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The ecological crisis as an educational challenge: analysis of the nursing degree curricula in Madrid and Catalonia.

La crisis ecológica como reto educativo: análisis de los programas curriculares del grado de enfermería en Madrid y Cataluña.

Iván Vázquez Tarrío [1]*, Silvia Casellas Castellano [2.]

[1] Miguel Hernandez University of Elche (UMH), Spain, ivan.vazquez01@goumh.umh.es, https://orcid.org/0025-1234-5678-9012.
[2] University School of Nursing of the Sea (EUI Mar), Spain, mussol1973@gmail.com, https://orcid.org/0009-0004-9179-0585
* Correspondence: ivan.vazquez01@goumh.umh.es

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Summary.
The ecological crisis is having increasing impacts on human health, demanding that nursing professionals possess the necessary knowledge to address these challenges and contribute to greater resilience in healthcare systems. To this end, a content analysis was conducted on teaching guides and curricula for the Nursing degree at universities in Madrid and Catalonia during the 2024-2025 academic year, identifying the presence of concepts related to climate change, planetary health, environmental pollution, biodiversity, and eco-social justice. The main findings of the analysis point to a limited and uneven integration of these topics into the curricula. 89% of Catalan universities include some reference to these concepts, compared to only 15% of those in Madrid, and public universities show a greater presence of this content than private ones. Environmental education content in nursing curricula appears fragmented and focused on traditional approaches to environmental health, with little presence of broader conceptual frameworks such as planetary health or a critical analysis of the socio-economic roots of the ecological crisis. A knowledge gap has been identified that reinforces the need to integrate socio-environmental content and interdisciplinary approaches across the board to prepare nursing staff to face the health challenges arising from the ecological crisis.

Keywords: Nursing education, curriculum, climate change, global health, environmental health education.

Abstract.
The ecological crisis is having increasingly significant impacts on human health, creating a need for nursing professionals to acquire adequate knowledge to address these challenges and contribute to greater resilience within healthcare systems. To this end, a content analysis was conducted of teaching guides and nursing degree curricula at universities in Madrid and Catalonia during the 2024–2025 academic year, identifying the presence of concepts related to climate change, planetary health, environmental pollution, biodiversity, and ecosocial justice. The main findings indicate a limited and uneven integration of these topics into nursing curricula. While 89% of Catalan universities include some reference to these issues, only 15% of universities in Madrid do so. Public universities also show a greater incorporation of these contents than private institutions. Environmental training within nursing curricula appears fragmented and primarily focused on traditional environmental health approaches, with limited inclusion of broader conceptual frameworks such as planetary health or critical analyzes of the socioeconomic roots of the ecological crisis. This knowledge gap highlights the need to integrate socio-environmental content and

interdisciplinary approaches across nursing education in order to better prepare nursing professionals to face the health challenges arising from the ecological crisis.

Keywords: Education, nursing, curriculum, climate change, global health, environmental health education.

1. Introduction

The Intergovernmental Panel on Climate Change (IPCC) and, more recently, The Lancet (1) in its 2024 report on climate change and health, report with a high degree of confidence that climate change has had, and will continue to have, a very significant impact on the physical and mental health of the world's population. Among the risks to human health (1) cited are increased exposure to heat waves, extreme weather events, and changes in the patterns of certain vector-borne infections. Other mechanisms through which climate change can affect health include food insecurity, waterborne and foodborne illnesses, population displacement, and impacts on mental health. In this regard, the IPCC and the World Health Organization have strongly recommended strengthening health systems to increase their resilience and that of local populations to the challenges posed by climate change. Although IPCC and The Lancet frequently refer to the term climate change, for the purposes of this work, the concept of ecological crisis will be used as a broad framework that includes interrelated phenomena such as climate change, environmental pollution and biodiversity loss, as well as their repercussions on human health.

This strengthening of healthcare systems necessarily implies a change in how healthcare professionals think and respond, not only to the health impacts of climate change, but also to the ecological crisis as a whole. This requires not only a deep understanding of these impacts, but also knowledge of the social and behavioral patterns that influence public exposure and a critical view of the institutional and environmental contexts and the root causes underlying the ecological crisis. This "emancipatory knowledge" is the foundation for building social, cultural, and political awareness regarding climate change among healthcare professionals (2-3), enabling them to act as agents of change for eco-social justice (4) . In this sense, both medical and nursing staff can play a fundamental role in communicating and disseminating information about the issue to patients and their families, as well as to leaders, legislators, government agencies, and international organizations (5) , acting as true drivers of social change.

