DALLA PEDAGOGIA MEDICA ALLA SALUTE PLANETARIA: VERSO UN MODELLO EPISTEMOLOGICO PER L'INTEGRAZIONE DEI PARADIGMI FORMATIVI CONTEMPORANEI

FROM MEDICAL PEDAGOGY TO PLANETARY HEALTH: TOWARDS AN EPISTEMOLOGICAL MODEL FOR INTEGRATING CONTEMPORARY EDUCATIONAL PARADIGMS

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ABSTRACT
The Planetary Health Pedagogy Model (PHPM) offers an integrated framework for medical education, bridging medical pedagogy, humanities, and planetary health. Developed through a critical mapping of literature and conceptual synthesis, it articulates four axes, ecology of care, intergenerational ethics, climate justice, and pedagogical-environmental reflexivity, redefining medical professionalism as ethical, sustainable, and human-centered.

Abstract
La formazione medico-sanitaria mostra fragilità nell'integrare saperi pedagogici, etici ed ecologici. Il Planetary Health Pedagogy Model (PHPM), sviluppato attraverso una mappatura critica della letteratura e una sintesi concettuale, propone quattro assi: ecologia della cura, etica intergenerazionale, giustizia climatica e riflessività pedagogico-ambientale, orientando curricula verso una professionalità medica sostenibile.

KEYWORDS
Medical pedagogy, Planetary health, Sustainable medical education
Italiano
Salute planetaria, pedagogia medica, formazione sanitaria sostenibile

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Introduction

In recent years, university education in the medical and health sciences has faced significant challenges. On the one hand, it guarantees a high level of technical and scientific training; on the other, it struggles to integrate pedagogical, ethical and communicative knowledge in a stable and organic way. This tension has fuelled the demand for models capable of restoring the centrality of the person and the care relationship, addressing curricular fragmentation (Frenk et al., 2010), the need for training courses that combine health, illness and care as educational dimensions (Zannini, 2001) and the urgency of an ethical-reflective orientation based on the pedagogy of care. At the international level, Engel's biopsychosocial model (1977), subsequently developed by Borrell-Carrió, Suchman and Epstein (2004), proposed an integral approach to the person, capable of overcoming biomedical reductionism. Schön (1983) described the training of the reflective professional, while Jonas (1990) introduced the ethics of responsibility towards future generations, which is now also crucial in healthcare training courses. In Italy, Bruni (2008) highlighted the need for training understood as a complex, ethical and reflective process, emphasising the value of problematisation and dialogue as critical devices in pedagogy. Mortari (2002, 2015) explored the practice and philosophy of care as fundamental pedagogical orientations, while Zannini (2001) developed the perspective of clinical training, highlighting the importance of training social and healthcare workers capable of integrating clinical competence and relational attention. These contributions testify to a growing awareness, but also to the need to consolidate the institutional role of pedagogy in healthcare curricula. Alongside these reflections, innovative methodological experiences such as the application of the Visual Thinking Strategies method have also been tested and validated in Italy, showing how art-based approaches can strengthen observation, interpretation and reflexivity skills (Ferrara, De Santis, & Melchiori, 2020). At a global level, Shaw et al. (2021) have emphasised the urgency of integrating planetary health into health curricula, while Walpole et al. (2023) have highlighted the lack of coherent educational frameworks capable of preparing future professionals for the challenges of the Anthropocene. This is the context for the Planetary Health Pedagogy Model (PHPM), which aims to provide a foundational theoretical framework for medical and health education. The model proposes four conceptual axes: ecology of care, intergenerational ethics, climate

justice and pedagogical-environmental reflexivity, with the aim of integrating clinical competence, ethical responsibility and sustainability, restoring the centrality of the individual in training programmes (Whitmee et al., 2015; IPCC, 2022).

1. Objectives

This epistemological contribution aims to present the Planetary Health Pedagogy Model (PHPM) as a theoretical framework for renewing medical and health education. The article first aims to clarify the fundamental categories that guide the model, rooted in critical pedagogy and the philosophy of care. In particular, Zannini (2001) highlighted, through the perspective of clinical training, how health, illness and care are also educational processes that require the centrality of the person and the relationship; Mortari (2015) emphasised the ethical-reflective dimension inherent in caring, while Bruni (2008) highlighted the need to understand training as a complex, ethical and dialogical process that cannot be reduced to simple technical transmission.

Secondly, the four conceptual axes are explained: ecology of care, intergenerational ethics, climate justice and pedagogical-environmental reflexivity. These axes revisit dimensions already discussed in international literature, but addressed in a fragmented manner. Shaw et al. (2021) emphasise the urgency of integrating planetary health into curricula, while Walpole et al. (2023) highlight the lack of coherent and shared educational frameworks.

