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Pedagogical intervention for the promotion of scientific literacy in girls deprived of liberty[1]

Intervenção pedagógica para a promoção da alfabetização científica em meninas privadas de liberdade

Intervención pedagógica para la promoción de la alfabetización científica en niñas privadas de libertad

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Abstract

When considering education as an essential right to the progress of adolescents who are socio-educational, the teaching and learning process should be adapted to the conditions required by this scenario, the promotion of Scientific Literacy. In this bias, the objective of this study was to discuss about a pedagogical intervention applied in the teaching and learning process of girls in deprivation of liberty focusing on the promotion of Scientific Literacy. The qualitative research of pedagogical intervention was materialized through a Didactic Sequence that addressed the Sustainable Development Goals over five meetings. The subjects involved were five female adolescents, who were in compliance with socio-educational measures, aged 12 to 18 years. The results show evidence of construction of knowledge by the participants, as well as the reach of all indicators of Scientific Literacy considered (seriation of information, organization of information, classification of information, logical reasoning, proportional reasoning, hypothesis survey, hypothesis test, justification, prediction and explanation). It is inferred, therefore, the need to provide conditions for girls deprived of liberty to develop skills and abilities related to the teaching and learning process through activities that instigate analysis of a problem and critical reflection, stimulating them to the construction of knowledge and respect for divergent opinions.

Keywords: Agenda 2030. Teaching and learning. Citizen training.

Resumo

Ao se considerar a educação como um direito essencial ao progresso dos adolescentes que se encontram em medida socioeducativa, o processo de ensino e aprendizagem deve ser adaptado às condições exigidas por este cenário, essencialmente, quando voltado para a promoção da Alfabetização Científica. Nesse viés, o objetivo deste estudo foi discutir sobre uma intervenção pedagógica aplicada no processo de ensino e aprendizagem de meninas em privação de liberdade com foco na promoção da Alfabetização Científica. A pesquisa qualitativa de intervenção pedagógica foi materializada por meio de uma Sequência Didática que abordou os Objetivos de Desenvolvimento Sustentável ao longo de cinco encontros. Os sujeitos envolvidos foram cinco adolescentes do sexo feminino, que se encontravam em cumprimento de medida socioeducativa, com faixa etária de 12 a 18 anos de idade. Os resultados mostram evidências de construção de conhecimentos pelas participantes, bem como o alcance de todos os indicadores de Alfabetização Científica considerados (seriação de informações, organização de informações, classificação de informações, raciocínio lógico, raciocínio proporcional, levantamento de hipóteses, teste de hipóteses, justificativa, previsão e explicação). Infere-se, portanto, a necessidade de oferecer condições para que meninas privadas de liberdade desenvolvam competências e habilidades relacionadas com o processo de ensino e aprendizagem por meio de atividades que as instiguem à observação, à análise de um problema e à reflexão crítica, estimulando-as à construção de conhecimento e o respeito às opiniões divergentes.

Palavras-chave: *Agenda 2030. Ensino e aprendizagem. Formação cidadã.*

Introduction

In Brazil, children and adolescents are recognized as subjects of rights and occupy a unique developmental condition with absolute priority. In this context, their protection is a duty incumbent upon the family, society, and the State. This obligation is enshrined in Law No. 8,069, dated June 13, 1990, which establishes the Statute of the Child and Adolescent (ECA). In addition to the legal provisions safeguarding children and adolescents, the statute prescribes penalties for cases in which they commit infractions (Brazil, 1990).

The Federal Constitution of Brazil, promulgated in 1988, in Article 228, establishes that individuals under the age of 18 are criminally non-responsible, that is, they cannot be legally convicted (Brazil, 1988). Accordingly, adolescents aged between 12 and 18 who commit an infraction are subject to socio-educational measures designed to hold them accountable for their actions. Such measures must be implemented within specialized educational institutions that comply with the provisions set forth in Article 94 of the ECA, ensuring adolescents the right to education, vocational training, healthcare, religious observance, culture, sports, and leisure, akin to any individual within their age group (Brazil, 1990).