Regarding nursing professionals, the International Council of Nurses (6) urges recognition of the fundamental role of nursing in the path towards health equity and social justice and universal, quality health coverage. Calls have also been made by the Canadian Nurses Association (CNA (7) , the American Nurses Association (ANA) (8) , and the National League of Nursing (9) . This essential role of nursing in public health and social justice is not new, as nursing has traditionally played an active role throughout history in advocating for public health and has been at the forefront of care and the recognition, within its own practice, of the social determinants of health. Indeed, achieving the goals of universal health coverage and health equity is closely linked to the empowerment and expansion of human resources in nursing (6, 8, 10). This is not only because the nursing profession is one of the largest and constitutes a substantial part of the health workforce (11) , but also because it is one of the professions that inspires the most trust among the population, gaining significant influence among patients and the community as a whole (11-12).

The lack of training regarding the ecological crisis and planetary health hinders nursing staff from playing an active role as leaders of profound socioeconomic transformation. This is why many authors advocate for the urgent incorporation of the ecological crisis into the nursing degree curriculum, while also calling for a stronger interdisciplinary approach (13-14). In this regard, some studies in the United States (10) and Canada (15) have already highlighted this lack of training, as well

as the absence of specific subjects addressing environmental issues in nursing education programs (16) . The development of professional competencies and the design of curricula are interrelated processes in which social needs, professional standards, and university institutions converge. Competencies guide the training of future professionals and define the expected areas of practice. In this context, the curriculum is a key element for incorporating new and emerging content, including environmental sustainability, planetary health, and climate change. (17–19) .

This traditional curriculum approach contrasts with the collaborative, work-based learning of knowledge in nursing and has posed a significant barrier to the inclusion of environmental issues and the principles of social ecology and planetary health in nursing student training (20-21). Other barriers frequently cited in the scientific literature for the inclusion of aspects related to the ecological crisis in nursing curricula are curricular overload and lack of space in current programs (7, 21), lack of knowledge and experience among faculty (7, 11, 21) coupled with a lack of resources and educational materials (22) , and finally, limited institutional support and the perception that content on climate change is not a priority (3, 7, 11, 23). Faced with these barriers, the literature proposes different strategies to promote the incorporation of the ecological crisis into nursing education, including the cross-cutting integration of content (20, 23-24), the creation of specific subjects (18, 20, 24), the use of active and experiential methodologies and other initiatives from Participatory Action Research (14, 18), and the strengthening of teacher training (18, 25-26) and institutional and regulatory support (23) with policies aimed at consolidating scientific research in the field (27) .

Furthermore, various voices argue that university education should incorporate critical perspectives from ecological economics or a deep or consistent ecological economics, in line with what has been proposed, to understand the social, economic, and political dimensions underlying the ecological crisis and to promote approaches oriented towards ecosocial justice. (28-29) providing students with a critical view of the social, political and economic value systems that fuel the ecological crisis (9, 30-31) abandoning the emphasis on individual responsibility (26) .

- too-distant future scenario in which Spain, due to its geographical location, will be especially vulnerable to the ecological crisis and its impacts on health (32), it is essential to rigorously analyze the academic curriculum of nursing studies at the various Spanish universities. This analysis recognizes that curriculum design and the definition of competencies are key elements that shape the professional profile, the capacity for action, and the worldview of future nursing professionals, who constitute one of the cornerstones of the National Health System (NHS). Investigating how, to what extent, and from what frameworks issues related to climate change, sustainability, and planetary health are addressed is fundamental to diagnosing existing training gaps and proposing strategies that allow for the critical and interdisciplinary integration of environmental content into nursing education. Systematic reviews such as that by Vandenberg et al. (33) highlight the significant research gap regarding how and in what way the environmental issue is being incorporated into nursing practice and the training of new graduates. While studies have been published that have addressed the analysis of nursing degree curricula, either in the form of case studies or cross-sectional studies, in various territories such as Latin America (31) , Sweden (26) , Canada (3) or the United States (34) , no studies have been found in the scientific literature that have focused on nursing degrees in Spanish universities. This study aims to fill an existing research gap by analyzing the nursing degree programs at universities in the two regions of Spain with the highest number of nursing positions offered during the 2024/2025 academic year: Madrid and Catalonia. It seeks to determine whether these curricula incorporate content related to three aspects of the ecological crisis (climate change, air pollution, and biodiversity loss) and their impacts on health, as well as issues related to sustainability and critical perspectives on the underlying causes of the ecological crisis. This study also aims to discern whether there are substantial differences between nursing education programs at public and private universities.

