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Knowledge and Practices of the "Espada de Fogo": Possibilities for Science Education in Quilombola Schooling

Saberes e fazeres da Espada de Fogo: possibilidades para a Educação em Ciências na Educação Escolar Quilombola

Saber y hacer de la Espada de Fuego: posibilidades para la enseñanza de las ciencias en la educación escolar quilombola

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Abstract: This article aims to reflect about the production of the Espada de fogo as a theme for Education in Science at the school from the Quilombola Community Porto D'Areia, considering the contextualization proposal based on criteria substantiated on Paulo Freire and the Diretrizes Curriculares Nacionais for Quilombola School Education. The theme evidenced possibilities for the contextualization in Education in Science at this community, providing anti-racist education.
Keywords*:* Espada de fogo; Education in Science; Traditional Knowledge.

Resumo: Este artigo tem como objetivo refletir sobre a produção da Espada de Fogo como temática para a Educação em Ciências na escola da comunidade quilombola Porto d'Areia, considerando a proposta de contextualização a partir de critérios fundamentados em Paulo Freire e nas Diretrizes Curriculares Nacionais para a Educação Escolar Quilombola. A temática evidenciou as possibilidades para a contextualização na Educação em Ciências nessa comunidade, proporcionando a educação antirracista.
Palavras-chave*:* Espada de Fogo; Educação em Ciências; Saberes Tradicionais**.**

Resumen: Este artículo tiene como objetivo reflejar sobre la producción de la espada de fuego como temática para la Educación en Ciencias en la escuela de la Comunidad Cimarrona Porto D'Areia, considerando la propuesta de contextualización a partir de criterios fundamentados en Paulo Freire y las Diretrizes Curriculares Nacionais para a Educação Escolar Quilombola. La temática evidenció las posibilidades para la contextualización en la Educación en Ciencias en esa comunidad, proporcionando la educación antirracista
Palabras clave: Espada de fuego; Educación en Ciencias; Saberes tradicionales.

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Initial dialogues

The National Curriculum Guidelines for Quilombola School Education (DCNEEQ), an achievement of the Quilombola Movement, established in 2012, aim to ensure the recognition and appreciation of the identity, culture, and history of Quilombola communities in Brazil. These Guidelines were developed as a way to address the injustices faced by Quilombola communities, with a perspective of historical reparation for social equality for the Black population (Brasil, 2012).

They guide the inclusion of a curriculum that respects, strengthens, and values the cultural and historical specificities of Quilombola communities. They also emphasize the importance of including history, territory, memory, ancestry, and traditional knowledge in a contextualized manner within Quilombola School Education (EEQ). Antônio Bispo dos Santos[3], better known as Nego Bispo, contributes to our understanding by teaching that traditional knowledge, originating from Quilombola, Indigenous, and riverside communities, constitutes a "set of knowledge and practices related to the natural world, orally transmitted within a given community" (Santos, 2022, p. 23).

Thus, according to Lopes et al. (2021, p. 89), it is necessary to envision a curriculum that engages with the community, addressing its specificities. Quilombola School Education (EEQ) is a distinct modality and must meet the local needs of the community. This involves including content that reflects local culture, such as the traditions, struggles, and histories of Quilombola people and, therefore, their ways of producing and transmitting knowledge from generation to generation, which are never static, as "reinterpretations are natural, especially since groups are not isolated." Moreover, these "symbolic contents that sustain the ways of being and living of the communities, grounded in processes of resistance and in their elationship with territory and ancestry" should be integral to the curriculum in Quilombola schools (Lopes et al., 2021, p. 89).

[3] "[...] He is the author of articles, poems, and the books *Quilombos, modos e significados* (2007) and *Colonização, Quilombos: modos e significações* (2015). As a Quilombola leader, he has served in the State Coordination of Quilombola Communities of Piauí (CECOQ/PI) and the National Coordination of Articulation of Rural Black Quilombola Communities (CONAQ). He is notable for his political engagement and activism, which are strongly related to his Quilombola background, evidenced by a worldview through which peoples construct symbols, meanings, and ways of life in defense of their traditional territories. [...] Bispo's thought is built upon the experiences and conceptions of Quilombola communities and the social movements fighting for land (PORFÍRIO, Iago; OLIVEIRA, Lucas Timoteo de. Antônio Bispo dos Santos). *In*: *Enciclopédia de Antropologia*. São Paulo: Universidade de São Paulo, Departamento de Antropologia, 2021. Disponível em: https://ea.fflch.usp.br/autor/antonio-bispo-dos-santos.

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In this way, Quilombola School Education (EEQ) provides a perspective on how teaching should be conducted in schools located in Quilombola territories and/or schools that serve Quilombola students. Regarding this, the National Curriculum Guidelines for Quilombola School Education (DCNEEQ) further advise:

> To engage in dialogue and incorporate traditional knowledge in communication with the global, national, regional, and local contexts, certain dimensions should be centrally included in the curricula of rural and urban schools offering Quilombola School Education throughout its stages and modalities: culture, traditions, orality, memory, ancestry, the world of work, ethnodevelopment, aesthetics, and the struggles for land and territory (Brasil, 2013, p. 442).

