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Interprofessional Pedagogy for the Anthropocene: Faculty Perspectives on the imperative for Climate Change and SDG-Aligned Planetary Health Education in Medicine, Veterinary Medicine, and Conservation and Marine Ecology programs

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Background: Climate change is one of the planetary boundaries that has been transgressed and is increasingly affecting human, animal, and ecosystem health. Its impacts include the expansion of vector-borne diseases, food and water insecurity, extreme weather events, poor air quality, and adverse mental health outcomes. Despite growing recognition of these threats, climate change and planetary health education remain inconsistently integrated across health professions curricula. Faculty perspectives on embedding planetary health education through interprofessional education (IPE) remain underexplored, particularly in Small Island Developing States (SIDS) where climate vulnerability is acute.

Methods: This qualitative study explored faculty perceptions of planetary health education and the role of IPE in its delivery. Heterogeneous focus groups and one individual interview were conducted with 49 faculty members representing Medicine, Veterinary Medicine, Public Health, Biology/Ecology, Marine Conservation, and pre-medical/pre-veterinary programmes across 18 geographical regions. The focus group/interview questions are provided in Appendix 1. Data were analysed using thematic analysis guided by two research questions addressing the importance of planetary health education and strategies for interprofessional curricular integration.

Results: Three themes emerged. First, faculty expressed strong consensus on the need to align planetary health competencies with the Sustainable Development Goals and identified key curricular topics, including vector-borne and zoonotic diseases, food and water security, heat stress, marine health, mental health, and social determinants of health. Second, participants proposed strategies for curricular integration, including curriculum mapping, vertical integration of competencies, simulation- and case-based learning, shared electives, and experiential learning through institutional partnerships. Third, faculty identified barriers to implementation, including limited accreditation requirements, insufficient faculty development, curriculum overcrowding, and a hidden curriculum in which relevant content exists across programmes but remains poorly coordinated and largely siloed.

Conclusions: Faculty across disciplines view planetary health education as an urgent professional responsibility and support its delivery through interprofessional approaches. However, institutional barriers continue to impede implementation. Existing climate- and One Health-related content across programmes provides a foundation for developing integrated, competency-based planetary health curricula, particularly in climate-vulnerable regions seeking to strengthen health system resilience.

Keywords: Planetary health; climate change; interprofessional education; One Health; Sustainable Development Goals; medical education; veterinary education.

Introduction

Scientific evidence unequivocally demonstrates that climate change is an accelerating phenomenon, that is increasingly impacting the health of humans and animals globally [1, 2, 3]. The ongoing disruption that climatic change has had on environmental systems has produced numerous interrelated direct and indirect impacts on health, manifested through extreme weather events, deteriorating air quality [4], geographic expansion of vector ranges and concurrently infectious diseases [5], biodiversity loss [6], food and water insecurity [7, 8], adverse mental health outcomes [9], and heightened societal conflict linked to socio-economic and political contexts [9]. Recognition of these impacts has led to the emergence of planetary health as an important framework for health professions education. Originating from ecological public health and formalised by the Rockefeller Foundation-Lancet Commission, planetary health emphasises that human health and wellbeing depend upon the integrity of Earth's natural systems [10]. While climate change is often regarded as the most visible environmental threat to health, it represents only one component of the broader planetary health agenda. The Planetary Boundaries Framework identifies nine critical Earth system processes that regulate the safe operating space for humanity, including climate change, biosphere integrity (biodiversity loss), land-system change, freshwater change, ocean acidification, biogeochemical flows associated with agricultural nutrient runoff, atmospheric aerosol loading, novel entities such as chemical pollution, and stratospheric ozone depletion [10], seven of which have already been breached [11, 12]. Planetary health therefore extends beyond climate change to examine how disruption of these interconnected environmental systems influences human, animal, and ecosystem health. Consequently, planetary health education encompasses a wider range of issues than climate change health education alone, including deforestation, biodiversity conservation, sustainable food systems, freshwater security, ocean health, pollution, and environmental justice. This broader perspective aligns closely with the One Health framework that underpins contemporary veterinary medicine and animal health practice [13] and also provides opportunities for these closely aligned narratives to contribute towards attainment of the UN Sustainable Development Agenda (SDG) [14].

The integration of climate literacy into health professions is increasingly recognised as essential [13, 15]. However, climate literacy should be considered one component of a broader planetary health competency framework. While climate change health education focuses on understanding the causes, health impacts, adaptation, mitigation, and healthcare sustainability implications of a warming climate, planetary health education additionally requires learners to understand the health consequences of biodiversity loss, ecosystem degradation, unsustainable food production systems, freshwater and marine ecosystem decline, and other environmental challenges occurring across multiple planetary boundaries [11]. Future graduates will be required to address a growing range of climate-related health challenges while working within healthcare systems that themselves contribute substantially

to global greenhouse gas emissions. Consequently, graduates need not only a strong understanding of the health impacts of climate change but also the practical skills and advocacy capabilities necessary to promote sustainable and resilient healthcare practices. As a result, planetary health literacy is increasingly being viewed as a core professional competency across the health professions [16, 17].

