Proposed blue education experimentation in selected countries

(BlueLightS – D3.1 - A report on proposed blue education experimentation in selected countries)

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Table of Contents

List of Tables

List of Figures

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- Blue education
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Disclaimer

This deliverable on the status of Blue Education in a selection of European countries has been compiled based on information collected from a range of stakeholders in these countries. While the project partners have made every effort to engage with relevant parties and ensure the accuracy and comprehensiveness of the data presented, there may be omissions or gaps in our coverage. As such, this report may not fully capture the complete picture of Blue Education practices and initiatives in each country.

Our suggestions for experimentation and improvement are based on the information available to us and are intended to provide constructive recommendations for the enhancement of Blue Education. We encourage stakeholders to consider these suggestions in the context of their unique circumstances and to seek further input and collaboration as necessary to address any potential oversights.

1. Introduction

In this BlueLightS deliverable "D3.1 A Report on Proposed Blue Education Experimentation in Selected Countries", we present a detailed analysis of the status and future needs of Blue Education in Europe. In its sections we provide insights and findings to guide the development and enhancement of Blue Education across Europe.

The **methodology** section describes the approach used to gather data, including the design and implementation of the BlueLightS survey and complementary interviews with partners from five countries. The analysis process used to draw conclusions from the collected data is also described in detail.

The **survey results and country analysis** section provide a comprehensive analysis of responses from 64 participants across nine countries. The **key challenges and recommendations** section identifies challenges including insufficient funding, lack of educational resources, and curricular constraints. Recommendations for the country experimentations that can address these issues focus on promoting interdisciplinary and experiential learning, enhancing community involvement, and increasing the use of innovative technologies. Key findings indicate a need for integrating interdisciplinary approaches, ensuring sustainability in Blue Education, enhancing community engagement, and adopting innovative technologies more consistently. Addressing these areas can significantly enhance the effectiveness and reach of Blue Education initiatives across Europe.

Moving forward**,** the workshop is planned for September 2024 aiming to share project updates, review survey findings, and develop action **plans for local experimentations**. This workshop will facilitate peer reviews and the exchange of best practices among stakeholders.

Finally, the **conclusion** underscores the importance of a coordinated approach to advance Blue Education across Europe, and it highlights the benefits of integrated efforts to create sustainable educational systems that promote marine and freshwater conservation.

2. Methodology

To investigate current understanding and collect information on the level of implementation of key principles of blue education and identify challenges in the respective countries, we launched the **Blue education survey**.

This survey also intended to gather information on stakeholders' willingness to take part in the experimentation process and join the Community of Practice[1] which is the focus of WP1. The BlueLightS partners from nine countries were invited to identify education stakeholders that cover a diversity of components of the education system, mandates and responsibilities and share this questionnaire with them.

The first step in designing the survey which aimed to capture the state of Blue education in selected countries was to outline the fundamental aspects of traditional educational systems, alongside those specific to Blue Education. By offering a comprehensive overview of the areas where Blue education can complement existing educational systems, or be integrated into them, we aim to empower countries to focus their efforts to specific areas in their experimentation and achieve the maximum impact.

Results from the survey included 64 responses from 9 countries, with a wide range of public and private organisation types involved (**Figure 1**) with most answers coming from Ireland and Finland. However, since one of the primary goals was to capture the views of various stakeholders, the survey was greatly enriched by responses from individuals in other locations as well (such as France, Croatia, etc.), where governmental representatives shared their perspectives on the topic. For detailed information on breakdown of responses by country, see **Table 1**. For additional information on the survey see section **4.1**.

To enrich the qualitative analysis of the survey, in addition to the survey responses, we conducted **complementary interviews** with Croatia, Finland, France, Portugal and Spain. During these meetings, the partners provided further information on their national initiatives, shared views of main challenges and elaborated on possible actions which could enhance Blue education activities on national level. Additional input received from the interviewed partners was integrated in the Survey results and Country analysis and serves as validation of the initial survey findings. Furthermore, all remaining partners were provided with draft survey analysis for their countries and had an opportunity to supplement the initial survey findings with their local expertise.

Additionally, these complementary interviews and information obtained through the survey were used as a baseline for task 2.1 *Blue education in Europe: a stocktaking exercise,* where the current state of play of blue education was investigated, with special attention given to the experimentation countries. The information gathered throughout the survey allowed identifying the bottlenecks in Blue education in respective countries, and enhanced collaboration between BlueLightS' WP2 and WP3

[1] Community of Practice (CoP) serves as a dynamic digital hub facilitating collaboration among educational institutions and individuals committed to advancing sustainable development goals.

Following detailed country analysis (sections 4.2 – 4.10) based on the information gathered through the survey and complementary interviews, European Schoolnet offered conclusions on Experimentation needs (subsections 19 for each of the nine locations).

Following the publication of this report, a workshop is planned for September 2024, to share project updates and survey findings, and to determine the upcoming **experimentation plans**[2] for each location. In their expositions, each country will present their experimentation plan, which can be annexed to this document. This workshop will also serve as a collaborative exchange space, where the experimentation countries will have the opportunity to peer-review specific examples provided by their partners, share ideas and local expertise. Such collaborative effort might bring fruitful exchanges and further complement the experimentation plans of respective countries with different perspectives.

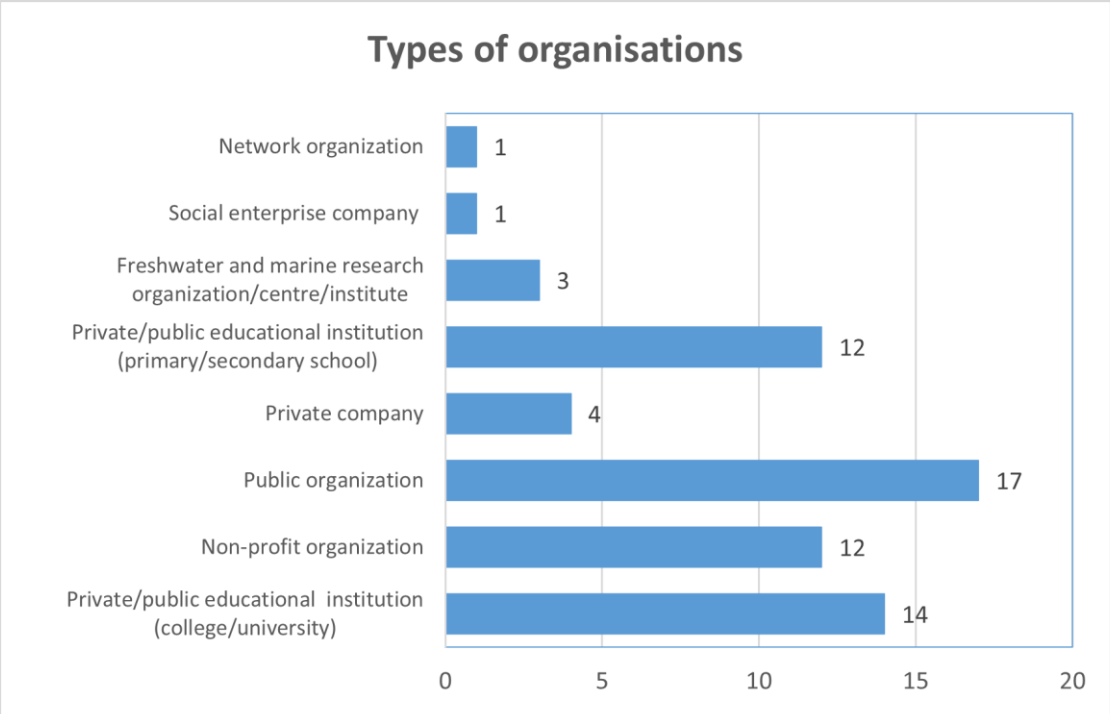

Figure 1. Types of surveyed organisations

2 Experimentation plans (roadmaps) will be prepared by each experimentation country. The template of the experimentation plan is available here: https://files.eun.org/scientix/bluelights/BlueLightS-WP3-Roadmap-Experimentation-plan-template.docx

3. Background information

In this section, we offer an outline of the fundamental elements of traditional educational systems alongside those specific to Blue Education. By highlighting these elements, we aim to provide clarity on where Blue Education can complement or integrate into existing systems, empowering professionals in the field to focus their efforts effectively for achieving maximum impact, collaboration and advancing the impact of both traditional and Blue Education.

These elements are later in the report reflected on the blue education recommendations provided per country, aiming to support the different countries in designing impactful and relevant experimentations.

The research done for these elements has been carried out in the framework of the BlueLightS project with the support of Scientix, the community for Science Education in Europe, an initiative of European Schoolnet.

3.1. Educational system and its main elements

Educational systems worldwide vary greatly in their structure, methodologies, and cultural contexts, reflecting the diverse needs and values of different societies. Despite this complexity and diversity, they all include comprehensive policies and procedures while they share common elements aimed at nurturing knowledge, skills, and personal development. The shared components, providing insight into the foundational principles that underpin educational systems include:

- **Students/Learners:** The focal point of any educational system, students/learners are individuals seeking knowledge and skills to facilitate personal development and contribute to society.
- **Learning Environment:** This encompasses physical spaces, digital platforms, and socio-cultural contexts where learning takes place, crucially impacting student engagement and outcomes.
- **Assessment/Evaluation:** Methods and tools used to measure student progress and achievement, ensuring educational objectives are met and informing instructional practices.
- **Educational Resources:** Materials, tools, and facilities utilised to facilitate teaching and learning, including textbooks, digital resources, laboratories, and educational technologies.
- **Teaching Methods**: Strategies and approaches employed by educators to facilitate learning, adapting to diverse student needs and learning styles, including traditional lectures, project-based learning, outdoor schooling, etc.
- **Community & Parental Involvement:** Collaboration between educational institutions, families, and local communities to support student learning and holistic development.
- **Support Services:** Additional services provided to students to address their diverse needs, including counselling, special education, and extracurricular activities.

- **Administration:** Structures and processes responsible for managing educational institutions, including leadership, policies, regulatory frameworks, financing instruments etc.
- **Governance:** Decision-making frameworks including institutional set-up, roles and responsibilities.
- **Education Research & Development**: Researchers and institutes carrying out research activities and developing innovative approaches.
- **Capacity Building and Professional Development**: Continuous development of educators' skills, which equip them with adequate knowledge to prepare students for the jobs of tomorrow, by following the changes in current job market and required skills.
- **Technology Integration:** Incorporation of technology into teaching and learning practices to enhance engagement, accessibility, and effectiveness.
- **Teachers/Instructors:** Educators who facilitate learning, impart knowledge, and inspire students through their expertise, guidance, and mentorship.
- **Curriculum:** Structured framework outlining educational goals, content, and methods that guides teaching and learning experiences to ensure coherence and alignment with educational objectives.

A visual representation on these components can be seen in **Figure 2**

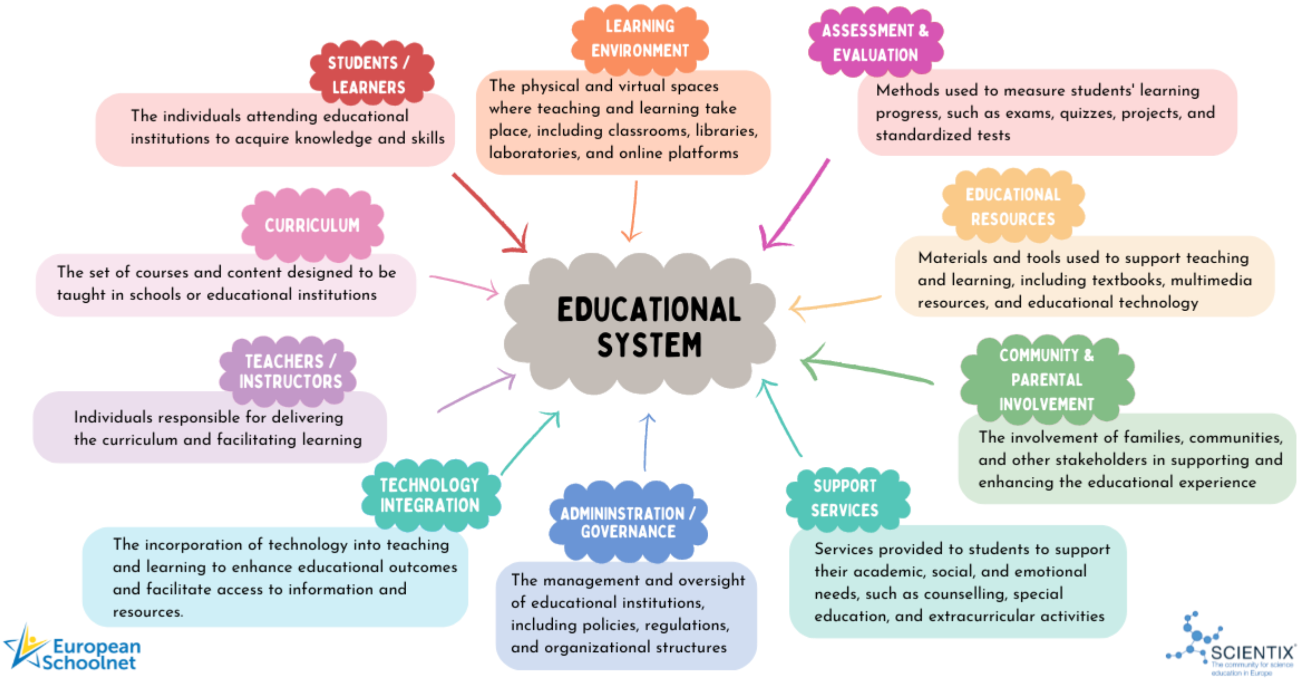

Figure 2. Main elements of an educational system[3]

3.2. Contribution of blue education in different elements of the educational systems

In 2015, all United Nations Member States adopted the 2030 Agenda for Sustainable Development[4], which presents a collective roadmap for peace and prosperity for both humanity and environment. Central to this agenda are 17 Sustainable Development Goals -SDGs (see **Figure 3**), which call all countries and sectors to join forces to achieve sustainability by addressing challenges related to sustainable development (Bianchi et all, 2022).

Sustainable development goals[5] cover a wide range of interconnected issues, including among others education, climate action, and life below water; within the latter, United Nations underlined the importance of life below water and imperative of conserving the oceans and marine resources for sustainable development. By defining ten targets and offering practical examples of what we can do to preserve the oceans, SDG14 is essential for promoting

[3] Source: European Schoolnet/Scientix

4 Agenda for sustainable development: 21252030 Agenda for Sustainable Development web.pdf (un.org)

5 Sustainable development goals: https://sdgs.un.org/goals

sustainable development and ensuring marine world preservation. Additionally, as the ocean is crucial for regulating climate and is tightly connected to SDG 13, failure to achieve these goals would make achieving Agenda 2030 close to impossible (United Nations, 2023).

Figure 3. Sustainable Development Goals[6]

Below, we outline the educational system elements and explain how Blue Education can be integrated into them.

- **Students/learners:** When considering the element of students/learners within educational systems, integrating Blue Education involves nurturing a generation of environmentally conscious and responsible citizens who are equipped with the knowledge, skills, and values necessary to understand and address the challenges facing marine and aquatic ecosystems. This includes fostering a sense of connection and respect towards the natural world, promoting critical thinking and problem-solving skills related to environmental issues and addressing the complex human-nature relationships, and instilling a commitment to sustainable behaviours and practices in many areas of their daily life.

  Furthermore, Blue Education seeks to empower students as active participants in environmental conservation efforts, providing them with opportunities to engage in hands-on learning experiences, community-based projects, and advocacy initiatives related to marine and aquatic conservation.

- **Learning environment**: Blue Education can significantly contribute to the learning environment by incorporating experiential and environmental learning opportunities related to marine and aquatic ecosystems. This can involve field trips and open schooling projects in coastal areas, visits to aquaria or marine research centres, hands-on activities such as water quality testing or marine life observation, and participation in conservation projects. Field

6 Source: https://www.un.org/sustainabledevelopment

trips and outdoor activities are particularly important because regular exposure to nature improves connection with nature (Duerden and Witt, 2010; Ives et al., 2017; Berto, 2017), and declining experiences in nature reduce opportunities for engagement that can promote nature conservation ((Pyle, 2003; Kahn, 2002). By integrating these experiences into the learning environment on a regular basis, students can develop a deeper connection with the natural world, gain a better understanding of marine ecosystems and their importance, and foster a sense of protection towards the oceans and waterways.

- **Assessment/evaluation**: Integrating Blue Education involves developing meaningful and holistic assessment strategies to measure student learning outcomes, environmental literacy, and engagement with marine and aquatic ecosystems.

  Assessment and evaluation in Blue Education may include:

  - **Project-based learning:** Incorporating project-based assessments that allow students to investigate marine and aquatic issues, conduct research, develop solutions, and communicate their findings through presentations, reports, and multimedia productions (Hungerford, 1990).
  - **Reflection and self-assessment:** Encouraging students to reflect on their learning experiences, environmental attitudes, and personal growth through journaling, self-assessment activities, and peer feedback, fostering metacognitive skills and self-awareness (UNESCO, 2017).
  - **Qualitative assessment methods:** Using qualitative assessment methods such as interviews, focus groups, and classroom observations to gather rich, descriptive data on students' experiences, perceptions, and learning outcomes in Blue Education programs (Dillon, 2006).

- **Educational resources (in Blue Education and Blue Economy)**: These involve, among others, materials produced by the European initiatives, supported by DG MARE, which contribute to ocean literacy. Among resources, this involves various platforms (such as the EU4Ocean Platform, the European Atlas of the Seas etc.) Additionally, this encompasses various replicable materials and methodologies which are developed not only in English, but also in other languages.

- **Community and parent involvement:** This element encompasses various dimensions, each playing a crucial role in upscaling Blue Education initiatives and fostering a culture of environmental responsibility within communities. From individual school programs to collaboration with environmental organisations and blue economy professionals, involvement of the local community, and engagement with regional and national governments, the active participation of stakeholders at all levels is essential for sharing knowledge, promoting awareness, inspiring action, and shaping projects and policies compliant to Blue Education. Fostering positive impact and contributing to development of empathy and respect for the marine environment in young students, they are more prone to becoming eco-citizens who are fully involved in their local communities. Additionally, the contributions of researchers, experts, and academia – including from the human science domains - further enrich the uptake of Blue Education, providing valuable insights and resources for lifelong learning and sustainable practices. In more detail, this would entail:

- **Upscaling blue education**: Within this aspect, we differentiate two school programmes for upscaling blue education: individual and national. While the latter will depend on the national bodies, the individual school program might include specific actions related to promotion of blue careers, raising awareness of the blue education and its importance, which may include various workshops, events, pledges, and other actions aimed at students and teachers.

- **Collaboration with environmental / conservation organisations**: This involves different activities (co)organised by various organisations with focus on improvement of blue education and can vary from tourism-oriented activities to those aiming to raise awareness on the environmental challenges, including inland and coastal areas.

- **Promotion of Blue careers**: Focus on opportunities in blue sector, presented through role models and various workshops/events focused on inspiring young students to pursue careers in marine economy.

- **Involvement of local community**: Through various channels and activities, such as promotions, presentations, dissemination, etc, schoolchildren and their parents can be involved at different levels of interventions. An example would be through open schooling and citizen's engagement into blue sustainability.

- **Involvement of regional and/or national government**: Starting from internationally recognized bodies and their dedication to enhancing the position of blue education in general, this cascades further to national and regional governments. Some examples of such involvement are Charter for Blue Education[7] which aims for aligning strategies between European education networks and sustainability initiatives, and the pledge made by Audrey Azoulay, UNESCO Director-General, during her presence in the One Ocean Summit 2022: "The international community must make education one of the pillars of its action for the ocean. Because if we want to protect it better, we must teach it better. On the occasion of the One Ocean Summit, I am setting a common objective for our 193 Member States: to include ocean education in school curricula by 2025."

- **Researchers / experts**: Apart from the well-established experts in the field and their publications, universities and academia, this area includes experts dedicated to lifelong learning and connecting directly to schools about Blue education and its overall environmental impact.

- **Support services:** Support services within educational systems, encompass a range of services and resources designed to address the diverse needs of students, educators, and stakeholders involved in environmental education and conservation efforts, including those related to Blue Education.

  Support services in the context of Blue Education may include:

[7] Signatories of the Charter for Blue Education: https://maritime-forum.ec.europa.eu/system/files/2022-08/charter_for_blue_education_final_final.pdf

   - **Environmental counselling:** Providing guidance and support to students and educators on environmental issues, conservation practices, and sustainable lifestyles. This could involve counselling sessions, workshops, and resources to promote environmental awareness and behaviour change (UNESCO, 2017).

   - **Professional development:** Offering training and professional development opportunities for educators to enhance their knowledge and skills in Blue Education pedagogy, curriculum development, and instructional strategies. This could include workshops, conferences, and online courses tailored to the needs of educators working in marine and aquatic education (Rickinson, 2004). Additionally, this category includes peer-to-peer learning, through which the educators have the opportunity to learn from their colleagues and improve their understanding of the blue topics. Such learning can be organised during face-to-face or online workshops, but also via rubrics[8] developed for specific activities.

   - **Access to resources:** Ensuring equitable access to educational materials, technology, and financial resources to support Blue Education initiatives, particularly in underserved communities. This could involve providing funding for field trips, equipment, and curriculum materials, as well as access to digital resources and online learning platforms.

- **Administration and governance:** When considering the administration and governance within educational systems, integrating Blue Education involves establishing policies, frameworks, and structures that support the implementation of blue education initiatives. This may include creating dedicated departments or committees focused on environmental education and sustainability, allocating resources for blue education programs and activities, and ensuring alignment with national or regional educational goals and priorities.