2. Methods

To achieve the objectives of this study, we propose a descriptive cross-sectional study using content analysis (35) to explore associations between the training programs of nursing schools in Madrid and Catalonia. This will allow us to determine whether these programs incorporate concepts related to Planetary Health and Social Ecology, and to what extent they consider the impacts of the global socioeconomic model on human health and well-being. To this end, we will conduct a content analysis (35) of the curricula and teaching guides for nursing degree programs (2024-2025 academic year) in the two selected regions. Madrid and Catalonia were chosen because they offer the highest number of places in nursing degree programs in Spain during the 2024-2025 academic year. Furthermore, these autonomous communities have a high number of public and private universities, which allowed us to analyze a wide variety of teaching programs while maintaining the feasibility of the study.

To select the study material, we used the search engine available on the Ministry of Universities' website for the Register of Universities, Centers, and Degrees (RUCT) to obtain a list of public and private universities that offer nursing degrees in their catalogs. From this list, we searched each university's website for the curriculum and course guides for the various nursing degree courses. Each course guide or syllabus for nursing degrees available on these websites was considered the unit of analysis. All required, core, and elective courses with accessible course guides during the data collection period were included. Courses whose course guides were not publicly available or for which the university was not provided were excluded.

Once the set of sample units was obtained, a content analysis was performed on the entire text of the course syllabus for each subject, based on the conceptual codes listed in Table 1 and the analysis categories in Table 2. The codes in Table 1 were developed from the work of Salinas et al. (36) and the IPCC glossary, also incorporating critical theoretical frameworks widely used in the literature on planetary health and political ecology. The coding of the sample corpus was carried out by reading the course syllabi in their entirety and systematically searching for terms and content related to each conceptual category. A sample unit or subject was considered positive for a code when one of the associated terms included in its operational definition appeared explicitly or when the described content corresponded unequivocally to the analyzed category. Ambiguous or insufficiently developed references were not counted.

Regarding the codes in Table 1, when the same concept appeared multiple times in the same subject, it was counted only once to avoid overrepresentation. Furthermore, given that the analyzed codes are conceptually interrelated (for example, climate change, biodiversity, and planetary health), a non-exclusive coding system was applied. Each unit of analysis could be assigned to multiple categories when the content simultaneously met the established operational criteria. To reduce ambiguity in the coding, specific operational definitions were established for each category, along with assignment rules based on the explicit presence of terms or concepts defined in Table 1. In cases of conceptual overlap, code assignment was based on the explicit presence of the associated term, avoiding interpretive inferences when there was no direct textual mention. In any case, a pilot test of manual coding was carried out on a subsample of the corpus to refine the category system and detect ambiguities.

Subsequently, content analysis was conducted by two independent observers to avoid potential biases related to each researcher's expectations, values, or categories. In case of discrepancies, the final decision was made by consensus between both evaluators. Inter-rater reliability was assessed using Cohen's kappa coefficient. A specific kappa coefficient was calculated for the main dichotomous variables, while for thematic classification or classification by conceptual codes, a kappa coefficient was estimated based on the dichotomous coding of presence or absence of each category.

Data analysis was performed using Microsoft Excel for coding and Stata 18.0 for statistical analysis, employing descriptive and inferential statistics. Categorical variables were summarized using absolute and relative frequencies (percentages). Fisher's exact test was used to analyze associations between qualitative variables (region and university ownership versus the presence of content related to the ecological crisis and the socioeconomic model). The level of statistical significance was set at $p < 0.05$. Analyses were performed using Stata (StataCorp, version 18.0). The inferential analysis was exploratory, as the study does not aim to make population-level inferences but rather to describe the set of universities analyzed. Furthermore, since the study included all universities offering the Bachelor's Degree in Nursing in the regions analyzed during the 2024–2025 academic year, the analysis approximates a comprehensive descriptive study of the defined framework, and therefore uncertainty and confidence intervals were not calculated.