Therefore, the importance of the presence of Quilombola traditional knowledge in Quilombola School Education (EEQ) lies in the fact that it constitutes the identities and resistances of Quilombola communities, and its presence contributes to breaking away from the Eurocentrism, urbanocentrism, and racism still present in school curricula. (Quijano, 2005, 2016; Walsh, 2009; hooks, 2013; Santos; Camargo; Benite, 2020; Lopes et al., 2021).

In this way, the school should aim to develop an open curriculum, prioritizing flexible dialogue with the community, in an interdisciplinary perspective that articulates the knowledge arising from this relationship/mediation. Thus, the curriculum is an important element in the process of education (Souza, 2015; Brasil, 2012). However, "there are some silences that need to be considered, especially in the field of Science Teaching." (Damasceno; Souza; Flôr, 2021).

In this sense, Faiad, Lima and Maringolo (2022) suggest that teachers should be able to incorporate a critical and reflective approach in their pedagogical practices, addressing scientific content based on the experiences lived by students in Quilombola communities. This highlights the importance of a Science curriculum that is interdisciplinary and contextualized, aimed at recognizing and valuing this knowledge. This requires that teachers have specific training to work in Quilombola communities or, alternatively, that they are capable of adapting to the realities and dynamics of daily life in these communities.

By including traditional knowledge in Science Education, teachers have the opportunity to incorporate Afro-Brazilian history and culture, specifically from Quilombola communities, into the curriculum. This way, it is possible to develop an approach that enables students to recognize and value the traditional knowledge of their territory. This practice not

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only educates students about school scientific concepts but also contributes to the appreciation, strengthening, and preservation of the cultural traditions of their community.

Furthermore, we can observe, as highlighted by Santos, Camargo, and Benite (2020), when they emphasize the possibility of dialogue between scientific knowledge and traditional knowledge, that

> [...] it is possible to establish a dialogue between scientific knowledge and traditional knowledge in Quilombola education, without hierarchizing one form of knowledge over the other, but rather promoting the coexistence of traditional knowledge and scientific knowledge in Quilombola school education.

By establishing this dialogue in Quilombola School Education, it is not only possible but essential for a contextualized education that values the community's knowledge. According to Santos, Camargo, and Benite (2020), this dialogue allows for the appreciation of Quilombola experiences and culture, without hierarchizing the different forms of knowledge. Thus, education becomes a space for sharing knowledge where science and traditional knowledge complement each other, contributing to the appreciation of the culture of the Quilombola community.

The dialogue proposed in this article is embedded in the voices advocating for the implementation of the DCNEEQ in Quilombola territories in Sergipe, focusing specifically on Science Education. This article is an excerpt from the master's research of the first author, under the supervision of the second. The master's research is part of the project "ENTRELAÇOS DE RES/EX/ISTÊNCIAS[4]": "What do we have and what do we want in Quilombola School Education in Sergipe?" aims to understand the possibilities and challenges encountered in the implementation of Quilombola School Education in Sergipe, considering the perspectives of the school community, Quilombola communities, scientific production in the field, normative and guiding documents at the national, state, and institutional levels, as well as field observations.

The analyses presented here were produced from dialogues with the Quilombola community of Porto d'Areia, in the oldest neighborhood of the city of Estância, located along the Piauí River in the state of Sergipe. Considered the cultural center of Estância, this community is home to the guardians of culture: the fogueteiros, repentistas, and trovadores, who keep alive the tradition of the Barco de Fogo during the June festivities

[4] Coordinated by the co-author of this article and approved by the Research Ethics Committee under the report CEPCONEP n. 5.699.931 (Lopes et al., 2022).

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(Sergipe, 2015). The Barco de Fogo (Fig. 1) is a small boat made of wood and cardboard to which various "Espadas de Fogo" are attached, and through the combustion of the gunpowder contained within them, it travels along a steel cable, providing a spectacular display of colors during its brief journey.

Figure 1 – Barco de Fogo, Day of the Barco de Fogo, Arraiá do Zé Dinato, São João de Estância, June 11, 2022.

Source: Photo by Cassandre Teodoro, 2022. Extracted from: https://infonet.com.br/noticias/cidade/dia-do-barco-de-fogo-de-estancia-e-celebrado- neste-sabado-11/. Accessed on: July 25, 2024.

The Quilombola community of Porto d'Areia is an urban quilombo that possesses both rural characteristics, with beautiful landscapes, and urban features (Sergipe, 2015). In this context, the community represents the strength of ancestry and the importance of traditional knowledge in constructing a collective identity that values a harmonious relationship with nature. Porto d'Areia is considered a place of great significance and Black resistance, being the birthplace of Estância's June culture and cultural and traditional manifestations. (Alves; José, 2021).

In addition, the cultural practices of fireworks and the Barco de Fogo are passed down from generation to generation through oral tradition, keeping alive the knowledge and traditions of the ancestors, which are valued and preserved by the community (Alves; José, 2021). The Barco de Fogo[5] is a cultural manifestation directly linked to the Quilombola community of Porto d'Areia. In 2008, the municipality of Estância was recognized as the "Sergipe Capital of the Barco de Fogo" (Fig. 2), becoming a cultural and historical heritage of the Sergipe people, according to Law No. 7,690. (Brasil, 2008).