  Furthermore, effective governance entails collaboration between governmental bodies, educational institutions, non-profit organisations, and other stakeholders to develop and implement policies that promote blue education at all levels of the education system (UNESCO, 2014). This could involve establishing partnerships with marine research institutions, environmental NGOs, and industry stakeholders to enrich learning opportunities and support educators in delivering high-quality blue education content.

  Additionally, transparent communication channels and mechanisms for stakeholder engagement are essential for ensuring accountability and fostering a culture of environmental stewardship within educational governance structures (Van Zejil-Rozema, 2008). By incorporating the goals of the Charter for Blue education into administrative and governance frameworks, educational systems can effectively nurture a generation of environmentally literate citizens who are equipped to address the challenges facing our marine ecosystems and oceans.

[8]Example of the rubric created for peer assessment in Bring the Ocean into your Classroom MOOC: https://www.europeanschoolnetacademy.eu/asset-v1:EU4OCEAN+BlueSchools+2024+type@asset+block@Bring-The-Ocean-Into-Your-School-Rubric.pdf

- **Technology integration:** Regarding technology integration within educational systems, incorporating Blue Education involves leveraging digital tools and platforms to enhance learning experiences and promote environmental awareness, sustainability, and conservation efforts related to marine and aquatic ecosystems. Technology integration in Blue Education may include:

    - **Interactive Learning Resources:** When not feasible to physically visit specific areas, innovative techniques such are developing digital simulations, virtual field trips, and interactive educational games that allow students to explore marine environments and ecosystems in immersive ways (Brečka, 2022) could be very useful.

    - **Online Learning Platforms:** Utilizing learning management systems and online platforms to deliver Blue Education curriculum materials, resources, and activities, enabling flexible and accessible learning experiences for students and educators.

    - **Data Visualization and Analysis Tools:** Integrating geographic information systems (GIS), satellite imagery, and data visualization tools to facilitate the analysis and interpretation of environmental data related to marine and aquatic ecosystems, promoting scientific inquiry and data-driven decision-making (Fauville, 2013).

    - **Citizen Science:** Engaging students in citizen science projects using digital platforms and mobile applications to collect, analyse, and contribute data to ongoing research efforts on marine biodiversity, water quality, and ecosystem health (Haleem, 2022).

    - **Digital Communication and Collaboration:** Facilitating online communication and collaboration between students, educators, scientists, and environmental experts to share knowledge, exchange ideas, and collaborate on conservation projects and initiatives.

  Technological innovation must also be integrated and balanced with other forms of innovation such as green and blue innovation, including by opening schools to communities and extending learning beyond the classroom into innovative learning environments such as oceans or other natural environments, which can foster emotional connectedness with nature (United Nations, 2024). By integrating technology and innovative teaching methods into Blue Education initiatives, educational systems can enhance engagement, accessibility, and effectiveness, empowering students, and educators to become informed and active participants in efforts to protect and conserve our oceans and waterways for future generations.

- **Teachers/instructors (professional development)**: The principles of Blue Education need to be included in the teachers' professional development programmes and aim to equip them with tools and knowledge to introduce the blue topics in their classrooms. To achieve this, professional development initiatives should encompass a variety of formats such as online and face-to-face workshops, webinars, seminars, or Massive Open Online Courses (MOOCs) focused on Blue Education and relevant technology applicable to teaching blue topics. These programs not only enhance teachers' understanding of ocean and freshwater-related issues but also equip them with innovative teaching methodologies to engage students effectively. Examples of recent professional development programmes organised in collaboration with EUN:

- MOOC Bring the Ocean into Your School https://apps.europeanschoolnetacademy.eu/learning/course/course-v1:EU4OCEAN+BlueSchools+2024
- Workshop and webinar Unlocking Ocean Literacy and European Blue Schools: https://www.scientix.eu/documents/10137/1644918/EU4Ocean-presentation-WEBINAR-Final.pdf/314803f4-d337-87e9-b50d-a55899bfabc7?t=1701267404477
- Science Project Online Workshops on Plastic Pollution and Working with ocean Technology: https://bit.ly/EU4Ocean-SPOW

In addition to the programmes listed above, the online courses BlueMinds4Teachers were also organised during 2024, and accompanied by a digital toolkit.

- **Curriculum**: In view of the urgent planetary environmental crisis, education for sustainable development, including climate and ocean literacy, should be integrated into curricula and teaching (United Nations, 2024). While some countries Prioritise blue education and include it in the curricula, under specific subjects such are Physics, Chemistry, Biology and Geography, in other countries blue education is part of the environmental education, under Natural Sciences. European Schoolnet conducted a comprehensive curriculum analysis in 2020 (Pocze, 2020) from a representative sample of nine (9) countries that included the countries of provenance for the consortium and Germany.

3.3. Main Trends and Dynamics of Educational systems

When designing the Blue Education experimentations in the selected countries, it is crucial to consider the specific contexts in which these educational systems will operate. In 2024, the educational landscape is evolving rapidly due to technological advancements, societal changes, and global challenges. The diversity of current educational trends has the potential to significantly influence the key elements of these systems, making it essential to account for these factors.

- **Technology Integration** In 2024, technology remains an important aspect of modern education, with schools and various educational institutions heavily using digital tools to enhance learning. Virtual reality (VR), augmented reality (AR), and artificial intelligence (AI) are gradually integrated into the curriculum, offering immersive and interactive learning opportunities. Online platforms and mobile apps facilitate flexible and modular learning, allowing students to access educational resources anytime, anywhere. In addition, data analytics and machine learning algorithms are used to personalise instruction, providing tailored support to students based on their individual learning styles and needs (Siemens et al, 2011). However, concerns have been raised about the detrimental effects of excessive and unregulated use of digital tools in classrooms, such as distraction, lack of focus, and minimal pedagogical guidance, which can negatively impact learning outcomes (UNESCO, 2023)
- **Blended Learning Models**: In the aftermath of the Covid-19 crisis, we can see that blending traditional classroom instruction with online components, is still very much present in 2024. This approach combines the

benefits of face-to-face interaction with the flexibility of digital learning, addressing students' diverse learning needs. Teachers make use of digital resources for better illustrating and introducing new concepts to their students, while they are using face-to-face opportunities for implementing collaborative and hands-on activities and discussions. (iDreamEducation, 2024).

- **Emphasis on Skills Development**: In response to the pressing demands of the job market, educational systems in 2024 prioritise the development of both essential skills and academic knowledge. Critical thinking, creativity, communication, collaboration, and digital literacy are reflected throughout curricula, aiming to prepare students for future success. Project-based learning, problem-solving, and real-world challenges provide opportunities for students to apply theoretical concepts in practical contexts (World Economic Forum, 2023).

- **Equity and Inclusion initiatives:** In 2024 educational institutions prioritise equity and inclusion initiatives to ensure all students have equal opportunities for success. Efforts are made to reduce barriers to education, including socioeconomic, racial, and gender issues. Culturally conscious teaching practices are used to create inclusive learning environments that promote diversity and promote respect for all backgrounds and different opinions. Additionally, targeted support programs and interventions are implemented to meet the needs of all student populations, fostering greater equity in educational outcomes.

- **Student Well-being**: In 2024, a strong emphasis is given on student well-being. Schools are gradually prioritising the mental, emotional, and physical health of students, adapting their daily routines and curricula. Social-emotional learning (SEL) programs are implemented to promote self-awareness, emotional regulation, empathy, and interpersonal skills. Counselling services, mindfulness practices, and wellness initiatives are provided to support students in managing stress, building resilience, and fostering positive mental health.

- **Behavioural and Transformative Change:** In response to escalating environmental challenges, behavioural and transformative change has become a critical trend in the educational sector. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the Intergovernmental Panel on Climate Change (IPCC) have both emphasised the importance of education in minimising biodiversity collapse, reducing CO_2 emissions and fostering a change in lifestyle at a systematic level (IPCC, 2022 and IPBES 2019). Schools are willing to increasingly incorporating project-based learning that focuses on real-world environmental problems, promoting critical thinking and problem-solving skills, with the aim to foster a generation that is not only aware of environmental issues but also equipped to address them, even if it remains a challenge of integrating these elements into current teaching methods.

- **Lifelong Learning**: The concept of lifelong learning gains traction in 2024. Educational systems emphasise the importance of ongoing learning beyond formal schooling, encouraging individuals to engage in continuous professional development and upskilling throughout their lives. Flexible learning pathways, micro-credentials, and competency-based assessments enable individuals to pursue personalized learning journeys tailored to their career goals and aspirations, facilitating lifelong learning as a cornerstone of personal and professional growth.

In 2024, educational systems are characterised by innovation, adaptability, and a commitment to preparing students for success in a rapidly changing world. Through the integration of technology, adoption of blended learning models, emphasis on skills development, focus on equity and inclusion, prioritization of student well-being, and promotion of lifelong learning, educators and policymakers are shaping an educational landscape that empowers learners to thrive in the 21st century and beyond.

4. Survey results and Country analysis

4.1. General information on the survey analysis

This report on Proposed Blue Education experimentation in selected countries has been compiled based on information gathered through the survey filled in by a range of stakeholders in experimentation countries and enriched with the complementary interviews. Despite efforts to ensure accuracy and comprehensiveness, there may be gaps in capturing the complete overview of Blue education practices and initiatives in each country.

Therefore, we recommend the following chapters are considered in context of location's unique circumstances, alongside further input and collaboration necessary to address any potential oversights.

The following chapters include individual country analysis for nine experimentation countries, based on the responses collected through the BlueLightS survey, which collected 64 valid responses from nine countries. The distribution of responses per country is presented in Table 1 below.

Table 1. BlueLightS Survey: Responses per country

Croatia	Finland	France	Greece	Ireland	Portugal	Romania	Spain	Sweden
6	9	3	5	17	6	6	6	6

The survey invited a diverse range of stakeholders (**Figure 1**) to share their views, enriching the responses and providing valuable insights into specific areas. However, given that EUN's conclusions on Experimentation needs (subsections 19 for each of the nine locations) and survey analysis are based on a small sample of stakeholders, there may be gaps regarding the involvement of specific organisation types in promoting and implementing Blue education activities in the respective countries. Such gaps highlight the need for local expertise and strong collaboration among BlueLightS partners, who can help clarify the state of Blue education in selected European countries through joint efforts.

As per the survey results, 92% of the surveyed stakeholders already contributed to the Blue education activities (see **Figure 4**), which indicates that there is awareness on the Blue education in experimentation countries, and that the majority of surveyed organisations are already actively contributing to its development.

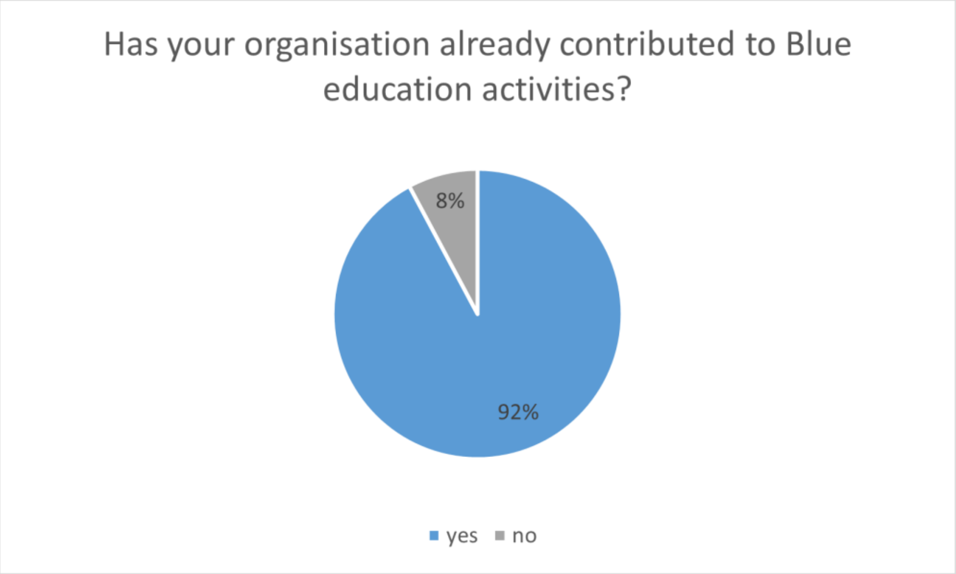

Figure 4: Contribution of surveyed organisations to Blue activities

Questionnaire design

The questionnaire designed for data collection consisted of 15 questions and explored specific areas:

- Respondents' background information
- Bleu education in respondents' countries
- Experimentation and challenges

To reduce respondents' burden, the questionnaire consisted mainly of multiple-choice questions, some open-ended questions and Likert scales. To address the limitations of Likert Scales, the respondents were also given the opportunity to provide additional input and capture the complexity of their opinions. In addition, respondents were not always required to answer all questions as some of them were only made available under certain conditions i.e., only if respondents answered positively to certain questions. The estimated time for completion, if all questions were answered, was 25 minutes. To access the complete survey questions, see *Annex.*

Data collection timeline

The data collection was launched on the April 30th, 2024, and lasted until the June 17th of the same year via purposive sampling[9]. As the main audience of the survey were selected stakeholders form nine countries, the survey was not disseminated via social networks, but rather via experimentation country partners who identified and reached out to experts on national level.

The questionnaire was available in English and available to all stakeholders from the education community from all countries of the European Union[10] and associated to the European Union. The questionnaire was designed in English and all data was collected through MS forms[11] and was anonymous, without any personally identifiable questions.

4.2. Blue education in Croatia

4.2.1. Status of Blue Education in Croatia

The analysis of the status of Blue Education in Croatia is based on six responses which come from different organisations: one from a private company, one from an NGO, one from a public organisation - governmental institution and three from public educational institutions (universities). The data provides insights into various existing initiatives and aspects of surveyed organisations' involvement in Blue Education activities. In this short report we attempt to summarize the key findings and draw some initial conclusions.

The survey responses were followed by an interview with the representatives from the University of Zadar, a BlueLightS project partner, which provided additional insights into the different areas discussed in this section.

4.2.2. Focus areas in Blue education

In Croatia, various institutions are actively engaged in Blue education through a range of initiatives. Most of these initiatives contribute to Blue education as non-formal education activities.

One of the public educational institutions (universities) organised a scientific and professional conference on sustainable development, offered field trips, outdoor educational programs, and collaborated with environmental

9 The main goal of purposive sampling (also known as judgmental, selective or subjective sampling) is to focus on particular characteristics of a population that are of interest, which in this case are the educational stakeholders in experimentation countries. For further details on this technique see: https://dissertation.laerd.com/purposive-sampling.php#explained

10 Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

11 The survey was conducted through MS Forms which processed this survey and may have therefore collected, stored and/or transferred respondents' IP addresses in accordance with its own terms and conditions which can be found at: https://privacy.microsoft.com/en-us/privacystatement

organisations and Blue businesses, targeting pupils, but also general public. It also implemented research projects, promoted Blue careers, and integrated Blue elements into curricula.

One of the non-profit organisations from Croatia focused on the following areas in relation to Blue education: workshops for pupils, field trips, and partnerships with conservation groups and academic institutions. Similar response was received from the surveyed private company, which is engaged in Blue education activities and develops awareness campaigns for pupils, youth and general public, educational podcasts/short e-products, and collaborates with environmental and academic organisations.

4.2.3. Initiatives or other programs

According to the respondents, apart from their activities, there are additional blue education initiatives existing in Croatia delivered by other organisations. Most of the existing initiatives and activities are mutually disconnected, organised at the local and regional scale. Also, there is a lack of systematic projects and initiatives at the national scale. Only recently, there are some projects aiming at educating teachers and educators and providing useful teaching resources at the national scale.

The survey indicates a mix of awareness levels across different types of organisations. While public educational institutions (universities) and non-profit organisations are more aware of specific initiatives and projects, some public organisations (governmental institution) show no familiarity with Blue Education programs. This shows discrepancies between governmental organisation and other blue education actors, indicating the need for building bridges and better communication between these organisations.

However, for more than three decades, in Croatia there is a strong presence of UNESCO's project -The South Eastern Mediterranean Sea Project (SEMEP), which aims to engage young people, educators, and communities in the Eastern Mediterranean region[12] in activities and studies aimed at understanding and protecting the environment, including the marine and coastal areas.

SEMEP was launched at UNESCO's General Conference in 1993, and it became a platform for dialogue and cooperation among its National Coordinators and is reaching beyond the school to the community and to politicians. Intercultural dialogue over the whole region has been promoted in particular through the development of student exchanges between SEMEP countries. As per information from 2012, over 5000 students and over 300 teachers were actively involved in SEMEP (UNESCO, 2012).

Some of the key objectives of this initiative are:

- Increasing awareness among students and educators about the importance of the marine and coastal environment in the Eastern Mediterranean and promoting sustainable development practices.

[12] SEMEP member countries: Croatia, Cyprus, Egypt, Greece, Israel, Italy, Jordan, Palestinian Authority, Romania, Slovenia, and Turkey.

- Fostering cross-cultural understanding and cooperation among the participating countries through collaborative projects and exchanges.

In Croatia, SEMEP has been implemented since 1996, and coordinated by the Agency for Education and Training. Every year, an inter-municipal meeting is organised for SEMEP county coordinators. Additionally, during the annual Summer School organised at the island of Vis, students independently present projects and, together with teachers, participate in lectures, fieldwork, and workshops on ecological issues, marine life, communication, and the cultural and linguistic heritage of Croatia, among other topics. So far, 24 summer schools have been organised, with more than 450 school projects presented, involving over 800 students and 100 teachers.

The project has expanded its activities beyond schools to engage local communities, and it includes participation in student exchanges between SEMEP countries. Currently, approximately 40 schools, primarily high schools, are active in both coastal and inland areas of Croatia. Their activities are showcased at conferences both nationally and internationally (Agency for Education and Training, n.d.). For further information on the initiatives, see section *Resources on activities/initiatives in Croatia gathered through the survey*.

4.2.4. Interdisciplinarity

The respondents from various types of organisations in Croatia consider that maturity of the country in relation to interdisciplinarity is at relatively low level, ranging from “very little” to “to some extent” indicating that there is still a lot to do to integrate various subjects such as science, geography, history, literature, and art to provide a comprehensive understanding of water systems and their interconnectedness with other aspects of life.

Respondents have limited awareness or engagement with the concept of interdisciplinarity in Blue Education, with most indicating "very little" or "to some extent" familiarity. None of the respondents reported a high level of integration of various subjects for a comprehensive understanding of water ecosystems.

4.2.5. Experiential Learning

The respondents indicate “very little” to “to some extent" the existence of possibilities for experiential learning, showing there is a recognition of experiential learning activities to some extent. These answers also indicate there is significant room for providing hands-on experiences, field trips, and practical activities that allow students to directly engage with water ecosystems, fostering a deeper appreciation and understanding of the ocean.

4.2.6. Sustainability

Answers to this question revealed differences in the awareness and engagement of sustainability in education among surveyed organisations, varying from “very little” to “a lot”. Some organisations consider that there is very little of engagement of sustainability and conservation and sustainable use of water resources, while others think it is present “a lot” or “to some extent”. This diversity of answers indicated different awareness of existing initiatives and the need for better collaboration and communication between organisation that contribute to blue education in Croatia.

Additionally, a study **How to Increase Ocean Literacy for Future Ocean Sustainability? The Influence of Non-Formal Marine Science Education** (Mokos, 2020) suggests that there is a need for an integrated approach to the teaching of Ocean Literacy in Croatia. The results of the survey, which involved over eighty students, indicate the need to implement ocean literacy into teaching, starting from the early grades by combining teachers' professional development, strengthening ocean-related topics in school curricula, and promoting non-formal educational activities.

4.2.7. Cultural and Historical Context

These responses show limited awareness and implementation. Public educational institutions (university) and a private company reported very little engagement with these topics, while a non-profit organisation and a public organisation (governmental institution) acknowledged some degree of integration ("to some extent"). This indicates that while some organisations recognize the importance of cultural and historical contexts in ocean education, there is a low level of awareness and implementation across the surveyed groups.

4.2.8. Global Citizenship

The responses regarding the promotion of global citizenship in Blue Education, emphasizing the interconnectedness of water and the impact of human activities on marine environments, indicate varying levels of engagement. Public educational institution (university) reported very little promotion and application of global citizenship in education, while a non-profit organisation indicated no engagement at all ("not at all"). In contrast, a public organisation (governmental institution) acknowledged some degree of focus on global citizenship ("to some extent"), and a private company reported a significant emphasis on these issues ("a lot"). Overall, there is a notable disparity in the awareness and implementation of global citizenship principles across different types of organisations which indicates the need for better communication and collaboration between the blue education stakeholders.

4.2.9. Innovation and Technology

The responses regarding the use of innovative technologies and scientific developments in Blue Education, aimed at studying, monitoring, and protecting water ecosystems while fostering creativity and problem-solving skills, reveal a generally low level of implementation. Responses in the survey ranged from "not at all" to "to some extent", again, showing disparities in the awareness of the surveyed organisations.

On the other hand, both a public organisation (governmental institution) and a private company acknowledged some degree of utilization of innovative technologies ("to some extent"). This suggests that while there is some awareness and use of technology for water ecosystem protection among public and private organisations, public educational institutions and non-profits are less engaged in these activities.

Furthermore, the choice of technological tools could vary according to the age of the students. Older students may benefit from advanced technologies such as drones or specialized programming activities like robotics, which can enrich their learning experiences. On the other hand, younger students could benefit from educational games as an additional resource to support their understanding of sustainability. However, the use of technology also depends on the available equipment in schools, and teachers' engagement in organizing activities which would utilize new technologies which could complement the core objectives of the lessons.

