emsea

ANNUAL CONFERENCE

Zadar, Croatia

23-26 SEPTEMBER 2024

BOOK OF ABSTRACTS

Dear Participants,

Welcome to the 11th European Marine Science Educators Association Conference in the beautiful city of Zadar, Croatia. This year's conference is organized by EMSEA, University of Zadar, and Marine Explorers Society – 20 000 Leagues, in partnership with the UNESCO's International Center for Underwater Archaeology, Zadar and the HORIZON SeaTecHub project.

Hosted at the historic University of Zadar, one of the oldest universities in Europe, this event will provide a unique setting to explore the intersection of education, research, and marine conservation. This year's conference focuses on advancing ocean literacy and fostering collaboration among educators, researchers, and practitioners to inspire meaningful change for our oceans. We are excited to have an engaging conference program that highlights innovative approaches, diverse perspectives, and the collective vision for a sustainable marine future.

Moreover, we are especially proud that this conference is endorsed as a UN Ocean Decade activity. This endorsement recognizes our conference's vital role in advancing ocean literacy and contributing to sustainability and conservation of the sea and the Challenge 10 of the United Nations Decade of Ocean Science for Sustainable Development (2021-2030).

Thank you for joining us and we hope you will enjoy this part of the ocean, the Adriatic Sea.

On behalf of the Organizers,

Melita Mokos, Ph.D.
Chair of the Organizing Committee
Department of Ecology, Agronomy, and Aquaculture
University of Zadar, Croatia

CONTENT

GENERAL INFORMATION

ORGANIZING COMMITTEE

Melita Mokos, Chair of the Organizing Committee, Department of Ecology, Agronomy and Aquaculture, University of Zadar, Croatia
Ivana Zubak Čižmek, Department of Ecology, Agronomy and Aquaculture, University of Zadar, Croatia
Igor Radeka, Department of Pedagogy, University of Zadar, Croatia
Maja Cindrić, Department of Teacher and Preschool Teacher Education, University of Zadar, Croatia
Ivana Klarica Karamarko, Department of Teacher and Preschool Teacher Education, University of Zadar, Croatia
Barbara Čolić, 20000 Leagues Marine Explorers Society, Croatia
Hrvoje Čižmek, 20000 Leagues Marine Explorers Society, Croatia
Mladen Pešić, International Centre for Underwater Archaeology UNESCO, Croatia
Evy Copejans, European Marine Science Educators Association, Belgium
Dominika Wojcieszek, European Marine Science Educators Association, Poland
Demetra Orthodoxou, AKTI Project and Research Centre, Cyprus

PROGRAM COMMITTEE

Nicola Bridge, European Marine Science Educators Association, Belgium
Melita Mokos, Department of Ecology, Agronomy and Aquaculture, University of Zadar, Croatia
Giulia Realdon, University of Camerino, Italy
Silja Teege, SeaTeach, Spain
Mark Ward, Somerset Wildlife Trust, UK
Dominika Wojcieszek, European Marine Science Educators Association, Poland
Ivana Zubak Čižmek, Department of Ecology, Agronomy and Aquaculture, University of Zadar, Croatia

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2021 2030 United Nations Decade of Ocean Science for Sustainable Development

Organizers:

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KEYNOTE SPEAKERS:

Emma McKinley

Senior Research Fellow at Cardiff University

Dr Emma McKinley is a Senior Research Fellow at Cardiff University. Her research focuses on understanding the complex relationships between society and the sea, taking account of diverse perceptions, attitudes, and values held by different communities and audiences, and considers how this insight can be used to support effective ocean governance. Her recent work has been through the SMMR project, Integrating Diverse Values into UK Marine Management, with a specific focus on understanding the diverse values of communities through the lens of ocean literacy. Emma is the founder of the Marine Social Science Network, a global, interdisciplinary community of marine social science researchers and practitioners, and sits on the UK's National Decade Committee for the UN Ocean Decade and IOC-UNESCO's Global Group of Experts on Ocean Literacy.

Lucy Hunt

Ocean Impact Director of The Ocean Race

Lucy Hunt is the Ocean Impact Director of The Ocean Race, using the global round-the-world sailing event to create a positive impact on the ocean and ocean literacy. She has worked with the race since 2017, initially creating and managing The Ocean Race Learning programme, which is used in 83 countries, and has won two REIMAGINE Education Awards. The Ocean Race Learning programmes have been highlighted as case studies by IUCN Sports 4 Nature and the International Olympic Committee Best Practice Reports. Lucy is currently undertaking a PhD on the influence of The Ocean Race Learning programmes on ocean literacy and pro-environmental behaviour. She is also the founder of Sea Synergy Marine Awareness, Research & Activity Centre in SW Ireland, which helps connect all ages to the ocean through several different informal education activities.

Craig Strang

Consultant and Associate Director Emeritus of Lawrence Hall of Science at the University of California, Berkeley

Craig Strang is a consultant and Associate Director Emeritus of Lawrence Hall of Science at the University of California, Berkeley where he worked for 32 years. His work spans science, ocean, and environmental literacy in education systems nationally and internationally, focusing on centering equity and justice. He co-founded/co-led the US Ocean Literacy Campaign and co-developed the Ocean Literacy Framework that resulted in inclusion of ocean sciences in the US Next Generation Science Standards. He currently co-leads the California Campaign for Outdoor Learning that builds on the National COVID-19 Outdoor Learning Initiative that he co-founded. He co-led development of the California Blueprint for Environmental Literacy that has increased science and environmental learning statewide. His work on BEETLES: Better Environmental Education Teaching, Learning and Expertise Sharing and The Working Toward Racial Equity Project significantly impacts outdoor learning throughout the US. He was founding Director of MARE: Marine Activities, Resources & Education, the most widely used elementary marine science program in the US. He has conducted research on marine mammals, and led ecotours to the Galapagos Islands, East Africa, Baja California/Sea of Cortez, and along the California coast.

Nicola Bridge

Head of Ocean Advocacy and Engagement at Ocean Conservation Trust (OCT) and EMSEA President

Nicola Bridge is the Head of Ocean Advocacy and Engagement at the Ocean Conservation Trust (OCT). Nicola is a Conservation Biologist with over 16 years of experience in both formal and informal environmental education and engagement and science communication, specifically linked to the marine environment
Nicola has dedicated her career to supporting people to connect with the Ocean, accessing the benefits it provides, whilst simultaneously fostering their own understanding of how they can help support a thriving Ocean themselves. Through her work, many thousands of people have been able to experience the Ocean first hand.
She is passionate about changing the Ocean conservation narrative, recognising that everyone on the planet is responsible for the health of the natural world, moving from raising awareness, to taking action.
Nicola is a member of the Defra Ocean Literacy Working Group and a founder of the We Are Ocean network. Nicola is President of EMSEA (European Marine Science Educators Association), leading the organisation to act as a hub for the Ocean education community. She is Co-Chair of a UN Ocean Decade Working Group, focusing on global sustainable change in human behaviour to support the health of the Ocean

EVENT PROGRAM

	Monday, September 23
08.30 | 09.30	**Registration**
09.30 | 09.45	***Opening and Welcome Speech (Moderator: Evy Copejans)***
	Melita Mokos, Chair of the Organizing Committee, University of Zadar Nicola Bridge, Chair of the European Marine Science Educators Association Lena Mirošević, Prorector of the University of Zadar
09.45 | 10.10	**Keynote talk (Moderator: Evy Copejans)**
	Nicola Bridge, Craig Strang: 20 years of Ocean Literacy: From Decades of Ocean Literacy to an Ocean Decade
10.10 | 10.35	**Keynote talk (Moderator: Evy Copejans)**
	Lucy Hunt: The Ocean Race: Sport has the power to change the world
10.35 | 11.10	***Coffee break and registration***
Ocean Literacy and Water Sports (Moderator: Dominika Wojcieszek)	
11.10 | 11.20	Maria Stella Scordo: The LIFE A-MAR NATURA2000 sailing campaign as instrument of ocean literacy
11.25 | 11.35	Frederico Almada: Kids Dive: Using scuba diving to foster a deeper understanding of the Ocean among school students
Ocean Literacy and Natural Sciences (Moderator: Dominika Wojcieszek)	
11.40 | 11.50	Dina Eparkhina: Scientists for Ocean Literacy: Empowering Scientists as Ocean Advocates
11.55 | 12.05	Francesca Alvisi: From geodiversity to biodiversity: how and why to practice this fundamental relationship
12.10 | 12.20	Juanita Zorrilla Pujana: Ocean citizen: storytelling for engaging communication
12.25 | 13.40	***Lunch break***
Ocean Literacy and Blue Economy (Moderator: Silja Teege)	
13.40 | 13.50	Evelyn Paredes-Coral: Ocean literacy for a more sustainable blue economy: why knowing about the ocean isn't enough?
13.55 | 14.05	Basia Dmochowska: Education and raising awareness on sustainable and innovative aquaculture for blue growth
14.10 | 14.20	Juanita Zorrilla Pujana: Beyond the plate: seafood literacy's role in the blue economy
14.25 | 14.35	Dimitris Gavalas: Ocean literacy as a catalyst for sustainable blue economy development in Greece
14.40 | 14.50	Mariana Almeida: How are blue economy concepts being integrated into ocean literacy initiatives?
14.55 | 15.05	Dimitris Gavalas: Navigating Yacht Cruisers' Sociology: A Comprehensive Study on Destination Development and User-Driven Logistics for Enhanced Cruising Facilities and Experiences
15.15 | 16.15	***Workshops***
	Yolanda Koulouri: BlueMinds4Teachers: design and implementation of a digital toolkit for empowering educators in ocean literacy Geraldine Fauville: Aligning National Curricula and Ocean Literacy: An opportunity for EMSEA-wide collaboration Cushla Dromgool-Regan: Explorers' fin-tastic sharks, mermaids and magical creativity on the shore
19.00	***Sunset wine reception***

	Tuesday, September 24
08.30 | 09.00	**Registration**
09.00 | 09.20	**Keynote talk (Moderator: Nicola Bridge)**
	Emma McKinley: Ocean literacy: The ocean research we need for the ocean we want
Ocean Literacy Beyond Natural Sciences (Moderator: Nicola Bridge)	
09.20 | 09.30	Vera Noon: Intersecting Ocean Literacy and Maritime Archaeology: Maritime Cultural Heritage for behavioural change!
09.35 | 09.45	Mladen Pešić: System of Protection and Management of Underwater Cultural Heritage on Velika Shallows, Letavica, and Baron Gautsch sites
09.50 | 10.00	Maria Vittoria Marra: 'Galway Bay is calling': a participatory music project aimed at promoting ocean literacy from the west coast of Ireland
10.05 | 10.15	Emma McKinley: Bringing the ocean to the stage: Performing Coastal Values and Marine Management
10.20 | 11.30	***Coffee-Break /Poster session***
Ocean Literacy Research (Moderator: Eliane Bastos)	
11.30 | 11.40	Jen McRuer: Understanding human-ocean connections and values through the global ocean & society survey
11.45 | 11.55	Giulia Realdon: Investigating Ocean connections among a sample of children and adults attending ocean literacy workshops and lectures
12.00 | 12.10	Géraldine Fauville: Underwater Virtual Reality for Awe, Ocean Connectedness, and Pro-Environmental Behavior
12.15 | 12.25	Ffion Mitchell-Langford: Hiraeth yn y mor - equitably growing community-scale ocean literacy for marine management, health & well-being in North East Wales (UK)
12.30 | 12.40	Jelena Basta: Engaging tourists in ocean literacy through two different forms of ecotourism programmes
12.45 | 14.40	***Lunch break***
Inclusive Ocean Literacy (Moderator: Mark Ward)	
14.45 | 14.55	Rada Pandeva: Thalassophile project: making marine science and ocean literacy universally accessible
15.00 | 15.10	Freyja Thomson-Alberts: Ocean for all - breaking barriers to access and bringing the ocean inland
Ocean Literacy and Academia + Open Session (Moderator: Mark Ward)	
15.15 | 15.25	Tammy D. Lee: Promoting Relationship with the Ocean Through an Immersive Whale Experience
15.30 | 15.40	Ninja Mueller: The global marine curriculum - decolonising and deanthropocentralising marine education
15.45 | 17.15	***Workshops***
	Yolanda Koulouri: Fins into the water workshop: Water sports to enhance Mediterranean Sea Literacy Caroline Schio: Engaging Educators in Coastal Monitoring: A Hands-on Workshop with the Coastal Junior Monitoring Project Eliane Bastos: Body mapping the human-ocean relationship
19.00	***Conference Dinner***

	Wednesday, September 25
08.30 | 09.00	**Registration**
Ocean Literacy and Education (Moderator: Cushla Dromgool Regan)	
09.00 | 09.10	Mark Ward: Somerset school coastal champions award: an initiative to engage young people with their local marine and coastal environments
09.15 | 09.25	Rita Borges: Let's scale up the blue generation!
09.30 | 09.40	Thomas Mtontsi: Towards the support of others with knowledge and science skills using a marine science context
09.45 | 09.55	Caitlin Ransom: Empowering educators: Promoting Ocean literacy through Blue Schools
10.00 | 10.10	Rebecca Katsaris: Increasing marine environmental awareness through the creative arts
10.15 | 10.25	Jadranka Šepić: Oceanographers on the island - bringing ocean education to Croatian islands and beyond
10.30 | 11.00	***Coffee-Break***
11.00 | 11.30	***Panel discussion: Empowering Schools to Become an EU Blue School (Moderator: Evy Copejans)***
	Panellists: Silja Teege, SeaTeach Elisabeth Bonfill, Spanish National Research Council (CSIC) Dominika Wojcieszek, EMSEA Melita Mokos, University of Zadar
12.30 | 13.30	***Lunch break***
13.30 | 13.45	***Conclusions and wrap up, EMSEA 2025*** ***Thank you and goodbye! (Moderator: Nicola Bridge)***
14:30-16:30	**Panel discussion: Implementation of Blue Education in Croatian Education System – opportunities and challenges (IN CROATIAN)**
	Panellists: Marijana Gojčeta, Ministry of Education, Science, and Youth Vesko Nikolaus, Education and Teacher Training Agency Melita Mokos, University of Zadar Evy Copejans, EMSEA Rita Borges, Oceano Azul Foundation
18:30	**Blue Caffe + evening photo exhibition**
Thursday, September 26	
Fieldtrip	

ORAL PRESENTATIONS ABSTRACTS LIST

No.	Presenting Author	Title
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O02	Almada F.	Kids Dive: using scuba diving to foster a deeper understanding of the ocean among school students
		Ocean Literacy and Natural Sciences
O03	Eparkhina D.	Scientists for ocean literacy: empowering scientists as ocean advocates
O04	Alvisi F.	From geodiversity to biodiversity: how and why to practice this fundamental relationship
O05	Zorrilla J.	Ocean citizen: storytelling for engaging communication
		Ocean Literacy and Blue Economy
O06	Paredes-Coral E.	Ocean literacy for a more sustainable blue economy: why knowing about the ocean isn't enough?
O07	Dmochowska B.	Education and raising awareness on sustainable and innovative aquaculture for blue growth
O08	Zorrilla Pujana, J.	Beyond the plate: seafood literacy's role in the blue economy
O09	Gavalas, D.	Ocean literacy as a catalyst for sustainable blue economy development in Greece
O10	Almeida M.	How are blue economy concepts being integrated into ocean literacy initiatives?
O11	Gavalas, D.	Navigating yacht cruisers' sociology: a comprehensive study on destination development and user-driven logistics for enhanced cruising facilities and experiences
		Ocean Literacy Beyond Natural Sciences
O12	Noon V.	Intersecting ocean literacy and maritime archaeology: maritime cultural heritage for behavioral change!
O13	Pešić M.	System of protection and management of underwater cultural heritage on Velika shallows, Letavica, and Baron Gautsch sites
O14	Marra M.V.	Galway bay is calling': a participatory music project aimed at promoting ocean literacy from the West coast of Ireland
O15	McKinley E.	Bringing the ocean to the stage: performing coastal values and marine management
		Ocean Literacy Research
O16	McRuer, J.	Understanding human-ocean connections and values through the global ocean & society survey

O17	Realdon G.	Investigating ocean connections among a sample of children and adults attending ocean literacy workshops and lectures
O18	Fauville G.	Underwater virtual reality for awe, ocean connectedness, and pro-environmental behaviour
O19	Mitchell-Langford F.	Hiraeth yn y mor - equitably growing community-scale ocean literacy for marine management, health & well-being in Northeast Wales (UK)
O20	Basta J.	Engaging tourists in ocean literacy through two different forms of ecotourism programmes
		Inclusive Ocean Literacy
O21	Pandeva R.	Thalassophile project: making marine science and ocean literacy universally accessible
O22	Thomson-Alberts F.	Ocean for all - breaking barriers to access and bringing the ocean inland
		Ocean Literacy and Academia
O23	Lee T.D.	Promoting relationship with the ocean through an immersive whale experience
O24	Mueller N.	The global marine curriculum - decolonising and deanthropocentralising marine education
		Ocean Literacy and Education
O25	Ward M.A.	Somerset school coastal champions award: an initiative to engage young people with their local marine and coastal environments
O26	Borges R.	Let's scale up the blue generation!
O27	Mtontsi T.	Towards the support of others with knowledge and science skills using a marine science context
O28	Ransom, C.	Empowering educators: promoting ocean literacy through blue schools
O29	Katsaris R.	Increasing marine environmental awareness through the creative arts
O30	Šepić J.	Oceanographers on the island - bringing ocean education to Croatian islands and beyond

O01

THE LIFE A-MAR NATURA2000 SAILING CAMPAIGN AS INSTRUMENT OF OCEAN LITERACY

Picchi S.[1], Luzi G.[1], Mattioli D.[1], Grandi R.[1], Scordo M.[1], Villani M.[2]

[1]*Triton Research, Italy*
[2]*Federparchi Europarc, Italy*

"You protect what you love, but love what you know". With this spirit Triton Research designed in 2023 the LIFE A-MAR NATURA2000 Sailing Campaign, fostering knowledge, appreciation and protection of the marine environment. Six weeks of sailing through 50 of the most suggestive Italian Natura 2000 marine sites (N2000MS), unveiling the wonders of the Mediterranean Sea, a project lying at the intersection between water sports, ocean literacy, and inclusion. The Campaign sailed through 6 Italian regions, each of which became the setting of workshops, sailing trips, and guided tours (both physical and virtual). Notably, the campaign was led by sailboats confiscated from organized crime, entrusted to the Italian Naval League by judicial authorities, adding a social objective to the conservation effort. A wide range of activities were taught and designed to make knowledge more accessible and available to people of all backgrounds, including local residents and stakeholders.
Fifteen guided tours allowed participants to learn about the ecological diversity of N2000MS, guided by experts through coastal areas, increasing awareness and community cohesion. In addition, 12 participatory meetings were organized with the project coordinator Federparchi, across different locations, giving an important platform to conservationists, scientists and public administrators, enabling them to share their expertise with stakeholders. The Sailing Campaign also comprised of events aimed at raising awareness, such as the sailing and ground trips in Liguria, Sicily, Tuscany, Sardinia and Lazio. These excursions involved almost 200 participants, among tourists, residents and yachtsmen, who, accompanied by expert marine biologists, gained knowledge about the good practices to be adopted in order to protect and conserve the ecosystem. For example, with LIPU, one of our valuable partners, we organized a sailing excursion at the Secche of Tor Paterno, N2000MS in Lazio, where participants were informed about the importance of preserving Posidonia beds and habitats, as well as the importance of seabirds as part of the marine fauna, all the while enjoying the opportunity of boarding beautiful sailboats offered by local organisations.
The activities offered by the Sailing Campaign were supported by communication channels: social network pages (about 5,000 people reached), newspapers (136 articles), websites (about 780 views), television and radio (9 passages) that made information and updates more accessible, even to those who could not participate. Also, a dedicated app "AMAR Sea LIFE" was introduced, providing information on the locations and naturalistic peculiarities of the Italian N2000MS.

One of the strengths of the Sailing Campaign was the delicate, detailed design that allowed for the participation of a variety of individuals, involving divers, snorkelers, boaters, N2000MS managers and fishermen. Individuals could participate in a variety of activities according to their interests, regardless of their age and background, an approach that made sure that the knowledge made available by the experts could be accessible to all. Learning about local environments generates a sense of responsibility, feeding love, and protection, for the marine ecosystems that are to be shared amongst the community as a whole.

O02

KIDS DIVE: USING SCUBA DIVING TO FOSTER A DEEPER UNDERSTANDING OF THE OCEAN AMONG SCHOOL STUDENTS

Almada F.[1], Rodrigues F.[1], Duarte-Coelho P.[1,2], Cláudio M.[3], Martins M.[2], Miranda C.[1,4], Malzone T.[1]

[1]MARE-MARDIVE, Portugal
[2]Ispa-IU, Portugal
[3]NOVA, Portugal
[4]FCUL, Portugal

Kids Dive is an innovative and practical educational program on ocean literacy that integrates complete classes of school students. This program includes a scuba diving experience in a local swimming pool, with a unique underwater circuit with activities specially designed to address fundamental topics of the ocean conservation agenda. Models of endangered species, marine forests, “invisible” plastics and overfishing are some of the hands-on training materials available for all participants during their underwater experience. Exiting the swimming pool opens the opportunity to continue practical activities with workshops provided by our partner institutions on microplastics (APLM), climate change (Lisbon Oceanarium) and biodiversity (Lisbon Zoo). To wrap up, we organized a field trip and a summit with colleague scientists to discuss how the scientific community is contributing to global ocean conservation efforts. Since 2018 this program has reached more than 3500 students in Portugal and Norway. These activities were performed locally, involving several schools from each municipality. To evaluate its effectiveness, individual inquiries were used to measure seven different ocean literacy principles in a total of 14 questions (2 for each principle). They were presented to each student before and after they completed the Kids Dive program. The 690 valid pre- and post-program inquiries (10% were excluded for inconsistencies) were similarly distributed between both genders and included students from the 8th grade (13-16 years old) from central west Portugal. A significant increase on the number of correct answers was observed on all ocean literacy questions with an average increase of about 9%. These differences were not gender, school, or age dependent thus providing consistent results under a wide range of conditions. It is important to highlight that, in the Portuguese learning system, general concepts on biology and ecology are lectured in the 8th grade. Thus, the improvement on ocean literacy levels is probably a result of a synergistic effect between Kids Dive and marine conservation topics lectured by the teachers in the classroom. Other school years will be evaluated in the future to partially disentangle this effect. Long term learning effects and behavioural changes were not measured but are also under our scope for future studies. Willingness to engage future scuba diving activities were clear among most participants and the enthusiasm generated by the scuba diving activity resulted in plenty of school initiatives, group projects and exhibitions. In the future, coupling scuba diving and virtual activities, such as virtual dives

will probably increase the impact of these programs, promoting an emotional connection to the Ocean. Our goal is to encourage and support the implementation of effective measures to protect marine ecosystems such as the establishment of local marine protected areas.