The integration of planetary health and climate change education into health professions curricula remains highly variable across institutions and countries [18, 19]. Existing literature has focused predominantly on medical education, where implementation has often been achieved through elective modules rather than being embedded within core curricula. In contrast, there is a paucity of evidence examining the incorporation of these topics into veterinary education, despite the profession's central role within the One Health framework [1, 15, 20]. Efforts to advance curriculum integration have increasingly been supported by student-led initiatives such as the Planetary Health Report Card (PHRC), which evaluates and benchmarks institutional performance across domains including curriculum, research, community engagement, and sustainability. The PHRC has emerged as an important mechanism for encouraging accountability and driving curricular reform within health professions education [21]. Complementing these efforts, the Global Consortium on Climate and Health Education (GCCHE) has developed competency frameworks that provide guidance on the climate and health knowledge, skills, values, and advocacy capabilities expected of future health professionals [22]. Together, these initiatives have contributed to growing recognition of climate literacy and planetary health as core educational priorities. Notably, studies across health professions have consistently highlighted strong student demand for greater inclusion of planetary health and climate-related content, underscoring the need for more comprehensive and systematically integrated curricular approaches [21,22].

Climate-related health challenges are inherently complex and transcend traditional disciplinary boundaries, requiring integrated approaches to education and practice. Both the One Health and planetary health frameworks emphasize the interconnectedness of human, animal, and environmental health and therefore necessitate collaboration among healthcare professionals, veterinarians, environmental scientists, and policymakers [23]. In this context, interprofessional education (IPE), defined as occurring when students from two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes, offers a valuable approach for fostering systems thinking and developing the collaborative competencies needed to address complex environmental and health challenges. By helping learners understand how to work effectively across professional boundaries, IPE prepares them to enter the workforce as members of collaborative practice teams and supports a broader transition of health systems from fragmented approaches to more coordinated and resilient models of care [24]. Although the evidence base for planetary health-focused IPE remains limited, a growing body of literature suggests its potential to enhance learners' understanding of interconnections across disciplines and to prepare graduates for collaborative action in addressing climate-related health issues [25].

Accordingly, this study explored the perspectives of faculty and students across health professions disciplines at one university regarding the role of interprofessional education in planetary health. Specifically, the study investigated perceptions of the importance of planetary health education in medical and veterinary curricula, students' views on the need for such education, and faculty recommendations for the design of interprofessional learning opportunities, with this paper concentrating on the faculty (RQ1 and RQ3). The research questions were:

- RQ1. How do faculty perceive the importance of incorporating planetary health education, including but not limited to climate change, within the curricula for Medicine and Veterinary Medicine?
- RQ2.What are the perceptions of veterinary and medical students about the need for them to be taught about the effects of climatic change on the health of their future patients?
- RQ3. What are the strategies that faculty propose for designing interprofessional education platforms for delivering planetary health education that would promote cross-institutional learning and collaboration?

Methods

To explore the faculty perceptions about the need for incorporating planetary health education and the strategies for doing this using Interprofessional Education (IPE) pedagogy, we conducted a qualitative study. A phenomenological methodology employed eight heterogeneous focus group interviews and one interview, designed to foster dynamic discussion and capture a range of viewpoints across disciplines. The focus group sessions and the single interview lasted a minimum of 60 minutes, leading to saturation at the end of each session.

Context and Setting

This study was conducted at St. George's University (SGU) in Grenada, West Indies. A Caribbean based offshore private for-profit institution that houses a School of Medicine (SOM) and a School of Veterinary Medicine (SVM) on the same campus. The SOM also offers a Master of Public Health (MPH) program that is Council on Education for Public Health (CEPH)- accredited and offers both stand-alone and dual-degree MPH programs for SOM and SVM students. Faculty across the SOM and SVM programs were invited to participate in the study with data collected between February and April 2026. Also included were faculty in the Department of Education (DES), also housed within the SOM, involved in teaching the pre-medical and pre-veterinary students. One faculty member who participated holds appointments within both the SOM as well as the School of Arts and Sciences (SAS) where they chair the Marine, Wildlife and Conservation Biology program offered to undergraduate students.

Participant Recruitment and Inclusion Criteria

All faculty and students based within the SOM and SVM at the main campus in Grenada, were invited to participate. The population of the institution consists of 372 full time and 67 part-time faculty members in the SOM and 91 faculty members in the SVM. The student population of the institution consists of 2089 MD students and 1115 DVM students based at the main campus on-island. Recruitment was conducted through email invitations, which included a Canva developed flyer, Participant Information Sheet (PIS) and a consent form and Microsoft Form link. The Microsoft form link included an embedded consent form and PIS, outlining the study details, and scheduling options for faculty based on their availability. Sixty-three faculty registered to participate. One of the investigators created heterogeneous groups of faculty and provided a poll to determine their availability. Forty-nine of the 63 registered faculty actually participated. Note the research investigators also participated in the focus groups and account for four of the 49 participating faculty. Due to time constraints, one faculty member could not attend the scheduled focus groups but offered to provide an interview.

The participation rates between medical and veterinary faculty were balanced with 27 participants from the SOM and 22 from the SVM as depicted in **Table 1** below.