Within this framework, considering education as an essential right for the development of adolescents under socio-educational measures, the teaching and learning process must be adapted to the conditions imposed by this context, particularly when aimed at fostering Scientific Literacy (SL). For instance, Claudio (2015) proposes exploring diverse strategies to foster accountability among incarcerated students through education, as well as encouraging their full engagement with and appropriation of constructed knowledge.

Promoting SL through the lens of sustainability, for example, contributes to the social inclusion of all participants in the educational environment, fostering social development and critical thinking among students, educators, and community leaders, while also encouraging professional conduct grounded in citizenship and the individual's social role (Sgarbi; Schlosser; Campani, 2013).

Moreover, it is noteworthy that global attention is currently focused on the 2030 Agenda, which represents a milestone in a trajectory of numerous international commitments undertaken by countries in the realm of sustainability, with particular emphasis on the Sustainable Development Goals (SDGs) (UN, 2015). These SDGs encompass 169 interconnected and indivisible targets that address economic, social, and environmental dimensions across various contexts. In this regard, the 2030 Agenda aspires to achieve transformative outcomes concerning participation and social change, emphasizing the critical importance of both local and global engagement by all individuals in matters affecting societal life (Araújo; Silva, 2024; Silva; Araújo, 2024).

Accordingly, for the dissemination and advancement of the SDGs, Saito (2021) highlights the necessity of adopting a conception of SL oriented towards grasping interdependencies and understanding their dynamics, as SL serves as a foundation for a systemic perspective on relationships among individuals and between individuals and the environment, thereby requiring the identification and comprehension of the various levels of these relationships.

Silva and Sasseron (2021) argue that promoting SL as a formative perspective, whereby students engage with elements of scientific culture, facilitates the incorporation of social norms and practices inherent to this domain, enabling their application in evaluation and decision-making processes in students' daily lives. Consequently, what was formerly perceived merely as content is transformed into meaningful knowledge with practical applicability in students' lives.

Given this context, and considering that the pedagogical axes of the National Socio-educational Assistance System Law (SINASE) mandate the development of workshops or educational activities that support the civic education of adolescents deprived of liberty, this study aims to discuss a pedagogical intervention applied in the teaching and learning process of girls deprived of liberty, with a focus on promoting Scientific Literacy. To this end, the methodological design employed is presented, emphasizing

the description of the pedagogical intervention, the development of the Didactic Sequence, and the analysis of its implementation, followed by sections on results and discussion, as well as final considerations.

Methodological Design

General Aspects of the Research

This article stems from a master's dissertation submitted to the Graduate Program in Science and Mathematics Education at the Federal University of Rio Grande do Norte (UFRN). The present study is characterized as qualitative research employing a pedagogical intervention approach. In this regard, Damiani et al. (2013, p. 58) argue that pedagogical intervention research "involves the planning and implementation of targeted interferences aimed at advancing and improving the learning processes of participants, followed by an assessment of the outcomes of these interferences." Accordingly, this study proposes a pedagogical intervention, operationalized through a Didactic Sequence (DS) aligned with the Sustainable Development Goals (SDGs). This thematic focus is justified by the imperative that, by 2030, all children and adolescents must acquire the knowledge and skills required to foster sustainable development (UN, 2015).

The pedagogical intervention was developed with reference to Law No. 12,594 (SINASE, Brazil, 2012), which, within its educational axis, permits the implementation of pedagogical activities through workshops tailored to the specific circumstances of participants and oriented towards improving the realities of adolescents subject to socio-educational measures, grounded in civic education for social participation.

The preparation of the DS was guided by the recommendations of Zabala (1998, p. 18), who conceptualizes the DS as "a set of activities that are ordered, structured, and articulated to achieve specific educational objectives, known to both teachers and students." Additionally, Aguiar and Fachín-Terán (2020) emphasize that the primary aim of the DS is to develop knowledge about one or more topics.

The activities were conducted according to the following steps:

1) Presentation of the context: The content to be addressed was introduced to the girls in a dialogical manner, alongside an explanation of the stages of the DS to be developed throughout the sessions.
2) Initial production: A diagnostic assessment was conducted, during which the girls orally shared their prior knowledge of the content in a discussion circle.
3) The sessions: These consisted of workshops in which topics and content related to the SDGs were explored.
4) Final production: The development of the girls was assessed based on their participation and progress throughout the workshops.Final production: The development of the girls was assessed based on their participation and progress throughout the workshops.

