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Medical students as advocates for a healthy planet and healthy people: Designing an assessment that prepares learners to take action on the United Nations Sustainable Development Goals

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ABSTRACT

Purpose: Health professionals are being called on to be advocates for the planet to ensure health and well-being for current and future generations. Clean air, flourishing ecosystems, a stable climate, and nutritious food are required for health and well-being. Considering the deteriorating state of our natural environment, today's health professionals need to be advocates for a healthy planet. This places an onus on tertiary institutions to prepare graduates to 'take action' for the planet and all of its inhabitants.

Materials and methods: This report outlines the development of a team-based Planetary Health Assignment that equips learners to use at least two of the 2030 United Nations Sustainable Development Goals (SDGs). It was identified at the design stage that an effective planetary health educational intervention should not only encourage learners to take action, but also embed creativity, with the best products available for public scrutiny. Several pedagogical principles were used in the design (authentic assessment, learner-centredness, creativity, scholarship).

Results: During the first five years of implementation, minor refinements were made based on learner and academic feedback. The assignment criteria sheet was improved to the point that it encouraged thoughtful and reflective submissions, and tasked learners to provide achievable and realistic solutions to pressing environmental issues. The marking rubric was also developed to provide quality feedback and insights for students.

Conclusions: The design of this assessment, framed by the SDGs, allows learners flexibility in their choices while still meeting the required learning outcomes. With the assignment underpinned by a robust design, it provides students with both knowledge and experiences about how they might take action on the SDGs and become advocates for a healthy planet.

KEYWORDS

Planetary health; climate action; Sustainable Development Goals

Introduction

The planetary crises and healthcare's responsibility

There are calls for health professionals to be eco-ethical leaders (McKimm and McLean 2020; McLean et al. 2022a) to tackle the triple planetary crises which all its inhabitants are facing in terms of a changing climate, pollution, and biodiversity loss (Guterres 2022; United Nations Framework Convention on Climate Change 2022). Globally, the healthcare sector contributes about 5.2% of the world's emissions (Romanello et al. 2022). In 2019, Australia's healthcare system was identified as one of the world's top four *per capita* emitters (Health Care Without Harm 2019).

Following the promulgation of Australia's 2022 Climate Change Bill, the Australian Medical Association in conjunction with an advocacy group, Doctors for the Environment, called on the Government and the healthcare sector to lead on climate change by reducing emissions by 80% by 2030, *en route* to net zero by 2040 (Ferraro 2022). Unsurprisingly, health professionals globally have been called on to practice environmentally sustainable healthcare, reducing not only emissions but also addressing biodiversity loss (Atwoli et al. 2021; Shaw et al. 2021). The

World Health Organization's COP26 Special Report (Climate Change and Health) identified climate change as the single biggest health threat facing humanity and outlined the responsibility for health professions to respond, including protecting nature which is the source of our health and well-being (World Health Organization 2021). This echoes worldwide medical and health accrediting bodies' position statements in terms of resource stewardship and emissions reductions. With most health professionals highly trusted by the public, nurses and doctors in particular are ideally suited to be the eco-ethical leaders to advocate and take action for a healthy planet (McLean et al. 2022a).

The challenge for health professions educators, however, is how to integrate these important issues in the curriculum such that graduates are equipped with the knowledge, skills, attitudes, and values that they can apply practically to their professional and their personal lives (Shaw et al. 2021). While other programs have sought to increase curriculum content relating to climate change (Orhan 2021), this assignment specifically aimed to focus on the broader concept of planetary health.

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In the short-term, this can be done by, for example, embedding relevant planetary health concepts in current courses, as we have done for physiology (Moro et al. 2023), until curricula can be redesigned. For long-term gains, learning should extend beyond content (knowledge) to include the empowerment of learners to ‘take action’ (McLean et al. 2022b) on pressing issues such as climate change and biodiversity loss by include skills development, fostering appropriate attitudes and values, and promoting behaviour change.

This article extends our recent evaluation of the first five years of this Planetary Health Assignment (McLean et al. 2022b), and describes in more detail the pedagogical principles used in the design of the assignment.