Table 1. Conceptual codes analyzed.

Code	Operational definition/Coding criteria	Associated or search terms
Capitalocene	Critical approaches that analyze relationships between power, economy, and the environment	Conflicts of ecological distribution, (eco) social justice, ecofeminism, or concepts that link the exploitation of labor, technological development, and unlimited growth to environmental degradation (extractivism or environmental colonialism), resource distribution, globalization
Anthropocene	References to the role of human activity as a transformative force in Earth systems and the origin of global environmental changes, without necessarily alluding to a specific socioeconomic model.	Anthropocene, anthropogenic pressure, human impact on the planet, human action on ecosystems, global environmental transformation, anthropogenic origin of environmental changes, human activity, carbon footprint, hole in the ozone layer, emission of pollutants, industrial activity.
Biodiversity	References to biodiversity and its alteration or loss	Ecosystems, biological diversity, ecological relationships, variety of life on Earth, loss of biodiversity, species, habitats, ecosystem degradation
Planetary Health	Reference to approaches that integrate human health with the health of natural systems on a global scale. The systemic relationship between health and the environment is made explicit.	Planetary health, planetary boundaries, One Health, EcoHealth, environmental health, ecological balance, health-ecosystem interdependence, intergenerational justice, ecosystem health
Social determinants of health	Social, economic, and environmental factors that influence health and equity. Social or structural factors of health are explicitly stated.	Social determinants of health, equity (gender, age, race, migrant status), social justice, living conditions, vulnerability, inequality, exclusion, environmental determinants, structural determinants
Climate change	Explicit references to climate change, understood as long-term changes in temperature and climate patterns as a consequence of human activity.	Climate crisis, climate change, climate emergency, global temperature, greenhouse effect, greenhouse gases, carbon dioxide, fossil fuels, emissions, sea level rise, melting glaciers, carbon cycle, ocean acidification, extreme weather events.
Land use changes	Explicit references to land use changes with environmental or climate impact	Deforestation, desertification, changes in reflectivity and storage of greenhouse gases, change in agricultural use, loss of vegetation

		cover
Extreme weather events	Mention of unusual intensity meteorological phenomena associated with climate variability and with an impact on health	Extreme weather events, hydrological cycles, floods, droughts and heat waves, forest fires, cyclones, extreme hydrometeorological phenomena
Sustainability and Circular Economy	References to strategies for maintaining social and healthcare systems within environmental limits. Strategic or institutional frameworks for sustainability are explicitly stated or mentioned.	Sustainable development, sustainability, Sustainable Development Goals (SDGs), circular economy, mitigation, adaptation, resilience, vulnerability associated with climate risk, 2030 Agenda
Food security	Conditions of access, production and quality of food with an impact on health. The relationship between health, food, and food production systems is made explicit.	Food systems, sustainable diets, foodborne illnesses, chemical and biological contaminants in food, local products, livestock farming, food sovereignty and sustainable agriculture.
Urban planning and housing	Influence of the urban environment and housing on health and well-being. The urban or housing environment is explicitly mentioned as a determinant of health.	Urban resilience, nature-based solutions, green infrastructure and sustainable mobility, green spaces, housing, urbanism, urban planning
Environmental pollution	Toxicological or eco-epidemiological effects of environmental pollution on the environment and human health.	Air pollution, water pollution, endocrine disruptors, persistent organic pollutants, pesticides or microplastics, environmental noise, light pollution
Ecological economics and biophysical limits	Explicit references to approaches that analyze the relationship between economy, society and environment from the perspective of the planet's physical limits, strong sustainability and the critique of unlimited economic growth.	Biophysical limits, degrowth, entropy, metabolic systems, social metabolism, selective degrowth, strong sustainability, economy-environment conflict, environmental externalities

Table 2. Content analysis categories.