4.2.10. Community Engagement

The responses regarding community engagement in Blue Education, which involves engaging local communities, stakeholders, educators, and citizens in water conservation efforts while recognizing traditional knowledge and practices related to the sea and rivers, show varied levels of involvement. Answers varied from "not at all" to "to some extent" showing different awareness of community engagement in education. A non-profit organisation acknowledged some degree of engagement ("to some extent"), while both a public organisation (governmental institution) and a private company reported very little engagement.

Overall, the feedback gathered through the survey highlights a mixed but generally low level of community engagement across different types of organisations, with some recognition of traditional knowledge and practices.

However, Croatia took an important step towards engaging stakeholders form different sectors through Local Action Groups (LAGs). These groups aim to implement local development strategies and projects within rural areas, gathering stakeholders from local authorities, business sectors, civil society organisations, and local residents in collaborative partnerships.

As per the latest available data, there are 56 LAGs in Croatia, which cover an area of 52,190.05 km² (92.30% of the total area of Croatia). There are 2,446,567 inhabitants in the area of LAGs, which makes 57.10% of the total population of Croatia. In addition, 14 fisheries LAGs (FLAGs) were established as partnerships between the fisheries sector and other local stakeholders. FLAGs use support funds from the European Maritime and Fisheries Fund intended for fisheries and aquaculture areas regulated by the Operational Program for Maritime Affairs and Fisheries in the programming period 2014-2020.

4.2.11. Environmental Justice

The responses regarding the focus on environmental justice in Blue Education indicate a generally low level of engagement and presence of this topic in the education. A non-profit organisation, and a private company all reported very little engagement with environmental justice. Only a public organisation indicated a moderate level of involvement ("to some extent"). This suggests that there is limited awareness and action on environmental justice issues across most surveyed organisations, with some recognition and effort primarily within public organisations.

4.2.12. Adaptation and Resilience

In summary, across these various sectors in Croatia, there is a predominant trend of limited efforts and awareness regarding climate resilience and preparing for future water health challenges. Public educational institution, along with non-profit and public organisation (governmental institution), generally indicate minimal presence of these topics in education. However, there is a notable exception within the private sector, where the surveyed company is taking significant action. This indicates potential areas for improvement and the need for increased focus and resources to enhance climate resilience education and preparation across all sectors.

4.2.13. Lifelong Learning

The responses show low level of lifelong learning initiatives in education varying from “not at all” to “to some extent”, indicating a lack of initiatives or awareness about these initiatives in fostering a lifelong passion for water issues. One public organisation shows slightly better result, with response of "To some extent," indicating the existence of some effort but not comprehensive.

Overall, the main challenges include a general lack of awareness, insufficient initiatives, and varying levels of engagement across different sectors.

There is a number of initiatives in Croatia which significantly influence importance of lifelong learning in Blue education. Some of these initiatives were also presented at the Ocean Literacy Islands, during the Ocean Literacy in Action at the European Ocean Days (Blue World institute), while the others produced a range of projects and educational materials and offer programmes for school visits to national parks (National parks Brijuni and Telašćica).

Additionally, the project Think (of) Blue was the first project on Ocean Literacy which encompassed the whole Croatian area, and engaged more than 800 pupils from Croatian elementary schools. The main goals of this programme, implemented with the approval of Agency for Education and Training, were to implement STEAM educational programs through the prism of ocean literacy, and popularizing knowledge about the sea among the pupils and wider community (Društvo 20000 milja, n.d.).

University of Zadar is taking a step further, pioneering in basic marine education for the students of the Primary education graduate programme by offering them an elective course on marine science education which provides elementary marine knowledge and classroom experience for future teachers.

4.2.14. Further comments on country’s maturity

Despite some initiatives, marine and freshwater topics are largely unrecognized by educational stakeholders and minimally covered in textbooks. There is a lack of teacher training on this subject, and while sea and water themes appear in various subjects, they are poorly integrated across different grades and disciplines. There are some activities promoting these topics regionally, but a coordinated national effort is lacking, creating a significant gap in comprehensive education on this issue.

4.2.15. Challenges limiting the development of Blue Education

The main findings on the challenges limiting the development of Blue Education in Croatia indicate a set of barriers across various sectors. Some of the key issues identified include a widespread lack of teachers' general knowledge on ocean and freshwater-related topics, a significant shortage of educational resources to support blue education activities, and inadequate funding dedicated to these initiatives.

Additionally, there is an absence of training programs on blue education, lack of parental interest, and limited involvement from appropriate "blue" partners and stakeholders. Structural challenges such as policy and institutional barriers, bureaucracy, curricula constraints, and insufficient attention to blue education within the general framework of environmental education further impede progress. Moreover, innovative teaching methods and technology integration are not widely adopted, and there is a lack of evaluation frameworks for blue education activities. These challenges highlight the need for comprehensive strategies to address educational, financial, and structural barriers to advance Blue Education effectively.

The key results from the responses regarding prioritizing specific topics within Blue Education in Croatia highlight several key thematic areas, all underlining the key challenge – the lack of awareness of the importance of the Blue education. Across various sectors, there is a strong emphasis on the impacts of climate change on marine environments, the blue economy and sustainable development, and coastal zone management and resilience. Ocean literacy and environmental awareness, freshwater and ocean conservation, and sustainable fishing practices and aquaculture are also identified as critical topics.

Furthermore, there is a need to connect human health with ocean health, promote blue careers, and incorporate local expertise and traditional practices. Other key areas include ocean acidification, marine technology and innovation, ocean governance, policy frameworks, and community engagement through citizen science and ocean monitoring. These Prioritised topics indicate a comprehensive approach to enhancing Blue Education, addressing both environmental sustainability and socio-economic development.

4.2.16. Prioritised topics in Blue Education

The following areas emerged as priorities for Blue education in Croatia:

- climate change impacts on marine environments, ocean literacy and environmental awareness, and the blue economy and sustainable development,
- freshwater and ocean conservation, sustainable fishing practices, ocean acidification, and the connection between human and ocean health,
- coastal zone management and resilience, promotion of blue careers, and regional sea/ocean familiarity.

Additionally, there is a focus on citizen science, community engagement, ocean governance, policy frameworks, and incorporating local knowledge and marine technology for ocean exploration. These priorities reflect a comprehensive approach to addressing both immediate and long-term challenges in marine and freshwater environments.

4.2.17. Interest in BlueLightS project activities

Survey results from Croatia indicate a positive response from various educational institutions and research organisations regarding collaboration with BlueLightS partners to enhance marine education. Representatives from surveyed organisations expressed willingness to participate in testing solutions aimed at strengthening blue education initiatives.

4.2.18. Collaboration preferences

The survey explored different types of collaborations each organisation is interested in.

The majority of surveyed organisations from Croatia expressed interest in collaboration in various fields. The responses from public educational institution (university) indicate strong interest in conducting joint research projects, participating in conferences to share experiences, and developing regional strategies to integrate "blue" topics into education. They also underline the value of opportunities to exchange best practices and collaborate on curriculum development and teacher training workshops. Similarly, the private company which participated in the survey is interested in collaboration with freshwater and marine research organisations enthusiastic about sharing teaching methodologies, forming partnerships with education stakeholders, and participating in online or in-person workshops and conferences to advance blue education goals.

Additionally, educational institution (university) emphasises their interest in joining a Community of Practice specifically tailored to blue education, as they seek to connect with diverse local stakeholders, including parents, businesses, policymakers, and NGOs, to enhance the success of blue projects within schools. They are also committed to updating educational materials with blue content and co-developing curriculum resources.

4.2.19. Experimentation needs

The responses from Croatia show mixed levels of awareness and commitment among several types of organisations regarding Blue education initiatives.

While there is agreement on the importance of interdisciplinary approaches and hands-on learning, there are noticeable differences in how principles like global citizenship, lifelong learning, and embracing innovation and technology are put into practice. Improving collaboration among sectors and organisations has the potential to significantly enhance both the understanding and implementation of Blue education across Croatia.

Addressing these differences can lead to more unified and effective strategies for integrating Blue education into educational systems and community projects. By **fostering partnerships** that range across academia, government, industry, and civil society, Croatia can leverage collective knowledge and resources to promote sustainable practices and environmental stewardship. Such **exchange of knowledge** could also promote the adoption of modern technologies, and encourage teachers to engage in Blue education initiatives, potentially allowing them to include accredited training in their professional portfolios. This **enhanced collaboration**, complemented with **mapping of formal and non-formal education initiatives** across the country, and participation in various projects (such is

Erasmus+[13]) could also drive the development of Blue education in Croatia, and better prepare students to tackle modern challenges in marine and environmental sciences.

4.2.20. Connection to Key elements of educational systems

The experimentation recommendations address several key elements of the educational system. They highlight the importance of interdisciplinary approaches and hands-on learning, indicating a focus on diverse **teaching methods**. They also emphasise the adoption of modern technologies, underscoring the **integration of technology into educational practices.** Additionally, they stress the need for improved **collaboration among various sectors**, including academia, government, industry, and civil society, which reflects the importance of community and parental involvement.

Teachers are encouraged to engage in Blue education initiatives and include **accredited training** in their professional portfolios, pointing to **capacity building and professional development**. Furthermore, they mention the mapping of formal and non-formal education initiatives and participation in projects like Erasmus+, indicating the use of **educational resources**.

4.2.21. Resources on activities/initiatives in Croatia gathered through the survey

Related to examples of initiatives in Croatia, the respondents shared the following links:

- https://hmrr.hr/leader/hrvatski-flag-ovi/
- https://www.kucapanonskogmora.hr/
- https://hmrr.hr/leader/hrvatski-lag-ovi/
- https://www.mbdb.hr/hr/pocetna/
- http://www.drustvo20000milja.hr/misli-na-plavo/
- http://www.drustvo20000milja.hr/ocuvanje-tradicije-akvakulture-i-ribarstva-novigrada-obrovca-i-starigrada-otarnos-2021/
- http://www.drustvo20000milja.hr/price-o-tri-mora-kroz-strip/
- https://aquarium.hr/en/projects

[13] Erasmus+ is the EU's programme to support education, training, youth and sport in Europe.

- https://argonauta.hr/en/education-centre/edukacijski-programi/
- https://bluesmart.hr/en/ocean_related_issues/other/ocean_literacy/
- https://eaa.unizd.hr/english/study-programmes/sustainable-management-of-aquatic-ecosystems
- https://ejournals.epublishing.ekt.gr/index.php/hcmr-med-mar-sc/article/view/23400/20671
- https://ejournals.epublishing.ekt.gr/index.php/hcmr-med-mar-sc/article/view/26797/23204
- https://ezadar.net.hr/dogadaji/4162216/ucenici-ps-puntamika-upoznavali-raznolikost-jadranskog-i-sredozemnog-mora/
- https://link.springer.com/chapter/10.1007/978-3-030-70155-0_9
- https://maritime-forum.ec.europa.eu/contents/winners-call-collective-action-challenge-year_en
- https://morepress.unizd.hr/books/index.php/press/catalog/view/26/22/361
- https://pp-telascica.hr/o-parku/?lang=en
- https://sunce-st.org/en/activities/environmental-education-and-sustainable-youth-development/
- https://twitter.com/BlueSmartPR
- https://udruga.bioteka.hr/hr/?s=more
- https://uzz.unizd.hr/znanstveno-istrazivacki-projekti/zavrseni-projekti/be-unizd
- https://uzz.unizd.hr/znanstveno-istrazivacki-projekti/zavrseni-projekti/blue-boost
- https://www.blue-world.org/about-us/
- https://www.blue-world.org/resources/educational-resources/
- https://www.blue-world.org/science-education-losinj/dolphin-day/
- https://www.blue-world.org/science-education-losinj/lmec/
- https://www.civilnodrustvo-istra.hr/projekti/detaljnije/stem-udruga-za-popularni-stem
- https://www.facebook.com/oceanografi/
- https://www.facebook.com/udrugaoceanus/

- https://www.frontiersin.org/articles/10.3389/fmars.2019.00396/full
- https://www.frontiersin.org/articles/10.3389/fmars.2021.648492/full
- https://www.np-brijuni.hr/en/plan-your-visit/educational-programs/schools-and-kindergartens
- https://youtu.be/KGpbW7X0ziE

4.3. Blue education in Finland

4.3.1. Status of Blue Education in Finland

The analysis of the status of Blue Education in Finland is based on nine responses, which come from different organisations: one from an NGO, two from a public organisation and six from private/public organisations, five of them being primary/secondary schools and one college/university.

The survey responses were followed by an interview with SYKE, the Finnish Environment Institute and a BlueLightS project partner, which provided additional insights into the different areas discussed in this section.

In this brief report we summarize the key findings and draw initial conclusions, based on gathered data which provides insights into various aspects of involvement in Blue Education activities in Finland.

4.3.2. Focus areas in Blue Education

The organisations were asked about their involvement in various Blue Education activities in Finland. The summary highlights diverse and collaborative efforts across different types of organisations, through a variety of activities and programs which aim to enhance marine and environmental education, promote Blue careers, and foster a deeper understanding of aquatic ecosystems among students and the broader community.

The survey findings show that Finnish private and public educational institutions, ranging from primary schools to universities, organise dedicated training programmes for teachers (workshops, seminars) and field trips and actively work on integration of Blue elements into their curricula. They also collaborate with environmental and conservation organisations, national research and academic institutions, and local Blue industry partners.

Public organisations develop educational materials, podcasts, and policies on Blue Education, while also engaging in awareness campaigns and events, while non-profit organisations contribute by providing grants for water and environmental technology projects.

4.3.3. Initiatives or other programs

Some primary and secondary schools reported not being aware of dedicated programs on Blue education, while one mentioned participation in the UNESCO school network. Another school highlighted the inclusion of water ecosystems in their curriculum, with field projects focused on specific sea species. However, there was a lack of familiarity or engagement reported by college/university-level institutions, other public organisations, and non-profit organisations.

Although the Finnish national education programme does not specifically emphasise freshwater or marine environments, various measures and networks at municipal, national, and international levels support this area.

- Specific municipalities, such is the City of Helsinki, provide support in this area and organize workshops, events, camps on a local level.

- The Luma Schools Network, present throughout Finland, comprises of primary schools, junior high schools, and high schools. The primary schools (3rd to 6th grade) form the smallest segment of this network while junior high schools and high schools constitute the largest portion. Currently, the Luma Schools Network includes 44 schools across Finland. These schools primarily focus on natural sciences and mathematics, with some offering specialised programmes in blue education-related subjects.

The Baltic Sea Project (BSP) is an international network of UNESCO ASPnet schools working together to build a sustainable future and to pursue the Sustainable Development Goals (SDG's) depicted in United Nation's Agenda 2030. (UNESCO Baltic Sea Project, n.d.) In Finland, there are currently16 schools which are part of this network, and their aim is:

- To increase the awareness of the students about the environmental problems in the Baltic Sea area and to give them an understanding of the scientific, social and cultural aspects of the interdependence between man and nature.
- To work together and find ways to prevent climate change
- To support the implementation of environmental studies and science in the Baltic Sea region
- To encourage students to participate in building a sustainable future
- To encourage students to learn about our shared history and today civics in Baltic Sea countries
- To learn about the living cultural heritage in the Baltic Sea countries

Additionally, there are specific events organised to raise awareness on the environmental issues and blue education:

- The Baltic Sea Day, is an annual celebration of the sea which calls everyone to take actions to protect the sea, and learn more about its versatile nature, culture and history. This initiative also encourages museums and libraries to highlight the day with e.g. book exhibitions, poetry or reading challenges, arts and crafts and other activities aimed at the wide public. The Baltic Sea Day provides a Baltic Sea-themed story, featuring activities for children, for day care centres, schools, and homes. (John Nurminen Foundation, n.d.)

- The European Researchers' Blue Nights event, initiated in 2022, targets the general public with a special focus on families, pupils, and students. It includes annual events, pre-events, and follow-up events with hands-on activities, exhibitions, webinars, games, and more. Organised in Finland, France, Italy, Malta, Portugal, and Romania, the events are interconnected via an online platform, allowing participants to explore activities in different locations. In Finland, the event was held in Helsinki at the City Hall, organised by SYKE and local partners, including the City of Helsinki, Rotary Club, Baltic Sea Action Group, and Helsinki Region Environment Services (BlueNIGHTs, 2023)
- Researchers / institutes also organize visits to schools to raise awareness of the blue education projects and gather feedback from the students, to further understand which areas should be given more attention.

For further information on initiatives, see section

Resources on activities/initiatives in Finland gathered through the survey.

4.3.4. Interdisciplinarity

This question aimed to investigate on integrating various subjects such as science, geography, history, literature and art to provide a comprehensive understanding of water systems and their interconnectedness with other aspects of life. The feedback indicated varying levels of integration. Some primary and secondary schools reported incorporating interdisciplinarity to some extent, while others noted very little or no integration at all.

A college/university also indicated implementing interdisciplinarity to some extent, and one primary/secondary school answered "I don't know" to this question.

4.3.5. Experiential Learning

Responses from various organisations regarding their involvement in experiential learning in Blue education reveal a diverse range of activities and levels of engagement.

Non-profit organisations primarily provide grants for water and environmental technology initiatives, showing moderate involvement in experiential learning. In contrast, higher educational institutions, such as colleges and universities, exhibit extensive engagement through organising workshops, integrating Blue elements into curricula, and collaborating with environmental and academic institutions. They also develop awareness campaigns and promote Blue careers and skills. Primary and secondary schools vary in their activities, with some significantly engaged in organising workshops, field trips, and developing dedicated training programs for teachers, while others have limited participation, primarily focusing on field trips and specific collaborations (such are UNESCO schools, the Baltic Sea Project, LUMA-schools, etc.).

Public organisations also play a crucial role, being involved in creating educational materials, developing strategies for Blue education, and conducting workshops and field trips. They collaborate with conservation organisations and academic institutions to enhance their programs. However, several public organisations reported only moderate efforts, primarily focusing on curriculum integration.

Overall, there is a notable difference in the extent of involvement among the different types of organisations, with higher education institutions and some public organisations showing the most comprehensive approach to integrating experiential learning in Blue education.

4.3.6. Sustainability

Responses regarding efforts to promote sustainability and the conservation of water resources reveal varying degrees of commitment among various types of organisations.

Non-profit organisations demonstrate a significant commitment to these initiatives, indicating strong involvement. Similarly, primary and secondary schools show mixed levels of engagement, with several schools indicating a high level of activity in promoting water conservation and the protection of biodiversity, while others report more moderate efforts.

Higher educational institutions such as colleges and universities, along with some public organisations, show a moderate level of engagement in sustainability and conservation initiatives, which indicates a growing but not yet comprehensive approach to integrating these values into their educational and operational frameworks.

Overall, the responses suggest that while there is substantial activity in some areas, particularly within non-profit organisations and certain schools, there is still room for increased commitment and action across all types of institutions to ensure the sustainable use of water resources and the protection of ecosystems for future generations.

4.3.7. Cultural and Historical Context

Responses to the question on recognising the cultural and historical significance of the ocean indicate a varied level of engagement across different organisations.

Non-profit organisations, higher educational institutions, and several primary and secondary schools acknowledge the importance of this topic to some extent, suggesting a moderate integration of maritime traditions, explorations, and trade into their programmes. These institutions appear to appreciate the historical relationship between humans and the sea, yet their efforts in incorporating this understanding into their activities and curricula are somewhat limited.

On the other hand, some primary and secondary schools, along with certain public organisations, exhibit minimal engagement with this cultural and historical context. These institutions report very little to no focus on the cultural significance of the ocean, highlighting a gap in their educational and conservation efforts.

A few schools also expressed uncertainty regarding their involvement in this area, further emphasising the inconsistency in recognising and exploring the historical relationship between cultural and historical context.

4.3.8. Global Citizenship

This question aimed at determining the maturity level on the topic of global citizenship, and the answers revealed varying levels of engagement among diverse types of organisations.

Non-profit organisations and some public organisations show a strong commitment to fostering global citizenship, indicating extensive efforts in promoting awareness and responsibilities that extend beyond local and national boundaries. This suggests a robust integration of global perspectives and initiatives aimed at encouraging individuals to become informed and responsible global citizens.

In contrast, higher educational institutions and many primary and secondary schools demonstrate a moderate level of engagement with global citizenship. They incorporate these values to some extent in their curricula and activities. However, there is inconsistency among primary and secondary schools, with some reporting significant involvement, while others show minimal to no engagement. This variation highlights the need for a more consistent approach to embedding the principles of global citizenship across all educational levels to ensure a comprehensive understanding and commitment to global issues among students.

4.3.9. Innovation and Technology

Responses regarding the utilisation of innovative technologies and scientific developments to study, monitor, and protect water ecosystems reveal mixed levels of engagement. Non-profit organisations and higher educational institutions show a moderate commitment, indicating they incorporate these technologies to some extent, which suggests partial integration of advanced methods in their efforts to protect water ecosystems, but perhaps not a fully developed or widespread approach.

The responses from primary and secondary schools and public organisations display significant variability. Some schools report substantial use of innovative technologies, highlighting a strong commitment to leveraging scientific advancements in their environmental efforts. However, other schools and some public organisations indicate very little use of such technologies. Additionally, a few schools are uncertain about their engagement in this area. This inconsistency points to a need for more widespread and cohesive efforts to integrate innovative technologies in educational and organisational practices aimed at protecting water ecosystems.

Some organisations, like SYKE, conduct interactive outdoor education sessions where classes study their local lakes, rivers, or marine shorelines. They also produce educational animations, videos, and 3DVR content from their Research Vessel Aranda, showcased on VR headsets at specific events. However, given that the schools have similar level of technological equipment at their disposal, the key to increasing technology use in classrooms lies with the teachers. Their enthusiasm and willingness to go the extra mile significantly enhance the integration of technology in education.

Teachers have at their disposal two portals which gather relevant data: Baltic sea portal and the portal on the state of Finnish fresh waters.