Table 1: Faculty Focus Group and Interview Sessions: Distribution between schools and countries – See attached

Focus Group/Interview Session	Department / Affiliation	Country / Region
Focus Group 1	SOM	Guyana
	SOM	Africa
	SOM	Canada
	Public Health	Africa
	SVM	Spain
	SVM	Argentina
	SVM	Africa
	SVM	Kashmir, India
	SOM, Public Health	Grenada
Focus Group 2	SVM	Italy
	SOM	USA
	SOM	Grenada
	SVM	Czechoslovakia
	Public Health	Grenada
	SVM	USA
	SVM	USA
	SVM	Spain
	SVM	Trinidad
	SVM	Germany
Focus Group 3	DES & SOM	India
	SOM, MPH	Grenada
	SOM	Africa
	PH	Grenada
	SVM	Chile
Focus Group 4	SOM	Guyana
	DES & SOM	Grenada
	DES & SOM	Grenada
	SVM	UK
	SOM	Africa
Focus Group 5	SVM	Canada
	Public Health	Carriacou
	SVM	Lebanon
	DES & SOM	Grenada
	SOM	Guyana
Focus Group 6	SVM	Trinidad
	SOM	Grenada
	SVM	India
	SVM	Grenada
	SOM	Grenada
	Public Health	Canada
Focus Group 7	SVM	USA
	SOM	Canada
	SOM	USA
	SOM	Trinidad
Focus Group 8	SVM	Africa
	SVM	New Zealand
	Public Health	Trinidad
	SOM	Africa
	SVM	Iran
Interview 1	SOM	Grenada

Data Collection Procedures

Semi-structured focus group sessions and one interview were held virtually using a secure videoconferencing platform (Microsoft Teams). Each focus group lasted approximately 60 minutes and was facilitated by the Principal Investigator (PI) and a Co-Investigator. The discussions were audio-visually recorded to ensure the accuracy of data capture, with participants' consent. Subjects were assured of their right to withdraw at any time and that their contributions would remain confidential. Faculty participants were asked to provide descriptive statistical data pertaining to their school affiliation, citizenship, and courses taught.

Data Analysis

All focus group and interview recordings were automatically transcribed on Teams and verified by three student research participants. The transcribers reviewed the audio-visual recordings to check the AI output transcripts for the interviews produced in Microsoft Teams. Participant names and identifying details were de-identified during transcription.

Each researcher independently open coded all of the data, generating initial keywords and themes. We analyzed each of the responses using line-by-line coding—first initial coding and then focused coding. The researchers then independently used the methods described by Braun and Clarke (26) to identify emergent themes. Both researchers then met to analyze and discuss the codes and emergent themes. The constant comparative method was used to move data to better-fitting categories or themes until both researchers agreed. Frequently occurring codes and associated initial themes were identified and determined to be primary themes. Subthemes were further identified within some of these primary themes because of their association with the theme. The determination of final themes and subthemes was discussed until general agreement was reached. To ensure rigor in the data analysis, the researchers triangulated their analyses, identifying the most suitable quotations from the participants to convey and support the derivation of themes. This approach allowed for the identification of emerging themes while also examining the data considering existing literature on student and faculty perceptions about the need for planetary health education in the curricula of the Medical (MD) and Veterinary (DVM) programmes.

Ethical Considerations

The study was submitted to the University Institutional Research Board which reviewed the study proposal for ethical approval. All participants provided informed consent prior to participation allowing the sessions to be recorded using audio and visual tools within Teams. The study design safeguarded confidentiality through anonymization, encrypted data storage, and restricted data access. The combination of voluntary recruitment, informed consent, and secure data handling ensured full compliance with institutional ethical standards

Results

There was consensus among the faculty that climate change health education was necessary to ensure student readiness for practice and patient care, particularly in the context of the rise in natural disasters globally as well as within the Small Island Developing State (SIDS) where the study was conducted. Thematic analysis revealed three key themes emerging from the faculty focus group interviews: consensus on the need for planetary health education for all disciplines and on specific topics and the need to align planetary health competencies with the SDG goals; strategies for interprofessional curricular integration & mapping; and institutional barriers to planetary health education and interprofessional education.

One faculty member mentioned:

"Overall, many of the accrediting associations that are associated with our MD and DVM degrees have raised the index of suspicion as to the influence these environmental factors have on health and have indicated the need for increased attention to have these issues raised within our curriculum. Currently we do not do so." (Public Health)

Theme 1: Consensus on the need for planetary health education for all disciplines and on specific topics and the need to align Planetary Health Competencies with the SDG goals

Most faculty expressed concern about the political climate that positions opponents to climate change education.

"Views from political angles that see us that they call it climate variability. They don't believe that there is climate change. It's just it varies overtime. Oh, looking at scientific evidence, there is no doubt the climate is changing and it's affecting everyone on the planet. Climate change is a reality" (SOM)

Other topics of concern that faculty felt students should be aware of to enable them to address patient health concerns were the effect of microplastics and its effect on ocean health as well as overfishing compromising food security, air pollution and heat stress leading to respiratory diseases.

"So in my own way, I'm thinking, looking at my own story, one of the ways we can begin with is actually raising the awareness level amongst students, just so that students get to recognize climate change as a global issue, especially heat stress" (SOM)

Additionally, some raised concerns regarding ocean acidification health and the effects of warming oceans on marine life as seal survival is impaired by less food availability.

"The pressure on overfishing or higher temperatures have been affecting wildlife, the species that we are have been (seals), we have been studying. So it is a fact. I think it's very important for veterinarian students, students and medical doctors also to realize and to bring this into their research or their clinical assessments as well. ..... In warmer years, they have less food available because of , ..., so they are less likely to survive to different natural pressure as diseases, parasites and different diseases occur." (SVM)

Faculty from the Caribbean region expressed particular concern about the need for awareness for disaster preparedness for the Small Island Developing States (SIDS), referencing events including hurricanes as well as a noticeable change in weather conditions over the last 10-20 years. Rising heat and exposure to Sahara dust were the greatest concerns for Trinidad, Grenada and Guyana.