[5] It is a historical and cultural asset built in an artisanal manner, of a traditional nature, linked to the June festivities of the city of Estância, state of Sergipe.

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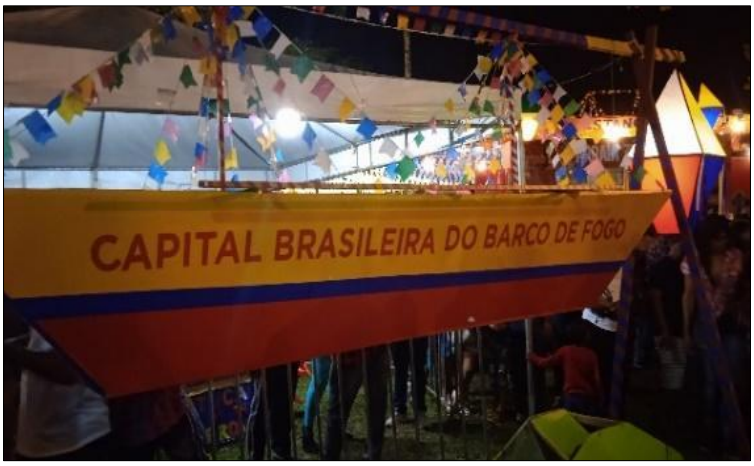
Figure 2 – Display of a Barco de Fogo, Day of the Barco de Fogo, Arraiá do Zé Dinato, São João de Estância, June 11, 2022.



Authorship: Edinéia Tavares Lopes, 2022.
Source: Project Archive. "ENTRELAÇOS DE RE/EX/ISTÊNCIAS", 2022.

It is in the Porto d'Areia community that traditions and traditional knowledge are passed down from generation to generation by the elders, who narrate and share their experiences (Alves; José, 2021), such as the production of the Espadas de Fogo and the Barco de Fogo.

This article aims to reflect on the "Production of the Espada de Fogo" as a theme for Science Education in the school of the Porto d'Areia community. These reflections were produced from the narratives of the fogueteiros of the Porto d'Areia community and the possibilities of their inclusion in the EEQ curriculum, specifically in Science Education, engaging with the references in the field, particularly the criteria developed by Bispo (2018) and Bispo, Lopes, and Lima (2019) for analyzing the textbook adopted in a Quilombola school. The categories used by these authors were constructed based on the Science, Technology, and Society (STS) approach, Paulo Freire's contextualization, and the principles of the DCNEEQ (Bispo, 2018; Bispo; Lopes; Lima, 2019). Thus, our analyses will be guided by the criteria developed from Freire's contextualization and the DCNEEQ.

This investigation has the characteristics of qualitative research (Bogdan; Biklen, 2013), specifically Participatory Action Research (PAR) (Fals Borda, 2010a; 2010b), as this type of study involves the active participation of the subjects (fogueteiros) in the investigative process. PAR should be understood as a process of awareness and emancipation for the participants, allowing the research subjects to actively contribute to all stages of the study. In this way, this active involvement between the researcher and the subjects avoids any hierarchy. Thus, it ensures that the research meets the needs and interests of the community (Fals Borda, 2010a; 2010b). The research was conducted in a Quilombola territory located in the city of Estância,

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Sergipe, in 2023, with the fogueteiros[6] from the community. Data collection included observations and open interviews with three fogueteiros6 from the community. Data collection included observations and open interviews with three fogueteiros. (João[7], Milton[8] e Val[9]), selected by the president of the community association for being considered the most experienced. This approach allowed for an in-depth understanding of the traditional practices and knowledge related to the production of the Barco de Fogo and the Espada de Fogo.

The production oh the Espada de Fogo and Science Education

Our analyses were based on the criteria of Bispo (2018) and Bispo, Lopes, and Lima (2019), comparing the STS approach, Paulo Freire's contextualization, and the foundations of the DCNEEQ. Following Auler, Fenalti, and Dalmolin (2009), we organized the criteria into five categories, namely: "Relevance of the themes," "Scope of the themes," "Emergence of the themes," "Disciplines and/or knowledge involved," and "Relation between theme and content" (Table 1).

Table 1 – Analysis criteria for textbooks based on the STS approach, Paulo Freire's contextualization, and the propositions of the DCNEEQ.

Criteria				
	Categories	**CTS**	**Paulo Freire**	**DCNEEQ**
1	Scope of the themes	Scientific, technological, and social	Social	Socio-historical-cultural, focusing on the ethnic-racial issue.
2	Scope of the themes	Universal themes	Local themes	Local themes
3	Emergence of the themes	Defined by the teacher.	The investigation of reality guides the choice of themes and content.	Participation of the school community.
4	Disciplines and/or knowledge involved	Themes addressed in the Natural Sciences subject, relating them to knowledge from the Social Sciences.	All areas address the themes by articulating them with scientific and cultural knowledge.	All areas centered around the axes or projects.
5	Relation between theme and content	Scientific and technological content is studied alongside discussions of its historical, ethical, and socioeconomic aspects.	Scientific concepts are selected based on the need to be addressed for understanding a real situation.	Articulation between scientific knowledge and the traditional and technological knowledge of the community with the knowledge produced by the broader society.