O03

SCIENTISTS FOR OCEAN LITERACY: EMPOWERING SCIENTISTS AS OCEAN ADVOCATES

Eparkhina D.[1]

[1]*EuroGOOS, Belgium*

Ocean literacy involves understanding the interplay between the ocean's impact on society and society's influence on the ocean. An ocean-literate person has a basic knowledge about the ocean, can communicate about ocean-related topics, and can make informed decisions regarding the ocean environment, resources, and human impacts. Aligned with the principles of the "new societal contract of science" (Gibbons, 1999), ocean scientists play a crucial role as intermediaries, translating scientific research into actionable insights for shaping public policies and promoting behaviour change towards sustainability, beyond academic confines.

Initiated by EuroGOOS, the UN Ocean Decade Scientists for Ocean Literacy project aims to synergize European ocean literacy initiatives at various levels. By bringing together experts from different disciplines, the project seeks to amplify the impact of these efforts, advocating for ocean literacy at institutional and funding levels.

Emphasizing engagement across diverse sectors, the Scientists for Ocean Literacy project integrates ocean literacy into core activities of research institutions and publicly funded agencies, aiming to deepen stakeholders' understanding of the ocean's role in addressing societal challenges.

Activities under the project address pressing challenges identified by the Ocean Decade, among others, ocean pollution, climate change, digital ocean, and strengthening the observing system. Challenge 10 particularly underscores ocean literacy's ambition to transform humanity's relationship with the ocean through inclusive dialogue and co-design.

As a scientifically-driven initiative with a focus on outreach, the project builds upon the groundwork laid by the EuroGOOS Ocean Literacy Working Group.

This proposed talk will outline the EuroGOOS ocean literacy activities, including promoting ocean knowledge, art and science collaboration, utilizing ocean technologies, and capacity building. Furthermore, preliminary results of the EuroGOOS survey on ocean literacy in European oceanographic agencies will be presented for the first time.

O04

FROM GEODIVERSITY TO BIODIVERSITY: HOW AND WHY TO PRACTISE THIS FUNDAMENTAL RELATIONSHIP

Alvisi F.[1]

[1]*CNR-ISMAR, Italy*

The term 'biodiversity' has become well known in recent years, while 'geodiversity' is a lesser known or understood concept. It is simply the abiotic equivalent of biodiversity and, first coined by Chris Sharples in 1993, has since come into common usage in the geoscience literature. In simple terms, geodiversity is the non-living or abiotic diversity of the planet.
In recent years, geodiversity has been related to biodiversity in an increasing number of studies. The integration of geodiversity information into biodiversity research and conservation has considerable potential to improve our understanding of biodiversity patterns and dynamics. It also allows us to improve biodiversity protection strategies by acting as a conservation tool.
Geodiversity can thus be seen as the foundation of biodiversity, where abiotic conditions set the stage for living nature by creating variation and nuance. By supporting and maintaining a variety of ecosystem functions and processes, geodiversity also contributes to ecosystem services and human well-being. Such a holistic view of the co-dependence of the living and non-living environment is fundamental to addressing the global problems we face today.
At CNR-ISMAR, various practical and interactive activities were developed to bring the topic of geodiversity into schools and society. As a research institute dedicated to the study of seas and oceans, the activities focused on marine geodiversity.
We started from the concept that the shape, size and rock composition are among the most important characteristics of sea basins, as they determine their unique geological features, thus influencing oceanography, biogeochemistry and ecology. Since the resulting geological processes and materials are responsible for these characteristics, it is essential to introduce some basic knowledge from the very beginning of the Ocean Literacy course. From the knowledge of the materials with which our historical cities are built, to the discovery of the underwater landscape, some examples of good practices developed at CNR-ISMAR within the framework of various educational projects carried on together with the wider community for ocean education will be shown and discussed. They focus mainly on the visualisation of concepts, and of the space and temporal context through 3D reconstructions, quiz games, cartoons, practical activities, and guided tours of the territory.
All educational practices are carried out through the experimental method and interaction with researchers who guide them on a path of exploration and acquisition of theoretical-practical skills based on the scientific approach and critical thinking.

O05

OCEAN CITIZEN: STORYTELLING FOR ENGAGING COMMUNICATION

Zorrilla Pujana J.[1] Maggioni T.[1], Fernandez S.[1], Verdugo M.[1]

[1]SUBMON, Spain

Effective communication is often unappealing in Horizon Europe projects, leading to missed opportunities for impactful ocean literacy initiatives. The OCEAN CITIZEN project, funded under the Blue Parks call and aligned with the European Commission's Mission Ocean, seeks to address this gap by implementing a transformative communication strategy that integrates ocean literacy with the project's Communication and Dissemination (C&D) plan. This abstract outlines our innovative approach and its potential to inspire and promote ocean literacy through strategic communication.
When starting the project, we were excited about the opportunity to transcend the standard C&D Plan and enhance ocean literacy through diverse communication tools. We fostered a spirit of collaboration, developing a Comprehensive Communication Strategy and creating and implementing a storytelling framework linked to the project's progress. As part of our engagement and communication efforts, we also promoted synergies and shared best practices, valuing the contributions of our partners in supporting continuous improvement.
The OCEAN CITIZEN project is a multidisciplinary approach integrating science and society in marine forest regeneration for ocean management and protection. Fields that range from oceanography, ecology, applied physics, biology, architecture, and engineering are essential pieces of the puzzle, but translating this complex scientific knowledge into accessible and engaging formats, such as videos, infographics, and a series of comics, is also challenging and critical to increase public understanding and awareness of OCEAN CITIZEN's objectives and results.
Key Steps - C&D Plan Establishment: Initiating an early comprehensive C&D plan aligns communication efforts with project goals and maximizes impact; Collaborative Decision-Making: Promote internal participation from partners to identify and define keywords, messages and target audiences. This process helps to strengthen relations between partners, fostering a sense of collective responsibility; Flexibility and Openness: Adaptable communication strategies allow for the exploitation of new opportunities and the dynamic evolution of the project; Multidisciplinary Approach: Integrating diverse perspectives and expertise addresses complex challenges more effectively; Emotional Engagement: Creative storytelling about ecological succession allows parallelism between many concepts related to ocean restoration, promoting ocean literacy and the project's advancements, always focused on evoking emotions and inspiring connection to ocean conservation; Synergies and Flexibility
OCEAN CITIZEN aims to enhance networking, efficiency, and effectiveness by seeking continuous collaborations and embracing new opportunities. Our approach leverages collective strengths, resources, and expertise to amplify our message and achieve the

MISSION OCEAN goals. This dynamic and integrative communication strategy serves as a model for future Horizon Europe projects, demonstrating the potential of strategic communication to promote ocean literacy and drive impactful change.

Conclusion: The OCEAN CITIZEN project exemplifies how a strategic communication approach can significantly enhance ocean literacy within Horizon Europe projects. By prioritizing communication from the outset and employing creative storytelling, we effectively engage stakeholders and foster a deeper understanding of ocean issues. This strategy promotes project objectives and inspires broader community action towards ocean conservation, setting a precedent for future initiatives. Through the innovative use of marine science communication, OCEAN CITIZEN advances both the understanding and awareness of ocean science, paving the way for a more informed and engaged public.

O06

OCEAN LITERACY FOR A MORE SUSTAINABLE BLUE ECONOMY: WHY KNOWING ABOUT THE OCEAN ISN'T ENOUGH?

Paredes-Coral E.[1], Mokos M.[2], Vanreusel A.[3], Roose H.[4]

[1]EMSEA, Belgium
[2]Department of Ecology, Agronomy and Aquaculture, University of Zadar, Croatia
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A sustainable blue economy calls for a workforce that understands the ocean's value, encourages sustainable practices, inspires innovation, and builds support for sustainable policies. Understanding what motivates ocean-protective or destructive behaviour is critical for designing and implementing effective trainings, campaigns, incentives and policies that encourage maritime workers to engage in ocean-friendly behaviours. While ocean literacy initiatives aim to deliver more sustainable practices in the blue economy, the current levels of ocean literacy in the maritime workforce are still unknown. Here we assess the levels of ocean literacy of 536 maritime workers across Europe using exploratory factor analysis and cluster analyses. Our results show that industry-related and sociodemographic factors have a significant effect on the levels of ocean literacy. Considering the scores from the three more relevant ocean literacy dimensions, namely, knowledge, attitudes towards ocean sustainability and ocean-friendly behaviour, we identified four clusters of maritime workers with similar sets of ocean literacy skills. Clusters were labelled as "ocean champions", "ocean enthusiasts", "ocean detractors" and "ocean disengaged". In the ocean detractors cluster, maritime workers reported negative attitudes and behaviours, despite their good knowledge about the ocean. These findings support the knowledge-behaviour gap theory, according to which, good levels of knowledge do not necessarily translate into positive attitudes and good behaviours. These results might help companies to understand that for certain groups of maritime workers enhancing knowledge alone is not enough to achieve ocean-friendly behaviour. Other ways of ensuring their employees' engagement with ocean sustainability seem appropriate.

O07

EDUCATION AND RAISING AWARENESS ON SUSTAINABLE AND INNOVATIVE AQUACULTURE FOR BLUE GROWTH

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Ocean literacy is a way not only to increase the awareness of the public about the ocean, but it is as an approach to encourage all citizens and stakeholders to have a more responsible and informed behaviour towards the ocean and its resources (Ocean literacy for all, UNESCO), with the living resources to be most valuable. Still, overfishing, through deliberate catches or bycatches is one of the biggest issues marine ecosystems face today. And here, the Baltic Sea is no exception. Populations are on a downward spiral with several stocks near collapse. Cod populations for example have crashed and not recovered. European eel has been fished to near extinction (Sustainable fisheries, WWF). Just to name two examples. These only changes have caused ripple effects for the entire Baltic Sea ecosystem.
One of the solutions to this emerging problem is innovative and sustainable aquaculture. As stated by European Aquaculture Society (The blue and the green, EAS).: "Aquaculture can take the lead in the Blue - Green Bio-Economy and is well placed to lead by example with new technologies such as land-based marine aquaponics, large-scale recirculating marine farms and innovative, integrated freshwater initiatives on brownfield sites. When it comes to having a societal impact, recent research has shown that aquaculture products, from seaweed to salmon, should be included as part of a balanced diet from the first 1000 days right through to promoting healthy ageing."
Still, in the South Baltic region, aquaculture is not a widespread sector, with the idea of "artificially produced' fish present at the society. And this is why, University of Gdańsk, the biggest higher education institution in the Pomeranian region, Poland, decided to use its capacity in research and training, supported by European projects (InnoAquaTech – Cross-border development and transfer of innovative and sustainable aquaculture technologies in the South Baltic area, INTERREG SB; Blue Platform – Bioeconomy for blue growth in the Baltic Sea region, INTERREG BSR, AquaVIP – Aquaculture virtual career development platform for the South Baltic region, AquaLoop – Aquaculture expert floor for circular economy practice, INTERREG SB, BlueBioTech – Blue careers for a sustainable blue economy, EMFAF) to develop and carry out activities for various stakeholder groups on sustainable production of aquaculture food, to communicate the results of research based on ongoing experiments at the university and in partner institutions, to indicate ocean conservation role of the innovative and sustainable aquaculture, and to finally demystify public beliefs regarding farmed aquatic organisms. We specifically put a strong emphasis on strengthening aquaculture programs in the universities, and outside. Our training activities include summer schools on innovative aquaculture technologies, study visits in modern, innovative farms and partners'

facilities, students' panels during branch events, jobs presentations, video materials on success stories and farms presentations. The courses and workshops provide participants with practical hands-on experience on modern aquaculture technology and innovative blue biotechnology-based approaches to provide knowledge, create conditions for changes in public awareness, increase environmental protection and the labour market.

O08

BEYOND THE PLATE: SEAFOOD LITERACY'S ROLE IN THE BLUE ECONOMY

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The concept of the Blue Economy has gained significant traction in recent years, promising sustainable development and economic growth while preserving the health of the ocean. However, the true essence of a Blue Economy lies not only in economic prosperity but also in ensuring the conservation and wise use of marine resources. Seafood literacy emerges as a pivotal tool in this endeavour, offering a pathway towards fostering an economy that respects and protects marine resources.

This oral presentation delves into the critical intersection between seafood literacy and the blue economy, emphasising the importance of informed consumer choices in mitigating the overexploitation of marine products. By enhancing public understanding of seafood sources, sustainability practices, and the ecological impact of consumption patterns, seafood literacy empowers individuals to make conscientious decisions that support marine conservation efforts.

The Horizon Europe SEA2SEE project aims to enhance seafood traceability through blockchain technology and promote seafood literacy and responsible consumption around Europe. The project leveraged the Collective Intelligence (CI) methods to identify and prioritise barriers affecting responsible seafood consumption. The CI is a barriers and value structuring method that involves critical learning, reflection, and action to enable co-creation with people. CI takes participants through four stages: Barrier Generation, Barrier Categorisation, Structuring Barriers, and Generating Options, and the Interpretive Structural Modelling (ISM) software facilitates the consultation process.

A comprehensive understanding of the challenges impeding responsible seafood consumption has been attained through collaborative efforts in four European countries. Nine main areas of action have been identified across countries, and one common issue is the lack of seafood literacy among the European population.

Building upon these insights, a multifaceted strategy for engaging seafood consumers and fostering greater seafood literacy and responsible consumption awareness has been developed.

The SEA2SEE consumer's engagement strategy includes both online and in-person activities:

A SEA2SEE Hackathon involved European students and professionals to create a tool aiding consumers in making informed seafood purchases.

A Massive Open Online Course (MOOC), set for release in July 2024, will educate participants on fisheries, aquaculture practices, and the importance of seafood traceability. It will also explore the broader impact of consumption choices, empowering individuals to make informed decisions.

Additional initiatives, like harbour visits, fish auctions, cooking workshops, and awareness materials, aim to boost seafood literacy and encourage responsible habits among stakeholders.

SEA2SEE contributes to the overarching goal of sustainable marine resource management by promoting responsible seafood consumption. Through education and engagement, consumers are encouraged to support practices that safeguard marine ecosystems while simultaneously fostering economic growth and social well-being.

This presentation showcases innovative strategies and educational interventions, drawing on insights from the SEA2SEE project. By leveraging the transformative power of knowledge and awareness, we can catalyse a paradigm shift towards a truly sustainable blue economy that cherishes and safeguards our ocean for generations to come.

O09

OCEAN LITERACY AS A CATALYST FOR SUSTAINABLE BLUE ECONOMY DEVELOPMENT IN GREECE

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The aim of this study is to assess the trends of economic development in Greece before, during and after the financial crisis, emphasizing the pivotal role of ocean literacy in nurturing a sustainable blue economy. Over the course of the pre-crisis, crisis, and post-crisis periods (2008 – Present), the analysis shows how fiscal adjustment has impacted the evolution of social and economic indicators. Simultaneously, the contribution of coastal and maritime tourism and maritime transport to the economies of the Greek coastal regions is presented as emblematic "blue activities".

The findings underline the significance of ocean literacy in guiding informed decision-making towards sustainable marine resource utilization, environmental conservation, and economic development. Greece's dependency on tourism and the multifaceted importance of coastal shipping in fostering social cohesion and regional development are highlighted. Advocacy for the integration of ocean literacy principles into blue economy strategies is emphasized, highlighting the need for diversification within the Blue Economy framework to enhance sustainable production and development models. Presenting Greece's experiences, a contribution is made to the discourse on ocean literacy's critical role in promoting responsible resource management and fostering partnerships for sustainable blue economy development. This study underscores the imperative of leveraging education, technology, and collaborative efforts to unlock the full potential of the blue economy, ensuring its alignment with principles of sustainability and ecosystem stewardship.

Understanding of the ocean challenges is a precondition for the success of a sustainable blue economy, as it provides individuals and stakeholders with the necessary information to make well-informed choices regarding sustainable resource usage, environmental conservation, and economic development. Additionally, it promotes transparency, mitigating the potential for unsustainable decisions and consequential disruptions on local and regional levels. Moreover, ocean literacy is essential in enhancing participatory governance mechanisms, simplifying the implementation of effective sustainable policies designed with optimal and acceptable outcomes in mind.

O10

HOW ARE BLUE ECONOMY CONCEPTS BEING INTEGRATED INTO OCEAN LITERACY INITIATIVES?

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Ocean literacy evolved in the last years becoming an essential mechanism for achieving the United Nations (UN) Ocean Decade's goals. As various initiatives on ocean literacy have emerged, there is now a growing need for a comprehensive understanding on how the blue economy is being addressed to effectively engage ocean stakeholders, and the broader society, on the principles and scope of the blue economy.
This presentation seeks to demonstrate an initiative aligning the stakeholders' views of the Ocean sector in Portugal and their needs, as the basis for a literature review on blue economy in ocean literacy.
A participatory workshop with stakeholders from the Ocean related sector was carried out to gain insights into their perceptions related to the current and future needs and challenges of the Ocean Sector in Portugal. Following the analysis of these results, ocean literacy theme emerged from this discussion, collecting 7% of the challenges discussed, namely public awareness of the blue economy and its value as well as sectorial-based topics like aquaculture.
In this context, a dataset of scientific publications on ocean literacy from the Web of Science and Scopus databases was analyzed to examine their integration of blue economy concepts. Using the keywords "ocean," "literacy," "literate," and "econom*," 52 relevant publications were identified. Preliminary findings indicate that around 40% of the ocean literacy associated publications include ocean economy in their publications. These themes include curriculum analysis and teachers' perceptions about this subject (16.7%) and sector-based economies like fisheries (22%), tourism (11%) and the maritime industry (5%). Other topics relate to the business sector, job careers, decision-making, and stakeholder awareness.
Our findings reveal a low number of publications in this topic, underscoring that while ocean literacy is gaining recognition broadly, it still faces significant awareness gaps in blue economy related topics. This study is being enlarged using Open Alex tool and results will be presented, including a more detailed description on the topics.

O11

NAVIGATING YACHT CRUISERS' SOCIOLOGY: A COMPREHENSIVE STUDY ON DESTINATION DEVELOPMENT AND USER-DRIVEN LOGISTICS FOR ENHANCED CRUISING FACILITIES AND EXPERIENCES

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This research endeavours to investigate the sociological dimensions of yacht cruising, focusing on the motivations, lifestyle, and environmental attitudes of individuals who engage in this form of tourism. The study examines the characteristics of yacht cruisers, their travel patterns, decision-making processes, and preferences, as well as their experiences and opinions regarding nature, local communities, and hosts' culture.

The research underscores the significance of understanding yacht cruising as a distinct form of tourism, often overlooked in the context of marine tourism development. The study reveals that yacht cruisers are typically characterized by a mature age group and are distinguished by a slow pace of travel, preferring to remain in harbours during the winter months. This unique pattern of travel can contribute to the reduction of seasonal fluctuations and the development of local economies.

The study identifies a range of motivational factors that drive individuals to purchase a cruising yacht and sail to various countries. These factors include the active nature of sailing, novelty, escape, autonomy, nature, self-development, stimulation, self-actualization, and relationship creation. Furthermore, the research highlights the importance of social connections, physical and mental well-being, and constant learning and excitement in the yacht cruising lifestyle.

The study also explores the environmental attitudes of yacht cruisers, revealing that they tend to prioritize the ecologically sustainable use of maritime resources. Yacht cruisers emphasize the importance of infrastructure and facilities in logistics and port destinations, which can contribute to the development of local economies. Additionally, the research suggests that yacht cruisers are willing to tolerate local communities and politics as long as hosts understand and accommodate their lifestyle.

The authors also examine the connection between yacht cruising and ocean literacy, highlighting the importance of educating yacht cruisers about the importance of marine conservation and sustainable practices. The research reveals that yacht cruisers are willing to engage in activities that promote ocean literacy, such as participating in beach clean-ups and supporting marine conservation initiatives. Furthermore, the study finds that yacht cruisers are interested in learning more about the blue economy and its potential to promote sustainable development.

The findings of this study have significant implications for the development of yacht cruising destinations, particularly in the Cyclades region of Greece. The research provides practical information about the amenities and infrastructure required for recreational sailing activities in Mykonos Marina, which can inform public policies and marketing

strategies. The study's results also highlight the importance of considering the broader context of coastal regions, including mooring places, cities, and entire coastal areas. The study's findings also emphasize the need for policymakers and stakeholders to prioritize ocean literacy and the blue economy in their efforts to promote sustainable development in the region.

