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Sexuality at the intersection between health education and STS education: critical reflection on teaching

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ABSTRACT

This article is intended to understand students' emotional experiences and sense of social responsibility regarding the topic of sexuality at the intersection between Health Education and Science, Technology and Society (STS) Education, by means of critical-reflective activities in secondary education. Using a qualitative approach, the study took form of a pedagogical intervention conducted at a private school in the countryside of the state of Pará, Brazil, with 8th-grade students in science classes. Data were derived from learning reports prepared by students during two activities; the material was examined in light of Discursive Textual Analysis, which brought two categories: (i) emotions, reflections, and critical thinking: developing knowledge in Health Education/STS Education; and, (ii) critical and reflective education for individual and collective responsibility. Results indicate that students' affective engagement and sense of responsibility enhanced critical thinking, ethical reflection, and social commitment by fostering debates on gender inequalities, sexually transmitted infections and early pregnancy, in addition to the development of scientific and technological knowledge, its social role and power relations. We conclude that contextualized practices that integrate debates on sexuality and health, science and technology, affective aspects, and the sociocultural dimension are potential drivers for students' humanistic, holistic, and civic education.

KEYWORDS: Sexuality; Health Education; Science, Technology and Society Education; Civic Education.

A sexualidade na interface educação em saúde e educação CTS: uma reflexão crítica da docência

RESUMO

Este artigo tem como objetivo compreender experiências afetivas e de responsabilidade social de estudantes sobre a temática sexualidade na interface Educação em Saúde e Educação CTS, por meio de atividades crítico-reflexivas no Ensino Fundamental. De abordagem qualitativa, a pesquisa configurou-se como uma intervenção pedagógica realizada em uma escola particular com estudantes do 8º ano do Ensino Fundamental, em aulas de Ciências, no interior do estado do Pará. Os dados foram produzidos a partir de relatos de aprendizagem elaborados pelos alunos em duas atividades, cujo material foi tratado à luz da Análise Textual Discursiva, emergindo duas categorias: (i) entre emoções, reflexões e criticidade: a construção de conhecimentos em Educação em Saúde/CTS; e, (ii) formação crítica e reflexiva para a responsabilidade individual e coletiva. Os resultados indicaram que a mobilização afetiva e de responsabilidade dos estudantes potencializaram a criticidade, a reflexão ética e o compromisso social ao favorecer debates sobre desigualdades de gênero, infecções sexualmente transmissíveis e gravidez precoce, além da construção do conhecimento científico, tecnológico, seu papel social e as relações de poder. Concluímos que práticas contextualizadas que integram debates sobre a sexualidade e saúde, ciência e tecnologia, aspectos afetivos e dimensão sociocultural são motores potenciais para a formação humanística, integral e cidadã dos estudantes.

PALAVRAS-CHAVE: Sexualidade; Educação em Saúde; Educação CTS; Educação para a Cidadania.

INTRODUCTION

In its multifaceted nature, Health Education has brought together concepts from the fields of Education and Health to define political and philosophical understandings and stances regarding the interaction between individuals and society in practice, considering educational processes to be dynamic and complex (Venturi & Mohr, 2021). In this context, we highlight Health Education as an emerging and fundamental area for civic education of students in secondary education, with focus on activities for health promotion, disease prevention and critical/autonomous thinking. Aligned with advances in educational practices, Health Education has been able to consolidate theoretical and methodological reflections by incorporating contributions from other areas of knowledge. This has resulted in practical pedagogical interventions and strategies that go beyond isolated efforts and transcend simple instruction to foster critical reflection (Marinho & Silva, 2018). Thus, the intention to unite theory and practice makes sense when the proposals are linked to life-long educational processes, as they involve biological, sociocultural, ethical, and public policy dimensions for society.

As stated in Ribeiro et al. (2021) and Massón et al. (2020), we emphasize that Health Education must surpass a traditional, hegemonic, behaviorist/deterministic conception (e.g., biomedical, biologistic, and technicist dimensions) and move toward a constructivist vision (interactionist, problematizing, and critical-reflective dimensions). This shift embodies educational praxis by integrating theory and practice within a dialectical perspective on education, whose pedagogical intent requires aware choices, decision-making, and social responsibility. In this process, we contextualize Health Education within the school and social spheres, as well as in non-school settings, where the role of teachers and institutions should be to stimulate and facilitate scientific knowledge, community knowledge, sociocultural practices, body care, well-being, health prevention and critical reflection — in a manner that is coherent and consistent with the objectives and mission of the school itself (Marinho & Silva, 2018; Venturi, 2022). The major problem still lies on the fact that these initiatives are generally carried out by science teachers or through school campaigns involving health professionals, with activities that are completely disconnected from the participants' lives, purely instructional, and based on behavioral paradigms, with minimal impact on civic education.