In the first session, a discussion circle was held to gauge the girls' prior knowledge of the SDGs. In the subsequent session, the objective was to create opportunities for research and debate on the SDGs and their respective targets, as well as to systematize this knowledge through an expository and dialogical lesson.

In the following sessions, activities were designed to help the girls understand the concepts of poverty and hunger eradication. Additionally, the topic of gender equality was addressed, providing them with the opportunity to reflect on the importance of fostering a culture of greater equality. These discussions included reflection circles, moments for critical thinking, and, ultimately, the writing of letters to their friends about the empowerment of all women and girls. To conclude, a diagnostic assessment was conducted to evaluate the learning outcomes and knowledge constructed.

All research participants signed a Free and Informed Assent Form (TALE), a Free and Informed Consent Form (RCLE), and an Authorization Form for the Use of Voice and Image. The research was submitted to the

Ethics Committee of the Federal University of Rio Grande do Norte (UFRN) via the Plataforma Brasil and received approval under opinion number 5.185.194.

Research Setting and Participants

The research was conducted in the city of Manaus, the capital of the state of Amazonas, at a Female Socio-Educational Detention Center (CSIF). The choice of this particular socio-educational setting was influenced by the professional ties of the researcher to the environment, which enabled continuous engagement with the context under investigation.

At the time of the research, the CSIF had a multidisciplinary team dedicated to the implementation of proposed activities. The professionals in direct contact with the adolescents comprised a team of specialists, including Social Workers, Nurses, Pedagogues, Psychologists, and Socio-Educational Agents (AS).

The AS is a professional responsible for assisting adolescents in state custody. Consequently, they play a crucial role in ensuring the safety and physical integrity of the adolescents and of the professionals working within the Socio-Educational Center. This professional function entails frequent and comprehensive interactions with the adolescents deprived of liberty

The participants in this study were five (5) female adolescents, aged between 12 and 18 years, who were serving socio-educational measures under the regimes of detention and semi-liberty. To protect the identity of the participants in the transcription of their statements, the initials M1, M2, M3, M4, and M5 were used throughout.

Data Collection

In order to understand the reality under investigation, the instruments used are fundamental tools for data collection within the research process. According to Marconi and Lakatos (2003), the techniques employed in scientific research are directly related to the research problem, and their selection depends on several factors, such as the research objective, financial resources, the nature of the phenomena under study, among others.

Observations were carried out five times per week (from Monday to Friday) during both morning and afternoon shifts, coinciding with the implementation of the DS with the participants. During this period, a field notebook and a voice recorder were used to document the information collected. Furthermore, the presence of Scientific Literacy (SL) indicators in each of the sessions was identified, based on the indicators proposed by Sasseron and Carvalho (2008) (Table 1).

Table 1 – Indicators of Scientific Literacy

Indicator	Description
Sequencing of Information	Refers to the establishment of foundations for investigative action.
Organization of Information	Emerges when existing data about the problem under investigation are prepared.
Classification of Information	Occurs when an attempt is made to establish characteristics for the data obtained.
Logical Reasoning	Involves how ideas are developed and presented..
Proportional Reasoning	Appears when the structure of thought is demonstrated.
Formulation of Hypotheses	Indicates moments when suppositions about a given topic are proposed.
Testing of Hypotheses	Refers to the stages in which the previously formulated suppositions are tested.
Justification	Arises when a justification is offered to support any given assertion.
Prediction	Occurs when a logical forecast is made based on the data and or facts encountered..
Explanation	Occurs when an action and/or phenomenon is associated with certain events.

Source: Sasseron; Carvalho (2008).

It is also noteworthy that the presence of one indicator, among those established by the authors, does not preclude the manifestation of another within the same activity. During the arguments presented in the educational setting—where students attempt to explain or justify an idea—it is likely that the indicators

provide support and reinforcement to the explanation being made, thereby enabling the student to develop multiple skills simultaneously.