O12

INTERSECTING OCEAN LITERACY AND MARITIME ARCHAEOLOGY: MARITIME CULTURAL HERITAGE FOR BEHAVIOURAL CHANGE

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"Out of sight, out of mind," right? This phrase clearly describes the status of the hidden cultural treasures within our oceans. But what sets apart a random piece of decaying wood from the unlocking of an ancient maritime mystery?
The evolving landscape of Maritime Cultural Heritage (MCH) research, combined with technological advancements, is attracting a diverse array of expertise beyond traditional maritime archaeology. Studies suggest that sustainable ocean development cannot be achieved without leveraging MCH as a bridge between science, society, and policy (da Silva, 2020). Collaborations with industries and marine sectors are also deemed essential to unlocking new possibilities and achieving sustainable development goals (Henderson, 2019).
In parallel, in the context of the UN Decade of Ocean Science, the growing prominence of Ocean Literacy (OL) has highlighted the need to incorporate further attitudinal and behavioural dimensions into OL initiatives (Paredes-Coral et al., 2021; Paredes-Coral et al., 2022). Incorporating knowledge from diverse fields is important to properly shape our understanding of the sea, and ultimately our choices and actions.
Looking into these connections, this presentation seeks (a) to explore the intersection of Maritime Cultural Heritage within international and regional Ocean Literacy initiatives, providing examples and case studies from the Mediterranean and beyond; (b) to examine the various learning and communication channels used to generate impact and finally (c) to pave the way for future research that tailors learning and communication approaches to foster specific behavioural changes within communities.
So, what distinguishes between a random piece of decaying wood and the unlocking an ancient maritime mystery? It’s Ocean Literacy, bringing submerged scientific knowledge to the surface of public consciousness.

O13

SYSTEM OF PROTECTION AND MANAGEMENT OF UNDERWATER CULTURAL HERITAGE ON VELIKA SHALLOWS, LETAVICA, AND BARON GAUTSCH SITES

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At the ninth meeting of countries that have signed up to the 2001 UNESCO Convention on the Protection of Underwater Cultural Heritage, held in Paris from 13 to 14 June 2023, the Croatian nomination of its System for the Protection and Management of Underwater Cultural Heritage at the Pličina Velika Shallows, Letavica, and Baron Gautsch sites was approved as an example of UNESCO best practices in underwater cultural heritage. Examples of best practices are considered to be those initiatives undertaken in an appropriate manner and in line with the 2001 UNESCO Convention on the Protection of Underwater Archaeological Heritage, which provides the public at large an opening to access underwater cultural heritage. The status of best practices in underwater cultural heritage is awarded for a period of four years. It can be renewed, and examples of best practices are allowed to use the 2001 Convention logo in line with UNESCO rules. Since 2015, when UNESCO first invited member states to submit examples of best practices in the implementation of the 2001 UNESCO Convention, there have been thirteen initiatives that have been awarded the status in relation to underwater cultural heritage.

Three Croatian cultural heritage sites are cited as examples of best practices, with three different approaches to protection in place. The largest protective metal cage in the Adriatic Sea has been installed at the Pličina Velika shallows near Cavtat. This is the site of the wreck of a merchantman that sank with some 1,200 north African and Aegean amphorae. It now lies at a depth of 30 metres and covers an area of 240 square metres.

The Letavica site off Pag island lies at depths of from 37 to 39 metres at the transition from the rocky to sandy seabed, about 130 metres offshore. There are some four hundred visible amphorae of the Lamboglia 2 form at the site, dated to the 1st c. BCE. Most of them are covered by marine organisms and have fused into a compact unit, with only a small number of the amphorae not part of the main grouping of finds.

The Baron Gautsch was the pride of the Austrian passenger fleet, plying the Trieste to Kotor line for the Österreichischer Lloyd steamship company. It was built in Scotland's Dundee in 1908, having a length of 84.5 metres and a beam just shy of 12 metres. On 13 August 1914 it hit an underwater mine between Pula and Rovinj enroute to Trieste with passengers on board. Many died as it sank into the dark waters of the northern Adriatic. Since then, the ship has laid upright on the seabed. This position allows numerous divers to explore the beauty of this metal wreck, and it is considered one of the most attractive diving locations in the Adriatic Sea.

Promoting access to underwater cultural heritage through the exchange of best practices among the countries that have signed up to the convention is one of many examples of the implementation of the principles of international cooperation.

O14

‘GALWAY BAY IS CALLING’: A PARTICIPATORY MUSIC PROJECT AIMED AT PROMOTING OCEAN LITERACY FROM THE WEST COAST OF IRELAND

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During the 2022 EMSEA conference, we provided an introduction to the journey that Galway Atlantaquaria (GA) started in 2020 to promote ocean literacy through music. We explored how, during the lockdown due to the Covid-19 pandemic, GA challenged a non-professional musical ensemble based in Galway (Ireland) to write an original marine-themed song meant to inspire ocean awareness and action in the listeners. The enthusiastic response of the musical ensemble members led to the development of a project called ‘Amhráin na Mara’ (‘Songs of the Sea’ in Irish Gaelic). In 2022 this was further developed via a collaboration with the Claddagh National School in Galway and the Marine Institute’s Explorers Education Programme, through the co-development between the musicians and the children in the 5th class of this primary school of an additional original song which was featured at the ‘Ocean Literacy in Action at the European Ocean Days’ in March 2024.
Since then, GA has continued exploring new avenues to increase the connection of the local communities with the ocean through music. In both 2022 and 2023, GA offered their premises to several Irish musicians to showcase their ocean-inspired repertoires through live performances and music installations. Both events were part of Culture Night, or Oíche Chultúir, 'a national celebration of the richness and diversity of Culture in Ireland today aimed at connecting people to cultural activities locally and nationally' (from https://culturenight.ie/).
The fascinating journey to conjugate music and ocean literacy undertaken by GA has culminated in summer 2023 with the approval by the national Creative Ireland Programme of a project called 'Galway Bay Is Calling'. This is a creative project co-developed by GA with the classical music organisation Music for Galway and the Atlantic Technological University, and aimed at raising awareness of the impacts of climate change in Galway among the local communities. Through their attendance to a series of ocean literacy and behaviour change workshops, the choirs and musician groups involved in the project first have boosted their awareness of the ocean's influence on them, and their influence on the ocean, and then they have contributed to the development of an original music piece in collaboration with internationally acclaimed cellist Naomi Berrill to inspire the local community's climate action. This music piece will be premiered at the opening ceremony of the international festival CELLISSIMO on 18th May 2024 in Galway.

This talk will reflect on the experience of the 'Galway Bay Is Calling' project, showcasing the challenges and the achievements it has involved. Also, we will discuss the lessons learned over the years, and the plans for the future of GA to keep unlocking the power of music to bring people together across barriers of age, gender and culture in order to deliver blue education and public engagement.

O15

BRINGING THE OCEAN TO THE STAGE: PERFORMING COASTAL VALUES AND MARINE MANAGEMENT

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Recent years have witnessed a seemingly constant call for improved understanding of human-ocean relationships, resulting in a 'boom' of marine social science research. However, despite this interest in the human dimensions of the ocean, coasts and seas, qualitative and arts-based research approaches remain on the periphery of ocean research. This paper explores the role of two ocean research 'outliers', intersecting arts-based practice and marine social sciences through the lens of interconnected performances designed to explore the diverse values held by communities about their marine and coastal environment. The performance series was undertaken as part of the Diverse Marine Values project, and brought together ocean scientists, coastal and marine managers, and community members to create original performance pieces in Lerwick, Shetland, Scotland, and Portsmouth, England. The distinct but interrelated performances utilised elements of forum theatre, devised theatre, and storytelling to address marine issues important to each respective community, with a view to understanding and fostering ocean literacy.

The performance in Shetland, Ripple Effect, took place in collaboration with the Shetland Youth Theatre in April 2023, and featured the work of ten youth performers aged 12-17. The Portsmouth performance, Community Consultation, featured local marine managers and was performed in February and November 2023, and has since been included in the teaching curriculum for the Coastal and Marine Management MSc at the University of Portsmouth. In each location, the performance work illustrated ways in which theatre can serve as not only a tool for science communication, but also a research method through which human-ocean relationships can be explored. The performances helped the research team, comprised jointly of specialist theatre practitioners and experts in ocean literacy, coastal management, and plastics pollution to reshape data collection and stakeholder engagement. Collaborative theatre making with area stakeholders, marine scientists, and artists led to deeper conversations and embedded engagement within each coastal community. It also led to a fundamental reshaping of the questions and approaches that marine managers and scientist asked of the communities in question. The paper presents a discussion of the challenges of bridging these related, but often distant, disciplines, and highlights the benefits of adopting

transdisciplinary approaches to better understand, and indeed, foster ocean literacy in diverse communities.

O16

UNDERSTANDING HUMAN-OCEAN CONNECTIONS AND VALUES THROUGH THE GLOBAL OCEAN & SOCIETY SURVEY

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This discussion highlights collaborative advances in ocean literacy through the creation of the Ocean & Society Survey (OSS). This global survey focuses on standardizing methods to measure public perceptions, values, attitudes, and behavioural intentions toward the ocean. It moves beyond the foundational roots of ocean literacy as an educational tool to assess ocean knowledge to instead measure ocean literacy as a societal outcome - a citizenry that understands, values, and cares for the ocean.
The primary objective of the OSS is to inform decision-making and catalyse investments aimed at strengthening collective societal-ocean relations. By gathering public ocean perceptions, the OSS shifts the narrative, framing the deteriorating state of the ocean as a people problem, but with people-driven solutions. It endeavours to answer the pivotal question of how to manage behaviours across all sectors and scales to ensure a healthy ocean and consequently, human health, community and planetary well-being.
Co-designed by partners in the Global North and South, with lead coordination by the Canadian Ocean Literacy Coalition, the OSS aims to invite participation from as many countries and respondents as possible. Increased uptake of the tool allows for the visualization of a global baseline across diverse regions and countries, presenting a timely opportunity for shared learning to guide adaptable and impactful education, communication, and science-policy-society action strategies. OSS emphasizes the importance, as outlined in the UN Ocean Decade Vision 2030 Challenge 10 white paper, of establishing/restoring meaningful connections with the ocean to foster the motivation, capability, and opportunities required for individuals across all societal sectors to contribute to ensuring a healthy ocean. In this discussion, we will provide further context into the co-development of this tool; its traction, uptake, and impact to date, as well as ongoing ways to be involved in this important initiative. Moreover, we will look to learn from EMSEA participants of the value of this tool for diverse educational interests and intentions.

O17

INVESTIGATING OCEAN CONNECTIONS AMONG A SAMPLE OF CHILDREN AND ADULTS ATTENDING OCEAN LITERACY WORKSHOPS AND LECTURES

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Twenty years have gone since the Ocean Literacy movement resulted in the publication of The Essential Principles and Fundamental Concepts, summarising what everyone should know at the end of the education cycle (NOAA, 2021). In subsequent years, the concept of Ocean Literacy has evolved, including further dimensions. as awareness, attitudes, communication, behaviour, and activism, all aimed at the final goal of achieving a pro-environmental behaviour.
However, research in social psychology has shown that behaviour change is hard to obtain, given the influence of many factors – both internal and external – that can favour or hamper the adoption of a desired behaviour (Kollmuss & Agyeman, 2002; Stoll-Kleemann, 2019). Among these factors, emotional connections have emerged as important drivers of human choices and actions, becoming the object of environmental education research and a possible lever for educational practices (McKinley et al., 2021).
With this in mind, we carried out a survey on a sample of 146 children attending Ocean Literacy workshops in a coastal area of N-E Italy and about 120 adults (graduate students, teachers and lay people) attending lectures in different Italian locations. The survey was based on the question "what is the sea to you?", collecting children's answers on post-it notes and adults' answers though online Mentimeter surveys. Children's data were processed through inductive content analysis (Bengtsson, 2016), performed by three coders who independently analysed children's answers. Adults' data, visualised through word-clouds, were qualitatively assessed. The most frequent categories in children's texts concerned emotions, especially positive ones, and knowledge, with descriptive remarks on marine environment. Leisure activities, ranked third in frequency, followed by memories and statements on the sea as a source of life. Finally, a few answers concerned the need to preserve the marine environment and the problem of marine litter. Adults' answers, given the used tool, did not allow a quantification, but resulted in different numbers of words/word-combinations, ranging from 17 to 28 per lecture session.
Among the entered terms, "life" stands out as the most used one, followed by different words referring to emotions, representing most answers. Graduate students also used terms related to the environment and sometimes to economic and professional aspects of the sea. Leisure activities and memories were seldom mentioned by these respondents. Despite the use of very basic instruments, both children's and adults' answers evidenced a large proportion of comments related to emotional connections. Children, also, expressed a range of comments revealing some knowledge of the marine

environment. The frequent use of “life” and “source of life” in both groups indicates an awareness of the importance of the sea in people's lives. Finally, we can deduce that the proximity to the coast and its frequentation by children, as well as the type of education of graduate students (blue economy or natural sciences), favoured the development of evident emotional connections grounded on first-hand experience.

These aspects represent a privileged opportunity for the studied sample, and are not granted to most people, who possibly have fewer opportunities to develop such connections.

O18

UNDERWATER VIRTUAL REALITY FOR AWE, OCEAN CONNECTEDNESS, AND PRO-ENVIRONMENTAL BEHAVIOR

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Underwater Virtual Reality (UVR) constitutes the next frontier in immersive technology for exploring the ocean. Virtual reality (VR) is considered a highly immersive technology because of its ability to visually immerse the user in a virtual world. UVR offers even further enhanced experiences by enabling double immersion. This means being visually immersed in a 360-degree video of a dive in a VR headset while being physically immersed in water. Early exploratory findings suggested that UVR can trigger high levels of presence and powerful emotions and affective states such as awe and empathy. However, due to the technology's novelty, limited research has been conducted to date on the impact of UVR on ocean-related psychological and educational outcomes, including ocean literacy and marine education. The present study is thus one of the first to quantitatively investigate the impact of UVR on pro-environmental affective and behavioural responses. A total of 214 Swedish university students watched two 5-minute long, animated 360-degree videos depicting virtual dives and encounters with charismatic megafauna. Participants were randomly assigned to one of three conditions that varied from least to most in immersion level: In the PC condition, participants watched the videos on a laptop computer screen; in the VR condition, participants watched the videos using a conventional VR system while standing on the ground; in the UVR condition, participants were floating in water while watching the videos through a waterproof VR headset and breathing through a snorkel. For each participant, we measured their level of presence, experience of cybersickness, and level of awe response along with ocean- and nature connectedness. We also measured their intention to act in a pro-environmental way and their actual, real-life pro-environmental behaviour through a veiled measure asking them how much of their financial compensation they were willing to donate to a marine conservation organization. The results will be presented and discussed in relation to the role that UVR could play in the future in marine environmental education.

O19

HIRAETH YN Y MOR - EQUITABLY GROWING COMMUNITY-SCALE OCEAN LITERACY FOR MARINE MANAGEMENT, HEALTH & WELL-BEING IN NORTH EAST WALES (UK)

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Ocean Literacy is increasingly recognized as a growing global movement (EMSEA, 2021) that seeks to contextualize the different value systems people hold when connecting with the marine environment. It continues to emerge as an area of prioritization for decision-makers, evidenced by the Welsh Government's current development of a national Ocean Literacy Strategy, and the UK's investment in conducting national ocean literacy assessments (Ocean Conservation Trust, 2022). Despite its growing popularity, the relationship between people and sea – particularly at a community-scale, amongst groups who have historically been under-represented in ocean literacy discourse – is still very poorly understood globally (McKinley, Burdon & Shellock, 2023). Little work has been conducted to explore equitable growth in community-scale ocean literacy as a tool in aiding sustainable management of our MPA network and broader policy decision-making. Hiraeth Yn Y Môr, a North-East Wales-based project funded by the National Lottery Heritage Fund on behalf of Welsh Government, seeks to trial novel transdisciplinary approaches in equitably growing ocean literacy as a means to support the sustainable management of Liverpool Bay SPA and improve community-scale health & well-being. The project deploys an array of social science techniques and community-led approaches in exploring how diverse community groups value their marine environment and might develop marine citizenship at a local scale. This talk (and poster) will provide an overview of the project's approaches, learning to-date, and key practical recommendations that are designed to aid future inclusive and equitable ocean literacy research and work.

O20

ENGAGING TOURISTS IN OCEAN LITERACY THROUGH TWO DIFFERENT FORMS OF ECOTOURISM PROGRAMMES

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Engaging with environmental conservation is often a personal choice, which is triggered by an emotional connection or experience. Changing the ocean narrative (Lubchenko & Gaines, 2019) requires individuals to recognize the importance of the oceans at a personal level. Marine ecotourism programs have an opportunity to create that emotional bond with participants. Within this study we tried to explore how marine tourism, as a primary interface between people and the marine environment, could be used to contribute to ocean literacy.

We define two different types of marine eco-tourists. Watchers, involved in a passive three-hour dolphin-watching tour, and doers actively involved in a 10-day residential participative ecotourism course. Through post-visit questionnaires of 206 watchers and 71 doers, we examine the motivation for participants to join these projects, their environmental attitudes and pro-environmental behaviour intentions. Considering the importance of engaging in ocean literacy over the long-term, we explored their interest to further engage in dolphin conservation. Our results show that, although watchers and doers joined with slightly different motivations, there was no major difference between their pro-environmental attitudes and behaviours. While watchers were more motivated to adopt new pro-environmental behaviours immediately after the tour, doers had a higher initial ceiling baseline of environmental knowledge that was already being practiced. In order to help watchers turn their pro-environmental behaviour intentions into action, we suggest means to prolong their motivational 'high' that appeared right after the ecotourism experience.

While long-term physical re-engagement is often not an option, due to cost or time, ocean literacy programs should focus on short-term engagement followed by concerted efforts to build an on-line community. Virtual engagement requires operators to invest time and resources to help participants turn their intentions into environmental actions. Virtual steps should be simple, relevant and encourage re-engagement and re-connection with the natural environment. Considering the current urgency to change the ocean narrative, conservation organisations should focus on engaging more people more broadly and then make re-engagement easier. Bearing in mind that most participants find longer term 'in person' engagement too time consuming and too expensive, ocean literacy campaigns should focus on shorter term 'in person' engagement with concerted efforts to reengage and motivate through virtual means.

O21

THALASSOPHILE PROJECT: MAKING MARINE SCIENCE AND OCEAN LITERACY UNIVERSALLY ACCESSIBLE

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The Thalassophile Project is an EU-funded initiative, dedicated to universal accessibility in marine science and ocean literacy, with a focus on the d/Deaf and visually impaired communities. By emphasizing accessibility, and by illustrating how theory is put into practice, the project brings together a network of cross-sector practitioners, combining marine research, education, and universal accessibility expertise to form the Thalassophile Project Partnership. This multidisciplinary approach fosters global awareness for marine sustainability put forward in the Sustainable Development Goals targets.

Equally, the Thalassophile Project aims to raise awareness within adult education institutions of the significant number of citizens unable to gain access to information, and a corresponding lack of experience and competence in adult educators in producing barrier-free 'Blue Education' resources. The project's practical initiatives address this gap in educational activities by intertwining SDGs 4, 13 and 14 and aligning with international frameworks such as ESD 2030 and UNESCO guidelines. Activities include introductory 'episodes' as educational tools, an online resource database, and user-friendly factsheets for specific audiences. The theoretical Common Accessibility Framework forms a baseline to all activities, rooted in Universal Design for Learning. The aim of these first pilot activities is to show how more equitable access for adult learners to high-quality ocean science information and ocean 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.

O22

OCEAN FOR ALL - BREAKING BARRIERS TO ACCESS AND BRINGING THE OCEAN INLAND

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[1]*Ocean Conservation Trust, UK*

The Ocean and wellbeing are intertwined deeply with each other, with exposure to blue spaces proven to have a host of benefits to people's mental wellbeing. However, there are many barriers that prevent people from accessing these benefits. The Ocean Conservation Trust's (OCT) Blue Mind Hub includes all of our accessibility, wellbeing and community-based activities, with a focus on the link using blue spaces to promote positive mental wellbeing. One of these activities is the Ocean for All programme, which uses virtual reality to bring the Ocean inland, and allow people to connect with it without getting wet. Working with care homes, community groups and hospitals, the OCT has been able to connect thousands of people with the animals inside the National Marine Aquarium, as well as the newly designated National Marine Park in Plymouth Sound, allowing them to explore habitats that they might never have the chance to see normally.

In this project, Blue Mind concept and Blue Health approach is used to encourage empathy and a recognition of an individual's role in the health of the Ocean and the role of the Ocean in their health, and improve their own wellbeing through the participation in blue-linked activities. Individuals from across Plymouth were prescribed through social prescribing organisations that work with GP surgeries to offer interventions for mental health, improving people's long-term health and reducing pressure on local care services. Through this programme, the OCT have taken people who are prescribed onto a series of Ocean based activities, from snorkelling, coastal walking and boat trips, to improve their wellbeing. These sessions are free to participants, with travel bursaries being offered to all to break barriers that may prevent people from coming.

Both of these activities have shown a marked improvement in people's Ocean Literacy through our evaluation methods. We use simple forms that measure against the OCT's generic learning outcomes and UCL's wellbeing measures toolkit, where users are asked after their experience during most of our activities. The only exception to this is our Blue Mind Hub activities, where users are asked to fill in evaluation before and after the 8 weeks, and then also after each activity within the 8 weeks. Using weighted averages, our Ocean literacy linked generic learning outcome responses show 4.44/5 (or above) in agreement to statements including 'I understand that the Ocean and its creatures are important for our planet'. Longer term, the OCT will continue its commitment and investment to explore blue wellbeing and contribute to raising public awareness even further to the massive benefits of these blue spaces, ensuring that the barriers that prevent people from accessing these spaces are broken down to create an inclusive space for everyone.