The third objective is a critical comparison with established educational approaches, such as competency-based medical education and narrative medicine, valuing their contributions but also highlighting their limitations in relation to contemporary global challenges (Ten Cate & Scheele, 2007; Charon, 2008).

Finally, the contribution aims to outline the model's application and research prospects, suggesting possible curricular paths and empirical experiments. In this context, some experiences already underway are fundamental, such as the application of the Visual Thinking Strategies method in medical education (Ferrara, De Santis, & Melchiori, 2020), which was recently the subject of a systematic review at the international level (Cerqueira et al., 2023). These examples show the possibility of integrating innovative methodologies to support the need to train professionals capable of addressing the health and ecological transformations of the 21st century (Frenk et al., 2010).

2. Method: epistemological foundations and process of constructing the theoretical framework

The construction of the Planetary Health Pedagogy Model (PHPM) falls within the scope of theoretical educational research, understood not as abstract reflection, but as a practice of critical analysis and conceptual construction aimed at innovating existing paradigms. In this perspective, Kvernbekk (2016) highlights how the use of evidence and causal premises contributes to strengthening the rigour of educational argumentation, while Biesta (2020) emphasises that theorising in education means producing conceptual tools capable of guiding and transforming practice. This approach is particularly relevant when addressing complex and transdisciplinary challenges, such as those posed by the Anthropocene, for which there are still no established pedagogical models, but there is an urgent need to provide guiding frameworks for professional training (Walpole et al., 2023).

The PHPM was developed through an iterative process of conceptual mapping, based on a critical analysis of the literature in three areas: medical pedagogy, medical humanities and planetary health. These lines of research provide conceptual frameworks which, despite their different traditions, can be integrated into a unified model to support medical and health training. Unlike a descriptive review, this process adopted a three-part interpretative lens – formative, ethical, sustainability – as a guiding criterion for selecting, comparing and integrating theoretical contributions. This method is inspired by the practices of systematic educational theorisation proposed by Biesta (2020), according to whom "theorising" in education means not only describing, but also generating conceptual tools to transform practice.

The process followed three stages:

1. Critical selection of key sources (articles, books, international frameworks) based on their ability to articulate at least one of the three interpretative categories;
2. Comparative analysis aimed at identifying convergences, tensions and gaps (e.g. the rich attention to the care relationship in Zannini and Mortari, but its absence in planetary health frameworks);
3. abstraction and recombination into four conceptual axes that do not overlap but are interdependent.

To give a concrete example, we will see how the axis of intergenerational ethics arises from the integration of Jonas's principle of responsibility (1990) with Walpole

et al.'s (2023) criticism of the temporal neutrality of medical curricula, while the axis of climate justice emerges from the comparison between the health inequalities described by Shaw et al. (2021) and the historical tradition that intertwined care and education, as documented by Gualdaroni (2025). This methodological approach, while not generating empirical data, aims to ensure transparency, internal consistency and potential replicability, providing a solid basis for subsequent curricular experiments. As Biesta (2020) observes, educational theory should not explain the world, but help us to intervene in it in a more just, sustainable and humane way. The four axes of PHPM do not derive from a descriptive review of the literature, but are the original outcome of a conceptual reflection that has systematically integrated three theoretical traditions, medical pedagogy, medical humanities and planetary health, which have so far been developed in parallel. This operation makes it possible to overcome the fragmentation of previous contributions, generating a unified framework capable of guiding medical and health education in an innovative direction. In this perspective, the PHPM is proposed not as a closed model, but as an open, critical and pedagogically oriented framework. Medical pedagogy has contributed to redefining the meaning of healthcare training, shifting the focus beyond technical competence alone, and Zannini (2001) has shown how the educational relationship is an integral part of clinical practice.

As documented by Gualdaroni (2024a; 2024b; 2025), this focus is not without historical roots, given that medieval hospital communities already organically intertwined care and education, placing educational support at the centre of care settings. In this, medieval hospital communities embodied, in essence, an integration of care, education and social responsibility that the PHPM aims to systematise conceptually in the Anthropocene. This historical tradition shows how education has been an integral part of healthcare practice long before the academic formalisation of medical pedagogy, offering a cultural genealogy that reinforces the need for its institutional recognition in contemporary curricula.

The medical humanities have consolidated this perspective. Narrative medicine, proposed by Charon (2008), highlights how the recognition and interpretation of illness stories strengthen the empathy and communication skills of the physician, making the integration between technical knowledge and subjective experience more conscious.