Data Analyses

Regarding the analysis of the data collected, Bardin's (2016) content analysis was used. According to the author, content analysis unfolds in three phases: pre-analysis, material exploration, and the treatment of results. The pre-analysis phase involves organization, during which the researcher selects the documents to be analyzed. Among the activities recommended by Bardin (2016) to be carried out at this stage are: skimming reading, selection of documents, formulation of hypotheses, and the development of indicators for result interpretation (Silva & Fossá, 2015). Therefore, in this phase, we organized all the selected materials.

In the material exploration phase, paragraphs from each interview, as well as texts from documents or field diary notes, are broken down into recording units (Bardin, 2016). These divisions are necessary to identify the keywords that will give rise to the initial categorization. Once this stage is complete, the treatment of results and interpretation of data begins. In Bardin's (2016) view, during data interpretation, it is essential to return to the theoretical framework, adapting it to the investigation, as it provides the foundations and significant perspectives for the study.

Results and discussion

The study demonstrated the construction of knowledge throughout the implementation of the Pedagogical Intervention, enabling the identification of all the Scientific Literacy (SL) indicators outlined by Sasseron and Carvalho (2008), namely: sequencing, organization and classification of information, logical reasoning, proportional reasoning, formulation of hypotheses, justification, prediction, and explanation.

During the first session, a discussion circle was held to introduce the topic of the SDGs, aiming to identify and recognize their importance, as well as to assess the girls' prior knowledge on the subject. The conversation circle was prompted by the following questions: "What are the SDGs?", "Have you ever heard about the SDGs?", "What do you think needs to improve in the world so that people, animals, plants, and the planet itself can live well?"

At first, the girls lowered their heads and remained silent until M1 raised her hand and said:

> M1: "Miss, I'm not sure, but, like, I think they are laws that must be followed to end hunger and take care of the environment.".

In the same vein, the participants responded to the last question with comments such as:

> M1: "Dispose of waste properly and take care of the environment.".
> M2: "Miss, the world needs more peace and less injustice."
> M3: "To live well we need jobs. If I had a job, I wouldn't haven stolen and I wouldn't be here."
> M4: "To live well, we need at least a decent job.".
> M5: "I don't know how to answer... I think to live well we need a good house and not to go hungry."

In the responses, issues linked to the environment (waste), work (employment and income), peace, food (hunger), and housing emerged. All these demands raised by the girls are part of the universe of the SDGs, including specific goals and targets for each of the problems they identified. In this sense, we agree with Vygotsky (1991), who warns that prior knowledge consists of what individuals already possess, constructed from their life histories. The author further highlights that this knowledge is imbued with beliefs and values and should therefore be considered in the learning process, as, from birth, human development is intertwined with learning through interactions and relationships established within their environment.

Oliveira, Fonseca, and Fachín-Terán (2020) contribute to this perspective by asserting that understanding the prior knowledge individuals already possess is an extremely important step in cognitive development, as the knowledge existing within their cognitive structures will serve as a basis for building new concepts. Through these pre-existing understandings, "the educator can identify the necessary interventions to be implemented" (Silva, 2020, p. 85).

Consequently, we used the video "The UN Has a Plan: The Global Goals" to expand the participants' understanding of the SDGs. It is important to note that this audiovisual production illustrates various possibilities for teaching children and adolescents about the objectives and targets established by the 2030 Agenda, reinforcing their importance in understanding the strategies underpinning the actions led by the UN. After viewing the video, we asked the girls what they understood from its message about the SDGs, and we obtained the following responses:

> M1: If everyone does their part, our planet will be grateful. We are the ones who need it...
> M2: I will at least try to do my part for the SDGs!
> M3:This is only on paper; no one knows about it!
> M4: Miss, people aren't united! By 2030, no one will be able to achieve that... The fight against inequality is something that must be done together.
> M5: These laws are the possibility of protecting our planet.

It is considered that the initially timid responses are natural, especially given that it was the first meeting and considering the context of deprivation of liberty, where interaction with the researcher represents a new experience in the daily reality and dynamics of the participants. Continuing the session, in another dialogue recorded after the video screening, an environmental and social awareness can be identified in the statements of M1 and M2:

> M1: I will no longer waste food.
> M2: Miss, since we are forced to wake up before the shift to take a shower, many times I leave the shower running and pretend I'm showering, but after watching this video, I won't waste water while showering anymore.