O23

PROMOTING RELATIONSHIP WITH THE OCEAN THROUGH AN IMMERSIVE WHALE EXPERIENCE

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This presentation will address how two science educators at a south-eastern university and an aquarium educator promoted ocean literacy principles and created awareness of the U.N. Ocean Decade through the creation of an immersive undergraduate course. The course, including its 7-day field experience in Baja California Sur, Mexico, focused on Ocean Decade Challenge #10, changing humanity's relationship with the ocean. The purpose of the course was to examine impacts of climate change from a local to a global perspective through the study of whiles and their migratory patterns. Climate change is a nuanced global issue with a scope that is often difficult to fully comprehend. Focusing on systems science issues using climate science and the Ocean Literacy Principles, students investigated the challenges facing our North Carolina marine ecosystems in comparison to the marine ecosystems of Baja, Mexico. Between the months of November and April, right whales visit our NC coast on their migratory journey to Georgia and Florida where they mate, calve, and spend the winter. This same phenomenon occurs with Gray whales as they migrate in the Pacific Ocean to the protected lagoons of Baja, Mexico. Using whales as a focus, students met for weekly seminars exploring contentious environmental issues facing marine mammals in both areas. Students heard from various stakeholders who provided multiple perspectives on the complex issue of human impacts to both marine ecosystems. Students engaged with research scientists, naturalists, aquarium educators, researchers, and local community members from NC and Baja. This presentation will outline the background for creating this course, the framework, student learning objectives, and course assignments. We will share how we researched the impact of the course on students' understanding of the migratory patterns of these whales and current advocacy projects aimed at protecting each species, as well as students' knowledge of ocean literacy, and their sense of connectedness and agency related to the ocean. We will explain our exploratory mixed methods approach with measures to answer three research questions. The first research question addressed students' understanding and knowledge of ocean literacy. The second question addressed students' understanding of whale migration and advocacy efforts humans have created to assist with these migration journeys. For our final question, we assessed the overall impact of the course on students' personal connectedness to nature and to the ocean. We will share results and discuss findings of our research, reflections on the course and how we plan to revise it in the future., Finally, we will provide suggestions for how others can adopt our framework for systems science issues that may be impacting other areas.

O24

THE GLOBAL MARINE CURRICULUM - DECOLONISING AND DEANTHROPOCENTRALISING MARINE EDUCATION

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Education is key to change humanity's relationship with the ocean. However, with less than 4,000 Academic Marine Education Programmes (AMEPs) worldwide, the ocean is still a niche discipline in academic education. Furthermore, access to marine education is unevenly distributed around the globe, with the majority of AMEPs situated and conceptualised in the Global North. Accessibility to marine education in the Global South, as well as an understanding beyond the Western perspective on the ocean are needed to change humanity's relationship with the ocean. Indigenous marine knowledge opens new paradigms of deep ocean knowledge, however, it is rarely recognised by or included in AMEPs.

An approach in marine education increasingly gaining global recognition is ocean literacy, aiming to enhance the learner's understanding about their impact on the ocean and the oceans' impact on them, and providing a first step towards a more holistic approach of marine education. Nevertheless, ocean literacy is only part of a fragment of AMEP curricula. Moreover, it is anthropocentric, describing marine inhabitants as "marine resources" and perpetuating a utility value of the ocean for humanity. The instrumentalising mind-set of humanity for the natural environment is a main reason for exploitative and damaging practices and therefore needs to be addressed in marine education.

A comprehensive overview on the status quo of AMEPs is necessary in the first place to incorporate the previously mentioned aspects. Only with a solid understanding of the distribution and abundance of different academic marine disciplines and their subject-specific perspective on the ocean, a targeted approach to decolonise and deanthropocentralise the marine curriculum is achievable to tackle challenge 10 of the ocean decade to change humanity's relationship with the ocean.

The research project described in this chapter therefore aims to map the worldwide distribution of AMEPs and their disciplines and subject-specific understanding of the ocean. Furthermore, it aims to investigate implications for different marine education disciplines and geographic regions to critically develop ocean literacy beyond the Western and anthropocentric paradigm.

In a first step, AMEPs are mapped globally using the vast database of marinetraining.eu; other online search platforms for study programmes; and accessing the swarm intelligence of international marine education networks, in order to circumvent the western bias prevalent in online search platforms. Surveys sent to the AMEP course coordinators provide a deeper insight into the AMEP's foci and ocean paradigm. The

survey data are complemented with the AMEP's online presence and curricula if freely accessible or made available.
Depending on the results and patterns of this global marine curriculum map, implications for a targeted incorporation of indigenous knowledge and ocean literacy are drawn to enhance marine education globally and develop the curricula we need for the ocean we want.

O25

SOMERSET SCHOOL COASTAL CHAMPIONS AWARD: AN INITIATIVE TO ENGAGE YOUNG PEOPLE WITH THEIR LOCAL MARINE AND COASTAL ENVIRONMENTS

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The county of Somerset in Southwest England has 74 kilometres of diverse coastline bordering the Bristol Channel consisting of habitats from rocky shores and salt marshes to sandy beaches and mud flats. Despite this the muddy waters of the Channel and the inaccessibility of some of the shores, compared with the bluer seas of neighbouring counties, means often local people do not really explore or understand their nearby beaches. This is especially true for young people from some of the disadvantaged small coastal towns in Somerset. The Somerset School Coastal Champions Award has been running for four years in a partnership between Somerset Wildlife Trust, Litter Free Coast & Sea Somerset and Carymoor Environmental Trust and has been taken up by coastal primary schools who have been working through the award to gain three levels of competency to demonstrate increased ocean literacy. The award is designed to give ownership to the schools and young people and encourages them to share their outcomes throughout the school and wider communities. An individual version of the award is now being developed aimed at keen students and youth club members. The Wildlife Trust has also just been selected to be the local lead on a national project called Blue Influencers which targets 10–14-year-olds to develop their own 'blue' (coastal, marine and aquatic) projects. The Trust has also been working with a local youth dance and drama group to come up with innovative ways of expressing their concerns about the environment and how they can share this with their wider community – including running a 'pop up' shop spreading the message about reducing the use of single use plastic.

Through these coastal projects and engagement activities, the Wildlife Trust and their partners are helping to raise general awareness so local people can better protect and campaign for their coast and seas.

O26

LET'S SCALE UP THE BLUE GENERATION!

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[2]Oceanário de Lisboa, Portugal

Education is one of the key drivers needed to restore society's relationship with the ocean. In this regard, the inclusion of ocean literacy in curriculum frameworks is key to develop cross-cutting competencies and values of ocean literate citizens - that are physically and emotionally connected to the ocean, that care, respect, and value the ocean and that are active in its protection.
This need is acknowledged in the targets established by the EU in its Mission Oceans and Waters and by the United Nations (e.g., UNESCO circular letter 2951), that recommend member states to incorporate marine education into national curriculum frameworks, and to provide teachers with training, professional development certification, and quality educational resources.
The pilot-program "Educating a Blue Generation" is a curricular program developed by Oceano Azul Foundation and Oceanário de Lisboa, in collaboration with the Portuguese Ministry of Education, that paves the way to including the ocean in the curriculum of the first cycle of the Portuguese basic education.
With a holistic approach to our relationship with the ocean, this program helps primary level teachers overcoming the barriers to teach about the ocean, through a very structured certified training program and educational resources guiding the inclusion of these topics into the curricula, in all subjects, along the first 4 years of the basic compulsory education. Moreover, the program also includes a collection of children's books and incentivizes a whole-school approach, with the mobilization of students for action in and with their communities.
Since 2018, the pilot included the training of more than 1.300 teachers in eight mainland municipalities and in the Azores region and is currently being implemented in more than 270 Portuguese primary schools, reaching over 20.000 students.
The results of a 4-year longitudinal impact assessment reveal the adequacy of the contents and tools to teach the first cycle curriculum and that students increase their knowledge and positive attitudes in relation to the ocean.
Given the success of this pilot-program, a working group led by the Portuguese Ministry of Education produced a set of recommendations on how to scale up the pilot-program to all the Portuguese primary schools and to formally include the ocean across curricula.
After the pilot phase and the improvements made, the program is ready to be scaled up to all the Portuguese schools, and to be replicated in other geographies.

O27

TOWARDS THE SUPPORT OF OTHERS WITH KNOWLEDGE AND SCIENCE SKILLS USING A MARINE SCIENCE CONTEXT

Mtontsi T.[1]

[1]*NRF-SAEON Science Engagement, Cape Town, South Africa*

South Africa, uniquely situated at the southern tip of the African continent and surrounded by three ocean basins, offers a distinctive platform for marine science education and research. The region's rich marine biodiversity, characterized by significant endemism, along with its diverse terrestrial biomes, positions South Africa as a natural laboratory for scientific inquiry and education.

Ocean observations play a crucial role in understanding climate change, with sea surface temperature variations serving as key indicators of broader environmental impacts. Through the use of advanced oceanographic tools like Argo Floats, mini-boat projects, and science camps, we have significantly enhanced ocean literacy among diverse groups, including students, educators, and community members from both coastal and inland areas.

Our educational initiatives, such as ocean science camps and workshops, provide hands-on experiences in data collection, analysis, and visualization using programming languages like Python. For instance, in one project, learners designed, assembled, and launched a self-manned mini-boat to monitor surface temperatures in the Atlantic Ocean, fostering practical understanding and engagement with marine science.

These programs not only support formal education but also disseminate cutting-edge scientific knowledge and develop 21st-century skills among young minds. By sharing best practices and successes from these initiatives, this presentation aims to contribute valuable insights into ocean literacy and education, showcasing how South Africa's unique geographic and ecological context can be leveraged to foster a scientifically informed and engaged society.

This presentation will be particularly relevant for the Ocean Literacy and Education category, emphasizing the importance of innovative educational strategies in promoting ocean literacy among various end-users.

O28

EMPOWERING EDUCATORS: PROMOTING OCEAN LITERACY THROUGH BLUE SCHOOLS

Ransom, C.[1]

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The Blue Schools programme in South Africa aims to increase ocean awareness and literacy to ensure that ocean knowledge is translated into action for sustainable oceans. Launched in 2021, the programme integrates ocean learning into the curriculum through an interdisciplinary, inquiry-based and project-based approach to teaching and learning. The South African Blue Schools aspires to get the learners to think about their connections to the ocean, to increase their ocean literacy and to encourage their curiosity and problem-solving skills in designing a research project.

Educator workshops are a significant component of the current Blue Schools Programme in South Africa. These workshops focus on equipping educators with the necessary knowledge and skills to inspire their learners in ocean-related research and discussions, even if they don't live along the coast. During the workshop, educators discuss their ocean connections (related to ocean literacy principles), how to develop research questions and explore data collection methods using citizen science tools. These tools can enable students to understand the broader impacts of their local environments on ocean health, fostering critical thinking and scientific literacy.

By promoting research projects, the Blue Schools programme empowers students to actively participate in scientific inquiry, enhancing their data and critical thinking skills. The programme not only advances ocean literacy within the natural sciences but it also integrates social science perspectives from geography, history, economics, and law, providing a comprehensive understanding of the ocean's impact and connections to society.

The impact of the Blue Schools programme extends beyond the classroom. Students have opportunities to attend the annual Blue Schools conference, where they can experience the ocean first hand and connect with peers from across the country. The programme also opens doors to scholarships and travel. Such experiences underscore the programme's role in inspiring future scientists and ocean advocates.

The Blue Schools programme highlights the importance of interdisciplinary education and the role of educators in cultivating ocean-literate and environmentally conscious citizens. As this programme continues to expand, it promises to inspire curiosity, problem-solving, and stewardship for marine environments across South Africa and beyond.

O29

INCREASING MARINE ENVIRONMENTAL AWARENESS THROUGH THE CREATIVE ARTS

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Coastal and marine environments in the Mediterranean are under constant pressure from various sources, which are interacting together and affecting biodiversity. In Cyprus, the most significant pressures on the marine and coastal environments result from unsustainable coastal development, pollution, overfishing and increasing presence of invasive alien species. Unfortunately, at present, public knowledge and awareness about the marine environment of Cyprus and the threats it is facing is very limited.
Environmental education and awareness are known to be the main drivers of public positive perception and attitude toward supporting environmental conservation. Investing in more intense and systematic research in the field of the marine environment of Cyprus and subsequently communicating the knowledge to the public, and especially children and professionals with jobs that involve interaction with children, is particularly important in order to ensure the long-term effectiveness of nature conservation and management efforts. Even though schools and other institutions offering non-formal education in Cyprus are trying hard to teach children and the wider school community how to connect to our natural world, there is still an urgent need to develop and implement new curricula on environmental education and conservation. Enalia Physis Environmental Research Center has been collaborating with a team of inspiring educators and professionals with artistic backgrounds such as storytellers, musicians, visual artists and dancers who specialise in delivering workshops and storytelling shows with live music to children (as well as dedicated teacher training sessions), to private and public schools, environmental centres, museums and galleries, cantered on crucial marine and coastal matters relating to the Mediterranean Sea (bycatch of marine vulnerable species, marine litter, the poor management of *Posidonia oceanica* seagrass, the threats of the Mediterranean monk seal *Monachus monachus*, to mention a few).
The aim of this collective is to raise awareness regarding these matters to as many young children and educators as possible, by actively engaging the participants and captivating their imagination and skills through music, the visual arts, dance, drama and storytelling. The team provides a platform for emotional expression while fostering simultaneously environmental stewardship in young learners and their teachers, developing a sense of gratitude and of responsibility in relation to the care of the Earth and to the care of people on the Earth.
Essentially by increasing the contact of our children and adults with Cyprus' (and the wider Mediterranean world's) current marine challenges, leads them to a deeper understanding of how the marine life is essential, how to better comprehend the importance of protecting this planet on which we live and finally, how the ocean and

humans are, essentially, inextricably interconnected. The project is being funded by the Cyprus Environment Foundation since 2022, it has received an official approval by the Ministry of Education, Sport and Youth of Cyprus and it is also part of the EU Mission "Restore Our Ocean and Waters by 2030".
Our educational team apart from presenting their work would be happy to facilitate workshop/s and teacher training session/s in order to share practical ideas with colleagues during the conference.

O30

OCEANOGRAPHERS ON THE ISLAND - BRINGING OCEAN EDUCATION TO CROATIAN ISLANDS AND BEYOND

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The “Oceanographers on the Island” is an initiative that arose from the idea of bringing ocean science closer to children, teenagers, and adults. We engage with young audiences through themed workshops, ocean-themed games, and quizzes. In our workshops, children explore ocean processes through discussion, hands-on experiments, and creative expression. Topics include sea level rise, flooding, beach erosion, the impact of physical processes on marine life, etc. We encourage independent thinking, creativity, and teamwork by guiding participants of our workshops through the process of finding answers to specific questions themselves rather than providing ready-made solutions.

For adults, we host talks in the relaxed atmosphere of cafés, followed by lively discussions, and organize pub quizzes about the sea. We engage all audiences on climate change and ecological issues, encouraging them to imagine possible worlds of tomorrow and consider ”What can you do to make a difference?”

Originally, the initiative focused on the Croatian islands (hence the name!), which are usually neglected in terms of STEAM activities. Today, the “Oceanographers on the Island” is a recognized brand when it comes to ocean science communication in Croatia, both on islands and the mainland. Our reach extends even beyond Croatia; we were recently selected to present our initiative at the ERC-funded “Science is Wonderful!” Science Fair in Brussels. Over the past three years, we have visited more than 20 locations and carried out more than 40 activities engaging 500-1000 participants of all ages. In this talk, we will share our journey, activities, and further plans.

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P01

BLUE WORLD - EDUCATION FOR THE FUTURE

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As part of the Blue world project dedicated to Ocean Literacy, various activities were organized with the aim of educating the young generation about the importance of ocean conservation. Key activities included workshops on the seashore, where students had the opportunity to learn about different types of seashore and the biodiversity specific to each of them.

The interdisciplinary approach allowed students to apply their knowledge from different school subjects in real conditions. In the field, the students determined the type of coast, researched and determined the species they found in the predominantly intertidal area, which further deepened their understanding of the ecosystem and the interrelationship of organisms.

Special attention is paid to the negative anthropogenic impact on the seacoast and the seabed. Through educational activities, students became aware of how human activities, such as concreting the coast, are harmful to marine ecosystems. This knowledge encouraged them to reflect on the importance of sustainable behaviour and environmental protection.

One of the significant activities was the artificial insemination of the sea urchin, which allowed the students to observe first-hand the reproduction process and the early developmental stages of marine organisms. In this way, they also became familiar with the work of marine scientists who work on marine conservation. Observing plankton under a microscope allowed them to better understand the importance of these microscopic organisms in the marine ecosystem. Active participation in field research and practical activities helped them develop new skills and acquire new knowledge in an interactive and dynamic way.

In conclusion, this project highlighted the key role of youth education in ocean conservation. Students gained a deeper understanding of the importance of marine ecosystems and developed an awareness of the need to preserve them. Through interdisciplinary and practical activities, the project successfully stimulated students' interest in science and the environment, which is a key step towards a sustainable future.

02

THE ROLE OF AQUARIUMS IN CHILDREN'S EDUCATION

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Zoos and aquariums globally attract millions of visitors annually, including a significant number of children. These facilities serve as crucial intersections between live animals, scientific knowledge, and people of all age groups.
Conservation and educational programs offered by zoos and aquariums hold promise in mitigating biodiversity loss. While their societal impact is still evolving, these initiatives encompass various activities like expert-led tours, informative displays, and interactive technologies. In the past, information at these establishments mainly focused on basic animal facts, but it now includes details about species' challenges and ways for human intervention.
Recognizing the educational value is essential for justifying the role of educational institutions advocating for environmental conservation and animal welfare. Engaging the public in scientific endeavours is increasingly vital, positioning zoos and aquariums as key players in conservation education. Educating individuals, especially children and youth, on nature preservation and conservation is critical for sustained impact and safeguarding diverse species. While existing research has explored the impact of zoos and aquariums on conservation education, there is a gap in understanding the specific educational role these facilities play for children.
This study aims to focus on children's experiences at aquariums, aiming to assess how these visits influence their education and interest in biology and conservation. The survey was conducted with fourth-grade pupils from primary schools throughout Croatia who visited the freshwater aquarium (*Aquatika - Karlovac Freshwater Aquarium*) as part of field lessons and excursions.

P03

THE "ESCOLES BLAVES" PROJECT: THE FIRST EXPERIENCE OF BLUE SCHOOLS IN SPAIN

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The "Escoles Blaves" (Blue Schools in Catalan) project was an educational project developed in 2017 in the Terres de l'Ebre region, a rural area in southern Catalonia, Spain. The aim was to bring marine research and sea life closer to schoolchildren from 8 high schools as a pilot case. We placed a special emphasis on introducing marine sciences into schools, bringing information and examples of recent marine research to pupils who have little access to science education events as they live in areas far away from large cities or important research centres. This was the first experience of Blue Schools in Catalonia, and in Spain too.

The project had 3 pillars: teacher training during 5 sessions, direct advising in schools, and the creation of a suitcase of the sea. At the end of this project, the participating high schools were awarded the Catalan Blue School label at a time when the Network of European Blue Schools did not yet exist.

The project started with a teacher training where the lecturers were researchers from different marine science disciplines (biology, chemistry, fisheries, physical oceanography, marine robotics, citizen science, etc.), both from research centres and universities. This training included theoretical sessions and practical sessions (also a snorkelling session in l'Ametlla de Mar, a beach closer to them). Once the teachers were trained, one week a month each school had at their disposal what we call 'the marine science advisor', who was a marine biologist or oceanographer who accompanied the teaching staff and generated content on marine issues on demand.

From all the activities carried out in the schools, we detected which materials could be the most useful to deal with the different didactic contents prepared and which were of interest to them. With this list, we created what would be the Blue Suitcase, or suitcase of the sea, a basic kit of useful materials and instruments for their practices, such as a plankton net, two oceanography experiment buckets, an aquarium assembly kit, a collection of molluscs from the area (specific wooden boxes were designed to classify them), zip bags for sampling, a collection of marine remains from the area, a teachers' guide, and a pen drive with all the teaching units and didactic resources generated from the project.

The project was granted by the Spanish government's Foundation for Science and Technology (FECYT) and supported by the Catalan government's Department of Education, so teachers received an official certificate of attendance, which was part of the success of the project. When the grant funding ended, the project did not continue, but the most motivated schools continued with the activities.

P04

DO INHABITANTS OF THE REMOTE AREAS NEED MARINE EDUCATION?

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Do we really need marine education in remote places far from the sea? What are the tasks for marine educators in outlying villages and small towns far away from the coastline? It goes without saying that the Ocean Literacy Principles must be spread all over the world no matter what distance separates inhabitants from the seashore as the state of the environment calls for urgent action. There is important work to do to raise public awareness, especially for marine and science educators. It is their mission to teach that everyone has a significant influence on the Ocean as well as that our daily actions can make a big difference!

The NMFRI Gdynia Aquarium Education Centre is a team of specialists i.e., marine biologists, chemists, geologists, who give lectures, conduct workshops and organize educational events for the visitors. Their main goal is to export knowledge of the sea. Therefore, wanting to reach a greater number of young recipients, the educators decided to organise the environmental science workshops in unusual and surprising place like the landfill which is located about 100 km (~ 62 miles) from the coastline of the Baltic Sea.

The workshops, entitled “Be at one with Segregation”, were executed by the NMFRI Gdynia Aquarium in December 2023. Almost 800 schoolchildren took part in it. The pupils came to the landfill by school buses. Firstly, every group of young participants had classes with marine educators where they got to know how huge responsibility lay on us due to appropriate waste segregation in our homes. The children were also taught how important every decision is, even the one made on the spur of the moment like whether to use plastic bags or to buy food wrapped in foil. What is more, the youngsters used the microscopes to observe beach-sand mixed with tiny pieces of micro-plastic. The main point of the meeting was to educate that producing less waste and segregating them correctly can decrease its amount in the Ocean.

