



Marine and Inland Waters Research Symposium

former Panhellenic Symposium on Oceanography & Fisheries

2022

PROCEEDINGS

AKS Porto Heli Conference Center, Porto Heli, Argolida, Greece
16-19 September 2022



Supported by the
HCMR Researchers Association and the
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Under the auspices of the
Hellenic Centre for Marine Research

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EMSEA EDUCATIONAL ACTIVITIES PROMOTING OCEAN LITERACY IN THE MEDITERRANEAN REGION

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Abstract

In 2015, within European Marine Science Educators Association (EMSEA), the Regional Group for the Mediterranean Sea (EMSEA-Med) was established. Since then, this group has been working on the diffusion of the Ocean Literacy (OL) in the Mediterranean region. As a result, educational activities, for primary and secondary school students, consisting of lectures and workshops, were held at international events in three Mediterranean countries (Croatia, Greece and Italy), from 2018 to 2021. The activities outcome was assessed based on the observation of students' behaviour, comments, drawings and handcrafts, while for 465 students of 1,300 in total a pre- and post-test on OL content knowledge, pro-environmental attitudes and behaviour were applied. The results evidenced improvement in knowledge and awareness in most of the involved groups, suggesting that this approach can provide a positive sustained effect on students and possibly on their families, friends and local communities, thus contributing to the protection, conservation and sustainable use of marine resources and consequently to the wellbeing of future generations in the Mediterranean Sea region.

Keywords: primary school, secondary school, Mediterranean Sea Literacy, educational activities, EMSEA-Med.

1. Introduction

Ocean Literacy (OL) is *"...a tool, a framework and, more broadly, a mindset that forefronts the ocean in all aspects of life on Earth. As an approach for society as a whole, OL catalyzes actions to protect, conserve and sustainably use the ocean..."* (IOC-UNESCO, 2022). Acknowledging the importance of OL, a declaration in the high-level conference "Our Ocean", in 2017, which reads *"Support plans to foster ocean-related education, for example as part of education curricula, to promote ocean literacy and a culture of conservation, restoration and sustainable use of our ocean"*, was issued to support the implementation of Sustainable Development Goal 14 on the ocean, along with the United Nations Agenda 2030. Towards the achievement of this goal, ocean-literate citizens are a pre-requisite and therefore, the promotion of OL in education is vital (Santoro *et al.*, 2017).

In the early 2000s, an OL movement was born in the United States to bridge the existing knowledge gap about the two-way relationship between cause and effect of ocean deterioration and human wellbeing, evident in both school students and citizens. In 2011, a European Marine Science Educators Association (EMSEA) was established, followed by the EMSEA Working Group for the Mediterranean Sea (EMSEA-Med) at EMSEAs' annual conference held in Crete (Greece) in 2015, to disseminate OL principles and concepts in the Mediterranean region (Previati *et al.*, 2018). Since then, this group: a) organized many educational activities for primary and secondary school students and general public at international events; b) translated OL principles and concepts into several languages of the Mediterranean countries (see <https://www.marine-ed.org/ocean-literacy/translations>); c) carried out educational research (e.g. Mogias *et al.*, 2019; Koulouri *et al.*, 2022); and d) developed the regionally-specific Mediterranean Sea Literacy (MSL), based on OL principles and concepts (Mokos *et al.*, 2020a), a guide to better understand

the important role of the Mediterranean Sea in peoples' lives in the region and therefore the need for sustainable management of its depleted marine resources (Coll *et al.*, 2012).

The aim of this article is to present educational activities, concerning OL and MSL in the Mediterranean region, performed by the EMSEA-Med group, mainly in three Mediterranean countries (Croatia, Greece, Italy), in primary and secondary education, and to discuss their possible outcomes on forming and training "ocean/sea citizenship".

