

JUR-1005 Pathways to a healthier planet: New approaches through creativity and experiential learning

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Pathways to a healthier planet: New approaches
through creativity and experiential learning

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PATHWAY 1 - Emotional Literacy. 1: Theoretical Approach. Methodological Steps Towards Ecological and Emotional Education and Research Fostering Multipotentiality

Tittel	PATHWAY 1 - Emotional Literacy. 1: Theoretical Approach. Methodological Steps Towards Ecological and Emotional Education and Research Fostering Multipotentiality
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Methodological Steps Towards Ecological and Emotional Education and Research Fostering Multipotentiality

*Emily Margaret Murray, Margherita Paola Poto,
and Laura Vita*

Abstract This contribution presents a systematic overview of the steps followed in co-creating the learning and research resource Follow Your Heart: The School for Multipotentialites for children, educators, and researchers. This resource promotes ecological and emotional research and education for sustainability by cultivating values and behaviours consistent with how nature makes us feel connected and nurtured. Built upon the intersection of ecological literacy and socio-emotional learning,

E. M. Murray co-wrote Sects. 1–6, especially contributing to the design and development of Sects. 1, 3, and 4. She also proofread and edited the entire piece.

M. P. Poto coordinated the research, co-wrote Sects. 1, 2, 3, 4, 6, supervised Sect. 5, and supervised the last version of the work.

L. Vita co-wrote Sects. 2–5.

E. M. Murray

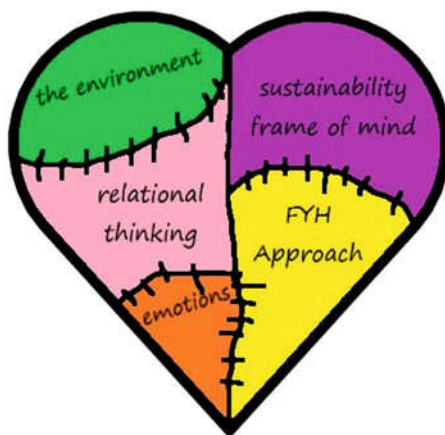
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grounded in sustainability and relational thinking, the steps in developing this project from book to educational movement are outlined. The steps include educational workshops, book launches, translation into different cultural contexts and languages, an accompanying online platform, and international research collaborations. This work concludes by outlining the transition from a single resource into an educational movement and strategies for sustaining forward progress.

Graphical Abstract



The methodological approach as a stitched heart, vision of Laura Vita, 2023.

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1 INTRODUCTION

1.1 *Introductory Remarks and Chapter Structure*

This contribution presents a comprehensive analysis of the methodological steps involved in the co-creation process of Follow Your Heart: The School for Multipotentialites (hereinafter referred to as FYH).¹ This endeavour is achieved by formulating a robust theoretical framework that investigates the intricate interconnections between sustainability, as delineated in the United Nations' 2030 Agenda for Sustainable Development (hereinafter Agenda 2030)² and emotional education (Sects. 1, 1.2–1.4). Subsequently, this chapter expounds upon the co-created and iterative process undertaken by the co-authors and contributing educators in the genesis of the book FYH, as outlined in Sect. 2. In Sect. 3, the analysis highlights how the book FYH has continued to develop as a research and education tool “in-action”, through academic lectures, interactive workshops, and outreach activities, adopting a multilingual approach to improve accessibility and expand the educational reach of the Follow Your Heart teaching philosophy and concepts (Sect. 4). Then, the chapter narrows in on the work conducted by health education and global health practitioner Laura Vita (Sect. 5) on the need for emotional education in primary and secondary classrooms in Ontario, Canada, and the educator feedback initiative currently underway. In Sect. 6, the study shifts its focus to the forthcoming phase, encompassing the establishment of a digital education and research platform and an exploration of the long-term prospects for the FYH initiative both in research and education. This new phase aims to extend the initiative's reach and influence, propelling the promotion of ecological and emotional research

¹ Murray, E. M., Russo, V., & Poto, M. P. (2022). Follow Your Heart. The School for Multipotentialites, La Bussola.

² The 2030 Agenda for Sustainable Development was adopted by the United Nations General Assembly (UNGA) on 25 September 2015, available on the official website: <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N15/291/89/PDF/N1529189.pdf?OpenElement>, last access 3 October 2023.

and education for sustainability. Additionally, it seeks to cultivate values that resonate with our innate connection, contentment, and nurturing experiences with nature.

1.2 The First Building Block of the FYH Approach: The Intersectional Element of Ecological Literacy (EL) and Socio-Emotional Learning (SEL)

The research constituting the theoretical framework of the multi-step process followed by the implementation of the FYH book activities and the subsequent evolution into a movement responds to the need for ecological literacy (EL) as a domain of inquiry aimed at expanding nature-protection-oriented knowledge and practices. The same research also intersects socio-emotional learning (SEL) as the process through which individuals develop essential skills, attitudes, and behaviours that enable them to understand and manage emotions, establish positive relationships, make responsible decisions, and effectively navigate social interactions. In this section, the two educational concepts will be analysed separately, and then commonalities will be underscored to demonstrate how both are vital components of a theoretical and practical research and education framework aiming to address sustainability challenges. This contribution will also highlight how FYH is developing as a movement that encompasses both EL and SEL competencies and their interactions.

EL is a concept dating back to the 1960s that has become a topical subject of investigation in recent years as the awareness of climate change education and achieving global sustainability within the Agenda 2030 has increased.³ Environmental education programmes promote ecological literacy among individuals of all ages and enhance awareness, knowledge, and understanding of sustainability challenges. Thus, EL leads to the development of environmentally conscious behaviours, responsible

³ Borsari, B., & Kunas, J. (2022). Historical memory and eco-centric education: Looking at the past to move forward with the 2030 agenda for sustainable development. In *Handbook of sustainability science in the future: Policies, technologies and education by 2050* (pp. 1–15). Cham: Springer International Publishing. Goodwin, T. (2016). Educating for ecological literacy. *The American Biology Teacher*, 78(4), 287–291; Cardelús, C., & Middendorf, G. (2013). Ecological literacy: The educational foundation necessary for informed public decision making. *Frontiers in Ecology and the Environment*, 11(6), 330–331.

citizenship, and a collective commitment to sustainable practices.⁴ In this sense, EL is a foundational element of environmental education that goes beyond simply transferring knowledge about environmental systems and processes. By deepening our understanding of ecological systems and their intricate connections, we can make informed decisions, develop sustainable practices, and contribute to the preservation of ecosystems, biodiversity conservation, climate change mitigation and adaptation, sustainable resource management, eco-conscious urban planning, ecological restoration, and environmental education and awareness. This type of literacy encompasses a broad array of competencies that connect to an overall improved comprehension of environmental issues; a holistic understanding and cultivation of the relationship between humans and the natural environment; critical thinking skills; and strengthening emotional and social intelligence to embody environmentally responsible behaviours.⁵

Alongside the need for focusing on the environment and creating a more sustainable society, the past few decades have seen increased awareness and funding initiatives towards SEL programmes within traditional educational curricula⁶ to raise children with the confidence to perceive, understand, and express their emotions while developing healthy relationships with their peers. On top of improving academic performance, individuals with strong emotional and social skills also have greater well-being and social awareness and are known to make more responsible decisions.⁷ In the face of society's complex environmental and socio-economic challenges, acquiring knowledge and technical skills are no

⁴ Berkowitz, A. R., Ford, M. E., & Brewer, C. A. (2005). A framework for integrating ecological literacy, civics literacy, and environmental citizenship in environmental education. *Environmental Education and Advocacy: Changing Perspectives of Ecology and Education*, 227, 66.

⁵ The literature on environmental literacy is vast. For a comprehensive study, see McBride, B. B., Brewer, C. A., Berkowitz, A. R., & Borrie, W. T. (2013). Environmental literacy, ecological literacy, ecoliteracy: What do we mean and how did we get here? *Ecosphere*, 4(5): 1–20, cit.; Rowe, D. (2002). Environmental literacy and sustainability as core requirements: Success stories and models. *Teaching sustainability at universities*, 79–103.

⁶ Mira-Galvañ, M., & Gilar-Corbi, R. (2020). Design, implementation, and evaluation of an emotional education program: Effects on academic performance. *Frontiers in Psychology*, 11, 1100. 10.3389/fpsyg.2020.01100.

⁷ Borsari, B., & Kunnas, J. (2022). Historical memory and eco-centric education: Looking at the past to move forward with the 2030 agenda for sustainable development.

longer sufficient; thus, higher education institutions have also recognised the importance of developing emotional intelligence as a core competency.⁸ Solid emotional intelligence goes beyond simply understanding one's emotions; it gives people the strength and perseverance to tackle challenges in both personal and professional domains. The ability to regulate emotions and cultivate an understanding of the emotions of others uniquely equips upcoming generations to navigate the ongoing and forthcoming impacts of the climate crisis on their lives. An integrated emotional education pedagogy, which FYH aims to be, is one that:

[...] help[s] to identify responsibilities, improve coping potential, and improve the future outlook. They [emotional educational pedagogies] can be characterized as caring (involving listening, dialogue, critical thinking, and meaningful connections between the student, their life, and the world), using knowledge for action, and as involving authentic experiences such as co-creation, authentic research, and outdoor education.⁹

Bringing emotional education and the environment into the same sphere, although their complementarity may not seem evident initially, is a reasonably novel topic in the Western world. As Dunlop and Rushton argue, “attending to the emotions in education is crucial in supporting constructive responses to climate change”¹⁰ and “the design of appropriate, emotionally-engaged pedagogies may be considered one dimension of ‘generational responsibility’ whereby teachers play a role in ensuring that the next generation is left with at least as good a planet as the previous one”.¹¹ An education or upbringing that teaches about the environment in small units across various traditional school subjects, without

In *Handbook of sustainability science in the future: Policies, technologies and education by 2050* (pp. 1–15), cit.

⁸ Gilar-Corbi, R., Pozo-Rico, T., Sánchez, B., & Castejón, J. L. (2018). Can Emotional intelligence be taught in higher education? A randomized experimental study of emotional intelligence training program using a multimethodological approach. *Frontiers in Psychology*, 9, 1039. 10.3389/fpsyg.2018.01039.

⁹ Dunlop, L., & Rushton, E. A. (2022). Education for environmental sustainability and the emotions: Implications for educational practice. *Sustainability*, 14(8), 4441. p. 14.

¹⁰ Dunlop, L., & Rushton, E. A. (2022). Education for environmental sustainability and the emotions: Implications for educational practice. *Sustainability*, 14(8), 4441. p. 2.

¹¹ Ibid. (see footnote 10).

instilling the notions of empathy, compassion, and care, will not create the connection to the natural world that warrants sustainable decisions.

Although the consciousness around instilling knowledge and skills in relation to the environment and emotions is a more recent endeavour, this approach is deeply rooted in the diverse histories of Indigenous communities and an integral component of their value and belief system, emphasising the importance of developing a sense of responsibility for the seventh generation.¹² Ecological literacy, the understanding of ecological systems and their interconnections, plays a vital role in promoting responsible environmental stewardship and sustainable practices. The principle of responsibility to the seventh generation is one such concept that highlights the profound relationship between ecological literacy and sustainable decision-making. This principle, rooted in Indigenous wisdom and worldview, emphasises the interconnectedness of all life forms and the importance of considering the long-term consequences of our actions on future generations. At the core of Indigenous worldviews is the understanding that humans are not separate from nature but an integral part of it. This perspective fosters a deep sense of responsibility and stewardship towards the environment, grounded in the recognition that our actions have far-reaching consequences for those who come after us. The principle of responsibility to the seventh generation emphasises the importance of considering the well-being and sustainability of future communities when making decisions in the present. EL, when influenced by Indigenous views, encompasses not only scientific knowledge but also an understanding of the ethical and spiritual dimensions of our relationship with the natural world. It involves recognising and valuing the interconnectedness of all living beings and the importance of living in balance and harmony with nature. By embracing Indigenous perspectives in EL, we gain a more holistic understanding of environmental issues and solutions, enabling a broader approach to environmental education and decision-making. Overall, it fosters a deeper appreciation for the diversity of knowledge systems and cultural practices that have sustained sustainable societies for centuries.

As reported by Linda Clarkson, Vern Morrisette, and Gabriel Regallet, the vision of sustainable development through the eyes and experience

¹² Clarkson, L., Morrisette, V., & Régallet, G. (1992). Our responsibility to the seventh generation: Indigenous peoples and sustainable development (p. 63). Winnipeg: International Institute for Sustainable Development.

of Indigenous peoples encompasses the need to acknowledge that we include women, elders, and children into consideration: “the prophecy tells us that what we do today will affect the seventh generation and we must bear in mind our responsibility to them today and always”.¹³ Indigenous knowledge and worldviews that integrate a holistic view of peoples, past and present, and the planet, can significantly impact the development of sustainable educational pedagogies.¹⁴

As a sustainable educational pedagogy, FYH is built around the many intersections between EL and SEL by fostering a deeper connection between individuals and the natural world while promoting empathy, environmental stewardship, sustainability, and a sense of responsibility towards nature and all living beings. One way in which these two types of literacy intersect is the connection between empathy and perspective-taking: EL encourages individuals to develop empathy towards the natural world and recognise the interdependence between human societies and ecosystems. This understanding nurtures a sense of compassion and empathy for living beings, promoting perspective-taking and considering the needs and experiences of other species and future generations. The second interaction deals with responsible decision-making, where EL empowers individuals to make responsible decisions that consider the ecological impacts and long-term consequences from their personal lives to their professional careers. SEL complements this process by enhancing critical thinking, problem-solving, and decision-making skills, enabling individuals to assess the ethical implications of their choices and align them with sustainability goals.

The third way EL and SEL interact is through the development of collaborative approaches to research and education. An individual with strong ecological literacy often finds solutions to sustainability challenges through collaborative approaches, which requires SEL skills such as communication, cooperation, and teamwork. These skills are vital in facilitating effective collaboration among diverse stakeholders and fostering shared responsibility and collective action towards environmental sustainability. Fourth, studying ecological systems and recognising environmental challenges can evoke a range of emotions, including concern,

¹³ Ibid. (see footnote 12).

¹⁴ Napoleon, V., & Friedland, H. (2016). An inside job: Engaging with Indigenous legal traditions through stories. *McGill Law Journal*, 61(4), 725–754.

frustration, or hope.¹⁵ SEL supports the development of emotional regulation skills, helping individuals understand and manage their emotions in response to ecological issues. Emotional intelligence enables individuals to engage constructively in sustainability efforts and take appropriate action, rather than feeling emotionally overwhelmed by feelings sometimes summarised as “climate anxiety”.¹⁶ Fifth, the interaction contributes to building a sense of purpose and agency.¹⁷ Ecological literacy combined with SEL helps individuals develop a sense of purpose and agency in addressing sustainability challenges.¹⁸ By understanding their connection to the natural world and recognising their ability to make a positive impact, individuals feel empowered to take action and contribute to environmental well-being.¹⁹ Last is environmental stewardship.²⁰ Ecological literacy fosters a sense of responsibility and stewardship towards the environment, and SEL complements this by nurturing a sense of personal and social responsibility, ethical decision-making, and a commitment to sustainable behaviours. Together, these elements encourage individuals to become active environmental stewards, advocating for sustainable practices and inspiring others to do the same.

¹⁵ Russel, C. & Oakley, J. (2016). Editorial: Engaging the emotional dimensions of environmental education. *Canadian Journal of Environmental Education*, 21, 13–22.

¹⁶ Dunlop, L. & Rushton, E. A. C. (2022). Education for environmental sustainability and the emotions: Implications for educational practice. *Sustainability*, 14, 4441. <https://doi.org/10.3390/su14084441>.

¹⁷ McBride, B. B., Brewer, C. A., Berkowitz, A. R., & Borrie, W. T. (2013). Environmental literacy, ecological literacy, ecoliteracy: What do we mean and how did we get here? *Ecosphere*, 4(5), 1–20.

¹⁸ Collado-Ruano, J. (2018). Cosmodern education: Emotional, spiritual, and ecological literacy to develop a sustainability mindset. In *Developing a Sustainability Mindset in Management Education* (pp. 133–157). Routledge.

¹⁹ Khadim, M., Tahira, S. S., & Naz, B. (2023). Emerging trends and research developments in education for sustainable development: Shaping conceptions for a sustainable future. *Annals of Human and Social Sciences*, 4(2), 499–512.

²⁰ Tidball, K. G., & Krasny, M. E. (2011). Toward an ecology of environmental education and learning. *Ecosphere*, 2(2), 1–17.

By promoting empathy, responsible decision-making, collaboration, emotional regulation, a sense of purpose, and environmental stewardship, this intersection contributes to the holistic development of individuals who are knowledgeable about ecological systems and equipped with the social and emotional skills necessary to create a sustainable future.

Building off the importance of bridging emotions and the environment in education and research, we argue that developing ecological literacy with a strong focus on the emotional component should start well before post-secondary education.²¹ FYH, as an integrated intergenerational educational pedagogy, focuses on the connectedness between the self, others, and the natural world, and instils sustainability as a frame of mind grounded in both the environment and emotions.

1.3 The Second Building Block: A Sustainability Frame of Mind

Education and research, in the quest to achieve sustainability and find solutions to complex societal and environmental challenges, are deeply interconnected.²² In the twenty-first century, the overall outcomes and outputs of most fields of research are connected to sustainability, just as a common goal of the education system is to prepare children and adults with the knowledge and skills to work in different environments and create a prosperous life for themselves, the people, and the planet around

²¹ Elias, M. J., Zins, J. E., & Weissberg, R. P. (1997). Promoting social and emotional learning: Guidelines for educators. Ascd.

²² Maina-Okori, N. M., Koushik, J. R., & Wilson, A. (2018). Reimagining intersectionality in environmental and sustainability education: A critical literature review. *The Journal of Environmental Education*, 49(4), 286–296.

them.²³ In the words of Michael Bonnett,²⁴ instilling sustainability as “a frame of mind” is a way to link education and research as an integrated process that helps to answer the questions: “What constitutes a right relationship with nature?” and “What should our basic stance towards the natural environment be?”. The educational philosophy and movement around FYH builds upon this idea, focusing on emotional intelligence and ecological literacy as crucial components of a sustainable future.

A “sustainability frame of mind” encourages learners to approach topics in a cohesive and integrated manner, which simultaneously works in favour towards achieving national and global sustainability frameworks, such as the 17 integrated Sustainable Development Goals (SDGs) as outlined by the Agenda 2030. The interconnectedness of the 17 SDGs seeks to address sustainable development across economic, social, and environmental dimensions,²⁵ impacting most (if not all) aspects of life

²³ Here are some references on twenty-first-century studies on sustainability: “Our Common Future: Report of the World Commission on Environment and Development” by the Brundtland Commission (1987); “The Limits to Growth: The 30-Year Update” by Donella H. Meadows, Jorgen Randers, and Dennis L. Meadows (2004); “Planetary Boundaries: Exploring the Safe Operating Space for Humanity” by Johan Rockström et al. (2009)—This paper defines a framework of nine planetary boundaries, including climate change, biodiversity loss, and freshwater use, within which humanity can safely operate to maintain a stable Earth system; “The Natural Step for Business: Wealth, Ecology, and the Evolutionary Corporation” by Brian Nattrass and Mary Altomare (1999)—This book offers insights into how businesses can integrate sustainability principles into their operations, emphasising the importance of systems thinking and long-term planning; “The Economics of Ecosystems and Biodiversity: Ecological and Economic Foundations” edited by Pushpam Kumar (2010)—This publication examines the interdependence between economic systems and ecosystems, emphasising the need to incorporate ecosystem services into economic decision-making for sustainable development; “Sustainable Development Goals: Their Impacts on Forests and People” edited by Pia Katila et al. (2018); “Doughnut Economics: Seven Ways to Think Like a 21st-Century Economist” by Kate Raworth (2017); “The IPCC Special Report on Global Warming of 1.5 °C” by the Intergovernmental Panel on Climate Change (2018). These references cover a wide range of topics related to sustainability in the twenty-first century, including sustainable development, planetary boundaries, business sustainability, ecosystem services, the Sustainable Development Goals, alternative economic frameworks, and climate change mitigation.

²⁴ Bonnett, M. (2002). Education for sustainability as a frame of mind. *Environmental Education Research*, 8(1), 9–20.

²⁵ UN General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development*, 21 October 2015, A/RES/70/1, available at: <https://www.refworld.org/docid/57b6c3e44.html>, last access December 2023.

on this planet; thus, implementing a sustainability mindset in early education becomes imperative. Education and research are interwoven among the different goals and targets, and the scientific and academic communities are even recognised as key players in achieving a sustainable society by 2030. Under SDG 4 *Quality Education*, there also lies a deep connection between adopting a sustainability frame of mind and promoting life-long learning; as the planet and society are constantly changing, instilling sustainability through education enables flexible thinking and equips learners to handle challenges in their future professional lives. More specifically, target 4.7 outlines the expectation that students at all levels of education should acquire the knowledge and skills to promote “sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity”,²⁶ which all contribute to achieving the overall goal of *Quality Education*. Perhaps the basis of this knowledge and skillset is applying the appropriate state of mind, and education is the most important tool in encouraging a sustainability frame of mind.

However, despite the scholarship supporting the need to embed sustainability into academic curricula and the role education plays in achieving the SDGs, policies and programmes do not reflect these aspirations.²⁷ It is a complex task to develop sustainable educational approaches that combine the appropriate interdisciplinary knowledge, skills, and values and then implement them in a rigid academic system.²⁸ One scholar who has led his career promoting culture for sustainability, Paul Shrivastava, developed a holistic approach that combines physical and emotional learning in line with traditional educational pedagogies called “embodied learning”. Furthermore, scholars such as David W. Orr argue that the concept of sustainability itself “implies a radical change in the institutions and patterns that we’ve come to accept as normal”,²⁹ hinting towards the necessity for a shift in education and research that place

²⁶ Ibid. (see footnote 25).