Secondly, the groups were given a guided tour through the different areas of the landfill to observe: conveyor belts, filled garbage layers, pipes, lifts and sectors for different fraction of wastes. The participants had a unique opportunity to learn about the Life Cycle of Wastes and our day-to-day actions that have tremendous influence on local waste management.

P05

FIRST STEPS TO COUNTERING “OCEAN BLINDNESS” IN AN ALPINE REGION: LESSONS LEARNED FROM OCEAN LITERACY ACTIVITIES ACROSS A WIDE AGE GROUP

Borrione I.[1]

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Environmental education (from child-care to high-school) is mostly focused on teaching aspects that characterize the local natural environment so that less attention is given to other environments. As an example, those residing in a non-coastal region will be less exposed to marine-related knowledge, with a smaller opportunity to learn about processes that regulate the ocean, and how or why day-to-day actions affect its health and sustainability. Acknowledging such “ocean-blindness” has led to the organization of a variety of pilot education and outreach activities that have been carried out in the schools of the province of Biella, a small-sized city located in the foothill of the Italian Alps, 300m above sea-level, and about 200 km away from the nearest coast. These projects involved pupils enrolled in child care (ages 1-3), kindergarten (ages 3 to 5 years), elementary (ages 6 to 10) and high-school (ages 14-18) and were aimed at teaching basic marine science concepts achieved in more than 10 years of experiences as an oceanographer. This contribution presents the results and lessons learned from three years of activities, with the aim of providing successful examples of what can be carried out in similar contexts, so that ocean literacy may be easily extended in areas considered to be far from the ocean's influence.

P06

EXPLORING TEACHERS EXPERIENCE OF OCEAN LITERACY PROFESSIONAL DEVELOPMENT WORKSHOPS IN IRELAND

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[1]Galway Atlantaquaria, Ireland
[2]Camden Education Trust, Ireland

Marine Science educators are moving to evaluate professional development programs to ensure that teachers are equipped with relevant content knowledge for students to achieve their learning outcomes (Brill et al. 2019; Nation and Feldman 2021). The Marine Institute Explorers Education Programme™ in Ireland has been running Teacher CPD for over 15 years. In 2023 and 2024, four weeklong summer courses, plus an online course based on 5 modules was held for in-service primary school teachers between July and August. This paper reports on results from participants who completed a mixed-methods online survey and knowledge questionnaire pre and post engagement. Results indicate that teachers were: (1) satisfied with the content; (2) gained ocean literacy content knowledge; (3) gained awareness of ocean literacy concepts; and (4) were motivated to implement the content. Teachers also (5) gained a deeper understanding of ocean threats, and (6) enjoyed the interactive workshop design. A comparison of face to face and online methods will be presented along with teacher feedback on how content is related to the formal curriculum and learning objectives.
For an indoor workshop a selection of methodologies can be showcased relating to how marine content is integrated into STEAM subjects.

P07

NATIONAL OCEAN LITERACY NETWORKS; CREATING AND PROMOTING INCLUSIVE OCEAN LITERACY FOR SOCIETY, LESSONS LEARNT FOR THE ISLAND OF IRELAND

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[1]Galway Atlantaquaria, Ireland

Since its establishment in 2016, the Irish Ocean Literacy Network (IOLN) has brought together like-minded individuals and organisations who passionately believe in the importance of the seas and oceans to the island of Ireland and its citizens. The aim of the network is to try to improve coordination, collaboration, and capacity building of the island's "Ocean Citizens" to help achieve a common vision – an Ocean Literate Society across the Island of Ireland. The network consists of a broad and diverse range of members including NGOs, public bodies, research and academia, education, private enterprises, and individuals from the public residing throughout the island of Ireland. However, its informal structure from 2016-2023 created a substantial barrier to being inclusive to all, as the network struggled to find the funds needed to meet its aims, vision, and mission. A high dependency on small-scale funding and voluntary in-kind contributions from its members also resulted in the network losing momentum as it struggled to maintain core tasks and deliverables. The lack of formal structure also resulted in the network not qualifying for funding applications. In 2022, the secretariat, Galway Atlantaquaria Ltd, received funding on behalf of the network through the Prep4Blue Project, Preparing the Research & Innovation Core for Mission Ocean, Seas & Waters. Funded by the European Union's Horizon Europe program, PREP4BLUE is a €4.9 million, three-year project that is setting the foundations for co-creating and co-implementing the research and innovation required to achieve Mission Restore our Ocean and Waters by 2030. This funding has resulted in the network becoming a formal Company Limited by Guarantee (a very common type of company for a social enterprise in Ireland) in 2023, creating a more formal structure and governance framework, led by a Board of Directors. In the same year, the development of a new strategy (2024-2030), a series of regional members meetings, and an annual members meeting have all helped reinvigorate the network. In this presentation we outline the journey the network has taken since 2016, the barriers it has faced and the lessons it has learned along the way. We will also explore our vision of an inclusive network for the future, through the implementation of an all-island advisory panel, ocean ambassadors and themed working groups embracing diverse perspectives, voices, and experiences from across the Island of Ireland.

P08

PROPOSALS FOR USING AI TO CONSERVE THE SEA BY SECONDARY SCHOOL STUDENTS

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By exposing students to marine science and conservation efforts, we can spark their interest in developing solutions for a healthier ocean and provide them with a foundation for developing green competencies. With that goal, as part of the Science Festival 2024, we organised two workshops with vocational secondary school students enrolled in the four-year program Computer Technician. We wanted to engage students in marine protection activity that could resonate with their interests. Therefore, we chose the theme “How Artificial intelligence can help us to conserve the sea?” Workshops started with a discussion about the importance of a healthy ocean for a healthy planet and society followed by an invitation to come up with ways to use AI to improve our understanding of the oceans and facilitate more effective marine conservation efforts. Key takeaways from the conversation and several proposals given by students will be presented.

P09

WHALE2SEA ACADEMY - INSPIRE, EDUCATE, AND EMPOWER THE NEXT GENERATION

Dias L., Bril M., Johnsen L., Gebser R.[1]

[1]*Whale2Sea, Norway*

For over two decades, Andenes, in North Norway, has been synonymous with majestic whales and unforgettable whale-watching experiences. Two pioneering whale-watching companies, Whale2Sea and Whalesafari, have played instrumental roles in establishing Andenes as a world-renowned destination for witnessing these impressive marine giants in their natural habitat. With a shared commitment to responsible tourism and marine conservation, these companies have embarked on a new journey - the Whale2Sea Academy. This visionary initiative seeks to inspire, educate, and empower the next generation of whale watching guides, enthusiasts, and conscientious tourists. In this detailed exploration and presentation, we look closely into the importance, goals, values, and vision of Whale2Sea Academy, designing a course towards a sustainable and educated future for marine wildlife and tourism. We will present the results of an amazing journey where, from January to May 2024 we promoted 3 workshops in Lisbon, Portugal, in Taranto, Italy, and in Hamburg, Germany to recruit new Whale Watching Guides. 15 new candidates were selected to join a 1-week full training course before joining the team. This was the 1st edition of a process to select, training, and prepare guides. The Academy is formed by the Founders, responsible for overall vision, strategy, and leadership of the academy and a Board of advisors, composed of experts in marine biology, conservation, education, and tourism, this board provides guidance and expertise to shape the academy's direction.
Whale2Sea Academy envisions a future where: 1.Whale watching guides are recognized as ambassadors of marine conservation, armed with knowledge, respect, and a commitment to responsible tourism; 2.Tourists become informed and conscientious participants in marine wildlife experiences, leaving with a profound appreciation for the oceans and a desire to protect them; 3.The whale-watching industry as a whole adopts higher standards of ethics and sustainability, minimizing its impact on marine ecosystems; 4.Collaborations with marine scientists and researchers enable us to contribute to ongoing research efforts, deepening our understanding of whales and their habitats; 5.Our academy becomes a global hub for marine education, offering a wide range of courses and resources for learners of all ages and backgrounds.
Whale2Sea Academy represents a natural evolution for Whale2Sea and Whalesafari. It embodies their unwavering commitment to responsible tourism, education, and marine conservation.

P10

EXPLORING OCEAN LITERACY GAPS: AN EXAMINATION OF ELEMENTARY SCHOOL TEXTBOOKS IN CROATIAN EDUCATION

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Ocean literacy (OL), which involves an understanding of the ocean's impact on us and our impact on the ocean, plays a crucial role in the protection of marine ecosystems and resources. This research examines the incorporation of ocean literacy principles (OLP) and concepts into Croatian elementary education. A comprehensive analysis of textbooks from grades 1-8 in subjects such as Nature, Biology, Geography, Chemistry, and Physics was conducted, covering a total of 7,520 pages from 55 textbooks. The study found that while all seven OLPs were present, many concepts were either missing or not fully addressed, particularly in lower grades. This discrepancy with the recommended Ocean Literacy Scope and Sequence suggests a need for greater integration of ocean science topics into formal education. By enhancing the inclusion of OL principles and concepts across various subjects and grade levels, students can acquire a more thorough understanding of the ocean, enabling them to make informed decisions and take responsible actions for ocean sustainability and conservation. The results highlight the importance of collaboration among ocean scientists, educational experts, and policymakers to integrate OL into curricula and textbooks, ultimately improving students' comprehension of ocean sciences.

P11

EXPLORING OCEAN LITERACY IMPLEMENTATION IN CROATIAN EDUCATION: STUDENT AND TEACHER PERSPECTIVES

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[3]*Institute of Oceanography and Fisheries, Croatia*

Research on the analysis of school textbooks in elementary schools in Croatia has confirmed deficiencies in the occurrence of ocean literacy principles in formal education. However, in addition to formal education, non-formal educational interventions and activities led by scientists and ocean experts make valuable contributions to enhancing ocean literacy for both students and teachers. This study was conducted to gain a broader understanding of children's knowledge about the sea, or how ocean literate they are, as well as the opinions of teachers regarding the presence of ocean topics in formal education.

This research consisted of three parts tailored to specific target groups: i) lower-grade elementary school students, ii) higher-grade elementary school students, and iii) teachers. A questionnaire was prepared for each of the target groups. For lower-grade students, a questionnaire specifically designed for this purpose was prepared, focusing on testing fundamental knowledge. For higher-grade elementary school students, a slightly modified questionnaire developed by other OL experts was used. The third targeted group was teachers, and the focus of their questionnaire was on their experience in teaching ocean-related topics in the classroom. A total of 382 lower-grade students, 250 higher-grade students, and over 100 teachers from schools across the Republic of Croatia participated, including coastal areas, islands, cities, mainland and rural areas.

The results provide a good insight into the understanding of ocean-related topics among different age groups as well as spatially. The results also confirmed that students were better acquainted with certain principles, likely influenced by the topics covered during classes. Obtained results suggest that additional effort should be made to educate ocean-literate generations, and for that, besides curriculum improvement, we need to emphasize the importance of educating teachers in adopting new ocean-related knowledge.

P12

NAVIGATING YACHT CRUISERS' SOCIOLOGY: A COMPREHENSIVE STUDY ON DESTINATION DEVELOPMENT AND USER-DRIVEN LOGISTICS FOR ENHANCED CRUISING FACILITIES AND EXPERIENCES

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[1]*University of Athens, Greece*

This research endeavours to investigate the sociological dimensions of yacht cruising, focusing on the motivations, lifestyle, and environmental attitudes of individuals who engage in this form of tourism. The study examines the characteristics of yacht cruisers, their travel patterns, decision-making processes, and preferences, as well as their experiences and opinions regarding nature, local communities, and hosts' culture.

The research underscores the significance of understanding yacht cruising as a distinct form of tourism, often overlooked in the context of marine tourism development. The study reveals that yacht cruisers are typically characterized by a mature age group and are distinguished by a slow pace of travel, preferring to remain in harbours during the winter months. This unique pattern of travel can contribute to the reduction of seasonal fluctuations and the development of local economies.

The study identifies a range of motivational factors that drive individuals to purchase a cruising yacht and sail to various countries. These factors include the active nature of sailing, novelty, escape, autonomy, nature, self-development, stimulation, self-actualization, and relationship creation. Furthermore, the research highlights the importance of social connections, physical and mental well-being, and constant learning and excitement in the yacht cruising lifestyle.

The study also explores the environmental attitudes of yacht cruisers, revealing that they tend to prioritize the ecologically sustainable use of maritime resources. Yacht cruisers emphasize the importance of infrastructure and facilities in logistics and port destinations, which can contribute to the development of local economies. Additionally, the research suggests that yacht cruisers are willing to tolerate local communities and politics as long as hosts understand and accommodate their lifestyle.

The authors also examine the connection between yacht cruising and ocean literacy, highlighting the importance of educating yacht cruisers about the importance of marine conservation and sustainable practices. The research reveals that yacht cruisers are willing to engage in activities that promote ocean literacy, such as participating in beach clean-ups and supporting marine conservation initiatives. Furthermore, the study finds that yacht cruisers are interested in learning more about the blue economy and its potential to promote sustainable development.

The findings of this study have significant implications for the development of yacht cruising destinations, particularly in the Cyclades region of Greece. The research provides practical information about the amenities and infrastructure required for recreational sailing activities in Mykonos Marina, which can inform public policies and marketing

strategies. The study's results also highlight the importance of considering the broader context of coastal regions, including mooring places, cities, and entire coastal areas. The study's findings also emphasize the need for policymakers and stakeholders to prioritize ocean literacy and the blue economy in their efforts to promote sustainable development in the region.

P13

AQUARIUM AS A STAGE: HOW THE OCEANÁRIO DE LISBOA IS FOSTERING OCEAN LITERACY THROUGH ARTS FOR BABIES AND FAMILIES

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[1]*Oceanário de Lisboa, Portugal*

Public aquariums play a crucial role in environmental education and conservation efforts, serving as learning environments that connect billions of visitors with the ocean. Since 1998, the Oceanário de Lisboa has welcomed over 29 million visitors and engaged 1.7 million participants in its educational programs.

The emotional connection and sense of belonging to the ocean should be fostered from the earliest stages of development. The arts provide babies with valuable opportunities for exploration, expression, and growth across various developmental domains, laying the foundation for lifelong learning and creativity.

Recognizing the profound impact of sensory experiences on young children's understanding of the world, especially during their formative years, the Oceanário de Lisboa has crafted three educational programs rooted in artistic experiences. "Concert for Babies," "Fado Miudinho," and "The Little Whale" were carefully designed to captivate babies, toddlers, and their families, immersing them in the wonders of the marine world.

Celebrating its 20th anniversary in 2024, “Concert for Babies” is a multisensory journey through the depths of the ocean for toddlers up to 3 years old. Every weekend, a window to 5 million litres of saltwater becomes the stage for a captivating concert, offering an introduction to the ocean's vastness and diversity, guided by the enchanting melodies of music.

Building upon the success of "Concert for Babies," the Oceanário de Lisboa has created "Fado Miudinho," an innovative program that blends cultural heritage with musical exploration, tailored for children up to 4 years old. This experience invites families to delve in the soulful rhythms of Portuguese fado while embarking on a sensory-rich journey through ocean-themed storytelling.

These two cultural experiences culminate in a family visit to the aquarium, where the enchanting atmosphere, enriched by the preceding musical journey, ignites curiosity for marine biodiversity.

Transitioning from musical experiences to the realm of literature, a new program emerged in 2023. Tailored for families with children aged 2 to 4, “Little Whale” invites participants to dive into the tale of the unlikely friendship between a boy and a whale. Based on the acclaimed children's book “The Storm Whale” by Benji Davies, this guided tour of the aquarium combines storytelling, hands-on activities, and sensory exploration to bring the ocean to life. Participants not only learn about marine biodiversity but also explore emotions, developing a profound appreciation for the interconnectedness of all life forms.

Throughout these programs, the Oceanário de Lisboa has already engaged thousands of children and their families in marine immersive experiences, cultivating ocean literacy from an early age, laying the groundwork for them to become passionate ocean enthusiasts.

P14

NEW EXHIBITION OF THE GDYNIA AQUARIUM - AN EXCELLENT EDUCATIONAL TOOL IN INCREASING AWARENESS OF COLD SEAS

Guellard T.[1]

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On April 20, 2024, the Gdynia Aquarium launched a new exhibition called "Cold Seas - from the Atlantic to the Baltic Sea". It presents the cold sea environment of the northern hemisphere, being the largest exhibition of this type in Poland. It consists of 12 tanks that are home to nearly 1,300 animals, representing over 30 species, inhabiting the cold part of the Atlantic Ocean, including the North Sea, the Danish Straits and the western part of the Baltic Sea.

The new exhibition aims to familiarize guests of the Aquarium with the diversity of the cold seas' environment, which is not generally considered as such. It invites to embark on a journey that leads from the open waters of the Atlantic Ocean to the nearly enclosed, least saline sea in the world - the Baltic Sea. It allows visitors to learn about organisms, often unique in their appearance and adaptations, which are difficult or even impossible for the average person to observe in their natural environment.

While walking along the educational path of the new exhibition, visitors have the opportunity to observe animals, both in large, impressive tanks, giving the impression of being immersed in the water, and in smaller ones, equipped with lenses, enabling a closer look at species that would go unnoticed in larger tanks. The tanks are inhabited mainly by bony and cartilaginous fish, but also by crustaceans, echinoderms, jellyfish and anemones. The new exhibition allows to admire the behaviour of schooling fish, gracefully floating jellyfish, as well as other fish and organisms hiding among rock crevices or in the sandy bottom.

Moreover, along with descriptions of the organisms' biology, the exhibition provides information on the challenges of marine conservation, allowing visitors to learn about the threats facing organisms of the cold seas, such as habitat loss, overfishing and climate change.

The educational path of the new exhibition ends in a hall where visitors will find information on the 7 principles of ocean literacy, showing the relationship between the marine world and the world of humans. The hall provides a place where visitors can relax, and also a perfect space for educational activities during classes and events organized by the Education Centre of the Gdynia Aquarium.

The "Cold Seas" exhibition in the Gdynia Aquarium is an excellent educational tool that promotes learning about the cold seas environment and its conservation. It also sparks curiosity, enhancing understanding and appreciation for marine life, thus raising ocean awareness.

P15

HOW DO WE BEST USE THE RESULTS FROM OCEAN LITERACY SURVEYS?

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Surveys on Ocean Literacy have recently been conducted in several countries to gain an understanding of the extent and current level of Ocean Literacy in each country.
To follow up the results, a survey can be repeated after a period of time. However, surveys are costly to conduct. Can we use them for more than just tracking the progress of our efforts to enhance ocean knowledge and awareness? If so, what can we use them for and how do we do it?
Results from the Swedish Ocean Literacy Survey will be presented. This presentation will show how to work with Ocean Literacy surveys to get the most out of them and how the results can be used to increase the usefulness of this and other similar surveys in other countries. Additionally, we will share how the results can be used to guide us in our future work on Ocean Literacy and how the results contribute to a better marine environment.

P16

THE ART OF ADAPTATION: PERMANENT EXHIBITION OF THE ZOO AS A TOOL FOR MARINE EDUCATION

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In the Gdynia Aquarium, in addition to the exhibition where we can admire aquatic animals from all over the world, there is also an Educational Center. Educators actively educate and popularize knowledge among people of all ages. The main place of work for educators are educational rooms, which enable high-level education. However, the permanent exhibition of the zoo is also a place where educational meetings can be organized. The Gdynia Aquarium took advantage of this fact by creating the "art of adaptation".

The art of adaptation is the name of the event created by Gdynia Aquarium educators, which was carried out as part of the 13th edition of the Biologists' Night.

Biologists' Night is a nationwide event whose aim is to popularize science and institutions dealing with natural issues by creating workshops, lectures, discussions, etc. Their aim is also to present basic but important issues that expand knowledge, arouse curiosity and the desire to understand the natural world, especially in children and school youth. The event takes place annually in January. In 2024, the Gdynia Aquarium was a partner of the event conducted by the Faculty of Biology of the University of Gdańsk for another year in a row.

The Art of Adaptation is an event that combines visiting the exhibition with fun, expanding knowledge and an artistic element. During this meeting, participants could play the role of nature designers, learning the secrets of animals' adaptation to various aquatic environments.

For the event, educators created 5 drawings of animals and 5 types of playing cards. The selected animals are residents of the Gdynia Zoo. Each drawing was divided into 5 parts, which were hung in 5 exhibition rooms. The playing cards consisted of 7 clues - five for body parts, one with a hint, and one with information on where to find the final species name.

The aim of the event was to draw an animal on a playing card using instructions describing adaptations to various environmental conditions. Body shape, limb length and masking skills became a key tool in the creation process.

P17

FROM RESEARCH TO ACTION: MARINE MAMMAL PROTECTION THROUGH EDUCATION

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The Faculty of Veterinary Medicine University of Zagreb (FVM) has started marine mammal research in the early 1980s, focusing on various ecological and health aspects of the marine mammal species permanently present in the Adriatic - the bottlenose dolphin (*Tursiops truncatus*). However, the role of academic institutions such as the FVM is not only to promote scientific findings but also to educate students about the importance of marine conservation and the anthropogenic impact on nature as part of the One Health concept. Students have been involved in research by participating in marine mammal necropsies, field work, writing student research papers (18 scientific studies and 17 diploma theses). Moreover, they have contributed to the development of the digital anatomical collection and the 3D digital and printed models of marine mammals' anatomical structures. Since 2010, the knowledge gained from long-term marine mammal research has been used for educational purposes. Today, the elective course Biology and Conservation of Marine Mammals is part of the integrated undergraduate and graduate study of veterinary medicine at FVM. Within this course, students learn about various aspects of marine mammal biology, conservation and morphology. From 2018, service-learning was integrated into the course curriculum through the project Blue Project – Contribution to the Establishment of Service-Learning at the Faculty of Veterinary Medicine University of Zagreb. During the project, faculty members were trained to implement service-learning in class while students were involved in the community-engaged learning process through the development of monitoring and first aid protocols for dolphins in the Adriatic Sea, underlining the crucial role of academia in promoting ocean literacy. Institutions such as the FVM play a central role in fostering a better informed and engaged community that contributes to the protection of marine ecosystems.