2. Material and Methods

The activities were held in primary and secondary schools in three Mediterranean countries (Croatia, Greece, Italy) at the European Maritime Day (EMD) and Mediterranean Action Day (MAD) events from 2018 to 2021 - involving 1,300 students - addressing different principles of OL and MSL (Table 1). They consisted of lectures and workshops including hands-on labs (e.g., "Mediterranean Sea is under "plastic siege". Be a part of the solution...Recycle!"), field work (e.g., "Meet your local sea"), role-play/game/competition (e.g., "Can not take your class to a Mediterranean seashore? We take the Mediterranean Sea into your classroom!"), drawing and handcraft activities (Table 1). In addition, intermediate sessions of questions and answers from educators to children and vice versa were performed, to ensure the understanding of each addressed topic. The duration of didactic interventions ranged between 1.5 and 5 hours.

Most of the activities have been assessed based on observation of students' behaviour, especially by asking questions during each activity, eliciting students' comments and by means of drawings and handcraft activities at the end of each session. Several of these activities, in which 465 students participated, included an assessment, pre- and post-activity, through the same questionnaire, to investigate students' knowledge and attitudes (Realdon *et al.*, 2019; Mokos *et al.*, 2020b), as well as their behaviour (Cheimonopoulou *et al.*, 2019), regarding ocean-related topics, while ensuring students' anonymity. Teachers' feedback was obtained through telephone calls after the activity.

Along with the activities under the umbrella of MAD 2021, a brochure was developed based on the MSL content (Mokos *et al.*, 2020a) in English and then translated into Croatian, Greek and Italian.

Table 1. List of educational activities of EMSEA-Med group concerning primary and secondary school students in Croatia, Greece, and Italy at EMD and MAD events.

Year	Event	OL/MSL principles addressed	Country	City	Student's age	Title of the activity	Type of activity
2018	EMD	1, 5, 6	Greece	Veria	8-10	A "sea" of plastic: How plastic wastes threaten our seas and therefore our lives.	Lecture, workshop
2018	EMD	3, 4, 5, 6	Croatia	Zadar	7-10	Sea and me	Lecture, workshop
2018	EMD	6	Italy	Monfalcone	6-14	Promoting Ocean Literacy	Practical labs
2019	EMD	1, 4, 5, 6	Greece	Veria	10-12	Hatching marine scientists on action! Learning about sea floor, currents and mountain fossils!	Lecture, workshop
2019	EMD	1, 2, 3, 4, 5, 6	Greece	Veria	13-15	Mediterranean Sea is under "plastic siege". Be a part of the solution... Recycle!	Lecture, workshop
2019	EMD	5, 6, 7	Croatia	Zadar	8-12	Little marine explorers	Workshop
2019	EMD	6	Italy	Monfalcone	6-18	EMD in the Extreme Northern Corner of the Mediterranean	Practical labs
2021	EMD	1, 2, 4, 6	Greece	Veria	8-12	Exploring a drop of sea water and not only...	Online lecture, workshop
2021	EMD	4,5	Croatia	Zadar	7-12	Wonders of the Adriatic Sea	workshop

Year	Event	OL/MSL principles addressed	Country	City	Student's age	Title of the activity	Type of activity
2021	MAD	1, 2, 4, 6	Greece	Veria	7-12	Marine photosynthetic organisms. How would our lives be without them?	Online lecture, workshop
2021	MAD	5, 6, 7	Croatia	Zadar	8-9	Meet your local sea	workshop
2021	EMD	6	Greece	Crete	10-11	Planet vs Plastic	Online lecture, handcraft activities
2021	EMD	6	Italy	Monfalcone	6-10	EMD at the extreme northern corner of the Mediterranean Sea	Online workshop
2021	MAD	5, 6	Italy	Monfalcone	10-11	"Can not take your class to a Mediterranean seashore? We take the Mediterranean Sea into your classroom!"	Practical labs, role-play

3. Results

The activities were successful according to students' comments, evidencing understanding, awareness and willingness to behave sustainably in order to protect the sea. Teachers expressed satisfaction and willingness to address OL and MSL topics, during school activities throughout the year, and explicitly requested to participate in similar activities, including fieldwork, in the future. Repeated collaborations with the same schools and teachers for several years, is indicative of the satisfaction and fruitful collaboration established between schools and EMSEA-Med members. Additionally, several schools that participated in these events are candidates for becoming European Blue Schools.