Despite progress, the ineffectiveness of educational approaches persists in schools — whether on part of students, families, or even the institution itself (teachers, administrators, etc.) — which hinders more concrete efforts to develop a pedagogical praxis that addresses society's current challenges, such as misinformation, fake news, taboos, influence of different media, social inequalities, adolescent sexuality, emotions and affections, socioeconomic and cultural vulnerabilities, plus all sorts of prejudices and violence.

Paula and Miranda (2020) point out the need for educational, informational, and training programs and initiatives at schools, particularly those with an emancipatory approach. We note here that such efforts should involve pedagogical practices aligned with critical perspectives on Health Education, as they require attention to the relationships established within the school context itself. Furthermore, Rodrigues et al. (2026) indicate that interactions between teachers and students directly influence the organization of teaching practices, as

they enable methodological adaptations and create spaces for debate about relevant socio-scientific issues.

By discussing issues related to sexuality at the intersection between Health Education and STS Education, we broaden the scope of this research to encompass such understanding by highlighting that students' emotional engagement and sense of social responsibility can foster critical reflection through discussions on gender inequalities, sexually transmitted infections (STIs) and early pregnancy, as well as the social role of science and power relations that underlie these topics. Based on the above, we view the subject of sexuality as an inseparable part of human health, as defined by the World Health Organization (WHO) in terms of physical, mental, and social well-being, and in line with the focus of Health Education, which is the empowerment of individuals to make informed decisions — whether individually or collectively — in pursuit of improved health and environmental conditions. We emphasize the scarcity of educational environments that promote open and welcoming dialogue about sexuality, based on the students' own experiences and feelings, evidencing the importance of rethinking pedagogical practices in educational institutions.

Addressing the topic of sexuality in secondary education is not limited to debates about human reproduction or the risks associated with sexual relations and STIs. On the contrary, this pedagogical taboo reflects a certain resistance among teachers themselves in their practices, due to the context in which they work, the school-family dynamics, and other internal and external factors (Mosquera & Garcia, 2021). We note that this theme involves affectivity, feelings, and emotions; knowledge of and about the body; conversations about gender and identity; and existing sociocultural relationships. By integrating the affective dimension into teaching-learning processes, we contribute to the development of critical-reflective individuals who are more aware of themselves, others, and the social relationships that shape them.

We recognize the significant theoretical contribution that fields such as Sex Education, Education for Sexuality, Sexuality Education and related disciplines have made to research and studies, which also provide the foundation for our considerations. However, we understand the approaches in this article as a character of health for managing emotions and affections of adolescents that needs to be addressed within the framework of Health Education. By treating sexuality as a complex phenomenon, influenced by social norms, power relations, and subjective experiences, this research engages with the premises of a critical Health Education that seeks to transcend the dominant model in schools and foster pedagogical practices capable of promoting health — conceived for emancipation, autonomy, and reflection — from the perspective of critical education (Nogueira et al., 2022), so that dialogue and participation are at the center of this process. The approach to the topic of sexuality in Critical Health Education is grounded in the perspective of Science, Technology, and Society (STS) Education, which is widely discussed in Brazilian schools, as it promotes interdisciplinary practices aimed at social transformation, promoting critical and creative thinking, scientific and technological literacy, as well as preparing students for citizenship, aware decision-making and social responsibility (Schwingel et al. 2022). We argue that schools, being a privileged environment for socialization and knowledge construction, should be able to recognize and explore this topic through reflections

that include emotions such as fear, shame, empathy and indignation — understood as elements that help develop critical thinking.

Our research question is: What feelings of affection and responsibility are evoked in secondary education students through pedagogical practices on sexuality in Health Education from a critical perspective? As we undertake this research challenge to discuss sexuality in Health Education through STS Education, our pedagogical intent assumes: (1) linking scientific knowledge to real-world contexts and socially relevant issues; (2) to encourage debates on health, feelings and responsibilities in human and civic development; and, (3) to promote students' autonomy, decision-making and active participation in establishing meanings regarding health and sexuality.