Source: Extracted from Bispo (2018) and developed by Bispo, Lopes, and Lima (2019) based on the DCNEEQ (Brazil, 2012), Auler, Fenalti, and Dalmolin (2009), and Halmenschlager (2011).

[6] We chose to assign fictitious names to the fogueteiros.
[7] Fogueteiro from the Porto d'Areia Community.
[8] Fogueteiro and also a fisherman from the Porto d'Areia community, but currently only performs the role of fogueteiro.
[9] Fogueteiro and fisherman from the Porto d'Areia Community.

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Having presented the analysis criteria proposed by Bispo (2018) and Bispo, Lopes, and Lima (2019) in Table 1, it is important to note that the analyses presented below were guided by the criteria constructed from Paulo Freire's contextualization and especially by the DCNEEQ.

Knowledge and practices involved in the production of the Espada de Fogo from the Quilombo Porto d'Areia

The production of the Espada de Fogo from the Quilombo Porto d'Areia is an example of traditional knowledge and practices that encompass the community's tradition, resistance, and culture.

In this context, the stages of this artisanal process will be presented, from bamboo harvesting to the final production of the Espada de Fogo. We will showcase the ancestral knowledge that is transmitted between generations, serving as a symbol of identity and resistance.

Harvesting Bamboo

The first stage in the making of the Espada de Fogo is the **"Harvesting of Bamboo."** The bamboo is obtained either from nearby areas of the Porto d'Areia community or through purchase. This harvesting takes place on a specific date, during the first full moon, to ensure that no issues arise; as the saying goes, "if you harvest before the full moon, it will spoil, and if it spoils, you've lost it." This knowledge about the full moon is a traditional practice among the fogueteiros of the Porto d'Areia community. The harvested bamboo is then cut, using a saw, into appropriate lengths, referred to as taboca.

Preparation of Taboca

The "**Preparation of Taboca"**, the second stage, begins with sun drying (Fig. 3), followed by cutting the mouth of the taboca using a saw. After this process, the tabocas are placed in boiling water with salt. According to the fogueteiros, this step ensures that the taboca has greater durability and resistance to weevil damage[10].

[10] Type of insect from the Curculionidae family.

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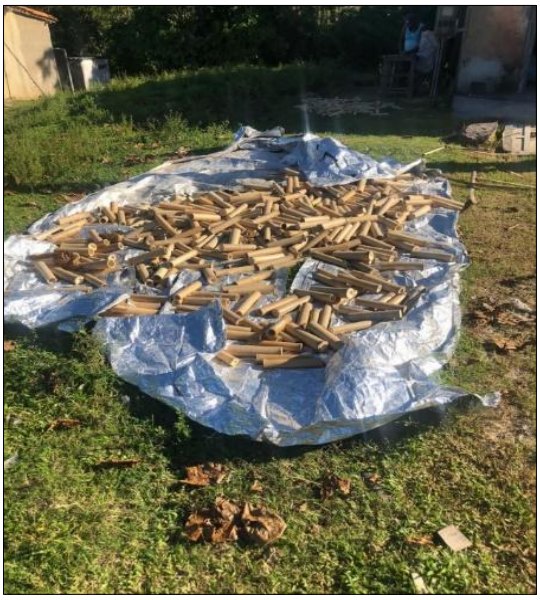
Figure 3 – Drying process of the taboca.



Source: Project "ENTRELAÇOS", 2023.

Salt acts as a natural preservative, contributing to the increased durability of the taboca, as emphasized by the fogueteiro João:

> [...] "I cook mine with salt; it lasts 4-5 years inside the house, and to this day, the tabocas are still there, they don't get infested because they're cooked with salt. The pest doesn't like salt; that little bug doesn't like anything salty. When you cook the taboca, it gets salty, so the bug doesn't come. Every year I do it with salt, and I have no problems at all; I only cook it with salt." (Fogueteiro João, 2023).

We can see that in João's statement, he emphasizes the importance of salt as a natural preservative for the taboca. By cooking the taboca with salt, he prevents the action of pests that could compromise it. This simple yet effective practice demonstrates how traditional methods can be applied to extend the lifespan of natural materials.

Winding of the Taboca

In the process of **"Winding the Taboca,"** the fogueteiros use a string acquired from a factory, which is later unraveled and coated with cerol. The cerol is handcrafted by the fogueteiros using materials such as rosin[11], candle wax, and beef tallow. As described by the fogueteiro Milton, they use "beef tallow[12]". He emphasizes the importance of the tallow, as

[11] It is a natural resin extracted from the secretion of certain plants..
[12] It is fat.