"But now you're looking at the smaller Caribbean regions that are trying to develop and saying you do the recycling, you do this when we're just probably a little dot.
When all of the impact is from the larger countries that are asking us to climate regulate, and that leads into ... a larger political economic game." (SOM)

Faculty discussed the importance of several topics they saw as crucial for inclusion within any curricula, including integration of the climate impacts on the geographical expansion of vector-borne diseases to new areas

"We'll say emerging and re-emerging diseases is climate change and in that context, vector borne diseases seems to be at the forefront of this." (SVM)

Other faculty discussed concerns and the need for linking the effects of climate change to patient outcomes:

"So, so just a quick one on the things we can actually add to the curriculum. I feel like especially concerning the medical school, we can come up with developing clinical scenarios that are linking climate change to patient outcomes. Like from my experience, we can think of things like heatstroke and the outcomes in vulnerable populations or even the impact of polluted air or environment aggravating cancer, asthma patients or even....." (SOM)

Other key topics suggested for curricula inclusion: water-scarcity, and availability, particularly pertaining to the role of agriculture and intensive farming systems on both animal welfare as well as raising the carbon footprint of the planet.

"A lot of the emissions on farm animals and also in terms of food security and elimination of poverty, which are like key sustainable development goals, that's where vets play a really important role as well, right in terms of how we produce food, sustainable food production and consumption. Production animals. ..... I would like to see more of this like gas emission, how it impacts us and maybe how we can reduce it on a farm level, how we can as veterinarians, if you're going to work with food animals." (SVM)

Sustainability in practice was also seen as key for inclusion in curricula across the MD and DVM programmes.

"*Another thing would be all of the plastic syringes, reusable things like maybe find in like maybe research, encourage research more in that area. Maybe find, I don't know, algae that we could use instead of using plastic. Like there's so many different things and topics that we can address from a pollution point of view and environmentally friendly stuff." (SVM)*

"A lot of the emissions on farm animals and also in terms of food security and elimination of poverty, which are like key sustainable development goals, that's where vets play a really important role as well, right in terms of how we produce food, sustainable food production and consumption." (SVM)

One MD discussed the role of geopolitical factors impacting patient mental health, a new discipline that is being developed for global medical curricula:

"The mental health issues that the children were facing or even family was facing, … could be built into Curriculum without saying, hey, I'm fighting for climate change. Geopsychiatry, which also includes climate change is one of the big components in in all medical school curriculum because of great neglect on mental health today." (SOM)

For the MPH faculty, waste management, policy development, and SDG goals inclusion in content frameworks were considered essential.

"But I think as a topic for students to focus on waste and waste management is it is very important.I just wanted to add the point of considering electronic waste because our students and we ourselves generate a lot of that too." (Public Health)

"I also feel very certain that the university will be moving more towards aligning the overall university towards sustainable development goals, SDGs and that's also an opportunity for us in medicine, vet medicine, other programs to realistically determine if how to what extent SDGs are featuring in our curriculum and based on that analysis, probably identify if there are gaps, how we can support the curriculum updates to reflect more of an SDG flavor." (Public Health)"

Dual degree tracks and institutional partnerships with global health organizations enables the MPH to be the most prepared to teach disaster preparedness and consideration of the social determinants of health on public health impacts.

"…., it made me think of the connection between climate change and financial constraints, which is directly impacted to socioeconomic constraints, right? So social determinants of health ……, there's been multiple studies on the effects of floods, fires and drought, and how California is one of the major agricultural players in the United States and how that has a direct impact on access and cost... So I think that the social determinants of health are very much enmeshed in all of this of the finances and the impact at the household and the community level." (SOM)

Another public health faculty proposed the role that artificial intelligence pedagogy could have in preparing students to connect the role that disease modelling could have in forecasting natural disasters.

"I'm thinking about it in terms of technology, how we can support us as a community, our students, our training to enable the technology for modeling determinants of climatic conditions to health impacts across species." (Public Health)

For medicine the focus in the Term 3 Public Health lecture series was on patient outcomes resulting from climatic change impacts rather than the effects on ecosystem and animal health or considering the interlinkages and effect on patient health including prescribing.

"Your patient is impacted. It's an environmental factor, a big environmental factor that can affect a whole host of things from the way you prescribe treatments, the way you evaluate what is going wrong. One of my current passions is to prepare future positions for climate related health risk and bake that in to the curriculum at all levels, because there's no system that you can say is not impacted by climate change, cardiovascular, mental, respiratory, even reproductive. I have papers where showing reproductive outcomes are impacted by climate change, so it would be ethically remiss of me if I, knowing this, didn't advocate for and just to quickly land this plane." (SOM)

One faculty felt that there was too much focus on Western medicine and that Eastern medicine had a lot more relevance in training students to consider a holistic perspective to diagnosis, considering environmental factors as heavily tied to disease occurrence.

"I know Western health, public health. They mainly focus on the disease and the symptomology and the scientific solution for treating those manifestations. Eastern medicine is more inclusive of climate change and as a whole, holistically, the ecosystem. We're part of a whole being." (SOM)

For veterinary medicine, the focus was on the effects of climate change on zoonosis emergence, effects of methane production and agriculture on climate change as well as the impact on wildlife and animal health in disasters. Aquatic systems and marine impacts also featured as key.