4.3.10. Community Engagement

Feedback received on community engagement reveal a mixed level of involvement among respondents.

Non-profit organisations and higher educational institutions report engaging with the community to some extent, which indicates a moderate commitment to fostering community involvement and collaboration in their activities, although there is room for increased engagement.

Primary and secondary schools exhibit a varied approach to community engagement, with some indicating moderate involvement and others reporting no engagement at all. This inconsistency suggests that while some schools recognise the importance of community involvement, others have yet to integrate it into their educational practices.

Some public organisations show a stronger commitment, although one of the respondents was uncertain about the level of involvement in their country.

Overall, these responses highlight a need for more consistent and comprehensive community engagement efforts across all types of organisations.

4.3.11. Environmental Justice

Responses on environmental justice and addressing issues of environmental equity and advocating for fair and equitable access to water resources and opportunities for all communities indicate a moderate level of engagement among non-profit organisations, higher educational institutions, and some primary and secondary schools.

While these organisations acknowledge the importance of environmental justice to some extent, their efforts vary. Additionally, there is a lack of awareness or engagement from certain primary and secondary schools and some public organisations, highlighting an inconsistency in addressing environmental justice across different sectors.

4.3.12. Adaptation and Resilience

This question aimed to investigate on building resilience to climate change impacts and preparing students to address future challenges.

Responses show varying levels of commitment across different organisation, with non-profit organisations and higher educational institutions engaged to some extent in preparing students to address future water health challenges. Primary and secondary schools display a mixed approach, with some reporting significant efforts, while others have limited or no engagement. Public organisations demonstrate a strong commitment, indicating substantial efforts to build resilience and prepare for climate-related challenges.

Overall, while there are commendable efforts across various sectors, including education and public service, there remains a need for broader and more consistent actions across all levels of society to effectively tackle the impacts of climate change on water ecosystems and ensure sustainable water management practices for future generations.

4.3.13. Lifelong Learning

The responses underscore a mixed landscape in efforts to promote lifelong learning and engagement with water conservation issues. While higher educational institutions lead with substantial commitments, there is a clear opportunity for primary and secondary schools, as well as certain non-profit and public organisations, to enhance their initiatives in fostering continuous learning and advocacy for sustainable water practices.

Achieving widespread lifelong engagement will require joint efforts across educational levels and sectors, to effectively address water conservation challenges and promote lasting awareness for environmental stewardship.

4.3.14. Further comments on country's maturity

The comments highlight varying perspectives on Finland's approach to water education across different sectors. Primary and secondary schools note significant gaps in the national curriculum regarding marine and freshwater education, with a strong emphasis on the independence of schools in adopting voluntary courses related to water themes.

While the freshwater education is well-represented nationwide, marine education is more comprehensive in coastal areas. Overall, there's concern about the fragmented nature of water education within the curriculum, with calls for more cohesive and mandatory inclusion of these topics across natural science courses to ensure comprehensive understanding and discussion among students throughout Finland.

4.3.15. Challenges limiting the development of Blue Education

When asked on indicating concrete challenges that limit the development of Blue education, the respondents highlighted a number of challenges limiting its development in Finland across various organisations.

These challenges include, among others, insufficient funding to support dedicated blue education activities, curricula constraints that do not adequately integrate ocean and freshwater topics, and a lack of educational resources necessary for supporting such initiatives.

There is also a notable gap in teacher training on blue challenges and issues, as well as a general lack of teachers' knowledge in ocean and freshwater-related topics. The schools that secure national development project bids receive teacher training and are part of the LUKEMA network, which aims to further train teachers and principals. These initiatives enhance educators' abilities to teach young students and foster collaboration between schools through established networks and also help address educational challenges.

Additional barriers include policy and institutional constraints, bureaucracy affecting educational processes, and insufficient integration of innovative teaching methods like project-based learning and outdoor schooling.

Moreover, there is a perceived need for greater attention to blue education within the broader framework of environmental education and enhanced use of technology in teaching and learning processes to overcome these limitations effectively.

4.3.16. Prioritised topics in Blue Education

Participants from Finland identified several critical areas for prioritizing blue education.

These include addressing the lack of funding and educational resources essential for supporting blue education activities, overcoming curricula constraints that hinder the integration of ocean and freshwater-related topics, and improving teacher training on blue challenges and issues. There is also a recognized need to enhance partnerships with appropriate stakeholders in the field, integrate innovative teaching methods such as project-based learning and outdoor schooling, and reduce policy and institutional barriers that currently impede comprehensive blue education initiatives.

Additionally, participants highlighted the importance of increasing attention to blue education within the broader framework of environmental education and improving the integration of technology in teaching and learning processes to effectively advance these priorities.

4.3.17. Interest in BlueLightS project activities

The responses to the question about interest in BlueLights activities show varied levels of engagement across different organisations.

College/university and primary/secondary schools expressed strong interest, with several schools indicating willingness to collaborate and participate actively in testing solutions for enhancing blue education. Some schools and universities have already signed up or expressed direct interest through contact information provided. In contrast, one non-profit organisation and two public organisations express no current interest in participating in BlueLights activities.

Overall, there is significant interest and potential for collaboration among educational institutions, highlighting a promising avenue for advancing blue education initiatives through practical experimentation and partnership.

4.3.18. Collaboration preferences

The survey also explored types of collaboration each organisation is interested in. Collected responses include co-developing curriculum materials or lesson plans, conducting joint research projects on challenges and solutions for blue education, exchanging best practices and teaching methodologies, and building partnerships between education institutions and freshwater/marine stakeholders to enhance blue education efforts.

Additionally, there's interest in developing strategies for integrating the "blue" into education nationally or regionally, participating in conferences to share experiences, and exploring initiatives like developing and testing a "blue" school label. Training sessions for teachers, both in-person and online, are also highlighted as crucial for advancing blue education objectives.

4.3.19. Experimentation needs

In conclusion, the current status of Blue Education in Finland reveals a notable level of engagement from various organisations, including primary and secondary schools, colleges and universities, public organisations, and non-profits. Despite these positive strides, there is a disparity in the extent of involvement and the integration of innovative technologies and experiential learning methods across different types of organisations. This inconsistency underscores the need for a more unified approach to effectively enhance Blue Education across all educational levels.

Moreover, while there are significant initiatives promoting sustainability, conservation, and global citizenship, challenges are present, particularly in terms of funding, curricular constraints, and teacher training. The fragmented nature of water education within the national curriculum and the variability in community engagement and environmental justice efforts further highlight areas requiring attention. Addressing these challenges will be crucial in fostering a comprehensive and cohesive Blue Education framework in Finland, ensuring that all students develop a robust understanding of aquatic ecosystems and the importance of their conservation.

4.3.20. Connection to Key elements of educational systems

One of the primary elements addressed is the engagement of teachers and instructors. The findings emphasise the importance of **teacher training**, highlighting the need for educators to be well-equipped with the necessary skills and knowledge to effectively deliver Blue Education. This underscores the significance of capacity building and professional development for educators, ensuring they are prepared to incorporate new methodologies and content into their teaching.

Additionally, the **integration of innovative teaching methods and technology** is critical. There seems to be inconsistency in the adoption of experiential learning methods and modern technologies across various organisations. This suggests a need for a more cohesive strategy to ensure all educational institutions are utilizing these advanced tools and approaches to enhance learning experiences and outcomes.

The role of **educational resources** is also mentioned, particularly in the context of initiatives promoting sustainability, conservation, and global citizenship. The presence of these initiatives indicates that there are educational materials and programs in place aimed at fostering an understanding of environmental issues among students. However, there are also challenges such as funding and curricular constraints, implying that access to and the quality of these resources may be uneven.

Curriculum issues are highlighted as another significant element. The fragmented nature of water education within the national curriculum points to the need for a more integrated and comprehensive approach. A well-structured curriculum is crucial for providing students with a coherent and continuous learning experience, ensuring that key concepts and skills are systematically developed.

Community and parental involvement are also touched upon. The findings hint a variability in community engagement and efforts toward environmental justice, indicating that a stronger collaboration between educational institutions and the broader community is needed.

4.3.21. Resources on activities/initiatives in Finland gathered through the survey

Related to examples of initiatives in Finland, the respondents shared the following links:

- https://areena.yle.fi/1-4293095
- https://areena.yle.fi (podcasts on Baltic sea)
- https://www.ymparisto.fi/fi/luonto-vesistot-ja-meri/luonnon-monimuotoisuus/suojelu-ja-tutkimusohjelmat/velmu-ohjelma
- Järvi-meriwiki (jarviwiki.fi)
- https://luontoportti.com/c/8/itameri?sid=8
- https://johnnurmisensaatio.fi/en/
- https://hiilineutraalilauttasaari.fi/
- https://www.b-s-p.org/
- https://itameri.fi
- https://www.vesi.fi
- https://www.oph.fi/fi/koulutus-ja-tutkinnot/biologian-opetuksen-tueksi
- https://eperusteet.opintopolku.fi/#/fi/perusopetus/419550/tiedot
- https://mvtt.fi/

4.4. Blue education in France

4.4.1. Status of Blue Education in France

The analysis of the status of Blue Education in France is based on three responses, which come from different organisations: one from a private/public educational organisation – university, and two from public organisations.

The survey responses were followed by an interview with Office Français de la Biodiversité (OFB) and a BlueLightS project partner, which provided additional insights into the different areas described in the following sections.

In this short report, we attempt to summarize the key findings and draw some initial conclusions on organisations' involvement in Blue Education activities in France.

4.4.2. Focus areas in Blue Education

The organisations were asked about their involvement in various Blue Education activities, and their responses highlight different focus areas. The university has contributed to Blue Education activities, especially in research projects[14] addressing Blue education, and evaluation of the educational tools which are beneficial for exploring marine and freshwater ecosystems. It is worth mentioning that the University has quite a neutral role and is aware of many Blue education projects in France.

From two responses received from French public organisations, it is noticeable they are both highly involved in promoting environmental awareness and education and place a strong emphasis on research and innovation.

Additionally, survey results demonstrate a high level of outreach and engagement, in wide community and in the schools. At the same time, there is a strong emphasis on policy-driven research initiatives.

4.4.3. Initiatives or other programs

The results reveal there is strong contribution to Blue education initiatives in France from all respondents.

The university is involved in evaluation of various academic programs and research projects focusing on marine biodiversity and water conservation. In their research programmes, they collaborate with other educational institutions and local authorities to achieve the common goal and promote awareness on these topics.

[14] The University of Rennes 2 is a leader or partner of many research projects that have obtained European funding, and their research covers several areas. To learn more about specific projects, visit https://nouvelles.univ-rennes2.fr/ and https://www.univ-rennes2.fr/recherche

In France, the national education system incorporates primary programs to promote "blue education" among students. These are:

- **Disciplinary approach:** allows teachers to integrate blue education into subjects like life and earth sciences and history-geography, although research indicates limited impact on student behaviour.

- **Eco-delegates**: required in all classes, engage in activities such as beach cleanups and awareness campaigns.

- **E3D projects:** schools demonstrating commitment to ecological transition can earn the E3D label[15]. Currently, 17% of French schools hold this label.

- **Educational marine areas[16]:** An Educational Area (EA) is a small coastal maritime zone (EMA) or a terrestrial or aquatic area (ETA), more or less impacted by human activity (urban park, beach, wasteland, wetland, mangrove, forest, river, etc.), managed participatively by pupils (8-18 years old) from one or more classes. Accompanied by their teacher and an environmental education specialist, the referent, the pupils study this area and democratically decide on actions to preserve its natural and cultural heritage. Through this project, they develop skills and concepts from the school curriculum and explore their local area and its stakeholders: the relevant municipality, as well as user associations, environmental protection organisations, and other local actors. (Office français de la biodiversité, 2020.) The projects which completed specific criteria[17] receive a label. Between 2023 and 2024, 1,138 Educational Areas were established (343 EMA and 795 ETA) while the government is calling for 18,000 schools, i.e., one-third of all schools in France. (Office français de la biodiversité, 2024)

- **Sea classes** provide students with educational trips to coastal areas to study marine environments and participate in activities like sailing and wildlife observation, enhancing their blue education outside the classroom.

- **Outdoor classes**: traditionally held in forests, also occur on beaches for coastal schools, reconnecting students with nature. ("Sea classes: Educational trips aimed at raising awareness," 2021)

- **Citizen science:** involves students in collaborative scientific research projects, where they collect and analyse data in partnership with researchers. These initiatives allow students to contribute to real scientific studies while enhancing their understanding of scientific methods and concepts In 2022, 480 classes (11,121 students) participated in a citizen science program.

[15] The "E3D" label (School or Institution in a Global Approach to Sustainable Development) was developed by the Ministry of National Education to recognise and encourage schools and educational institutions that commit to a comprehensive approach to sustainable development.

[16] For further information see: https://ame.ofb.fr/lib/exe/fetch.php?media=docs_cadrage:guide_methodo_creation_ae_v3_final_charte.pdf and https://www.calameo.com/ofbiodiversite/read/00350294814098beea5f3

[17] The criteria for labelisation is available on pg.37 of this document: https://ame.ofb.fr/lib/exe/fetch.php?media=docs_cadrage:guide_methodo_creation_ae_v3_final_charte.pdf

The French Ministry of Education and Youth has launched and coordinates numerous initiatives and programmes related to Blue Education, in collaboration with various partners. Some of the examples include the establishment of a national committee dedicated to Blue Education and the provision of information and resources for teachers, national programmes which include marine educational areas, and "les classes Enjeux Maritimes" in partnership with the Fondation de la Mer and the French Navy, are notable efforts. Additionally, the ministry has initiated educational actions on polar issues and launched the "Brevet d'Initiation à la Mer" (BIMer), a certificate introducing maritime culture and sea-related skills and careers.

Other initiatives include a national partnership between the Ministry of Education and the French Navy, the "Concours Arts en plastiques pour l'Océan" award with the Fondation de la Mer, and a citizen science programme called "Opération Plastique à la Loupe" with the Tara Ocean Foundation. Furthermore, educational tools developed with the Office for Climate Education (OCE) and Tara Ocean Foundation, and with the Institut français de la mer (IFREMER) also contribute to Blue Education.

Additionally, the public organisation which participated in the survey suggested a wide range of citizen science initiatives developed by NGOs or research institutes. One of the examples is Adopt a float, a multidisciplinary educational program that offers students the opportunity to explore the global ocean and how crucial its study is to better understand and protect it.

Further examples are the programme Plages Vivantes, a participatory observatory focused on the biodiversity of the upper beaches, aimed at better understanding and predicting the effects of global and local changes, and a programme Osparito, designed for pupils who wish to take a part in collecting scientific data on aquatic waste, using a scientific protocol. For further information on initiatives, see section *Resources on activities/initiatives in France gathered through the survey*.

4.4.4. Interdisciplinarity

The results indicate high level of awareness among respondents from France related to interdisciplinarity and its importance in achieving a comprehensive understanding of water systems.

Surveyed public organisations promote interdisciplinarity by incorporating environmental science, policy studies, and community engagement into their programs, aiming to offer a holistic education that covers multiple aspects of water ecosystems and their societal impacts. In addition, one public organisation is encouraging schools to adopt an interdisciplinary approach, combining not only science but also all the other subjects covered at school (history, geography, art, civics, written and oral expression, etc.) in their blue education curriculum. They support teacher training programs to help educators effectively integrate these subjects.

Such comprehensive approach ensures teachers and pupils gain a better understanding of water ecosystems and are better prepared to contribute to sustainable solutions in the future.

4.4.5. Experiential Learning

The survey results indicate significant efforts in promotion of experiential learning, as respondents believe that direct engagement with water ecosystems fosters a deeper appreciation and understanding among students.

Such approach is encouraged through hands-on experiences through field trips and practical activities, various learning opportunities, including fieldwork, workshops and interactive sessions with environmental experts, and organizing national and regional field trips to significant water bodies. All these activities aim to provide students with practical skills and real-world experience in water conservation.

4.4.6. Sustainability

All surveyed organisations emphasise sustainability in their approaches to water management and education. The university encourages programs which promote conservation and sustainable use of water resources, emphasizing the protection of water biodiversity and ecosystems for future generations. At the same time, the public organisations strongly advocate for sustainable water management practices: while one is making sustainability central to its educational programmes and public awareness campaign, highlighting the importance of protecting water ecosystems, the other incorporates sustainability into the national curriculum, promoting an ethos of conservation among students.

These efforts emphasise a comprehensive approach to tackling environmental challenges related to water resources, stressing the importance of collective action to ensure the long-term health and resilience of our water ecosystems.

4.4.7. Cultural and Historical Context

The survey indicates diverse representation among the respondents from various organisations in France.

While the university recognizes the significance of the cultural and historical context of the ocean in societies, it explores the historical relationship between humans and the sea to a limited extent, through various academic courses and research projects they evaluate.

Both public organisations showed a substantial focus on this aspect, emphasizing cultural and historical perspectives in their educational programs, and recognising traditional knowledge and maritime history. They also incorporate the cultural and historical context of the ocean into the curriculum, delving into the historical connections between humanity and maritime environments.

4.4.8. Global Citizenship

In responses from organisations in France regarding global citizenship, the university showed a moderate interest in promoting global citizenship, although in their research they promote the connections between water systems and how human activities affect marine environments.

Meanwhile, one of the public organisations show moderate engagement, while the other indicates high commitment. However, they both emphasise how water resources are interconnected and highlight the impact of human actions on marine ecosystems, with a goal of encouraging a strong sense of global responsibility among people and communities.

4.4.9. Innovation and Technology

The responses reveal some variations in the emphasis on innovation and technology in relation to water ecosystems. The university and one public organisation show moderate interest in utilizing innovative technologies, incorporating scientific advancement and innovative tools into their educational initiatives. They give priority to development of problem-solving skills in water conservation efforts and encourage creativity in this approach, which enables better connection with nature though hands-on experiences and field trips and making connections with relevant stakeholders. The technology is seen as a tool to complement certain activities (for example, if pupils want to study the evolution of the temperature in the sea, they might need specific technological aids) but not as a medium to conduct work in educational areas. Additionally, having specific technological tools would imply that teachers feel comfortable using them, which might require additional teacher training sessions.

The response from another public organisation indicates efforts into integration of technology into the curriculum and using scientific developments to enhance water education. They also support schools in adopting innovative teaching methods for Blue Education.

4.4.10. Community Engagement

Based on the responses received from France, organisations are actively involving local communities, stakeholders, and citizens in efforts to conserve water.

Public organisations are particularly dedicated to this engagement, valuing traditional knowledge and practices related to marine and river environments. They collaborate closely with educational institutions and citizens to raise awareness and promote active participation in conservation initiatives. They also encourage schools to engage with local communities in water conservation initiatives, and support programs that involve parents, local organisations, and the wider community.

The university also engages community in water conservation efforts, where through collaboration with the stakeholders they promote awareness and involve citizens in educational activities[18].

[18] Examples of such projects are The (Re)Source project deciphers our attachment to water | News from Rennes 2 (univ-rennes2.fr) and Recherche sur les Aires marines éducatives | Maison des Sciences de l'Homme en Bretagne (mshb.fr)

4.4.11. Environmental Justice

In responses from various organisations in France, there is a variety of involvement regarding environmental justice.

The university indicates moderate engagement in addressing issues of environmental equity and fair access to water resources, as their focus is more on research activities related to water conservation.

The public organisations vary in their commitment, with some showing moderate involvement and other demonstrating a significant dedication to advocating for environmental justice. They prioritise ensuring equitable opportunities for all communities, and support initiatives that promote fair access to water resources for all.

4.4.12. Adaptation and Resilience

The responses from organisations in France indicate a shared focus on adaptation and resilience concerning water health.

In their research activities, the university shows a moderate level of commitment to preparing students for climate change impacts, including challenges like sea level rise and ocean acidification. Meanwhile, public organisations vary in their dedication, with some demonstrating a moderate level of engagement and others showing a strong commitment to building resilience and addressing future water health challenges: sea level rise, ocean acidification, and other challenges facing water ecosystems.

4.4.13. Lifelong Learning

The organisations surveyed in France focus on promoting lifelong learning and passion for water conservation. While university showed moderate involvement in this area, public organisations demonstrate a strong commitment to fostering ongoing exploration, advocacy, and engagement with water issues throughout individuals' lives, extending beyond formal education settings. They support initiatives that encourage students to remain engaged with water issues throughout their lives, and to keep string links with the experts working in the area.

4.4.14. Further comments on country’s maturity

France's approach to Blue education underlines its maturity in sustainable development, with recent efforts including strengthened curricula, widespread student engagement through the development of educational areas, eco-delegates, partnerships with scientific and NGO sectors, citizen science initiatives, sustainable school certification (E3D), and a specialized water competency framework.

The university highlights the need for more integrated and interdisciplinary approaches to enhance Blue education and suggests greater collaboration between academic institutions and local authorities. At the same time, public organisation advocate for continued efforts to strengthen community engagement and sustainability practices and highlight the importance of ongoing support for schools and educators to sustain these efforts.

Additionally, the emphasis is on expanding the number of educational areas. At present, educational areas are one of the most ambitious environmental education programmes in France and are supported by the French Ministry of Education to reach 18,000 educational areas by 2030. To reach this number, it is essential to mobilise all involved stakeholders.

4.4.15. Challenges limiting the development of Blue Education

The results reveal that surveyed educational institutions in France encounter obstacles in implementing effective blue education activities. These include funding shortages, insufficient educational resources, and a lack of evaluation frameworks, while teachers also show limited interest and knowledge in ocean and freshwater topics.

Public organisations face similar challenges, with funding constraints, teacher disinterest, institutional obstacles and the importance of addressing environmental justice issues.

Overall, these issues highlight the need for improved support and reforms to enhance blue education initiatives nationwide.