Materials and methods

Context

The integration of planetary health across a five-year university undergraduate medical curriculum began in earnest in 2017, beginning in Year 1 of the Medical Program with an introduction to planetary health. The following year (Year 2), the parasitology (global health) assignment was replaced with a new Planetary Health Assignment, underpinned by the Sustainable Development Goals (SDGs), in particular SDG13 (*Climate Action*). As there is usually only one assignment each semester, this assignment not only had to motivate medical students to be more than global citizens (a Bond graduate attribute), i.e. planetary citizens and stewards (Wabnitz and Guzmán 2022), but it also had to equip them with the appropriate knowledge, skills, values, and capabilities to take forward into their senior years and into clinical practice.

Pedagogical design principles

The assignment design had to ‘count’ on several levels: Develop, or perhaps increase awareness of the triple planetary crises (climate change, biodiversity loss, pollution) (Guterres 2022) facing humanity (knowledge) (Guzmán et al. 2021; Jochem et al. 2023), take personal and professional responsibility (citizenship, advocacy, activism), and develop new skills (e.g. systems and design thinking) (Stone et al. 2018; Iyer et al. 2021; Shaw et al. 2021), but also strengthen other skills (e.g. teamwork, communication, problem-solving) which have been identified as key for health professionals (Gordon et al. 2015). Four design principles informed the assignment: Authentic assessment, learner-centredness, creativity, and scholarship. The

assignment (10% of the year grade) comprised several summative and formative components based on these four design principles (Table 1).

Principle 1: Authentic assessment

The assignment was framed by the 17 2030 SDGs, which represent a ‘shared blueprint for peace and prosperity for people and the planet, now and into the future’ and were agreed by all United Nations states in 2015. They thus offer an authentic real-world benchmark for sustainability, and hence an appropriate basis for assessment. All teams had to address SDG13 to tackle climate change, choosing at least one additional SDG depending on their chosen ‘product’ (submitted output) for an intended audience. The assignment also addresses SDG4 (*Quality Education*), which calls for sustainability education to be included in curricula (Shaw et al. 2021). The assignment was implemented in 2018, pre-dating the Institution becoming a signatory to the SDGs in 2019, which requires institutions to include sustainability in learning and teaching, research, and general operations.

Principle 2: Learner-centred

A primary consideration of the assessment was learner-centredness. Students are free to form their own teams (4–6 students), and in addition to SDG13, select a second SDG (McLean et al. 2022b). Teams also need to identify an audience (e.g. government department, community members, students) and decide how best to deliver their message through a ‘product’ (e.g. learning module, formal letter, pamphlet, video). This freedom of choice provides opportunities for creativity, leadership, and personal engagement. Following grading, the academic team meets to identify 8–10 teams to pitch their products to their peers and vote for the top two products (winner and runner-up of the Academics’ Choice Award). Following their five-minute presentations, the cohort votes for their favourite (‘People’s Choice Award’ winner and runner-up). Prizes are donations to environmental organizations chosen by the winning teams. With the cohort in attendance, more than 200 students are exposed to strategies peers had devised to mitigate climate change.

Principle 3: Creating new or original work (Bloom’s taxonomy)

Teams are required to apply Boyer’s scholarship criteria to Create (Bloom’s highest taxonomy level) novel educational material (product) for their target audience.

Table 1. Planetary health assignment components, contributing to 10% of the year grade.

Assignment component	Assessment type and weighting	Details
Protocol	Formative and summative (4%)	Template based on Boyer’s scholarship criteria provided for teams to pitch their idea. Reviewed independently by two academics. Collated feedback provided to teams.
Product	Summative (5%)	Teams design a creative output (product) to deliver a message to a particular audience.
Reflective critique	Summative (1%)	In a template, teams reflect on their collective personal development as a result of the assignment.
Self-assessment of the product	Formative	Teams grade their product using the summative grading rubric.
Contribution to teamwork and scholarship	Formative	Individual team members sign off on their contribution, plus additional roles, based on the International Committee of Medical Journal Editors (ICJME) 2022 guidelines to ensure that all team members contribute to all aspects of the assignment.