²⁷ Dunlop, L. & Rushton, E. A. C. (2022). Education for environmental sustainability and the emotions: Implications for educational practice. *Sustainability*, 14, 4441. <https://doi.org/10.3390/su14084441>.

²⁸ Orr, D. W. (1990). Environmental education and ecological literacy. *Education Digest*, 55(9), 49–53.

²⁹ Orr, D. W. (1990). Environmental education and ecological literacy. *Education Digest*, 55(9), 49–53.

sustainability at the centre of their purpose. Raising children and teaching students (from primary to higher education) and researchers to feel connected to the natural environment and their own emotions fosters future generations who make decisions grounded in sustainability and environmental stewardship, with an awareness of how their actions affect both people and the planet.

1.4 *The Third Building Block: Relational Thinking*

An integrated approach to education that embodies emotional intelligence, ecological literacy, and sustainability, such as FYH, can be situated in a relational thinking framework; a thought process that treats systems as being made up of complex networks and relationships of living and non-living beings. Indigenous scholars, anthropologists, and geographers, among other emerging research fields, promote this systematic, relational approach that targets relationships when attempting to solve environmental and socioeconomic challenges.³⁰ Relational thinking, inherently linked to sustainability as a frame of mind, recognises that humans cannot be separated from nature while encouraging mindfulness, reciprocity, and care internally (the self) and externally (others and the planet). Furthermore, relational thinking can be found at the intersection between EL and SEL, where an awareness of the relationships between living organisms and their physical environment is supported by an emotional understanding of how one's actions impact the systems to which one belongs.

In terms of rethinking education and bringing this underlying principle of relational thinking into classrooms—supported through emotional and ecological literacy programmes and policies—focusing on relationality from an early age is critical to ensure that children grow up and maintain a sense of connectedness to the world around them. Naturally, humans are relational beings and have an innate capacity to empathise, care, and

³⁰ Eyster, H. N., Satterfield, T., & Chan, K. M. A. (2023). Empirical examples demonstrate how relational thinking might enrich science and practice. *People and Nature*, 1–15. <https://doi.org/10.1002/pan3.10453>.

draw connections; however, as children move through the Western education system, intuitive skills are often overridden by cognitive skills,³¹ on top of spending more time in their classroom as opposed to being outdoors. As supported by the underlying FYH and other Early Childhood Education (ECE) research,³² creativity and imagination must be sufficiently nurtured to support this relational, sustainable outlook on life. Developing a strong awareness of one's own emotions and sense of purpose leads to the capacity to relate and connect to other beings, and when those other "beings" go beyond human form, the natural world becomes an essential relationship to respect and maintain. Bringing EL, SEL, and sustainability into the same integrated education and research approach can be visualised as a three-dimensional concept (Fig. 1) in which the self, others, and environment interact through elements such as co-creation, participation, integral ecology, relationships, responsibility, and emotions. FYH, as an educational philosophy and research framework, focuses on these dimensions across several target audiences—an ambitious yet necessary approach to building a more sustainable, caring future.

2 MATERIAL AND METHODS: FOLLOW YOUR HEART THE BOOK (FIRST STEP)

The theoretical foundations of FYH's educational philosophy were laid in the book *Follow Your Heart: The School for Multipotentialites*,³³ an educational resource targeting children, educators, and researchers. The original idea, a school for multipotential children who have the freedom to create, imagine, and express as an integral part of their formal education, was envisioned by the book's illustrator, Valentina Russo. Moving from the original idea, the authors developed the manuscript into a tripartite book with (1) an embedded illustrated story for children, (2) evidence-based

³¹ Wels, A. E. J. (2017). Sustainability by default: Co-creating care and relationality through early childhood education. *International Journal of Early Childhood*, 49, 155–164. <https://doi.org/10.1007/s13158-017-0193-5>.

³² Davis, J. (2009). Revealing the research 'hole' of early childhood education for sustainability: A preliminary survey of the literature. *Environmental Education Research*, 15(2), 227–241.

³³ Murray, E. M., Russo, V., & Poto, M. P. (2022). *Follow Your Heart. The School for Multipotentialites*, La Bussola, cit.

Fig. 1 The three dimensions of education and research for sustainability ideated by Emily Murray and illustrated by Valentina Russo (2022)



research supporting the FYH educational philosophy for both educators and researchers, and (3) a chapter of co-created activities written by and intended for educators.

The embedded children's story, *The Story of Cora*,³⁴ presents the concept of multipotentiality and the anxieties linked to the question, "What do you want to be when you grow up?".³⁵ A multipotential person, as reported by Emilie Wapnick, has "many interests and creative pursuits"³⁶ and excels across a multitude of disciplines, yet is also someone who struggles with finding balance or meaning in their work because of the need to fulfil all of their passions. Multipotentiality, although it may be perceived or feel like a disadvantage because of the "specialist" and "linear" mindset our capitalistic society promotes, is a

³⁴ Original idea of and written by Emily Murray and illustrated by Valentina Russo.

³⁵ For an analysis of the Story of Cora, see Ali, S., *Exploring the origins of cora from follow your heart*, July 3, 2023, blogpost published in https://en.uit.no/project/ecocare/blogg/innlegg?sub_id=816760, last access July 4, 2023.

³⁶ Wapnick, E., & Buford, M. V. (2023). The rise of multipotentiality in a new landscape of work. In *Mapping the Future of Undergraduate Career Education* (pp. 155–166). Routledge.

core characteristic that—if nurtured—can be advantageous for making the world a better, more sustainable place.³⁷

The second part of FYH establishes the knowledge foundations essential for grounding research on ecological and emotional education and exploring the concept of multipotentiality. Dedicated to researchers and educators engaged in emotional and ecological education research, this section maintains an element of playfulness that can effectively captivate and involve students as well. By intertwining scholarly rigour with interactive elements, this section serves as a valuable resource for researchers and educators seeking to deepen their understanding of the subject matter while fostering an engaging learning experience for students.

The concluding segment of the comprehensive educational resource, *Follow Your Heart*, embodies a participatory and co-creative approach. This chapter, specifically designed for teachers and their pupils, encompasses a range of activities that aim to cultivate emotional literacy, foster relational thinking, and nurture the development of multiple talents. Drawing upon a collaborative process, the authors worked closely with educators from Italy and Canada to co-create these engaging activities. The result is a diverse collection of lessons and exercises reflecting the insights and expertise of the authors and educators involved. Through this participatory approach, the activities are finely tuned to meet the needs and interests of students, ensuring a dynamic and interactive learning experience.³⁸

Within this final part of FYH, readers and teachers find a wealth of valuable suggestions and practical guidance for seamlessly integrating these activities into their curriculum. Each activity is thoughtfully designed to promote emotional awareness, encourage critical thinking, and foster creativity. By embracing the spirit of participation and co-creation, this chapter empowers teachers and students to actively engage in the educational process, fostering a sense of ownership and collaborative learning.

³⁷ Wapnick, E. (2017). *How to be everything: A guide for those who (still) don't know what they want to be when they grow up*. HarperOne; see also Murray, E. M., Russo, V., & Poto, M. P. (2022). *Follow Your Heart. The School for Multipotentialites*, La Bussola, cit., 39 and ff.

³⁸ Murray, E. M., & Poto, M. P. (2023) Co-creation of educational spaces and curricula to develop an ecology of participation: an example from *Follow Your Heart* in Lohse, E. J., & Poto, M. P., *Coproduction of knowledge in Climate Governance*, Berliner Wissenschafts-Verlag, 2022, ISBN 978-3-8305-5538-4.

Moving beyond the physical book, Follow Your Heart is an integrated form of education, and has developed into an educational movement, taking shape through workshops³⁹ and outreach activities, as outlined in the following section.⁴⁰

3 FOLLOW YOUR HEART IN ACTION (SECOND STEP)

3.1 *Three Educational Workshops Developing the Book Activities*

Following the publication of the book, three book launches were organised, accompanied by a series of diverse activities and workshops each purposefully centred around the core values of ecological education, emotional intelligence, and the nurturing of multipotentiality.⁴¹ The book launches have served as a vibrant platform to introduce the publication, bringing together individuals who share a deep appreciation for the interconnectedness of ecological and emotional education. Through the events hosted thus far (in the UK, Italy, and France), attendees were immersed in a captivating atmosphere that fostered an exchange of ideas, experiences, and insights. Moreover, several activities and workshops were thoughtfully curated to delve into the values at the heart of the book. Participants actively engaged in interactive sessions and hands-on experiences, all designed to promote a holistic understanding of ecological principles, emotional intelligence, and the cultivation of multiple talents. These gatherings provided a unique opportunity for participants to explore and deepen their knowledge in these critical areas in a safe, welcoming space open to out-of-the-box thinking. The activities and workshops encouraged reflection and the development of practical skills and sparked meaningful discussions around the transformative power of ecological education, emotional intelligence, and embracing one's

³⁹ Poto, M. P., Murray, E. M., Russo, V., & Vita, L. (2023). Third Book Launch, Workshop and Next Steps "Follow Your Heart. The School for Multipotentialites". Septentrio Reports, (1). <https://doi.org/10.7557/7.7101>; Poto, M. P., Murray, E. M., Russo, V., & Green, J. (2023). Second Book Launch and Creative Bilingual Workshop "Follow Your Heart. The School for Multipotentialites". Septentrio Reports, (1). <https://doi.org/10.7557/7.7037>; Poto, M. P., Murray, E. M., & Russo, V. (2023). Book Launch and Scientific Workshop "Follow Your Heart. The School for Multipotentialites". Septentrio Reports, (1). <https://doi.org/10.7557/7.6986>.

⁴⁰ Ibid. (see footnote 38).

⁴¹ See reports cited in the footnote above.

multipotentiality. By combining the excitement of book launches with purposeful activities and workshops, these events became catalysts for building a community of like-minded individuals passionate about integrating ecological values, emotional intelligence and celebrating diverse talents into their personal and professional lives. Among the activities organised in the last workshop, we developed the reading of *The Story of Cora*; the development of the banner, co-created by all participants, around the theme of “What does Follow Your Heart mean to you?”; and the collection of books that constitute a multilingual library, meant to be expanded with a further study on resources connected to ecological and emotional education, as well as multipotentiality.

3.2 *FYH as a Learning Resource for University Students*

The FYH book has also been adopted as a valuable learning resource for the bachelor course programme in Business and Management at the University of Torino (Unito, Department of Management, University of Turin, academic year 2022–2023).⁴² Its inclusion in the curriculum has proven to be instrumental in inspiring and guiding students towards success in their academic and professional pursuits and has been particularly influential in the context of student-led creative projects centred around the Agenda 2030. As part of their coursework, students have utilised FYH as an inspirational tool to delve into the challenges and opportunities associated with the global sustainable development goals outlined by Agenda 2030.⁴³ By reading the book and exploring its themes, students have gained valuable insights and perspectives on how individuals and organisations can contribute to a more sustainable and inclusive future through emotional and ecological education and by fostering multipotentiality from an early age. One of the notable outcomes of incorporating FYH into the curriculum has been the development of engaging roundtable discussions based on book reviews. After reading the book, students have been encouraged to critically analyse

⁴² Inspired by FYH as a learning resource, the students developed their own projects along the lines of sustainability education within the Agenda 2030. For testimonies on their projects, refer to <https://en.uit.no/project/ecocare/blogg>, last access July 2023.

⁴³ See, for example, Mohammad Abniki, *Italiran: The story of inspiration*, July 7, 2023, in https://en.uit.no/project/ecocare/blogg/innlegg?sub_id=817034, last access July 2023.

its content, themes, and key messages, which have been followed by roundtable sessions where they have shared their insights and engaged in thoughtful discussions with their peers and faculty members. These roundtable discussions have provided a platform for students to articulate their opinions, exchange ideas, and deepen their understanding of the book's concepts. Through these interactive sessions, students have gained a broader perspective on the significance of following one's passion and incorporating legal and ethical considerations into future business endeavours.

The integration of FYH into the Business and Management curriculum at Unito has fostered a holistic approach to education, emphasising the importance of personal growth, value-driven decision-making, and sustainable development. By utilising the book as a learning resource, students have expanded their knowledge and critical thinking skills and been inspired to become agents of positive change within their communities and beyond. In conclusion, FYH has become an essential component of the bachelor course programme in Business and Management at Unito, enriching students' learning experiences, providing them with valuable insights, inspiring their creative projects related to Agenda 2030, and encouraging meaningful discussions through roundtable sessions. By embracing the messages and themes of the book, students have gained a deeper understanding of their role in shaping a sustainable and socially responsible future.

3.3 *Outreach Activities with Primary School Pupils: The Experience Offered by the Initiative "Bambine and Bambini. Un giorno all'Università" (University of Turin, April 2023)*

In April 2023, as part of the "Bambine and Bambini. Un giorno all'Università" initiative at the University of Turin, an impactful outreach activity was organised involving primary school pupils. Margherita Poto, Arianna Porrone, and Xhesika Nikolli facilitated this endeavour, utilising the resources provided by the book FYH to lead a thought-provoking session centred around fostering an emotional connection with the planet.⁴⁴ During this engaging activity, the children were encouraged to

⁴⁴ See https://en.uit.no/project/ecocare/nyheter/artikkel?sub_id=810378, last access July 4, 2023.

explore their creativity and imagination. Drawing inspiration from Indigenous traditions of the Arctic, they collectively constructed their own unique story that emphasised the significance of preserving and nurturing our planet. By incorporating elements from FYH, the children delved into the importance of following their passions and cultivating a deep connection with the environment. To further enhance their experience, the children collaborated to compose a song that captured the essence of their story. This process fostered teamwork and cooperation while allowing them to express their thoughts and emotions through music in a creative manner. Through the composition of the song, the children were able to develop a deeper understanding of the interconnectedness between individuals, the environment, and the need to take responsible actions. In addition to storytelling and song creation, the children also had the opportunity to showcase their artistic talents by creating their illustrations. By creating a visual representation of their ideas and concepts, they could portray their interpretations of the themes discussed during the activity through another mode of expression. This artistic aspect of the experience further reinforced the importance of nurturing individual talents and embracing creativity to foster a deeper connection with one another and the planet.

Overall, the outreach activity with primary school pupils proved to be a very formative experience; through their participation, the children gained a profound understanding of the significance of nurturing their talents, fostering positive relationships with others, and cultivating a deep and emotional connection with our planet. The integration of FYH resources into the activity provided a framework for exploration and reflection, giving the children the flexibility and freedom to invent their own stories, song, and illustrations, all while empowering them to become active agents of positive change in their communities and instilling in them a sense of responsibility towards the environment. From the teachers' feedback, the take-home message that emerged was that, through experiences like these, the seeds of awareness and compassion are surely planted, paving the way for a future generation committed to safeguarding our planet and promoting sustainable practices.

4 EXPANDING REACH AND IMPROVING ACCESSIBILITY THROUGH TRANSLATION AND AN ONLINE PLATFORM (THIRD STEP)

Building on the knowledge and experience gained from the book launches, lectures, and outreach activities, the Follow Your Heart project team is expanding by focusing on the message of Cora and developing evidence-based research to support the need for an integrated emotional and ecological education. Through community interactions with the book, Cora has been well-received by all ages and has been identified as a central component to the Follow Your Heart project. *The Story of Cora* resonates with individuals in search of a meaningful career and life that makes space for their multiple talents and interests while simultaneously promoting the teaching resource Follow Your Heart. To reach a wider audience, *The Story of Cora* has been translated and contextually adapted into Chinese and Farsi by university students as part of research internships. Including personal touches and input from university students with varying educational backgrounds and skills has further contributed to the co-created, community-based approach that the Follow Your Heart team aims to embody in their work.

To further expand the reach of the book and development of the FYH project, the team has developed a website⁴⁵ to showcase the educational resource and create an online space that brings together ecological and emotional educational resources. As highlighted by Haleem et al. (2022), digital resources improve access to a wide variety of learning tools that enhance the educational experience for students and educators.⁴⁶ Incorporating digital learning into the classroom can foster creativity, giving students a sense of success and encouraging non-traditional ways of thinking. Digital classrooms are also accessible and interactive, offer flexible and personalised learning, help students develop teamwork and communication skills, and often provide collaboration opportunities for

⁴⁵ See <https://www.followyourhearteducation.org/>, last access February 2024.

⁴⁶ Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3(3), 275–285. <https://doi.org/10.1016/j.susoc.2022.05.004>. Haleem, A., Javaid, M., & Singh, R. P. (2022). An era of ChatGPT as a significant futuristic support tool: A study on features, abilities, and challenges. *BenchCouncil Transactions on Benchmarks, Standards and Evaluations*, 2(4), 100089.

educators and students. The website will act as a resource hub for students, educators, and researchers with both original resources—crash-course style videos and a podcast series—and a curated collection of books, podcasts, videos, research publications, and other tools that align with Follow Your Heart and the educational philosophy.

Continuing to translate the themes and teachings of FYH into various forms of media (website, children’s books, podcasts, short videos) will help to grow and strengthen the education and research community, integrating competencies of emotional and ecological literacy into the education system. The development of FYH, beyond a physical book, supports educational pedagogies that call for holistic, well-rounded teaching approaches that yield complex thinkers who will have the skills, knowledge, and confidence to address future challenges.

5 APPLICATION OF RESULTS IN ONTARIO’S SCHOOLS: A CASE STUDY (FOURTH STEP)

Following a community-based, co-created approach to education and research, the book Follow Your Heart and future developments of this educational space involve international collaboration through diverse educator input and university student research internship programmes. Since the state of educational policies and programmes enforcing emotional and ecological-based learning themes and skills vary across the globe, and in most cases are absent or severely lacking, it is important to collaborate with students, educators, and researchers from various contextual settings to gain better insight to understand what is needed and how educational spaces and resources like Follow Your Heart can fill such gaps.

Despite the many intersections of SEL and EL, there are very few instances of these educational topics converging in the same policies and programmes and are usually conceptualised in silos. Through her experience as a public health nurse working to support elementary schools in Ontario, Canada, Laura Vita became aware of the gap in emotional education resources and training for educators. Following the COVID-19 global pandemic, teachers and school administrators highlighted mental health and well-being as key issues that needed to be addressed to support their students better. Many educational staff sought to obtain evidence-informed tools to promote social-emotional learning within their classrooms, in response to the challenges their students were experiencing. Fostering and strengthening social and emotional skills became

an area of importance because of its positive impact on mental well-being and its focus on developing tools to build resiliency. In Ontario, Canada, emotional education—in the form of social-emotional learning (SEL) skills—and environmental education are addressed differently in the Ontario Ministry of Education Curricula and treated as separate concepts, despite how interconnected they have proven to be. In 2009, the Ontario Ministry of Education published the “Acting Today, Shaping Tomorrow” policy framework for environmental education in Ontario schools, citing the critical need to help students understand the nature and complexity of environmental challenges and the knowledge and skills to take action. Additionally, they denote environmental education as a “cross-curricular and integrated learning” skill, indicating, through resource documents, that environmental education should be taught across all subject areas and grades because of the learning opportunities it presents to students. The resource documents for grades 1–8 and 9–12 outline lesson plans and activities that give educators inspiration for integrating environmental topics in subjects such as The Arts, French as a Second Language, French Immersion, Health and Physical Education, Language, Mathematics, Native Languages, Science and Technology, and Social Studies. However, the content of the resource guides is merely knowledge-based and does not suggest lessons and themes that would instil environmental responsibility and notions of caring and empathy which foster a sense of appreciation and connection to the natural environment.

Similarly to the way environmental education is addressed in Ontario, emotional education (in the form of SEL) is promoted as developing “cross-curricular and integrated learning” skills for both primary and secondary pupils; however, the scope of SEL is limited and mostly focuses on individual mental and physical well-being and building the capacity to learn and flourish.⁴⁷ These topics are lightly addressed in Ontario school curricula under the “Health and Physical Education in Grades 1–8” and suggest a few ways to integrate SEL skills into learning across three subjects: Active Living, Movement Competence, and Healthy Living. Currently, there is not yet a resource document from the Ministry of Education to support educators in implementing SEL in their classrooms,

⁴⁷ Ontario Ministry of Education. (2019). Social-Emotional Learning (SEL) Skills. Ontario.ca; Government of Ontario. <https://www.ontario.ca/document/health-and-physical-education-grades-1-8/social-emotional-learning-sel-skills>, last access July 4, 2023.

though the ministry website does promote School Mental Health Ontario as a resource. As outlined, there have been steps taken by the Government of Ontario through the Ontario Ministry of Education to promote both environmental education and emotional education; however, alongside this effort, it is imperative to support educators who bring the curriculum to life each day with their students by providing tools that support the implementation of ecological and emotional education.

From an international policy perspective, the Agenda 2030 for Sustainable Development states that the SDG goals and targets are “integrated and indivisible, global in nature and universally applicable, taking into account different national realities, capacities and levels of development and respecting national policies and procedures”⁴⁸; thus, the tools and implementation strategies to address these goals and targets should also be universal in nature and applicable across multiple contexts (in contexts such as Ontario, Canada, and beyond). Systematic changes and creating a sustainable and healthy future can be supported through the intersection of SEL and EL programmes and policies, and further research should focus on how to better integrate these practical and life skills across traditional primary and secondary education curricula as a whole. FYH, as a physical book, educational philosophy, and movement, is a tool that aims to change the status quo by integrating these two very important topics in education. With the assistance of educational models such as the FYH approach, we can begin to change the education system to support both curriculum goals and broader societal goals such as the 17 SDGs, educating from a sustainability mindset and integrating different forms of knowledge. The Follow Your Heart book, philosophy, and movement apply co-creation principles to their research and development to support the creation of educational materials applicable across multiple contexts. As previously addressed, the FYH approach integrates emotional and ecological education to support students in developing into whole persons with the capacity for sustainable action. Integrating multiple intelligences and valuing the multiple potentials of every student is also a hallmark of the FYH approach.