"Where diseases may be kind of decreasing the effect on the temperature changes, salinity changes, pH changes on stress, you know, is a big one in aquatics too. And so it's difficult because I don't have room in the curriculum to really focus a lot on wildlife. (SVM)

It was also perceived as a professional responsibility for sustainability to be taught to students.

"And like because professionalism is now becoming a way bigger topic that we teaching, certainly on the SVM side and I'm assuming on the SOM side as well." (SVM)

Plant toxicity and the effect of heat stress on animals from the effects of heat on their plant sources for food were also seen as crucial.

"So, it is related with the overall climate change related challenges, especially I'm looking from veterinary side and I'm linking to the overall One Health perspective. So just like since we are in Grenada, we could appreciate the extreme climate change, especially during the April to June month there is a lot of heat stress and also it is common for both human as well as animal. And it is also accompanied with the water scarcity. So, these are the two main important events. In these extreme weather events, it is quite an important challenge for the large animals. So, most of the available plants have totally dried and we are all aware of it. It is generally ending up in that only the left out toxic plants or some of our less nutritious plants will be there and this could increase the chances of the toxicity among the animals." (SVM)

Theme 2: Strategies for interprofessional curricular integration & mapping

Faculty proposed several strategies by which IPE could be included across campus and were eager to discuss methods for collaboration. Key amongst these was the need to engage in mapping to identify gaps, overlap across program and how integration could become a reality. Discussions revealed where content was already being covered across disciplines, albeit siloed but could be offered as points for IPE integration. The Dept of Education within the SOM enlightened the faculty from the other programmes, who were unaware that the principles of One Health and green chemistry are taught to pre-medical and pre-veterinary students, establishing a foundational appreciation and awareness of the need for transdisciplinary collaboration benefits and suggested topics that could be used as an example for integration.

"Climate science and health literacy, and ask then how do we implement that? I was also thinking systems thinking might be a nice starting point for the different areas to see how they connect or how is this going to be integrated based on the different sectors and risk communication? We could have a one-off lecture on something that is sustainable development related, but it might come under green chemistry, …. These are the classrooms where I would say there's a bit of integration because we would have mixed classrooms where we have biology students, we have nursing students, we have pre-med, pre-Vet students and they're all students that have to take these particular courses." (Pre-SOM/SVM))

In biology, students form a group called ECO that do community work; MD Term 3 embeds public health, ethics, and justice in a few lectures; premed/prevet programs introduce One Health cases requiring problem-solving as well as green chemistry, ocean health, and urban case studies. The MPH program holds strong institutional collaborative partnerships (UNFCCC, WHO Occupational Health, Global Water Partnerships, Grenada National Disaster Management Agency) and prepare students to design and engage in policy development and virtual practicums for disaster preparedness and waste management, though transitioning from virtual to in-person field experience is needed. Faculty had several suggestions by which IPE could occur.

Simulation and active learning: Utilizing Objective Structured Clinical Examinations

(OSCEs), problem-based learning (PBL), and campus-wide interprofessional case competitions for applied clinical skills. In the MPH moving towards in person experiential learning for practicums /capstones.

"Teaching it as like a separate climate change course etcetera and probably even incorporating like OSCE scenarios regarding like there probably are but like focusing on heat stroke, post hurricane infection which is relevant to specifically the Caribbean." (Public Health)

Vertical integration and certification as short courses and cross campus cross talk through shared faculty lectures and electives: Implementing vertical spiraling of climate change competencies content across formal degree programs alongside short electives. Offering certificate courses and cross campus electives and selectives to interested undergraduate, graduate students and faculty as well as MSc and PhD programs.

"Spiraling it in through the curriculum because as x mentioned, the curriculum's already very packed. But given this is a priority area for the university to be more conscious of our environmental impact and our environmental vulnerabilities, this could be a central theme throughout our various curriculum." (Public Health)

"I totally agree with X and X said about the like a mixed elective course between schools of medicine and of veterinary medicine but maybe prior to that like. I know there's like groups within the university, like special groups with special interests. I don't know if there's a group of climate change and climate health related, like maybe we can or maybe it would be a nice thing to like start a group to see how much interest." (Public Health)

Leveraging existing partnerships: Collaborating centres (UNFCC, WHO, Global water partnerships, Red Cross) within the MPH program to enable students to perceive the practical benefits of education: Invited speaker series with experts from government and utilizing institutional partnerships with collaborating centres to have guest speakers. Engaging in training faculty through international paid-for climate certification to deliver campus led post-graduate/CME tracks as MSc and PhD in Planetary Health. Leveraging institutional partnerships with collaborating centres and TED-style lectures including internal opportunities as in the biology program:

"We have an existing student group called Eco and they do climate ecosystem conservation, climate change type of community activities. They go to small schools and talk about climate change. They're doing cleanups and all kinds of other stuff. So this exists. It's open to all students of SGU, so it might just be a matter of advertising it to a wider body. Most of it is our undergraduate students in our program." (SAS)

Utilising the Pre-vet and Pre-med program:

"We talk about the integration of human, animal and environmental health as a part of the overall One Health Framework, and then we ask them to propose a solution to sometimes a hypothetical and sometimes a very real life One Health challenge. For example, in our current cohort we have two prongs. One asking them to address ocean health the other one is about urban farming, how urban farming affects humans as well as animals, and since urban farming is such a popular thing now in the United States, I think it's important for them to be well conversant with those topics. So, the point I'm trying to make is we introduce One Health as a concept to premed students as early as the last semester, the 2nd and the 2nd to last semester of their pre-med studies. Yeah, so they have the, they have the knowledge, they have the basic idea of how to not silo human health and see the overall the big picture, if you want to call it that, yeah.." (Pre-SOM/SVM)

Mapping within and across programs to identify points of coverage in individual curriculum and identify points for integration.