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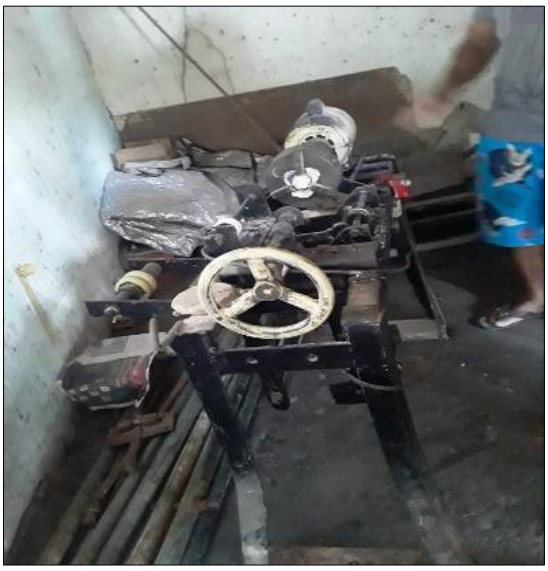
without it the string would become fragile and limp. This artisanal process ensures the strength and durability of the string, which are essential for the precise winding of the taboca.

In this process of winding the taboca, the fogueteiros employ different strategies to carry out this stage. According to the fogueteiro Val, some do the entire process manually, while others use machines to assist. For example, the fogueteiro João uses a specific machine (Fig. 4) to facilitate the winding of the taboca. In this process, he carefully positions the tabocas in the machine and performs the winding, while another person applies the cerol to the string. It is important to note that this machine was created by a fogueteiro.

Figure 4 – Taboca Winding Machine



Source: Project "ENTRELAÇOS", 2023.

During the demonstration of this stage, we observed a variation in the spacing of the string in different parts of the taboca. At the bottom, where the person will grab the Espada de Fogo, the strings are wound very close together. In the other section, where the gunpowder is located, the strings are wound farther apart.

The fogueteiro Milton explained that this variation is strategic: "We make this separation in the string because, when we go to pack it, we already know that the clay is from here to here, the area where the string is very close together, and the gunpowder is from here to here, where the string is farther apart" (Fogueteiro Milton, 2023). In other words, the area where the string remains closer together, where the clay will be placed, corresponds to the spot where the person holds the Espada de Fogo. Therefore, the fact that the string is wound more closely contributes to safety during the use of the Espada de Fogo, preventing the taboca from breaking and injuring the hands of the fogueteiros.

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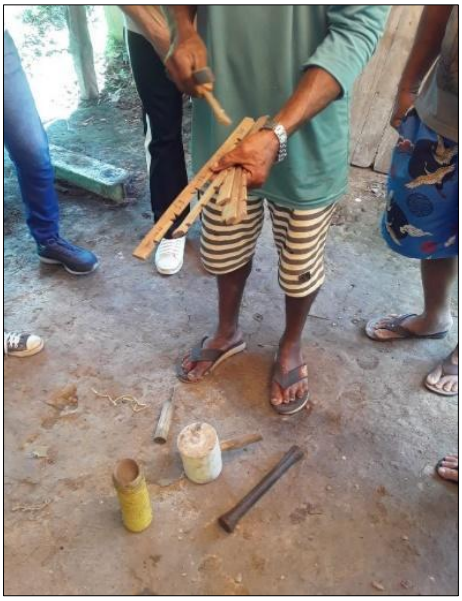
Adjusting the Taboca

We move on to the fourth stage, which consists of **"Adjusting the Taboca."** "Adjusting" the taboca involves making an opening at one end. During the use of the Espada de Fogo, the combusting gunpowder exits through this opening. This opening is important to ensure that the taboca does not break during the use of the Espada de Fogo.

The hole is made using a specific tool, referred to by the fogueteiros as "Parte" (Fig. 5). The "Parte" is a standard measurement produced by the fogueteiros that ensures uniformity in the opening of the taboca.

Figure 5 – Fogueteiro holding the "Part."



Source: Project "ENTRELAÇOS", 2023.

First Packing

In the fifth stage of the process, referred to in this article as **"First Packing,"** as indicated by the name, clay is added to the interior of the taboca, in the part corresponding to where the fogueteiros hold the Espada de Fogo. The specific type of clay used in this process comes from the city of Itabaianinha, Sergipe, known as brick clay. This clay is compacted using a tamper to ensure an even application. It is packed down to accommodate the gunpowder in the next stage.

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Preparation of the Gunpowder

The **"Preparation of the Gunpowder,"** the sixth stage, is a process that involves mixing three materials, namely: saltpeter[13], sulfur and charcoal, in order to obtain the gunpowder in the end (Fig. 6).

Figure 6 – Sample of the finished gunpowder.

Source: Project "ENTRELAÇOS", 2023.

In the production of gunpowder, a 25 kg bag of saltpeter is used, to which 5 kg of sulfur is added[14] and 5 kg of charcoal. To start the mixing process, water or cachaça is added to the combination, and then the phase of stomping[15] the mixture starts. The fogueteiro emphasizes that the choice between water or cachaça makes a significant difference in the result of the gunpowder. According to him, using cachaça gives the mixture greater potency. As highlighted by fogueteiro Milton, using water or cachaça really makes a difference.