⁴⁸ United Nations. (2015). Transforming our world: The 2030 agenda for sustainable development United Nations. In United Nations Department of Economic and Social Affairs. United Nations. <https://sdgs.un.org/sites/default/files/publications/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>, cit., last access July 4, 2023.

To build upon the evidence-based research supporting Follow Your Heart, the project team has initiated a feedback initiative with educators in Ontario, Canada, to gain perspective from inside the classroom, specifically from those responsible for implementing the curriculum outlined above. For this feedback initiative, primary school educators have been provided with a copy (physical or PDF) of *Follow Your Heart: The School for Multipotentialites* and have been asked to review the content, apply it within the classroom with students, and share their experiences and activity ideas. Educators have been asked to identify strengths or areas of growth within the book and to provide an activity they have previously used to promote ecological or emotional education in their classrooms. Seeking this feedback is another step in further developing Follow Your Heart, allowing for the opportunity to integrate information from front-line educators to inform further developments in making this tool applicable across learning contexts. Additionally, the global research team assisting in developing the Follow Your Heart Project is an integral part of developing a programme that can be adapted and made applicable across different cultural contexts. The approach to the Follow Your Heart movement embodies relational thinking, teaching with an integrated instead of siloed approach supporting the growth of a whole child and a whole heart. *Follow Your Heart: The School for Multipotentialites* stands at the intersection of addressing local-level curricular needs and Agenda 2030 goals and targets; this type of tool epitomises the adage “think global, act local” and acts as an example for future education projects that support sustainable education.

6 CONCLUSIONS AND WAY FORWARD

The systematic overview presented in this article highlights how FYH has evolved into an educational movement that promotes ecological and emotional research and education for sustainability. With the original intention of publishing the book as an open-access tool for pupils in low-resource settings with a need for more English teaching materials, the subsequent development of resources and interactive, in-person community events were not originally planned but have been strongly supported by students, researchers, and educators and are fuelling the quite novel research. As discussed, the interconnections between research and education in sustainability, emotional education, and the relevance of encouraging multipotentiality in individuals of all ages constitute the

core of *Follow Your Heart: The School for Multipotentialites* and support a type of integrated educational philosophy. In particular, this chapter establishes a theoretical framework demonstrating the inherent linkages between sustainability and emotional education, as outlined in Agenda 2030. By fostering values and behaviours aligned with our connection to nature, emotional education can empower researchers, educators, and learners to contribute to developing an educational and research framework for sustainability literacy with ecological education and emotional and multipotentiality empowerment at its core.

Building off the foundational elements of emotional education, ecological literacy, sustainability, and relational thinking, this chapter describes the co-creative process applied at all stages of FYH, involving the collaboration between authors and contributing educators, underscoring the importance of cross-disciplinary and intersectional approaches and diverse perspectives. The continuous development and application of FYH as a research and education tool through academic lectures, workshops, and outreach activities have greatly expanded its reach and impact, generating feedback which enables the refinement and adaptation of Follow Your Heart teaching philosophy and concepts. This iterative process ensures the richness and effectiveness of the research and educational resource.

Additionally, FYH promotes the adoption of multilingualism in education and research. Multilingualism serves as a pivotal element in an educational approach that embraces and nurtures multipotentiality. By embracing multiple languages, pupils are equipped with holistic learning experience, expanding their perspectives, enhancing cognitive abilities, and fostering a profound appreciation for diverse cultures.⁴⁹ Multilingualism improves accessibility and expands the educational reach of FYH, demonstrating a commitment to inclusivity. The initial idea to promote multilingualism in an educational context has developed into the translation of the book into many languages (as of today: Chinese and Farsi)⁵⁰ to reach a broader audience by providing educational resources in multiple languages and cultural contexts, enabling individuals from diverse backgrounds to benefit from the Follow Your Heart teachings. Lastly, this multistep process from book to educational movement has

⁴⁹ See Murray E. M., Russo V., & Poto, M. P. (2022) *Follow Your Heart*, cit., p. 53.

⁵⁰ For the version in Farsi developed by Mohammad Abniki, see https://en.uit.no/Content/816869/cache=20230507133423/Follow_your_heart.pdf, last access July 2023.

highlighted the need for integrated emotional and environmental education in primary and secondary classrooms. In particular, the work of global health practitioner Laura Vita and the ongoing feedback initiative in Ontario, Canada underlines the importance of co-creating new tools and supports for educators who have the confidence and motivation to bring important novel topics into their traditional teaching routine and curricula. Integrating emotional intelligence and well-being into educational settings aligns with the principles and concepts promoted by FYH, fostering a nurturing and connected learning environment.

In conclusion, the insights gained from the study of the preliminary results of this research present promising avenues for the progression of the FYH initiative and its overarching support for emotional and ecological education. The integration of emotional and ecological learning represents a compelling opportunity to foster more holistic and sustainable educational approaches. The following key steps have emerged as potential ways forward for the success of the FYH initiative.

Firstly, continued research and development should remain a primary focus for the FYH initiative. Collaborative efforts with educators, researchers, and sustainability experts can enrich and refine the educational resources offered by FYH. Through the creation of these resources, a robust evidence base at the intersection of emotional and ecological education will be developed, which will be essential for advocacy efforts for policies and programmes that embrace more comprehensive, sustainable learning models. Secondly, the establishment of strong partnerships with educational institutions, organisations, and communities is critical for expanding the reach and impact of FYH. Engaging in alliances with like-minded entities can garner support, facilitate knowledge sharing, and leverage additional resources to enhance the influence and dissemination of the Follow Your Heart philosophy.

Thirdly, the creation of a digital education and research network, as discussed in Sect. 4, offers an exciting opportunity to improve the accessibility and scalability of FYH. This digital platform can serve as a centralised hub for educational resources, research materials, and interactive tools, enabling individuals worldwide to access and engage with the FYH initiative. Moreover, advocating for the integration of emotional education and sustainability principles into formal education systems is vital. Engaging policymakers, educators, and relevant stakeholders will be instrumental in driving the adoption of emotional education practices and sustainability initiatives within curricula, policies, and educational

frameworks. Lastly, ongoing monitoring and assessment of the long-term outcomes and impact of the FYH initiative are imperative. Rigorous evaluations, data collection, and obtaining feedback from educators, students, and participants will provide invaluable insights into the effectiveness of the initiative, fostering continuous improvement and refinement.

By embracing and implementing these strategies, the FYH initiative can realise its vision of nurturing emotionally aware and ecologically conscious citizens. Emphasising the symbiotic relationship between emotional intelligence and environmental consciousness, the FYH initiative seeks to contribute to the advancement of a more interconnected and sustainable society. As the movement progresses, its significance will resonate not only within primary schools in Ontario but also as a potential model for fostering more holistic and responsible educational practices worldwide.

In the face of worsening climate change and its far-reaching consequences, as well as the alarming increase in mental health issues among youth, including eco-anxiety, depression, and feelings of hopelessness, there is an urgent need for comprehensive and innovative approaches to address these complex challenges. Building upon and integrating resources such as FYH can help prepare the current and future generations for overcoming challenges in both their personal and professional lives. In the twenty-first century, shifting towards sustainable practices and making eco-conscious decisions is relevant across every sector, thus it is imperative that children value emotional and ecological health to develop into whole beings who protect the planet. By implementing these ways forward, the FYH initiative can further its mission of promoting ecological and emotional research and education for sustainability, fostering values and behaviours that align with our innate connection to nature.

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PATHWAY 2 - Ecological Literacy and Ocean Literacy. 1: Theoretical Approach. Achieving a Common Future for all Through Sustainability-Conscious Legal Education and Research Methods

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Achieving a Common Future for all Through Sustainability-Conscious Legal Education and Research Methods

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Abstract: This contribution explores ecological literacy as a critical facet of legal inquiry, focusing on expanding knowledge and practices oriented towards nature protection. Evolving to encompass interdisciplinarity and a systems-thinking approach, ecological literacy is crucial for achieving environmental sustainability. The study argues that integrating an approach promoting eco-responsible behaviors is essential for sustainability-centered legal research and education. This necessitates a shift in foundational pillars of legal methodology, moving beyond conventional dogmatic approaches and embracing a participatory and active dimension. The study provides a theoretical foundation for future applications for rethinking legal methodology to implement ecological literacy effectively.

Keywords: sustainability; ecological and emotional literacy; legal domain

1 Introduction: The Intertwined Dimension of Education and Research in Ecological Literacy

1.1 An Unexplored Field in the Legal Domain

This contribution tackles ecological literacy (EL) as a domain of legal inquiry aimed at expanding nature-protection-oriented knowledge and practices. Originally coined as “environmental literacy” when Charles E. Roth (1968), American environmentalist and educator, asked “how shall we know the environmentally literate citizen?”, the terms ecological literacy and ecoliteracy have evolved in more recent decades to comprehend the interdisciplinarity and systems-thinking approach needed for

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achieving environmental sustainability (McBride et al. 2013). EL (Cutter-Mackenzie and Smith 2003; Kaya and Elster 2019) encompasses a broad array of activities and consequently outcomes, including: improved knowledge and understanding of various environmental concepts and issues; cognitive and emotional understanding of humankind's position in altering the natural environment and sustainability; interest in learning about and embodying environmentally responsible behaviours; and skills such as critical systems thinking, communication and attitude to collaborative efforts towards a more sustainable local and global community.

In this study, EL is treated as an umbrella term comprehensive of both legal education and research in academic settings. Preliminarily to the analysis, it is worth noting that within the legal domain, EL is a relatively unexplored field – which is where this study has its main focus – and must be expanded upon and better integrated into legal education for effective solution-oriented approaches and practices to complex sustainability challenges (Dernbach 2010; Menon and Suresh 2020; Pipere, Veisson, and Salite 2015). Nicole Graham (2014) contends that legal education significantly influences anthropogenic environmental change by shaping individuals into lawyers, judges, and policymakers. The prevailing conceptual framework in law education often fosters an unsustainable approach, segregating issues of entitlement to land and natural resources from responsibilities towards them. This separation in law curricula hinders the development of a cohesive environmental legal system that aligns rights with responsibilities among generations of legal practitioners.

Moving from this reflection, we argue that developing an approach to research and education that promotes eco-responsible behaviours is essential to sustainability-centered legal research and education. Such an approach requires rethinking the foundational pillars of legal methodology, moving away from the conventional dogmatic approaches constructed on the divide between education and research, and most importantly, conceiving this binomial in its participatory and active dimension. This study will therefore offer a theoretical base and some practical examples of how the legal methodology can be rethought and reshaped toward an effective implementation of ecological literacy.

1.2 Sustainability as a Frame of Mind

In this research, the terms education and research are used interdependently and are deeply interconnected to an active and collaborative dimension of the involved parties (educators, researchers, scientists, lawyers). When engaging in action research on sustainability, teachers and learners are seen as researchers (Bradbury, Lewis, and Embury 2019; Groundwater-Smith and Mockler 2016; Mertler 2009;

Somekh 2005) who have the opportunity to co-create ethically informed practices, enhance their response-ability, and strengthen their emotional knowledge, as well as advance their individual and collective coping strategies to sustainability challenges; hence, the interconnectedness between education and research.

The importance of education and research for sustainability emerges when realizing that sustainability itself contains the elements of education and action research or, in the words of Michael Bonnett, can be conceived as “a frame of mind” (Bonnett 2002). An integrated vision of sustainability as an education and research process helps us reflect on its essence and the core question that any law and policy development regarding sustainability should be concerned with: “What constitutes a right relationship with nature?” and “What should our basic stance towards the natural environment be?” (Bonnett 2002). In other words, delving into sustainability as a frame of mind and guideline for law and policymakers implies posing a set of questions about the basic understanding of our human identity and our relationship with nature.

Though the scholarship seems to progressively agree on the importance of embedding sustainability in the academic curriculum, effective education and research approaches focusing on complex combinations of interdisciplinary knowledge, understanding, skills, and values are widely recognized as inherently challenging and therefore still hardly applied in practice (Orr 1990). More specifically, the scholarship has underlined how non-disciplinary views and approaches to achieving education and research in sustainability are nearly absent in the literature (Molderez and Ceulemans 2018), and only few researchers have attempted to effectively develop non-traditional views of how students and academics can learn about sustainability and contribute to shaping sustainability solutions (Ceulemans, Molderez, and Van Liedekerke 2015). In particular, in their study on Paul Shrivastava, Ingrid Molderez and Kim Ceulemans observe how boldly, and pretty uniquely, the scholar Shrivastava promoted a culture of passion for sustainability that “can be taught using a holistic pedagogy that integrates physical and emotional or spiritual learning with traditional cognitive (intellectual) learning about sustainable management” (Ceulemans, Molderez, and Van Liedekerke 2015). According to this view, it is possible to expand the field of education and research to sustainability by developing innovative approaches and methods that facilitate real integrated and cross-disciplinary thinking and offer concrete solutions, also in the field of education and research, to the sustainability challenges (Molderez, Baraniuk, and Lambrechts 2021). Furthermore, David W. Orr (1990) argues that building a sustainable society is strongly linked to improving EC and that the concept of sustainability itself “implies a radical change in the institutions and patterns that we’ve come to accept as normal” (Orr 1990). Instilling a sustainability frame of mind in those involved in education and research can have a positive, long-lasting impact on both humans and the environment.

As hinted in Section 1.1, the importance of innovative and integrated educational and research approaches to sustainability becomes even more evident in the field of legal education and research to sustainability, where the tasks of lawyers and legal scholars consist of designing, drafting, implementing and managing sustainable solutions to the wicked problems posed by the environmental crisis. In legal education and research on sustainability, Bonnett's definition (2002) of sustainability as a frame of mind is perfectly fitting, as the law is expected to equip learners and researchers with education and inspiration for feasible solutions for sustainable living (Stone 2010), both in their personal and professional spheres, enabling them to develop a profound understanding of the interactions and consequences of actions and decisions. Enhancing EC within legal education and research which will eventually infiltrate into the legal system as a whole —thus instilling a sustainability state of mind— can foster decision-makers who have a greater sense of environmental stewardship and an awareness of how their actions can shape a sustainable future for all.

1.3 Positioning

The lack of effective and integrated legal education and research approaches to sustainability is the gap that this article addresses by offering concrete examples of how to frame and further develop a transformative approach to legal education and research. As will be further explained, and in line with the study conducted by Angela Moriggi et al. (2020), the transformative approach to legal education and research proposed in this study organizes the education and research practices developed in academic courses and research groups' experiences through three main thematic pillars: (1) ethically-informed practices, through instilling a 'care' lens that allows humans to situate themselves in relation to others and the planet; (2) development of response-ability, through recognizing the vulnerability and interconnectedness of living and non-living beings and the planet; and (3) emotional awareness, through nurturing cognitive-emotional skills such as imagination, creativity, and intuition to give humans the capacity to better understand and hope for a better future. The approach is grounded on the need to develop a strong context of inter-relationships and nature experience, overall focusing on the individual, community and planet. This is in line with the core issue of sustainability that Bonnett defines as our relationship with nature and how it ultimately shapes sustainability education in three dimensions: the individual, the collective and the planet.

For this purpose, the first part of the study examines how the complexity of the Agenda 2030 indirectly calls for composite responses merging education and

research outcomes through its urgency for collaborative, community effort towards sustainability. The interconnectedness of the SDGs and the role that policy can play in implementing society-wide changes is connected to the legal discourse. In its second part, the article provides concrete examples of experiential learning and participatory research whose application contributes to equipping legal researchers with the ability to respond to sustainability challenges, before concluding with lessons learned and future directions.

2 The Agenda 2030: The Complexity of Sustainability

The current global framework for achieving sustainability for all, which involves many sectors such as health, education, agriculture, industry and the environment (to name a few), was unanimously approved in September 2015 by the United Nations General Assembly (UNGA). The document “Transforming our world: the 2030 Agenda for Sustainable Development” (hereinafter: The Agenda) identifies a set of 17 integrated global goals (the well-known Sustainable Development Goals (SDGs)), composed of 169 targets and 232 unique indicators, which were set to be achieved by 2030. The Agenda, recognized and in effect in all 193 United Nations (UN) member states, aims to achieve a set of ambitious goals and targets through interconnected actions while balancing the three dimensions of sustainable development: economic growth, social inclusion, and environmental protection (Griggs et al. 2014). As highlighted in Section 1.1, for the purpose of this paper, the “environmental protection” dimension of sustainable development will be of main focus, drawing on the interconnected SDGs and how the objectives and indicators point towards education and research being powerful tools for achieving good environmental governance and sustainability.

In the Agenda, the SDGs and their respective objectives are preceded by two sections entitled Preamble and Declaration. In the Preamble, the UNGA enumerates the five pillars of the Agenda: people, planet, prosperity, peace, and partnership (Tremblay et al. 2020). Through characteristics of coherence and integrity (Coopman et al. 2016), the five pillars set the foundation for the systemic and interconnected approach that must be taken when working towards sustainability, in any capacity (Barbier and Burgess 2017). The commitment to implement the SDGs in a coherently integrated way is grounded in the overall objectives which hope to: end poverty and ensure that all human beings can realize their potential (Steiner 2018); protect the planet from degradation, adopt urgent measures against climate change, and ensure everyone a prosperous and satisfactory lifestyle; enhance economic and social

progress in harmony with nature; promote peaceful, just, and inclusive societies, free from fear and violence (Fisher et al. 2021; Sharifi, Simangan, and Kaneko 2020); and, finally, realize the potential of global solidarity, which includes the participation of all countries, stakeholders, and people (Spraul and Thaler 2020; Pinz, Roudyani, and Thaler 2018).

The Declaration follows with eight subsections, outlining that everyone must play a part in achieving sustainability and the importance of universal, collective action from stakeholders in low-, middle-, and high-income countries across the globe. More specifically, the Declaration urges that science and policy play a crucial role in finding solutions and implementing concrete actions for sustainability (McBean 2021), and although not explicitly stated, legal education and research—in their scientific dimension—also play an integral role in shaping the sustainability of the future. In the subsection *Our shared principles*, there are clear links made between achieving sustainability and international law, referring to the Charter of the United Nations, the Universal Declaration of Human Rights, and the Millennium Declaration, as well as to international environmental law sources such as the Rio Declaration on Environment and Development (Meuleman, Niestroy 2015). The UNGA recognizes that there are many challenges to achieving sustainable development, but points to the fact that we are currently living in a window of opportunity to create more interconnected knowledge societies (among other opportunities i.e., further developing scientific and technological innovation). Addressing the gap of EL within legal education and research while promoting sustainable education are just a couple of the ways to harness this “window” and therefore build a more environmentally-aware society that makes decisions with a sustainability mindset.

Examining the individual SDGs more specifically, it is clear that education and research play an important (if not, central) role in making global progress towards the objectives and indicators set to be achieved by 2030. Inherently, each of the 17 global goals cannot be successfully achieved without integrated solutions that simultaneously target the objectives of multiple goals due to the complexity of the challenges we are facing today. For example, any practice or policy implemented to *End hunger, achieve food security and improve nutrition and promote sustainable agriculture* (SDG 2) must also consider the SDGs that have objectives and targets relating to poverty, human health, education, planetary health, and consumption patterns – virtually each of the 17 goals. It is overwhelming to realize the interconnectedness of the goals and the collaboration that must be taken across all sectors and disciplines to truly reach a sustainable global society, yet empowering for the legal community who has the opportunity to shape education and research around instilling a sustainability mindset into those who will develop the policies and laws that lead to achieving the SDGs.

Consequently, legal education and research have the responsibility of developing methodologies, knowledge and tangible solutions for the realization of the overall vision and goals. The term “policies” is mentioned 32 times between the Declaration and 17 goals, with the overall theme of needing to implement national policies and programmes that fit under the framework of the Agenda while aligning with national policies and programmes. This reference makes it evident that the UNGA has the assumption that policies are the main tangible tool that must be focused on in order to achieve global sustainability. However, even in the mention of important stakeholders who play a key role, the UNGA neglects to mention how lawyers and policy makers (i.e., those in the legal discourse) hold the responsibility to create such policies and law. As mentioned above by Nicole Graham (2014), current legal education and research practices instil a “dephysicalized” perspective of the environment and teach its students that the planet should no longer be treated as a “thing” (Meuleman, Niestroy 2015). It is time to close the gap between the legal discourse and ecological literacy through recognizing that the planet is an integrated ecological system with an infinite amount of living, moving parts and processes (Meuleman, Niestroy 2015). Carrying out educational and research activities that instil a sense of responsibility and care for the planet will influence future law-makers and the subsequent policies they develop which (hopefully) consider the environment at all costs.

Along these lines, and with the intent to show some practical and effective applications of an innovative approach to integrated legal research and education, the following section expands on several examples of how to shift away from conventional legal teaching and research methods toward nature-based, participatory methods that foster a sustainability frame of mind.

3 Examples of Education and Research for Transformative Change in Sustainability

3.1 Introduction

The two sections of the Agenda described above (the Preamble and Declaration) contain statements that, if not accompanied by the assumption of responsibility and actual plans of action, risk remaining empty and rhetorical statements of principle (Murray and Poto 2022). This contribution shows how understanding and implementing the vision that emerges from the 17 SDGs assign a new role to legal education and research, by requiring them to generate and disseminate knowledge to achieve sustainability. Following the three thematic pillars of transformative change as

elaborated by Angela Moriggi et al. (2020) and described in Section 1, this section offers practical examples of how legal education and research on environmental matters can offer tools for concrete implementation strategies to give substance to the objectives and overall mission of the Agenda. In particular, it will describe some education and research practices developed and adopted as implementing activities of the research project “An Exchange Program on Empathy Compassion and Care in Water Governance, from the Perspective of Integral Ecology (ECO_CARE 2023). The examples will be organized following the above-described matrix developed by Angela Moriggi et al. (2020), in the tripartite form of a care-based approach that leads to transformative change through: (1) ethically-informed practices; (2) response-ability; and (3) emotional awareness.