"I think training on how we could incorporate it into the curriculum, see if it is mapped in any of the SOM at least curriculum. Personally I don't know if it is mapped anywhere, but we could use that system to find out." (SOM)

Practicums:

"I believe every single program should have a practicum that allows the students to hone the competencies, the knowledge, the skills that they are learning in the classroom. But we are required by our accreditation agency to show the application within the courses, and it cannot necessarily be just academic taking, you know, a paper and asking them to do something, but bringing that experience and the knowledge that they're gaining to produce something that an entity can use. And it has to be something that they can use immediately, let's call it that. So down the road, whether it's crafting a policy or whether it's doing an educational snippets, a flyer, something that would get the public educated on a particular issue." (Public Health)

Faculty training as Continuous Medical Education (CME):

"Maybe we can think about alumni. We had alumni recently down for the Art of Medicine CME, So I think some of the challenges we can expect is probably faculty stating that they're not trained specifically in this area to deliver this. I think that curriculum saturation is something that we hear about a lot. But what I can also say is that on the preclinical lower level for some of the general chemistry courses, what we often would have is a one-off lecture on something that is sustainable development related, so not all- encompassing. These are the classrooms where I would say there's a bit of integration." (Pre-SOM/SVM)

Students in research:

"So maybe integrating you know public health like a research elective course where they

spend time not just studying, for example, theory and climate change and impact on health, but actually conducting research at the same time connected to this area." (SOM)

Professionalism:

"It may be in the curriculum, but how do we ensure that we are getting that message across in practical, applicable ways to our students and our professions that come through the curriculum? Definitely it's taught in the population health component of the curriculum. So, it's taught and tested there. But as x mentioned, it can go in one and come out the next if the importance is not highlighted though the perspective in term three, of course, is to connect it with patient outcomes and not just a study on environmental sciences. Where should we implement it? ... maybe in a professionalism class because … all of our professionalism classes, we call them HIPWIPS (Health promotion, wellness and professionalism) classes in the School of Medicine, and we have 21 of them currently." (SOM)

Theme 3: Institutional Barriers to planetary health education and interprofessional education.

Barriers identified across the institution centred on the lack of accreditation mandates across programmes for including climate change /planetary health competencies in curricula. Additionally, a lack of faculty training and willingness to teach**,** given their already heavy workload. Tied to the latter was a lack of administrative support for IPE.

Faculty described the issues surrounding the MD student focus on board exam preparation. Navigating overcrowded curricula and scheduling prohibits student interest for IPE.

"And I made the remark that you know whether you believe it or not, climate change is real and then proceeded on to say, you know how the environment as illustrated by climate change can impact your patients health. In our review, you know we get reviewed. I had a comment from a student who wrote back that I should keep my political opinion to myself and not pushed. So, I got slammed." (SOM)

Hidden curriculum: There is also the issue pertaining to the hidden curriculum, while conversations exist regarding promoting a green campus and adhering to the SDG goals, the reality is hindered by a lack of cross-campus communication and hence a lack of faculty awareness regarding ongoing climate related content already being taught in other programs.

"We're so bounded by accreditation and and professional standards, competence requirements that will ultimately dictate how we engage this aspect of climate and health.But that's the official curriculum. We in academia also appreciate it as a hidden curriculum where we can navigate contents such as this and build into a a curriculum setting to add

understanding of the existing competencies and how climate, climatic events and climatic determinants are part of that process." (Public Health)

Discussion

This study explored faculty perspectives on integrating planetary health education into the curricula of medicine, veterinary medicine, public health, and biological science, with particular attention to the role of Interprofessional Education (IPE). The findings demonstrate strong faculty consensus that planetary health education is both necessary and professionally relevant, while also highlighting significant institutional and curricular barriers to implementation. Three overarching themes emerged: the need to establish core planetary health competencies within curricula, opportunities for interprofessional curricular integration, and institutional barriers that constrain implementation. Together, these findings suggest that while awareness of planetary health issues is increasing among educators, translating this reality into systematic curricular change remains challenging.

The widespread agreement among participants regarding the importance of planetary health education aligns with growing international calls for integrating planetary health competencies into health professions education [10, 16, 18, 23, 29]. Faculty perceived planetary health as directly relevant to contemporary and future professional practice, particularly given the increasing impacts of environmental change on human, animal, and ecosystem health. Consistent with competency frameworks proposed by the Global Consortium on Climate and Health Education [22] and recommendations from health professional organizations [16, 17, 27, 28, 29, 31] participants emphasized the need for graduates to understand the health effects of climate change, infectious disease emergence, food insecurity, biodiversity loss, pollution, and environmental degradation. While the Council on Education for Public Health (CEPH) that accredits the MPH program does cover environmental health, the standards do not explicitly require climate education. Hence, the Association of Schools and Programs of Public Health partnered with the GCCHE to design a Climate Change for Public Health Education toolkit, they felt necessary for practise [30].