Dealing with sexuality in secondary education remains a challenge marked by silence, discomfort and resistance (Egypto, 2012; França Filha, 2021). In school teaching practices, there is a predominance of a biomedical approach focused on risks, disease prevention and reproductive aspects. While relevant in some contexts, this point of view tends to overlook the subjective, sociocultural and emotional dimensions that shape the experience of sexuality, particularly among adolescents. This gap contributes to the perpetuation of gender stereotypes, prejudices and misinformation, restricting the possibility of a critical and emancipatory reflection about sexuality (Schwingel et al. 2022).

The suggested approach to the topic of sexuality in Health Education through STS Education, from a pedagogical and critical standpoint, holds great potential, as it leads to: (i) the preparation of critical and responsible students; (ii) the overcoming of biologizing and/or moralizing approaches; (iii) a critical examination of sexuality; (iv) an approach based on human rights, responsibility, and civic ethics; (v) an innovative pedagogical practice for (re)thinking teacher training; (vi) the production of pedagogical materials for classroom practices; and (vii) student participation, the establishment of dialogues, and shared responsibility in social interactions.

Accordingly, our overall objective is to understand students' affective experiences and sense of social responsibility regarding the topic of sexuality at the intersection between Health Education and STS Education, by means of critical-reflective activities in secondary education. Specifically, we also aim to: (a) critically analyze students' formative experiences about affection and emotions concerning sexuality as developed in Health Education practices; and (b) investigate how students perceive their responsibility toward themselves and others in social relationships of practices that address the theme of sexuality.

To this end, these experiences were conducted with 8th-grade students at a private school in the countryside of the state of Pará, Brazil, as part of a pedagogical intervention on the topic of sexuality. The purpose was to contribute to the development of critical and reflective knowledge about sexualities, while also promoting early discussions on gender relations and sexual and reproductive health. Thus, by investigating learning about sexuality, this study seeks to provide strengthening of educational approaches committed to a holistic development of students, by recognizing the power of affective experiences as catalysts for critical, reflective and emancipatory knowledge.

METHODOLOGICAL APPROACHES ADOPTED

This research was carried out by using a qualitative approach with an interpretive perspective (Moraes & Galiazzi, 2016), as it allows for the investigation of aspects such as emotions, beliefs and representations, and requires careful attention to the complexity of sociocultural interactions that permeate the educational process, particularly with adolescents.

As for the objectives, we characterize this as a descriptive study of an interpretive nature aimed at understanding how emotions experienced by students during an educational activity about sexuality helped develop critical and reflective knowledge regarding gender relations and health. Therefore, we sought to describe and interpret conception and perceptions emerging from the research by deepening debates and reflections that structure the subjective aspects of qualitative data.

As a process of (re)thinking the transformation of educational practices through the investigation of practice itself, we adopted the pedagogical intervention research approach described by Damiani et al. (2013) concerning procedures, as we believe that approach enables the production of knowledge in a real classroom context, expands debates with potential practical benefits, promotes improvements in school settings based on the results obtained, supports pedagogical decisions grounded in changes of educational practices, and views pedagogical practice itself as an agent of social transformation.

This intervention was carried out through planning, development, and implementation of a Potentially Meaningful Teaching Unit (PMTU) (Moreira, 2011) at a private school located in the municipality of Castanhal, Pará, Brazil, with an 8th grade class. The choice of the institution was strategic, given the existing connection between the lead teacher (first author of this paper) and the school. The institution includes classes ranging from early childhood education up to high school, with approximately 300 students in the daytime shift.

We chose not to present the entire PMTU here and focused this study solely on learning reports developed at the end of the pedagogical intervention, where students were able to express their perceptions, feelings and understandings of the process they experienced. In addition, the teacher's reflective notes, recorded during the sessions, were considered to contextualize the data and enrich the analysis. Two activities stand out among those performed during the intervention, and were revisited by the students when, at the completion of the teaching unit, their learning reports were produced. These were the screening of the documentary "Meninas" ("Girls") — which follows the lives of four pregnant teenagers in the suburbs of Rio de Janeiro, Brazil — and an activity titled "bebê balão" (balloon baby) — in which students received the task of caring for a balloon as if it was a real baby, and, after a week, had to return the balloon "alive".

Given the theoretical and methodological framework adopted, the analysis of these activities is justified by the fact that we have considered additional elements associated with the intersection between sexuality and Health Education through STS Education, as shown in Table 1.