Planetary health has introduced an innovative framework linking human health, social equity and environmental sustainability. The Rockefeller Foundation–Lancet

Commission report highlighted the urgent need to rethink healthcare systems in relation to global ecological and social crises (Whitmee et al., 2015). More recently, Walpole et al. (2023) highlighted the inadequacy of medical curricula in relation to the challenges of the Anthropocene and the lack of coherent educational frameworks. Similarly, Bellis et al. (2025) documented the fragmentation of medical humanities in the British context, emphasising the need for more cohesive and community-based training practices.

In light of these perspectives, the PHPM identifies three interpretative categories – training, ethics and sustainability – which guide its theoretical development. These constitute the criteria used to analyse the main international educational models, allowing the specific contributions of the PHPM to be identified.

Category	**Main Focus**	**Key References**	**Function within the PHPM**
Educational	Integration between clinical competence and the educational–relational dimension	Zannini (2001); Mortari (2015)	Extends training beyond technical skills, emphasizing communicative, relational, and reflective capacities
Ethical	Responsibility, reflexivity, intergenerational justice	Jonas (1990)	Grounds medical professionalism in responsibility toward the person, the community, and future generations

Sustainability	Health–environment link, social equity, global challenges	Whitmee et al. (2015); Walpole et al. (2023); Bellis et al. (2025)	Integrates ecological perspective and climate justice into medical curricula, overcoming the fragmentation of current educational approaches

Table 1. Interpretative categories and analysis criteria

3. Results: the Planetary Health Pedagogy Model (PHPM)

Based on an analysis of the literature and a critical comparison of the main educational approaches, the Planetary Health Pedagogy Model (PHPM) was developed, which is divided into four conceptual axes. These axes are not simply a sum of previous contributions, but represent an original synthesis of pedagogical categories, ethical issues and ecological perspectives, which form the basis of an integrated model for medical and health education.

1. Ecology of care

The first axis concerns the ecology of care, understood as recognition of the profound interdependence between individual health, social conditions and the environment. The Rockefeller Foundation–Lancet Commission report emphasised that healthcare systems must respond to the challenges of the Anthropocene, moving beyond an exclusively clinical vision (Whitmee et al., 2015). In the field of education, this translates into the need to train professionals who are able to consider care not only as a therapeutic practice, but also as a responsibility towards ecosystems and communities.

2. Intergenerational ethics

The second axis is that of intergenerational ethics, inspired by the principle of responsibility theorised by Jonas (1990). Medical training cannot be limited to the immediate clinical relationship, but must include awareness of the long-term

consequences of healthcare choices, particularly in environmental and social terms. In this sense, education in care also becomes education in sustainability, highlighting the need for extended responsibility towards future generations.

3. Climate justice in medicine

The third axis concerns climate justice, which implies recognition of the inequalities generated by environmental crises and their impact on the social determinants of health. Shaw et al. (2021) highlighted the urgency of including training in health sustainability in medical curricula, while Walpole et al. (2023) showed how the absence of coherent pedagogical frameworks limits the preparation of future professionals. Placing climate justice at the centre of medical pedagogy means equipping students with critical tools to understand and combat health inequalities exacerbated by climate change.

4. Pedagogical-environmental reflexivity

The fourth axis is pedagogical-environmental reflexivity, which combines the tradition of the reflective practitioner (Schön, 1983) with the demands of care pedagogy. Mortari (2015) emphasised the need for reflective practices to raise awareness of educational and healthcare actions. Applied to planetary health, this reflexivity takes on an ecological dimension, inviting future doctors to question not only their relationship with patients, but also the broader effects of their clinical choices on the environmental and social context.

Conceptual Axis	Function within the PHPM
Ecology of care	To integrate the ecological dimension into training processes and clinical practice.
Intergenerational ethics	To ground professional action in an extended and sustainable ethics of responsibility.
Climate justice in medicine	To equip future doctors with critical tools to understand and counter disparities related to climate change.
Pedagogical-environmental reflexivity	To promote a reflective professional habitus capable of connecting care, education, and sustainability.

Table 2. Conceptual axes of the Planetary Health Pedagogy Model (PHPM)

Table 2 summarises the four conceptual axes that make up the Planetary Health Pedagogy Model. Each of these is based on established theoretical traditions, but it is their integration that constitutes the innovative element of the model. The ecology of care extends clinical practice to the relationship with ecosystems; intergenerational ethics introduces responsibility towards future generations as a formative criterion; climate justice draws attention to health inequalities amplified by environmental crises; pedagogical-environmental reflexivity promotes a critical habitus that links the educational dimension to sustainability. The combination of these axes is not only a conceptual operation, but provides a unified pedagogical framework capable of orienting medical and health curricula towards an integral education that is attentive to the individual and capable of responding to the global challenges of the 21st century. Understanding the constituent axes of the PHPM takes on further meaning if the model is interpreted in its theoretical genealogy, as a critical evolution of already established educational paradigms that now need to be expanded in light of contemporary global challenges.