4.4.16. Prioritised topics in Blue Education

While the University prioritises reconnecting students with their regional sea or ocean environments as a key focus of their research within Blue Education, public organisations emphasise several thematic areas, including freshwater and marine biodiversity, sustainable management and conservation of water ecosystems, ocean literacy, and environmental awareness.

They also highlight the importance of citizen science and community engagement in ocean monitoring, understanding the connection between human health and ocean health, exploring maritime history and cultural heritage, addressing climate change impacts on marine environments, and tackling freshwater and marine pollution through prevention and cleanup efforts. They advocate for a focus on practical skills and experiential learning and support a comprehensive approach that includes policy development and educator training.

4.4.17. Interest in BlueLightS project activities

The survey assessed the interest of these organisations in participating in BlueLights activities, capturing their interest in the following areas: joint research projects and building partnerships, organizing and participating in training sessions and community engagement activities, and building partnerships and joining a community of practice.

4.4.18. Collaboration preferences

The types of collaborations each organisation is interested in were also explored. The overarching goal is to connect with stakeholders to exchange best practices, share experiences to enhance existing methodology, and adapt it for global contexts. Additionally, the aim is to foster partnerships on national and international level.

4.4.19. Experimentation needs

The survey responses from France highlight the diverse approaches and priorities in Blue Education across different organisations. While there are common themes such as sustainability, community engagement, and the need for interdisciplinary education, each organisation brings unique perspectives and focuses to the table. Addressing the identified challenges and **leveraging the strengths of each organisation** can help enhance the overall effectiveness of Blue Education in France.

Additionally, **creating and strengthening links** with other countries can reinforce mutual dynamics, where France can offer support and training on the existing ready-to-use methodology to help teachers develop **educational marine area** projects in other experimentation countries interested in such approach.

4.4.20. Connection to Key elements of educational systems

In the suggested experimentations for France a number of key elements are addressed. **Community and parental** involvement are highlighted by the emphasis on community engagement, which underscores the importance of collaboration between educational institutions and the broader community. The need for **interdisciplinary education** points to diverse and integrative teaching methods. The recommendations also emphasise **capacity building and professional development,** as they mention offering support and training to other countries on the ready-to-use methodology, underscoring the importance of **continuous professional development for educators.** Additionally, the existing methodology for developing educational marine area projects serves as a valuable **educational resource** for teachers.

4.4.21. Resources on activities/initiatives in France gathered through the survey

Related to examples of initiatives in France, the respondents shared the following links:

- https://ame.ofb.fr/lib/exe/fetch.php?media=docs_cadrage:guide_methodo_creation_ae_v3_final_charte.pdf
- https://eduscol.education.fr/1117/education-au-developpement-durable
- https://eduscol.education.fr/3851/les-aires-educatives
- https://eduscol.education.fr/3921/l-education-au-developpement-durable-dans-le-cadre-des-enseignements
- https://eduscol.education.fr/document/51026/download?attachment
- https://eduscol.education.fr/document/7781/download
- https://fondationtaraocean.org/partager/ressources-projets-pedagogiques/

- https://maudfontenoyfondation.com/
- https://maudfontenoyfondation.com/classesdemer/
- https://rame.hypotheses.org/
- https://www.calameo.com/ofbiodiversite/read/00350294814098beea5f3
- https://www.education.gouv.fr/20-mesures-pour-la-transition-ecologique-l-ecole-378545
- https://www.education.gouv.fr/comite-national-de-l-education-au-developpement-durable-pour-l-ocean-et-les-mers-327221
- https://www.education.gouv.fr/l-education-au-developpement-durable-7136
- https://www.education.gouv.fr/media/157227/download
- https://www.fondationdelamer.org/nos-actions/eduquer-et-sensibiliser/
- https://www.ifremer.fr/fr/la-mediation-scientifique-l-ifremer/nos-offres-pedagogiques
- https://www.ird.fr/ressources-pedagogiques
- https://www.lamarinerecrute.fr/metiers-et-formations/vivre-une-premiere-experience/partenariats-education-nationale
- https://www.ofb.gouv.fr/aires-educatives
- https://www.ofb.gouv.fr/les-aires-marines-educatives
- https://www.reseau-canope.fr/actualites/actualite/foredd-2022-leau-sur-la-planete-terre-une-ressource-en-tensionsnbsp-inscrivez-vous.html
- https://www.reseau-canope.fr/entrez-dans-le-littoral.html
- https://www.reseau-canope.fr/forum-des-ressources-pour-leducation-au-developpement-durable/programme-2024.html
- https://www.reseau-canope.fr/forum-des-ressources-pour-leducation-au-developpement-durable/retour-sur-le-foredd-2022-leau/des-paroles-dexperts.html
- https://www.reseau-canope.fr/forum-des-ressources-pour-leducation-au-developpement-durable/retour-sur-le-foredd-2022-leau/les-interviews-des-conferenciers-du-foredd-2022.html

- https://www.reseau-canope.fr/forum-des-ressources-pour-leducation-au-developpement-durable.html
- https://www.reseau-canope.fr/forum-des-ressources-pour-leducation-au-developpement-durable/retour-sur-le-foredd-2022-leau/un-parcours-mgistere-gestion-de-leau-un-levier-pour-ledd.html
- https://www.reseau-canope.fr/forum-des-ressources-pour-leducation-au-developpement-durable/retour-sur-le-foredd-2022-leau/leau-dans-la-plateforme-etincel.html
- https://www.reseau-canope.fr/forum-des-ressources-pour-leducation-au-developpement-durable/retour-sur-le-foredd-2022-leau/un-parcours-mgistere-avec-tara-ocean.html
- https://www.reseau-canope.fr/notice/enseigner-la-mer_9135.html
- https://www.youtube.com/watch?v=1ZXjZeurB38

4.5. Blue education in Greece

4.5.1. Status of Blue Education in Greece

The analysis of the status of Blue Education in Greece is based on five responses, which come from different organisations: one from an NGO, two from public organisations, one from a freshwater and marine research organisation, and one from a public educational institution (the laboratory centre located in a secondary school).

In this brief report we summarize the key findings and draw initial conclusions, based on gathered data which provides insights into various aspects of involvement in Blue Education activities in Greece.

4.5.2. Focus areas in Blue Education

The organisations were asked about their involvement in various Blue Education activities in Greece. Various organisations are actively promoting Blue education through multiple initiatives. They have organised workshops and seminars specifically focused on Blue education and set up dedicated teacher training programs. These organisations have established support programmes for Blue education initiatives and integrated Blue elements into school curricula. They organise field trips and outdoor educational programmes to provide practical learning experiences. A key focus is collaborating with national research and academic institutes, environmental organisations, and the Blue industry. They have implemented research projects addressing Blue education and developed educational podcasts and short e-products. Awareness campaigns and events have been launched to promote Blue education, careers, and skills.

4.5.3. Initiatives or other programmes

One public organisation reported not being aware of dedicated programmes on Blue education, while the NGO pointed out that although there may not be specific Blue Education initiatives, activities related to Blue Education are integrated into the curriculum through the Education for Sustainable Development (ESD) strategy at primary and secondary education levels.

Three of the organisations note some notable efforts:

- **"Adopt a Land or Coastal Marine Area" Programme:** An initiative by the Institute of Educational Policy attached to the Greek Ministry of Education encouraging schools to adopt and monitor local land or coastal areas.
- **BlueS_Med Project**: a project aimed at integrating Ocean literacy issues into school curricula and developing educational activities. The key principles of the project are co-building, inclusivity, sustainability and interactivity, as it aims to make use of e-tools to support peer-to-peer exchanges. It also involves collaborative activities with schools, pupils, and local stakeholders from Greece, Malta, France and Italy.
- the **BLUEMED Initiative**, this project involves partners from several Mediterranean countries, aiming to promote a healthier and more resilient Mediterranean Sea, enhance social well-being, boost economic growth, and create jobs. It involves partners from Cyprus, Croatia, France, Greece, Italy, Malta, Portugal, Slovenia, and Spain.
- **Blue Flag Programme:** Managed by the Hellenic Society for the Protection of Nature.
- The **Eco Schools Network**, which connects schools focused on environmental education and sustainability.

For further information on initiatives, see section *Resources on activities/initiatives in Greece gathered through the survey.*

4.5.4. Interdisciplinarity

This question aimed to investigate on integrating various subjects such as science, geography, history, literature and art to provide a comprehensive understanding of water systems and their interconnectedness with other aspects of life. The feedback indicated varying levels of integration. One research institute and one public organisation reported incorporating interdisciplinarity to some extent, while another public organisation and an NGO noted a lot of integration.

It is important to mention that, according to the public institution, the Greek National Curriculum for the "Environment and Education for Sustainable Development" (Government Gazette 2820/2022, Issue B) for kindergartens, primary and lower secondary schools, provides guidelines for environmental education (issues of ocean literacy are included as well) through projects and relevant activities and is implemented as a compulsory cross-curriculum subject. The Curriculum is currently in the process of revision. Thematic units in the revised curriculum related to ocean literacy are: 'Protection of biodiversity' & 'Sea in danger'.

4.5.5. Experiential Learning

Responses from various organisations regarding their involvement in experiential learning in Blue education reveal a diverse range of activities and levels of engagement.

Almost all organisations, with the exception of a public educational institution , are actively engaged in organizing a variety of Blue education activities. These initiatives include:

- **Training Programmes for Teachers**: Many organisations provide dedicated training programmes aimed at equipping teachers with the knowledge and skills necessary to effectively teach Blue education concepts. These programmes ensure that educators are well-prepared to integrate Blue education into their classrooms.
- **Field Trips**: To enhance practical learning, organisations arrange field trips that allow pupils to experience and study marine and coastal environments firsthand. These excursions provide valuable hands-on experience and deepen pupils' understanding of Blue education topics.
- **Outdoor Educational Activities:** In addition to field trips, various outdoor educational activities are organised to engage teachers and pupils in experiential learning. These activities might include beach clean-ups, biodiversity surveys, and other interactive programmes designed to foster a connection with marine and coastal ecosystems.

Overall, there is a notable difference in the extent of involvement among the different types of organisations, with the higher education institute and a public educational institution showing the most comprehensive approach to integrating experiential learning in Blue education.

4.5.6. Sustainability

Promoting an ethos of conservation and sustainable use of water resources, with an emphasis on protecting water biodiversity and ecosystems for future generations, has been approached to varying extents by different types of organisations. Public organisations have recognised and integrated these sustainability goals to some extent, reflecting a moderate level of commitment. The freshwater and marine research organisation has similarly engaged with these principles to some extent, indicating a focus on sustainability in their work.

The non-profit organisation has shown a high level of commitment, addressing sustainability issues a lot, and demonstrating a strong dedication to these principles. Private and public education institutes have also incorporated these goals to some extent, suggesting that while sustainability is a recognised value, there is potential for further emphasis and integration in their curricula and activities.

4.5.7. Cultural and Historical Context

Recognising the cultural significance of the ocean in different societies and exploring the historical relationship between humans and the sea, including maritime traditions, exploration, and trade, has been approached to varying extents by different types of organisations. Public organisations have acknowledged this to some extent, highlighting their awareness and partial integration of these themes. Freshwater and marine research organisations or institutes have engaged very little with the cultural and historical aspects of the ocean, indicating a possible area for further development. Non-profit organisation has not indicated a clear stance, as some respondents stated they do not know about their involvement in this context. The public educational institution also recognises these themes to some extent, suggesting an opportunity for further emphasis in educational curricula.

4.5.8. Global Citizenship

Promoting a sense of responsibility and global citizenship by highlighting the interconnectedness of water and the impact of human activities on marine environments, regardless of geographical location, has been addressed to varying degrees by different organisations. Public organisations and freshwater and marine research centres have engaged with these themes to some extent, indicating a significant gap in fostering global citizenship and awareness of the global impact of water-related issues. In contrast, non-profit organisations and public educational institutions have shown a strong commitment, addressing these themes a lot.

This suggests that while certain sectors are leading the charge in promoting global citizenship and responsibility towards marine environments, there is a clear need for increased efforts and focus from public organisations and research centres to enhance their engagement and impact in this area. Overall, a more unified and comprehensive approach across all types of organisations would better support the development of a globally conscious and responsible society.

4.5.9. Innovation and Technology

Utilising innovative technologies and scientific developments to study, monitor, and protect water ecosystems, while fostering creativity and problem-solving skills among students, has been embraced to varying extents by different organisations. Public organisations and /public educational institutions, together with the freshwater and marine research organisation have shown a strong commitment to these initiatives, engaging a lot with innovative technologies and promoting scientific advancements. However, the other public organisations have engaged very little in these efforts, indicating a gap in the adoption and integration of innovative technologies within this sector. Non-profit organisations have not provided clear responses, reflecting uncertainty or lack of focus in this area.

Overall, while there is significant engagement from some public and educational institutions, and a freshwater and marine research organisation, there is a need for greater involvement and utilisation of innovative technologies by other public sectors to enhance the study, monitoring, and protection of water ecosystems, and to foster essential skills among students.

4.5.10. Community Engagement

Engaging local communities, stakeholders, education, and citizens in water conservation efforts, while recognising their traditional knowledge and practices related to the sea and rivers, has been addressed to varying degrees by different organisations. Public organisations and freshwater and marine research institutes have engaged with community involvement to some extent, indicating moderate recognition and integration of community knowledge and practices. Another public organisation has engaged very little, showing a significant gap in community engagement.

Non-profit organisations, however, have demonstrated a strong commitment, engaging a lot with local communities and stakeholders. Public educational institutions have also involved communities to some extent, suggesting an awareness and partial integration of traditional knowledge and community practices.

Overall, while non-profit organisations lead in community engagement efforts, there is a clear need for increased involvement and recognition from public organisations and research institutes to fully leverage community knowledge and practices in water conservation initiatives.

4.5.11. Environmental Justice

Addressing issues of environmental equity and advocating for fair and equitable access to water resources and opportunities for all communities, particularly those disproportionately affected by environmental degradation, has seen varied levels of engagement from different organisations. Public organisations and freshwater and marine research institutes have engaged very little in addressing environmental justice, indicating a significant gap in their efforts toward ensuring equitable access and opportunities. Non-profit organisations have shown a strong commitment to these issues, engaging a lot and actively advocating for environmental justice. Public educational institutions have addressed these themes to some extent, suggesting a moderate level of integration of environmental equity in their activities.

Overall, while non-profit organisations lead in advocating for environmental justice, there is a crucial need for increased efforts from public organisations and research institutes to ensure fair and equitable access to water resources for all communities, especially those disproportionately affected by environmental degradation.

4.5.12. Adaptation and Resilience

Building resilience to climate change impacts and preparing pupils to address future challenges facing water health, such as sea level rise, ocean acidification, and extreme weather events, has been approached to different extents by various organisations. Public organisations and public educational institutions have engaged with these themes to some extent, indicating a moderate level of commitment to building climate resilience and preparing pupils for future challenges. Freshwater and marine research organisations, as well as other public organisations, have engaged very little in these efforts, showing a significant gap in addressing climate change impacts. Non-profit organisations have demonstrated a strong commitment, engaging a lot in activities that build resilience and prepare pupils for future environmental challenges.

Overall, while non-profit organisations are leading in fostering climate resilience, there is a need for greater involvement and focus from research institutes and public organisations to comprehensively address the impacts of climate change on water health and to better prepare future generations for these challenges.

4.5.13. Lifelong Learning

Promoting a lifelong passion for water conservation and learning, encouraging ongoing exploration, advocacy, and engagement with water issues beyond formal education settings, has been addressed to varying degrees by different organisations.

Public organisations and freshwater and marine research institutes have engaged with these themes to some extent, reflecting a moderate level of commitment to fostering lifelong learning for water issues. Another public organisation has engaged very little, indicating a significant gap in promoting lifelong engagement with water conservation. Non-profit organisations have shown a strong commitment, engaging a lot in activities that promote lifelong learning. Public educational institutions have also addressed these themes to some extent, suggesting that while there is some integration of lifelong learning principles, there is potential for further emphasis and development.

Overall, while non-profit organisations are leading in promoting a lifelong passion for water conservation, there is a clear need for increased efforts from public organisations and research institutes to enhance lifelong engagement and advocacy for water issues.

The lead criterion for a successful outcome is to deliver highly evaluated projects and/or teaching interventions and/or modules that meet basic educational standards for communicating this material; these standards include correct and reliable scientific knowledge, following modern and participatory teaching and learning methods, and involving constructive and inquiry-based learning within an authentic learning context characterized by a critical approach; and all the above always under the framework of a current Sustainability Education.

For these to be successfully realized, it is imperative that scientists who work in specific scientific fields on the one hand, and classroom teachers who are familiar with modern pedagogical approaches on the other, accomplish close and continuous collaborations.

4.5.14. Further comments on country's maturity

There are numerous teachers in Greece engaged in blue projects at the primary and secondary education levels. However, these efforts often lack recognition, rewards, funding, and necessary training.

Ocean literacy in Greece is facilitated through a network of Centres of Education for the Environment and Sustainability, offering short-term educational projects for school groups and seminars for in-service teachers. Additionally, several non-governmental organisations such as Medsos, Mom, Kallisto, the Hellenic Society for the Protection of the Environment and the Cultural Heritage, EKBY, Archelon, Medies, and MIO-ECSDE provide essential environmental education programmes in schools. Primary and secondary schools can also implement long-term projects on environmental education and sustainable development, typically lasting for some months. Support is further extended by experts in charge of environmental education appointed in regional education directorates. Despite these efforts, there has yet to be a national assessment of the impact of these initiatives on ocean literacy.

4.5.15. Challenges limiting the development of Blue Education

The development of Blue Education in the country is hampered by several challenges. These include a general lack of teachers' knowledge on ocean and freshwater topics, insufficient funding for blue education projects, and a scarcity of educational resources.

Additionally, there is an absence of an evaluation framework for blue education, and curricular constraints further impede progress. Teacher training on blue challenges is lacking, and there is limited interest and involvement from local communities. Bureaucratic hurdles and insufficient attention to blue topics within the broader context of environmental education are also problematic. Innovative teaching methods, such as project-based learning and outdoor schooling, are not properly and/or widely integrated.

Other significant issues include teachers' lack of interest, difficult access to marine environments, inadequate integration of technology in education, insufficient support for students' diverse needs, and a lack of appropriate blue partners and stakeholders. There is also a notable lack of parental interest in blue education activities.

4.5.16. Prioritised topics in Blue Education

There are several key topics and thematic areas within Blue Education that are considered priorities in the country. Ocean literacy and environmental awareness are repeatedly highlighted as crucial, alongside the blue economy and sustainable development. There is a strong emphasis on citizen science and community engagement in ocean monitoring and understanding of the regional sea or ocean. The connection between human health and ocean health is also considered important.

Other significant areas include freshwater and ocean conservation and sustainable management, climate change impacts on marine environments, sustainable fishing practices, and aquaculture, coastal zone management and resilience, and marine technology and innovation for ocean exploration. Ocean governance and policy frameworks are vital, as is the promotion of blue careers among students.

Given Greece's geography, all these topics are deemed very important. Additionally, freshwater and marine pollution, prevention and cleanup efforts, maritime history and cultural heritage, freshwater and marine biodiversity and ecosystems, as well as ocean acidification and its effects on marine life are also considered priorities.

4.5.17. Interest in BlueLightS project activities

The responses indicate a strong willingness among one public organisation and a freshwater and marine research institute to collaborate with BlueLightS partners in testing solutions to strengthen blue education in Greece.

There is also interest in participating in European programmes which promote teachers’ training on sustainability and citizenship topics. However, some of the respondents didn’t provide an answer to this question, which indicates that further promotion of blue education and more specifically BlueLightS project is needed in Greece.

4.5.18. Collaboration preferences

The responses indicate a wide range of collaborative interests within Blue Education, reflecting a comprehensive and multifaceted approach to integrating blue concepts into educational frameworks. Key areas of interest include co-developing curriculum materials and/or lesson plans and updating textbooks with "blue" content to ensure that these tools are current and relevant. There is a strong focus on organising and participating in training sessions for teachers and workshops, both online and in-person, which underscores the importance of professional development and skill enhancement for educators.

Exchanging and sharing best practices and teaching methodologies are seen as crucial for fostering a collaborative learning environment and improving the overall quality of blue education. Strengthening the integration of "blue" themes into existing sustainability initiatives and programmes is another priority, highlighting the need for coherence and synergy between different educational actors.

Developing national or regional strategies for integrating blue education is a significant interest, along with the idea of developing and testing a "blue" school label. This initiative aims to recognize and promote schools that excel in blue education, providing a benchmark for others to aspire to. Participation in conferences for sharing experiences and good practices is also valued, indicating the importance of networking and knowledge dissemination.

The interest in conducting joint research projects or studies on the bottlenecks and solutions for Blue education demonstrates a commitment to evidence-based practice and continuous improvement. Revisiting the current evaluation framework to integrate a "blue" component ensures that assessments accurately reflect the emphasis on blue education.

Joining a Community of Practice (Blue Education Community of Practice, Blue Edu CoP) is highlighted as a key interest, aiming to connect educational stakeholders from various sectors to enhance the success of blue projects in schools. This community would provide a platform for collaboration, support, and sharing of resources.

Additional specific interests include supporting schools with educational materials and best practices for implementing the revised national curriculum on sustainable development, enriching school actions related to the adoption of coastal ecosystems, promoting partnerships among schools and teachers with a focus on ocean literacy, and engaging schools in research to become agents of change in ocean policies.

4.5.19. Experimentation needs

In conclusion, the current status of Blue Education in Greece reflects a diverse landscape of engagement and initiative among various organisations. While many are actively promoting Blue Education through workshops, training programmes, and community engagement, challenges seem to persist. Notably, disparities in awareness and participation among public institutes, research organisations, and educational facilities hinder comprehensive progress.