Table 1

Relationships established in the theoretical and methodological framework of the activities

Suggested Activities	Theme: Sexuality	Health Education	STS Education
Documentary "*Meninas*" ("Girls")	It explores real-life issues related to adolescent pregnancy, affective relationships, motherhood, and gender.	It addresses issues such as early pregnancy, sexual health, body care, and socio-emotional relationships.	It raises a relevant issue with social and economic implications for young people's lives.
"*Bebê balão*" activity (balloon baby)	It symbolically explores motherhood, emotional responsibilities, and the consequences of choices.	It motivates care, self-care, prevention, and responsibility towards life and sexual health.	It exposes students to a simulated real-world scenario that explores the role of scientific and technological knowledge in society.

Source: Compiled by the authors (2025).

The students' reports were examined using Discursive Textual Analysis (DTA), as this research methodology is particularly well-suited for interpreting meanings produced in educational contexts (Moraes & Galiazzi, 2016). This methodology allowed us to deconstruct the texts to identify units of meaning, reorganize them into categories, and promote deeper understandings of the phenomena under investigation. DTA is a self-organized process of understanding construction, composed of three main stages: (a) unitization: we fragment the texts in the corpus into units of meaning; (b) categorization: we regroup these units based on similarities; and (c) capturing the emerging new meaning: we produce a theoretically grounded interpretive synthesis in the form of a metatext.

To protect the identity of the students who participated in the study, they were identified according to a coding system based on the following information: the letter R, indicating the Report activity, followed by a number ranging from 1 to 10 (a sequential number indicating the order of students who contributed to the study); UM, which indicates Unit of Meaning (i.e., the excerpts we deemed relevant to the discussion, followed by a number referring to the sequence of excerpts taken from a single report) ; finally, we used the letters F or M to indicate gender, followed by a number indicating the student's age. Example: R1UM1F13 indicates that it is Unit of Meaning 1 (UM1) from the first report (R1) of a female student, aged 13 (F13).

Initially, based on the empirical data, we analyzed the texts produced during the pedagogical intervention known as the Learning Report. The first stage of this analytical process consisted of unitization, which involved an intensive reading of the reports, a fragmentation of the material into basic units of meaning, and the identification of the key ideas expressed by the students. Next, those units of meaning were grouped, resulting in two final categories that gave rise to two metatexts, which will form the basis of the discussions in this research.

It is worth noting that the choice of DTA as a reference framework for data analysis is justified by its ability to access not only the explicit content of the reports

but also the ways in which students discursively construct their knowledge and feelings, by revealing links between emotion, cognition, and criticality in the learning process of sexuality. This understanding made it possible to structure the units of meaning (unitization) and distribute them into categories (categorization), as presented in Table 2 below.

Table 2

Workflow for analyzing narratives and organizing them into categories

Units of meaning	Initial categories	Final categories
(R1UM1F13) "Given all that, I felt a little sad — about how girls my age act these days. And a little queasy, after seeing some images of the diseases".	Emotionally impactful experiences	Among emotions, reflections, and critical thinking: developing knowledge in Health Education/STS Education
(R2UM1F13) "When I was learning about STIs, the images made me feel sick, but I was glad to learn about them because now I know how to protect myself and others".		
(R3UM1M13) "[...] when I studied STIs, I felt a little embarrassed, but it was necessary for my education".		
(R4UM1F13) "The documentary surprised me a lot, showing what teenage pregnancy is really like".		
(R5UM1F13) "[...] I wondered how the pregnant girls under 18 were coping emotionally. I was really saddened by the fact that this still happens today — and in even worse ways".	Developing critical thinking and empathy	
(R4UM2F13) "I watched the documentary Meninas, and I felt truly distressed by the girls' ages, their way of thinking and behaving, and the fact that their partners were always older [...]"		
(R6UM1M13) "It was a fun and unique experience taking care of the balloon baby, because I realized that taking care of a baby isn't easy".	Perception of responsibilities	Critical and reflective education for individual and collective responsibility
(R7UM1M13) "When we had to take care of the balloon baby, I felt a sense of responsibility while looking after him at home".		
(R2UM2F13) "While taking care of the balloon, I came to understand how parents worry about their child. Whenever I went out without it, I felt worried — my sister might pop it, it might get lost, and so on".		

Source: Compiled by the authors (2025).

In the following section, we present results and discussions, organized into two metatexts, which constitute an in-depth interpretation of the emerging categories in light of theoretical frameworks aligned with this research. We

emphasize that this study is a subset of a broader research project which, to ensure ethical rigor, was submitted at every stage for review by the Research Ethics Committee of the Universidade Federal do Pará (UFPA), under number 84429124.7.0000.0018, and received a favorable opinion.