> [...] because cachaça has alcohol in it, mixed with the gunpowder, when you stomp it with the alcohol, it goes "fluuuuup." Sometimes, when that cachaça evaporates, it goes out. And when it's stomped with water, if you try the gunpowder and set it on fire, you'll see that it doesn't burn the same way; it stays as it is at the end, because it was stomped with water (Fogueteiro Milton, 2023).

[13] Mineral composed of the inorganic compound with the formula KNO_3 (Faria; Filgueiras, 2021).
[14] "It is a yellow solid with a characteristic odor.
[15] The terms "pisar" (to step) and "pisada" (step) are used here as by pyrotechnicians to demonstrate the process of pressing gunpowder

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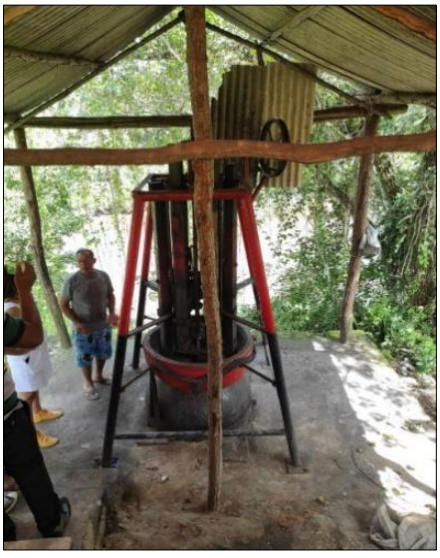
The fogueteiro also emphasizes that

> [...] when it comes time to put it in the taboca, it has to be with cachaça, because it will ferment. After filling it, it will take three days to ferment. When you fill a fire like this and place it in the corner, in 10 minutes you'll notice the taboca is hot; that's the fermentation happening—it takes three days to ferment (Fogueteiro Milton, 2023).

In this specific context, when adding cachaça, the taboca should be left to ferment for a few days. They mention that fermentation occurs, but in a broader sense, it signifies a process of change.

In the process of stomping the gunpowder, some fogueteiros choose to do it manually, stomping by hand, while others use a specific machine (Fig. 7) developed by a fogueteiro named Jorge. This machine was built to automate the entire process of stomping gunpowder. It consists of six columns that move sequentially up and down, a wheel that controls the movements of the columns, and a central support that rotates to ensure the homogenization of the gunpowder. This process in the machine is quick to prevent the gunpowder from cooling.

Figure 7 – Gunpowder Stomping Machine.



Source: Project "ENTRELAÇOS", 2023.

After the gunpowder is stomped, the fogueteiros perform a quality test by igniting a small sample. Then, it undergoes a screening process to ensure uniform consistency. The fogueteiros emphasize that this procedure should be carried out in an isolated location, free from external interference. They handle the gunpowder using a plastic scoop, avoiding metal

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tools that may contain residues capable of igniting the gunpowder, posing a safety risk. After screening, the gunpowder is ready to be used in the production of the Espada de Fogo. When adding the gunpowder to the taboca, it is left to rest for five days. After this period, fire is used to complete the preparation.

Closing the Taboca

In the seventh stage, referred to as **"Closing the Taboca,"** a quantity of clay is added just above the gunpowder to seal the base. Next, a "powder" is added on top of the clay. The type of powder used corresponds to the colors that each Espada de Fogo will produce during its use. Following this, the taboca is closed using a "colored mouth." The "colored mouth" consists of colored plastic tied with an elastic band at the upper end of the Espada de Fogo. The colors of this plastic correspond to the color that the salt, referred to by the fogueteiros as "powder," will emit during the combustion of the gunpowder.

Production of the "Espada de Fogo" as a Theme for Science Education

In this section, we will analyze, based on the criteria proposed by Bispo (2018) and Bispo, Lopes, and Lima (2019) within the framework of Paulo Freire's approach and the DCNEEQ, as summarized in Table 2, the five categories proposed by Auler, Fenalti, and Dalmolin (2009) and by Halmenschlager (2011). It is important to note that, in our understanding, the assumptions underpinning the DCNEEQ (Brasil, 2012) are closely linked to Freirean thought; however, these guidelines also address the ethnic-racial specificities of quilombola communities.

Table 2 – Analysis Criteria for the Theme of Espada de Fogo Based on Paulo Freire's Contextualization and the Propositions of the DCNEEQ

	Categories	Paulo Freire and DCNEEQ
1	Relevance of themes	Socio-historical-cultural, with a focus on ethnic-racial issues
2	Scope of the themes	Local themes
3	Emergence of themes	The investigation of reality guides the choice of themes and content, with the participation of the quilombola community.
4	Disciplines involved	All areas address the themes, axes, or projects by integrating scientific knowledge with traditional knowledge
5	Relation between theme and content	Selection and dialogue between the community's traditional and technological knowledge and school scientific knowledge, aiming to understand a real situation.

Source: Synthesis prepared by Santos and Lopes (2024) based on Bispo (2018) and Bispo, Lopes, and Lima (2019) from Auler, Fenalti, and Dalmolin (2009) and Halmenschlager. (2011).