Criteria*	Description	Important questions for you
Clear goals <i>What will we do, for whom and why are we doing it?</i>	Purpose of the work stated with realistic, achievable targets or outcomes for an intended audience.	<i>What problem/issue have we identified? Why is it important? What additional SDG (including targets or indicators) is relevant? What are the proposed outcomes/message? At whom is this aimed (who is the audience)?</i>
Adequate preparation <i>What do we need to know and be able to do to undertake the project?</i>	Systematic inquiry (e.g., of the literature plus consultation with experts and potential users or consumers if using design thinking) to gain an in-depth understanding of the problem. An assessment of the resources and skills required before the work can be carried out. A minimum of five (5) high quality reliable references (e.g., recent journal articles, government websites) required (Vancouver style).	<i>What is already known (i.e., literature review; expert consultation)? Who do we need to consult? Do we have the appropriate skills to undertake the work? If not, what will we do?</i>
Appropriate methods <i>What and how will we undertake the work?</i>	For results (outcomes; product) to be persuasive or meaningful, the methods need to align with the goals, be feasible, ethical, and culturally appropriate. Systems and/or design thinking must be used.	<i>Will we use system and/or design thinking? What is our 'product'? Feasible in the allocated time and budget? Who will we approach to test our concept/idea?</i>
Significant results <i>What do we envisage as the (potential) acceptance and/or impact of our product?</i>	Significance refers to the magnitude of the results/product, in terms of its (potential) acceptance and/or impact of the findings or product on individuals, communities, organizations, or systems.	<i>How will the intended audience (e.g., peers, colleagues, communities, or other key stakeholders) benefit from our approach? How do/will we know?</i>
Effective presentation <i>How do we best present our message as a product?</i>	As there will be users of the product, format, language and grammar are important if you want your intended audience to engage.	<i>Is the style and approach appropriate and engaging for the intended audience? Is it evidence-based? Is it free of grammatical and spelling errors? Is the language appropriate for the intended audience?</i>
Reflective critique <i>What did we learn? So what (now and the future)?</i>	The process ends with a critical reflection on the problem identification, preparation (including acting on feedback for supervisors, stakeholders), results/outcomes in the context of the existing literature, limitations, and key recommendations to guide practice and future action.	<i>What did we learn from this exercise (about the problem, our approach, its (potential) impact, feedback received, our team, leadership)? If we had to do this again, what would we do differently? Now what do we do? What's next?</i>

*Adapted from Boyer's expanded domains and Glassick and colleagues' criteria for scholarship.

Figure 1. Criteria sheet for the planetary health assignment, with student information outlined, and questions for the groups to consider while drafting their submissions.

The protocol template requires them to:

1. Identify an 'issue' to address (with evidence),
2. Select an SDG in addition to SDG13, with relevant Targets and/or Indicators,
3. Choose an intended audience,
4. Decide on the best format to deliver their message to the intended audience (communication for impact), and
5. Create a 'product' that could potentially be made available for public scrutiny (scholarship).

Principle 4: Boyer's scholarship

Although Boyer's expanded criteria for learning and teaching scholarship have been around for more than 30 years, they are no less relevant today. As teams would be creating 'products' that could be distributed in the public domain, their work needs to meet scholarship criteria. The assignment instructions included a table of the criteria plus relevant questions to guide the completion of each of Glassick and colleagues' (2000) criteria (Figure 1). This was then used to create the grading rubrics (Figure 2) for the various summative components.

Results

Over the five years of the assignment (2018–2022), a focus was placed on embedding design principles that encourage thoughtful and reflective submissions that could make a difference. Although the assignment was deemed 'effective' following the first year of implementation, minor changes and tweaks to the criteria sheet (Figure 1), assessment rubric (Figure 2), and marking outlines (Table 1)