RESULTS AND DISCUSSION

The analysis of the learning reports allowed us to identify the meanings constructed by the students throughout the educational intervention on sexuality. It revealed how emotional experiences were deeply intertwined with the process of critical learning. Based on DTA, two final categories arose, which we will now discuss: (i) Among emotions, reflections, and critical thinking: developing knowledge in Health Education/STS; and, (ii) Critical and reflective education for individual and collective responsibility.

BETWEEN EMOTIONS, REFLECTIONS, AND CRITICAL THINKING: DEVELOPING KNOWLEDGE IN HEALTH EDUCATION/STS

The understanding of affective relationships regarding sexuality is quite vast and, in our view, suggests that educational work requires "(...) a reexamination of concepts, overcoming prejudices and stereotypes, a reflective look at one's own sexuality, and addressing taboos, fears, and shame. It requires dedication and study" (Egypto, 2012, p. 9). Within this broader understanding, working on this topic also requires us, as educators, to be sensitive to the diversity of emotions that children and adolescents express when interacting with others. Addressing emotions has never been an easy task. Nevertheless, especially in school — an academic environment for acquisition of knowledge — we have the opportunity to refine those emotions to achieve a healthy experience of sexuality. According to Egypto (2012, p. 16), "school is a place where knowledge is discussed, where dialogue and reflection occur. It is, therefore, a privileged environment for discussing sexuality with children and adolescentes".

From the analysis, we found that students expressed immediate emotional reactions upon encountering sensitive content, images, and discussions about STIs and early pregnancy. Feelings such as sadness, disgust, nausea, embarrassment, distress and surprise were evident in their texts, pointing to an emotional intensity evoked throughout the process. In this regard, one student reported that "Given all that, I felt a little sad — about how girls my age act these days", and emphasized her experience of discomfort: "And a little queasy, after seeing some images of the diseases" (R1UM1F13).

The emotions expressed by the students when confronted with sensitive content about sexuality demonstrate an affective dimension that is intrinsic to Health Education, for it is known that dealing with emotions is no trivial task, but rather requires teachers to provide a more comprehensive understanding of adolescent health by addressing issues related to physical, social, ethical, and psychological aspects. This approach reveals that it is a proactive pedagogical practice with elements that focus on preventive actions regarding STIs in a more effective manner, as confirmed by studies of Spindola et al. (2021), who note that

condom use, even with casual partners, offers, among other benefits, prevention of STIs and unintended pregnancy.

We believe that sexuality and emotions are closely intertwined, with both influencing each other and having a social impact on young people's lives. The way sexuality is experienced and expressed is driven by feelings, and, in turn, emotions can be shaped by experiences and attitudes related to sex, all of which can affect emotional well-being.

Based on Guimarães and Cabral (2022), we argue that educational practices and existing discourses on sexuality often reproduce hegemonic norms, prejudices, and traditional moralities that can generate ambivalent feelings, internal conflicts, and negative emotions such as anxiety, fear and distress among young people as they cope with their sexuality. In Science, Technology, and Society (STS) Education, we were able to broaden this debate through scientific knowledge about sexuality and health, thereby problematizing the sociocultural context of adolescents, making it possible to relate scientific information on STIs to contraceptive methods and sexual development in real-life situations. It brought to the fore a debate on social, technological, and ethical impacts of sexual decisions by connecting science, society and personal responsibilities, demonstrating that the practice stimulated critical reflection to convert emotional experiences into civic learning and social transformation (Carneiro et al., 2022).The reactions of disgust, mentioned above, were recurrent and also appeared frequently, as can be seen in the following report: "When I was learning about STIs, the images made me feel sick, but I was glad to learn about them because now I know how to protect myself and others" (R2UM1F13). Insofar as we view this reaction as an emotional response on part of the students, a primitive and aversive one, Vygotsky (cited in De Faria & De Camargo, 2024) decribes emotions as dynamic, transformative, and imbued with a subjective and historical-cultural character, shaped by interaction with the social environment and by meanings attributed to that unique experience. And at school, we have a conducive environment for working with those reactions around sexuality, in order to develop values, attitudes and behaviors, as well as a means of appropriating knowledge (Marinho & Silva, 2018).