3.2 Ethically-Informed Practices: An Example of Teaching and Research through a Story About Knowledge

As an example of ethically-informed practice (1), the teaching and research developed from the two books “A Story About Knowledge” (Porrone, Poto, and Russo 2021a, b) (hereinafter, the handbook) and “A Story About Knowledge. Illustrated version” (Porrone, Poto, and Russo 2021a, b), (hereinafter, the silent book) show how, also in legal education and research, it has been possible to co-create ethically informed practices engaging with a legal context, embracing playful experimentation (Fazey et al. 2018) and experiencing the tension toward empowerment, by reframing relations of powers.

The two books are educational and reflection-provoking resources rooted in an Arctic Indigenous story about the search for knowledge, which in the end turns out to be ecological and emotional knowledge. Story characters and plot belong to the Native American – Anishnaabe – storytelling tradition connected to the myth of Nanabozho, and its relationship with water (Perkinson 2019; Smith 2020). As will be further explained, these resources have been applied to the research workshops and University curricula developed within the umbrella of the ECO_CARE project (ECO_CARE 2021-2025), in undergraduate courses as well as in Master’s Programs. Moreover, the teaching materials were used to lead research seminars on the theme of situated knowledges: in 2022, in Bayreuth (Hayden et al. 2022) and on a research expedition in the Northern Sea (Panieri et al. 2022); and in 2019–2020 as part of the core activities complementing I and II year students’ doctoral training in Global Studies. Justice, Rights, Politics (University of Macerata, Italy, Department of Political Science, Communication and International Relations). Finally, the teaching methodology has also been adopted in an interdisciplinary Master’s program

on Global Health, with a specific focus on Arctic Governance (McMaster University, Ontario, Canada 2021–2023).

The story at the core of the two books follows the nested loops technique, enabling the core message (“Where can knowledge be found, hidden and preserved?”) to be communicated and discovered through several narratives delivered within one story (Petrovic et al. 2022). The story is chosen for its focus on the collective search; one that bridges human and non-human worlds with underlying principles of care and responsibility, for the best place to find and have custody of knowledge.

The story begins with a research question posed by the creator to the trickster spirit named Nanabozho, to find that place where knowledge can be found, and from the trickster spirit, the task is delegated to the animals of the Earth (symbolically represented by Arctic animals: a bear, an eagle, a salmon, and a mole). The search becomes an interactive, situated, and delocalized thought-provoking process. Each story character situates their answer based on their knowledge of the habitat they live in: the bear knows the mountains, and is sure that knowledge can be found, hidden and treasured on top of them; the salmon is the knowledge keeper of the secrets of river courses and sea; and the eagle, created to soar above the heights, provides her knowledge of the high altitudes in the sky. In the unfolding of each animal’s nest, the story leads to the final conclusion of the mole, who seems to be the only one able to provide the correct answer to the trickster’s question. Although the mole is not gifted with any apparent eyesight, she is gifted with great vision. In her view, knowledge is found and guarded in the heart of the earth.

The multi-layered theme of this story is found in the fact that there are potentially limitless interpretations of how the problem of the search for (ecological and emotional) knowledge can be solved, and these interpretations depend on the audience, the positioning of each member and also the relationship between the audience members. For example, among the answers we collected through carrying out this activity with legal scholars, it was interesting to note that the scholars studying ecological restoration as a collective act, agreed on the fact that it was not the last animal that provided the answer, but rather the “right” answer blossomed out of a collective sum of the individual efforts of all the animals involved in the search (Hayden et al. 2022). Following the story plot, the handbook develops educational insights and stimulates a debate around each animal character, their roles, the relational aspects that are generated from their search, and their deep interconnectedness with nature, as well as with the community of readers and researchers engaging with the story.

In parallel with the lessons developed in the handbook, a co-created and illustrated book project, the silent book, based on the same story plot as above, continues along with the conceptual idea of the need to engage in conversations around the

relational dimension of ecology (Porrone, Poto, and Russo 2021a, b). In this latter case, the investigation process is situated in fictitious and coloured settings (the mountainside, airspace, waterside, and underground). Numerous art prototypes display the crucial moments of the animals' search for knowledge and the consequent full immersion in and interaction with their own environment. This silent book helps readers and learners engage in the search for knowledge by giving them a voice and transforming them into storytellers and interpreters of the story (Garan and DeVogd 2008).

Seminar series and academic lectures organized around these two books provide examples of ethically-informed practices firstly by inviting the audience to develop a sense of engagement with the learning context; a sense of place, represented by the situated answers of each animal (Judson 2010); and a sense of community, extending beyond the community of animals and embracing the community of learners, giving life to what the scholars call an eco-sociological model (Yıldırım and Hablemitoğlu 2013). The skills and lessons realized through this type of learning activity become foundational moments toward the development of sustainability values.

When workshops and lessons around "A Story About Knowledge" are carried out, the sense of place and community is further ignited by the education and research protocol of respect and mutual understanding that is instilled in the development of the learning and investigation experience (Fitzpatrick et al. 2016; Koster, Baccar, and Lemelin 2012). At the beginning of each session, and following the Indigenous practice of acknowledging traditional territories hosting the human communities, an expression of gratitude to the hosting place is expressed by the session leaders (Blenkinsop and Fettes 2020). At times, the session may begin with the practice of story reading and storytelling; reading or telling the story aloud is also a tool to strengthen a multisensory connection with the space and the community audience (Fernández-Llamazares and Cabeza 2018). Afterwards, space is dedicated to sharing and reporting back preliminary impressions, before initiating a deeper conversation around the subject matter. Before, during, and after the sessions, participants are encouraged to engage with the learning materials and stories by providing written answers, as well as their visual creativity. Creative answers brought forward through designing and colouring journaling prompts, are highly encouraged and recommended so that creativity becomes a fundamental tool of pedagogy for ecological education (Capra 2007) by encouraging the learners to be engaged in conscious acts of gentle exploration of their abilities in their surrounding space (Inwood 2008). Engaging with the learning toolkit through journaling exercises and prompts can be construed as part of a collective therapeutic process that brings awareness to the need to heal the planet by restoring our relationships and improving overall human health by creatively engaging with inner and outer

conflicts (Larsen and Johnson 2017). The personal and community work outside the seminar room contributes to spurring new conversations, allowing us to discuss key issues in greater depth, and elevating the richness and complexity of mutual understanding. Through these continued conversations, which consolidated into ethically informed practices of education, the key underlying principles forming a common conceptual framework of integral ecology are identified through the relationship with the environment and the affected peoples.

The experience of delving into collaborative educational and research activities, and thus engaging in a reciprocal effort to co-create and look for solutions, shifts the conversation toward purpose, intention, and consciousness of the socio-ecological interdependencies. Discussing concerns for the biophysical environment including climate change threats, economic and social disparity, and inadequacy of the Western-centric legal approaches to overcome poor environmental governance, leads these ethically informed practices to reflective questions on the need to develop a sense of relational accountability and individual, collective, and planetary search for solutions are understood as part of a ceremony (Wilson 2008).

In this sense, and in response to the different calls for ecological education, the goal of quality education (SDG 4) coordinated with other SDGs (such as 13, 14 and 15 among others), is being reframed through the ethically informed practices of storytelling to prioritize not only academic learning and scientific research, but also social, emotional, and ethical competencies (Cohen 2006).

3.3 How Sustainability-Conscious Legal Education and Research Strengthen the Ability to Provide Responses: Co-creating Legal Materials with the Chiquitano People from Mato Grosso, Brazil

Looking at the Agenda's commitments and objectives from the perspective of environmental response-ability is crucial to ensure that the sustainability vision is transformed into the ability to provide effective and practical *responses* to the many complex and interconnected challenges of sustainability. Rendering each other able to provide responses is the key role that legal education and research (Bozalek 2020) are asked to play within and beyond 2030, by raising awareness on the need to develop a sense of response-ability among individuals and community as a whole to repair the harm to the environment and build up different relational and ethical systems that prevent future harm (Haraway 2015). Thus, teachers, learners and researchers become effective ability trainers and response-givers to the sustainability challenges. Sustainability-conscious education and research (Greuenewald

2018) aim to strengthen this ability by enhancing awareness of the need to repair the harms and by building a relational sense of solidarity and mutuality (Noddings 2013).

Developing the ability to connect with others (Banks 2011), through environmental education and literacy, activates the capacity to ‘care about’, an internal state of readiness, and a commitment to the possibility of caring for strangers or distant others, which precedes the actual practice of caring. The ability of responsiveness builds upon multiple ethically-informed practices of relationality: the more we engage in attentive relationships, developing a sense of place and a sense of community, the stronger our ecological identity becomes, building our feelings of empathy, compassion and care for others.

An example of this collective experience of building up these three emotions and therefore strengthening responsiveness abilities is provided by one of the co-created activities carried out by the ECO_CARE research team with the Chiquitano Community of Mato Grosso, Brazil.

In collaboration with local scholars from Brazil, cultural mediators, law students, community representatives and school communities, the ECO_CARE team created a series of visual and narrative materials on environmental participation with and for the Chiquitano People of Mato Grosso. The project, entitled ‘Legal Design and Visual Law in International Environmental Law: Conversion of the Escazú Agreement in Visual Materials for the Chiquitano People’, was developed during the related academic course, throughout the year 2020, by the students of the Universidade Federal do Estado do Rio de Janeiro, Postgraduate Law Program and with the active participation of the Chiquitano People from Mato Grosso. The objective of the project was to teach, in practice, an efficient method to create a knowledge base of participatory environmental law, as well as co-develop educational materials that could work as a tool for strengthening environmental participation. The project participants were assigned to three thematic areas, corresponding to the three pillars of environmental participation, and critically revisited through the three mentioned emotions: respectively, access to information was associated with empathy, as the ability to feel for others; participation was connected to compassion, as the ability to feel with others; and access to justice was connected to care, as the ability to take restoring action (ECO_CARE 2021-2025).

The leader of the academic team was a Chiquitano student and young scholar, Silvano Chue Muquissai, who holds membership in one of the communities the team has been working alongside. Silvano has strong social and family ties to the *aldeia* (‘village’ in Portuguese) of Vila Nova Barbecho, as this is where he lived until he left for his post-secondary academic studies. The development of this community-based project therefore built upon a very strong base of relationships and kinship with the community members (Desai and Smith 2018), and was shared in a relational connection, which has been essential to all stages of our project, most particularly in

its early development when it was crucial to build trust and gain community understanding of the project vision, scope and long term objectives. The education and research project formally began with many community meetings involving researchers, law students, residents, teachers and spiritual leaders (*pajé*, in Portuguese), and elders seeking to elicit local perceptions on key environmental issues among the Chiquitano communities in different villages in Mato Grosso. This resulted in various discussions with students and community members through meetings and focus group sessions that enabled a better understanding of local environmental concerns. The meeting point between the community needs and the project vision was found in the co-created version (in comics) of the Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean (Escazú Agreement 2018). The community members took part in the project, actively becoming the protagonists and discussing the possibility of transforming the Escazú Agreement into an accessible format, where different understandings and concerns could be voiced and the role of the Chiquitano People could become effectively visible. Thus, the community chose to imagine and develop a comic format for the Agreement (i.e., a manifestation of visual law): the voice was given to the community members who played an active role in participating in the creation of an accessible version of the Agreement, through the construction of co-developed dialogues. Accordingly, the legal provisions on participation of the Escazú Agreement, written in technical legal language, were cooperatively translated into an easily accessible dialogue, understandable by everyone. Each sentence in the comic dialogue was paired with pictures from the village, representing places and people that different individuals could recognize and relate to within the story. The pictures of the community were transformed into cartoons by students and community members and accompanied by corresponding speech bubbles. The final work consisted of two versions of the Agreement in comics, in Portuguese and English, where the Indigenous Chiquitano People of Vila Nova Barbecho converses on the individual and collective understanding and interpretation of environmental participation as regulated in the Agreement.

As a final restitution act, the books were returned to the community, and a series of video documentaries on the process of co-creation, and the building of trust, mutual understanding, and empathy-building between the community of researchers, students and the Chiquitano communities (Rebello, Mehmood, and Marsden 2020). By strengthening the bond between the Indigenous community, its space, and the community of learners, a sense of ecological identity was developed and, through effective participation in education and research, a collective ability for responsiveness to environmental challenges was created.

This co-created approach to research education parallels the essence of situated and community-based education which aims to transform the Western conventional

approach of educational institutions to include the spirit of community, a re-imagined relationship to nature and a commitment to the responsibilities that grow from that relationship (Sobel 1995).

Central to the process of building responsiveness through the community practice of co-creating learning materials were the attributes of healing, participation, storytelling, categorizing harm, and accountability. Healing and participation were closely correlated to the process of involvement and cooperation between the community of students and the Chiquitano community members. Conversations and collective brainstorming on the creation of the most accessible legal tool that could effectively give voice to the unvoiced led toward relational and emotional healing through the practice of ‘restorying’ the experiences, integrating and understanding both the root causes of the problems as well as the responses to them. Storytelling and identifying harms helped develop conversational empowerment and inclusion of perspectives, as well as situating events and persons in time and place, and therefore contributing to develop collective consciousness and accountability (Aarnio-Linnanvuori 2019; Gallhofer et al. 2000).

3.4 Ecological Literacy and Emotional Awareness for a Sustainable Future: Follow Your Heart

Another example of practices toward transformative change in research and education is represented by programmes that stimulate emotional intelligence and competencies as a central element to learning, to foster future generations with an awareness of the relationships with themselves, others, and their surrounding environment. Addressing the gap in EL within a legal education and research context is not possible without building emotional intelligence since EL requires the ability to integrate “empathy, seeing others’ perspectives, and cooperation with an understanding of and respect for natural systems” (Jordan 2013). The co-creation of the education and research resource ‘Follow Your Heart: the school for multi-potentialites’ (Poto, Murray, and Russo 2022) (hereinafter Follow Your Heart) forms part of this scenario with a playful, yet scientific approach to improving emotional intelligence, ecological literacy and an overall appreciation for creativity and mindfulness. The book project developed from the original idea of the illustrator, Valentina Russo, whose personal experiences led to the realization and motivation for implementing more emotional literacy and creativity within elementary and secondary education, and potentially higher education (Poto, Murray, and Russo 2022). Continuing on the path of creativity and participatory methods for education and research practices that instil a sustainability frame of mind, ECO_CARE supported and developed the original project plan (written in Italian) into an English

teaching resource with a multipurpose scope (scientific, educational, and playful) (Poto, Murray, and Russo 2022). As mentioned above, the ECO_CARE research group develops education and research approaches that bring empathy, compassion, and care into the world of environmental law and sustainable development, and felt inspired to take on this project with the belief that focusing on emotional literacy within youth will lead to future generations who have the emotional-cognitive skills to imagine and create a more sustainable society (ECO_CARE 2021–2025).

Through the iterative process of developing Follow Your Heart into a co-created and dynamic learning and teaching resource, and an educational philosophy overall, the authors structured the book in a way that speaks to the interests of young learners, educators, and researchers. Within the primary and secondary school systems, learners and educators might use Follow Your Heart as inspiration to reimagine their learning spaces and stretch the boundaries of traditional school curriculum to strengthen imagination and creativity – important skills to nurture in the case of improving emotional awareness, according to Angela Moriggi et al. (2020). For researchers and higher education, the themes, concepts, and activities of Follow Your Heart can be further explored through academic courses, community-based research, and interconnected outreach on emotional education, environmental awareness, compassion, ethics of care and human rights.

With the aim to create space for the development of emotional education and support present and future generations in their effort to make the world a better place, the book is built upon solid research that supports the importance of co-created approaches for achieving a common future for all (the ultimate objective of sustainability) (Szetey et al. 2021). One unique characteristic of Follow Your Heart is its dual participatory element, which is linked to the co-creation of sustainability approaches: the resource (1) encourages the participation of its target audience members as participants and co-creators of the educational resource itself and the subsequent materials that will continue to develop, and (2) describes a curriculum and teaching style that encourages the active participation of pupils and students in their learning to foster deeper engagement with learning outcomes, and a greater sense of autonomy and belonging (Billett and Martin 2018). Along with creating an environment that views participation as a central element in education and research, Follow Your Heart welcomes creativity, imagination and multiple talents (elements lacking in the Western education context), which can shape the minds and hearts of learners into eager citizens who remain hopeful in the face of difficult challenges and inspired to find sustainable solutions (Egan 2015).

Embedded in the first part of the Follow Your Heart book, a fully-illustrated children's story called "The Story of Cora" visually demonstrates the pressure that comes from the question adults often ask children, "what do you want to be when you

grow up?” (Poto, Murray, and Russo 2022). One of the themes in *Follow Your Heart* is to shift away from this question, which limits imagination and creativity while encouraging children to pick a linear path from an early age. The second part of the book contains evidence-based research supporting emotional education and gives examples of multipotentialites such as Malala Yousafzai and Wangari Maathai who have learned how to use their multiple talents and emotional intelligence to work towards a more sustainable future (Poto, Murray, and Russo 2022). The book’s final part is a co-created ‘activities’ chapter with contributions from various educators focusing on developing emotional awareness and an understanding of the interconnectedness between humans and nature and the responsibility we have to care for each other. Teaching pupils to care for others sets the foundation for strong interpersonal and social relations with all beings, including a sense of responsibility and care for the natural environment (Sauvã 1999). Overall, a curriculum that includes mindfulness activities, outdoor learning, multi-language and multi-age classrooms, while embodying and instilling relational thinking, has the potential to raise children with a sustainability mindset and the skills to tackle complex challenges; children who will become future lawyers, policymakers and politicians who need the skills and self-awareness to create and implement innovative solutions to build a more sustainable society.

In the legal context, emotional intelligence programs such as *Follow Your Heart* can and should be engaged with in higher education since the acquisition of theoretical knowledge and technical skills, although necessary, are no longer sufficient for working with the complex challenges our society is currently facing (Gilar-Corbi et al. 2018). As with *Follow Your Heart*, there must also be a paradigm shift in higher education towards recognizing the multiple potentialities that exist within individuals and teaching them how to utilize their diverse talents (outside academic environments). Developing emotional and social intelligences and making time and space to give students to opportunity to re-discover their creativity, imagination, and autonomy (alongside the necessary university curriculum) will benefit the individuals themselves by giving them the confidence and skills to work cooperatively with others and their surrounding natural environment.

Thus, the resource encourages the development of intergenerational programs on emotional awareness, especially starting from an early age. The typical Western education classroom is not usually viewed as a place to foster creativity, imagination, and emotions, but rather as academic excellence and discipline. *Follow Your Heart* promotes educational approaches that enhance emotional and ecological knowledge, recasting the role of children and teachers as agents of intergenerational learning in environmental and sustainably conscious education and research (Instead, and Shapiro 2014).

4 Concluding Remark and Ways Forward

This study has shown the importance of investing in ecological and emotional literacy as an integral element of the legal inquiry on how to reach environmental sustainability. Legal education and curriculum are heavily theoretical and technical, embedded in traditional (Western) ways of knowing, and are currently not sufficient in equipping lawmakers and policymakers with an eco-literate mindset – one that ensures sustainability is intertwined in all aspects of their work. Thus, developing ethically informed practices, strengthening a sense of response-ability and enhancing emotional awareness is a tripartite approach that is recommended in the endeavour to cultivate caring, empathetic and responsible graduates of legal education and research programs. Examples of these three practices have been tested and implemented in various geographical academic settings and demonstrate a way forward in which education and research are committed to the achievement of ‘Our Common Future’, following the ambitious indication of the Agenda 2030. Thinking of a way forward is, therefore, the second step after the establishment of education and research foundations based on ecoliteracy and emotions, which follow the direction of environmental experts such as David W. Orr (2011) who recommends the continuing development of experiential education and research, specifically informed by the interconnectedness of nature. Attempts should be made to go beyond linear thinking and toward a systems thinking approach, both applied to knowledge systems and to the relational dimensions of the knowledge seekers (teachers and students) (Orr 2011). Relational thinking instills situationality and allows citizens to understand their place in the current global vision of achieving sustainability for all. Essentially, improving ecoliteracy in legal education and research is, in a sense, “eco-designing” (seen, by David Orr, as a complementary activity of ecoliteracy: Orr 2011) a community of care, where individuals, communities and the planet are part of the same learning experience – this is the main direction that must be followed in the preservation of our common home, the planet (Orr 2011). Without reshaping education and research to foster a sustainability state of mind, the environment will continue to be governed in such a way that does not reflect caring and responsibility, leading to further degradation.

In the future, the different practical examples developed and tested in the project ECO_CARE can be upscaled and applied in other contexts and situations. Conducting research to investigate the long-term beneficial impacts of these practices on the restoration of the relational fabric of society can help to expand the evidence base supporting ecological education, especially within a legal context. Collaborating with educators, researchers and academic institutions as a whole who

have integrated emotional and ecological education within their programs is another way forward, to develop a framework to guide those who want to reshape their curriculum. Additionally, students and educators may be surveyed in the future to investigate what aspects of the ecoliteracy curriculum should be further addressed and developed, which would also contribute to creating an overall framework or set of guidelines to reshape legal education with grounding principles of ecoliteracy and sustainability. Consequently, based on the consolidation of these practices and the research studies that come forth, policymakers could be informed on the relevance of ecological and emotional education to provide concrete responses to complex sustainability challenges. Further research following this study, including a larger number of students, schools and communities, is expected to be conducted in the near future to build upon the tools for developing ethically informed practices, response-ability and emotional awareness.

Instilling a sustainability state of mind and integrating practices to strengthen ecological literacy is important across all disciplines and ages, and is a gentle step forward towards the co-creation of a common future for all.