Categories of analysis	Operational definition	Response codes	Coding criteria
Is there any mention of the health impacts of the ecological crisis?	Explicit mention of the effects of climate change, pollution or environmental degradation on human health	No/Yes	Yes: Presence of one or more terms or concepts associated with climate change, loss of biodiversity, pollution or the various effects of the ecological crisis or the environment on health (food security, zoonoses, waterborne or foodborne diseases…)
Is there any mention of the impacts of the socioeconomic model on health?	Explicit mention of the anthropogenic origin of the ecological crisis or its roots in the socio-economic model.	No/Yes	Yes: The presence of concepts such as inequality, capitalism, social justice, or other terms associated with Social Ecology or the Capitalocene. References to globalization, development, international relations, or territorial inequalities that do not explicitly establish a relationship with health were not coded as affirmative.
What content is being referred to?	Presence of the conceptual categories in Table 1	Multiple	Presence of terms associated with each category or content that is unequivocally associated with that

	category. Non-exclusive coding; a sample unit can have several codes.

3. Results

After consulting the RUCT (National Register of Universities, Centers, and Universities) belonging to the Ministry of Universities, 13 universities with nursing degrees were identified in the Community of Madrid (4 public and 9 private) and 9 universities in Catalonia (6 public and 3 private). In Madrid, the majority of places offered during the 2024/2025 academic year were in private universities, 1,723 compared to 965 offered in public universities. In Catalonia, most of the places offered were in public universities (2,258 compared to 550 in private universities) (see Table 3).

In total, a total of 872 sample units were analyzed (448 belonging to Madrid universities and 424 to Catalan universities) that comprised the teaching guides of the subjects of the different nursing degrees of the 22 regional universities.

Regarding the first research question (is the ecological crisis and its impacts on human health mentioned in any way?) (see Table 4), a total of 11 of the 22 universities analyzed (50%) included some explicit reference to this relationship. In the analysis by region, it was observed that in Madrid, 3 out of 13 universities (23.1%) incorporated this content, compared to 8 out of 9 universities in Catalonia (88.9%). A statistically significant difference was found between regions (Fisher's exact test, $p = 0.008$).

Table 3. Universities with undergraduate nursing studies in Madrid and Catalonia.

University	Ownership	Region	Places offered for the 2024/2025 academic year
Alcalá	Public	Madrid	175
Autonomous University of Madrid			455
Complutense			250
King Juan Carlos			85
Alfonso X the Wise	Private		308
Antonio de Nebrija			135
Camilo José Cela			205
European Union of Madrid			198
Francisco de Vitoria			210
International Business			60
Villanueva International			80
Pontifical University of Comillas			395
San Pablo CEU			132
Autonomous Community of Catalonia	Public	Catalonia	698

Barcelona		750
Girona		190
Lleida		190
Pompeu Fabra		175
Rovira i Virgili		255
International of Catalonia	Private	120
Ramon Llull		130
Vic-Central		
University of Catalonia		300

Regarding public versus private universities, 8 of the 10 public universities analyzed (80.0%) presented content that refers to the health impacts of the ecological crisis, compared to 3 of 12 private universities (25.0%), also observing a statistically significant association (Fisher's exact test, $p = 0.03$).

The agreement observed between the two evaluators for this issue was 99.6% (there were only three disagreements) and the kappa coefficient was 0.92, with high inter-rater agreement.

The identified references were primarily found in core or required courses related to public health, community nursing, health anthropology, or health determinants, although they were also recorded in some elective courses. Table 4 presents representative textual fragments or units from the categories of analysis.

Table 4. Content analysis results.

University	**Number and type of subjects with affirmative mentions**	**Examples of content**
Is there any mention of the health impacts of the ecological crisis?		
Alcalá	1 required	"Ecological approach to the determinants of health"; " Influence of the atmosphere and water on health, Impact of climate change on human health."
King Juan Carlos	1 required	"Environment and health. Environmental risks to public health. … Influence of climate on health. Thermal extremes: heat waves and cold spells. … Housing and health. Adaptation to climate change "
Camilo José Cela	1 required	"Introduction to the environment in relation to human health… Climate and health… Food, water, health and the environment… Soil pollution. Waste management… Human environment, housing and health"
UB	4 (2 compulsory, 2 optional)	"Health and the environment"; "Food waste. Food systems, negative impact on the environment. A global problem with economic, environmental, and social consequences"; " Analyzing the relationship between the environment and health"; " Analyzing the impact of the health system on the environment"; "Climate refugees"
UAB (Sant Pau and Terrassa)	2 basic	"Ecosocial model of health, work and health"; "Environmental epidemiology"; "Migration and health"
Tecnocampus UPF	1 basic	"Climate crisis and emerging diseases"; "We are currently