P18

SAILING INTO SCIENCE- THE CLIPPER RACE COMES TO OBAN

Leng M.[1], Miller A.[1]

[1]Scottish Association for Marine Science, Scotland

The Scottish Association for Marine Science is embarking on an exciting initiative to celebrate the Clipper Race's inaugural visit to Oban this July. In a combination of science, community engagement, and maritime celebration, SAMS will set up community science busking events aimed at inspiring and educating the local community and international visitors about key marine environmental topics, to make the marine world more inclusive and accessible to all.

The Clipper Race, known for its global sailing challenges, will make its penultimate stop in Oban, bringing with it an atmosphere of adventure and international collaboration. This provides an ideal backdrop for SAMS to engage with the public on important marine science issues, and welcome international visitors and sponsors involved in the race to the West coast of Scotland.

Community science busking involves SAMS researchers and volunteers setting up interactive, informal science demonstrations and discussions in public spaces around Oban. These pop-up science sessions will cover a range of topics, from the science of sailing and the environmental impact of marine activities to the importance of ocean conservation and the effects of climate change on marine ecosystems. As well as our own scientists, organisations from around Scotland will be participating, to showcase the breadth of expertise around Scotland, including the Scottish Seabird Centre, Hebridean Whale and Dolphin Trust, Species on the Edge, and the SAMS Robotics Academy team.

The aim of these events is twofold: to celebrate the Clipper Race and to foster a deeper understanding of marine science and ocean literacy within the community. By bringing science to the streets, SAMS hopes to make complex scientific concepts accessible and engaging for people of all ages and backgrounds. The busking sessions will feature hands-on activities, demonstrations, and opportunities to speak directly with marine scientists, creating an interactive and educational experience.

The arrival of the Clipper Race in Oban is a momentous occasion, and SAMS is seizing this opportunity to bring marine science to the forefront of community consciousness. Through community science busking, SAMS is not only celebrating a significant maritime event but also fostering a culture of curiosity and environmental stewardship that will resonate long after the race has departed on its final leg.

Key topics to be highlighted during the community science busking include: The Clipper Race and Oceanography: Understanding the science behind sailing, navigation, and the physical challenges faced by sailors; Marine Conservation: Highlighting the importance of protecting marine habitats and species, and how local actions can have a global impact; Climate Change: Educating the community about the effects of climate change on marine environments and what can be done to mitigate these impacts; Plastic

Pollution: Raising awareness about the issue of plastic pollution in the oceans and promoting sustainable practices to reduce waste.
These events will inform but also to inspire action, by raising awareness of sustainability and citizen science projects. By engaging directly with the public, SAMS aims to empower individuals with the knowledge and tools they need to contribute to the protection of marine environments.

P19

UHI STEM COORDINATOR NETWORK FOR OCEAN LITERACY

Leng M.[1], Miller A.[2]

[1]Scottish Association for Marine Science, Scotland

The University of the Highlands and Islands (UHI) STEM Coordinator project in Scotland aims to enhance the engagement and proficiency of students in Science, Technology, Engineering, and Mathematics disciplines across Scotland. As a partner of UHI, at the Scottish Association for Marine Science, we are utilizing this network to promote Ocean Literacy and Sustainability goals to protect the blue economy around Scotland's coasts and empower the younger generation to advocate for the health of the ocean in the future.

Scotland heavily relies on the blue economy, especially coastal communities. Over the last few decades there has been a change in the recruitment of young people into these careers, due to both a lack of awareness of the employment opportunities available in the rural localities and the absence of the required skills in the young workforce. There is an increasing brain drain from rural coastal communities around Scotland's coasts into the central belt- for what is often deemed to be "better" employment opportunities for young people.

Marine renewable companies have come together to fund the UHI STEM Coordinator programme, to upskill the future workforce and communities of Scotland in all things STEM. This pilot study employs 11 Coordinators around Scotland's mainland and islands. The network develops and shares resources and expertise across the country, with an aim to inspire the next generation to take up these blue careers in the future. Moreover, the project addresses diversity and inclusion challenges within marine science and STEM fields. Efforts to engage underrepresented groups and rurally isolated communities are yielding positive results for participation and enthusiasm engagement.

Beyond the classroom, the UHI STEM Coordinator project is developing partnerships between educational institutions, industry stakeholders, and the local community whilst exposing students to potential blue career pathways and addressing regional skills gaps. The Scottish Association for Marine Science (SAMS) is a partner of UHI, and we are using this network to effectively promote Ocean Literacy further afield than our previous reach. By coordinating the collaboration between other deliverers of Ocean Literacy and STEM across the locality this project is improving the distribution of efforts reaching rural and isolated schools.

We are working with the marine science researchers here at SAMS to develop new and inspiring workshop content to expand the awareness and knowledge of marine topics for pupils and community groups. Utilising the range of expertise in the coordinator network enables professional development to empower teachers to engage with the Ocean Literacy framework, Actions for Ocean Decade, and general marine science content.

The concept of this network will be shared with others, on how to use it to promote the awareness of the Ocean literacy framework, develop the confidence of teachers to deliver marine content and encourage youth advocacy and empowerment towards the health of the ocean in the future.

P20

SMALL SCHOOL OF BIODIVERSITY

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The Small School of Biodiversity is a project initiated by classroom teachers Katarina Markulin and Sandra Tomić, in collaboration with the Association for the Protection of Biodiversity Aurelia.
It began implementing this project in 2021, driven by a desire to promote ocean literacy. This involves understanding the connection between humans and the sea, the rich biodiversity of the marine environment, the importance of maintaining the balance of the marine ecosystem, and the impact of human activities on our environment. Our goal is to raise students' awareness of the importance of environmental preservation for the well-being of the community and to train them to recognize examples of sustainable development and their impact on the local community. By getting to know nature, children will learn that the only correct way is to cooperate with it.
The project is structured in the form of workshops, research, and problem-solving classes conducted outdoors, which are thematically followed up with work in extracurricular activity classes.
The workshops were conducted in cooperation with experts in the field of marine biology, who conveyed new knowledge about the Adriatic Sea and its inhabitants, as well as the impact of climate change on the sea and life in general, in a fun and memorable way to the students.
The project's activities include the integration of the results from the Nature and Society lessons, as well as outcomes from cross-curricular topics.
Based on the activities of the Small School of Biodiversity project and the school project "Find the Blue," our school became part of the Blue Schools network. This is part of the EU4Ocean initiative supported by the European Commission, which aims to connect different organizations, projects, and people who contribute to ocean literacy and sustainable ocean management.
The value of the project was also recognized by Zadar County, which provided financial patronage for the activities during the 2021/2022 school year.
The Small School of Biodiversity received financial support from the Ministry of Science and Education based on the Decision on Financing Projects as part of Extracurricular Activities of Primary and Secondary Schools and Student Dormitories for the 2022/2023 school year.

P21

CHALLENGER CONVERSATIONS: OCEAN EXPLORATION PAST, PRESENT & FUTURE

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When marine science emerged as a modern scientific discipline in the 19th century, the Challenger Expedition of 1872-76 was its poster child, delivering the world's first exploration of the deep sea. The wealth of data from the 70,000-mile voyage lives on in fifty tomes of reports, of course available now in digitised format, and provide today's scientists with important baseline information.

A maritime historian from the University of Illinois Urbana-Champaign developed a new website (challenger-expedition.sams.ac.uk) to bring the Challenger data into 21st century: there visitors can explore the information gathered at all 364 stations, including temperature profiles spanning the global ocean at various depth and lists of species that lived 150 years ago. There is ongoing development on the site - addressing issues such as changes in taxonomy.

The new website allows anyone to engage with what our ocean was like 150 years ago. It is a tool to stimulate and inform multi-disciplinary conversations about the future of climate change, ocean conservation and marine science.

Challenger Conversations was a conversational webinar series running in the 2023-24 academic year that aimed to engage a diverse community of ocean advocates that were unlikely to meet in conversation. Historians, scientists and educators discussed a range of Challenger-Expedition-inspired topics from mapping and imperialism to art.

The format was a monthly hour-long session, running at a time of day that would allow transatlantic participation, with short presentations to introduce the diverse backgrounds and a free-flowing conversation between the panellists with questions from the floor as well as the hosts. It was an unfunded collaboration enthused by a joint vision.

The talk will give a summary of the different conversations and a look into the future. Challenger Conversations is growing a new network of partners, hopes to grow further and looks for a more global approach to ocean literacy.

Following in the footsteps of the Challenger scientists we want to stimulate a more global approach. In a time of a global climate and biodiversity crisis we need to build platforms to bring our local and regional ocean literacy communities together.

P22

CITIZEN SCIENCE AS A TOOL FOR IMPROVING PUBLIC OCEAN LITERACY – STRATEGIES IMPLEMENTED IN THE MARINE RANGER APP FOR COLLECTING DATA ON MARINE MAMMALS

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In the past decade, citizen science has become widely used as a standard means of collecting data in natural sciences and has also been used to great effect in the marine environment. Opportunistic observations made by the public complement existing results of dedicated surveys and are particularly effective in filling in gaps in knowledge with respect to rare species, species of low abundance or invasive species. The success of citizen science programmes inherently relies on maintaining adequate public engagement that will result in a sufficient number of people contributing data. Successful citizen science programmes are therefore implemented in ways that are most likely to reach as many groups of stakeholders as possible and can have high levels of reach and visibility in the public. These attributes lend themselves to utilising communication channels set up for data transfer as an effective platform for improving public ocean literacy. Nowadays, the most prominent and obvious choice to achieve quick and effective means of information transfer has become the production of dedicated applications for smart devices. One such example is the Marine Ranger – a free app for mobile devices for reporting Mediterranean marine mammal observations, bycatch, injured and stranded animals and providing feedback to citizens. This app has been developed as part of the EU co-funded project LIFE DELFI – Dolphin Experience: Lowering Fishing Interactions. In addition to its core functionality of reporting observations of marine mammals in a quick, simple and effective manner, the app is designed to be a hub for the creation and growth of a community of engaged citizens who are actively contributing to conserving the marine environment and increasing the knowledge on marine mammals. The app was developed to include several sections with succinct but relevant information on marine mammals that can be accessed by the user at will to learn about species occurring in their immediate environment and about appropriate behaviour when in the vicinity of animals, both healthy and in distress. In addition to this more passive means of learning, the app allows the administrators to actively focus the user's attention by means of geofenced time limited calls for action that are enticing users to take specific tasks furthering their knowledge and providing real-time information on current interesting events. Reports are linked to registered profiles and users can quickly verify their own and learn about those uploaded by others, either in app or through the web. These functionalities, and useful back-end app design choices make the aptly named Marine Ranger, a tool that is aimed at bettering the

knowledge of citizens so that they may become effective stewards of the marine environment.

P23

MARINE POLLUTION FROM MICROPLASTICS: THE CONTRIBUTION OF NON-FORMAL EDUCATION TO THE DEVELOPMENT OF KNOWLEDGE, ATTITUDES, AND BEHAVIOURS IN GREEK PRIMARY SCHOOL STUDENTS

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As the production of goods made from plastics has increased in recent decades, their presence as pollutants has grown rapidly. With the increased use of these products and at the same time the improper management of the waste produced during their manufacture and disposal, modern societies have heavily polluted marine ecosystems. Both formal and non-formal education are expected to play an important role in facing these problems and in shaping pro-environmental attitudes and behaviours. This study focuses on the potential of non-formal education to feature marine microplastic pollution issues and presents the benefits of a short teaching intervention to primary school students. One hundred thirty-five students from 6 schools, attending grades 3 (8-9 years old), 5 (10-11 years old), and 6 (11-12 years old), participated in a 3-hours intervention that was specially designed and carried out at "Thalassokosmos" aquarium of Crete, Greece, focusing on marine pollution by microplastics. Students conducted a series of hands-on experiments and used stereoscopes to understand the huge problem of marine pollution in general and microplastics in particular. They were given a tour of the aquarium observing the various marine ecosystems and the organisms living in them, and were displayed several images through comics and photographs showing the impact of microplastics on marine organisms and ecosystems. Interactive screens with digital games and quizzes about Mediterranean marine mammals and the effects of pollution on them were also used during the intervention. To assess the impact of the intervention, the same questionnaire was administered to the students before and after the intervention. More specifically, the questionnaire consisted of (i) demographic questions (e.g., gender, grade, participation in environmental education programs, sources of information about marine issues), (ii) 12 multiple-choice questions covering knowledge of plastic waste, microplastics, their hazards, and measures to tackle plastic pollution, and (iii) 10 statements evaluating their degree of agreement regarding attitudes and 10 statements regarding behaviours respectively, following a 5-point Likert scale. In terms of data analysis, descriptive (mean values, standard deviations, frequencies) and inferential statistics (t-test for independent samples and one-way ANOVA univariate analyses) were performed. The results revealed significant differences between students' initial and final perceptions and beliefs in all survey parameters as a result of their participation in the teaching intervention that took place in the aquarium This intervention, although short in time, proved to be a fruitful contribution to the existing school curriculum, mainly due to the limited possibilities and the "tight"

curriculum that is met in the Greek educational system. This becomes even more important when discussing non-common topics, such as ocean literacy and more specifically marine microplastics. Finally, the teaching intervention was very beneficial for both students and teachers as they were engaged with constructivist, discovery, and authentic teaching and learning conditions and were involved in a highly collaborative and interdisciplinary way; at the same time, they were also given the opportunity to communicate directly with the scientists who produce new knowledge through pure scientific research.

P24

EMPOWERING A BLUE GENERATION: STORYTELLING AS A POWERFUL TOOL TO INCLUDE OCEAN LITERACY IN THE CURRICULUM

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The educational program "Educating a Blue Generation" aims to promote the inclusion of ocean literacy in the 1st cycle of basic education in Portugal. This pilot-program is being implemented by Oceano Azul Foundation and Oceanário de Lisboa since 2018, in collaboration with the Portuguese Ministry of Education and partner municipalities. A 4-year longitudinal impact assessment identified the adequacy of the contents and strategies provided to teachers, and the increased knowledge and positive attitudes that the program sparks in students. It also allowed the identification of improvement opportunities, namely the need for an educational resource for students. After a consultation process on the best educational resource to develop, that involved teachers, marine educators, technicians from the Ministry of Education and other relevant stakeholders, it was decided for a children's book collection that would merge educational content with storytelling and that would include distinct books adapted to specific ages.
"Patrulha Ação Azul" emerges in this context, as a collection of 4 books designed to engage the young learners in the exploration of ocean themes with a holistic approach and through captivating narratives and illustrations. These books can be integrated into the classroom learning, by enriching students' understanding of the ocean, while fostering the curriculum objectives of the 1st cycle of primary education. The stories were created so that they would also allow students to develop key competencies outlined in the National Students' Profile by the End of Compulsory Schooling, a major educational reference document for the Portuguese education system. The books were also endorsed by the Portuguese National Reading Plan, of the Ministry of Education, a selected list of recommended books for specific target ages. Each book of the "Patrulha Ação azul" collection is tailored to each of the 4 years of the primary school, ensuring accessibility and relevance across different ages. The expected impact of the books "Patrulha Ação Azul" extends far beyond the classroom, as the books will also reach families and the broader educational community. By immersing young readers in the adventures of four marine animals and two children, the series not only educates but also inspires a sense of responsibility towards ocean conservation. Through these narratives, families are invited to join the journey, fostering dialogue and action towards ocean protection. More than 25.000 books are being offered to the students involved in the pilot-program, through immersive dynamic sessions held by marine educators from the Oceanário de Lisboa, that create a memorable and emotionally resonant experience, sparking curiosity and forging a deep connection to the characters and the ocean. In

essence, the "Patrulha Ação Azul" collection represents a holistic approach to ocean literacy, merging storytelling with curriculum objectives. As students embark on adventures alongside their fictional companions, they not only deepen their understanding of the ocean but also cultivate a sense of empathy and responsibility towards its preservation. Through this innovative blend of education and imagination, the journey towards ocean literacy becomes both enriching and transformative for young minds and their families and communities.

P25

PHOTOGRAPHY CONTESTS AS TOOLS TO INCREASE ENGAGEMENT AND RAISE AWARENESS AMONG THE GENERAL PUBLIC ABOUT THE EUROPEAN LIFE PROJECTS AND MEDITERRANEAN SPECIES CONSERVATION

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Launched between autumn 2021 and winter 2022, LIFE Pinna, LIFE Conceptu Maris, and LIFE A-MAR NATURA 2000 are very different European projects. LIFE Pinna (LIFE20 NAT/IT/001122 PINNA "Conservation and re-stocking of the *Pinna nobilis* in the western Mediterranean and Adriatic Sea") focuses on protecting and restoring the last populations of the noble pen shell (*Pinna nobilis*), the largest bivalve in the Mediterranean, which has been brought to the brink of extinction by a global epidemic. LIFE Conceptu Maris (CONservation of CEtaceans and Pelagic Sea TUrtles in Med: Managing Actions for their Recovery in Sustainability) uses advanced technologies and commercial ferries to study the distribution and ecological preferences of cetaceans and sea turtles, identifying key open sea sites for their long-term conservation. Lastly, LIFE A-MAR NATURA 2000 (LIFE20 GIE/IT/001352) works to disseminate and promote the network of Marine Natura 2000 sites.

To enhance public engagement and increase direct involvement, Triton Research, the partner responsible for the management and communication activities of the three projects, has conceived and launched an annual thematic photography contest for each project. The photo contests (Life among the Rocks, Deep Blue, and Life above and below the Sea) were promoted, often synergistically, through a comprehensive campaign involving national press, social networks, project websites, and participation in themed events and scientific festivals.

The first outcome of this communication campaign, which has so far included two contests for LIFE Pinna, two for LIFE Conceptu Maris, and one for LIFE Amar Natura 2000, has been the submission of over 1,200 images from 450 participants. This result is significant because the LIFE Conceptu Maris and LIFE Pinna contests had very specific image requirements: cetaceans and turtles in the open sea for the former; organisms in the intertidal zone and the first few meters of water for the latter.

In some cases, the contests also had positive scientific impacts on the projects. For the LIFE Pinna project, for example, the involvement of photographers helped to spread the citizen science campaign "Segnala la Pinna/Report Pinna" aimed at finding surviving individuals of the bivalve. The Deep Blue contest of LIFE Conceptu Maris helped promote the volunteer recruitment campaign for boarding ferries to collect data. For each contest, a qualified jury, including naturalists, biologists, and nature photography experts, awarded the most deserving images, with the authors receiving prizes in the form of books and project-related gadgets.

During these first two editions, around 20,000 people showed interest in the photo contests by visiting the relevant project website pages (www.lifepinna.eu; www.lifeconceptu.eu; https://lifeamarnatura2000.eu - on each project site, the contest page was the most visited overall), while a much larger number, estimated at around 200,000 people (based on “cover” data from posts about the contest), were exposed to the photo contest content through project social networks.

P26

THE MEDITERRANEAN BLUE ECONOMY SECTORS AND THE ROLE OF OCEAN LITERACY

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Ocean literacy (OL) is defined as the understanding of our influence on the ocean and the ocean's influence on us. Over the years, it evolved from the knowledge concept to a global perspective with an interdisciplinary approach, integrating different fields like marine sciences, social sciences, arts, and economy, aiming at empowering society to make informed and responsible decisions towards conserved and sustained ocean. Globally, including the Mediterranean region, OL has been more focused at school level and knowledge. However, the development of different policies and initiatives has been taking place recently, promoting OL not only to students, but also to educators, scientists, policy-makers, stakeholders, and the public. In the Mediterranean region, some initiatives and policies have been implemented in order to promote OL. For instance, the Mediterranean Sea Literacy Guide, developed by the regional Mediterranean group of the European Marine Science Educators Association (EMSEA Med), which is based on OL principles and concepts adapted to the Mediterranean Sea. Despite all these efforts, the concept is hardly reaching the blue economy sectors from practitioners to investors and funders.

As the Mediterranean Sea is an important source of different goods and services like fisheries, aquaculture, tourism, maritime transport, and renewable energy; uncontrolled exploitation of its marine resources leads to their depletion, threatening environmental and economic stability and sustainability in the region. Targeting the blue economy sectors, through dedicated, innovative and adaptive OL strategies, is key to promote the sustainable use of marine resources while conserving marine ecosystems. Enhancing Ocean Literacy and its different dimensions through communication and dissemination in the Blue Economy sectors in the Mediterranean is crucial for environmental conservation, economic sustainability, social and cultural connections and community engagement. Additionally, it is important to create a nexus between science, society, and industry to achieve the UN's Sustainable Development Goals and contribute to sustainable use of marine resources. Therefore, the Co-SUBE developed policy recommendations to promote OL in the blue economy sectors, and these are: map and connect existing OL related platforms for communication and exchanges, invest in social studies and economics, invest in long-term observations of various ocean threats, develop a Mediterranean Ocean Literacy Strategy, educational outreach, local

knowledge integration, public awareness campaigns, professional training, collaboration and funding, and monitoring and evaluation.