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PATHWAY 2 - Ecological Literacy and Ocean Literacy. 1: Theoretical Approach. The Agenda 2030 and the Imperative for Research and Education for the Climate and the Oceans

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The Agenda 2030 and the Imperative for Research and Education for the Climate and the Oceans

*Giuliana Panieri, Margherita Paola Poto,
and Emily Margaret Murray*

Abstract This chapter sets the scene and provides background information regarding the primary objective of the book: to contribute to the knowledge base for climate education and research, with a specific focus

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on the oceans and water. Within this framework, the chapter situates educational and research strategies that specifically focus on ocean literacy, developed and coordinated by the authors over the past years. Drawing upon the intersection of ecological literacy and inclusive learning, firmly grounded in sustainability and ocean literacy, the chapter describes the steps in developing an education and research platform that responds to the primary purpose of advancing knowledge and effectively contributing to climate knowledge-in-action. These steps encompass the ideation, development, and implementation of The Ocean Senses Activity Book (and connected outputs) as a pilot project for Ocean Literacy (OL) and its translation, validation, and application in various cultural contexts. The Ocean Senses Activity Book marks an important contribution in promoting OL in research and education settings. Some further reflections on the importance of OL stem from the experience of a student-led course on Agenda 2030, with a particular emphasis on Sustainable Development Goal (SDG) 14 on Life Below Water. Additionally, the chapter highlights how the preliminary conclusions of the Ocean Interconnectedness workshop sparked new ideas on how to develop cross-disciplinary research and educational tools on OL. To wrap up this introductory chapter, a general overview of the book's structure and conceptual framework is provided.

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The work was developed during the course on the “New Horizons of Administrative Law, The Agenda 2030 (with a specific focus on SDG 14 Life Below Water)” at the Department of Management, University of Turin, co-led by Poto and Panieri in the academic year 2022–2023. The core ideas were further developed during the interdisciplinary workshop “Ocean Interconnectedness”, organised on September 19 and 20, 2023, at the UiT The Arctic University of Norway. M. P. Poto coordinated the research, co-wrote Sects. 1, 2, 3, and supervised the last version of the work.

Keywords Research · Education · Climate · Ocean

1 INTRODUCTION: THE 2030 AGENDA AND THE URGENCY TO SAFEGUARD PLANETARY HEALTH

The 2030 Agenda for Sustainable Development, adopted by the United Nations in 2015 (hereinafter Agenda 2030),¹ marks a global milestone in the commitment to addressing imperative sustainability issues such as ending poverty, overcoming food insecurity, reversing climate change impacts, and reversing inequality and injustice.² At the core of the Agenda 2030 lies the fundamental acknowledgement that there exists a profound interdependence between our planetary ecosystem and the overall well-being of the human population, defined within the comprehensive framework recognised as “planetary health”.³ Yet, despite the unequivocal recognition of planetary health’s pivotal significance within the scientific community,⁴ which underscores the imperative for immediate action to safeguard both the planet and human health,⁵ the successful realisation of sustainability objectives remains elusive.

¹ The 2030 Agenda for Sustainable Development was adopted by the United Nations General Assembly (UNGA) on 25 September 2015, available on the official website: <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N15/291/89/PDF/N1529189.pdf?OpenElement>, last access 3 October 2023.

² The literature on the Agenda is quite vast. Among the most recent contributions, it is worth citing the critical study of Kotzé, L. J., & Adelman, S. (2023). Environmental law and the unsustainability of sustainable development: A tale of disenchantment and of hope. *Law and Critique*, 34(2), 227–248. For an overview of the architecture of the Agenda 2030, see Poto M. P., Murray, E. M. (2022). The New Horizons of Law and Science through a systemic approach promoted through the lens of the Agenda 2030 on sustainable development. Some Emerging Issues, *Environmental Policy and Law*, pp. 1–14.

³ See Holden, E., Linnerud, K., & Banister, D. (2017). The imperatives of sustainable development. *Sustainable Development*, 25(3), 213–226.

⁴ Specifically on the role of planetary health in education and research see Brand, G., Wise, S., Bedi, G., & Kickett, R. (2023). Embedding indigenous knowledges and voices in planetary health education. *The Lancet Planetary Health*, 7(1), e97–e102.

⁵ Ortiz-Moya, F., Tan, Z., & Kataoka, Y. (2023). State of the voluntary local reviews 2023: Follow-up and review of the 2030 agenda at the local level. Institute for Global Environmental Strategies. <https://doi.org/10.57405/iges-13013>, last access October 2023.

In the words of António Guterres, UN Secretary General (UNSG), “The Doomsday Clock is now 90 seconds to midnight, which means 90 seconds to total global catastrophe. This is the closest the clock has ever stood to humanity’s darkest hour [...]. In truth, the Doomsday Clock is a global alarm clock. We need to wake up – and get to work”.⁶ And, in the words of Guterres, climate action is “the 21st century’s greatest opportunity to drive forward all the Sustainable Development Goals”⁷ and address such urgency. The UNSG explicitly anchors this call to climate action to the safeguard of water, “Our ocean is choked by pollution, plastics and chemicals. And vampiric overconsumption is draining the lifeblood of our planet — water. 2023 is a year of reckoning. It must be a year of game-changing climate action”.⁸ Vivid words that well depict the urgency to act for the climate.

Within this framework and in alignment with the overarching theme of this book, climate action in the context of ocean sustainability assumes a crucial role in both academic research and educational settings. This places a significant responsibility on scientists and educators to effectively act within their own fields of expertise, by developing knowledge frameworks that incorporate, promote, and facilitate effective responses to sustainability challenges.⁹

In conclusion, the primary objective of this book is to contribute to strengthening the ongoing efforts within the research community on advancing the framework for the planetary health research agenda,¹⁰ with

⁶ The complete discourse of the UNSG can be accessed online at: <https://www.un.org/sg/en/content/sg/speeches/2023-02-06/secretarygenerals-briefing-the-general-assembly-prioritiesfor-2023>, last access 3 October 2023.

⁷ Ibid. (see footnote 6).

⁸ Ibid. (see footnote 6).

⁹ For a thorough study on the interconnections between climate action and environmental education and research, see Trott, C. D., Lam, S., Roncker, J., Gray, E. S., Courtney, R. H., & Even, T. L. (2023). Justice in climate change education: A systematic review. *Environmental Education Research*, 1–38; Brownlee, M. T., Powell, R. B., & Hallo, J. C. (2013). A review of the foundational processes that influence beliefs in climate change: Opportunities for environmental education research. *Environmental Education Research*, 19(1), 1–20.

¹⁰ Biermann, F., & Kalfagianni, A. (2020). Planetary justice: A research framework. *Earth System Governance*, 6, 100049; Capra, F. (2007). Sustainable living, ecological literacy, and the breath of life. *Canadian Journal of Environmental Education (CJEE)*, 9–18.

a specific, even though not exclusive, focus on the ocean. Recognising that the well-being of our oceans is intricately linked to planetary health and in line with the vision and mission of the UN Ocean Decade to strengthen the knowledge base for transformative ocean science solutions that connect people and the ocean,¹¹ research and education initiatives focusing on ocean sustainability (within the umbrella concept of Ocean Literacy)¹² stand as vital contributors to formulating effective responses to sustainability challenges. According to the UN, the ocean is “the world’s greatest ally against climate change”¹³ due to the central role it plays in regulating global greenhouse gas emissions.

Human beings and non-human beings are impacted by the ocean daily, whether or not they are living in a coastal region. Developing accessible tools to improve OL among various ages is one step towards improving ecological literacy, and an area of literacy and understanding that we feel can have the greatest impact on climate action. After providing a definition of OL, in the subsequent sections, we will delve into the various steps that have contributed to the development of our research and educational strategies and tools, igniting transformative behavioural change and fostering action towards ocean sustainability.¹⁴

2 PILOT PROJECTS FOR OCEAN LITERACY (OL)

2.1 *Preliminary Remarks*

In Sect. 2, we describe the initiatives undertaken by our cross-disciplinary team towards the enhancement of Ocean Literacy for all: The Ocean Senses Activity Book,¹⁵ its interconnected outputs (Sects. 2.2 and 2.3);

¹¹ On the UN Ocean Decade and its role in igniting climate action for ocean sustainability see the official website <https://oceandecade.org/>, last access 6 October 2023.

¹² For the definition of Ocean Literacy (OL), see further Sect. 2.2.

¹³ <https://www.un.org/en/climatechange/science/climate-issues/ocean>, last access December 2023.

¹⁴ McKinley, E., Burdon, D., & Shellock, R. J. (2023). The evolution of ocean literacy: A new framework for the United Nations Ocean Decade and beyond. *Marine Pollution Bulletin*, 186, 114467.

¹⁵ Panieri G. et al., No. 1 (2023). The Ocean Senses Activity Book, Edited by Giuliana Panieri and Mathew Stiller-Reeve; Authored by Panieri, G., Savini, A., Willis, C., Oddone, D., Rosnes, Maric, F., Franchi, F., Zimmermann, H. J., Todd, J. E., Meyer, Losleben,

the student-led course on the New Horizons of the Agenda 2030 with a focus on SDG 14 (Sect. 2.4); and the preliminary results from the interdisciplinary workshop on Ocean Interconnectedness (Sect. 2.5).

2.2 *Ocean Literacy: A Concept Bridging the UN Ocean Decade with Oceanic Views*

In the development of a comprehensive conceptual framework that informs the research and education community on ocean sustainability, OL focuses on the reciprocal influence between the oceans and humankind.¹⁶ Our approach is rooted in this understanding. This concept aligns with the overarching vision of the international community, as articulated in the Ocean Literacy Framework (hereinafter OL Framework) by the Intergovernmental Oceanographic Commission for the United Nations Ocean Decade (2021–2030),¹⁷ while also incorporating the perspectives and insights of oceanic communities and oceanic Indigenous knowledge custodians and philosophers.¹⁸ The main overarching aim of our methodology consists of this: to achieve integration and mutual exchange of knowledge sets, combining the perspectives of the Ocean Decade and oceanic views, to promote well-being and inclusivity for all. The concordance observed between the definition outlined in the UN

L. K., Poto, M. P., Eilertsen, M. H., Stiller-Reeve, M. A., Clerici, M., R., Ramalho, S., Mohadjer, Aune, V., Os, V., Poddevin, V., & Holm, V. D. & Sancak Sert, Z. Contributions from: Panieri, G., S., Savini, A., Willis, C., C., Oddone, D., D., Rosnes, E., F., Maric, F., Franchi, F., Zimmermann, H. J., Todd, J. E., K. A., Losleben, L. K., Poto, M. P., Eilertsen, M. H., Stiller-Reeve, M. A., Clerici, M., R., Ramalho, S., Mohadjer, S., Aune, V., Os, V., Poddevin, V., Holm, V. D., Haule, A., Hayden, J., Pickering, R., Mandana Knust, TRINT Tromsø International School students & ECO_CARE project, An Exchange Program on Empathy, Compassion, and Care in Water Governance, from the Perspective of Integral Ecology. Graphics and Layout Heike Jane Zimmermann, in Septentrio Educational, No. 1, <https://doi.org/10.7557/sc.2023.1>.

¹⁶ Ibid. (see footnote 15).

¹⁷ UNESCO-IOC. 2021. Ocean Literacy Framework for the UN Decade of Ocean Science for Sustainable development 2021–2030. Paris, UNESCO. (IOC Ocean Decade Series, 22), available at <https://unesdoc.unesco.org/ark:/48223/pf0000377708>, last access 6 October 2023; Ferreira, J. C., Vasconcelos, L., Monteiro, R., Silva, F. Z., Duarte, C. M., & Ferreira, F. (2021). Ocean literacy to promote sustainable development goals and agenda 2030 in coastal communities. *Education Sciences*, 11(2), 62.

¹⁸ Hau'Ofa, E. (2008). *We are the ocean: Selected works*. University of Hawaii Press.

Ocean Decade and the Pacific knowledge repositories does not necessarily imply the absence of disparities between them. Rather, it serves to corroborate and strengthen the notion that the most promising avenue for safeguarding the ocean lies in embracing a multifaceted, dialogical, hybrid, and relational approach.

In this vein, we see the concordance between the OL Framework of the UN Ocean Decade and the oceanic views of indigenous peoples.¹⁹ It is stated in the OL Framework that:

Ocean Literacy refers to the understanding of the ocean's influence on us and our influence on the ocean. Many people are unaware that the ocean is intrinsically linked to major global issues such as climate change and food security, human health and the global economy. The ocean also represents a range of social values for various cultures, as people from all over the world are able to recognize and relate to the ocean in different ways. To achieve sustainable development and well-being across the globe, everyone needs to understand our dependence on the ocean, and how we can contribute to its sustainability. In this context, Ocean Literacy has a twofold goal: to learn more about the world's oceans and to contribute to the co-design and co-delivery of solutions to the problems and threats it faces. In this way, Ocean Literacy becomes more than a tool for capacity development and knowledge generation.²⁰

This definition aligns with the oceanic perspectives, "Our most important role should be that of custodians of the ocean, and, as such, we must reach out to similar people elsewhere for the common task of protecting the seas for the general welfare of all living things. [...] The formation of an oceanic identity is really an aspect of our waking up to things that are already happening around us".²¹

Reflecting on such need to adopt a relational approach between knowledge sets and towards the ocean, our educational tools and their overarching conceptual framework were co-created with the communities of learners to foster the understanding of the interdependence between

¹⁹ Ibid. (see footnote 18).

²⁰ UNESCO-IOC. 2021. Ocean Literacy Framework for the UN Decade of Ocean Science for Sustainable development 2021–2030. Paris, UNESCO. (IOC Ocean Decade Series, 22), available at <https://unesdoc.unesco.org/ark:/48223/pf0000377708>, last access 6 October 2023.

²¹ Ibid. (see footnote 20).

the ocean and humankind. Thus far, the co-creation process has involved the Chiquitano Indigenous Peoples from Mato Grosso²² and the schools from the Ruvuma Region, in the southern region of Tanzania, as well as the Bachelor students in Business and Management from an academic environment not directly connected to the sea, as in the case of the University of Turin in Italy.²³ In collaboration with our communities of educators and learners, we reflected on the interconnections between our lives, knowledge paradigms, and perceptions, validated by multisensory experiences, emotional responses, and life histories. This collective effort led to the co-creation of project ideas that underscore the imperative of planetary protection and the fostering of a responsible attitude towards it.

2.3 The Ocean Senses Activity Book: Developments, Outputs, Validation, and Application to Multicultural Contexts

As a first example of a co-created learning resource bridging ocean and people, The Ocean Senses Activity Book was developed by a group of scientists from different backgrounds (marine geosciences, philosophy, psychology, gender studies, education, environmental law) during the AKMA-Ocean Senses Research Expedition (11–23 May 2022).²⁴ The expedition was part of a research project aiming to advance knowledge of methane in the Arctic led by Giuliana Panieri, aboard the research vessel Kronprins Håkon to the Barents Sea and Arctic Ocean focusing on both science and education.²⁵ It had two overarching aims. First, to investigate and collect data from extreme environments such as “cold seep”, sites characterised by emission at the seafloor of deep-sourced fluids enriched in methane and hydrogen sulphide, to increase the ability of marine geoscientists to understand greenhouse gas dynamic in the past, present and predict the future. Second, to develop an educational platform for interdisciplinary collaboration with the goal of improving OL.

²² For a recount of this experience, see the blogpost (in Portuguese) at https://en.uit.no/project/ecocare/blogg/innlegg?sub_id=795326, last access 4 October 2023.

²³ For some examples of co-created projects from the students at the University of Turin, see <https://en.uit.no/project/ecocare/blogg>, last access February 2024.

²⁴ For more details, see <https://en.uit.no/project/akma/Akma2>, last access 4 October 2023.

²⁵ Ibid. (see footnote 24).

The Ocean Senses Activity Book was the project result of this latter aim. The marine geoscientists involved in the primary project activity (Advancing Knowledge on Methane in the Arctic) were paired with educators and (mainly) social scientists from different backgrounds. The project team was divided into five groups that worked together for educational resources that facilitate experiential learning using the human senses (touch, sight, smell, hearing, and taste). The diversity within and between these smaller working groups is reflected in the variety of the resulting lesson plans, compiled in the final Ocean Senses Activity Book, where multiple activities and different approaches and laboratories are promoted, varying from visual and touch-learning, to kinaesthetic to hands-on activities across sixteen comprehensive lesson plans. The learning resource, and the partnership developed among the different contributors and the target audiences (mainly but not exclusively school communities from partnering countries), address two major issues in scientific literacy in general, and in ocean sciences literacy in particular. First, the book responds to the increasingly urgent need for scientists to engage and communicate more effectively with the public about scientific issues.²⁶ Second, it provides an inclusive learning platform for diverse learning needs and cultural contexts. The idea to develop a multisensory approach to learning responds to the need for an inclusive quality education and to overcome learning barriers (physical, mental, cultural, and social).²⁷ Hence, the compilation of multisensory practical sessions and interactive activities, translated from English into multiple languages (including Chinese,²⁸

²⁶ O'Brien, M., Freitas, C., Venzo, P., & Francis, P. (2023). Fostering ocean literacy through informal marine education programs. *Marine Pollution Bulletin*, 193, 115,208; Freitas, C., Francis, P., Bellgrove, A., & Venzo, P. (2023). Adopting Ocean-Themed Picture Books to Promote Ocean Literacy in Primary Education. *Children's Literature in Education*, 1–16; McCauley, V., Davison, K., McHugh, P., Domegan, C., & Grehan, A. (2021). Innovative Education Strategies to Advance Ocean Literacy. *Ocean Literacy: Understanding the Ocean*, 149–168.

²⁷ Kamenopoulou, L. (2022). EBOOK: Inclusive Education for Learners with Multisensory Impairment: Best Practices and Research Priorities. McGraw-Hill Education (UK); Dede, C., Salzman, M. C., Loftin, R. B., & Sprague, D. (1999). Multisensory immersion as a modelling environment for learning complex scientific concepts. In *Modeling and simulation in science and mathematics education* (pp. 282–319). New York, NY: Springer.

²⁸ Panieri et al., No. 2 (2023). The Ocean Senses Activity Book (Chinese version by Giuliano Bertolotto Bianc) <https://doi.org/10.7557/se.2023.2>.

Ukrainian,²⁹ Italian, and Farsi) by local educators, serves the purpose of engaging teachers, learners, the researchers and communities at large in discussions and hands-on activities pertaining to ocean-related topics.³⁰

In the words of Olena Peftieva, translator of The Ocean Senses Activity Book into Ukrainian: “Translation is an art expressed with words. It is also the art of translating the untranslatable. The latter permeates the activity book ‘Ocean Senses’ by Giuliana Panieri and her team. Inspiration igniting others, devotion to profession, love of nature, and desire to protect it are all between the lines. It is an unusual methodological edition based on an interdisciplinary collaboration brought to the classrooms to tell students about the history of our planet, nature and its living creatures, and present-day environmental problems. Translation is also a science in that it requires extensive knowledge of the source language to understand the nuances of the text and find appropriate equivalents in the target language. However, translation is usually a combination of science and art, especially when it comes to poetry”.³¹

This view is shared by Giuliano Bertolotto Bianc, translator of the project into Chinese: “Following the interdisciplinary spirit of The Ocean Senses Activity Book, the translation into Chinese promotes the interconnection between the marine ecosystem and the Chinese speaking communities, broadening the audience on this topic of sensibilisation. Focusing mainly on the younger generations, the book aims at developing their knowledge interactively, using their senses, while indirectly educating them on the vital importance of environmental protection. This last factor is key, considering the impact that the People’s Republic of China have on a global level: the rush to environmental protection will have to go along with the decisions undertaken by such country. A sensibilisation of the youngsters could very possibly have a meaningful

²⁹ Panieri, G., et al. (2023). Ocean Senses. Сприйняття океану: Плани уроків. Пефтієва О., перекладач. Septentrio Educational, 2023(3). <https://doi.org/10.7557/sc.2023.3>. <https://septentrio.uit.no/index.php/SapEdu/issue/view/687/89>.

³⁰ On the importance of co-creation for inclusivity in education see Bovill, C., Cook-Sather, A., Felten, P., Millard, L., & Moore-Cherry, N. (2016). Addressing potential challenges in co-creating learning and teaching: Overcoming resistance, navigating institutional norms, and ensuring inclusivity in student-staff partnerships. *Higher Education*, 71, 195–208.

³¹ Panieri, G., et al. (2023). Ocean Senses. Сприйняття океану: Плани уроків. Пефтієва О., перекладач. Septentrio Educational, 2023(3). <https://doi.org/10.7557/sc.2023.3>. <https://septentrio.uit.no/index.php/SapEdu/issue/view/687/89>.

impact on the future of marine ecosystem protection, both nationwide and worldwide”.³²

From these work and testimonies, it emerges how the overall aim of this project is not only to enhance the collaboration between marine geoscientists, social scientists, and educators but also to jointly develop strategies that enable teachers, learners, the entire project team, and the involved community to collaborate effectively in supporting OL. Collective endeavours of scientists and educators have been emerging as outputs of this collaboration: the Teacher-Scientist Pairing Scheme and the Polaroid Project.³³ In particular, we adopted the Teacher-Scientist Pairing Scheme as a teaching pedagogy to bring together school teachers and scientists to collaborate, as equal partners, on developing and teaching lesson plans focused on topics relevant to the participating teachers and their pupils.³⁴ In particular, during the 2022 AKMA2/Ocean Senses expedition mentioned above, scientists and educators developed a science-informed and pedagogically engaging educational video about greenhouse processes in the Arctic Ocean.³⁵ The video follows a pedagogical model known as paired teaching. This approach enables scientists and teachers to create and instruct virtual lessons and activities carried out under the guidance of the in-class teachers in school classrooms. The video is designed to be viewed in short segments. In each video segment, the scientist asks questions that will be explored through hands-on activities and group discussions under the guidance of the classroom teacher in between segments.