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The analyses presented here were produced through dialogues with the fogueteiros from the quilombola community of Porto d'Areia during the process of producing the Espada de Fogo.

The "Production of the Espada de Fogo" is a theme that holds socio-historical-cultural relevance with a focus on ethnic-racial issues, thereby meeting the criteria outlined in the category "Relevance of Themes." The production of the Espada de Fogo can be viewed as a form of popular education and awareness, where the traditional knowledge of the fogueteiros is passed down orally from generation to generation. This reflects Freire's method of learning based on practice and lived experience, emphasizing the social aspect (Freire, 1996, 1979).

Still considering the DCNEEQ, the production of the Espada de Fogo can be seen as an expression of quilombola identity, as well as an example of how traditional cultural practices are preserved and valued, being transmitted through oral tradition. Thus, the production of the Espada de Fogo is not merely a traditional practice; it represents a symbol of cultural resistance, traditional knowledge, and social inclusion, aligning with Paulo Freire's educational principles and the objectives of the DCNEEQ to value and strengthen ethnic-racial diversity in the school and community context (Brasil, 2012). Undoubtedly, this contributes to the appreciation of the cultural expressions of this community. Valuing quilombola culture and history represents a commitment to an anti-racist education, which strengthens the identity of the quilombola community. In this context, the contextualization of their processes contributes to the construction of a more just and equitable Society.

Regarding the category "Scope of Themes," Freire (1996) inspires us by emphasizing the importance of contextualizing learning based on local reality and the lived experiences of students. In the production of the Espada de Fogo, this approach is evident in valuing the traditional knowledge of the fogueteiros, which is passed down orally through ancestral knowledge related to handling bamboo (taboca), preparing the taboca, producing gunpowder, and fabricating the Espada de Fogo.

In the context of the DCNEEQ, the aim is to promote an education that respects and values the history, culture, and specificities of quilombola communities, and the production of the Espada de Fogo stands out as a significant expression of the cultural identity of this community. In our view, at the quilombola school of the Porto d'Areia community, the inclusion of this theme in the curriculum not only enriches students' learning about their own traditions but also fosters respect for ethnic-racial and cultural diversity. In this context, "an open curriculum is not exclusive to Quilombola Education; however, due to its specificities, it becomes an even more conducive field for its implementation." (Brasil, 2012, p. 461).

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Thus, the approach to the production of the Espada de Fogo, according to Freire and the DCNEEQ, is characterized by valuing local knowledge, developing community autonomy, and constructing an education that is inclusive and contextualized with local cultural and historical realities (Brazil, 2012; Freire, 1996). Therefore, the production of the Espada de Fogo meets the criterion of "Scope of the Theme" and its inclusion in Science Education within this community. Silva (2016, p. 14) describes Quilombola Education as a "living education that arises from the knowledge of the people themselves, to return to that same people what has been denied to them." This education values, recognizes, strengthens, and shares local knowledge and wisdom, without abandoning universal knowledge. Education should seek emancipation and become a tool for struggle, promoting social justice and equity (Brasil, 2003). The development of a curriculum that meets the needs of quilombola communities is essential.

The third category, "Emergence of Themes," in the context of Freire, is directly related to his methodology of investigating reality. Freire (1979) argues that the educational process should begin with a critical and reflective analysis of local conditions and the experiences lived by people. In this context, the choice of themes should be oriented by the concrete reality of students. In the case of the production of the Espada de Fogo, this approach involves recognizing and valuing the traditional knowledge of the fogueteiros. Thus, teaching this traditional practice not only preserves local culture but also promotes awareness of its significance.

When considering knowledge and directing learning towards the construction of a contextualized curriculum, Silva (2020, p. 88) states that "the existence of a quilombola community education should inspire and engage in dialogue with school education." This facilitates a learning process where students can relate what they are studying to their own experiences and the realities of their community, serving as a means to overcome such inequalities.

In the approach of the DCNEEQ, the participation of the school community is a fundamental principle. These guidelines were established to ensure that education in quilombola schools is embedded in the social, cultural, and economic context of the community. In the process of producing the Espada de Fogo, the participation of the school community means involving fogueteiros, community leaders, and other members of the community in the development and design of the school curriculum (Brazil, 2012). In light of this, the production of the Espada de Fogo emerges as a significant theme due to its connection with the local and cultural reality of the Porto d'Areia community.

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Regarding the category "Disciplines Involved," in Freire's approach, the production of the Espada de Fogo encompasses disciplines that integrate scientific and cultural knowledge, following his methodology of problematizing and integrative education. In the framework of the DCNEEQ, all areas of knowledge are integrated around axes or projects that value the history, culture, and identity of quilombola communities. Thus, the production of the Espada de Fogo has the potential for integration across various disciplines, promoting an education that engages with scientific knowledge linked to traditional wisdom, providing students with a contextualized understanding of the practice of producing the Espada de Fogo.