Importantly, faculty discussions extended well beyond climate change alone, reflecting the broader conceptualisation of planetary health outlined in the introduction. While climate-related health impacts such as heat stress, respiratory illness, vector-borne diseases, and disaster preparedness were frequently discussed, participants also identified biodiversity conservation, ocean health, sustainable agriculture, waste management, water scarcity, and food system sustainability as essential content areas. These findings reinforce recent arguments that planetary health education should not be limited to climate literacy but should encompass the wider range of environmental disruptions represented within the Planetary Boundaries Framework [10, 11, 18].

The prominence of One Health perspectives throughout the discussions is particularly noteworthy. Veterinary faculty frequently linked climate change to zoonotic disease emergence, animal health, agricultural systems, and wildlife conservation, while medical faculty emphasised patient outcomes and public health consequences. This disciplinary

variation reflects the different professional lenses through which environmental challenges are encountered. However, the overlapping concerns identified across professions suggest that planetary health may serve as a valuable integrative framework capable of bridging traditional disciplinary boundaries. Similar observations have been reported within the One Health literature, where environmental issues increasingly require coordinated responses involving human health professionals, veterinarians, environmental scientists, and policymakers [1, 10, 13, 23, 32, 33, 34, 35].

Faculty also highlighted the particular vulnerability of Small Island Developing States (SIDS) to climate-related health challenges. Participants from the Caribbean context described experiences with hurricanes, heat stress, drought, water scarcity, Saharan dust exposure, and disaster preparedness. These findings suggest that planetary health education may be especially relevant in regions already experiencing direct environmental and climatic impacts [36]. Furthermore, contextualising planetary health education within local environmental realities may enhance student engagement by demonstrating its immediate relevance to professional practice and community wellbeing. This observation supports educational recommendations that climate and planetary health curricula should be locally grounded while maintaining global perspectives [37, 38, 39].

The findings further revealed broad agreement that planetary health content should be linked to clinical and professional practice rather than taught solely as environmental science. Faculty repeatedly advocated for using patient-centred and practice-based examples, including heatstroke, respiratory disease, mental health impacts, food insecurity, infectious disease emergence, pharmaceutical supply chain vulnerabilities, and agricultural sustainability. This emphasis reflects theories of meaningful learning and professional identity formation, which suggest that students are more likely to engage with new knowledge when its direct relevance to future professional responsibilities is clear [40, 41]. Participants' focus on clinical application is also consistent with recent literature indicating that health professional learners prefer practical and solution-oriented approaches to climate and planetary health education [13, 15, 16, 42].

A noteworthy finding was the recurring emphasis on Sustainable Development Goals (SDGs) as a framework for curriculum development [43, 44]. Faculty identified opportunities to align existing curricula with SDG priorities relating to health, food security, sustainability, environmental stewardship, and social justice. This finding suggests that SDGs may offer a practical institutional mechanism for embedding planetary health across multiple programmes without requiring entirely new curricular structures. Such alignment could also strengthen institutional social capital by fostering collaboration across departments around shared sustainability objectives.

The second major theme concerned opportunities for interprofessional education and cross-disciplinary collaboration. Participants consistently identified IPE as an ideal vehicle for delivering planetary health education due to the inherently interdisciplinary nature of environmental health challenges. Faculty recommended numerous approaches, including case-based learning, problem-based learning, simulations, OSCE scenarios, shared electives,

certification programmes, community projects, research experiences, and experiential practicums. These recommendations closely mirror emerging international models of planetary health education, which frequently utilise systems thinking, collaborative learning, and community-engaged practice [23, 25, 45].

An important observation was that many examples of planetary health teaching already existed across programmes but remained largely siloed. Participants identified relevant activities in public health, biology, premedical, preveterinary, medical, and veterinary curricula; however, awareness of these efforts was often limited outside individual programmes. This finding highlights a common challenge within higher education institutions whereby innovative teaching initiatives exist but are not connected through systematic curriculum mapping or institutional coordination [46, 47]. Faculty therefore viewed curriculum mapping as a critical first step toward identifying overlap, reducing duplication, and establishing opportunities for cross-disciplinary integration [48].

The proposed use of active learning approaches is particularly significant. Case-based learning, simulations, and experiential practicums were repeatedly discussed as mechanisms for developing both knowledge and practical competencies. These approaches align strongly with the Theory of Planned Behaviour, which suggests that behavioural intentions are influenced by attitudes, perceived social norms, and perceived behavioural control [49]. By providing authentic opportunities to engage with planetary health challenges, students may develop the confidence and professional identity needed to translate knowledge into action. Practical learning experiences involving disaster management agencies, waste management , authorities, environmental organisations, and public health agencies, particularly those with which Schools have already established collaborative relationships, may therefore help bridge the gap between awareness and professional practice [42, 50, 51].

Despite strong support for planetary health education, faculty described substantial institutional barriers that hinder implementation. Curriculum overcrowding emerged as one of the most frequently cited concerns [16, 38, 46]. Participants recognised the importance of planetary health but questioned how additional content could be incorporated into already densely packed programmes. Similar barriers have been reported internationally across medicine and veterinary medicine, where competing accreditation requirements often limit opportunities for introducing new curricular content [52].

Accreditation requirements represented a second major barrier. Faculty indicated that, although some accrediting bodies increasingly acknowledge environmental determinants of health, explicit accreditation mandates for planetary health competencies remain inconsistent across programmes [16, 38]. This finding suggests that broader systemic changes may be necessary to accelerate curriculum adoption. International experience indicates that accreditation standards can be powerful drivers of curricular reform, particularly when linked to graduate competencies and professional expectations [16, 46, 53].