Writing about emotional well-being at school as a key part of an inclusive and transformative education, Carneiro et al. (2025) explain how teaching practices that embrace emotions help students become critical, resilient and empathetic citizens, ready to engage responsibly and with compassion in society. Guimarães and Cabral (2022), reflecting on the impact of hegemonic social norms on young people's emotions and identities, show how emotional experiences of exclusion, fear, anxiety and suffering are linked to doubts about sexuality, stigma, discrimination, and apprehension accomplished by youth who do not fit into traditional social standards.

From a Health Education standpoint, these reactions present an opportunity to develop social-emotional skills and increase knowledge about STIs and early pregnancy. In line with Marinho and Silva (2018), we emphasize that this is a moment when teachers should avoid focusing solely on teaching concepts and definitions related to the subject, but rather to foster learning grounded in understanding — specifically, how these issues impact adolescents, how they occur, and what can be done. Such systematic activities extend beyond the school walls and are intrinsic elements of preparation for life and citizenship.

By acknowledging the power of sexuality as a theme in students' imaginations and emotional lives, the experience becomes a source of critical and healthy learning. This made it possible to discuss how social, cultural and technological factors impact human behavior regarding sexual issues, as a way to promote critical debates and ethical awareness. In addressing the definition of STS Education in comparison with other perspectives, Andrade and Teixeira (2025, p. 15) underscore that the role of school, within a conception of emancipatory education, must be committed to the "endeavor to ensure that educational practice is aligned with the population's interests in transforming Society".

Drawing on Carneiro et al. (2025), we also recognize the impact of students' emotional difficulties in the learning process, as illustrated by the following statement: "When I studied STIs, I felt a little embarrassed, but it was necessary for my education" (R3UMS1M13). Thus, it is evident that the initial affective response helped develop more complex and engaged understandings of sexuality. We observed that these reports point to a reflective process that surpass individual experience, displaying a critical and empathetic perspective towards gender inequalities, social vulnerability and adolescent pregnancy.

This change is evident in some students' comments, as they expressed concern for girls their own age or younger. For instance, one of them stated: "I wondered how the pregnant girls under 18 were coping emotionally. I was really saddened by the fact that this still happens today — and in even worse ways" (R5UM1F13). Another one mentioned how distressing it was to watch the documentary: "I watched the documentary Meninas, and I felt truly distressed by the girls' ages, their way of thinking and behaving, and the fact that their partners were always older [...]" (R4UM2F13). The surprise at the reality depicted was also highlighted: "The documentary surprised me a lot, showing what teenage pregnancy is really like" (R4UM1F13). These reports reveal that learning process was more than just a collection of information; it fostered a critical awareness of social issues related to sexuality, such as gender inequality, early motherhood, and dropping out of school.

From the above, we note that Health Education, when integrated with STS Education, is not limited to mere transmission of concepts and instructions, but rather resonates through dialogue, emotions, empathy and care for others, in a critical and reflective way, as part of a more sophisticated development of scientific knowledge, which leads us to emphasize that the discussions do not just focus on information about STIs and early pregnancy, but they include several dimensions (emotional, ethical, social, political, etc.) capable of fostering holistic learning. Figueiredo et al. (2010, p. 120) reiterate that traditional models of Health Education have not disappeared, but, in light of literature, a dialogic model has emerged, offering advantages for "the collective development of knowledge, which provides individuals with a critical and reflective view of their reality, making them jointly responsible and empowering them to make decisions regarding their health".

Based on this analysis, we claim that:

- students' emotional reactions — those that stir their feelings — serve as catalysts for constructing meanings around sexuality and reinforce the role of Health Education in going beyond mere instruction by

connecting critical and reflective discussions about STIs and adolescent pregnancy;

- the formative experiences that resonated with the students exceeded their individual experiences and helped them develop a critical perspective on social matters, gender inequality, adolescent pregnancy and youth vulnerability, thereby promoting empathy and social ethics; and,
- discussing sexuality — a subject whose understanding is linked to scientific and technological aspects — encourages reflection and aware decision-making about how to act and the choices to make, incorporating human values, attitudes and behaviors that contribute to well-being in society.

Therefore, as they experienced emotions of empathy and outrage, students were led to question the conditions that contribute to these situations, demonstrating that the affective component enhanced a more critical and reflective mindset. Logically, we know that teachers need to create a pedagogical framework that enables these debates, and that students' learning will reflect how their activities in promoting Health Education at school occur in a dynamic, wide-ranging and critical manner, within an emancipatory and civic-minded posture.