4. PHPM as a critical evolution of existing training models

The Planetary Health Pedagogy Model (PHPM) did not arise in isolation, but rather as a critical development within already established educational traditions. Its originality lies in its ability to bring together contributions from the biopsychosocial model, skills-based training and medical pedagogy with medical humanities, linking them with the latest proposals from Planetary Health Education.

A first reference is the biopsychosocial model, introduced by Engel (1977), who proposed moving beyond the exclusively biomedical paradigm to include psychological and social factors in the understanding of health and disease. Twenty-five years later, Borrell-Carrió, Suchman and Epstein (2004) observed that the model, although widely cited, was often applied in a reductive or rhetorical form, calling for a more complex and coherent interpretation. The PHPM takes up this legacy and expands it by including the ecological dimension as an additional component of the concept of health, an extension that responds to current global challenges.

A second reference is Competency-Based Medical Education (CBME). This approach has oriented curricula towards observable and assessable learning outcomes (Ten Cate & Scheele, 2007), promoting greater clarity in training. However, the literature indicates that CBME applications often favour technical-clinical skills at the expense

of relational and reflective dimensions (van der Vleuten et al., 2012). PHPM proposes an expansion in this direction, understanding competence as not only technical, but also ecological, ethical and narrative.

A third area is that of medical humanities and medical pedagogy. Zannini (2021) emphasises that patients' narratives of illness are an essential expression of their lived experience and that reflective writing by professionals is useful for deepening their knowledge of patients and of themselves.

The mutual reading of patients' and professionals' writings can generate a web of stories that can foster understanding and enrich the care relationship. These practices, together with the philosophy of care outlined by Mortari (2007), can help to promote a more holistic approach to care. The mutual reading of patients' and practitioners' writings can generate a web of stories that can foster understanding and enrich the care relationship. These practices, together with the philosophy of care outlined by Mortari (2015), have helped to root the idea that health education must include ethical and reflective dimensions. The PHPM is part of this tradition, but relaunches it in an ecological and planetary key.

The Planetary Health Education Framework (PHEF; Faerron Guzmán et al., 2021) is an important international reference for the integration of planetary health into healthcare professional curricula. However, the Planetary Health Pedagogy Model (PHPM) proposes a conceptual and educational advancement, distinguishing itself by adopting care as a pedagogical principle and integrating critical reflection as a transversal competence.

The PHEF is divided into five conceptual domains: interconnection with nature; the Anthropocene and health; equity and social justice; movement building and systemic change; systemic thinking and complexity. The PHPM, on the other hand, is structured around four educational axes: ecology of care, climate justice in medicine, intergenerational ethics and pedagogical-environmental reflexivity.

A comparison between these two theoretical architectures clarifies the specificity of the PHPM, which does not replace the PHEF but rather deepens some of its elements and fills in areas that are still underdeveloped.

Domains of PHEF	Axes of PHPM	Added Value of PHPM
Interconnection with nature	Ecology of care	Shifts the emphasis from abstract systemic analysis to the clinical relationship as an

		ethical and ecological act, rooted in the experience of care.
Anthropocene and health	Ecology of care + Climate justice	Integrates the historical-planetary dimension with a direct professional responsibility for health inequalities amplified by the environmental crisis.
Equity and social justice	Climate justice in medicine	Strengthens the social perspective with a specific focus on health injustices produced by climate change, linking them to clinical practice.
Building movements and systemic change	(not central to PHPM)	PHPM does not emphasize political mobilization, but rather the transformation of healthcare professionalism as a lever for change.
Systems thinking and complexity	Ecology of care + Pedagogical-environmental reflexivity	Goes beyond the analysis of interconnections by promoting a critical habitus capable of questioning the ethical, social, and ecological consequences of clinical choices.
(not present in PHEF)	Intergenerational ethics	Introduces an unprecedented training criterion: responsibility towards future generations as an educational and professional principle.