Despite significant efforts from NGOs and some educational institutions, issues such as insufficient funding, lack of teacher training, and limited curricular integration remain barriers to effective Blue Education. Prioritised themes such as ocean literacy, sustainable development, and community involvement highlight the potential for a unified approach to enhance the understanding and importance of water ecosystems.

Moving forward, fostering collaboration among stakeholders and addressing existing challenges will be crucial to advancing Blue Education and ensuring a more sustainable future for Greece's marine and freshwater resources. A way to promote Blue education can be through the skills labs (health, social behaviour, environment, careers) by integrating the Ocean Literacy framework as the content knowledge basis, regarding the one big ocean with its many features.

4.5.20. Connection to Key elements of educational systems

The Key elements of educational systems addressed in the suggested experimentation recommendations include **teaching methods**, evidenced by the promotion of workshops and training programs, and **community and parental involvement**, emphasised through community engagement efforts. **Capacity building and professional development** are also highlighted, particularly concerning the need for **teacher training**. The mention of ocean literacy and sustainable development also indicates a focus on **curriculum content** and **educational resources**.

4.5.21. Resources on activities/initiatives in Greece gathered through the survey

Related to examples of initiatives in Greece, the respondents shared the following links:

- https://utopia.duth.gr/amogias/BlueMinds4Teachers/call.pdf
- https://www.facebook.com/groups/963396845351491/?paipv=0&eav=AfbNvK8LfyhNeo4_phEiy8GZ3Bz8927_eFUR726aUTxcWXV9980p9lfXrtROxShUKc4&_rdr
- https://www.linkedin.com/posts/panayota-yolanda-koulouri-67556b4a_blueminds4teachers-blueminds4teachers-activity-7171395564897452033-xmFz
- https://maritime-forum.ec.europa.eu/empowering-teachers-train-trainer-network-european-blue-schools_en
- The Greek National Curriculum for the "Environment and Education for the Sustainable Development" (Government Gazette 2820/2022, Issue B) for kindergartens, primary and lower secondary schools provides guidelines for environmental education (issues of ocean literacy are included as well) through projects and relevant activities and is implemented as a compulsory cross curriculum subject. The Curriculum is currently in the process of revision. Thematic units in the revised curriculum related to ocean literacy are: 'Protection of biodiversity' & 'Sea in danger'.
- https://medies.net/project/esd-training-courses-eligible-for-erasmus-ka1-grant/

- https://medasset.org/el/perivallontiki-ekpaideysi/
- https://safewatersports.com/education/394-educational-program
- https://water-matters.hcmr.gr/en/homepage/
- https://wwfeu.awsassets.panda.org/downloads/ekpaideytiko_programa_adopt_a_beach.pdf
- https://www.helmepa.gr/periballontiki-enimerosi/paidiki-helmepa
- https://www.marlisco.eu/education.en.html
- https://www.plastic-pirates.eu/en/partners
- https://www.thalassapedia.gr/drastiriotites

4.6. Blue education in Ireland

4.6.1. Status of Blue Education in Ireland

The analysis of the status of Blue Education in Ireland is based on 17 responses, which come from different organisations: five from NGOs, three from private companies, six from private/public educational institutions, two from public organisations and one from a social enterprise.

The data provides insights into different aspects of their involvement in Blue Education activities. In this short report, we attempt to summarize the key findings and draw some initial conclusions.

4.6.2. Focus areas in Blue Education

The responses indicate that various types of organisations in Ireland are already contributing to Blue education initiatives. These include non-profit organisations, private companies, colleges, universities, primary and secondary schools, public organisations, Government bodies and State agencies and social enterprise companies. Majority of respondents confirmed their involvement in Blue education activities in Ireland.

4.6.3. Initiatives or other programs

According to survey findings, organisations in Ireland have undertaken a variety of activities related to Blue Education.

Non-profit organisations have been supporting Blue education initiatives through various activities: creating training programmes for teachers, organising workshops and seminars, integrating Blue elements into curricula, developing educational podcasts, promoting Blue careers, and collaborating with various partners.

Private companies have also engaged in similar activities, including field trips and awareness campaigns. The main focus of educational institutions was promoting Blue careers, conducting field trips, developing podcasts, and collaborating with local and international partners.

Public organisations and social enterprises have contributed by implementing research projects, developing strategies for Blue education, and promoting environmental conservation.

A number of Government bodies and State agencies are the lead in collaborating and funding Blue education and outreach programmes in Ireland.

Some of the main initiatives/programmes are:

- Marine Institute Explorers Program, which promotes ocean awareness, knowledge and engagement, as well as supports ocean literacy and marine education in primary schools. The Programme is funded by the Marine Institute, Ireland's State agency for marine research and development. It has a dedicated management and outreach team that delivers marine modules in schools, provides teachers CPD training and 3rd level student teachers training. It also develops teaching resources in line with the national curriculum that are freely accessible online for all schools and other programmes use. The Explorers outreach programme delivers over 400 marine modules to schools, which are predominately in coastal counties. It reaches over 12,000 pupils and over 400 teachers annually. The Explorers team also participate in various public and education events and activities throughout the country promoting marine literacy.

- An Taisce's Green Schools[19] covers a range of different themes, including: litter and waste, energy, water, travel, biodiversity. Their Global Citizenship – Marine Environment is a theme which aims to highlight how work on the Green-Schools programme has positively influenced environments worldwide.

- The Irish Ocean Literacy Network (IOLN) is a network of citizens and organisations that are focused on developing ocean literacy in Ireland. It has recently formed a dedicated marine education working group that is aimed at promoting marine education. Its Blue School webpage outlines Irish programmes which aim to connect teachers and students to marine world and provide practical activities which can be used in the classrooms. They IOLN marine education includes membership including formal, non-formal marine education and citizen science projects such as Explore your shore, The Irish Whale and Dolphin Group, and Leave No Trace-Ireland.

[19] Green-Schools is a student-led programme with involvement from the wider community, coordinated by the Environmental Education Unit of An Taisce (Foundation for Environmental Education (FEE) member for Ireland). An Taisce's education programmes are funded largely by the Government of Ireland through government departments, agencies and local authorities. The largest of these grant-making agencies by far are the National Transport Authority, the Department of the Environment, and the Department of Housing.

- The Water forum and the Government Environment Protection Agency provide a range of resources and links to other water education programmes in Ireland, including lesson plans for teachers and digital maps to explore water resources.

- There are a number of individuals, voluntary community groups, and charities that provide outreach to schools at all levels, adult education learning, as well as community programmes for citizens. A sample of these include Sea Synergy Marine Awareness Centre from Kerry, Cuan Beo from Galway, Ahare River and Biodiversity Development Group from Wexford, and Geashill Tidy Towns from Offaly, Saltwater Detectives – Ken Whelan in Louth, and Seal Rescue Ireland. These include citizen science and river restoration work of community groups, rivers trusts, local development companies, and LEADER Programmes – that aims to support local development of Ireland's rural areas,

- BIM, Ireland's Seafood Development Agency brings their expertise in promoting responsible environmental practices where they promote careers in the Irish catching, fish farming and seafood processing sectors by training new entrants and upgrading the skills of existing practitioners. They also run the Bord Iascaigh Mhara's (**BIM**) **ARC.** This is a mobile aquaculture remote classroom, designed to raise young people's awareness of aquaculture.

For further information on initiatives in Ireland, see section *Resources on activities/initiatives in Ireland gathered through the survey.*

4.6.4. Interdisciplinarity

Responses from organisations in Ireland show varied levels of interdisciplinarity in Blue Education.

While non-profit organisations mostly integrate many subjects like science, geography, history, literature, and art, private companies and public organisations generally incorporate these subjects to a moderate degree. Universities report significant integration.

A dedicated blue education subject is not 'formally' on the primary or secondary curriculum in Ireland. It, however, includes water and marine strands as part of the primary geography subject: Land, rivers, and seas of my country; Weather, climate and atmosphere; Environmental awareness and care. The science subject strand also covers marine themes as part of the strands: Living things. Marine topics are also extensively taught through cross curricular and thematic learning in primary schools. Many primary schools have taken part in marine and water projects through the Green Schools programme, Explorers Education Programme, ARC school visits, Leave No Trace-Ireland, Something Fishy Project, and Heritage in Schools etc. Many more individuals provide voluntary support visiting school as guest speakers talking about rivers, lakes, estuaries, the seashore and ocean throughout Ireland.

Secondary schools show moderate efforts with a less flexible curriculum. The National Council for Curriculum and Assessment who advise the Minister for Education on curriculum is underway with the development for the new Leaving Certificate subject: Climate Action and Sustainable Development. This will be introduced into schools on a phased basis from September 2025. Other efforts are noted with water and marine themed science projects completed by secondary schools through the BT Young Scientist & Technology national exhibition, where students compete in creating STEM projects.

The diversity in implementation highlights both the progress made and the potential for further development in creating comprehensive, interdisciplinary and formal education Blue Education programmes.

4.6.5. Experiential Learning

Responses from organisations in Ireland regarding experiential learning in Blue Education vary widely and highlight the diverse levels of commitment across different organisational types in Ireland. At the same time, they suggest opportunities for enhancing experiential learning within Blue Education initiatives in Ireland.

Most non-profit organisations are involved in hands-on experiences, field trips, and practical activities, while private companies generally participate less in experiential learning, with only one respondent who indicated strong engagement in these activities.

All surveyed educational institutions demonstrate moderate to significant engagement. Public organisations vary in their involvement, with some showing moderate engagement and others more extensive participation, while a social enterprise company indicated no involvement in experiential learning.

Such disparity suggests that organisations could benefit from sharing successful strategies with each other to promote more consistent and widespread participation in experiential learning initiatives. With the recent changes in the primary school curriculum (Primary School Curriculum Framework 2023), experiential learning is a key feature providing children with the opportunity to learn by doing as part of completing themed school projects.

4.6.6. Sustainability

When asked about promoting an ethos of conservation and sustainable use of water resources and emphasizing the importance of protecting water biodiversity and ecosystems for future generations, organisations in Ireland demonstrated different degrees of engagement.

Non-profit organisations predominantly promote conservation and sustainable use of water resources, to varying degrees, which is also noticeable with respondents coming from private organisations.

Among educational institutions, colleges and universities demonstrate moderate to significant efforts in fostering a conservation ethos and sustainable water use, while for primary and secondary schools there are different levels of involvement. Public organisations generally show moderate engagement, while a social enterprise company reported no involvement in sustainability efforts.

To improve overall engagement and impact, it is recommended that organisations collaborate more closely across sectors. By fostering greater cooperation and knowledge exchange, Ireland can further advance its goals in promoting conservation and sustainable use of water resources through Blue Education initiatives.

4.6.7. Cultural and Historical Context

Respondents from Ireland included different organisations, including private companies, public organisations, non-profit organisations, social enterprises, and educational institutions at different levels. The responses from such broad sample show a range of perspectives on the cultural and historical significance of the ocean: some private companies and educational institutions saw "very little" significance, while others, including public organisations and non-profits, acknowledged it "a lot" or "to some extent." Such disparity indicates that different organisations have varying levels of awareness and appreciation for maritime heritage.

4.6.8. Global Citizenship

When asked about encouraging a sense of responsibility and global citizenship by highlighting the interconnectedness of water and the impact of human activities on marine environments, the responses from Ireland indicated different levels of engagement in this topic.

Some private companies and primary/secondary schools noted "very little" focus on this issue, while others, including non-profits and higher education institutions, reported high level of engagement (“a lot").

However, there are some programmes which focus on collaboration with communities to help protect the coastline and marine life, such is the [Clean Coasts](https://cleancoasts.org) programme[20].

This suggests that the importance of fostering global citizenship and understanding the impact on marine environments is perceived differently across various types of organisations, which highlights the need for broader awareness and consistent efforts across all sectors to foster a sense of global responsibility and environmental stewardship.

4.6.9. Innovation and Technology

The question on utilization of innovative technologies and scientific developments to study, monitor, and protect water ecosystems brought different views of the survey respondents, as their engagement with innovative technologies varied.

Some private companies and primary/secondary schools reported "not at all" or "very little" use, while public organisations and higher education institutions indicated high usage. Non-profits and some schools recognised their importance "to some extent." This shows that while some sectors are committed to using innovative technologies for environmental protection, others may need more encouragement and support to enhance their involvement.

20 Clean Coasts create a tangible improvement of Ireland’s coastal environment by supporting over 2000 community groups to host beach clean-ups, empower volunteers, facilitating marine litter surveys and complete a range of environmental focused activities in their region. To learn more, visit: https://cleancoasts.org

4.6.10. Community Engagement

The views expressed by the survey respondents from Ireland demonstrate varied views on community engagement in water conservation.

While many non-profits and public organisations, along with some private companies and higher education institutions, reported significant engagement, other private companies and some educational institutions noted moderate involvement. However, social enterprises and some primary/secondary schools reported little to no engagement ("not at all" or "very little"). This indicates a mixed level of commitment to involving communities and recognising traditional knowledge in water conservation efforts across different sectors.

4.6.11. Environmental Justice

Survey responses show different engagement levels among different types of organisations regarding environmental justice. While non-profit organisations are significantly involved in addressing environmental equity and advocating for fair access to water resources, some colleges/universities participate only moderately in these efforts. However, private companies, social enterprises, and many primary/secondary schools demonstrate limited or no engagement in environmental justice activities.

The findings highlight the importance of enhancing collaboration across sectors to ensure fair access to water resources and environmental opportunities for all communities in Ireland. There is a clear need to expand educational initiatives and advocacy programmes that promote environmental equity and raise awareness about sustainability.

4.6.12. Adaptation and Resilience

The survey investigated into levels of involvement in promoting adaptation and resilience to climate change impacts, particularly in preparing students to tackle future challenges affecting water health. The responses from Ireland indicate a disparity in commitment across different surveyed organisations, highlighting the potential for broader participation and increased collaboration. Given that NGOs and some colleges/universities are particularly active in these efforts, while certain primary/secondary schools and social enterprises show minimal engagement, stronger synergies between different sectors could strengthen Ireland's readiness in addressing the environmental challenges. (National Council for Curriculum and Assessment, 2024)

4.6.13. Lifelong Learning

Responses to the question which explored the extent to which organisations implement lifelong learning aspects in their Blue education activities were quite varied and differed according to the type of organisation.

Overall, most organisations - seven out of seventeen - reported a moderate level of involvement in lifelong learning. Six organisations reported a strong interest in engaging in lifelong learning, while two organisations - an NGO and a private company - expressed very little effort to promote a lifelong passion for water conservation and systems, two other organisations - a public educational institution and the social enterprise company – reported no involvement in lifelong learning at all.

Most public educational institutions - four out of the six survey respondents - and private companies - two out of three - revealed moderate engagement in lifelong learning, with most of the NGOs revealing strong engagement.

Therefore, while overall the majority of survey responses show that organisations are engaging in some form of lifelong learning in their Blue Education activities, more effort is needed to increase the level of engagement of other organisations.

4.6.14. Further comments on country's maturity

Some respondents commented that it is difficult to assess Ireland's overall approach to Blue education initiatives and programmes as they are unaware of what other schools and practitioners in the sector are doing. Other respondents noted that Ireland's potential for Blue education is great given its population and contextual landscape, including a wealth of marine educators and scientists, passionate individuals interested in exploring their environmental knowledge, marine-based industries, businesses and national institutions. Examples include the Marine Institute of Ireland, Camden Education and the Galway Atlantaquaria. However, as noted by the organisations, Ireland's maturity in marine systems and conservation activities is hampered by a lack of funding and a lack of collaboration between different stakeholders. Indeed, many students and individuals from rural coastal communities have limited access to some programmes; for such cases, increased long-term (more than 3 years) funding would ensure greater access to and inclusion in Blue educational spaces. Often, funding is one-off or short-term (less than a year). Finally, a more holistic approach to water education involving different stakeholders would allow Ireland to realise its potential to make Blue education a national resource, rather than regional, by creating more opportunities for individuals to engage in Blue education opportunities.

Formalising blue education in primary and secondary schools, led by the NCCA and the Department of Education, would ensure teachers included topics annually. Currently, funding school programmes is dispersed through other Government bodies and state agencies. With this approach, there is an over-reliance that concepts related to blue education are considered under other initiatives e.g. STEM, Sustainable Development, Climate Action etc.

4.6.15. Challenges limiting the development of Blue Education

The surveyed organisations indicated a variety of challenges that limit the development of Ireland's Blue education initiatives and programmes.

The following challenges were highlighted as hindering factors: lack of funding to support dedicated blue education activities (especially as this obstacle limits accessibility and inclusivity for those from more rural communities), lack of teachers' general knowledge on ocean and fresh-water topics and issues, and curricula constraints.

The limitations which affect further development of Blue education were also identified in lack of the evaluation framework for "blue" education activities); lack of appropriate "blue" partners/stakeholders; insufficient integration of innovative teaching methods and insufficient attention paid to blue in the general framework of environmental education. Additionally, more than half of the surveyed organisations indicated a lack of teacher training on blue challenges as a hindering factor to the development of water conservation and system activities. Therefore, responses suggest that more guidance on effective Blue education implementation, teacher training on the topic, and more collaboration between "blue" stakeholders and experts would help to overcome the identified challenges.

Finally, the minority of surveyed organisations pointed out insufficient integration of technology in teaching and learning processes, difficult access to water and marine (outside) environments, lack of parental interest and appetite for blue ed activities, and limited interest and involvement of local communities in topic as hindering elements. Altogether, the responses suggest that it is not a lack of stakeholder interest that limits the development of Blue education, but rather a lack of long-term funding, training and curriculum constraints.

4.6.16. Prioritised topics in Blue Education

When asked about specific topics or thematic areas within Blue education which should be prioritized in Ireland, the respondents identified several areas. The key areas of focus include: ocean literacy, climate change impacts, marine biodiversity, sustainable practices, and the connection between human health and ocean health.

Overall, these priorities reflect an inclusive approach to Blue education, which would cultivate a generation of informed and proactive citizens, ready to contribute to the preservation of marine and freshwater environments and at the same time, support economic and social resilience.

4.6.17. Interest in BlueLightS project activities

The survey responses show a strong willingness among various organisations in Ireland to collaborate with BlueLightS partners in testing solutions to enhance blue education. Most private companies, non-profit organisations, colleges, universities, and primary/secondary schools indicated their readiness to participate, while only one public organisation declined the opportunity to collaborate.

4.6.18. Collaboration preferences

While any organisations showed interest in participating in BlueLightS activities to test and experiment with various solutions, some of them expressed the need for further details on such collaboration before fully committing. One NGO mentioned that their involvement would need to be compensated.

4.6.19. Experimentation needs

The responses gathered through the survey indicate that various organisations in Ireland are contributing to Blue education initiatives. These involve a range of activities, such are creating educational programmes, organising workshops, and promoting environmental conservation.

However, despite the widespread involvement, the level of engagement and focus on aspects such as interdisciplinary learning, experiential learning, sustainability, cultural and historical context, global citizenship, and the use of innovative technologies varies significantly across different types of organisations. To ensure all sectors are equally engaged, further **inter-sector collaboration** is needed to foster stronger synergies and ensure sharing of successful programmes and strategies. Such collaboration across sectors can help reinforce the importance of protecting water biodiversity and ecosystems for future generations.

Additionally, creating **engaging content** aligned to the needs of Irish schools could highlight various aspects, such are interdisciplinary learning, cultural and historical context of the ocean to promote environmental practices and marine and freshwater conservation awareness among students, but also the wider community.

4.6.20. Connection to Key elements of educational systems

When it comes to Ireland, the recommended experimentations address a number of key elements: Improved **teaching methods**, can be achieved by the creation of educational programs and organizing workshops. The focus on **community and parental involvement** is highlighted through the promotion of environmental conservation and the need for inter-sector collaboration. The recommendations also emphasise the integration of interdisciplinary and experiential learning, as well as the importance of sustainability, global citizenship, and innovative technologies. Additionally, there is a mention of **curriculum content**, particularly the cultural and historical context of the ocean, which can enhance environmental education.

4.6.21. Resources on activities/initiatives in Ireland gathered through the survey

Related to examples of initiatives in Ireland, the respondents shared the following links:

- https://allatlanticblueschools.com/
- https://bim.ie/a-seafood-way-of-life/the-arc
- https://camden.education/
- www.explorers.ie
- https://educationalpassages.org/boats/seoltoir_na_gaillimhe/
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4.7. Blue education in Portugal

4.7.1. Status of Blue Education in Portugal

The analysis of the status of Blue Education in Portugal in the following chapter is based on six responses which come from different organisations: three from NGO/network organisations, one from a public organisation, and two from private/public educational institutions, one of them being a college/university and the other freshwater and marine organisation/institute.

The survey responses were followed by a complementary interview with Ciência Viva, National Agency for Scientific and Technological Culture, and a BlueLightS project partner, which provided additional insights into the different areas described in the following sections.

In this short report, we attempt to summarize the key findings and draw some initial conclusions on organisations' involvement in Blue Education activities in Portugal. However, according to the findings of Ciência Viva, currently there are research studies ongoing, with aim to capture the complex overview of Blue education in Portugal which involves more than 150 different organisations engaged in Blue education activities. A publication encompassing Portuguese results in this area is expected by the end of September 2024.

4.7.2. Focus areas in Blue Education

The responses from diverse organisations involved in Blue education reveal a strong commitment to enhancing Blue education across various sectors.

From non-profits to academic institutions, there are notable efforts in developing and implementing comprehensive projects. These include workshops, seminars, teacher training, field trips, and collaborative projects with environmental organisations and research institutions.

Additionally, the development of Escola Azul[21], policy strategies, and awareness campaigns underscore the collective effort to integrate Blue education deeply into curricula and public consciousness.