		facing a new situation, that of climate change, which has significantly increased people's vulnerability to the impact of extreme weather events, so the most vulnerable people are exposed to hurricanes, torrential rains or droughts that affect health, food security and nutritional status"
Blanquerna	1 basic	"To assess the impact of pollution (water, air, noise) and healthcare waste management on human health, and to propose nursing interventions for the prevention and mitigation of their effects."
Rovira i Virgili	2 optional	"Eco-feminism, social justice and ecosystems"; "WHO, we place health within a framework that depends on ecosystems (individual-community-environment relationship). Health inequities and their causes. The social determinants of health."
Girona	1 required	"Determinants of health. Environmental factors that influence health. SDGs"
Lleida	1 basic and 1 optional	"Global health and globalization. Healthcare systems of the world: middle- and low-income countries. Healthcare for vulnerable groups. Climate change and nursing"; "Sociology of health. Future challenges: 2030 Agenda. Social determinants of health. Environment and health. Environmental determinants of health and healthy spaces. … Public health and social policy. Globalization and international health."
Vic-UCC	2 required	"Health and its determinants. The environment and health. Understanding environmental factors and their influence on population health. The atmosphere, water, soil, and their pollutants"; "Global and Environmental Health"
Is there any mention of the impacts of the socioeconomic model on health?		
Pompeu Fabra	1 required	"The social determinants of health: conditioning factors of lifestyles; Anthropology of health in the field of public health and environmental sciences. Medication, capitalism and biopolitics. Anthropological perspectives on environmental pollution and global health"; to identify the social, cultural and economic-political factors that intervene in the development of this process (health-disease), assimilating at the same time knowledge and reflective skills that will enable them to address health and disease beyond their technical and biological dimension"; "Inequality, poverty and health"
Rovira i Virgili	2 optional	"Well-being and healthy habits. Food and sustainability. Social problems and personal values. Social justice and human rights. WHO, we place health within a framework that depends on ecosystems. Health inequities and their causes"; "Eco-feminism and environmental health"

Regarding the roots of the ecological crisis in the socioeconomic model and the impacts of human activity on global health and well-being, only two universities explicitly mention these interactions in any way. Both are public universities in Catalonia. Overall, the presence of content related to the impacts of the socioeconomic model on health was generally low. Thus, only 22.22% of Catalan universities (2 out of 9) explicitly mention the interrelationship between the socioeconomic model and human health (see Table 4). No statistically significant differences were detected between regions (Fisher's exact test $p = 0.156$) or according to ownership (Fisher's exact test $p = 0.195$). Inter-

rater reliability for this issue was high, with 99.9% agreement. Cohen's kappa coefficient was κ = 0.80, indicating substantial agreement between evaluators. Although the observed agreement was virtually perfect, the value of κ was influenced by the low frequency of cases classified as "Yes".

Content analysis identified the areas most frequently found in course syllabi (see Table 5). The most common code was "Social Determinants," present in universities from both regions and with different ownership structures, typically linked to subjects such as Public Health, Community Nursing, or specific healthcare for women, postpartum patients, children, or the elderly. Other identified codes included "Sustainability and Circular Economy, " " Environmental Pollution, " "Food Security, " "Urban Planning and Housing," and " Extreme Weather Events. " In Table 5, a single university could contribute more than one subject to the same category. Inter-rater agreement for this category was substantial (k=0.65), calculated using Cohen's kappa coefficient on a dichotomous coding system of presence/absence of the topic. The discrepancies identified during the coding process were reviewed and resolved by consensus between both reviewers.

Table 5. Number of subjects coded in each conceptual category.