Table 3. Comparison between the PHEF domains and the PHPM axes

The PHEF provides a global conceptual framework centred on the complexity of socio-ecological systems and social justice. The PHPM, on the other hand, pedagogises these principles, transforming them into an operational model for medical and health training. It values care as an epistemological and relational category, integrates climate justice as a professional responsibility, explicitly addresses intergenerational ethics, and introduces pedagogical-environmental reflexivity as a key competence. In this way, the PHPM positions itself as a critical and innovative evolution on the international scene, capable of connecting clinical competence, ethical responsibility, and ecological sustainability in a single educational trajectory. From this perspective, the PHPM takes on the role of integrative evolution, not replacing existing paradigms, but connecting and renewing them, offering training that combines narrative, clinical competence and ecological responsibility as inseparable dimensions of contemporary medical professionalism.

5. Discussion

The development of the Planetary Health Pedagogy Model is part of an educational landscape already marked by innovative but still partial approaches. Competency-based medical education (CBME) represented an important turning point (Ten Cate & Scheele, 2007), but its application has often been criticised for prioritising efficiency and standardised assessment, reducing educational complexity to technical and clinical performance. While recognising its merits, the PHPM proposes an expansion that includes ethical, ecological and reflective dimensions that cannot be reduced to assessment checklists and that place professional competence within a framework of responsibility towards people and ecosystems. This perspective also opens up the possibility of innovative assessments, for example by adapting widely used clinical tools such as Objective Structured Clinical Examinations (OSCE) to complex ecological and social scenarios, thus linking clinical competence and planetary responsibility.

Programmatic assessment, developed by van der Vleuten et al. (2012), introduced a significant innovation, aiming at continuous formative assessment throughout the professional career. This approach has improved the dialogue between learning and certification, but remains centred on the individual. The PHPM, on the other

hand, broadens the perspective, also considering the social and ecological impact of training and suggesting that assessment should include not only individual performance but also the ability to generate collective awareness and change in real care contexts.

Another established reference is narrative medicine, developed by Charon (2008), which has restored the centrality of speech and listening to stories of illness, promoting empathy, communication and personalisation of care. The PHPM takes these elements and places them in a broader framework: pedagogical-environmental reflexivity concerns not only the doctor-patient relationship, but also the link between health, community and environment. In this way, the model broadens the horizon of narrative medicine, linking it to a planetary perspective that includes ethical and ecological dimensions.

A comparison with these approaches shows that PHPM is not simply a combination of already known categories, but a systematic integration that brings together previously parallel traditions, medical pedagogy, medical humanities and planetary health, and organises them within a unified theoretical framework. It is in this synthesis that its originality lies, not in superimposing existing skills, but in generating an epistemological framework that connects them and directs them to respond coherently to the health and ecological challenges of the 21st century.

The model is also rooted in a historical tradition that saw medieval hospitals as places where education and care were inseparable (Gualdaroni, 2024a; 2024b; 2025). This reference to cultural genealogy allows us to place the PHPM in continuity with practices which, although developed in different historical contexts, anticipated the need to combine care, training and social responsibility.

6. Future research prospects

The Planetary Health Pedagogy Model opens up a field of investigation that requires empirical and theoretical development. One initial direction concerns curricular experimentation, with the integration of the four axes of the model into university courses in medicine and the health professions, in order to assess their impact on students' learning, communication and ethical skills, and ecological awareness. To verify this impact, longitudinal studies supported by mixed methodologies (surveys, focus groups, and observational assessments) are a priority. Measurement can be based on tools such as educational sustainability rubrics, adaptations of Objective Structured Clinical Examinations (OSCE) to complex environmental and social scenarios, indicators of reflectivity derived from

narrative diaries or digital portfolios, as well as validated tools for assessing communication and ethical skills. A second area is the evaluation of training practices. Qualitative and quantitative studies can analyse how tools such as reflective journals, high-fidelity simulations or educational sustainability rubrics promote real change in professional habitus, understood as the ability to connect the clinical dimension, ethical responsibility and planetary awareness. A third perspective concerns international and cross-cultural comparison. The challenges related to planetary health take different forms in different contexts: documented experiences in the medical humanities in Europe and Asia (Bellis et al., 2025; Yang et al., 2025) show the need for models capable of adapting to cultural and institutional specificities, avoiding a mere uniform application. A further line of investigation concerns the structuring of integrated training courses. International literature has highlighted the importance of approaches that combine clinical knowledge and humanistic perspectives (Bekele et al., 2025; Bellis et al., 2025). Based on these experiences, research will be able to outline curricular modules structured around interdisciplinary seminars on health, the environment and the ethics of care; narrative and reflective workshops to develop communication skills and ecological awareness; high-fidelity simulations that integrate clinical, relational and decision-making dimensions in complex scenarios; service learning projects in community contexts, to connect academic training with concrete social needs. This approach is not limited to introducing additional content, but aims to transform the curricular culture in an ethical and ecological sense, providing students with operational tools and evaluation criteria to combine clinical competence and planetary responsibility.