Overall, these initiatives highlight a proactive approach to overcoming challenges in Blue education, aiming to foster a generation well-versed in the significance of sustainable water management and marine conservation.

4.7.3. Initiatives or other programs

The responses show that there is a variety of initiatives and programmes in Portugal, which aim to enhance ocean literacy and awareness among different age groups and sectors. Some of the key programmes include:

- Escola Azul, a national initiative promoting ocean literacy in schools, created by the Ministry of the Maritime Affairs[22] in 2016/2017. It was developed with the mission to promote Ocean Literacy within the school community and create more responsible and participative generations that contribute to the sustainability of the Ocean. This program recognizes and guides schools that work on ocean-related topics, creating a community that connects

[21] Escola Azul is an educational program with a mission to promote Ocean Literacy in schools. This national program distinguishes and guides Portuguese schools that address ocean-related issues, creating an Ocean Literacy community that brings together schools, the maritime sector, municipalities, and other entities with an active role in marine education

[22] Due to governmental organisational changes, the maritime affairs are split between the Portuguese Ministry of Agriculture and Fisheries and the Ministry of the Economy. Escola Azul continues to be coordinated by the Directorate of Maritime Policy Affairs, now within the umbrella of the Ministry of the Economy.

schools with the maritime sector, industry, municipalities, NGOs, universities, and other entities actively involved in Ocean Literacy.

The program encourages diverse teaching strategies that promote active learning, aligning with contemporary educational objectives. This includes integrating ocean-related topics into existing curricula through practical projects, interdisciplinary activities, and partnerships with local entities. These strategies enhance students' knowledge and prepare them with essential skills for responsible citizenship and sustainable development (Costa et al., 2021).

Table 2: The outreach of Escola Azul

	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023
Students engaged	13,172	13,340	22,435	32,000	68,518	81,675
Blue Schools	29	81	170	235	307	366
Stakeholders	40	70	80	94	106	109
Stakeholders' initiatives for schools	120	220	250	395	383	390

The overarching goal is to stimulate the school community to understand the Ocean's influence on us and our influence on the Ocean, motivating schools to address the Ocean in a structured, interdisciplinary, and comprehensive manner, extending beyond the classroom context and having a social impact through the involvement of local communities and the Blue School partners' network. This programme uses a holistic OL framework and promotes the interaction between different sectors of the society. (Costa, 2021; Escola Azul, n.d.)

This programme currently gathers around 409 schools in Portugal, which hold the Escola Azul label, and hence have specific benefits, which include networking and collaboration, access to facilities supported by Escola Azul's partners (NGOs, scientific institutions, etc.), and opportunity to raise awareness on ocean and marine life with their students and within their communities, empowering them to take action to protect the environment. Escola Azul was submitted to an independent evaluation in 2022 with very positive results, namely regarding behaviour change of students.

- Ciência Viva, with a network of twenty science centres, has been very active regarding ocean literacy and blue education, offering a diversity of teacher training activities and webinars. Among its various activities, the organisation hosts an annual professional development event known as the Conference of Sea Teachers, which focuses on both marine and freshwater ecosystems. Additionally, it provides attendees with the updates on the latest research in the field. Ciência Viva also coordinates the participation of Portugal in Plastic Pirates[23] since 2020 and supports the activities of many freshwater projects in schools.

- The Oceano Azul Foundation, which recently created an education programme for primary schools, Educating for a Blue Generation[24] / Educar para uma Geração Azul (EGA), reaching over 1,300 teachers and over 24,700 students (Geração Azul, n.d.). This programme was submitted to an independent evaluation in 2022 with positive results and recommendations. It has been recently adopted by the Ministry of Education[25] with a view to scaling it up to all country and later extending it to other levels of schooling. The programme is now managed by Oceanário de Lisboa, which also depends on the Oceano Azul Foundation but has a larger educational team.

Complementing these efforts, organisations like Oceanário de Lisboa and Observatório do Mar dos Açores (OMA), which focuses on marine education in the Azores, engage the public through outreach and educational programmes. Research institutions like CCMAR, MARE and CIIMAR have developed citizen science initiatives and outreach programmes, which bring marine science directly into classrooms and within society. All this ecosystem is very dynamic – as an example, Kids Dive, which educates children about diving and marine ecosystems, was launched by scientists and evolved into an independent association. Additionally, certain Ciência Viva centres offer ocean-related exhibits and educational activities.

Collectively, these initiatives reflect a comprehensive and collaborative approach to Blue Education in Portugal, involving various stakeholders: non-profits, research institutions, science centres, and public educational organisations. Most of these entities are partners of Escola Azul, besides running their own outreach and education programmes.

For further information on initiatives, see section *Resources on activities/initiatives in Portugal gathered through the survey.*

23 The Plastic Pirates will help to achieve the objectives of the Mission Restore our Ocean and Waters, in particular its ambition to prevent and eliminate pollution in European seas and waters and is included as specific action in its implementation plan. The initiative also contributes to key European environmental policy objectives, notably the Marine Strategy Framework Directive, Water Framework Directive and the Zero Pollution Action Plan for Air, Water and Soil. To learn more about the initiative visit: https://www.plastic-pirates.eu/

24 EGA promotes ocean literacy in students in the 1st cycle of Basic Education, with the aim of qualifying a generation of citizens who will be more knowledgeable, aware, responsible and active in relation to the ocean and its conservation. To learn more about this programme visit: https://geracaoazul.org/educar-para-uma-geracao-azul/

25 Due to governmental organisational changes, the Ministry of Education has been merged with the Ministry of Science and Innovation.

4.7.4. Interdisciplinarity

Regarding the integration of various subjects such as science, geography, history, literature, and art to provide a comprehensive understanding of water systems and their interconnectedness, the responses from various organisations in Portugal indicate a partial engagement with interdisciplinarity.

Non-profit organisations, network organisations, public and private educational institutions, and freshwater and marine research centres all acknowledge integrating these subjects to some extent. This suggests that, while there is recognition of the importance of a multidisciplinary approach, its implementation might still be developing or uneven across different sectors.

The consistent response of "to some extent" across diverse types of organisations highlights a common understanding of the value of an interdisciplinary approach in Blue Education. However, it also implies that there may be challenges or limitations in fully realising this integration. These could include resource constraints, curricular restrictions, or varying levels of institutional support.

Overall, there is a clear awareness and initial steps towards interdisciplinarity, but further efforts may be required to achieve a more comprehensive and cohesive implementation across all educational and organisational settings.

4.7.5. Experiential Learning

Responses from different organisations in Portugal indicate varying levels of engagement with experiential learning, which involves providing hands-on experiences, field trips, and practical activities that allow students to directly engage with water ecosystems.

Non-profit organisations and freshwater and marine research centres are particularly active in this area, frequently offering substantial experiential learning opportunities. Network organisations also report a high level of engagement, suggesting that these sectors are well-equipped to provide immersive, practical experiences that enhance students' understanding of water ecosystems.

In contrast, public organisations and some educational institutions report more limited involvement. Public organisations indicate very little provision of experiential learning, while educational institutions, including colleges and universities, offer such experiences to some extent. This variation may be due to differences in resources, priorities, or institutional capabilities. Overall, while non-profits and research centres are leading the way in experiential learning, there is room for increased involvement from public organisations and educational institutions to provide more comprehensive hands-on learning opportunities across the board.

4.7.6. Sustainability

Responses demonstrate a significant commitment to promoting sustainability in the context of water resources. Non-profit organisations and network organisations are particularly dedicated, reporting a high level of engagement in fostering an ethos of conservation and sustainable use of water resources. These organisations actively emphasise the importance of protecting water biodiversity and ecosystems for future generations, indicating a strong focus on sustainability in their programmes and initiatives. Educational institutions, including both private and public colleges and universities, also report substantial efforts in promoting sustainability, integrating these principles into their curricula and activities. Some programmes, such is EGA, also show strong commitment to sustainability, and has shown positive impacts in fostering a generation of responsible citizens, responsible and active in the ocean conservation efforts.

However, the commitment to sustainability is varied among other sectors. Public organisations and some freshwater and marine research centres report only moderate engagement in promoting conservation and sustainable use of water resources. This suggests that while there is a general recognition of the importance of sustainability across different types of organisations, the depth and extent of its integration may vary.

There is a high emphasis on sustainability from non-profits and educational institutions, with room for increased focus and consistency from public organisations and research centres to ensure a more comprehensive approach to water resource conservation.

4.7.7. Cultural and Historical Context

Responses from various organisations in Portugal regarding the integration of cultural and historical context into Blue Education reveal a mixed level of engagement.

Non-profit organisations and network organisations acknowledge the cultural significance of the ocean and the historical relationship between humans and the sea to some extent. One non-profit organisation stands out by reporting a high level of engagement in this area, indicating a strong emphasis on exploring these aspects. Public organisations and freshwater and marine research centres also recognise the importance of cultural and historical contexts but engage with it only to some extent.

Conversely, educational institutions, including both private and public colleges and universities, report very little integration of cultural and historical contexts into their Blue Education programmes. This suggests a gap in the comprehensive understanding of the ocean's role in different societies and its historical impact on human development within formal education settings or a lack of resources to do so.

According to the initial analysis, there are recognition and efforts to incorporate cultural and historical perspectives, particularly among non-profits and educational institutions which are using a holistic approach to teach Ocean Literacy.

4.7.8. Global Citizenship

Responses regarding global citizenship from various organisations in Portugal indicate varied levels of commitment to encouraging a sense of responsibility and global citizenship by highlighting water interconnectedness and human impact on marine environments.

One of the surveyed non-profit organisations and network organisation engage with this aspect to some extent, while the other surveyed non-profit organisation shows a high level of involvement. Educational institution (freshwater/marine research centre) and public organisation report limited engagement in promoting global citizenship in relation to water issues.

Even though some non-profits are actively fostering global citizenship through awareness of water's interconnectedness and human impact on marine environments, there is a noticeable gap in involvement from educational and public sectors in Portugal. However, there is a strong collaboration between schools and different associations to promote citizenship activities through Citizenship classes, a discipline taken by more than 90% of schools.

4.7.9. Innovation and Technology

Responses from organisations in Portugal regarding innovation and technology in the context of water ecosystems reflect varying levels of engagement.

Non-profit and network organisations report very limited involvement in utilising innovative technologies and scientific developments for studying, monitoring, and protecting water ecosystems. On the contrary, one non-profit organisation demonstrates a significant commitment to innovation in this area. Educational institutions, both colleges/universities and freshwater/marine research centres, also show limited engagement, though the latter indicates some level of involvement in leveraging innovative technologies. Public organisations across the board report very little activity in this domain.

There is some advancement in innovation and technology in certain non-profit sectors and research centres, but a broader need remains for increased adoption of innovative approaches to study, monitor, and protect water ecosystems across all sectors in Portugal.

These initiatives are often initiated and supported by teachers, who expressed need for continuous professional development in this field, which would allow them to be up to date with existing technological tools and empower to utilize the knowledge in the field. To encourage teachers to utilize technology in the ocean-related classroom activities, but also in other areas such are robotics and engineering, certain programmes were developed, among which are the Atlântico Júnior contest, organised by Ciência Viva in collaboration with the Luso-American Development Foundation (FLAD).[26]

These findings suggest opportunities for collaboration and enhancement in integrating cutting-edge technologies and scientific developments which could address water-related challenges effectively, on national and international levels.

[26] FLAD focuses on four major areas – Science and Technology, Education, Art and Culture and Transatlantic Relations and paves the way for the Portuguese scientific, academic and artistic potential, strengthening Portuguese American communities and bringing people and institutions closer together from the two sides of the Atlantic.

4.7.10. Community Engagement

Responses regarding community engagement from various organisations in Portugal indicate varying levels of involvement.

Non-profit and network organisations report a significant commitment to engaging local communities, stakeholders, and citizens in water conservation efforts. Public educational institutions are highly engaged with the community, and they participate in national activities and programmes organised by Ciência Viva.

Overall, while non-profits and networks are actively fostering community engagement and integrating traditional knowledge into water conservation efforts, there is a notable gap in participation from public and educational sectors, suggesting potential for broader collaboration and enhancement in community-based conservation initiatives.

This can be further enhanced through strengthening links with relevant municipalities on local level, along the coastline and inland, as they are currently engaged in specific education and outreach programmes with a focus on the ocean. To conduct these programmes, they are often collaborating closely with Escola Azul, Ciência Viva Science Clubs, the Oceano Azul Foundation, etc. Apart from funding, the municipalities also provide support in logistics and dissemination of activities.

4.7.11. Environmental Justice

Responses from organisations in Portugal regarding environmental justice reveal a mixed level of engagement. Non-profit and network organisations acknowledge the importance of addressing issues of environmental equity and advocating for fair access to water resources, although their involvement varies.

Educational institutions, including colleges/universities and freshwater/marine research centres, show minimal engagement in advocating for environmental justice in relation to water resources. Public organisations across the board report very little activity in this area. Overall, while non-profits and networks are to some extent addressing environmental equity and fair access to water resources, there is a need for broader participation and advocacy from educational and public sectors in Portugal.

4.7.12. Adaptation and Resilience

Responses from organisations in Portugal regarding adaptation and resilience in the face of climate change impacts show varied levels of engagement. Non-profit and network organisations report some degree of involvement in building resilience to challenges affecting water health, such as sea level rise and ocean acidification. In contrast, educational institutions, both colleges/universities and freshwater/marine research centres, demonstrate limited engagement in preparing students to address these future challenges. Public organisations also show mixed involvement, with some reporting a moderate level of activity in adaptation and resilience efforts. Overall, while some non-profits are actively building resilience to climate impacts related to water health, there is a need for increased participation and preparation from educational and public sectors in Portugal to effectively address future challenges.

4.7.13. Lifelong Learning

Organisations in Portugal display varied levels of commitment to promoting lifelong learning in water conservation. Non-profit and network organisations are involved in fostering ongoing passion and engagement with water issues beyond formal education to some degree. Educational institutions, especially colleges and universities, show a strong dedication to encouraging lifelong learning about water conservation. Public organisations and freshwater/marine research centres demonstrate mixed levels of engagement, with some indicating efforts to promote lifelong learning to a certain extent.

We are listing below examples of engagement in Blue education beyond formal education settings:

- The Pavilion of Knowledge has an immersive space called **Fishanarium**, where children can draw marine animals, digitize their drawings, and explore on characteristics of certain species. **https://www.pavconhecimento.pt/fishanario/**.

- **The Oceanario of Lisbon**, owned by Oceano Azul Foundation, is one of the most popular venues for children in Portugal, which offers immersive experiences and programmes for the whole families.

- Museums focused on the marine life are: **Sea Life** in Porto, **the Maritime Museum** at Ílhavo, **Museu de Marinha**, **Aquário Vasco da Gama**, etc.

- Some of the centres / initiatives focused on freshwater are: Fluviário de Mora, which provides education programme on freshwater ecosystems. **Centro de Monitorização e Interpretação Ambiental** of Vila do Conde offers a rich programme of activities both on marine and freshwater ecosystems and is coordinated by CIIMAR, a leading research and training institution. CIIMAR, in collaboration with a Research Center in Biodiversity and Genetic Resources **CiBIO**, launched a campaign **Charcos com Vida** to raise awareness about the importance of freshwater habitats and their conservation. This project also aims to encourage the inventory, adoption, construction, and maintenance of ponds and small bodies of water for the development of scientific and educational exploration activities and biodiversity observation. Overall, while non-profits and educational institutions actively encourage continuous exploration and advocacy in water conservation, there remains a need for broader participation and clearer initiatives from public and research sectors in promoting lifelong learning opportunities related to water issues.

4.7.14. Further comments on country's maturity

The respondents from Portugal did not elaborate on further comments on country's maturity, apart from the non-profit network organisation which noted a significant need for consistent and sustained ocean literacy policies, as well as increased financial support for related projects and activities. Apart from financial support, the need for human resources and support to a nucleus of staff who would support various dissemination and outreach activities is also underlined.

4.7.15. Challenges limiting the development of Blue Education

Organisations in Portugal highlight numerous challenges in advancing blue education. Non-profits and network organisations point to insufficient funding for blue education activities, and curricula constraints. They also note a lack of teacher training on blue challenges, policy and institutional barriers, insufficient integration of technology, and bureaucracy.

Similarly, private and public educational institutions, as well as freshwater and marine research organisations, emphasise the need for funding and an evaluation framework for blue education activities. They also cite policy barriers, limited community involvement, and insufficient continuous support for programmes like the Blue School Programme. Both sectors recognise the need for more innovative teaching methods and highlight additional obstacles such as parental disinterest and difficult access to marine environments.

These challenges underline the necessity for comprehensive strategies and increased support to effectively integrate blue education in Portugal.

4.7.16. Prioritised topics in Blue Education

Organisations in Portugal have identified several key areas within Blue Education that should be prioritised to enhance understanding and conservation of marine and freshwater environments.

Non-profit organisations and network organisations emphasise the importance of freshwater and ocean conservation, sustainable management, maritime history, and cultural heritage. They also highlight the significance of ocean acidification, climate change impacts, marine technology and innovation, and promoting blue careers among students. Additionally, there is a focus on understanding sea currents, marine geology, and the connection between human health and ocean health.

Educational institutions, including both private/public colleges and universities as well as freshwater and marine research centres, stress the need for sustainable fishing practices, aquaculture, and the blue economy. They advocate for comprehensive ocean governance and policy frameworks, coastal zone management, and resilience strategies. Public organisations and research centres also underscore the importance of ocean literacy, environmental awareness, and community engagement in ocean monitoring through citizen science.

Furthermore, topics such as freshwater and marine pollution, local knowledge, and traditional practices are deemed critical for fostering a holistic approach to Blue Education in Portugal.

4.7.17. Interest in BlueLightS project activities

The responses indicate a strong willingness among non-profit organisations and educational institutions to collaborate with BlueLightS partners in testing solutions to strengthen blue education in Portugal, whereas public organisations and research institutes show a lack of interest in such collaborations.

4.7.18. Collaboration preferences

Organisations in Portugal show interest in various types of collaboration to strengthen blue education. Non-profits and network organisations are keen on conducting joint research, organising and participating in training sessions and workshops, exchanging best practices, and developing strategies for integrating blue education into existing initiatives. They also express interest in building partnerships with freshwater and marine stakeholders, developing a "blue" school label, and participating in conferences. Private and public educational institutions focus on developing national or regional strategies for blue education integration, while public organisations and research institutes did not specify their interests.

4.7.19. Experimentation needs

The analysis of Blue Education in Portugal reveals a committed approach towards enhancing ocean literacy and sustainable water management, with strong involvement from non-profits, academic institutions, and network organisations. There is significant engagement in experiential learning, sustainability, and community involvement, though interdisciplinary integration and the inclusion of cultural and historical contexts are still developing.

However, the development of Blue Education faces challenges such as a lack of teacher knowledge, insufficient funding, curricular constraints, and policy barriers. There is also a need for more innovative teaching methods and better integration of technology. Overall, while there is clear progress, further efforts and collaborations are necessary to overcome challenges and increase the impact of Blue Education.

To further enhance Blue education in Portugal, several areas could be revisited. **Continuous teacher training** is essential, including workshops that offer hands-on activities. Moreover, encouraging teachers from non-STEM areas to participate in Blue activities through a more **interdisciplinary approach** can also be beneficial for development of Blue education in Portugal, and could increase **collaboration and sharing knowledge** among the peers.

4.7.20. Connection to Key elements of educational systems

For Portugal the experimentation recommendations are focusing on the improvement of **teaching methods**, as they are evidenced by the significant engagement in experiential learning and the need for more innovative teaching methods. **Community and parental involvement** are also highlighted through the strong involvement from non-profits, academic institutions, and network organisations, as well as community involvement efforts. The recommendations also emphasise sustainability and the need for continuous **teacher training**, which points to **capacity building** and **professional development**. Finally, the mention of curricular constraints and the need for interdisciplinary integration touches upon the need for **curriculum improvement**.

4.7.21. Resources on activities/initiatives in Portugal gathered through the survey

Related to examples of initiatives in Portugal, the respondents shared the following links:

- https://academia.cienciaviva.pt/4752/8-conferencia-de-professores-do-mar
- https://ccmar.ualg.pt/en/citizen-science
- https://ciimarnaescola.wordpress.com/
- https://escolaazul.pt/
- https://escolaazul.pt/atividades
- https://geracaoazul.org/
- https://geracaoazul.org/educar-para-uma-geracao-azul/
- https://marevaiaescola.wixsite.com/omarevaiaescola/home
- https://tavira.cienciaviva.pt/3447/projetos
- https://tavira.cienciaviva.pt/3521/oferta-educativa-2023/2024
- https://www.cienciaviva.pt/centroscv/rede/index.php?id_centro=15
- https://www.cienciaviva.pt/ciencia-viva-no-laboratorio/2024
- https://www.cienciaviva.pt/concurso/flad-premio-atlantico
- https://www.cienciaviva.pt/en/
- https://www.cienciaviva.pt/oceano/home
- https://www.cienciaviva.pt/planeta-agua/
- https://www.cienciaviva.pt/verao/2024/
- https://www.dgpm.mm.gov.pt/enm-21-30
- https://www.emepc.pt/actividades

- https://www.kidsdive.org/en/home/
- https://www.oceanario.pt/en/education/
- https://www.ua.pt/pt/fabrica/
- https://www.youtube.com/watch?v=2GBKI9bq6Mg
- https://www.youtube.com/watch?v=83RaqH3xniM&t=2s
- https://www.youtube.com/watch?v=fdju2LspxJ0
- https://www.youtube.com/watch?v=UzqaGm7PTK8
- https://oma.pt/
- www.escolaazul.pt

4.8. Blue education in Romania

4.8.1. Status of Blue Education in Romania

The analysis of the status of Blue Education in Romania is based on six responses from three different types of organisations: four representing a private/public educational institution (three of them being a college/university and one being a primary/secondary school), one representing a public organisation, and a non-profit organisation.

