

TRANSFORMATIVE EDUCATION FOR NURSES TO ADDRESS CLIMATE CHANGE: FREIREAN PERSPECTIVES

EDUCAÇÃO TRANSFORMADORA A ENFERMEIROS E A ENFERMEIRAS, PARA ENFRENTAR AS MUDANÇAS CLIMÁTICAS: PERSPECTIVAS FREIREANAS

EDUCACIÓN TRANSFORMADORA PARA ENFERMEROS Y ENFERMERAS, PARA ENFRENTAR LOS CÁMBIOS CLIMÁTICOS: PERSPECTIVAS FREIREANAS

 Nádile Juliane Costa de Castro¹
 Matheus Gabriel dos Santos Cunha²

¹Universidade Federal do Pará UFPA, Programa de Pós Graduação em Enfermagem. Belém, PA - Brazil.

²Universidade Federal do Pará UFPA, Faculdade de Geografia. Belém, PA - Brazil.

Corresponding Author: Nádile Juliane Costa de Castro

E-mail: nadiledecastro@hotmail.com

Authors' Contributions:

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ABSTRACT

Objective: to reflect on the training for addressing climate change in Nursing, based on Paulo Freire's perspectives on transformative education. **Method:** a theoretical-reflective study, grounded in scientific literature and aligned with the authors' experiences in extension projects, research, and teaching on the topic. **Results:** this paper articulates two main axes: training based on critical awareness to drive action in response to climate change; and dialogue, equity, and social justice in Nursing education. **Final considerations:** this study underscores the need for transformative education in the training of nurses, capable of fostering critical awareness and proactive engagement in addressing the challenges posed by climate change. The integration of Freirean principles into Nursing education can promote reflective and emancipatory practices, which are essential for building a more equitable and resilient healthcare system.

Keywords: Nurses; Nursing Education; Climate Change; Environmental Health; Equity; Social Environment; Nursing.

RESUMO

Objetivo: refletir sobre a formação para o enfrentamento das mudanças climáticas na Enfermagem, a partir das perspectivas de Paulo Freire sobre educação transformadora. **Método:** estudo teórico-reflexivo, fundamentado na literatura científica e alinhado às experiências dos autores em projetos de extensão, pesquisa e ensino sobre o tema. **Resultados:** este texto articula dois eixos: formação a partir da conscientização crítica para o agir frente às mudanças climáticas; e diálogo, equidade e justiça social na educação em Enfermagem. **Considerações finais:** este estudo reforça a necessidade de uma educação transformadora na formação de enfermeiros, capaz de promover a conscientização crítica e a atuação proativa diante dos desafios das mudanças climáticas. A integração dos princípios freirianos na educação em Enfermagem pode fomentar práticas reflexivas e emancipatórias, essenciais para a construção de um sistema de saúde mais equitativo e resiliente.

Palavras-chave: Enfermeiras e Enfermeiros; Educação em Enfermagem; Mudança Climática; Saúde Ambiental; Equidade; Meio Social; Enfermagem.

RESUMEN

Objetivo: reflexionar sobre la formación para enfrentar los cambios climáticos en la Enfermería, a partir de las perspectivas de Paulo Freire sobre educación transformadora. **Método:** estudio teórico-reflexivo, fundamentado en la literatura científica y alineado con las experiencias de los autores en proyectos de extensión, investigación y docencia sobre el tema. **Resultados:** este texto articula dos ejes: la formación desde la concienciación crítica para actuar frente a los cambios climáticos; y el diálogo, la equidad y la justicia social en la educación en Enfermería. **Consideraciones finales:** este estudio refuerza la necesidad de una educación transformadora en la formación de enfermeros, capaz de promover la concienciación crítica y la actuación proactiva ante los desafíos de los cambios climáticos. La integración de los principios freirianos en la educación en Enfermería puede fomentar prácticas reflexivas y emancipatorias, esenciales para la construcción de un sistema de salud más equitativo y resiliente.