Evaluation Area	Tool/Indicator	Brief Description	References
Clinical learning	OSCEs adapted to ecological and social scenarios	Structured clinical stations that include environmental and social complexities.	Inspired by van der Vleuten et al. (2012)
Communicative and ethical competences	Communication Assessment Tool (CAT) and similar instruments	Validated psychometric scales to measure relational and empathic abilities.	Validated tools in literature

Ecological awareness	Educational sustainability rubrics	Evaluation grids that integrate ethical and ecological criteria into training pathways.	Whitmee et al. (2015); Walpole et al. (2023)
Professional reflexivity	Narrative diaries and digital portfolios	Reflective productions evaluated with rubrics for critical depth and ethical responsibility.	Mortari (2015); Charon (2008)

Table 4. Indicators for assessing the impact of the PHPM

Conclusions

Despite its ambition to offer an integrated and innovative theoretical framework, the Planetary Health Pedagogy Model (PHPM) is not without its limitations and challenges. Its implementation requires a profound rethinking of the curriculum, which is not limited to the inclusion of new content, but implies a transformation of disciplinary habits, teaching practices and institutional cultures (Guzmán et al., 2021; Redvers, Guzmán & Parkes, 2023). Academic resistance and the fragmentation of study plans remain structural challenges in educational innovation processes. Added to this is the need to train trainers in ecological-pedagogical skills, a requirement already highlighted by Astle (2021), who calls for urgent transdisciplinary and equity-centred approaches to integrate planetary health into curricula. Addressing these critical issues will require a proactive, multi-level commitment that combines flexible implementation strategies with sensitivity to different educational and political contexts (Gingerich et al., 2024).

However, these difficulties do not weaken the value of PHPM, but rather confirm its urgency. In an era marked by the climate crisis and worsening health inequalities, viewing medical training as merely the transmission of technical skills would be short-sighted and insufficient (Faerron Guzmán et al., 2021). PHPM should be understood not as an additional option, but as an epistemological and ethical necessity, a compass to guide the transformation of the educational paradigm towards a medical professionalism capable of integrating clinical dimensions, social responsibility, critical reflection and ecological sustainability (Potter, 2021; Jacobsen et al., 2024). The challenges of the 21st century do not allow for

incremental approaches; instead, they require a radical change of course, in which responsibility towards the individual, the community and ecosystems becomes the inseparable foundation of every act of care (Redvers, Guzmán & Parkes, 2023).

In this context, the Planetary Health Pedagogy Model stands as an epistemological proposal for medical and health education, capable of integrating three traditions that have hitherto developed in parallel – medical pedagogy, medical humanities and planetary health – within a unified theoretical framework. The articulation of the four axes of ecology of care, intergenerational ethics, climate justice and pedagogical-environmental reflexivity does not simply introduce new content into the curriculum, but outlines a training paradigm that takes sustainability as the structural principle of medical professionalism.

The PHPM is a critical evolution of established models. From the biopsychosocial paradigm (Engel, 1977; Borrell-Carrió, Suchman, & Epstein, 2004) to competency-based training (Ten Cate & Scheele, 2007; van der Vleuten et al., 2012), from medical humanities and narrative medicine (Charon, 2008; Zannini, 2021) to the Planetary Health Education Framework (Faerron Guzmán et al., 2021; Shaw et al., 2021; Walpole et al., 2023), the model brings together and connects diverse perspectives, overcoming their fragmentation. Its originality lies precisely in this systematic integration, which transforms already fruitful contributions into a coherent horizon capable of responding to the health and ecological challenges of the 21st century. At the application level, the PHPM suggests curricular paths that include interdisciplinary modules, narrative and reflective workshops, high-fidelity simulations, and *service learning* projects in community contexts. The impact of these practices can be assessed using established tools that have been reoriented towards ethical and ecological considerations, such as Objective Structured Clinical Examinations adapted to complex scenarios (van der Vleuten et al., 2012), educational sustainability rubrics (Whitmee et al., 2015; Walpole et al., 2023), scales for communication skills (Cerqueira et al., 2023) and reflective productions such as narrative diaries and digital portfolios (Mortari, 2015; Charon, 2008).