A further challenge concerned faculty preparedness and capacity. Participants acknowledged that many educators lack formal training in planetary health and may feel insufficiently

equipped to teach the subject. This observation reinforces previous work identifying faculty development as a critical prerequisite for successful implementation [2, 16, 35, 38, 54]. Participants therefore recommended continuing professional development opportunities, certification programmes, and institutional support structures to build educator confidence and expertise.

Finally, the findings highlighted the role of the hidden curriculum. While institutional discourse increasingly emphasises sustainability, faculty noted a disconnect between organisational aspirations and everyday educational practice. Limited communication across programmes contributed to low awareness of existing teaching initiatives and restricted opportunities for collaboration. This finding is particularly important because educational culture may influence curricular reform as much as formal policy structures [55, 56, 57]. For example, Roopnarine *et al.* (2025) demonstrated the potential of an interprofessional education platform, informed by the Global Consortium on Climate and Health Education (GCCHE) competencies and incorporating a One Health framework, to deliver climate change education across veterinary and medical curricula. However, such initiatives remain uncommon and have yet to be widely embedded within health professions education [59]. Building institutional networks and communities of practice around planetary health could therefore represent an important strategy for fostering sustained change [16, 58, 59].

Overall, this study suggests that faculty recognise planetary health as an emerging professional competency that extends beyond climate change to encompass the broader relationships between environmental systems, human health, and animal health. Participants identified numerous opportunities for curricular integration and interprofessional collaboration but also highlighted significant structural barriers that require institutional action. Curriculum mapping, faculty development, alignment with SDGs and accreditation standards, and the expansion of experiential interprofessional learning opportunities may provide effective pathways for embedding planetary health within health professions education.

Recent international developments provide a potential model for operationalising these recommendations. In July 2026, stakeholders from several Swiss universities developed a competency-based Planetary Health curriculum framework that may serve as a useful reference for institutions seeking to embed planetary health across health professions education [60]. The framework organises intended learning outcomes across four domains: knowledge, skills, attitudes, and action, with the aim of preparing graduates to promote sustainable healthcare practices and system transformation. Notably, the framework was adopted across eleven health professions programmes, including medicine, nursing, physiotherapy, nutrition and dietetics, occupational therapy, and public health-related disciplines, demonstrating the feasibility of broad interprofessional implementation. However, veterinary medicine was not represented, highlighting an important gap and reinforcing the need for further work integrating One Health and veterinary perspectives within planetary health curricula.

Given the growing health impacts of environmental change, preparing future health professionals to address these complex challenges is increasingly not only an educational priority but also a professional and societal responsibility.

Strengths and limitations

Key strengths of this study include the interdisciplinary nature of the participant group, which encompassed perspectives from veterinary medicine, medicine, public health, and biology, as well as a range of national backgrounds. The study was also situated within a Caribbean small island developing state, providing insights from a context that is particularly vulnerable to environmental and climate-related challenges. Furthermore, the presence of multiple health-related programmes on a single campus enabled exploration of opportunities for interprofessional planetary health education across disciplines, facilitating discussions that may be difficult to achieve in more geographically or administratively dispersed institutions.

However, the findings should be considered when interpreting the findings. The study was conducted at a single institution, and voluntary participation may have introduced self-selection bias, as individuals with a particular interest in climate change, planetary health, or interprofessional education may have been more likely to participate. In addition, the co-location of multiple health professions programmes, while a significant strength of the study, may also limit transferability, as institutions without similar organisational structures may encounter different challenges when implementing interprofessional planetary health curricula. Consequently, the findings may not be directly generalisable to all educational settings. Nevertheless, the consistency of many themes with the broader international literature suggests that the findings have relevance for planetary health curriculum development across a range of health professions education contexts.

List of abbreviations

IPE: Interprofessional Education
SIDS: Small Island Developing States
PHRC: Planetary Health Report Card
GCCHE: Global Consortium on Climate and Health Education
RQ: Research question
SGU: St. George's University
SOM: School of Medicine
SVM: School of Veterinary Medicine
MPH: Masters of Public Health
CEPH: Council on Education for Public Health
DES: Department of Education
SAS: School of Arts and Sciences
MD: Medical Doctor
PIS: Participant Information Sheet
DVM : Doctor of Veterinary Medicine
PI: Principle Investigator

AI: Artificial Intelligence
SDG: Sustainable Development Goals
UNFCCC: United Nations Framework Convention on Climate Change.
WHO: World Health Organisation
OSCE: Objective Structured Clinical Examination
PBL: Problem-based learning
CME: Continuous Medical Education
HIPWIPS: Health Promotion, Wellness And Professionalism Classes
ILO: intended learning outcomes

Ethics approval and consent to participate

All data were generated following the Helsinki Declaration (61).The study was submitted to and approved by the SGU Institutional Review Board ***Application 25026.***All participants provided informed consent prior to participation allowing the sessions to be recorded using audio and visual tools within Teams.

Consent for publication

Not applicable

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available as the participants of this study did not give written consent for their data to be shared publicly.

Competing interests

Not applicable

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None

Authors' contributions

RR was responsible for the conceptualisation of the study and framed the topic within the context of the extant literature. RR and HJ were both involved in the data collection, data analysis, interpretation of findings, and preparation of the manuscript. Both authors reviewed and approved the final manuscript.

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- AppendixIFacultyInterviewQuestions.docx