The AKMA Polaroid project developed a communication process wherein the scientists and school classes communicated primarily via handwritten letters and polaroid photo albums made by the scientists during the AKMA2/Ocean Senses expedition. We experienced how

³² Panieri et al., No. 2 (2023): The Ocean Senses Activity Book (Chinese version by Giuliano Bertolotto Bianc) <https://doi.org/10.7557/se.2023.2>.

³³ <https://blogs.egu.eu/geolog/2022/11/25/a-pedagogical-dance-egus-teacher-scientist-pairing-scheme/>, last access 22 October 2023; see also Stiller-Reeve, M., Argentino, C., Waghorn, K. A., Vadakkepuliambatta, S., Kalenitchenko, D., & Panieri, G. (2023). Handwritten letters and photo albums linking geoscientists with school classes. *Geoscience Communication*, 6, 1–9, <https://doi.org/10.5194/gc-6-1-2023>.

³⁴ https://www.youtube.com/watch?v=kviu1s8I79Q&ab_channel=EuropeanGeoscienceUnion, last access 9 October 2023.

³⁵ Ibid. (see footnote 34), last access 9 October 2023.

using traditional media could make a science communication project personalised and tailored to the children's abilities and expectations and therefore less intimidating.³⁶

2.4 *A Student-Led Course on SDG 14*

In conjunction with the educational resources mentioned above, and in collaboration with the Department of Management at the University of Turin, Italy, we introduced a cross-disciplinary course on the New Horizons of the Agenda 2030, with a specific focus on Sustainable Development Goal (SDG) 14, addressing Life Below Water. The organisation of this course was a remarkable endeavour that brought together over fifty undergraduate students from various parts of the world (among the countries, Italy, the United Kingdom, Germany, China, Iran) each with a unique perspective and background. The students embarked on a journey to delve into the intricacies of SDG 14 and its associated targets, while also considering the interconnectedness of this goal with broader sustainability objectives.

Working collaboratively in diverse teams, the students took on the role as young researchers in action and were tasked with a challenging yet inspiring final project: to design and create impactful educational materials that help raise awareness on the importance to achieve the SDG 14. The materials that the students collectively created were carefully crafted to resonate with a chosen target audience, reflecting the students' creative freedom and adaptability. The objective was not only to enhance their own understanding of the critical need for legal protection of our oceans, grounded in science-informed decision-making, but also to convey this vital message effectively to their designated audiences. Throughout the course, the students engaged in active learning, exploring the multifaceted dimensions of sustainability and the integral role that scientific knowledge plays in fostering a sustainable ocean.³⁷ As they presented their projects to their peers, the students honed their communication skills and developed the ability to engage a diverse range of audiences on topics related to our oceans.

³⁶ <https://en.uit.no/project/akma/educations>, last access 9 October 2023.

³⁷ For a few examples of the projects co-created by the students, see the official website and blog of the project ECO_CARE <https://en.uit.no/project/ecocare/blogg>, last access 9 October 2023.

This unique course on SDG 14 showcased the power of active learning and embraced an interdisciplinary approach to sustainability issues. It empowered students to recognise the pivotal role of science in shaping our understanding of the oceans and encouraged them to become advocates for a more sustainable future. The results of their endeavours consisted in the creation of over ten interactive works, including podcasts, songs, social media content, as well as traditional presentations and essays. This diverse array of materials, showcased on social media platforms, not only demonstrated the students' commitment to the cause but also exemplified their innovative and inclusive approach to ocean education.

2.5 *The Ocean Interconnectedness Workshop*

On 19th and 20th September 2023, a workshop on “Ocean Interconnectedness” was convened at UiT The Arctic University of Norway, in collaboration between the Department of Geosciences and the Faculty of Law. The workshop aimed to synergise the multisensory and emotional elements cultivated within the aforementioned project with activities pertaining to planetary health, with a special focus on the ocean.³⁸

To set the stage for this experience, the workshop commenced with a Morning Concert featuring performances by G. Bertolotto Bianc, E. Isayevskaya, I. Tandberg, and R. Sosa Dal Pozzo. This musical interlude not only entertained but also served as an inspiring prelude to a broader audience, igniting a deep sense of commitment to ocean conservation, with a specific focus on the Arctic region. Approximately sixty participants attended the concert, and the organisers extended their gratitude to the supporting funding agencies (UArctic, UiT The Arctic University of Norway, the NFR, HKDIR, Erasmus+ via the Deep Network).³⁹

After the concert, around twenty-five participants from different backgrounds (law, global health, marine geosciences, sustainable tourism, education, communication) gathered in the Nunataken room at the

³⁸ Panieri, G., Poto, M. P., Bertella, G., Bertolotto Bianc, G., Médici, N., Murray, E. M., Pandeva, R., & Vita, L. (2023). Ocean Interconnectedness: An interdisciplinary workshop to learn from the ocean, through multisensory activities and reflections on the role of emotions in science and law: Senses & Science, Love & Law. Septentrio Reports, (1). <https://doi.org/10.7557/7.7271>.

³⁹ For a video of the concert see <https://youtu.be/J3l3ypiuV4Q>, last access 9 October 2023.

Department of Geosciences, UiT. The organisers welcomed the attendees, emphasising the pivotal role of OL in addressing pressing marine issues. The session then delved into the overarching concept of OL, exemplifying it through projects like Ocean Senses,⁴⁰ Follow Your Heart,⁴¹ and ECO_CARE.⁴²

Day 2 commenced with the launch meeting of The Ocean Incubator Network (OIN), a newly funded project by UArctic, featuring partners from UiT The Arctic University of Norway, the James Hutton Institute in Scotland, the University of Edinburgh, the Arctic Centre of the University of Lapland, Dalhousie University, and Women of the Arctic. The group discussed the idea of developing a pilot project aimed at fostering meaningful connections and approaches to ocean literacy by reshaping the manner in which academics plan workshops and roundtable discussions. This initiative begins with introspective reflections on their personal journeys, sharing experiences, and collaboratively devising innovative methods to convene and deliberate on topics related to ocean protection.⁴³

The second day continued with presentations from participants who offered diverse perspectives on ocean-related topics. Giovanna Bertella discussed sustainable tourism in the Arctic, exploring the emotional connection between humans and whale watching. Rada Pandeva shared insights into the Thalassophile Project, an Erasmus+ initiative aimed at making marine science accessible to all, with a particular emphasis on the D/deaf and blind communities.⁴⁴ The Thalassophile Project activities, described in the last chapter of this book, aim to show how more equitable access for adult learners to high-quality information on ocean sciences and literacy can be effectively achieved and at the same time, inspire and empower people and communities to join forces in making this goal a reality. In parallel with the project presentations, participants engaged in an interactive session titled “Developing methodologies for improving Ocean Literacy among adults”, involving Vita, Murray,

⁴⁰ For details on this project see <https://en.uit.no/project/akma/Akma2>, last access 9 October 2023.

⁴¹ For details on this project see <https://www.followyourhearteducation.org/>, last access 9 October 2023.

⁴² For details see <https://en.uit.no/project/ecocare>, last access 9 October 2023.

⁴³ Official website of the project The Ocean Incubator Network | UiT, last access 9 October 2023.

⁴⁴ More on this, in Chapter 10 of this book.

Pandeva, Bertolotto Bianc, Bertella, Ajebe Akame, and Brambilla. This session saw the commencement of work on an educational learning toolkit for Water Literacy, which continued on day 2. Furthermore, educators and young researchers within the group presented strategies for effectively engaging and motivating adults in ocean conservation topics, often involving children as mentors and learners.

Various learning materials, including copies of the book *Follow Your Heart: The School for Multipotentialites* (from the ECO_CARE research project)⁴⁵ and children's stories about foraminifera (from the Akma 2 Ocean Senses Research Project),⁴⁶ were shared with and made available to attendees.

The workshop yielded several outcomes, including a strong commitment among participants to integrate ocean conservation into their research, educational, and outreach efforts. Additionally, it established a network of dedicated educators and researchers focused on intergenerational ocean education, fostering ongoing collaboration. The event also generated recommendations for future research projects and educational resources. Social media content created by Kai Mortensen, Valentina Lanci, and Laura Vita heightened visibility for various projects, including footage of the opening Morning Concert. Furthermore, a mind map outlining the steps towards co-creating a Water Learning Toolkit was developed, and a preliminary outline for a co-authored publication on the workshop's theme was generated.

3 BOOK STRUCTURE AND CONTENT

This book is the project result of the “Ocean Interconnectedness” workshop. It aims to promote ecological and emotional research and education for sustainability by cultivating values and behaviours consistent with how nature makes us feel connected and nurtured. The book unfolds as a comprehensive exploration divided into two integral parts, each contributing distinct perspectives to the discourse on ecological literacy. The following outlines the book structure and a reasoned conceptual map of the topics and their interconnections found throughout this

⁴⁵ Poto M. P., Murray E. M., Russo V. (2022). *Follow Your Heart. The school for multipotentialites*, La Bussola.

⁴⁶ <https://en.uit.no/project/akma/Akma2>, last access 9 October 2023.

compilation of approaches to strengthening ecological and ocean literacy education and research.

Part I: Ecological and Emotional Literacy for All

Chapter 2: Achieving a Common Future for All Through Sustainability-Conscious Legal Education and Research Methods (Emily Margaret Murray, Margherita P. Poto);

Chapter 3: Methodological steps towards ecological and emotional education and research fostering multipotentiality (Margherita Paola Poto, Emily Margaret Murray, Laura Vita);

Chapter 4: Holistic Learning, Emotional Well-being, and Sustainable Development Action in LESPLAY (Learn, Speak, and Play) (Gilbert Ajebe Akame).

Part II: Ocean and Water Literacy: A Transdisciplinary Overview

Chapter 5: Ocean tourism: when emotions meet science (Giovanna Bertella);

Chapter 6: The Ocean Senses Activity Book: Enriching Ocean Literacy through a multisensory approach (Giuliana Panieri, Zeynep Sancak Sert, Filip Maric, Margherita Paola Poto, Emily Margaret Murray);

Chapter 7: The paths of Water and their relations: a dialogue between Brazil and Norway (Natalia Médiçi Machado, Margherita Paola Poto, Emily Margaret Murray);

Chapter 8: Arctic Vulnerability: Examining Biosecurity Risks Amidst Climate Change (Sareen Ali, Emily Margaret Murray, Margherita Paola Poto);

Chapter 9 Connecting with the Deep: Lifelong Learning (LLL) and Marine Sustainability (Caroline Johansen, Rhianon Williams, Ourania Xylouri, Giuliana Panieri);

Chapter 10 Universally accessible marine science and ocean literacy for all citizens: The Thalassophile Project (Rada Pandeva, Caroline Johansen, Rhianon Williams, Carolina Carotta, Giuliana Panieri).

The primary focus of Part I revolves around the pivotal role of emotional and ecological research and education in cultivating a profound ecological literacy. Chapters 2 (Murray and Poto), 3 (Murray et al.),

4 (Akame) illuminate the significance of these facets, weaving together insights from a multitude of areas including participatory methodologies, emotional intelligence, and children's rights.

In Part II, the narrative takes a specific turn towards water and ocean literacy, with a specific, yet not exclusive, focus on the Arctic environments. The six chapters in this part delve into the complexities of these crucial themes. One overarching theme that binds these chapters is the recognition of the inseparable link between research and education in ecological literacy. Chapter 5 (Bertella) serves as an insightful exploration of the transformative potential of effectively managed tourism. It underscores how tourism has the power to offer enriching experiences for human well-being and entertainment and can become a powerful tool for education, particularly in the critical realms of ocean protection and conservation.

In Chapter 6, the authors (Panieri et al.) contribute by advocating for inclusive toolkits and approaches, acknowledging the necessity of multisensorial methods to enhance comprehension.

Chapter 7 (Médici et al.), draws attention to the imperative of developing ecological research by focusing on Indigenous knowledge systems, emphasising inclusivity not only in methods but in knowledge sets as well.

In Chapter 8, Ali et al.'s contribution further reinforces the interconnectedness of these themes, urging us to think about planetary health by applying an integrated, multidimensional approach. Here, the chapters agree that understanding and addressing ecological challenges demand a comprehensive and interconnected approach, encompassing both emotional dimensions and inclusive methodologies. Chapter 9 (Johansen et al.) aligns with an ecological approach to research and education on the sea by framing marine sustainability within global and regional initiatives in lifelong learning and adult education. The authors emphasise the need for adults to recognise, engage with, and act upon economic, social, and environmental challenges to achieve the SDGs. Finally, in Chapter 10, Pandeva et al. emphasise the need to connect ocean literacy with accessibility and illustrate how theory is put into practice. The project illustrated in the chapter brings together a network of cross-sector practitioners, integrating marine research, education, and universal accessibility expertise.

In essence, with its rich fabric of contributions, the book not only champions the significance of emotional and ecological research and education but also advocates for a nuanced and inclusive approach,

echoing the imperative to consider diverse perspectives and methodologies.⁴⁷ This comprehensive exploration, rooted in Arctic contexts, serves as a valuable research and education resource for scholars, educators, and practitioners alike, inviting them to reflect on the intricate interplay between emotions, education, and ecological literacy in the broader context of planetary health.

⁴⁷ Dillon, J., & Herman, B. (2023). Environmental education. In *Handbook of research on science education* (pp. 717–748). Routledge; Andreoni, V., & Richard, A. (2023). Exploring the interconnected nature of the sustainable development goals: The 2030 SDGs Game as a pedagogical tool for interdisciplinary education. *International Journal of Sustainability in Higher Education*, 1–22.

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PATHWAY 2 - Ecological Literacy and Ocean Literacy. 2: Creativity. Activities for Ocean Literacy

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CHAPTER 8: ACTIVITIES FOR OCEAN LITERACY

Laura Vita,¹ Marcelle Dabbah,² Alba Hernández Anta,³ Ana Maria Montaña Monoga,⁴ Emily Margaret Murray,⁵ Sofie Elise Quist,⁶ Juliana Hayden-Nygren,⁷ Olena Peftieva,⁸ Dana Ahmed,⁹ Stéphanie Heckman,¹⁰ Arianna Porrone,¹¹ Giuliana Panieri,¹² Inés Barrenechea Angeles,¹³ Jane Zimmermann,¹⁴ Mojgan Pooladi¹⁵, Shamim Wasii Nyanda.¹⁶

Abstract: The chapter showcases over 20 examples of ocean literacy activities developed during the Ocean Incubator Network Living Laboratory and beyond (The Foraminifera Box contains more than six activities that can be downloaded freely). The authors of these activities include students, scientists, researchers, educators, linguists, legal scholars, and experts in accessibility. Each activity has been scrutinised through the educational and pedagogical lens of Marcelle Dabbah to ensure its efficacy and relevance. Both teachers and learners can find inspiration in these activities, which are available for download and can be tailored to meet specific learning objectives and classroom needs. Each activity is structured according to an outline developed by Laura Vita, and includes details such as the contributors, activity name, target audience, focus of the activity, learning objectives, and guidance or instructions.

Keywords: Ocean literacy – Activities - Accessibility

ACTIVITY 1: The Self

Contributors Names: Alba Hernández Anta, Ana Maria Montaña Monoga, Emily Margaret Murray, Sofie Elise Quist

Activity Name: The Self

¹ LVita, MSc, McMaster, Canada and OIN Project developer, UiT The Arctic University of Norway.

² MDabbah, David Yellin College of Education, Jerusalem.

³ AAnta, NOMPEL, Faculty of Law, UiT The Arctic University of Norway.

⁴ AMonoga, Department of Geosciences, UiT The Arctic University of Norway.

⁵ EMurray, University College Cork, Ireland.

⁶ SQvist, NCLOS, UiT The Arctic University of Norway.

⁷ Jhayden-Nygren, Department of Law, University of Turin, Italy.

⁸ OPeftieva, CEOS, Kiel and Mariupol State University.

⁹ DAhmed, EcoSpectrum and University of Glasgow.

¹⁰ SHeckman, Independent Visual Facilitator and illustrator, based in Belfast, Northern Ireland.

¹¹ APorrone, Dr., University of Macerata, Italy.

¹² GPanieri, Department of Geosciences, UiT The Arctic University of Norway.

¹³ IAngeles, Department of Geosciences, UiT The Arctic University of Norway.

¹⁴ JZimmermann, Independent illustrator, based in Tromsø, Norway.

¹⁵ MPooladi, Master's in Business and Management, University of Turin.

¹⁶ SWasii Nyanda. Lead at Tanzania Ocean Climate Innovation Hub endorsed by the UN Ocean Decade.

Target Audience: All learners in both formal and informal education settings

Focus of Activity: positionality and connecting with the Ocean and its more-than-human communities.

Learning Objective: to be able to identify and gain a deeper understanding and awareness of the sounds and acoustics found within the Ocean and its communities to develop a sense of connection to the Ocean through sound and emotions

Materials

- Recycled drawing canvas (e.g., old cereal boxes, recycled paper, etc.)
- Colouring pencils, markers

Guidance:

Group size and time

- Group size can vary (10-15 people for the given time); it depends on space and amount of materials available
- 5-10 minutes for explanation
- 15-20 minutes for reflection and drawing exercise

Step 1: Explain to the group a background on positionality, using *Chapter 3: Positionality* as a key resource. Talk about the 5 different areas that help one to reflect on positionality: lived experiences, where you live(d), worldviews, privilege, and intersectionality. Ask some questions to encourage participants to begin reflecting about their own positionality and how they relate to the Ocean.

“What is the first thing that comes to your mind when you think of the Ocean?”

“What is the emotion that best represents the Ocean when you think about it?”

“Have you lived near the Ocean? Have you lived very far away from the Ocean?”

“What identities do you align with and how did you come to these identities?”

“How do your identities intersect and influence each other?”

“What role has the Ocean played in shaping my identities? How have my identities shaped how I relate to the Ocean?”

Step 2: Each person starts drawing their answers to the reflective questions for 20-30 min.

Step 3: Once the given time has finished, the drawings can be displayed to the group, either on the wall or in the middle of a circle. Participants are invited (but also given the option to refuse) to explain and show to the others what their drawing represents. What’s the meaning behind that drawing? Why did they choose those materials or colours, etc.

Step 4: The facilitator asks the participants to choose a name for their portraits.

Debrief

Once each participant has finished its drawing, presenting to each other, and chosen a title, the activity could lead to exploring the following debrief question:

“In which ways you believe that your representation differs from the others, what are the main characteristics that compound your position to the ocean?”

ACTIVITY 2: How do we know the Ocean?

Contributors Names: Alba Hernández Anta, Ana Maria Montaña Monoga, Emily Margaret Murray, Sofie Elise Quist

Activity Name: How do we know the Ocean?

Target Audience: All learners in both formal and informal education settings

Focus of Activity: positionality and connecting with ourselves and the Ocean

Learning Objective: use senses, such as sound and touch, to explore our positionality to better understand how we connect to the Ocean (or related water body or earth process)

Materials Needed:

In preparation for the activity, the facilitator will request that each participant bring an object or sound that holds meaning in relation to the Ocean. For example, a participant might bring in a seashell from a beach they once visited; anything that represents a memory or an experience related to the Ocean. Participants can bring in photos or video clips, or maybe a movie that makes them feel connected to the Ocean. The facilitator is also encouraged to bring their own object.

Guidance (instructions):

Group size and time

- 10 participants (if the group is larger, split into smaller groups)
- Suggested time: 30-45 minutes

Instructions

Step 1: Organise the group into a circle so that all participants face each other and ensure that everyone has with them an object/sound that connects them to the Ocean.

Step 2: As the facilitator, describe how your object/sound reminds you of the Ocean/water and how it represents your connection with it. After sharing your connection story, pass the object around the circle so that all participants have the chance to hold, feel and look at the object. If the connection is a sound, play the audio clip on a laptop, radio, or any available device.

Step 3: Participants take turns explaining how their object or sound connects them to the Ocean. While each participant is explaining, the group members will continue to pass around the object or listen to the sound.

Debrief

Forthcoming in Poto, Vita, The Ocean Literacy Learning Toolkit, Palgrave Macmillan, 2024.

Once each participant has shared their object/sound, a final consideration from the facilitator should focus on the many ways we can find a connection to the Ocean.

“Was it easy to find an object/sound at home that reminded you of your connection to the Ocean/a body of water?”

“Prior to listening to the other participants share their physical connection to the Ocean, did any of the objects surprise you? Which ones?”

“After listening to everyone’s connection story, were there any examples of an object/sound that didn’t come directly from the Ocean?”

ACTIVITY 3: How does the Ocean speak?

Contributors Names: Alba Hernández Anta, Ana Maria Montaña Monoga, Emily Margaret Murray, Sofie Elise Quist

Activity Name: How does the Ocean speak?

Target Audience: All learners in both formal and informal education settings

Focus of Activity: positionality and connecting with the Ocean and its more-than-human communities.

Learning Objective: to be able to identify and gain a deeper understanding and awareness of the sounds and acoustics found within the Ocean and its communities to develop a sense of connection to the Ocean through sound and emotions

Materials Needed:

- Laptop or tablet
- Audio system
- Quiet, calm space
- Collection of environmental Ocean sounds (suggested links: [Sounds in the Ocean](#) and [Discovery of Sound in the Sea](#))

Guidance:

Group size and time

- Group size can vary; depends on space and amount of time for listening and reflection
- Suggested time: 10-15 minutes.

Instructions

Step 1: Organise the group into a circle, asking them to find a comfortable position and to close their eyes.

Step 2: Ask the participants to close their eyes, if they are comfortable to do so, and to listen to the first sound. Refrain from telling the participants the source of the sound to encourage them to listen and figure out what the sounds might represent.

Step 3: Play the recording of one environmental sound in the Ocean (e.g. Earthquake). Play again.