Palabras clave: Enfermeras y Enfermeros; Educación en Enfermería; Cambio Climático; Salud Ambiental; Equidad; Medio Social; Enfermería.

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INTRODUÇÃO

Climate change represents one of the greatest contemporary global challenges, directly impacting health and requiring appropriate responses from healthcare systems⁽¹⁾. This issue is emphasized in legislative frameworks such as the Paris Agreement and the 2030 Agenda, which highlight the need for integrated actions to mitigate or adapt to climate impacts, particularly concerning the basic human rights of vulnerable groups, such as access to healthcare⁽²⁾. This discussion has gained significant attention in recent years, especially with the growing consequences of climate change and the increasing demands on health services due to extreme weather events⁽¹⁾.

In this context, the education of nurses takes on a prominent role, as these professionals are on the front lines of healthcare delivery^(2,3). To address these challenges, nursing education needs to be reoriented through critical and transformative perspectives, using a theoretical framework aligned with the redirection of educational processes. This approach aims to recognize health as a right of affected individuals and education as a means of fostering dialogue about this reality^(4,5). Liberating education emerges as a pathway, serving as a tool for social, political, and critical transformation, countering the domestication inherent in models aligned with banking education^(5,6).

Moreover, it is important to recognize that the vision of environmental rationality advocated by Enrique Leff in the book *Environmental Epistemology* (*Epistemologia ambiental*) serves as a relevant guide in academic development, critically addressing climate changes exacerbated by neoliberal capitalism⁽⁷⁾. This rationality contrasts with the economic perspective that produces alienated agents, oblivious to the significant impacts generated by this economic model, which directly affect the health of the global population.

In this regard, works such as *Education, the Practice of Freedom* and *Pedagogy of Autonomy* by Paulo Freire provide valuable insights for charting this path^(5,6). Both emphasize awareness as a fundamental process in education and argue that education should awaken learners' critical consciousness about their social, political, and economic conditions, enabling them to act as agents of change⁽⁸⁾. This highlights the need to focus on vulnerable populations, reinforcing the relevance of these works in addressing emerging issues.

The relevance of the central themes and key concepts developed in these works is evident. From this perspective, the interconnection between education and politics stands out, as well as the critique of the massification of education, dialogicity, conscientization, reciprocity

between teaching and learning, respect for the culture of learners, and praxis^(5,6,8). These elements underpin education and training for social justice, considering inequalities in access to health, while also providing a theoretical framework capable of transforming education and, consequently, society⁽⁹⁾. In light of this scenario, and although there are some studies on environmental health and disaster response^(2,3), a significant gap remains regarding the specific training of nurses in relation to climate change. While there are studies on environmental education⁽⁸⁾ and risk management⁽³⁾, little progress has been made in addressing the impacts of climate change on the health of vulnerable populations, particularly those in geomorphologically disaster-prone regions, such as flat areas near rivers, lakes, and peripheral regions. In these areas, health must be guaranteed as a right that ensures dignified living conditions.

Therefore, the application of Freirean principles^(5,6) is essential to mediate reflections on perceived demands, processes already in place, and possible adaptations, with the aim of addressing the impacts of climate change⁽¹⁾. This approach can guide teaching and learning processes rooted in actions that seek to transform social realities, promoting an education that goes beyond the mere transmission of technical knowledge, capable of training agents of change^(5,6,8). This stands in contrast to the growing influence of neoliberal models in health education.

This aspect involves understanding education as a dialogical process, seen as a communicative practice that promotes the exchange of knowledge and guides its processes through experiences shared between educators and learners⁽⁵⁾. It is crucial to integrate scientific knowledge with the experiences and local wisdom of communities, as this enables discussions about the distribution of resources and access to healthcare services⁽³⁾, while engaging with issues of equity and social justice⁽⁵⁾.

These are opportunities to promote an education that fosters the critical capacity and autonomy of students^(8,10), based on mutual and collaborative learning. However, it is necessary to move beyond Eurocentric models, in which students are passive subjects, content does not reflect regional realities, and there is no acknowledgment of the need to adapt systemic structures. Therefore, the incorporation of critical and dialogical approaches in education can be guided by various mechanisms and methodologies that emphasize critical reflection and active participation in the educational process^(5,6).