The most significant contribution of the PHPM is therefore not the proposal of an additional teaching model, but the definition of an epistemological framework capable of orienting healthcare training towards a form of medicine that is clinical, narrative and ecological. Rather than offering definitive answers, the model opens up a field of research and experimentation that requires further empirical validation and comparative developments in different international contexts. In this perspective, PHPM aims to contribute to the training of health professionals

equipped not only with technical skills, but also with ethical responsibility, planetary awareness and reflective capacity, restoring full centrality to the person and to care as an educational and human act.

Author Contributions

Elisabetta Faraoni

Authored the *Introduction*, *Objectives*, *Results: the Planetary Health Pedagogy Model (PHPM)*, and *Discussion* sections. She conceptualised and developed the overall structure of the Planetary Health Pedagogy Model, conducted the critical literature mapping and conceptual synthesis, and articulated its four conceptual axes. Faraoni also drafted the *Comparison with Existing Training Models*, contributed to the *Future Research Prospects*, and finalised the manuscript for submission.

Francesco Maria Melchiori

Authored the *Method: epistemological foundations and process of constructing the theoretical framework* and *Conclusions* sections. He supervised the theoretical and methodological framework of the article, ensuring epistemological consistency and alignment with international pedagogical and medical education standards. Melchiori contributed to the conceptual validation of the PHPM, the refinement of theoretical references, and the overall scientific supervision of the work.

Joint Contribution

The sections *PHPM as a Critical Evolution of Existing Training Models* and *Final Conclusions* were collaboratively written, integrating Faraoni's pedagogical synthesis with Melchiori's theoretical and methodological oversight.

References

Astle, B. (2021). Planetary health in nursing: A transdisciplinary equity-centered approach. *Creative Nursing, 27*(4), 237–241.

Bekele, A., Nkurunziza, T., Uwizeyimana, A., Mutesi, J., & Uwitonze, E. (2025). "An eye-opener": A qualitative study of a liberal arts approach in medical undergraduate curriculum. *BMC Medical Education, 25*, 7157. https://doi.org/10.1186/s12909-025-07157-z

Bellis, R. T., Frampton, S., Hadley, G., Wallis, J., Bleakley, A., De Luca, G., … & Fulford, K. W. M. (2025). Teaching humanities in UK medical schools: Towards community-

building and coherence. *Medical Humanities*. Advance online publication. https://doi.org/10.1007/s40592-025-00249-y

Biesta, G. (2020). *World-centred education: A view for the present*. London: Routledge.

Borrell-Carrió, F., Suchman, A. L., & Epstein, R. M. (2004). The biopsychosocial model 25 years later: Principles, practice, and scientific inquiry. *Annals of Family Medicine, 2*(6), 576–582. https://doi.org/10.1370/afm.245

Bruni, E. M. (2008). *Pedagogia e trasformazione della persona*. Lecce: Pensa MultiMedia.

Cerqueira, L. H., Marques, C. F., dos Santos, J. P., Almeida, H. O., & Gomes, A. P. (2023). Visual thinking strategies in health professions education: A systematic review. *BMC Medical Education, 23*(1), 370. https://doi.org/10.1186/s12909-023-04470-3

Charon, R. (2008). *Narrative medicine: Honoring the stories of illness*. Oxford: Oxford University Press.

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196*(4286), 129–136. https://doi.org/10.1126/science.847460

Faerron Guzmán, C. A., Aguirre, A. A., Astle, B., Barros, E., Bayles, C., Chimbari, M., … Potter, T. (2021). *A framework to guide planetary health education*. *The Lancet Planetary Health, 5*(5), e253–e255. https://doi.org/10.1016/S2542-5196(21)00110-8

Ferrara, V., De Santis, S., & Melchiori, F. M. (2020). Art for improving skills in medical education: The validation of a scale for measuring the Visual Thinking Strategies method. *La Clinica Terapeutica, 171*(3), e252–e259. https://doi.org/10.7417/CT.2020.2223

Frenk, J., Chen, L., Bhutta, Z. A., Cohen, J., Crisp, N., Evans, T., … & Zurayk, H. (2010). Health professionals for a new century: Transforming education to strengthen health systems in an interdependent world. *The Lancet, 376*(9756), 1923–1958. https://doi.org/10.1016/S0140-6736(10)61854-5

Gingerich, S. B., Olson, E. R., Potter, T. M., LeClair, J., Luebke, J., & Oakley, L. D. (2024). *The future of nursing for planetary health is today: Essential transitions for education and research*. *Quality Advancement in Nursing Education – Avancées en formation infirmière, 10*(4), Article 3. https://doi.org/10.17483/2368-6669.1464