Code	Public Madrid	Madrid Private	Public Catalonia	Private Catalonia
Capitalocene	0	0	4	0
Anthropocene	0	0	0	0
Biodiversity	0	0	0	0
Planetary Health	0	1	9	1
Social Determinants of Health	24	38	27	9
Climate change	2	0	3	0
Land use changes	0	1	0	0
Extreme weather events	1	1	1	0
Sustainability and Circular Economy	3	3	9	9
Food security	1	5	7	1
Urban planning and housing	1	2	0	0
Environmental pollution	2	3	6	2
Ecological economics and biophysical limits	0	0	0	0

The terms "Planetary Health" and " Climate Change " appear in a limited way, and " climate change " or "climate crisis" were identified only in courses at four public universities (Pompeu Fabra, Lleida, Alcalá, and Rey Juan Carlos). No explicit references to biodiversity, the Anthropocene, or ecological economics and biophysical limits were recorded.

The most explicit environmental references focused primarily on aspects related to environmental health, such as air, water, and food pollution, healthcare waste management, and other factors. These references were mainly found in subjects related to public health and community nursing.

Specifically, a subject in the program at the University of Girona included the term "planetary health", while in other universities expressions related to the interdependence between health and the environment could be identified, such as environmental health, One Health or ecosystem approaches.

In three Catalan public universities (Rovira i Virgili, Pompeu Fabra, and UAB), content associated with critical perspectives on the socioeconomic model was identified, linked to the code

"Capitalocene" (social justice, ecofeminism, capitalism and biopolitics, globalization, North-South relations). However, the presence of this content did not necessarily imply affirmative coding in the analytical category "impacts of the socioeconomic model on health." This category required an explicit reference to the influence of socioeconomic or structural factors on human health. For this reason, some mentions related to globalization or North-South relations were classified within the conceptual code "Capitalocene," but were not considered sufficient to answer affirmatively to this analytical category. Terms linked to the field of social ecology, such as biophysical limits, metabolism, social entropy, or degrowth, were not found in the analyzed course guides.

Finally, the analysis of course syllabi also revealed humanistic or religious content in some Madrid public universities, present in general education or interdisciplinary courses. For example, the Francisco de Vitoria University includes topics such as Christian values, beliefs, and principles (in courses like Clinical Nursing I) and Islamic terrorism and the future of the West (in courses like History of the West) in its course programs. Furthermore, University Activities I and II at the same university validate activities such as the Camino de Santiago (Way of St. James).

In the case of CEU San Pablo, we find terms such as Existential Manifestations (in Anthropology) or the dialogue between science, reason and faith (in Social Doctrine of the Church).

4. Discussion

The results show a limited and uneven integration of the ecological crisis and its impacts on health into the nursing degree programs analyzed, consistent with previous studies found in the literature (3, 10, 33-34). Although some content is identified, especially in Catalan public universities, the analysis shows that the presence of content related to climate change, biodiversity loss, planetary health, or social ecology is minimal within the set of course guides examined. A low overall proportion of universities incorporating this content is observed, as well as a notable difference between the various regions and between public and private universities.

In general, Catalan universities show a higher frequency of references to the relationship between health and the ecological crisis compared to those in Madrid, incorporating a greater number of references. This same trend is observed in public universities compared to private ones. These results could reflect the existence of possible differences between institutional contexts that might influence the design of curricula. However, the study design does not allow for the identification of the underlying causes of these differences, so future research could delve deeper into the organizational and academic factors that influence the incorporation of this content.

Besides, A significant presence of terms linked to the social determinants of health, sustainability, and the Sustainable Development Goals has been identified. While this content could point toward a broader range of educational content beyond the strictly biomedical, there is a risk that it will remain tied to a public health and care planning framework with fewer references to structural frameworks or critiques of the socioeconomic model (2, 18-19). Concepts related to environmental health have also been detected in the curricula, primarily linked to pollution, extreme weather events, and waste management. This content, found in various subjects, appears to be associated with more traditional approaches to environmental health, rather than more innovative or comprehensive perspectives.

of the term " climate change," primarily associated with public universities, is striking. This absence contrasts with the broad scientific consensus on the impacts of climate change on human health. Furthermore, there is a limited presence of references to its anthropogenic origin, the loss of biodiversity, and other concepts inherent to the Planetary Health approach. These results suggest that the incorporation of these conceptual frameworks into the analyzed curricula is still in its early stages.