In M1's statement, the participant shows willingness to change her consumption habits to contribute to combating hunger. In M2's statement, the adolescent demonstrates responsibility regarding water usage, proposing to reduce her consumption in daily practices. According to Melo et al. (2020), such simple processes can save lives, since scientifically literate children and adolescents may transform the world in the future.

Therefore, it can be inferred that raising awareness is a valuable process for generating outcomes capable of changing human actions and, consequently, the planet's future. Even in vulnerable situations, the participants demonstrated concern and willingness to perform actions that contribute to improving life for all, including those socially more privileged.

In the second meeting, participants were asked to conduct bibliographic research on the 17 SDGs, which enabled them to learn about all the goals and targets, as well as understand that the SDGs are part of an action plan created by the UN. They recognized the importance of the SDGs in the formulation of new knowledge, as their research showed that individual values and attitudes can contribute to sustainable behaviors.

Consequently, it is possible to infer that the participants were able to articulate ideas, investigate, argue, read, and write in Science, besides creating and acting in alignment with Scientific Literacy (Pizarro; Lopes-Junior, 2015). Moreover, the activity met the assumptions of Scientific Literacy proposed by Chassot (2016), whereby participants constructed knowledge through solving problems related to their everyday life.

Among the participants' records, three stand out as they demonstrate the presence of Scientific Literacy indicators according to Sasseron and Carvalho (2008). In M1's record — the participant most

engaged in the discussions — the indicators identified were: "ordering of information" (when listing what is needed to achieve quality education based on her prior experiences); "organization of information" (when discussing how the work was conducted); "logical reasoning" (when describing and explaining her thoughts); and "prediction" (when stating that to achieve SDG 4, everyone must do their part, making a prediction based on an expected outcome).

Regarding the "ordering of information" indicator, it was observed that M1 responded to the researcher's questions based on her previous experiences. Silva and Lorenzetti (2020) highlight that this indicator aims to list already processed data or prior experiences of learners, establishing the foundation for the investigated problem. In the "organization of information" indicator, there was an attempt to order existing data on the researched problem (Sasseron; Machado, 2017).

In M3's report, the indicators that stand out are: organization of information, hypothesis generation, and explanation. Furthermore, the opening statement of her discourse — "I learned by doing this research" — suggests that M3 recorded what was most significant to her, as illustrated below:

> M3: Doing this research on the internet, I learned about the main goal of SDG 8. It's tough, you know! But for work to be decent, I think the money people earn should be fair for the work they do. Like, work should be well paid so that men and women can have a dignified and respectful life. Working all day standing and not being well paid, Telezé.

It is possible to observe that the indicator "organization of information" emerges when the participant expresses her thoughts about decent work. According to Sasseron and Machado (2017), this indicator can be identified when it is evident that the subject has organized information to understand the situation. Regarding the indicator "classification of information," it is noticeable that there was an ordering of the elements being worked with (Sasseron, 2008). This indicator was evidenced when ideas previously discussed in the earlier meeting were revisited and related to other concepts already established at a certain point in the participant's life,

The indicator "hypothesis generation" (about what should be done for work to be decent), according to Silva and Lorenzetti (2020), holds significant pedagogical value in the construction of scientific knowledge, since it allows the exposure of prior knowledge before making a decision. Regarding "explanation," this indicator is attained when the participant explains that, for work to be decent, salary payment must be fair. Silva and Lorenzetti (2020) argue that as the subject explains, even if their arguments are initially inconsistent or weak, it represents an opportunity to generate ideas and explanations that progressively become more complex and coherent.

After introducing the SDGs into the participants' learning routine (during the first two meetings), we proposed a new session focused on the eradication of poverty and hunger, aiming to provide knowledge on these topics and to promote reflections on sustainable agriculture. The session was guided by questions, with the answers presented in Table 2.

Table 2 – Prior Knowledge about Hunger, Its Causes, and Consequences

Researcher's questions	Participant's responses
What is hunger?	**M1: I**t is the need for food. **M2:**If I don't eat properly, I feel hungry.
Why does hunger exist?	**M1:** Social causes, right? There are also eating disorders. **M3:** So poor people suffer more than they already do. **M5:** I ask you, why does hunger exist in the world?