were made each year to clarify ambiguous concepts, or to assist in guiding learners towards tangible ways of taking action (Table 1 and Figures represent the 2022 versions). In recent years, teams of learners have genuinely started to provide achievable and realistic solutions to tackling climate change. Based on our findings from that evaluation (McLean et al. 2022b), we believe that this assignment, by being framed by several educational principles, allowed learners to take meaningful steps towards making a difference as well as demonstrating leadership in this space. Where applicable, products are sent to the intended audience. For example, in 2019, one team summarised the recent advances in dengue fever control (a vector-borne disease predicted to increase because of climate change) which was forwarded to the Queensland Minister of Health to inform a new State policy. More recently, in 2022, a team created a costed triphasic approach (with charging stations in bays outside the Emergency Department) to replace the current fleet of Queensland ambulances with electric vehicles, which they sent to the relevant Health Planning Department. We believe that developing a proposal (with feedback), followed by the development of a potentially implementable 'product' to convey a message to an intended audience about one of the greatest threats to the planet (climate change), allows learners to develop the knowledge, skills, values, and capabilities to advocate not only for patients but also for all the planet's inhabitants, i.e. to be planetary citizens and stewards.

Discussion

As evidence of the learner-centred nature of the assignment, at the request of the Student Well-being Officer, this

Criterion	Below acceptable standard (1)	Just meets standards (2)	Generally meets standards (3)	Meets standards but can be improved (4)	Excellent standard and error-free (5)	Mark (/5)
Appropriate methods (i.e., product matches intention, based on design or systems thinking) <i>What and how did we undertake the work?</i>	Product format inappropriate to convey message; message poorly articulated and delivered, e.g., too long, too convoluted; inappropriate language and/or content. Feedback from proposal not taken into consideration. No evidence of system or design thinking	Probably an appropriate format but not well constructed in terms of conveying message, e.g., too much or too little information; too long; language used not appropriate.	Appropriate product but not well constructed in terms of conveying message, e.g., too much or too little information.	Appropriate format but improvements could be made to make the message delivery clearer, more impactful.	Appropriate format; message well delivered for the intended audience. Clear evidence of system and/or design thinking.	
Effective presentation (i.e., quality) <i>Is the product of high quality and free of errors?</i>	Poor quality product with many spelling and grammatical errors; referencing absent or incorrect.	Product quality requires considerable improvement in terms of grammar, spelling, referencing and general quality.	Acceptable but lack of attention to detail in terms of spelling, grammar and referencing.	Good quality with a few spelling, grammatical or referencing errors.	Error-free. High quality product that can be distributed to the intended audience.	
					SUBTOTAL: 10/2 = 5 max	/5
						Mark (/5)
Reflective critique <i>What did we learn? So what (now and the future)?</i>	No evidence of feedback being incorporated or reflection of learning during the assignment process. Little or no reflection on the implications (current and future) of the work.	Considerable improvement required in terms of reflection on the various criteria. Some have not been addressed. Attention to detail lacking.	Length exceeded and one or more of the criteria not addressed or one or more not well described; grammatical and spelling errors.	Criteria all addressed but some grammar and spelling issues.	Excellent reflection on all of the criteria provided and free of errors.	
					SUBTOTAL: 5/5 = 1 max.	/1
					TOTAL: 6 max.	

Figure 2. Assessment rubric for the planetary health assignment, with space for the examiners to provide feedback and summaries of marks provided.

year (2023), the primary SDG was changed from SDG13 (*Climate Action*) to SDG3 (*Good Health and Well-Being*), with the theme of well-being for all of Earth's inhabitants. The request for a change in focus on well-being was not surprising, considering the anxiety amongst young people around the triple planetary crises, particularly our changing climate (Hickman et al. 2021; Patrick et al. 2023). In Australia, the devastating bushfires of 2019/2020 and the 2021/2022 floods in Australia have led to increased climate and eco-anxiety (Patrick et al. 2021; Gunasiri et al. 2022).

We hope that by sharing how we used a range of educational principles to design a planetary health assignment framed by SDG 13 (*Climate Action*), and through the provision of some of our assignment documentation, other health professions institutions are inspired to design authentic, learner-centred assignments that can potentially make a difference with respect to the triple planetary crises (climate change, biodiversity loss, pollution). Being able to make a difference will become increasingly important as expectations grow for health professionals to act as advocates for the health of the planet and provide eco-ethical leadership in addressing pressing global issues (McKimm and McLean 2020).

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