It is essential that nursing educators be committed to fostering critical and emancipatory education, capable of adopting and implementing transformative pedagogical

strategie⁽⁵⁾ within the context of the Unified Health System (SUS). This is particularly important given the pressing need for a socio-political perspective on nursing practice, enabling educators to promote reflective actions that develop students' critical thinking⁽⁸⁾, as well as their curiosity. This approach aims to transcend banking education and outdated curricular models^(5,6) that fail to address the unique characteristics and diversities of different groups.

In this regard, one might ask: how should Paulo Freire's insights be integrated into the training of nurses to address the challenges posed by climate change? This paper seeks to provide a critical and transformative perspective for the education of historically aware individuals, enabling them to act with consciousness, ethics, and a commitment to social justice in the face of climate change challenges. This is especially relevant in caring for vulnerable populations within the context of the SUS.

METHODOLOGY

This theoretical-reflective study was developed in the first semester of 2024, grounded in scientific literature and aligned with the authors' experiences as researchers in the fields of Geography and Nursing. The authors have been involved in extension projects, research, and teaching on the topic. The study evaluates the possibility and necessity of engaging with the concepts of transformative education, with a particular focus on dialogue, equity, and social justice, so that these principles can support an education practiced as a means of freedom^(5,6,8), especially in actions addressing climate change.

Paulo Freire's theoretical model of transformative education is central to this study^(5,6). Freire proposed an education capable of transforming social and political realities, and these theories were applied to analyze how such principles can be integrated into the training of nurses to address the challenges posed by climate change.

An interpretative analysis of the key concepts of Freirean education was conducted to ground the proposed reflections. Thus, a critical analysis of Paulo Freire's works was carried out, focusing on the convergent concepts within his writings. This stage involved in-depth and interpretive readings, aiming to understand how his educational principles can be applied to the training of nurses, highlighting elements that encourage individuals to engage in transforming their social and political realities.

Other concepts were also relevant to this analysis, such as environmental health and climate change. These terms are essential for understanding the multiple dimensions and conceptual tensions involved. To this

end, convergences and divergences between the concepts were identified, enabling more accurate and well-founded analyses of their interrelationships and impacts in contexts of anthropogenic interactions^(8,9).

It was found that while environmental health focuses on the relationship between human health and the physical environment, climate change encompasses alterations in climate patterns^(1,9), which can have broad and varied consequences for ecosystems and population health. Both concepts converge in their concerns for human well-being and environmental sustainability but differ in their approaches and specific scopes, necessitating integrated strategies to build a holistic management framework.

The reflection proposed in this study is presented in two main axes: the development of critical awareness to act in response to climate change, and the promotion of dialogue, equity, and social justice in nursing education.

Critical awareness and action in response to climate change

The debate regarding concerns about the significant use of natural resources emerged in the mid-1950s, driven by the rise in industrial production (referred to as the Great Acceleration). However, discussions about climate change only gained momentum in the 1990s, specifically during the global event Rio-92. The central focus of this event revolved around strategies to combat the growing impacts of these changes and their damaging effects on ecosystems, as well as on environmental and collective health⁽¹¹⁾.

Such debates and discussions on a global scale—often ineffective due to their alignment with neoliberal interests—have made little progress regarding the main objective: combating the advancement of climate change. Therefore, understanding that these top-down discussions often fail to produce tangible results is crucial for building horizontal dialogues and actions that can genuinely mitigate such damages, contributing to the promotion of health among the most impacted populations⁽¹¹⁾.

It is within this context that the debate arises regarding the importance of developing a new curricular framework that incorporates current discussions and environmental realignments. In this regard, it is essential to understand the role of nurses in addressing climate collapse and ensuring fair and democratic access to healthcare. To achieve this, it is necessary to question the current approaches adopted by higher education institutions, given the insufficient attention these issues receive,

which undermines the future preparedness of nursing professionals.