CRITICAL AND REFLECTIVE EDUCATION FOR INDIVIDUAL AND COLLECTIVE RESPONSIBILITY

We understand that sexuality involves more than just the act of sexual intercourse. It includes how people feel about sex, their sexual orientations, feelings they have for others, and how they perceive themselves as sexual beings, within the context of both individual and collective responsibility (Guimarães & Cabral, 2022). We believe that sexuality is a combination of physical, emotional, and affective factors that are part of life: each individual's sexuality, just like being born and dying, is a biological and natural process. In this sense, sexuality defines part of each person's personality from a biological perspective.

Through the practical experience provided by the balloon baby activity, we encourage a concrete understanding of parental responsibilities. Statements such as: "It was a fun and unique experience taking care of the balloon baby, because I realized that taking care of a baby isn't easy" (R6UM1M13), show the pedagogical nature of simulation. Based on Foucault's (1993) conception of sexuality, it is no longer viewed as merely something natural but comes to have a more social, political, constructed character (Louro, 2010). It must also be considered that sexuality encompasses rituals, languages, fantasies, representations, symbols and conventions. Therefore, these are cultural and plural processes that are not related to something exclusively natural. In the way the activity was conducted, we used an experiential approach so that adolescents could understand that sexuality is a natural part of being human because we are all born as sexual beings, but at the same time it is historically, politically, and socially constructed, because we are social beings with culture, values, and living in a society governed by power relations.

By viewing sexuality as a complex feature of human life, Health Education understands it as a wide and holistic phenomenon, so that experiences lead

students to reflect on themselves, on others, and on their relationships, through individual and collective responsibilities that are negotiated. These pedagogical attitudes reveal the role of the teacher and the multifaceted nature of Health Education, with practices that transform representations developed through experience — here understood as "a field where representations and practices intersect; subjectivity and objectivity; thought and action; body and mind" (Gazzinelli et al., 2005, p. 204).

These experiences are one of the goals of Health Education when designing a curriculum that meets the school's needs and interests, especially when experienced learning can be enhanced with scientific knowledge for the benefit of one's own health. In this sense, given its place in the school curriculum, Marinho and Silva (2018, p. 729) argue that it can "contribute to the construction of knowledge in individuals and help them better understand the world, as well as better relate to issues concerning their health and that of others".

We emphasize the need to address Health Education topics in the Basic Education curriculum as an emerging requirement for the critical development of students. And considering sexuality within this framework does not seem appropriate to us — despite some cross-cutting efforts to incorporate Health Education questions — given its direct link to the holistic human development of adolescents. For this reason, we must go further with effective proposals and efforts to integrate these issues into the curriculum of educational institutions.

The balloon baby activity is considered a successful method for engaging students and placing them in a scenario — albeit a simulated one — where they must take responsibility for and share ownership of their choices regarding sexuality, in terms of parental and emotional commitments. By symbolically caring for a baby, learners are exposed to the complexity of caring for another person and the essential attention required. This experience provides a tangible emotional comprehension of early pregnancy, social life, and the emotional aspects inherent in these situations.

In expanding the debate on STS Education, we can see that decisions, sexual behaviors and responsibilities assumed are tied to the social, cultural and technological context of students, in which sexuality is no longer viewed simply as a biological and natural element, but rather as a phenomenon historically created by humanity, permeated by values, conceptions, and power relations. In critical articulation with Health Education, this refers to the "sharing of goals and critical, autonomous, and conscious education concerning healthy and sustainable life choices for oneself, one's community, and the environment" (Schwingel et al., 2022, p. 346).

Foucault (1993, p. 100) had already understood sexuality as a construct related to time and history: "It should not be conceived as some kind of natural data that power attempts to challenge […]. Sexuality is the name that can be given to a historical construct". For the author, sexuality can be conceived as a historical product, for it is no longer perceived as a personal and private matter but is instead conceived as a social and political issue — moving from personal to collective — determined by the historical moment and around which power relations converge.

In the same activity and aligned with these assumptions, another student commented: "When we had to take care of the balloon baby, I felt a sense of

responsibility while looking after him at home" (R7UM1M13). In debating responsibilities, we must not only question the roles of teachers and schools, but also those of families — despite many taboos — since their members should be the first to provide sex education to adolescents, which is not always the case; and such action would enhance dialogue, respect, empathy, and, no less importantly, models of sexual identity (Egypto, 2012; Guimarães & Cabral, 2022).