Step 4: The facilitator asks the group to open their eyes and to guess the source of the sound. If the group is having a difficult time interpreting the sound, play again and offer a hint such as “You might hear this sound when you feel a rumble under your feet.”

Step 5: After the group has had time to reflect, play the next environmental Ocean sound (e.g. Ice Calving), repeating steps 3 and 4 until the participants have experienced several environmental (otherwise natural) Ocean sounds.

Debrief

Forthcoming in Poto, Vita, The Ocean Literacy Learning Toolkit, Palgrave Macmillan, 2024.

To finish this activity, the facilitator can ask the following reflection questions to highlight that there is a whole environment under the water that we cannot always see and hear.

“Were any of the sounds familiar to you? If so, where were you when you heard them naturally occurring?”

“When you heard these ocean sounds, did it help you to feel more connected to the Ocean?”

ACTIVITY 4: How does the Ocean know us?

Contributors Names: Alba Hernandez Anta, Ana Maria Montaña Monoga, Emily Margaret Murray, Sofie Elise Quist

Activity Name: How does the Ocean know us?

Target Audience: All learners in both formal and informal education settings

Focus of Activity: positionality and reflexivity on how the Ocean knows us

Learning Objective: to be able to identify the anthropogenic sounds that affect the marine environment and realise human impact on ocean health and reflect on how human activity influences the well-being and health of sea critters

Materials Needed:

- Laptop or tablet
- Audio system
- Quiet, calm space
- Collection of environmental Ocean sounds

Guidance:

Introduction

In recent decades, the impact of human activity on the environment has become alarmingly obvious with rising temperatures, intensifying storms and forest fires, and changing precipitation patterns. The Ocean is not always at the centre of climate change mitigation and adaptation conversations and initiatives, yet the Ocean is one of the most important systems for maintaining balance among all of Earth's ecosystems. The anthropogenic (human-related) activities that are having negative consequences for the Ocean include overfishing and unsustainable marine practices, oil spills, plastic pollution and chemical waste, among many others.

From the perspective of positionality and how we relate to the Ocean, it can be helpful to think about how the Ocean relates to humans. This activity focuses on anthropogenic ocean-related sounds to better understand how the Ocean and its creatures experience human life above and below water. The aim is to evoke feelings and emotions to increase a sense of compassion and empathy for the Ocean, and to conceptualise the Ocean as 'home' to many different creatures who are impacted every day by the choices made by humankind.

Group size and time

- Group size can vary; depends on space and amount of time for listening and reflection
- Suggested time: 10-15 minutes.

Instructions

Step 1: Organise the group into a circle, asking them to find a comfortable position and to close their eyes.

Step 2: Ask the participants to close their eyes, if they are comfortable to do so, and to listen to the first sound. Refrain from telling the participants the source of the sound to encourage them to listen and figure out what the sounds might represent.

Step 3: Play the recording of one anthropogenic sound in the Ocean (e.g. Large Vessel). Play again.

Step 4: The facilitator asks the group to open their eyes and to guess the source of the sound. If the group is having a difficult time interpreting the sound, play again and offer a hint such as “You might hear this sound when swimming underneath it.”

Step 5: After the group has had time to reflect, play the next anthropogenic Ocean sound (e.g. Pile Driving - Offshore Wind Energy Construction), repeating steps 3 and 4 until the participants have experienced several anthropogenic (otherwise natural) Ocean sounds.

Debrief

To finish this activity, the facilitator can ask the following reflection questions to initiate a conversation about life under water and the ways in which human activity is impacting the quality of life of marine ecosystems and its creatures.

“When there is, for example, construction noise close to your house and it bothers you. Then, how do you think the anthropogenic sounds affect the life of sea creatures?”

“On a scorching summer day, you feel exhausted and dehydrated from the heat. With the Ocean temperature rising due to human impact, how do you think cold water animals feel if they have to migrate?”

“Imagine aliens come and steal natural resources from the ground causing a global crisis. Don’t you think we are doing the same with overfishing and marine pollution which is affecting the marine ecosystem and its food webs?”

ACTIVITY 5: The More-than-Human Ocean: A Systems Game

Contributors Names: Alba Hernandez Anta, Ana Maria Montaña Monoga, Emily Margaret Murray, Sofie Elise Quist

Activity Name: The More-than-Human Ocean: A Systems Game

Focus of Activity: positionality and connecting with the more-than-human Ocean

Target Audience: All learners in both formal and informal education settings

Learning Objective: identify the interconnectedness between the Ocean and human society through a systems thinking approach to demonstrate how the Ocean, marine life, earth system processes, human culture and institutions such as law and policy connect to and influence each other

Materials Needed:

- List of system actors (see below or make your own)
- Two large balls of yarn or other durable string that unravels easily.
- Flip chart
- Index cards or similar to create name tags
- Coloured markers
- Tape
- Good space to move. The group should be able to stand shoulder to shoulder in a circle. For larger groups, space for observers is ideal.

Guidance:

Introduction

How we think about ocean connectivity and our own place in the web of life matters. There can be a tendency to think about our relationship with the Ocean, and consequently our actions, in isolation. It is, after all, easier to look at things from our own standpoint. However, doing so leads to fragmented solutions to pressing challenges such as climate change, biodiversity loss, or food insecurity. When we fail to see the whole, interconnected web of multiple human relationships with the Ocean, and when we fail to be aware of *how* we see those connections, some ways of knowing the Ocean are also privileged above others. Do we know the Ocean? How? ... What is the Ocean? A carbon sink? A source of food? A source of wealth? A means of transport? Home? An entity with rights of its own? How are human actions affecting the Ocean? How does the changing Ocean affect different communities?

This activity is adapted from the systems game Web of Life¹ and explores more-than-human Ocean connectivity. Using movement and dialogue, the game aims to demonstrate how the Ocean, marine life, earth system processes, human culture and institutions such as law and policy are interconnected. The game is designed to follow on from the other activities in the positionality tool kit that explore the 'self' and 'the Ocean'. However, the game also works on its own or in conjunction with activities in this publication.

Group size and time

- 6-15 people
- 15 to 30 minutes

Instructions

Step 1: Organise the group into a circle and give the ball of yarn to someone.

Step 2: When the group is standing in a circle, discuss the complex ocean issue that you want to make visible during the game. For example, you might want to explore Ocean Literacy - 'we are the Ocean, the Ocean is us' - by highlighting participants' different relationships with the Ocean. Alternatively, the group might want to think about the impact of climate change on marine food webs and human food security, the effects of different forms of pollution on the marine environment or other issues depending on the group.

The game will help bring to the surface existing knowledge within the group about the interconnections and dynamics inherent to the chosen topic.

Step 3: Once you have discussed the system you are going to address (Ocean Literacy, ocean and climate change...), you can either introduce the predetermined actors from the list below or brainstorm your own with the group. Write out the actors (or variables) on the flip chart one by one and note each of them on a name tag. The number of actors should correspond to the number of participants in the group. Once you have your list, assign each participant an actor, making sure they display the name tag so everyone can see it.

Step 4: The person holding the yarn names their actor. E.g., 'fish stocks'.

Step 5: Another person in the circle then names their actor or variable and explains how it is connected to the person holding the yarn. Once they have done so, the ball of yarn is passed to them. The first person holds on to the end of the yarn so that a string is formed between them. For example, the second person might say 'food security' and explain that their food traditions are based on seafood.

Now another person names their actor or variable and the ball of yarn is passed to them. For instance, person three might be 'ocean warming' and explain that when fish stocks move due to warming oceans, traditional food and food security ways are threatened. Continuing the sequence, person four might be a legal or policy instrument that protects the human right to food or climate change.

Step 6: The group continues identifying how their actors or variables are connected using the yarn to create lines between them that will eventually form a web. Once the initial variables/actors are all used, the group may come up with additional ones (i.e., each person can have more than one actor/variable). Once an interconnected web emerges, ask: "Have you captured the most important relationships? The group then places the web on the floor, making sure it stays intact and takes a step back.

Debrief

Once each participant has had the opportunity to hold the ball of yarn and share with the group how their actor/variable is affected by or affects another actor/variable in the ocean ecosystem, the resulting interconnected web of yarn can be used to explore the following debrief questions.

“How did anthropocentric (human-related) activities impact life below the water?”

“Were there any connections that you did not already know? Was there anything that surprised you? Why?”

“Was it difficult to find connections between life below water and life on land?”

Suggested list of actors/variables for exploring Ocean Literacy and ocean connectivity

In order to motivate the facilitator, we have included possible actors and variables related to Ocean Literacy that can be used for this activity. However, we encourage groups to come up with their own actors and connections before and/or during the activity, to create a unique web of ocean connections that is more relatable to the participants involved. One of the main objectives of the Ocean Literacy activities found throughout this book is to encourage co-learning and co-creating knowledge; sharing with each other how we come to know the Ocean through our lived experiences.

Creatures:

- Phytoplankton
- Fish
- Shark
- Killer Whale
- Coral
- Mussels

Anthropocentric actors/variables:

- Fishing vessel
- Increased carbon emissions
- Oil spill
- Plastic pollution
- Sea level rise
- Coastal erosion
- Ocean acidification
- Overfishing
- Food security

Examples of Interconnected Ocean Systems

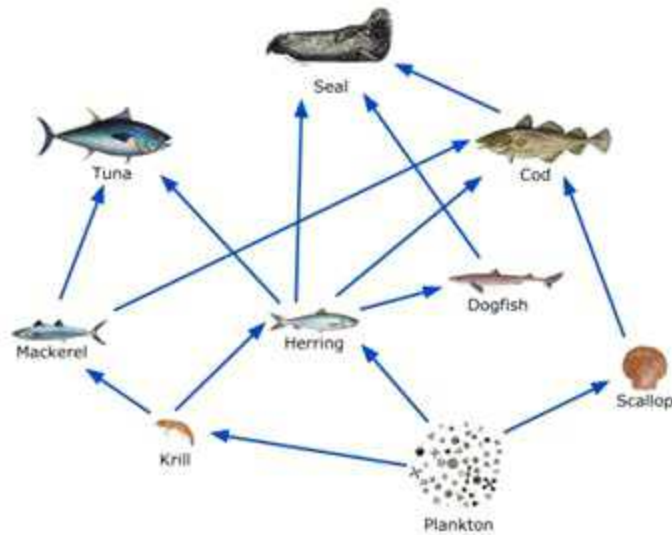


Figure 1. Food Web Diagram for the Gulf of Maine Habitat. Original source: Ocean Food Webs Module (<https://oceanservice.noaa.gov/education/marine-ecosystem-modeling-vr/ocean-food-webs/activity-4.html>)

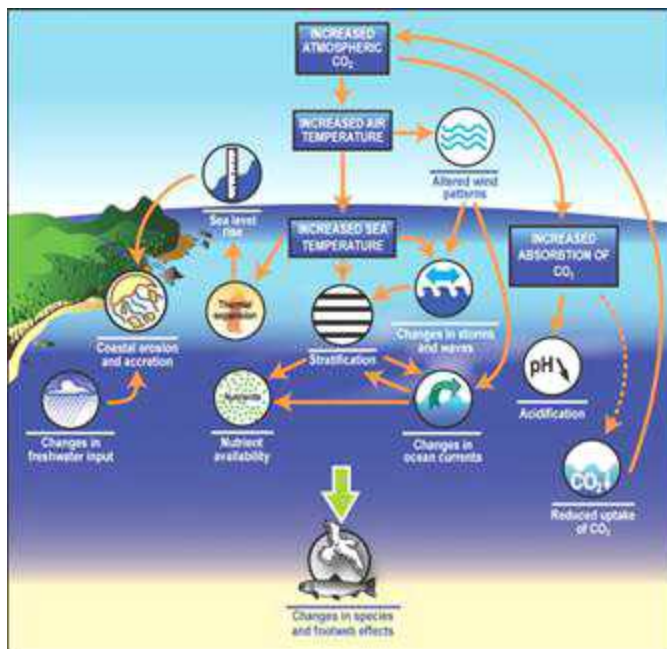


Figure 2. Diagram depicting the effects of increased atmospheric carbon dioxide on global oceans including Oregon's coastal and nearshore environments and the species that live there. Original source: Oregon Conservation Strategy (<https://www.oregonconservationstrategy.org/oregon-nearshore-strategy/factors-stressors-affecting-species-and-habitat/>)

ACTIVITY 6: Ocean Literacy Investigation

Contributor: Juliana Hayden

Activity Name: Ocean Literacy Investigation

Target Audience: Secondary School Pupils (age 14 & 15)

Focus of Activity: Student lead investigations, creative thinking

Learning Objective: This learning activity integrates investigative elements via phenomenon-based learning to interest and resonate with this target group. Students will exercise their problem-analysis, creative thinking and inquiry skills.

Materials Needed:

- Video Clip of a natural phenomenon occurring in the ocean
- Area for students to gather and co-work
- Individual writing implements or computers for students to brainstorm
- Persona Cards (for an example of persona cards, please refer to Chapter 4, section 4.3 of this book)

Guidance:

In a classroom setting, participating students will be shown a dynamic short video clip (under 10 minutes) of a natural phenomenon taking place in the Arctic Ocean. The learners will then be divided into breakout groups to explore the Arctic Ocean phenomenon using self-directed learning. Each breakout group is to explore the clip from a different 'persona.' Each of the breakout groups' personas will represent key stakeholders in ocean literacy and governance in an Arctic setting. Five persona cards will be handed out to the class, with each breakout group receiving one persona card. For example, one breakout group may represent the persona of a local fisher. Through the lens of their respective personas, the breakout groups will then undertake an investigation of the video answering "what, where, when, why, and how" the phenomenon depicted in the video may have come to be. The breakout groups will address those questions from a different lens relevant to OL. Each breakout group will then present the findings of their persona's investigation to the entire class. Following all the groups' presentations, the breakout groups will then work together to revise and integrate their answers to co-create a final, comprehensive interdisciplinary analysis pieced together from their breakout groups' investigations. This final analysis may be presented in a format as per wishes of the teacher and the students.

Examples of Breakout Group Personas:

Persona 1: Subsistence/ small-scale fisher from a coastal Arctic community.

Persona 2: Central government representative, such as an official from a Ministry of Environment. This persona is a bureaucrat who implements national level marine and coastal policies.

Persona 3: Marine biologist, who has had lab and field work experience.

Persona 4: Whale, the inclusion of a non-human perspective is intended to represent the OL principle of protecting life below water.

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Persona 5: Legal researcher in international law, such as a subject matter expert in law of the sea.

ACTIVITY 7: Ocean Literacy, Eco-linguistics & A Critical Lens

Contributors: Olena Peftieva (adapted and edited by Laura Vita)

Activity Name: Ocean Literacy, Eco-linguistics & A Critical Lens

Target Audience: Bachelor-level Students (preferably from many different academic disciplines)

Learning Objectives: This activity aims to foster a deep understanding of marine issues, identify biases, integrate interdisciplinary knowledge, promote critical thinking, and empower advocacy. By scrutinizing the sources and evidence presented in documents, we can assess the credibility and reliability of the information. Critical reading and appraisal are essential skills for distinguishing between scientifically sound data and misinformation. Developing these skills is imperative for creating a more informed and engaged society that effectively addresses our oceans' challenges.

Materials Needed: A public access document related to ocean protection or water governance—paper copy of the document, pens/pencils and highlighters.

*For contextual applicability, having the document from the region/province/state/country where this activity is being run is best. For example, if you were running this activity in Canada, you could choose to critically read Canada's Oceans Protection Plan.

*The activity can be completed digitally by having an online version of the document, and participants can type notes and highlight the document on their computer/tablet/phone.

Guidance:

1. Gather the students and provide them with a copy of the document you are reviewing. Instruct the students to read through the document to familiarize themselves with its content, and allow them time to review and consider it from their perspective. They are encouraged to take notes or comment on their document copy.
2. Once the students have completed their reading time, reorient them and commence a short discussion, with students sharing their initial impressions of the text and its contents.
3. Complete a short review of essential linguistic and critical reading elements to be aware of while reading the document.
4. Have students re-read the document using the elements they just reviewed as a reminder to apply a critical lens to what they are reading. Again, encourage them to make notes on their copy of the document to aid them in the next discussion.
5. Re-orient students once they have completed the second reading and commence a discussion of their new findings and thoughts on the document. Encourage each student to share their perspective so that a variety of information is shared, and encourage them to identify any underlying biases or assumptions they may have brought to the text based on their educational background.
6. Have the students share their results in smaller groups, then try to develop a short summary, re-writing the text and applying a co-created and collaborative approach.

ACTIVITY 8: The Blue Mind Exercise

Contributor: Dana Ahmed

Target Audience: All ages (this exercise was applied in classrooms with 5-12 year old students)

Focus of Activity: Engage in a mindfulness exercise to increase awareness of and explore our emotional connection to the ocean

Learning Objective: emotional regulation skills, increasing connection between nature and emotional states

Materials Needed: Ocean sounds either from an online source or, if you are able to do so, conduct this activity at the seaside

Guidance: This activity is an excellent tool to use to help students prepare themselves for learning. It is meant to instill feelings of peace and grounding prior to students moving on to other learning materials. As previously mentioned, this activity was also used to facilitate the transition of students from their break time back to class time. The facilitator can first introduce the concept of Blue Mind Theory, exploring our emotional connection to the ocean. Distinguishing and defining the Blue Mind, a state of calm and mindfulness associated with water. To help students internalize this concept, have them sit or stand in a position that they are comfortable in, and instruct them to start by taking a big deep breath followed by a relaxed exhale. Inform them that you will be playing Ocean sounds for a set duration of time and that they are to close their eyes and focus on the sounds. Finally, play the video and enjoy! It is at the facilitator's discretion the duration of time that students will meditate on the ocean soundscape; it is also up to the facilitator to choose an ocean soundscape; however, we advise using an audio file with calming natural ocean sounds.

ACTIVITY 9: Squiggle Fish

Contributor Name: Stéphanie Heckman, Graphic Recorder & Visual Facilitator

Activity Name: Squiggle Fish

Target Audience: Any age group interested in communicating their messages in a visual way (e.g. school children, students, scientists, policy makers, public engagement officers, community activists, etc)

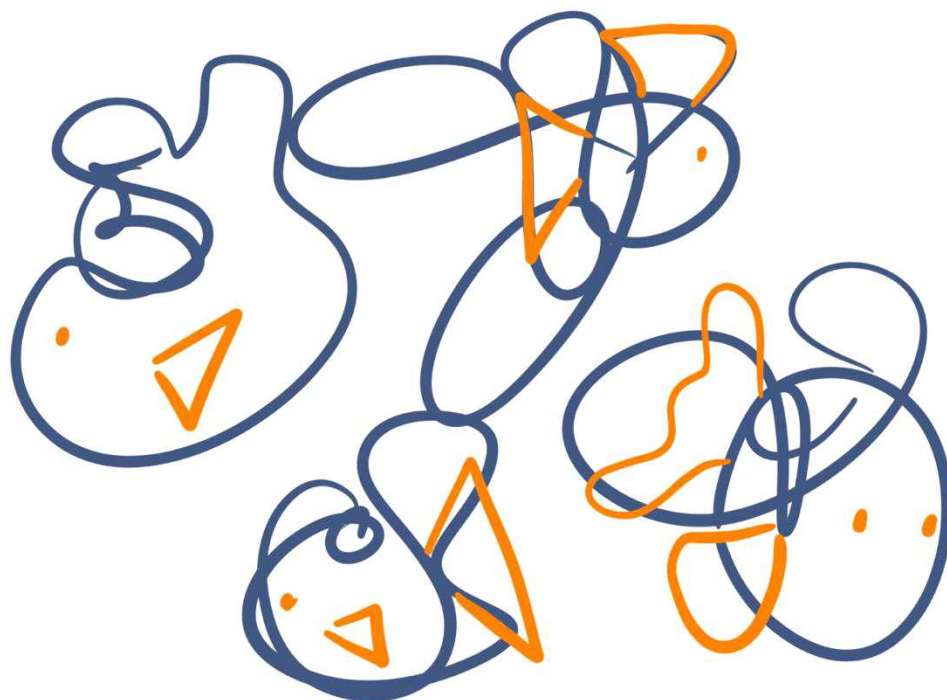
Focus of Activity: Warm up exercise to start drawing and 'level the playing field' of visualising our message in a simple and effective way.

Learning Objective: Visual thinking is not about art, it's about communication. We do not need to be Fine Artists to communicate our message effectively. Humans are great at pattern recognition and will recognise what you're aiming to visualise even in simple drawing or pictograms.

Materials Needed: Some blank sheets of paper or notebooks, two colours pens/pencils/markers (for example a grey pencil and blue pen work fine for this exercise)

Guidance to complete activity:

- Give all participants a sheet of paper and two colours of pencil/pen/marker. After giving a rationale/background/examples of visual communication, explain to them this is a warm-up exercise to get them visualising their own message themselves.
- Tell them to make random 'squiggles' on their page; making random shapes in a continuous line drawing for 10 seconds, filling the page without lifting the pen. Count them down out loud for 10 seconds.
- Now explain that they get 1 minute to 'find' as many fish as their can in their squiggles, and make them visible by giving them a tail, a fin and an eye, simply by adding two triangles and a dot respectively. They can get creative and make more elaborate tails, fins or eyes if they want, but the aim is to turn as many squiggles as they can into fish within 1 minute.
- They can either find the squiggle fish on their own sheet of paper, or you can let them swap sheets with a neighbour to make this exercise a preamble to a 'co-creative approach'.
- Ask them to hold up their paper with squiggle fish when they're done, and reiterate the learning objective that you don't need much to make fish recognisable as fish, or any object or concept you want to draw.



