidemiology and Health Surveillance Unit (Nevs) contributed the most. In addition to the scientific consulting provided by researchers, student participation also stood out. Students from Multiprofessional Residency Programs in Health and from the Scientific Vocation Program (Provoc) contributed during the game sessions.

According to Muniz²⁹, universities (and, consequently, research institutions) speak through the scientific articles their researchers publish, the conferences they promote, the news disseminated by their press offices, and so on. Universities and research institutions also speak “through art, music, schools, extension programs”²⁹⁽³⁸⁾, and it is here that science communication initiatives such as SNCT fit in.

Science communication consists of a variety of activities that can be developed by a diversity of agents, such as journalists, educators, social movements, and researchers – in fact, historically, it began to be practiced by scientists themselves³⁰. Today, however, the

public communication of science “does not always originate with scientists and their institutions, nor does it always have as mediator a science communicator, journalist, or professional educator”³¹⁽¹⁷⁾. Although this fact is positive on the one hand, because it illustrates the democratization of speaking about science, on the other hand, it is also associated with the intensification of fake news. In this context, it is, therefore, increasingly important that universities and research institutions reaffirm their role as promoters of science communication.

According to Escobar, however, “no researcher should be forced to do science communication, but all should be encouraged to do so”²⁷⁽³⁴⁾. In the case of SNCT 2024 at FIOCRUZ Brasília, this encouraging role was played by Ascom, Nueve, and the Pedagogical Advisory Office, but the number of mobilized researchers and students was not sufficient for the event to take place.

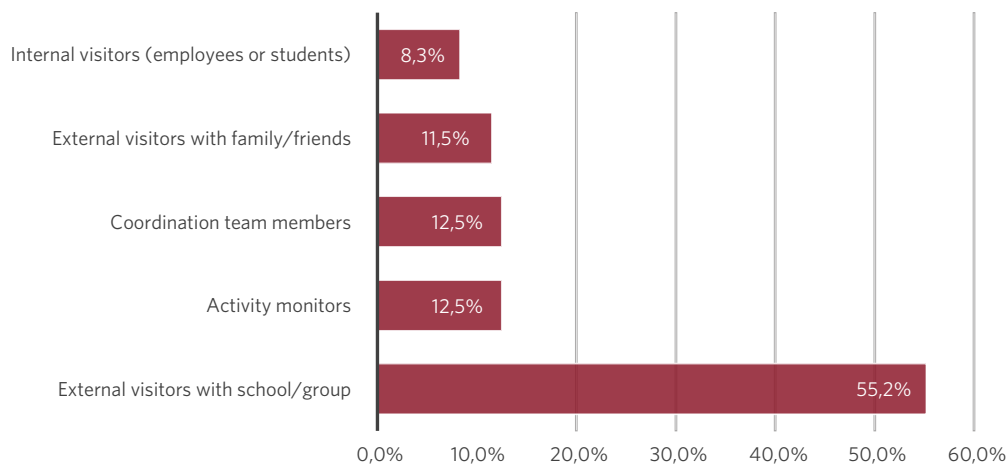
For this reason, external contracted professionals were added to the internal team and

worked on designing the program, organizing activities, welcoming the public, and interacting with visitors by guiding them through the activities. They received brief training, including informational material about the Cerrado and detailed activity scripts with step-by-step instructions and scientific grounding.

Evaluation

Ninety-six responses to the event evaluation form were recorded (*graph 1*). All respondents stated that they would recommend FIOCRUZ Brasília’s science communication activities to other people. Most rated the event as excellent in terms of venue, date, schedule, duration, and program. The activities most appreciated by the public were the theater play, with 34 votes (35.4%), and the digital exhibition, with 29 votes (30.2%). One visitor wrote: “*I liked the play because it was the first time I had ever seen one*” (anonymous visitor 1), reinforcing the social and cultural importance of the event, beyond science communication itself¹³.

Graph 1. Survey respondents (n = 96)



Source: Prepared by the authors.

One of the least appreciated activities was the Zé Gotinha exhibition, with 20 votes (20.8%). However, it cannot be said that there

was rejection of this activity: some respondents, for example, claimed not to have had the opportunity to take part in it, and one

even wrote, “*I liked it, I just liked others more*” (anonymous visitor 2).

Other aspects, however, deserve attention: 24 respondents pointed to the need for more spaces for interaction, indicating that improvements should be made so that the SNCT at FIOCRUZ Brasília becomes more dialogical. For example, at the Integrated Cerrado Week promoted by the Federal Institute of Goiás (IFG), scientific knowledge walked alongside traditional knowledge, “brought by the social subjects who inhabit the Cerrado, such as Indigenous peoples, quilombola communities, and peasants”³²⁽⁵⁹⁾. Cultural diversity and traditional knowledge were addressed at the FIOCRUZ Brasília event, but without representatives from these peoples and communities. The presence of these diverse voices would enrich the event, in keeping with the proposal of a more plural science communication.

Visitors were also asked about their topics of interest: they indicated a wide variety of subjects, the main ones being science and art, and mental health. These indications reinforce the need to experiment and innovate in science communication practices.

Poetry, music, painting, dance, and [...] audiovisual language, oral literature, and the storytelling associated with it signify possibilities for relating reason and heart, feeling and thinking, in the production and transmission of knowledge^{33(m)}.

Finally, participants responded as to why the SNCT 2024 at FIOCRUZ Brasília had been important to them, and the main answers were the opportunity to learn about scientific topics in a fun way (69.8%) and participation in practical and interactive activities (61.5%). It is noteworthy that fewer than 50% of participants identified interaction with specialists as a reason. This finding may be associated with the fact that visitors interacted mainly with external mediators rather than directly with the institution’s scientists. This may indicate a science communication practice that is still conducted ‘for’ the public and not ‘with’ the public. In this case, even though it adopts a more playful and attractive form, the model

of unidirectional transmission of information without social participation is still perpetuated¹⁰.

Final considerations

Most participants approved of the SNCT 2024 at FIOCRUZ Brasília, but there are opportunities for improvement. The activities fulfilled their role of disseminating scientific knowledge on health and the environment to society. Through the combination of science, art, and games, the program’s playful nature was a strong point, as was its ability to receive visitors from different regions of the DF, including those furthest from central Brasília.

The satisfaction observed, however, does not necessarily mean a positive effect on behaviors related to Cerrado preservation or on health decision-making based on scientific evidence. Therefore, more studies are needed on the impacts of science communication activities³⁰, especially regarding their contributions to the promotion of Public Health and the consolidation of the principles of the Unified Health System (SUS).

To further strengthen science communication at FIOCRUZ Brasília, increasing articulation among all sectors and technical areas of the institution is required, so that workers, especially researchers, may become more closely engaged with and appropriate the concepts and practices of science popularization. There is a clear need to develop awareness-raising and training strategies in science communication for researchers and students. In addition, it is important to foster the development and offering of new science communication activities that are increasingly dialogical, grounded in listening and public participation, and aligned with SUS principles.

Authorship contributions

Fernandes MFM (0000-0002-4313-4602)* is responsible for preparing the manuscript. ■

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