Thus, critical awareness and environmental rationality are processes through which individuals develop a deep understanding of the social, political, economic, and environmental conditions that influence their lives^(3,9). These concepts are fundamental to the training of nurses, enhancing their ability to analyze and intervene in the face of climate change impacts and identify connections with social inequalities⁽⁹⁾. This awareness is crucial because the groups most exposed to these changes—such as Black people, residents of peripheral regions, children, and the elderly—are also the most vulnerable.

The black youth of the Global South, for instance, have been identified as the most vulnerable to climate change, as they represent a marginalized population due to historical processes and the contexts in which they live—such as favelas, peripheral areas, and quilombos⁽¹²⁾. Moreover, conditions of precarious urbanization, with limited access to quality urban infrastructure, make these populations more susceptible to the effects of climate change, exposing them to various types and intensities of disasters. Within this framework, it is important to highlight that poverty directly impacts certain groups, particularly women and children.

In this regard, a nursing practice must be developed to understand these specificities and vulnerable scenarios⁽¹⁰⁾. Structures that support education, such as research, can contribute to the production of knowledge and dialogues about the potential of these groups, enabling them to organize and address recurrent difficult situations. This can support studies on resilience in risk management, promoting a more critical approach to training.

However, when analyzing the curricula, it is evident that, in practice, the advancement of neoliberal models⁽¹³⁾ reinforces the dehumanization of the educational process, reducing individuals to mere market objects while erasing their historical and cultural realities. This stands in stark contrast to critical education, which is grounded in questioning and addressing the challenges faced within the SUS. Therefore, aspects related to the needs of SUS users, aligned with public policies and scenarios involving vulnerable groups^(1,10), must be integrated through alternative mechanisms such as outreach programs and research, as a counterbalance to the neoliberal perspective.

Moreover, it is important to consider the significant expansion of nursing higher education courses in Brazil and the influence of oligopolies, which aim to promote ideological and political training centered on neoliberal principles⁽¹³⁾. It is crucial to identify both the setbacks and

progress within this context, particularly regarding climate change, to understand how curricula have diverged or aligned in this regard, as well as how these dynamics impact professional training in the field and influence actions taken in response to this scenario.

Neoliberal power has become hegemonic, embedding its narrative on a global scale and promoting an economic vision based on the exploitation of natural resources to achieve development. This perspective has been absorbed into the everyday ways many people interpret, live, and understand the world^(11,14). This phenomenon does not only affect economic issues but also permeates the sciences, producing professionals who respond solely to economic interests. It is essential to foster dialogues about the impacts of neoliberal practices on territories, health care networks, and the role of health professionals in training. As dialogical processes about the world and evolving society, educational practices aligned with critical reflection on reality help cultivate professional action that is attuned to social and economic transitions, which disproportionately affect marginalized and minoritized individuals. Therefore, it is crucial to challenge students to reflect on their roles as citizens within this broader context.

This involves integrating specific content on climate change and environmental health into nursing curricula from critical and citizen-oriented perspectives^(9,10). First, students should be active participants in their educational processes, with a voice in the innovation of practices and ideas through horizontal dialogue between educators and learners, fostering effective participation and critical reflection^(6,8). Second, it is necessary to outline pathways that address socio-environmental issues, such as the assessment of environmental risks (analyzing how they impact collective health), disaster management, and strategies to promote sustainable practices related to human dignity and quality of life.

Various socio-environmental impacts driven by climate changes can be highlighted, which cause harm to collective health, such as the increased frequency and intensity of extreme weather events (storms, droughts, heatwaves)⁽¹⁾. These events lead to forced migration processes, changes in precipitation patterns, acidification of rivers and oceans, affecting food security, rising sea levels, among other consequences. These examples illustrate how climate changes exacerbate climate-related diseases^(1,2).