Researcher's questions	Participant's responses
What are the causes of hunger and poverty in our city and in Brazil?	**M1:** Unemployment makes people not have food. **M2:** Inequality, right? Those who have money eat well and those who don't go hungry. **M3:** Lack of investment in Brazil to improve this situation. **M4**: How can one not go hungry when everything is so expensive?
What are the consequences of hunger and poverty?	**M2:** Could malnutrition be a consequence? If a person doesn't eat well, they become malnourished, like the children in Africa I see on TV.
How are hunger and poverty related to our lives?	**M1:** Did you know that I keep wondering if my brother has eaten outside? That's why I don't waste food here inside. **M2:** Theoretically, at home we have difficulty buying certain things, but I have never been hungry in my life. However, I know some people do suffer from hunger **M5:** Before, it was still possible to buy bread and cheese, but now everything is expensive, so we have to save and buy only bread.

Source: Authors (2023).

Through the dialogue, it was possible to observe a critical-reflective stance on the part of the girls, especially when questioned about the causes and consequences of hunger and poverty in Brazil. This dialogue is fundamental to strengthening and empowering the social environment in the pursuit of rights and effective public policies across all sectors of society. According to Costa and Marcomim (2018), dialogue around educational resocialization is essential. Ramineli and Araújo (2019, p. 6) further complement this by stating that "the opportunity for conscientizing dialogue for learners is, above all, to increasingly approach the possibilities of living in a more just world, with a culture of peace and sustainability." Thus, these writings reinforce the content addressed in this workshop, while also reflecting the indicators: "logical reasoning," "proportional reasoning," "hypothesis testing," and "hypothesis formulation" within the concepts.

It is noteworthy that the indicator "hypothesis formulation" manifested both as statements and in the form of questions at times when the girls elaborated assumptions about the topic discussed. The "hypothesis testing" indicator was identified in moments when the research participants reconsidered their attitudes and put to the test the assumptions they had raised.

In the fourth session, the theme of Gender Equality was addressed. The first proposed activity consisted of the screening of the video "Gender Equality," available on the YouTube channel of UN Women Brazil. The animation is brief but provides essential information for this debate, promoting reflection by presenting a historical division between toys and activities for girls and boys, such as dolls and toy cars or soccer and ballet. The audiovisual production uses this context to introduce data about the labor market, where the social idea is spread that men are responsible for work outside the home, while women take care of domestic duties (children and housework).

The concept of gender inequality is presented as the mandatory determination of decision-making based on being a man or a woman. As the animation progresses, statistical data are provided regarding the total percentage of women in Brazil, the rates of domestic work performed by men, femicide rates, and figures related to the labor market. In response to these challenges, the video advocates for gender equality, linking actions that promote respect and freedom to make decisions about one's own life and power balance.

In this research, the video screening was conducted without audio, given that it is an animation. This approach is justified by our intention to encourage the girls' attention as well as critical reflection on the images and data presented throughout the video, especially to stimulate problematization through the following guiding questions: a) What is the role of men and women in society? and b) What do you think we can do to change the current situation of inequality in society? The discussion brought essential elements for identifying actions appropriate to developing gender equality within the social sphere, as evidenced by the participants' statements:

> M1: At home, there is no such thing as men's or women's roles because everyone does everything, but I know that society's culture makes women take care of the house and the children.
>
> M2: The man's role is to command, and the woman's role is to obey. Back home, I used to wake up early and work at the market gutting fish because my father told me to; only in the afternoon did I go to school.
> M3: The woman's role is to be a housewife, mother, and woman.
> M4: The man's role is to stay home just chilling... You know, ma'am, the woman goes out to work and when she gets home, she still has to cook and clean because the handsome guy is at home doing nothing but using his phone.
> M5: Everyone has their role because some fathers take care of their children. [...] My mother left, and my father has always taken care of me.

The dialogue between the girls and the researcher highlights the critical thinking indicator "logical reasoning" in M1's statement, specifically when she clearly recognizes how societal culture strongly influences women's role in domestic work, even though she has experienced a context where both parents share equivalent responsibilities. Additionally, the indicator "proportional reasoning" emerges in the other girls' statements, as they manage to develop a line of thought on the topic, albeit sometimes in an uncritical manner.