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For more information: www.stephanieheckman.com/visualpractice

ACTIVITY 10: Drawing in Basic Shapes

Contributor: Stéphanie Heckman, Graphic Recorder & Visual Facilitator

Activity Name: Drawing in Basic Shapes

Target Audience: Any age group interested in communicating their messages in a visual way (e.g. school children, students, scientists, policy makers, public engagement officers, community activists, etc)

Focus of Activity: Equipping participants with a simple, accessible way to draw icons that depict objects and concepts to visualise their work/message.

Learning Objective: A simple way to draw any object or concept they can think of, using the basic shapes of circle, triangle, square to 'constructing' their icons.

Materials Needed: Some blank sheets of paper or notebooks, two colours pens/pencils/markers (a light colour and a darker colour, for example a grey pencil and black marker or felt-tip pen)

Guidance: Humans are hardwired to process visual information. It is estimated that 80% of our sensory input is visual (excepting those with a visual impairment). This explains why people are drawn to pictures and illustrations, and why these are so effective in communicating even complex ideas/concepts/instructions. Imagine assembling IKEA furniture with no pictures in the manual! In this exercise you will learn a simple method for visualising objects and concepts that is accessible to everyone, regardless of artistic skill or background.

- Ask participants if they can think of the three basic shapes. They will get them all very quickly. Circle, triangle, square.

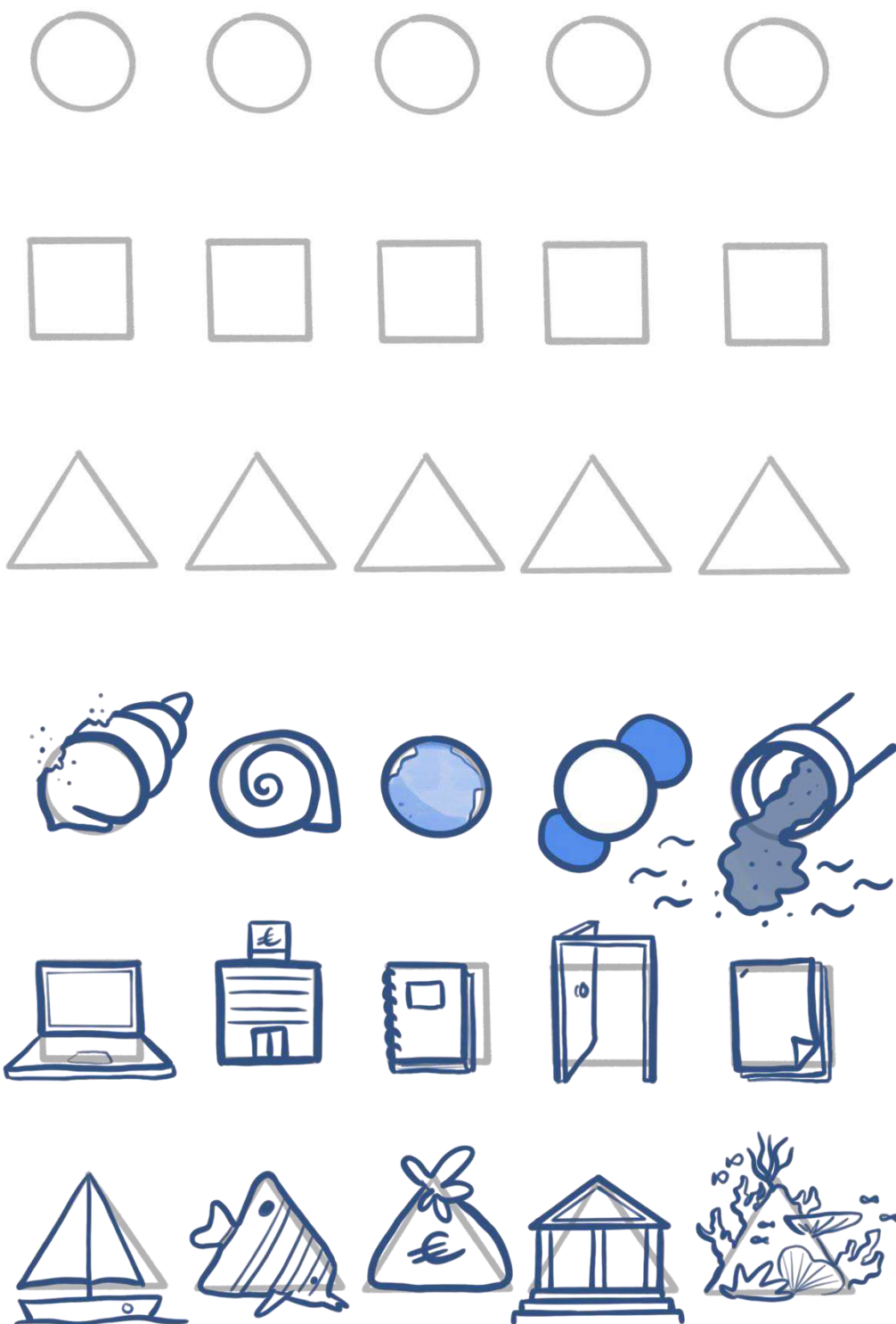
- Tell them orient their page horizontally and draw on it, with their light coloured pen (eg a grey pencil), a row of 5 circles, a row of 5 triangles underneath, and finally a row of 5 squares at the bottom of their page.

- Now tell them to switch to their darker pen (eg a black marker) give them 2 minutes to turn as many of these shapes into objects or concepts relating to their work or message they want to communicate. Objects are physical things; for example an apple, traffic sign or laptop (you can easily turn a circle, triangle, square into these respectively). Concepts are abstract, but can be still be visualised by things we can see. For example, the planet Earth can symbolise environmental protection, a mountain top can represent challenge and an outstretched hand can represent cooperation (again, a circle, triangle, square can be used as basic shapes for these respectively).

- They can either completely freestyle what icons they draw, or you can ask them to make them relevant to a particular topic. You can even give a list of objects/concepts for them to draw in basic shapes. Basic shapes can be combined to form more complex icons – for example, a house is a square with a triangle on top, a tree is a rectangle with a circle or triangle on top.

- To make this exercise co-creative, ask participants to exchange their sheet with a neighbour when they're done. Then ask them to 'annotate' the icons their neighbour has drawn, i.e. to write beside each icon what it represents. This can be literal or symbolic. For example, beside an apple, traffic sign or laptop you could write just that, their literal description, or a symbolical interpretation, e.g. 'nutrition', 'danger' and 'digital access' respectively. Debrief from this part of the exercise, explaining that visuals are powerful tools to

illustrate messages, but if they stand on their own they are too open to interpretation. Language and imagery aren't competing; they complement each other.



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For more information: www.stephanieheckman.com/visualpractice

ACTIVITY 11: Becoming the Ocean

Contributor: Arianna Porrone; Original by Arianna Porrone, University of Macerata & Hatha Vinyasa Teacher (adapted to a marine-related activity by Laura Vita)

Activity Name: Becoming the Ocean

Target Audience: Primary School Children

Focus of Activity: Movement of the body and increasing awareness of the Ocean by emulating its movements

Learning Objective: Begin to establish a creative connection with the ocean, increasing awareness and engaging in environmental empathy.

Materials Needed: Indoor or outdoor space where participants can move their bodies freely

Guidance:

Allow students/participants to spread out in an open space for comfortable movement. Explain that the students are going to experiment with becoming the Ocean, which is a very important part of our planet, it sustains many different life forms, and is deeply connected to our climate.

Guide Students using the following prompts, and at each step, encourage them to improvise and explore how they want to move their bodies.

- First, we will connect to our bodies by pausing and taking a few deep breaths. Then, we will think of the Ocean and all its different movements.
- Second, we are going to start moving our arms gently, like the ocean on a calm day
- Third, we are going to add our legs to our movement, gently moving them like the ocean on a calm day.
- Fourth, we are going to move our whole bodies as if we are the ocean on a calm day
- Repeat the second, third and fourth steps with various prompts such as “Move like the ocean on a stormy day”, “move like the ocean when there is a title wave”, “move like the ocean underneath a big iceberg”, “move like the ocean as the tide comes in/the tide goes out”. Feel free to have your examples be specific to the context of your group.
- Fifth, when your group has completed all the prompts you have prepared, have the students sit together and facilitate a short discussion about their experience. Some sample discussion questions are: What did they think about when they moved like the ocean? How did they feel about becoming the ocean? What things (man-made or environmental) do they think would impact the Ocean?

ACTIVITY 12: Discovering the Wonders of Seaweed from Ecosystem to Innovation.

Contributor: Shamim Wasii Nyanda. Lead at Tanzania Ocean Climate Innovation Hub endorsed by the UN Ocean Decade.

Activity Name: Discovering the Wonders of Seaweed from Ecosystem to Innovation.

Target Audience: University Students

Focus of Activity: Understanding the role of seaweed in marine ecosystems and how it contributes to coastal resilience, livelihoods, and climate change mitigation through sustainable Ocean farming practices.

Learning Objective:

- To educate students about the importance of seaweed in maintaining marine biodiversity.
- To explore how seaweed farming contributes to coastal community livelihoods.
- To introduce innovative uses of seaweed, from food to cosmetics, emphasizing sustainability and conservation.

Materials Needed:

- Visual aids or slides illustrating different types of seaweed and their benefits.
- Samples of seaweed or dried seaweed for hands-on observation.
- A video or photos showcasing seaweed farming practices from the hub's activities.
- A whiteboard and markers for student participation in discussions.

Guidance:

1. Introduction (10 minutes)
 - Begin by asking students if they've ever seen or eaten seaweed.
 - Explain what seaweed is and its critical role in marine ecosystems, emphasizing biodiversity, habitat creation, and nutrient cycling.
2. Learning through Observation (15 minutes)
 - Show samples of different types of seaweed (if available).
 - Let students touch and examine the seaweed samples, explaining their unique textures, colors, and biological structures.
 - Use visual aids to explain the process of photosynthesis in seaweed and its contribution to carbon sequestration.
3. Understanding Seaweed Farming (10 minutes)
 - Play a short video or present images of seaweed farming from the Tanzania Ocean Climate Innovation Hub's seaweed farming activities.
 - Discuss how seaweed farming is done, its role in supporting local communities, and how it helps mitigate climate change through carbon capture.
4. Interactive Activity (20 minutes)
 - Split students into small groups and provide them with cards showing different uses of seaweed (e.g., food, cosmetics, fertilizers).
 - Each group should brainstorm how they would use seaweed in their daily lives and how they think it contributes to sustainability.

5. Wrap-up Discussion (10 minutes)

- Ask the students to reflect on how seaweed impacts the environment and their own communities.
- Lead a discussion on how they can contribute to ocean conservation efforts and sustainable practices.

6. Optional Extension

- Students can create seaweed-based products or artwork inspired by the lesson and share their creations with the class.

ACTIVITY 13: Becoming an Ocean Advocate

Contributors: Inspired by the work of the Student-led Project Group 4 (see Chapter 1 for additional information)

Activity Name: Becoming an Ocean Advocate

Target Audience: Young Learners Aged 12-16y.o.

Focus of Activity: Providing an engaging learning experience that allows children and teenagers to explore the lives of people who have made contributions to Ocean and environmental conservation.

Learning Objective: Increase awareness of the work being done globally to progress in Ocean conservation and allow students to become inspired by the work of others.

Materials Needed:

- Access to written or online materials that highlight individuals who have worked to make impactful change in Ocean advocacy or more broadly in environmental advocacy
- Any available tools for students to use in a creative presentation (pens/pencils/colours/stationary/poster board/stickers) etc.

Guidance:

Provide access to written or online materials highlighting the work of notable Ocean/environmental advocates such as Dr Sylvia Earle, Oluwaseyi Moejoh, or Sir David Attenborough. As the facilitator, feel free to use ocean or environmental advocates that you think resonate best with your participants.

Aim to provide enough examples so that students can work in groups of 5 (approx.). Instruct students that they will be working in their groups to teach their peers about their assigned Ocean advocate through a short 5-minute presentation. Allow students time to research their Ocean advocate, learning about their work, what inspired them to become involved in advocacy, and why they think Ocean advocacy is important. Have the students brainstorm how they want to share their new-found information with their peers and encourage them to be creative! Depending on the setting for this activity and the needs of the students, the facilitator can adapt the timeline for the activity to suit their needs. They could have students work on this project for one day, breaking the day into research time, creative collaboration time, and presentation time, or allow students to return to this project and their working groups many times over the course of a week.

ACTIVITY 14: Foraminifera Activity Box

Contributors: Giuliana Panieri, Inés Barrenechea Angeles, Jane Zimmermann

Activity Name: Foraminifera Activity Box¹⁷ (<https://before-dinosaurs.com/foraminifera-activity-box/>)

Target Audience: Children and Teenagers

Focus of Activity: Providing an engaging, hands-on learning experience that introduces children and teenagers to the fascinating world of foraminifera and its significance in marine science and environmental studies.

Learning Objective: The Foraminifera Activity Box is an educational toolkit designed to be distributed to schools globally, enabling teachers to integrate engaging and informative activities about foraminifera into their curriculum. This box serves as a comprehensive resource to help students learn about these fascinating marine organisms, often used as indicators in scientific studies about marine environments and climate change.

Materials Needed: The material needed for the different activities is provided in the box. What you will find in this box: 1) Seafloor sediment 2) Paper microscope 3) Foraminifera as sea surface thermometer 4) Modelling clay instructions for Nina & Berry 5) Modelling clay 6) `Foraminifera Boogie Song` instructions 7) 3D models of foraminifera 8) Nina & Berry stickers 9) Meet Nina & Berry – Foraminifera from the Ocean Pixie Book

Guidance:

- Activity 1: Exploring seafloor sediment

Objective: To observe and identify within seafloor sediment.

Materials needed: Seafloor sediment, paper microscope.

Instructions:

1. Spread a thin layer of seafloor sediment on a white paper plate or a flat surface.
2. Use the paper microscope to closely examine the sediment.
3. Try to identify different foraminifera based on their shapes and textures. Refer to any additional resources provided in the box and also the 3D printed foraminifera shells.

- Activity 2: Foraminifera as sea surface thermometers

Objective: Learn how planktonic foraminifera census counts can be used to estimate (historical) sea surface temperatures.

Materials needed: Educational materials on foraminifera as sea surface thermometers, scissors

Instructions:

¹⁷ The materials of this activity and the following can be downloaded freely: <https://before-dinosaurs.com/foraminifera-activity-box/>

1. Read through the provided educational materials as a class.
2. Discuss how some species are sensitive to temperature changes and how an assemblage of planktonic foraminifera can indicate (past) sea surface temperatures.
3. Engage in a Q&A session to reinforce understanding.

- Activity 3: Crafting Nina & Berry

Objective: To create models of foraminifera characters using modelling clay.

Materials needed: Modeling clay, modelling instructions for Nina & Berry.

Instructions:

1. Follow the step-by-step instructions to use the modelling clay to create figures of Nina & Berry.
2. Allow the models to dry if necessary.
3. Display the models in the classroom to facilitate discussion.

- Activity 4: Sing the Foraminifera Boogie Song

Objective: To engage students musically while learning about foraminifera.

Materials needed: Instructions for the "Foraminifera Boogie Song".

Instructions:

1. Distribute the song lyrics and play the tune if available.
2. Practice the song together, encouraging students to sing along and perform any accompanying actions.
3. Perform the song as a group, possibly at a school event or as part of a science day.

- Activity 5: 3D Foraminifera exploration

Objective: To study the structure and form of foraminifera using 3D models.

Materials Needed: 3D models of foraminifera.

Instructions:

1. Hand out the 3D models to students.
2. Discuss the unique features of each model and their biological significance.
3. Encourage students to sketch the models, noting key structural features.

- Activity 6: Story time with Nina & Berry

Objective: To learn about foraminifera through a narrative approach.

Materials needed: "Meet Nina & Berry – Foraminifera from the Ocean" Pixie Book.

Instructions:

Forthcoming in Poto, Vita, The Ocean Literacy Learning Toolkit, Palgrave Macmillan, 2024.

1. Read the storybook aloud to the class or have students read in small groups.
2. Discuss the storyline and how it relates to the science of foraminifera.
3. Engage students in a creative writing activity where they write their own short stories featuring foraminifera.

- Activity 7: Decorating with Nina & Berry stickers

Objective: To personalize learning tools and reinforce character recognition.

Materials Needed: Nina & Berry stickers. Instructions:

1. Provide each student with a set of stickers.
2. Encourage students to decorate their notebooks, folders, or other personal items with the stickers.
3. Use the stickers as rewards for participation and achievement throughout the activities.

FOR THE CO-CREATED PROJECT: Seven Health-Related Challenges

Tittel	FOR THE CO-CREATED PROJECT: Seven Health-Related Challenges
Forfatter	
Utgiver	
Årstall	
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Pathway 1

Project 1: Community Wellness Gardens

SDGs Addressed:

- SDG 3: Good Health and Well-being
- SDG 4: Quality Education

Challenge: Design and implement a community wellness garden that serves as both a green space for promoting mental and physical health and an educational hub where community members can learn about emotional literacy and environmental sustainability. The challenge involves:

- **Planning:** Designing a garden that incorporates elements beneficial for mental health, such as quiet zones and therapeutic plant species.
- **Educational Integration:** Developing workshops and programs that teach emotional literacy through gardening activities, emphasizing the connection between nature and emotional well-being.
- **Community Engagement:** Ensuring the garden is accessible and inviting to all community members, fostering a sense of ownership and collective responsibility.

Project 2: Eco-Mindfulness Digital Platform

SDGs Addressed:

- SDG 3: Good Health and Well-being
- SDG 4: Quality Education

Challenge: Create a digital platform that offers eco-mindfulness exercises combining teachings in emotional literacy with actions that benefit the planet. This platform should:

- **Content Development:** Produce engaging multimedia content that explains the concepts of emotional literacy and its relation to environmental health.
- **Interactive Features:** Develop interactive features that guide users through mindfulness practices focused on deepening their connection to the natural world.
- **User Engagement:** Implement strategies to maximize user engagement and encourage daily practice, including progress tracking, rewards for consistency, and community challenges.

Project 3: Schools for Resilience Program

SDGs Addressed:

- SDG 3: Good Health and Well-being
- SDG 4: Quality Education

Challenge: Develop a comprehensive program for schools that integrates emotional literacy and planetary health into the curriculum. This program should:

- **Curriculum Integration:** Work with educators to embed emotional literacy and environmental sustainability into existing curriculums across various subjects.
- **Teacher Training:** Provide training for teachers on how to effectively deliver lessons that combine emotional literacy skills with planetary health concepts.
- **Student Projects:** Encourage students to undertake projects that require them to apply emotional literacy in real-world contexts, such as community clean-up events or initiatives to improve school sustainability.

Each of these projects not only addresses important aspects of emotional literacy and planetary health but also encourages participants to actively engage in practices that enhance both personal and

environmental well-being. By tackling these challenges, communities can foster a more holistic approach to education and health, ultimately contributing to the achievement of the targeted SDGs.

Pathway 2

Project 1: Ocean Health Awareness Campaign

SDGs Addressed:

- SDG 3: Good Health and Well-being
- SDG 14: Life Below Water

Challenge:

Develop a public awareness campaign that educates the community about the interconnections between ocean health and human health. This project should contribute to:

- **Information Dissemination:** Create informative materials (videos, brochures, social media content) that explain how ocean health affects food security, climate regulation, and overall well-being.
- **Community Involvement:** Organize beach clean-up events and workshops on sustainable seafood choices to actively engage the community in ocean conservation.
- **Health Monitoring:** Implement a program to monitor and report on local seafood safety and its impacts on community health.

Project 2: Women for Oceans Initiative

SDGs Addressed:

- SDG 3: Good Health and Well-being
- SDG 14: Life Below Water
- SDG 5: Gender Equality

Challenge:

Launch an initiative that empowers women to take leadership roles in marine conservation and promotes their well-being through engagement with ocean health. This project should contribute to:

- **Leadership Training:** Provide training for women in marine biology, conservation strategies, and project management.
- **Community Projects:** Support women-led projects that focus on sustainable fishing, marine pollution reduction, and coral reef restoration.
- **Health and Safety:** Address specific health challenges faced by women in coastal communities, including access to healthcare and education about reproductive health in relation to environmental pollutants.

Project 3: Peaceful Waters Dialogue Fora

SDGs Addressed:

- SDG 3: Good Health and Well-being
- SDG 16: Peace, Justice, and Strong Institutions

Challenge:

Facilitate dialogue fora that focus on resolving water-related conflicts through peaceful means and promoting community health. This project should: contribute to:

- **Conflict Resolution Workshops:** Organize workshops that teach conflict resolution and negotiation skills, focusing on water resource management.
- **Health Impact Studies:** Conduct studies and share findings on how water conflicts impact community health and well-being.
- **Policy Advocacy:** Advocate for policies that ensure equitable water distribution and contribute to peace and well-being in the community.

Project 4: Climate-Resilient Oceans Program

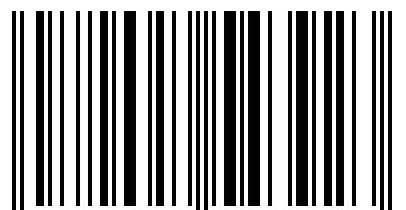
SDGs Addressed:

- SDG 3: Good Health and Well-being
- SDG 13: Climate Action
- SDG 14: Life Below Water

Challenge:

Create a program that addresses the impacts of climate change on ocean ecosystems and human health, promoting resilience in coastal communities. This project should contribute to:

- **Resilience Building:** Develop and implement strategies to enhance the resilience of marine ecosystems, such as mangrove restoration and protection of marine biodiversity hotspots.
- **Health Adaptation Plans:** Work with health professionals to create adaptation plans for communities affected by climate-related changes in marine environments, such as increased diseases or nutritional deficiencies due to declining fish stocks.
- **Education and Outreach:** Educate the community about the links between climate change, ocean health, and human health, and promote actions that individuals can take to mitigate these challenges.



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