P27

AN OPTIMAL INNOVATIVE AND FRIENDLY APPROACH TO EDUCATE AND INVESTIGATE THE MARINE ENVIRONMENT

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Living in an era where population growth, shortage of agriculture growth fields and global climate crises caused our planet great damage yet possible to recover. Keeping sustainability is an acquired, responsible and committed behaviour.
To gain this desired attitude citizens from all ages must be exposed to and trained by educational focused programs for honest and respectful caring for our environment.
We suggest a scientific educational program to stimulate and develop imagination, provoke curiosity and creativity among students who will design, plan, and carry-on hands- on inquiries on algae growth and environment independent variables influence them.
In the last decade many farms for growing algae are rising around the world. Algae are used for: food – vegetarian protein, super food, food supplements; purification of the atmosphere from CO_2 and emission of 70% atmospheric O_2; purification of water from industrial and urban contaminations; raw materials for cosmetic industries.
During their inquiry projects, students will learn, explore and discover new scientific knowledge in the fields of Biology, Chemistry, Physics, Biotechnology and Sustainability in an innovative hands-on experience. Learning process in such an innovative approach becomes significant and enjoyable on one hand and challenging to initiate and develop new applications for the benefit of humans and society on the other hand.
Educational institute that will train their students by this program curriculum are carrying for a valuable and occupational future of their citizens in area that myriad and pose themselves as desired educational institute. This program curriculum has been approved by the Ministry of Education in Israel, and it contains: curriculum; laboratory kit; algae growth bio system – photo bio reactor.

P28

EMPOWERING EDUCATORS: “ONE OCEAN TO TEACH” DIGITAL MAGAZINE AS A TOOL FOR OCEAN EDUCATION IN SCHOOLS

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With the mission of encouraging people to learn more about the ocean and making all citizens aware of their duty to conserve their natural heritage by changing their behaviour, the Oceanário de Lisboa prioritizes education through immersive aquarium experiences, outdoor activities, and effective communication of ocean knowledge.
To strengthen the promotion of ocean literacy, the Oceanário launched a monthly digital magazine, "One Ocean to Teach," in 2022. It is available for free and tailored exclusively for teachers and educators, recognizing them as essential allies in shaping a "blue generation" that is environmentally conscious and ocean-literate.
"One Ocean to Teach" serves as a conduit between ocean topics, such as marine biodiversity, ocean conservation and policies, and the classroom, offering a diverse array of engaging activities. The content is aligned with essential learning frameworks and caters to the diverse needs of teachers, from preschool to high school. From interactive experiments to interesting facts about marine life, the magazine provides educators with versatile resources to enliven their lessons and spark curiosity among students, following the principles of engagement, exploration, investigation, knowledge acquisition, and action.
With more than 2400 subscribers, "One Ocean to Teach" is more than just a magazine; it is an educational tool for empowerment. By arming teachers with knowledge and resources, it empowers them to become catalysts for change within their educational communities.
Furthermore, in 2024, each issue of the magazine is aligned with the United Nations' Sustainable Development Goals (SDGs), ensuring that all 17 are addressed within the year. By integrating the SDGs into the magazine's thematic framework, educators are provided with a structured approach to explore topics from marine biodiversity and conservation to sustainability. This strategy not only enhances students' understanding of the interconnectedness of environmental issues but also empowers them to act within their communities and be proactive agents of change.
"One Ocean to Teach" digital magazine is a tool for environmental education and ocean literacy, helping educators shape a generation that is informed, engaged, and committed to the sustainable stewardship of the ocean. Through collaboration and innovation, we can build a brighter future for the planet and inspire positive change for generations to come.

P29

BUILDING OCEAN PHYSICS KNOWLEDGE THROUGH EXPERIENCE: THE LITTLE OCEANOGRAPHERS

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The “Little Oceanographers” project was born out of the desire to share the research we conduct in physical oceanography, perhaps the least immediately appealing discipline within the field of oceanography, and also to improve Ocean Literacy among Catalan students. Indeed, despite the nearly 6000 km of coast in Spain, the scholar curriculum has very little space for the sea.
Beyond dissemination, the project also seeks to share the experience of being a scientist and foster a critical spirit. The scientific career is in decline and different studies have shown the key role of enthusiasm and active participation to mitigate this problem, improving scientific capacity.
During a full scholar course, we carry out a comprehensive work, which involves both teachers and students with the ambition to change the vision that many have of science, research and the sea. “Little Oceanographers” also promotes STEM among girls, and in particular, physics and technology which are traditionally studied by 20-30% of girls around Europe.
More specifically, the project aims at bringing the scientific method closer to schools in a fun and participatory way, raising awareness among students about the importance of preserving the sea and promoting scientific vocations.
Students aged 10-12 have the opportunity to live the experience of “being a scientist” and, in particular, to become young oceanographers. Students experience all facets of scientific research: asking relevant questions, learning and developing theories, experimenting, participating in an oceanographic campaign and, finally, disseminating the results.
Our proposal integrates two perspectives: 1) bringing the ocean to the classroom: theoretical and practical learning of ocean physics through classroom experimentation; 2) bringing the class to the ocean: the pupils actively follow remotely an oceanographic campaign in real time and interact with research personnel on board. They can then participate themselves in a small oceanographic campaign on a historical ship.
The project concludes with a research project in groups that the students present at the end of the scholar year at the “Little Oceanographers” conference, that takes place at the Institute of Marine Sciences.
To evaluate the impact of our work, we have elaborated a survey for the teachers that we pass both at the beginning and at the end of the project and another one to the pupils after the conference. Finally, we have interviewed some teachers who have participated in previous editions. During the EMSEA conference, we will present the first analysis of these surveys.

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EDUCATIONAL ACTIVITIES IN BRIJUNI NATIONAL PARK

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Brijuni National Park is located on the west coast of Istria, near the city of Pula, in Croatia. This archipelago includes 14 islands, and is known for its natural beauty, rich history and significant ecosystem.

Brijuni was declared a national park in 1983 due to its exceptional biological and geological diversity. The marine part of the park covers about 80% of the total area of the park and is home to many protected and endemic species. The waters of the Brijuni National Park are a protected marine area, meaning that various activities within the boundaries of the park are prohibited or strictly regulated. The result is the preserved biodiversity of marine flora, fauna and habitats which are otherwise under great human influence in locations outside the protection area. This especially applies to fish stocks, sea flowers and various strictly protected species such as *Pinna nobilis*.

Educating young people about the importance of oceans and seas for the ecosystem, agriculture and economy is extremely important. Seas and oceans play a key role in climate regulation, oxygen production and biodiversity maintenance. They also provide the resources needed for food, medicine and industry. Understanding and preserving these ecosystems is essential for the sustainable development and future of our planet.

Brijuni National Park conducts numerous educational activities, workshops and events in order to increase awareness of the importance of nature conservation. One of the main activities is the "Mali čuvari" summer camp, which enables children and young people to learn about ecology, marine biology and geology of the park through field lessons. Also, various workshops are organized on the topic of marine ecosystems, where participants can learn about marine life, marine conservation and the impact of climate change.

These activities not only educate, but also inspire young people to become advocates of nature conservation and active participants in sustainable development.

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DESIGN, DEVELOPMENT AND IMPLEMENTATION OF A NON-FORMAL DIDACTIC INTERVENTION TARGETING STUDENTS' KNOWLEDGE, ATTITUDES AND BEHAVIOUR TOWARDS GOOD ENVIRONMENTAL STATUS

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GES4SEAS is Horizon Europe research funded project (2022-2026), entitled “Achieving Good Environmental Status for maintaining ecosystem services, by assessing integrated impacts of cumulative pressures” (www.ges4seas.eu). To achieve some of its objectives, the project includes Ocean Literacy activities to communicate the importance of the ocean, how different activities and pressures are impacting our seas, and to mainstream the key paradigm of ‘healthy oceans for healthy societies’. One of such tasks engages with schools in order to bring added value to the ongoing school curricular activities related to the environment and the ocean. The goal of this task is to raise awareness of the students on issues related to ocean health, through the production of a free digital publication containing scientific articles adapted to young generations. Researchers from different countries, participating in the project, write short and illustrated articles on marine-related key topics and share this with a student class linked to science or other disciplines. Students read the articles and comment on what is not clear, what could be improved, what details are missing, and how the illustrations could be improved, to better address these issues for young people. After receiving the feedback, the project researchers improve the articles and prepare a digital publication which will be translated into different languages, available online and shared with the participating schools and their societies.

Towards this aim, a non-formal didactic intervention was designed, developed and implemented by HCMR scientists in collaboration with the Biology Teacher of the Music School of Heraklion focusing on the students’ knowledge, attitudes and behaviour towards investigating Good Environmental Status of a semi-enclosed marine ecosystem located on the north-eastern part of Crete Island. This intervention included laboratory and fieldwork/outdoor activities. Initially, the marine ecosystem of Elounda bay was presented to the students (e.g., nursery ground, non-indigenous species). Students visited the labs of HCMR in order to familiarize them with scientific equipment (e.g., microscopes, stereoscopes) as well as to observe and identify marine species (e.g.,

macrobenthic animals). Fieldwork/outdoor activities included a visit to the study area where the students measured abiotic parameters in situ (e.g., water temperature, salinity, pH, dissolved oxygen) using scientific instruments and had the opportunity to discuss with local fishermen and authorities. Finally, students were asked to review a short scientific article on the environmental status of the marine ecosystem of Elounda bay. A review form was prepared and given to the students in order to fill in with specific comments. Questionnaires were also given to the students before and after this didactic intervention in order to measure the impact of all these Ocean Literacy activities concerning their knowledge, attitudes and behaviour. The Blue Project developed was also a part of an educational program targeting 'adopting a marine ecosystem' and the involvement of the Music School of Heraklion in the EU Blue Schools initiative in order to certify them as a blue school and to become a member of this European network.

P32

ENHANCING INCLUSIVE OCEAN LITERACY THROUGH INNOVATIVE EDUCATIONAL PRACTICES AND TECHNOLOGIES

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Oceans cover more than 70% of the earth's planet and are vital to many processes that sustain our planet and its diverse ecosystems. Despite this, a large percentage of the population remains unaware of the oceans' significance and their impact on daily life, often due to cultural, linguistic and accessibility barriers. This presentation will explore educational strategies coupled with technological solutions designed to enhance ocean literacy among a broader audience regardless of their cultural background, physical abilities, or disabilities.

The presentation will start by exploring the current state of ocean literacy, identifying barriers to inclusivity and accessibility within educational contexts. A discussion will follow about the necessary components that foster meaningful learning experiences. This will include the challenges remaining to be addressed such as the digital divide and the need for educators to adapt materials for different cultural contexts. After analysing these barriers, we will propose strategies for overcoming them.

We argue that crucial to this end is the collaboration between educators and communities in combination with technology. Various types of educational practices and technologies can be incorporated. For the former, examples of education practices can include blended learning environments, the use of digital storytelling as well as interactive simulations among others while for the latter, examples of technologies include, but not limited to, the use of smartphones as platforms, the use of Artificial Intelligence (AI), Augmented and Virtual Reality (AR/VR) as well as various standardized practices that foster and improve the accessibility of digital content and of existing platforms. After the introduction of those technologies, recommendations will be given for increasing the accessibility of marine resources to diverse audiences of different cultural backgrounds, physical abilities or disabilities, thus fostering ocean literacy and paving the way for a more sustainable environment.

At the end of the presentation a questionnaire will be given to gather information about the participant's familiarity with the discussed technologies, share their previous experiences and collect feedback on potential ways to enhance ocean literacy in their own view.

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LAND OR SEA: GETTING TO KNOW THE OCEAN FROM LAND

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There is currently an urgent need for ocean literacy, as it may positively help citizens in understanding how the functioning of our planet is linked to our own functioning and therefore help in empowering people to make informed decisions regarding habits and lifestyles. Thus, a number of varied efforts are being seen around the world to bring people closer to the Ocean. From the ICM-CSIC in Barcelona, several educational proposals have been launched since 2000. One of the most appreciated by users allows to get to know the ocean better by taking advantage of human's greater knowledge of terrestrial environments. The proposal was inspired by the teachings of the renowned ecologist Dr. Ramon Margalef, who had a profound and holistic knowledge of ecosystems. His ability to think from local to global and vice versa enabled him to see similar processes and mechanisms in diverse and apparently very different systems. These comparisons allow for a very quick and efficient way of getting a general picture on how Nature works and are immensely valuable as they may bring closer unknown or distant ecosystems, facilitating knowledge acquisition, comprehension and further stimulating attitudes aligned with nature conservation.
Inheriting Margalef's teachings and way of thinking, some educational materials were developed, addressed to a variety of public and aimed at narrowing the gap between society and the Ocean, as despite its pivotal role in the planet, the Ocean remains quite unknown. This may respond to several facts, such as that humans are terrestrial animals and therefore tend to know land ecosystems better, that the Ocean is difficult to access for most people or that its presence in formal education is still scarce. This creates an enormous breach regarding awareness, perceptions, knowledge and, ultimately, attitudes towards marine ecosystems if compared with terrestrial ones.
Following Margalef, analogies and similarities were chosen as sharp educational tools to address this issue and attain a better ocean literacy while stimulating questioning, creativity and curiosity: parting from our own experience in land ecosystems, we may think of similar ecological, biological, geological processes and structures or even human activities in the marine environment. This matching land and sea through analogies was materialized in the form of a board game with different difficulty levels, presented as an open tool which may be widened and complemented with new contributions by players. It has also been turned into an illustrated album which treats 101 of the more than 150 proposed similarities, adding further complexity as it includes themes such as technology, comparisons between scales or gender perspective. Also, the land or sea

concept was transformed into an in-person workshop on “sea forests” for the general public, performed in science fairs, E&O events and educational environments.
These educational tools are thought from an experimental sciences perspective, but easily allow for transdisciplinary implementation. The results we aim to present from several study cases show that “land or sea” educational proposals prove effective in changing views on the ocean and in enhancing ocean literacy/culture.

P34

INCREASING OCEAN LITERACY THROUGH WATER SPORTS: PRELIMINARY RESULTS FROM OSES FIRST PILOT INTERVENTIONS

Vendrell-Simón B.[1,2], Sanchez-Vidal A.[1], Fuertes I.[3], Wojcieszek D.[4], Uviedo O.[1], Sessa V.[5], Malave N.[6], Drillet A.[7], Pina G.[8], Curto X.[2]

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There is a global need for collaboration among different ocean users to enhance global Ocean Literacy (OL). As highlighted by the UN Decade of Ocean Science, OL is relevant in addressing global challenges related to the environment in general, and in addressing several Sustainable Development Goals. OL is inherently interdisciplinary and should encourage the engagement of diverse blue space users, including water sports practitioners. The role of informal education programmes, including those related to water sports, is crucial to advancing and achieving OL, and may be especially relevant when engaging with youth. Through physical presence by practicing sports, positive relationships with the ocean can be developed: current examples show that marine water sports have a strong potential for positive environmental actions and awareness within the community of practitioners. The engagement of these practitioners in educational programmes and also in citizen science projects is a means to reach a wider audience and promote OL, and may not only benefit marine preservation but also contribute to wider ocean resource monitoring and public awareness.
Since 2023 the project “Ocean Sustainability through Education and Sport” focuses on the development of tools for federations and local sports actors to educate youth in eco-responsible actions and develop environmental awareness from an early age through sport.
It is built around three main objectives: 1. Assess the experience and insight of active sports organisations on creating and implementing an awareness campaign and educational methodology towards ocean and seas preservation; 2. Develop educational and environmental awareness methodology at a local level to foster ocean protection through sports; 3. Measure the social and environmental impact of the programme so as to strengthen advocacy toward ocean protection.
The project is built around four pilot interventions in Malta, Portugal, France, and Spain, implemented by sports organisations at local, regional, and European levels. Those pilot interventions consist of integrating pedagogical methodology about ocean protection

and environmental awareness into day-to-day sports activities and as an essential part of those activities. We aim to showcase the benefits and importance of educating the youth on environmental issues with concrete, measurable, and identifiable results, through the development of an educational and environmental awareness methodology at the local level to foster ocean protection through sports. The objective of the presentation will be to present the preliminary results both of the diagnostic surveys that were filled in by instructors in four water sport disciplines corresponding to pilot interventions (scuba diving, sailing, kayaking, surfing) and the results of the first educational intervention of the project, addressing diving in Malta. Diagnostic surveys include items addressing different OL dimensions, specific water-sports practices, and OL and education-related questions regarding the professional role of instructors. Educational interventions include pre- and post- evaluation surveys on OL and the specific sports practice, and also the use of a toolkit to measure several environmental parameters related to the four topics addressed during OSES: climate change, biodiversity, coastal management and pollution. We aim at sharing these preliminary results and collecting feedback and insight for future interventions.

P35

LEARNING SHOULD BE FUN

Wiśniewska D.[1]

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Ocean is fascinating, beautiful, full of various organisms but it is also very complicated. How can we teach the youngest about a subject which is so complex? The concept that everything is connected or even some names are simply an abstraction for them.
The challenge is to explain it in the simplest way possible while maintaining scientific values. What can be a successful method to accomplish the goal? Having fun while learning! The younger children are, the more demanding they are. Their focus ability is different compared to adults. Also, their needs in learning about the surrounding world are based on the senses and things that are already known to them in some way.
In Gdynia Aquarium we conduct classes for people at various levels of education including “the youngest”. In the regular offer you can find classes for children from the age of four years old. For this group we have a class specially prepared for the needs of the kindergarten children. There are four topics to choose from. Each of them describes a different ecosystem, e.g., a coral reef, the Baltic Sea, Animals of the Amazon River. or unusual inhabitants of the ocean. The last one is a lesson that requires special attention. It is time to make learning about the sea as fun as playing games. We travel deep into the ocean to meet many interesting and unusual species of animals with a characteristic appearance. What is so special about them? The names of these animals are related to various objects that are known from everyday life. Meet the hammerhead shark, sailfish, trumpetfish and a lot more. This is an opportunity to learn about unusual animals, the names of which most children already know, although they may not realise that these are also the names of animals. Additionally, various objects are presented whose shape is supposed to resemble a specific animal from the educator's story. This combination is intended to make it easier for children to remember the names and connect them with existing marine animals, and at the same time it is a form of observing similarities and having fun.
This is one possibility to show how to turn learning about the ocean into an exciting adventure. Our goal is to give educators simple yet powerful ideas to spark children's interest in the ocean and make learning a blast!

P36

HARNESSING SPORTS FOR OCEAN PROTECTION: INSIGHTS FROM THE OSES GOOD PRACTICES HANDBOOK

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The "Ocean Sustainability through Education and Sport" (OSES) project aligns with the European Union's Work Plan for Sport, recognizing the potential of sports activities in addressing climate change challenges and global awareness on Ocean topics. It aims to empower sports federations and local stakeholders to foster eco-responsible behaviours in youth.
The first of the three overarching project objectives was to assess the experience and insight of active sports organizations in creating and implementing an awareness campaign and educational methodology toward ocean and sea preservation. The presentation will share insights from OSES's initial phase, highlighting the development of the OSES Good Practices Handbook.
The dual purpose of the publication is to map existing practices across Europe and beyond and to promote exemplary and inspiring practices. The handbook features 25 successful projects that integrate ocean literacy into water sports, offering practical examples to inspire sports organizations, schools, environmental NGOs and associations, museums, and aquariums to develop activities and approaches that protect the environment. It enhances our understanding of the ocean through sports, shows how we can preserve biodiversity, reduce environmental footprints, combat pollution, and encourage reflection on our impact and lifestyle through six themes: Connecting schools, water sports, and ocean literacy; Environmental clean-ups; Citizen science, environmental data collection, and monitoring; Sustainable practices in water sport tourism; Engaging with local communities; Good practices in professional sports.
Given that water sports practitioners are among the first to be impacted by climate change (e.g., changes in wind patterns, swells, currents, and unpredictable weather conditions) and aquatic ecosystem degradation (e.g., pollution, biodiversity loss, coastal erosion), the handbook serves as a crucial resource for fostering environmental stewardship and highlights the critical role of water sports in marine education, advancing environmental awareness and building a positive relationship with the ocean.

P37

FUTURE SEA – A PROJECT THAT CONNECTS

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Croatia is a maritime country, and in recent years, significant efforts have been made to raise awareness about the importance of the ocean for life on Earth, the advantages we have as a maritime country, and the possibilities that the ocean provides. However, more efforts are needed to ensure understanding of the importance of the ocean for human well-being and sustainable development, especially from early childhood. Previous experiences in popularizing ocean topics among school children have shown that children in larger coastal areas have more activities related to the ocean compared to children in rural areas. Therefore, through the "Future Sea" project (www.futuresea.eu), we aimed to connect schools in different parts of Croatia with one goal - to educate children about the importance of the ocean. The main goal of the project is to sensitize children to the environment and sustainable development and encourage their creative expression on ocean-related topics. As part of the project, we organized workshops in 25 primary schools across Croatia, mostly in rural areas. A total of 45 workshops were conducted, involving approximately 1000 students and around 70 teachers. The workshops thematically covered various aspects of ocean literacy, such as the importance of a healthy ocean (e.g., oxygen production, temperature regulation, food from the ocean, aquaculture, etc.), ocean changes (e.g., global warming, pollution, decreasing biodiversity), and what we can do to reduce our negative impact. After the workshops, students were encouraged to creatively express themselves, resulting in over 140 student works that were exhibited during the main event of the European Researchers' Night in Split in 2023.

In addition to the workshops, a publication titled "Ocean in Our Hands: A Guide to Ocean Literacy" was released as part of the project. This publication aims to provide teachers with basic knowledge and ideas for teaching ocean-related topics. The publication was distributed to all schools where the workshops were held, as well as to other interested teachers, educators, and individuals. The "Future Sea" project has become recognizable both locally and at the national level in Croatia, and in the future, we will continue to build a platform that will be known as a place for spreading knowledge about the ocean among students and their teachers.