Finally, regarding the "Relation Between Theme and Content," the production of the Espada de Fogo facilitates the articulation of themes and content in an interdisciplinary and contextualized manner, where scientific concepts are selected based on the need to understand a specific real-life situation. This approach includes a dialogue between school scientific knowledge and the traditional and technological knowledge of the community. It enables a learning experience where students not only acquire theoretical knowledge but also apply that knowledge practically in their lives. In this context, "the curricular proposal of Quilombola School Education will therefore incorporate traditional knowledge from quilombola communities in conjunction with school knowledge, without hierarchization" (Brasil, 2012, p. 442). In line with this thinking, Silva (2020, p. 92) reflects that the

> [...] quilombola school education draws from quilombola community education to integrate as an element of strengthening, reproducing, and innovating community traditions and territorial organization, aiming to reduce hierarchies without detriment or overlaps.

In this way, in quilombola schools, contextualization can involve the incorporation of traditional knowledge, cultural practices, and local insights, enriching the curriculum and making education relevant to the students' everyday lives.

The curriculum should reflect the representations of the community and traditional knowledge, not limited to the predominant scientific knowledge in Basic Education (Santos, Camargo, Benite, 2020). For example, Santos, Camargo, and Benite (2020) used the teachings of the griots[16] from the quilombola community to discuss concepts such as temperature, heat, and thermal sensation in a practical and engaging way, promoting a dialogue between traditional knowledge and scientific understanding.

[16] They are masters who carry knowledge and practices that preserve culture, with their wisdom transmitted through oral tradition.

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In the context of the practices involved in the production of the Espada de Fogo in the Quilombo Porto d'Areia, valuing culture and cultural traditions is essential. This community, known for its production of fireworks and its cultural June festivities, offers a rich opportunity to integrate traditional knowledge into Science Education. The teachings of the fogueteiros, through the dialogue between traditional knowledge and school scientific knowledge, can contribute to the teaching and learning of concepts such as combustion, material properties, exothermic systems, energy conduction, physical properties, chemical reactions, cultural traditions, and units of measurement, for example.

Nego Bispo further enriches our reflections (2023) by highlighting the importance of orality and ancestry in cultural preservation and in confronting historical oppressions. It is essential that quilombola knowledge is not devalued but included in a way that acknowledges the significance of a transgressive education, as emphasized by hooks (2013) and Freire (1967).

Bispo, Lopes, and Lima (2019) emphasize the need for educational policies that value and strengthen quilombola communities, ensuring access to quality education that considers their cultural and historical specificities. To achieve this, the curriculum must engage with the community and reflect its needs, incorporating dimensions such as culture, traditions, orality, memory, ancestry, and struggles for land and territory (Brasil, 2013). And, In this case, it is essential to consider a curriculum that engages with the community, addressing its specificities, so that Quilombola School Education (EEQ) has a differentiated curricular matrix that reflects the unique needs and realities of the community When

> dialoguing and integrating traditional knowledge with global, national, regional, and local contexts, several dimensions should be central in the curricula of rural and urban schools offering Quilombola School Education throughout its stages and modalities: culture, traditions, orality, memory, ancestry, the world of work, ethnodevelopment, aesthetics, and struggles for land and territory (Brasil, 2013, p. 442).

Therefore, Quilombola School Education should be viewed as a fundamental area for investigation and action, highlighting the importance of representativity in educational practices. In Science Education, the need for pedagogical approaches that respect and include cultural and social diversity becomes evident.

In summary, we conclude, based on the analyses conducted, that the production of the Espada de Fogo presents various possibilities for its establishment as a theme in Science Education in the Porto d'Areia community school because the topic...:

- has socio-historical and cultural relevance, with a focus on ethnic-racial issues.;
- presents local scope, focusing on the ethnic-racial specificities of the community.;

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- arises from the investigation of reality and guides the selection of themes and content with the participation of the quilombola community.;
- enables all areas of school knowledge to engage in dialogue with traditional knowledge, seeking to understand a real-life situation.

Final dialogues

This article aimed to reflect on the "Production of the Espada de Fogo" as a theme for Science Education in the Porto d'Areia community school, as well as in other educational institutions, fostering dialogue between traditional knowledge and school knowledge.

The proposal to present in this article the practices of producing the Espada de Fogo by the fogueteiros of the Porto d'Areia quilombola community in Estância, Sergipe, is based on the idea of the quilombo as a formative space for knowledge production. As demonstrated, the process of producing the Espada de Fogo, from bamboo harvesting to the completion of the process, along with the analyses grounded in the contextualization proposed by Freire and the DCNEEQ, indicates that the production of the Espada de Fogo offers various possibilities for establishing it as a theme in Science Education at the Porto d'Areia community school.

By utilizing the practices of producing the Espada de Fogo, educators can not only teach about the scientific principles involved in the production but also explore the relationship between science and culture. Additionally, this approach stimulates reflection on the connection between scientific knowledge and traditional know-how, providing socio-historical and cultural relevance with a focus on the ethnic-racial issues of the community. It also facilitates the dialogue between traditional knowledge and school knowledge.

In this way, the knowledge and practices related to the Espada de Fogo are considered a theme for Science Education, challenging the predominant Eurocentric model in the educational curriculum. This approach integrates the traditional knowledge of quilombola communities into the curriculum of EEQ, contributing to the production and development of diverse forms of knowledge.

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