Concerning the activities with pre- and post- assessment, the results were encouraging. Most of them revealed a statistically significant increase in students' knowledge level and behaviour and an increase in positive attitudes towards the marine environment (Cheimonopoulou *et al.*, 2019; Realdon *et al.*, 2019; Mokos *et al.*, 2020).

MSL brochures were distributed among students and teachers to spread the word of MSL, while they are also available online on the EMSEA website (<https://www.emsea.eu/ocean-literacy/publications>). In January 2022, after the online presentation of the MSL brochure to the EMSEA community several volunteers started to translate the brochure into other Mediterranean languages such as Catalan, Maltese, Slovenian, Spanish, as well as non-Mediterranean languages, such as German.

4. Discussion/Conclusion

Students of elementary and partly of secondary school show an innate curiosity about nature; therefore, they are interested in acquiring new knowledge (US Commission on Ocean Policy, 2004) and building pro-environmental attitudes and behaviour (Hartley *et al.*, 2015). This is evidenced by the positive comments of students participating in the above-mentioned activities, their eagerness to participate in new ones and their increased knowledge, pro-environmental attitudes, and behaviour, even weeks or months after the interventions, (Cheimonopoulou *et al.*, 2019; Realdon *et al.*, 2019; Mokos *et al.*, 2020b), suggesting that this approach could represent a valuable strategy for building "ocean/sea citizenship". Moreover, children are potential agents of social change as they influence knowledge, attitudes, and behaviour of their families and friends (Hartley *et al.*, 2015). This way, students participating in such educational activities, can help in changing the perception of their community on environmental issues, at present, and most certainly in the future, as they will be the ocean/sea citizens who can understand the "dynamic balance" between their rights and duties on the ocean and in particular on the Mediterranean Sea.

The lack of ocean/sea topics in the school curricula of the three countries (Croatia, Greece, Italy), also

evident in other Mediterranean countries (Mokos *et al.*, 2021; Pocze *et al.*, 2020), and of specialized teacher training on marine issues, probably are the main factors for inadequate level of ocean/sea knowledge among students (Mokos *et al.*, 2020b). Educational activities, combining collaboration among schools and local scientists/marine research centres can complement the limited ocean/sea knowledge, provided by national curricula, and empower the diffusion of OL and MSL. A noticeable finding is that teachers also acquire substantial ocean/sea knowledge from these activities, especially the ones that had a lasting collaboration with EMSEA-Med members, and keep disseminating their new knowledge to their students all along the school year. Currently, several of these schools collaborating with EMSEA-Med members are candidates for becoming European Blue Schools, an initiative launched by EU4Ocean coalition in 2020 to actively engage teachers and students in ocean/sea education and citizenship.

Effective outreach and dissemination of ocean/sea knowledge to the general public (e.g., understanding of long-term impacts of human activities, historical ecology) is also important, as most people seem unable to recognize the impacts of their activities on the marine environment (Vincent, 2011; Stoll-Kleeman, 2019). EMSEA-Med members have participated in activities aimed at enhancing OL and MSL of the general public at international events, e.g., the Mediterranean Coast Day, the World Ocean Day and the UN Ocean Decade Laboratories.

Promotion of OL and MSL, in education, requires an integrated and holistic approach (IOC-UNESCO, 2022), including flexible and hybrid teaching and learning methods, new curricula and textbooks, teacher training and ready-to-use teaching materials, extracurricular activities and field trips, as well as spreading European Blue Schools initiative around the Mediterranean. All these actions will enhance pro-environmental attitudes and behaviour, contributing to the sustainable use of marine resources and, consequently, to the wellbeing of future generations in the Mediterranean region (Realdon *et al.*, 2019; Mokos *et al.*, 2020a, b; IOC-UNESCO, 2022). Emotional engagement of children, and people in general, with the ocean, is a key element to that direction (Vincent, 2011).

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