A minority presence of content addressing critical elements of the global socioeconomic model or power relations in the wake of the ecological crisis is observed. These references are found associated with terms such as ecofeminism, social justice, anthropological perspectives on capitalism, and biopolitics in some Catalan public universities. This content indicates that there are spaces where the relationship between health, the environment, and socioeconomic structure is addressed from more comprehensive and broader perspectives. This content is offered primarily in elective courses and appears marginally in the analyzed curricula, both in public and private universities in both regions, which could point to a still limited integration into the general undergraduate curriculum. On the other hand, the analysis has also revealed evidence of how certain private universities in Madrid incorporate content of a religious nature.

Taken together, these results reflect the diversity of educational approaches present in the Spanish university system. The coexistence of this content with the absence of specific courses on the ecological crisis and its impacts on health opens a debate about the differences in the distribution of curricular content among universities and in the hierarchical organization of knowledge within study plans. How institutional frameworks influence this configuration of content could be a subject of study in future research.

This work is still an approximate study and is subject to some limitations. On the one hand, the analysis has been based exclusively on teaching guides available on institutional websites, meaning that the content taught in classrooms may not coincide with that included in the teaching guides, and some of the topics covered in these guides may require further exploration in daily teaching practice.

The study of teaching guides also fails to capture the potential impact of complementary activities or innovative teaching projects (18) , which may not be reflected in these documents, meaning that environmental training could be underestimated. Furthermore, it is important to remember that nursing professionals' training continues throughout their careers, so the results of this study are not intended to reflect the overall environmental training of the nursing community.

Even so, the results obtained do point to trends in how socio-environmental content is incorporated into university nursing education and point to a still limited commitment from universities to make the ecological crisis a cross-cutting issue (7, 11, 23).

Furthermore, the results of this study can be a good starting point for future work that addresses the perception of the climate crisis of teachers, students and nursing professionals through the use of other quantitative and qualitative social research techniques (interviews, surveys…) and also points to the need to investigate and problematize how different institutional and contextual sensitivities towards the socio-environmental issue influence the social and curricular construction of the ecological crisis in the university environment.

Finally, the methodology used can be replicated in the analysis of academic curricula of other university degrees or qualifications, such as Medicine, Chemistry, Biology or Pharmacy, which can also play a key role as active agents of social transformation.

5. Conclusions

- This study highlights the significant gap between the magnitude of the ecological and climate crisis and its impact on human health, and the degree to which these issues are integrated into the academic curricula of nursing degrees in Madrid and Catalonia. Despite the broad scientific consensus and accumulated evidence on the anthropogenic origin of climate change and its socio-health implications, the results show that these topics appear in a limited and variable manner

across different universities in the course syllabi for nursing degrees, despite their relevance to public and community health and to the very sustainability of healthcare systems.

- The descriptive analysis of the teaching guides suggests territorial and institutional differences, with a greater presence of content more sensitive to the eco-social issue in public universities, especially Catalan ones.
- The incorporation of this content appears fragmented and with little depth in addressing the structural dimensions of the socio-economic crisis. This difference in approach between public and private institutions is noteworthy in the current context of the rise of private universities. However, it is important to understand that the study design does not allow us to infer the level of depth with which this content is addressed in daily teaching practice, since the analysis of course syllabi does not allow us to evaluate other elements of the educational process, such as the development of competencies, effective teaching practices, or the actual implementation of the content in the classroom. Therefore, the results should be interpreted as an approximation of the formal presence of this content in curricula, rather than as an evaluation of learning or educational practice.
- In general, the curricula analyzed tend to address concepts such as sustainability, SDGs, and social determinants, although they do so from descriptive or applied approaches. In contrast, central frameworks of political ecology and critical ecological economics are practically absent from the teaching guides analyzed.
- The limited explicit inclusion of climate change and other aspects of the ecological crisis in nursing programs poses significant challenges for preparing future nursing professionals to face the changing and complex socio-health scenarios of the future, especially in a geographical area like Spain, which is particularly vulnerable to climate change. In this sense, these results reinforce the need for universities to become aware of and adequately prepare future professionals to address the health challenges arising from the socio-ecological crisis, while simultaneously fostering an empowering education for healthcare professionals that enables them to participate critically in debates on finding alternatives to the current scientific and technological model that underpins the unlimited growth models underlying the current ecological crisis.

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Declaration of the use of Artificial Intelligence: In the preparation of this article, AI (ChatGPT) was used only for the purpose of translating the article summary into English.

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