Regarding the second guiding question, which addressed the necessary actions to change the gender inequality situation in society, the following responses were obtained:

> M1: There is still so much to do.
> M2: Yes, there really is a lot still.
> M3: Miss, we have to pressure the government to improve the situation.
> M4: Miss, the challenge is huge! Even here, the boys always get the best of everything... The best opportunities are for them. For example... My hair is curly, but they give me shampoo for straight hair; the sanitary pads we get are awful—I don't even want to talk about them—they're terrible. The razors are even worse; they give me allergies, and no one cares about this because I'm imprisoned. Do you think this will change? I hope it changes someday, but I don't believe it will be by 2030.
> M5: You say that, M4, but here in the female unit it's much better than for the boys. The socio-educators are better because they are more humane.

Although the dialogue initially lacked motivation for critical-reflective exercise, the responses of M1, M2, and M3 sparked the debate proposed by M4. This occurred as they made inferences about the reality in the socio-educational environment, especially regarding the difficulties faced by being women. Girls deprived of their liberty suffer daily from racism, prejudice, and social inequalities, both from society in general and from the law itself, which "punishes" them by subjecting them to discrimination simply for being women (Souza, 2017).

In this respect, the participants demonstrated awareness of the ideals of equality and respect that society should uphold regarding the female sex, especially in environments of deprivation of liberty. Furthermore, they showed a clear and objective understanding of the challenges they face daily in achieving these ideals, engaging in a continuous struggle to obtain dignified and equitable conditions within their social context. Thus, the promotion of Critical Thinking (CT) can contribute to the construction of knowledge that supports them in their process of civic formation.

In the fifth meeting, a diagnostic evaluation workshop was held, enabling the participants to produce graphic material in the form of a mini dissemination book, where the girls presented explanations about what they understood throughout the meetings. The girls surprised by creating colorful and explanatory mini-books about the studied theme (Sustainable Development Goals).

After the mini-book creation, the girls were guided through reflective exercises via a discussion circle, during which they were encouraged to talk about the most relevant information they recorded in their mini-books:

> M1: The SDGs are important for the population. They are a plan aimed at ending poverty and hunger, protecting the planet, and ensuring that we have a life with more dignity. Although I think this 2030 agenda will not be fulfilled, I know the intentions are good, and I needed this learning.

In M1's statement, it is possible to perceive that the teaching and learning process is significant. By saying "I know I needed this learning," the participant emphasizes an affective evaluation about the importance of learning in the socialization process. The girl recognizes that "education must come first" so that she can claim her right to citizenship. In M1's speech, the following indicators stand out: "logical reasoning" (when she explained her thought process); "hypothesis formulation" (when she supposed that the agenda would not be fulfilled by 2030); and "justification" (when she stated that the intentions of the 2030 agenda are good).

In M2's contribution we find the following dialogue:

> M2: [...] for me, these workshops were very important because I learned a lot about this topic that is little known by people. An action that was once considered innocent, like wasting food we don't like, can cause a big problem for the environment, and besides, there are people who need that food to live, so we must avoid food waste. I reconsidered my attitudes and decided to pass this knowledge on to other people so they can contribute to the SDGs and help create a better world.

M2's speech emphasized SDG 2, which aims to end all forms of hunger and malnutrition by 2030. We can note that M2's discourse is an "explanation" constructed within the researched context. The girl refers to previously constructed knowledge, which makes her argument possible. This use of knowledge demonstrates the indicator "organization of information," since, based on it, she can continue her assertion and thus establish a "prediction" regarding outcomes in this context: "people need this food to live." Her prediction gains veracity due to the "justification" M2 also presented: "that's why we must avoid wasting food."

The presence of the indicator "justification" was evidenced when participants gave veracity to their positions in the research. The establishment of "prediction" arose from the thoughts expressed, which, in most cases, occurred naturally and confidently. It is also considered that as the subject justifies, predicts, and explains, even if their argument is somewhat weak, this is an opportunity for them to construct ideas and explanations (Silva; Lorenzetti, 2020).