Gualdaroni, F. (2024a). Educare per guarire: Il ruolo formativo delle comunità ospedaliere tardo medievali di Renania e Magonza. *Formazione & Insegnamento, 22*(1), 152–162. https://doi.org/10.7346/-fei-XXII-01-24_17

Gualdaroni, F. (2024b). Emergenze e risposte educative: un'analisi storica dell'educazione civica in tempi di crisi sociale. *Formazione & Insegnamento, 22*(3), 151–159. https://doi.org/10.7346/-fei-XXII-03-24_17

Gualdaroni, F. (2025). Le radici dell'educazione sanitaria: Il contributo delle comunità ospedaliere civili e religiose nella Padania medievale. *Formazione & Insegnamento, 23*, 172–181. https://doi.org/10.7346/-fei-XXIII-01-25_21

IPCC. (2022). *Climate change 2022: Impacts, adaptation, and vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (H.-O. Pörtner et al., Eds.). Cambridge: Cambridge University Press. https://doi.org/10.1017/9781009325844

Jacobsen, K. H., Marchione, K. A., Faerron Guzmán, C. A., Aguirre, A. A., Waggett, R., … (2024). *Planetary health education in the United States: Four curricular models, one goal*. *International Journal of Environmental Health Research, 34*(10), 3672–3681. https://doi.org/10.1080/09603123.2024.2316185

Jonas, H. (1990). *Il principio responsabilità. Un'etica per la civiltà tecnologica* (trad. it.). Torino: Einaudi. (Opera originale pubblicata nel 1979).

Kvernbekk, T. (2016). *Evidence-based practice in education: Functions of evidence and causal presuppositions*. London: Routledge.

Mortari, L. (2002). *La pratica dell'aver cura*. Milano: Bruno Mondadori.

Mortari, L. (2015). *Filosofia della cura*. Milano: Raffaello Cortina.

Potter, T. M. (2021). *Planetary health: An essential framework for nursing education and practice*. *Creative Nursing, 27*(4), 226-230. https://doi.org/10.1891/cn-2021-0017

Redvers, N., Faerron Guzmán, C. A., & Parkes, M. W. (2023). *Towards an educational praxis for planetary health: A call for transformative, inclusive, and integrative approaches for learning and relearning in the Anthropocene*. *The Lancet Planetary Health*, 7(1), e77–e85. https://doi.org/10.1016/S2542-5196(22)00332-1

Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.

Shaw, E., Walpole, S., McLean, M., Alvarez-Nieto, C., Barna, S., Bazin, K., … & Redvers, N. (2021). AMEE consensus statement: Planetary health and education for sustainable healthcare. *Medical Teacher, 43*(3), 222–238. https://doi.org/10.1080/0142159X.2020.1860207

Ten Cate, O., & Scheele, F. (2007). Competency-based postgraduate training. Can we bridge the gap between theory and clinical practice? *Academic Medicine, 82*(6), 542–547. https://doi.org/10.1097/ACM.0b013e31805559c7

Van der Vleuten, C. P. M., Schuwirth, L. W. T., Driessen, E. W., Dijkstra, J., Tigelaar, D., Baartman, L. K. J., & Van Tartwijk, J. (2012). A model for programmatic assessment fit for purpose. *Medical Teacher, 34*(3), 205–214. https://doi.org/10.3109/0142159X.2012.652239

Walpole, S. C., Vyas, A., Maxwell, J., & Hutchinson, E. (2023). Planetary health and medical education: Preparing future doctors for the Anthropocene. *The Lancet Planetary Health, 7*(3), e210–e218.

Whitmee, S., Haines, A., Beyrer, C., Boltz, F., Capon, A. G., Ferreira de Souza Dias, B., … & Yach, D. (2015). Safeguarding human health in the Anthropocene epoch: Report of the Rockefeller Foundation–Lancet Commission on planetary health. *The Lancet, 386*(10007), 1973–2028. https://doi.org/10.1016/S0140-6736(15)60901-1

Yang, J., Li, H., Zhang, Y., & Chen, W. (2025). Exploring and practicing trans-cultural humanistic education: Current situation, challenges, and reform suggestions. *Frontiers in Education, 10*, 1461718. https://doi.org/10.3389/feduc.2025.1461718

Zannini, L. (2001). *Salute, malattia e cura. Teorie e percorsi di clinica della formazione per gli operatori sociosanitari*. Milano: FrancoAngeli.

Zannini, L. (2021). Intrecciare parole nelle pratiche di cura: Il contributo della medicina narrativa. *Autobiografie. Ricerche, Pratiche, Esperienze, 2*(2), 37–46. https://mimesisjournals.com/ojs/index.php/autobiografie/article/view/1304