P38

CONNECTING THE DOTS: ENHANCING SCIENCE COMMUNICATION FOR MARINE ANIMAL FORESTS

Zorrila J.[1]

[1]*SUBMON, Spain*

We present an innovative and comprehensive training school on Scientific communication of Marine Animal Forests (MAFs). We aimed to provide senior and young scientists with tools to better communicate the ecology, threats, ecosystem services, and conservation opportunities of MAFs. The training offered different formats to translate complex scientific knowledge to diverse audiences, including kids, a target public that can be highly inspired by scientists and marine science educators through storytelling.
In many cases, the first step to achieving a full educational process is to build bridges, and communication is the first step in this process to create engagement and interest in the story we are about to tell.
This training program was delivered as part of the COST Action 20102 Marine Animal Forest of the World, with the objective of improving science communication within the network and welcoming diversity of profiles, experiences and visions to make the best of the training school experience.
The training was co-created and co-delivered with the network's scientific members, who had communication and dissemination experience and volunteered to do the training. The program was called "Connecting the Dots for Storytelling in Marine Animal Forests". It was fully booked within three days of the call release, giving insights into the high interest the topic generates within the scientific community.
The training school program consisted of four segments: MAFs Social, MAFs exhibitions, MAFs Citizen Science, and MAF stories. The sessions included theoretical and practical components over the four training days. Participants worked in groups across different scientific disciplines to create stories about MAFs in various formats. These stories aimed to explain the significance of these ecosystems and highlight their ecological importance, vulnerability to human impacts, and critical role in providing ecosystem services. Despite their immense value, these habitats face numerous threats, including climate change and habitat destruction. However, through creativity, we can inspire curiosity, raise awareness, and catalyse action for marine conservation.
Trainers showcased successful science communication initiatives related to MAF with examples illustrating the transformative impact of engaging narratives, visual storytelling, and hands-on activities in enhancing public understanding and fostering a sense of stewardship towards these invaluable ecosystems.
In conclusion, we showcase an innovative exploration of communication skills training and strategic networking within the UN Ocean Decade endorsed MAF-World COST Action. With a practical and integrated approach, it aims to elevate the impact of EU-

funded research, foster co-creation and creativity, and engage diverse stakeholders. This systematic training on science communication is a first step toward developing skills in engaging and educating future generations, but also developing and strengthening soft skills much needed, such as communication, leadership, creativity and teamwork.

P39

ASSESSING EARTH COMPETENCES: A FRAMEWORK FOR EDUCATORS AND YOUTH

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This session invites researchers, educators, and practitioners to critically assess and refine the "Earth Competences" framework, a pioneering initiative that was collaboratively developed by Slovak Eco Quality in partnership with educational experts and environmental practitioners across Europe.
This process involved extensive research of existing materials in the field, progress testing and feedback collection from educators and youth, ensuring the relevance and adaptability of the competences to various educational settings and cultural contexts.
It is designed to foster environmental “Earth” literacy and proactive engagement. The framework categorizes competencies into 15 distinct areas, each with three progressive levels detailing specific skills, knowledge, and attitudes necessary for effective environmental action. Ten of mentioned competencies are crucial for the world we live in now and the remaining 5 are aimed towards our future and its implications.
Participants will be introduced to the structure of the framework, including all 15 specific competences. The discussion will focus on the framework’s practical application in educational settings, its adaptability for youth and their engagement through methodological guides for educators and infographic materials for younger audiences, and its potential impact on fostering informed and active environmental stewards.
What we envision to achieve: Solicit broad-based feedback on the practicality and applicability of the competences in diverse educational contexts; Identify challenges and potential barriers to implementation, share the ones we have identified, as well as suggesting solutions, with a focus on inclusivity and accessibility of the material; Discuss strategies for integrating this framework into existing educational curricula and non-formal educational settings; Showcase practical programs, tool, and games aiming to reflect the framework and support the development of the Earth Competences via education.

WORKSHOPS ABSTRACTS LIST

No.	Presenting Author	Title
W01	Koulouri P.	BLUEMINDS4TEACHERS: Design and implementation of a digital toolkit for empowering educators in Ocean Literacy
W02	Teege S., Koulouri P.	Fins into the water workshop: Water sports to enhance Mediterranean Sea Literacy
W03	Fauville G., Skantz E., Strang C.	Aligning National Curricula and Ocean Literacy: An opportunity for EMSEA-wide collaboration
W04	Strang C.	Examining Equitable and Inclusive Work Environments in Environmental Education: Perspectives from the Field and Implications for the Field
W05	Dromgool-Regan C.	Explorers' fin-tastic sharks, mermaids and magical creativity on the shore
W06	Lamport E.	Project Starfish
W07	Bastos E.	Body mapping the human-ocean relationship
W08	Schio C.	Engaging Educators in Coastal Monitoring: A Hands-on Workshop with the Coastal Junior Monitoring Project

W01

BLUEMINDS4TEACHERS: DESIGN AND IMPLEMENTATION OF A DIGITAL TOOLKIT FOR EMPOWERING EDUCATORS IN OCEAN LITERACY

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[5]*European Marine Science Educators Association, Belgium,*
[6]*Sea Teach, Spain*
[7]*Democritus University of Thrace*

A free-access digital toolkit has been developed within the framework of the BlueMinds4Teachers project, supported by the EU4Ocean Coalition and funded by the European Commission, after the implementation of an interactive online course. The online course was designed through a collaboration between marine and freshwater scientists -several of them from organizations that are members of the EU4Ocean Platform- as well as with experts from educational and social sciences, teachers of schools being members of EU Blue Schools Network, and young ocean advocates from Youth4Ocean Forum, universities, and collaborative projects. The interdisciplinary approach, implemented during the online course, aimed at empowering teachers of Primary and Secondary Education and other educators from both EU and non-EU countries in Ocean Literacy (OL).
Integrating content knowledge (CK) on ocean science issues and pedagogical content knowledge (PCK) into teaching at school and other non-formal educational settings (e.g., aquaria, museums) is fundamental to achieving Education for Sustainability. Therefore, teachers of primary education, participating in the course and having an adequate PCK, were provided with CK on ocean science issues. On the other hand, secondary school teachers, especially those having a science degree, were offered relevant methodology on PCK. Furthermore, teachers were introduced to blue economy concepts and the role of OL in fostering more sustainable blue industries and increasing the attractiveness of blue careers. In addition, concrete examples for incorporating blue economy topics into their lessons were provided as a way to engage with their students/trainees.
The learning goals of the online course were: a. familiarization with the OL issues related to EU Missions, Sustainable Development Goals (SDGs) of Agenda 2030, UN Ocean Decade 2021-2030; b. to offer tools to identify ocean topics and to integrate them into school curricula and teaching activities in non-formal educational settings (e.g., aquaria, museums); c. to provide methods to develop and implement lesson plans, in collaboration with students/learners and local stakeholders, based on the use of participatory methods in teaching and learning processes (e.g., hands-on science,

project-based learning, open schooling); d. to supply materials to promote blue economy concepts and blue careers in classrooms, aquaria, etc.

Based on partners' experience with relevant OL projects (e.g., BlueS_Med, BlueNIGHTs), initiatives (e.g., EMSEA, EU Blue Schools Network, EMD) and in synergies with other projects (e.g., ERASMUS+ Fins into the Water, BlueGeneration, FLORES), the online course of BlueMinds4Teachers provided teachers and educators with materials and tools, resources, and links. This will enable teachers and educators to equip their students/trainees with the necessary skills to play an active role in a modern democratic society and participate in decision-making processes.

In order for the online course to be reproducible, exportable, and adaptable to the needs of teachers and other educators, and to contribute to improving their teaching skills and OL CK, a free-access digital toolkit was produced. The toolkit will serve as a gateway for achieving European Blue Schools certification and joining the Network, which represents a movement that aims to make pupils aware of and passionate about sustainable ocean management.

W02

FINS INTO THE WATER WORKSHOP: WATER SPORTS TO ENHANCE MEDITERRANEAN SEA LITERACY

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[2]*University of Zadar, Croatia*
[3]*HCMR, Greece*
[4]*Elpeixalplat*
[5]*EMSEA, Belgium*
[6]*Bikini Diving*
[7]*EcoMarine Malta*

The session aims at showcasing the results of the Fins into the Water project that came to life with the collaboration of 7 European partners, to enhance Mediterranean Sea Literacy (MSL) in the region and beyond. As the Mediterranean Sea hosts several endemic and emblematic species, gives home to more than 450 million people and a is a very important region in the blue economy, due to human induced climate changes, it is not in a good health status.
Therefore, there is a great need for education, awareness raising to be able to take actions towards its protection and conservation. Here comes the importance of the MSL principles that serve as fundamentals for all the users, inhabitants, and visitors of the Mediterranean.
The project aims at targeting all stakeholders, visitors of the region, with a special focus on water-sport centres and entities as they fully operate in the sea, and have a big impact on how they work, and how they run their business.
The project partners collected more than 140 online resources in different languages and included them on a Resource map, which serves as an important open-source library for all who want to learn more about the Med. While creative contents were developed to provide short, but engaging and informative visuals for the stakeholders, along with the MSL Brochure that is available now in all the Mediterranean languages. Finally, throughout the project lifetime partners were organizing events, engaging with local water-sport people and relevant stakeholders to provide them information and knowledge regarding MSL.
This session will showcase all the materials, ask participants to test the Resource Map and open-source library, while also encouraging the audience to give feedback on the developed materials.
Secondly, the session will follow a workshop format where the audience will be divided into teams per the most common water sports or by regions (depending on the participants), to brainstorm on different questions such as:
“How could water sport entities be more active in ocean conservation?”,

“What are the biggest obstacles to do so?”
“What are the best practices that could be copied in other regions?”
At the end of the workshop, each team reports back to the audience and draws conclusions.

W03

CURRICULUM AND OCEAN LITERACY ALIGNMENT (COLA) PROJECT IN SWEDEN AND BEYOND

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In 2023, during the UN Ocean Decade, the United Nations Secretary-General's Special Envoy for the Ocean, Peter Thomson sent a letter to all the UN member states to remind them of the under-representation or absence of the ocean in the school curricula across the world. He stated that the "inclusion of the ocean in school curricula around the world is essential if we are going to achieve ocean literacy and lay better foundations for ocean science," and that "embracing ocean literacy through a whole-school approach will ultimately lead to universal recognition that the ocean is crucial for the survival of humankind on Planet Earth."

Any journey toward a blue education will start with a critical look at the existing science curriculum in each country or region. Indeed, a first step is to identify where ocean science is missing from the curriculum and where it can be inserted to improve both science literacy and ocean literacy.

The goal of our study is twofold. First, we will analyse the current Swedish national Learning Goals for science and geography to identify the extent to which ocean literacy is present and the extent to which it is missing. Second, our goal is for the method we developed to analyse the Swedish curriculum to be useful in other countries where it can be adapted, improved, and used to conduct a similar analysis of the local curriculum.

We developed a codebook to conduct a content analysis of each of the 190 learning goals in the Swedish science and geography curriculum for primary and secondary grades. The result from the content analysis will allow us to quantify different aspects of the Swedish curriculum in relation to the marine content.

We are currently conducting the content analysis and we can see trends appearing. First, the ocean and ocean-related aspects of general science concepts are mostly invisible. Second, many learning goals are broad and thus subject to each individual teacher's interpretation. Third, some learning goals are location-specific or place-based, ensuring that populations living inland do not learn certain important ocean concepts.

We suggest a 1-hour long indoor workshop where we will first share the latest findings from our analysis of the Swedish curriculum. Then, we will invite the participants to discuss the codebook regarding its adaptation to their own national curricula. We will discuss whether our approach is relevant in other countries, weaknesses and strengths of the codebook in relation to different national contexts, potential future collaborations, and strategies for using our collective findings to influence education policy nationally and internationally to improve ocean literacy.

W04

EXAMINING EQUITABLE AND INCLUSIVE WORK ENVIRONMENTS IN ENVIRONMENTAL EDUCATION: PERSPECTIVES FROM THE FIELD AND IMPLICATIONS FOR THE FIELD

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The environmental education and ocean literacy fields are going through a period of reflection and re-examination in an attempt to overcome decades of practices that have resulted in a nearly homogenous white workforce. This workshop will begin with a brief overview of a study, led by the Research Group at the Lawrence Hall of Science at the University of California, Berkeley, that informed the design of a professional learning workshop series for outdoor science organizations (including ocean literacy organizations). Through focus groups with educators of colour and a survey of organization leaders, we sought to better understand how organizations think about and operationalize equity and inclusion in the work environment. While we acknowledge the many dimensions of diversity and intersectional identities, this study specifically focused on the experiences of outdoor science educators of colour. Next, we will share some guiding ideas and frameworks that emerged from the study that we applied to the iterative design of a professional learning program for organization teams called Working Toward Racial Equity. We will also share some lessons learned and challenges that emerged from our work with 27 different organizations from across the United States. Throughout the workshop we will engage participants in reflection, and small and large group discussions about the challenges of equity and inclusion in your respective countries and contexts. While discourse around race and other elements of intersectional, marginalized identities are approached differently in the US than in Europe, issues of inequity, injustice, racism, and unconscious/implicit bias in the ocean literacy community are widespread on both continents. We hope to begin an open, candid and brave discussion that will help us learn from each other and find productive, healthy pathways forward through this difficult terrain.

The findings we will present highlight how imperative it is that environmental education and ocean literacy organizations examine their practices regarding equity and inclusion to ensure that they are being responsive to the experiences of their staff of colour. By presenting these findings, we hope to increase the degree to which organization leaders and white-identifying staff can begin to gain a deeper understanding of the lived experiences of educators of colour and can reconcile the ways they have been thinking about and operationalizing equity and inclusion in their organizations. We believe it is critical for all staff, including organization leaders and educators of colour, to engage in ongoing dialogue as a means to understand and empathize with each other's perspectives and lived experiences. Finally, we hope that increased understanding and

empathy will encourage a culture of productive reflection and action among the leadership of organizations in our field.

W05

EXPLORERS FIN-TASTIC SHARKS, MERMAIDS AND AN EGG HUNT

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New educational resource for primary school children: Explorers Fin-Tastic Sharks+. has been developed as part of the Marine Institute's Explorers Education Programme. This programme delivers marine-themed modules to over 400 primary school classes annually around Ireland. Such resources and activities help engage teachers and children in completing thematic cross-curricular projects that involve the class, school, and engagement with the wider community. The content delivery focuses on supporting the development of children's competencies and skills while also teaching subjects such as science, geography, maths, English and the arts.
This specific education resource includes an introduction to sharks+ book, a workbook for children, a mermaid's purses (shark and skate egg cases) identification key for children (representing the most popular cases found around Ireland's seashores), as well as a shark poster. It also includes a series of presentations about sharks, skates and rays from around the world that teachers can use in the classroom to enhance their students' understanding of these fascinating creatures. All resources can be accessed at https://www.marine.ie/site-area/areas-activity/education-outreach/explorers/explorers-fin-tastic-sharks-resources.
These resources have not only led to the creation of key projects in classrooms, but they have also sparked a wave of active learning about sharks, skates and rays, conducted beach cleans, and involved the wider community in raising shark awareness and codes of conduct in waters around Ireland. The impact has been significant, with increased awareness and engagement in marine conservation, particularly for species like basking sharks, angel sharks, and the rare white skates. The workshop will introduce participants to the Explorers Fin-tastic Shark+ resources. Participants will be given an introduction to elasmobranchs, their special adaptations, reproduction, and threats. They will be introduced to a series of team-building activities and games, which can be adapted for use in the classroom.

W06

PROJECT STARFISH

Lamport E.[1]

[1]*Beach Academy CIC, Wales, UK*

From an early age, many of us know what a starfish looks like. An iconic seashore favourite shown in brochures, books, photos, illustrations, travel promotions, art and rockpool imagery all across the world. The starfish is a symbol of 'beach life' and 'beach biodiversity' well known and loved by many. But starfish are being unknowingly killed by the people who love them through their human activities.

Project Starfish is an educational conservation campaign to stop people touching them on the shore, highlighting the reasons why, through formal and informal education and engagement.

Project Starfish will be collaborating with artists and councils and asking marine organisations, members of the public and educators across Wales to make a pledge to stop handling these delicate marine animals and are hoping other EMSEA members will sign up too in a simple united way to aid marine life.

Beach Academy is leading the way by already teaching young people and families to not touch starfish and have embedded the message it into its 'Rockpool Code', developed as part of its extensive Rockpool Guardians project funded by the Nature Network's Heritage Fund through Welsh Government.

Project Starfish hopes to Influence behaviour change through education and is suitable for all age groups and focuses on increasing ocean literacy levels.

Through engaging interactive activities, the project teaches: How to tell if a starfish needs rescuing with signs that a starfish may be ill; How to rescue stranded starfish; Why starfish should not be touched with reference to biological functions; Human impacts on the marine environment and marine animals; Awareness of the harmful souvenir starfish trade; How to care, respect and understand starfish life, both above and below water in intertidal areas.

The 'Project Starfish' education programme includes: Starfish Rescue workshops for local families and tourists; A curriculum-linked digital resource education pack; An outdoor art installation made by a local artist with orange beach litter collected off Welsh beaches by Beach Academy staff, volunteers and school groups; Outreach sessions, supporting learning in the classroom and in community settings such as libraries; A digital and written pledge platform.

EMSEA workshop participants will have the opportunity to engage in 'Starfish' biological and art activities, learn simple rescue techniques and sign the Project Starfish pledge.

W07

BODY MAPPING THE HUMAN-OCEAN RELATIONSHIP

Bastos E.[1]

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Ocean literacy (OL) provides a framework for understanding the human-ocean relationship and is defined by Cava et al. (2005) as 'an understanding of the ocean's influence on you, and your influence on the ocean' (p.5). Although it seems to acknowledge the complexity of the human-ocean relationship, the proposed framework of 7 principles and 45 fundamental concepts (Carley et al., 2013) of what every student should know by the time they complete school seems to be somewhat limited in scope to mostly include knowledge of the ocean as a physical environment. This onset focus on addressing the lack of knowledge about ocean issues in school curricula may potentially help justify how OL research to date has greatly focused on the evaluation of educational approaches and the assessment of levels of citizens' knowledge, values and awareness about marine issues (Costa and Caldeira, 2018), including efforts to develop reliable, standardised tools to measure levels of knowledge and awareness at an international level (Fauville et al., 2019).

However, it is increasingly accepted that OL encompasses much more than knowledge and awareness, and that more complex and wide-ranging factors are at play in determining people's level of connection to the ocean. For example, how a person feels, experiences and accesses the ocean realm is personal and individual. Acknowledging this, McKinley et al. (2023) proposed expanding the OL framework, arguing that emotional connection, adaptive capacity, and access and experience also play a role in shaping individual's levels of OL. It is therefore important to develop research methods able to capture the complex, subjective, dynamic, multifaceted nature of personal human-ocean relationships.

In this workshop, I propose to explore the potential for using the arts-based method of body mapping storytelling (Gastaldo et al., 2012) to help access people's embodied, lived experiences of the ocean, which inherently reflect their personal circumstances, including cultural, historical, social and economic contexts. Participants will be invited to create visual representations of their own bodies (body maps) using a range of arts-based techniques. They will be invited to select symbols to add to their maps that represent their understanding of the role the ocean in their lives, their feelings about it, and the factors they perceive to be shaping their relationship with the ocean. By centring the body, participants will be able to communicate more deeply about their ocean identities and experiences as lived in an embodied manner, rather than through the spatial and temporal understandings of their experiences. This is enabled through engaging in creatively making something and critically reflecting on their creations, potentially challenging their taken-for-granted perceptions and accessing understandings that may not otherwise be accessible through language.

Although it is important to continue promoting understanding of the ocean as a physical environment, OL research must devote attention to developing methods able to capture the complexity of ways people relate to the ocean, and understand how this may be influenced by our sense of place, our history, values and culture, as these are also key to developing OL (Glithero and Zandvliet, 2021).

W08

ENGAGING EDUCATORS IN COASTAL MONITORING: A HANDS-ON WORKSHOP WITH THE COASTAL JUNIOR MONITORING PROJECT

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Coastal environments are invaluable resources that provide numerous ecological, economic, and recreational benefits. However, they are increasingly threatened by human activities and environmental changes. Effective conservation and management of these vital ecosystems require not only scientific expertise but also active engagement and stewardship from local communities.

The Monitoramento Mirim Costeiro (Coastal Junior Monitoring Project) is an innovative educational initiative aimed at empowering educators to promote ocean citizenship among students by engaging them in the care of their coastal zone. This fosters a deeper connection with the marine environment and encourages active participation in its protection and preservation. The project offers an outdoor workshop experience designed to equip educators with the knowledge, skills, and resources necessary to engage students in coastal monitoring activities. During the workshop, educators will be introduced to the Monitoramento Mirim Costeiro (MMC) citizen science methodology, a youth-centred approach to coastal monitoring developed in collaboration with local schools and environmental organizations. Through a series of interactive activities at the beach, participants will learn how to engage students in scientific inquiry and data collection and foster a sense of environmental stewardship among the next generation of coastal citizens. Topics covered will include water quality assessment, monitoring weather and oceanic conditions, marine debris surveys, and good practices in sustainability.

This project is developing a pedagogical model to foster ocean citizenship based on the Monitoramento Mirim Costeiro method (Schio and Reis, 2024). The testing of the pedagogical model with 1.592 students (children aged 7 to 11) and 83 teachers from 32 Portuguese schools allowed to verify the emergence of new knowledge, values, attitudes and competencies related to ocean citizenship. Preliminary findings underscore the model's significant potential to enhance ocean literacy, aligning with the Ocean Decade's objectives. Students and teachers developed new knowledge, skills, values, and attitudes towards ocean conservation, demonstrating the model's effectiveness in enhancing ocean citizenship.

The model's emphasis on extracurricular activities, coastal visits, and the cultivation of social and emotional connections with the sea, alongside promoting activism and ocean citizenship, mirrors the IOC-UNESCO proposal for blue school curriculum development. Such alignment suggests that the pedagogical model not only adheres to but advances the goals set forth by the Ocean Decade and Education for Sustainable Development, particularly SDG 14: "Protect the oceans and marine resources through ocean literacy and action".