Moreover, the impact of droughts on Amazonian communities, intensified by climate change, poses risks to mental health, access to water, and affects subsistence

activities. The training of nurses should include the analysis of such cases to develop effective intervention and prevention strategies⁽⁹⁾, raising awareness to use indicators such as water quality, air pollution, and the incidence of climate-related diseases to assess and plan public health guidelines.

It is possible to observe the importance of praxis—the integration of theory and practice—as a pathway to genuine awareness and social transformation^(5,6,8). Therefore, it is essential to critically revisit pedagogical projects, understanding how their content, practices, and references align with Freirean principles. These are crucial steps, as continuous evaluation helps identify convergences throughout the training process and, above all, monitors those aspects that deviate from Freirean educational principles, particularly in terms of reading and problematizing the world⁽⁶⁾.

The inclusion of the theme in a cross-cutting manner, when there are no specific curricular activities with designated hours, can serve as an initial approach, which is already under discussion^(3,9). Additionally, selecting disciplines that are more closely aligned with the topic and integrating this content is essential. However, it is relevant to incorporate generative themes related to climate change and environmental justice in a cross-cutting and dialogical way, grounded in the reality of the students and their territories. In the absence of such integration, offering the topic as an optional curricular activity can help fill the gap, as modifications to pedagogical projects involve discussions and time to develop a new version for approval by the Ministry of Education.

Dialogue, equity, and social justice in nursing education

Paulo Freire's dialogical pedagogy emphasizes a critical education that opposes the “banking” model of education, which is considered oppressive and capitalist^(5,6), reinforcing social inequities. Freire's work underscores the importance of fostering dialogue, incorporating reflections and historical processes⁽⁶⁾, paving the way for transformations that transcend institutionalized models of health service practices and promote an education grounded in dialogue and community vigilance.

Based on this conception, the need to mediate such a process by integrating scientific and popular knowledge during nursing education becomes evident, with the aim of addressing climate change. The incorporation of local community experiences and knowledge enriches student training, providing more holistic and

contextualized understandings of socio-environmental challenges, supported by strategies that promote life and health.

In this context, by adopting Freirean principles, nurses are trained as critical agents committed to social transformation, capable of advocating for equity in the distribution of health resources and services. This involves the development of critical and participatory practices, rooted in local realities⁽⁹⁾. Such an approach helps break away from uniform models that fail to reflect the diversity of Brazilian realities, while valuing the potential and dynamics of each territory.

As Freire emphasizes, it is vital for educators to nurture epistemological curiosity and promote the collective construction of knowledge^(5,6). This process prepares professionals to address, for example, the challenges posed by climate change from a perspective of solidarity. Solidarity, which is fundamental to care and the practice of citizenship, when integrated into education, fosters more humanized care⁽⁶⁾.

As an act of love and courage⁽⁶⁾, questioning, challenging, and transforming reality means that nurses engage in continuous learning, which is crucial for addressing contemporary challenges and strengthening the SUS. This educational approach encourages students to reflect and act, considering health as a right and implementing health policies in innovative ways.

The renewal of professional practice through the critical problematization of the living conditions of SUS users and the impacts of climate change must always consider the dynamics of power and inequalities present across territories. Teaching and learning processes should address real health issues, ranging from primary care to more complex demands, promoting a critical perspective on the current scenario.

Moreover, the embodiment of words through examples, as proposed by Freire in 1996, requires educators to demonstrate, through their actions^(5,6), a commitment to sustainability and social justice. Possible pathways include discussion forums, seminars, and workshops, where students and health professionals can share experiences and learn from one another.

Furthermore, it is essential to create a learning environment that values creativity, collaboration, and innovation⁽⁶⁾. Such an environment prepares nurses to face the challenges of climate change with courage, hope, and political engagement. Additionally, joy and hope must be nurtured—essential aspects that Paulo Freire highlights as part of continuous and transformative educational processes. Training nurses as historical, conscious, and

engaged individuals is crucial for building a fairer and healthier world.