This underscores that sexuality transcends biological factors, age, instinct, or libido. It should not be viewed purely from a physical standpoint. In fact, it is a vital energy that is part of subjectivity and culture. It is something complete and integrated, a social construct influenced by various historical, economic, political and social moments of life (Guimarães & Cabral, 2022). Thus, noting that students expressed feelings of empathy throughout the task reveals that the experience mobilized affective aspects that evolved into reflections on collective responsibility: "While taking care of the balloon, I came to understand how parents worry about their child. Whenever I went out without it, I felt worried — my sister might pop it, it might get lost, and so on" (R2UM2F13).

This type of statement indicates that the activity helped transform knowledge that might otherwise remain abstract — the consequences of adolescent pregnancy — into concrete experiences, thereby fostering more effective learning. A sense of responsibility emerged in tandem with feelings of care and concern, extending understanding of social and personal implications related to the issue. This process of mastering responsibilities is inherent to the role of educating students to think critically, when their knowledge provides them with autonomy, engagement and decision-making skills that are consistent with a citizenship education (Andrade & Teixeira, 2025).

Based on this analysis, we assert that:

- the balloon baby activity allowed students to gain insights in order to comprehend that sexuality has a human and holistic character; from a Health Education perspective, it promoted critical reflection on themselves and others through the assumption of responsibilities;
- the activity involved a simulated scenario that addressed topics such as early pregnancy, care and responsibility, and social-emotional skills, combining knowledge-developing practices with social engagement; and,
- by expanding the discussion on sexuality and its relationship to scientific and technological knowledge, as well as culture and power, it has enabled critical, autonomous, and ethical scientific education that cultivates individual and collective responsibility within and for society.

Hence, we emphasize that an emotional dimension permeated the entire learning process and was a driving force for critical reflection and development of new meanings regarding sexuality in Health Education/STS Education, with the aim of strengthening attitudes, values, ethical commitment and social responsibility. Thus, it is clear that pedagogical practices integrating affective and cognitive experiences contribute not only to conceptual understanding but also to the development of empathetic and awareness-based attitudes toward inequalities and challenges for adolescents, as Health Education in the school curriculum assumes, in order to achieve a critical and emancipatory education.

FINAL CONSIDERATIONS

The analysis of results from this pedagogical intervention revealed that emotions expressed by students were not peripheral aspects of the educational process, but rather central elements to the development of critical knowledge about sexuality. Emotional experiences arose as mediators of learning, stimulating reflections, meanings and attitudes that surpass a mere acquisition of information. This implies that Health Education should be prioritized in school curricula, particularly in terms of critical thinking.

Results demonstrated that integrating emotion and affectivity facilitated the development of broader understandings of gender relations, early pregnancy and responsibility regarding personal and collective choices. Experiences of sadness, empathy, surprise and concern proved to be affective movements that favored critical and sensitive posture development. This illustrates how feeling and thinking intertwine in shaping more aware and reflective individuals, as well as being potential elements of scientific and technological literacy, critical thinking, and of relationships between technological knowledge and its social implications, whose intersection was evidenced in the articulation of Health Education and STS Education.

From a theoretical standpoint, this study reaffirms the potential of Discursive Textual Analysis as research methodology capable of revealing the meanings produced in educational interactions, especially when it comes to phenomena that involve subjectivity and affectivity. In the pedagogical sphere, this investigation demonstrates the relevance of teaching practices that integrate emotional and cognitive aspects, leading to a more meaningful and humanizing learning experience. Strategies such as documentary screenings and symbolic activities have proven effective in promoting engagement and evoking empathy upon students concerning socially sensitive issues. This points to a promising future in which more educational practices in Health Education are incorporated into school curricula and treated critically.

However, we acknowledge that this study was conducted within a specific school context, with a limited number of participants, which precludes generalizations. Even so, the emerging insights may inspire new inquiries at different educational levels, exploring other topics that examine the relationship between emotion, cognition, and critical thinking, particularly with regard to other issues that can be linked to Health Education/STS Education. As implications of this work, we also point to the role of school as a legitimate and driving place to approach sexuality in a critical, responsible, and welcoming way, within the scope of its pedagogical potential for social transformation in Health Education/STS Education.

We conclude that debate between emotion and reason in sexuality education constitutes a fruitful path toward strengthening critical, reflective, affective, and emancipatory pedagogical practices in a wide variety of school contexts. By recognizing feeling as an inseparable part of thinking, school reasserts itself as an environment for humanization and dialogue, where scientific knowledge is combined with sensitivity and empathy in the preparation of ethical, critical individuals committed to the social transformation of themselves, others, and the community, by means of ethical responsibility and civic education.

NOTES

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