Thus, the "explanation" indicator appeared when the participants attempted to relate information to hypotheses raised during the SDG training process, and although these explanations were still developing, they already showed concern and interest in the issues raised. This is seen as a first step toward more substantial and coherent explanations regarding problems they may face in their realities.

Participant M3 stated:

> M3: [...] the meetings showed me a new way of looking at the world; I learned that simple actions, like not pouring oil down the drain, can change the world for the better. Here, it is possible to observe the construction of an "explanation." The explanation begins with a "hypothesis formulation" expressed by the sentence, "if we pour these residues incorrectly, it can cause problems for the environment."

We note that M3 built her argument logically, expressing her ideas clearly and coherently, demonstrating the use of "logical reasoning." Thus, four CT indicators were identified in M3's speech: explanation of an idea, hypothesis formulation about a context she aims to present, presence of justification to validate her positions, and logical reasoning to structure the ideas.

Regarding the requested activity, participant M4 expressed:

> M4: [...] the workshops were really cool because they addressed a new, super interesting topic that is little known. I learned that our actions can help change the world for the better. Through this empowerment, many girls are overcoming barriers imposed by society. I'm even thinking that because of this, I reconsidered my attitudes and will pass this knowledge on to others and help other girls too.

Here, the following CT indicators are present: “organization of information” (when she discussed how cool the workshops were); “hypothesis formulation” about the problem (by stating that through empowerment, many girls are overcoming societal barriers); “hypothesis testing” (when she rethinks her attitudes and puts her suppositions to the test by saying she will share her knowledge with other girls); “justification” (when she coherently supports her statements); “explanation” (to make her ideas clear); and “logical reasoning” (used to structure her thinking).

According to Losquiavo (2017), CT plays a fundamental role in transforming the subject into a critical being capable of selecting, understanding, and participating in scientific movements and actions aimed at society as a whole. In this sense, the excerpts above demonstrated comprehension of information and knowledge construction by reproducing their meanings.

Throughout the statements, the girls’ enthusiasm and interest in the activities developed in this study were evident. Their accounts showed that the girls considered the SDGs important for the population, highlighted the need to change society’s view toward a more sustainable world, and indicated changes in their thoughts and attitudes for a better world, where small actions, behaviors, and attitudes can contribute to such change.

Final Considerations

The findings point to the achievement of the objective by showing significant evidence that Critical Thinking (CT) was promoted in the target audience, given that all the considered indicators were identified at some point throughout the implementation of the activities developed in the Pedagogical Intervention, whether through discussions, dialogues, or observations made.

It is emphasized, therefore, that the CT indicators were able to materialize some of the competencies necessary for scientific literacy, as they provided the research subjects with situations in which they needed to position themselves based on their prior conceptions about some of the topics, subsequently demonstrating appropriation of several scientific concepts and realizing that it is possible to express opinions, take a stance, and even propose solutions to everyday problem situations.

CT is a continuous process and, as already cited by Lorenzetti and Delizoicov (2001, p. 45), “it is a lifelong activity, and it is possible to achieve it.” In the context of this study, it was observed that it is necessary to offer conditions for girls deprived of liberty to increasingly develop competencies and skills related to the teaching and learning process.

As a change in the behavior of teaching activities, it is believed that, in addition to differentiated planning that proposes to implement initiatives in the socio-educational environment, it is also necessary to have an educator more aligned with a literacy perspective focused on critical thinking, innovation, and opinion formation. Thus, it is envisioned that this challenge is not solely the educator’s responsibility but that of the entire socio-educational system, which must provide material, professional, and intellectual conditions capable of guaranteeing educators a teaching practice based on the necessary didactic practices for the teaching process and, at the same time, an affective one.

It is further inferred that, given the trajectory of this investigation and the results evidenced, research of this nature expands the possibilities of disseminating both CT and the SDGs with their respective targets, since the data indicated that it is possible to create opportunities for CT to genuinely occur, specifically through activities that encourage subjects to observe, analyze a problem, and engage in critical reflection, stimulating knowledge construction and respect for divergent opinions. In this way, important formative skills such as teamwork, problem-solving, and decision-making abilities can be developed through actions like those presented in the Pedagogical Intervention discussed here.

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