Upon reviewing these aspects, it becomes clear that dialogue is fundamental to initiating this transformation, though it is limited by processes of interaction and collective knowledge construction. It is crucial for communities to recognize their reality in the practices developed, with the aim of integrating them into the educational process and achieving better outcomes. Yi-fu Tuan emphasizes the importance of viewing this through the lens of the concept of place, as he argues that individuals understand the world from their own place, based on their perception of lived space⁽¹⁵⁾. Therefore, incorporating the regional knowledge of the populations served becomes essential.

The dialogue between scientific knowledge about climate change and the experiences and local wisdom of the communities served provides an opportunity for the protagonism of social movements, which value popular actors and knowledge. Along this path, case studies and community outreach projects, in which students work directly with communities to understand and mitigate the impacts of climate change, are essential to materialize this idea. These initiatives enable nurses to deeply understand the social, political, and economic conditions that affect the health of populations.

Moreover, the inclusion of new knowledge is vital to breaking away from economic rationality by addressing issues that reveal the true nature of factors impacting the environment, while dismantling weak and ineffective approaches—often infantilized perspectives promoted by the neoliberal system⁽¹⁴⁾. An interdisciplinary vision, as opposed to a multidisciplinary framework, becomes empowering in the training of nurses, fostering a critical and questioning perspective.

This inclusion can be effectively implemented through proper planning, timely enough to transcend Eurocentric theories and models present in nursing curricula, and to reach the groups most affected by climate change, such as indigenous peoples, quilombolas, Black communities, and those in unique geographic contexts, like riverside populations. When there are limitations in executing actions or projects, methodological approaches such as problem-based learning (PBL), Design Thinking adapted for dialogical processes, and traditional methods like the Maguerez Arch can be employed to address diverse realities.

It is necessary to implement interdisciplinary seminars that address the socio-environmental aspects of climate change, allowing students to discuss topics such as climate justice, social vulnerability, and community

resilience strategies, fostering a deeper understanding of the interconnections between health and the environment^(3,9). Extension projects can include awareness campaigns on the importance of basic sanitation in flood-prone areas or programs to monitor water quality in riverside communities, for example.

Equity can be promoted through the resolution of real-world problems related to climate change and health, such as developing an emergency plan for a community vulnerable to natural disasters. This approach encourages collaboration and praxis, building knowledge alongside the population while providing students with hands-on experience and raising awareness about environmental issues. Furthermore, case studies also support the development of educational processes, including learning, teaching, and evaluation, while offering opportunities for the application of methodological innovations.

FINAL CONSIDERATIONS

This study reaffirms the importance of transformative education in the training of nurses, fostering critical awareness and proactive engagement in addressing the challenges posed by climate change. By integrating Freirean principles, nursing education can promote reflective and emancipatory practices, which are essential for building a more equitable healthcare system committed to social justice. Critical awareness empowers individuals to recognize and address the impacts of climate change, while situating their understanding within the complex interplay between social inequalities and environmental health.

The integration of scientific knowledge with local wisdom is crucial for developing culturally relevant public health strategies. Vulnerable communities, such as riverside populations, quilombolas, and indigenous peoples, hold valuable knowledge that, when combined with the technical training of nurses, can lead to more appropriate interventions. This dialogical and inclusive process aligns with Paulo Freire's principles, promoting an education that goes beyond the mere transmission of knowledge, striving for social transformation and equity in healthcare.

The development of environmental rationality in the context of climate change emerges as a tool to train professionals capable of mitigating the socio-environmental impacts that arise from this new social rearrangement. In doing so, critical thinking is fostered, alongside resistance to hegemonic neoliberal rationality, strengthening the dialogue between traditional and academic knowledge. This dialogue enables practices that reduce such

risks and damages, combating climate and environmental injustices.

However, this study presents some limitations, such as the reflective nature of the research. Future studies should focus on the implementation and evaluation of the proposed strategies in real-world nursing education contexts and may include case studies documenting the experiences of nurses trained under curricula that incorporate these critical and transformative approaches. Research could also investigate the impact of university extension programs that integrate local knowledge with formal health education, as well as the use of innovative educational technologies and problem-based learning.

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