The data provides insights into different aspects of their involvement in Blue Education activities in Romania. In this short report, we attempt to summarize the key findings and draw some initial conclusions.

4.8.2. Focus areas in Blue Education

In response to the question about familiarity with Blue Education initiatives in Romania, all six organisations answered that they have already contributed to such activities. While the most common activities undertaken involved organising events and making connections with different stakeholders, the least common involved developing, promoting, or setting up a programme or a campaign.

All organisations reported engaging in the following Blue Education activities: "organising a workshop/seminar on Blue education'', "organising field trips or outdoor educational programs and activities'', "collaborating and partnering with environmental/conservation organisations'', "collaborating and partnering with national research and/or academic institutions''.

However, only two organisations - one college/university and the non-profit organisation - reported developing awareness campaigns, educational material including podcasts or e-products, developing strategies or policies on blue education, while the public organisation reported engaging in capacity building on Blue Education. Further investigation could determine at how different reasons are allocated for each, to better understand the reasons behind engaging in particular Blue education activities as opposed to others.

4.8.3. Initiatives or other programs

Different initiatives and programs that aim to promote Blue Education among the community were mentioned by respondents. These include the following projects and organisations:

- *Shore*: an EU funded project under the Horizon Europe program that aims to enhance Ocean Literacy and engage with students, teachers, and schools across five regions: Baltic Sea, Black Sea, Mediterranean Sea, Danube River, and Rhine River.

- *Blue Deal*: an Erasmus+ project that aims to expand young people's knowledge about the oceans, by helping to strengthen the exchange of best practices between organisations involved in protecting the oceans and the environment.

- *Just4MPA*: a project based in Romania that investigates the link between marine protected areas (MPAs) and Environmental Justice.

- *Make Sense*: an Erasmus+ project that aims to equip teachers with the tools and methodologies to develop social entrepreneurship skills, based on the EntreComp framework and the Competitive Arena models.

- *Mare Nostrum*: a Romanian NGO that aims to spread awareness amongst the community about respecting the environment and to implement solutions to conserve the Romanian Coastal Zone and the resources of the Black Sea.

One respondent noted that while Blue Growth is often promoted at the institutional level in Romania, this is often not followed through with, at an implementation-level.

For further information on initiatives, see section *Resources on activities/initiatives in Romania gathered through the survey.*

4.8.4. Interdisciplinarity

In comparison to other aspects of activities to promote an understanding of water system activities, the implementation of the interdisciplinarity of such activities scored lower. Indeed, organisations reported only a subtle implementation of interdisciplinarity. Three public educational institutions – two universities and a primary/secondary school – and a public organisation reported a moderate integration of various subjects in Blue education activities, while the other two organisations reported very little integration efforts.

4.8.5. Experiential Learning

Amongst the survey respondents, the degree to which the Blue Education activities implemented provide experiential learning differed, resulting in there not be a majority/minority of answers. It is not surprising that two respondents rated experiential learning as “a lot’’ given that all six organisations reported organising workshops on seminars on Blue Education, as well as field trips or outdoor educational programs and activities.

Overall, the extent of involvement within the activities differs not only according to the type of organisation, but to the organisation within the realm of organisations, as different public educational institutions rated their experiential learning as “a lot’’, “very little’’, and “to some extent’’ altogether.

4.8.6. Sustainability

Efforts to promote sustainability were similar across all organisations except those for two public universities, that indicated “a lot’’ and “very little’’, as opposed to “to some extent’’. Therefore, within this sample size, responses suggest that some public educational institutions, the public organisation, and the non-profit organisation show similar moderate efforts of achieving a culture of sustainability and protection of water biodiversity and ecosystems within their activities. Though there are efforts towards sustainability, given the moderate responses, there are still areas of improvement.

4.8.7. Cultural and Historical Context

Many of the Blue Education projects mentioned by survey respondents are related to the conservation of the ocean and with promoting a culture of respect towards it, particularly among young individuals. However, answers to the cultural and historical context of water systems and Blue Education did not illustrate a very high implementation of such an aspect within each organisation. Indeed, no respondents rated the cultural significance of the ocean as very high. On the contrary, four respondents rated it as “very little’’, and two, “to some extent’’.

Therefore, public educational institutions, the public organisation, and non-profit organisation could all improve their engagement in increasing maritime history, traditions and explorations by, for example, creating relevant awareness raising campaigns.

4.8.8. Global Citizenship

The answers to the question of integrating global citizenship within the Blue education activities revealed differences within the organisations. Public educational institutions seem to integrate less global citizenship than the non-profit organisation, but more than the public organisation. However, within the educational institutions, one reported focusing very much on global citizenship. Thus, the extent to which a sense of responsibility and global citizenship are highlighted within the water conservation and environment activities depends upon not only the type of organisation itself, but on the individual organisation as well.

4.8.9. Innovation and Technology

There are mixed levels of engagement related to innovation and technology to study, monitor, and protect water ecosystems while fostering important problem-solving and scientific skills. The non-profit organisation revealed low commitment to innovation and technology, the public organisation, moderate commitment, and the public educational institutions, varied commitment. Most organisations, however, reported very little commitment to innovation and technology, except for one that reports a very high commitment. Hence, the use of innovative technologies and scientific developments in Blue education can be further improved upon, although some organisations are more advanced in this than others.

4.8.10. Community Engagement

The majority of responses scored a “to some extent'' for the level of local community, stakeholder, educator, and citizen engagement in water conservation efforts. Therefore, though this is not a maximum score, the responses here still show that some efforts are being done by the majority of organisations to achieve more community engagement. For the public educational institutions, two reported “to some extent'', one “very little', and another, “a lot''. Therefore, though overall most responses across all organisations were “to some extent'', amongst public educational institutions, the extent of community involvement is quite varied.

Overall, though community engagement is happening across all organisations, some efforts can still be made to include the community more, particularly at the public educational institution levels.

4.8.11. Environmental Justice

Only two organisations, a public educational institution and the public organisation, reported addressing very little issues of environmental equity in their water system and ocean activities. Besides a university that reported addressing such issues a lot, all other organisations revealed a moderate engagement of environmental justice. Therefore, while the organisations show an understanding of the relevance behind the topic, their implementation efforts vary both across and within different types of organisations.

4.8.12. Adaptation and Resilience

Efforts to build resilience to the impact of climate change, particularly among the younger population, are still needed. The majority of responses here exhibited a low commitment to adaptation and resilience (“very little''). Only one public educational institution reported a very high commitment to it (“a lot''). However, both the public organisation and the public educational institutions reported moderate to lower scores (“to some extent' and “very little''). The non-profit organisation reported a moderate commitment to implementing adaptation and resilience within its Blue education activities (“to some extent'').

4.8.13. Lifelong Learning

Promoting a lifelong passion for water conservation and the ocean seems to be of high importance for one public educational institution, while for the other organisations, it seems to be a moderate to low aspect of Blue education activities. Altogether, in comparison to the non-profit organisation, the public organisation leads with less commitment in the area. While the non-profit organisation promotes lifelong learning in its educational settings to some extent, the public organisation does very little.

Finally, public educational institutions are varied in terms of their commitments to lifelong learning, reporting various levels of commitment ranging from low to moderate to very engaged.

4.8.14. Further comments on country’s maturity

Two respondents further commented on Romania’s maturity in terms of water system and ocean education. Both comments hint to the fact that there is a lot of existing information on Blue education, provided by small NGOs, schools, and local initiatives. However, despite these efforts, Romania’s population still seems to be quite unaware on the topic. One possibility as to why this is the case, as highlighted by a respondent, is the lack of connection between the organisations, activities and initiatives and their target groups, as well as a lack of support at both the school and the local level. Stronger efforts are needed to build connections amongst stakeholders and spread the word on the valuable NGOs, school initiatives and local activities to contribute promoting awareness on Blue education across Romania’s youth and citizens altogether.

4.8.15. Challenges limiting the development of Blue Education

The results of the survey indicate that the challenges limiting the development of Blue education across different organisations in Romania relate to a lack of resources and possibilities rather than to a lack of stakeholder interest. The challenges reported by most of the survey respondents include lack of funding, lack of educational resources to support blue education activities, lack of teacher training on Blue challenges and issues, bureaucracy and curricula constraints. The challenge that was highlighted by five respondents is “lack of the evaluation framework for “blue’’ education activities’’.

The challenges to implementing Blue education highlighted by the organisation representatives suggest that it is not a lack of attention or interest on part of the stakeholders that hinder the implementation of such activities, as shown by Romania’s numerous local-scale initiatives and programs on Blue education. Rather, it is the insufficient support, funding, teacher training opportunities, bureaucratic constraints that hinder this.

4.8.16. Prioritised topics in Blue Education

Five out of six organisations rated the following three topics as priority ones in Romanian Blue education: “coastal zone management and resilience’’, “freshwater and marine pollution, prevention, and cleanup efforts’’, and “promotion of blue careers among students’’. Four of the six organisations instead identified the following Blue education topics to Prioritise: “climate change impacts on marine environments’’, “ocean literacy and environmental awareness’’, “sustainable fishing practices and aquaculture’’, “freshwater and marine biodiversity and ecosystems’’.

The topics that were not as popular among the survey respondents are, instead: “maritime history and cultural heritage’’, “freshwater and ocean conservation and sustainable management’’, “ocean acidification and its effects on marine life’’, “sea currents and marine geology’’, “indigenous knowledge and traditional freshwater and marine practices’’, and “marine technology and innovation for ocean exploration’’.

4.8.17. Interest in BlueLightS project activities

Precisely half of the respondents reported that they would be interested in collaborating with the BlueLightS project partners on Blue education activities in Romania. Of the organisations that are interested in the project activities, one is a public education institution, one is a public organisation, and the other is a non-profit organisation.

4.8.18. Collaboration preferences

Of the organisations that expressed interest in engaging in the BlueLightS project activities, different types of collaboration preferences were mentioned by respondents. Respondents are interested in co-developing curriculum materials or lesson plans, organizing and participating in training sessions for teachers, organizing and participating in online or in-person workshops, and exchanging/sharing best practices and teaching methodologies.

Additionally, survey respondents expressed interest in joining a community of practice. Expectations from such a community are to gather good examples from the schools and stakeholders involved and establish connections with teachers, NGOs, researchers, and the overall community of individuals involved, at a European level. Further motivations to join the community of practice are to learn of methodologies to evaluate projects and measure their impact, and to strengthen the knowledge of teachers and educators on information and resources to promote Blue education.

4.8.19. Experimentation needs

In conclusion, six organisations filled in the survey on Blue education in Romania. Of these six, four were public education institutions, one a public organisation and the other a non-profit organisation. All organisations are actively engaged in promoting Blue education; however, some are more involved in promoting specific educational elements than others. Such a variation is observed not only in terms of the type of organisation, but in terms of the specific organisation itself.

Therefore, further efforts are needed to ensure that all organisations are more committed to specific elements of Blue education, and stronger **synergies** are needed between the stakeholders operating the initiative and the target audience. To overcome these challenges, organisations may look for project synergies and collaborate with one another to join their efforts, build connections, and involve more stakeholders in sustainable water conservation practices and ocean knowledge, **on country level and internationally**, participating in annual international events[27] which gather wide communities and promote Blue education. Additionally, many learning opportunities arose from the non-permanently funded projects, therefore there is a need to mobilise the involved stakeholders to turn those lessons learnt from temporary projects into long-term programmes and initiatives.

4.8.20. Connection to Key elements of educational systems

In Romania, the recommendations are touching upon the following key elements: The improvement of **teaching methods** is indicated by the active engagement of various organisations in promoting Blue Education. **Community and parental involvement** are highlighted through the encouragement of collaboration and building connections among stakeholders. The recommendations also emphasise the importance of sustainability and ocean knowledge, pointing to the integration of these themes into educational practices. Additionally, the need for stronger **synergies** and participation in international events underscores the importance of **capacity building** and **professional development**.

4.8.21. Resources on activities/initiatives in Romania gathered through the survey

Related to examples of initiatives in Romania, the respondents shared the following links:

- http://www.marblue.ro/
- https://app.durable.co/website/builder
- https://black-sea-maritime-agenda.ec.europa.eu/
- https://blue4citizens.univ-ovidius.ro/
- https://bsun.org/
- https://liceulovidius.ro/steps-to-tomorrow/PROIECT%20Dezvoltare%20durabila.html
- https://liceulovidius.ro/steps-to-tomorrow/PROIECT%20Fastfashion.html
- https://littoral24.univ-ovidius.ro/

[27] Such example is the event Blue Nights, initiated in 2022, targets the general public with a special focus on families, pupils, and students. It includes annual events, pre-events, and follow-up events with hands-on activities, exhibitions, webinars, games, and more. It is organised in Finland, France, Italy, Malta, Portugal, and Romania, with the events interconnected via an online platform, allowing participants to explore activities in different locations.

- https://marenostrum.ro/
- https://response.unibuc.ro/
- https://www.uauim.ro/en/events/co-land/
- https://www.wave-project.org/
- https://www.youtube.com/watch?v=NJgoTp8VpT4–

4.9. Blue education in Spain

4.9.1. Status of Blue Education in Spain

The analysis of the status of Blue Education in Spain is based on 6 responses, out of which 5 are public organisations and one primary/secondary school.

The survey responses were followed by an interview with CSIC, The Spanish National Research Centre and a BlueLightS project partner, which provided additional insights into the different areas discussed in this section. One of the research institutes of the Spanish National Research Council (CSIC) is The Institut de Ciències del Mar (ICM), the largest research institute in Spain dedicated to marine research.

In this brief report we summarize the key findings and draw initial conclusions, based on gathered data which provides insights into various aspects of involvement in Blue Education activities in Spain.

4.9.2. Focus areas in Blue Education

In response to the question about familiarity with Blue Education initiatives in Spain, responses from all Spanish organisations which participated in the survey were unified, as all of them answered “yes” to this question.

Such engagement of the surveyed organisations (institutes, a semi-private school, a foundation, a public education programme and a public organisation) indicates a strong commitment across different sectors in Spain towards promoting Blue education, reflecting a collaborative effort to enhance marine and environmental awareness and education.

4.9.3. Initiatives or other programs

Survey findings indicate a wide range of activities and initiatives to promote Blue Education.

One of the surveyed public organisations (national research centre) is focusing on dedicated "blue" training programs for teachers, aiming to equip educators with the necessary skills and knowledge to effectively integrate Blue Education into their teaching. While in some areas, such is Barcelona these trainings have been running for several years, other areas, such is Catalonia, are currently in the development phase, and will initiate these activities only in the next scholar course. This research centre has developed and run field trips and outdoor educational programs, providing students with hands-on learning experiences in marine environments. They also participated in various activities, including awareness campaigns and events, regional annual sea-related projects, and workshops and seminars.

Additionally, one of the surveyed institutions has promoted Blue careers and skills, helping to guide students towards future professions in marine and environmental fields. Such example is Institut de Nàutica de Barcelona, a public education center specialising in training professionals in recreational and sports boating, which contributes to the Blue economy and industry.

Given that the education in Spain is decentralised[28], regional authorities have flexibility in addressing certain priorities and tailoring educational programs. We are providing information on some of the regional programmes/initiatives:

- The programme which provides support and assistance to schools in Barcelona Network which aims to tackle the challenges of sustainability is More Sustainable Schools, which currently includes close to 400 schools, while the overall programme Barcelona More Sustainable gathers around 2,000 organisations. More Sustainable Schools is a programme for all schools in Barcelona at all levels: early years education for children under 7 years old; primary, secondary and post-compulsory secondary education; vocational training, adult education, special education and adapted programmes. The Network is made up of citizen associations, business and commercial organisations, schools, universities, professional associations, trade unions and public institutions which share the common goal: strong commitment to tackle climate and ecological challenges in a collaborative way. The main goals of the More Sustainable Schools programme are: promoting processes that encourage the incorporation of sustainability criteria in schools, supporting the educational community in the transformation towards education for sustainability and to encourage schools to exchange experiences and partner with each other and finally, highlighting and recognise schools' contribution in the transition towards a more sustainable Barcelona, linking educational projects to the urban context and environment. (Barcelona+Sostenible, n.d.). Recently, a "blue gaze[29] was added to this programme, with the aim of enhancing the educational environment with a maritime reference in Spain. (Barcelona+Sostenible, 2024, p.5)

  In 2023, a conference for teachers was organized within this programme, which equipped teachers with theoretical knowledge on the topic. Additionally, the teachers were given the possibility to use "pedagogical suitcases" with school materials adapted for kindergarten and primary school, which are available in a resource centre for all interested teachers.

[28] https://eurydice.eacea.ec.europa.eu/national-education-systems/spain/overview

[29] https://www.barcelona.cat/barcelonasostenible/sites/default/files/2024-07/CatalegActivitatsEinesMar_Juny2024.pdf

- The Green Schools of Catalonia, a programme which focuses on promoting ecological awareness among students and fostering a culture of sustainability within the school community, is also interested in expanding the expertise to Blue education, by integrating it into the existing green label. Currently, there are over 760 schools in this network, and efforts are made to organize training sessions in the fall of 2024 with CSIC, which should highlight the importance of integrating blue education and equip teachers with knowledge in the topic, but also ensuring they get recognition for their professional development portfolios.

- The "Magnet, alliances for educational success" programme develops innovative educational projects, promotes the alliance of an educational centre with an institution of excellence in a specific field of knowledge. In 2014 and 2018, the Institute of Marine Science (ICM) participated in two of such programmes, with scientists and technicians from ICM-CSIC, among them biologists, oceanographers and geologists, were involved in an educational project focused on the subject of marine ecosystems. (ICM CSIC, 2018).

  Apart from partnership with ICM-CSIC, The Blanes Centre for Advanced Studies (CEAB) is also collaborating with Magnet and giving contributions towards promoting blue initiatives.

- SeaTeach developed "WE are Blue Schools" in Majorca, which represents an Erasmus + project aimed to bring environmental awareness and sustainability skills to young people in schools by teaching them Ocean Literacy. The primary target group of this project are teachers and school leaders from all levels of schools: primary school, secondary school and basic VET. The project focuses on schools and teachers located in Mallorca, which counts: 162 primary schools, 54 secondary schools, 81 cooperative schools and 12 private schools. (Blue Schools, n.d.)

In addition, together with CSIC, SeaTeach is putting efforts towards identifying regional coordinators who would further support work of existing local initiatives, and as the next step, contribute to knowledge-sharing between different regions.

For further information on initiatives, see section *Resources on activities/initiatives in Spain gathered through the survey.*

4.9.4. Interdisciplinarity

Responses regarding the integration of various subjects to provide a comprehensive understanding of water systems and their interconnectedness show varied levels of interdisciplinarity among Spanish organisations. While one surveyed public organisation (educational centre) reported a high level of interdisciplinarity (incorporating subjects such as science, geography, history, literature, and art), several public organisations and a primary/secondary school indicated they have integrated these subjects to some extent, while one public organisation (national research centre) reported very little integration of various subjects in their activities, which can be related to the principal role of the organisation.

Such variations in the responses highlight the need for more consistent strategies and support to enhance the interdisciplinary teaching of Blue Education in Spain. Additionally, better coordination among different stakeholders is crucial for enhancing interdisciplinary integration.

4.9.5. Experiential Learning

Gathered responses suggest a disparity in the implementation of practical educational activities related to water ecosystems across different organisations in Spain.

Two of the surveyed public organisations (including the national research centre and an educational centre) reported are providing a lot of hands-on experiences, field trips, and practical activities to engage students with water ecosystems. In contrast, the remaining three public organisations and a primary/secondary school that participated in the survey indicated they offer very little in terms of experiential learning. One public organisation (public foundation) reported offering such experiences to some extent.

This uneven distribution of practical educational activities related to water ecosystems in Spain indicates a need for more consistent integration of these activities across all institutions to better enhance student engagement and learning about water ecosystems.

4.9.6. Sustainability

Responses regarding the promotion of sustainability in relation to water resources show varied levels of commitment among Spanish organisations.

Depending on the organisation types which were surveyed, we gathered slightly different answers from scholar and non-scholar organisations. A reason for that may be that learning about the 17 SDGs (see **Figure 3**) is integrated into the school curriculum in Spain, and aims to foster awareness and responsibility in pupils, but also action towards achieving these goals.

Such mixed responses from the survey respondents underline differing priorities and approaches to advocating for the protection of water biodiversity and ecosystems across different types of organisations in Spain.

4.9.7. Cultural and Historical Context

Recognising cultural significance of the ocean and exploring the historical relationship between humans and the sea are vital for fostering a deeper understanding and appreciation of maritime heritage.

The survey findings indicate that a majority of the surveyed organisations in Spain, three public organisations and the primary/secondary school, offer very little in terms of integrating cultural and historical context into educational activities. One public organisation (public foundation) reported not offering any such activities at all, while two public organisations provide practical experiences to some extent, which corresponds to the organisations’ roles.

Therefore, there is a clear need for a more consistent and comprehensive approach across all institutions to ensure that students gain meaningful and practical knowledge on water ecosystems in a cultural and historical context. Enhancing such educational activities will help cultivate a greater appreciation and understanding of maritime heritage among students, promoting a deeper connection with and respect for the ocean and its history.

4.9.8. Global Citizenship

The responses reveal a varied approach to promoting global citizenship and the interconnectedness of water and human activities within different organisations, which calls for a more consistent and comprehensive approach across all institutions.

Half of the surveyed organisations (two public organisations and the primary/secondary school) report offering very little in terms of activities that encourage a sense of responsibility and global citizenship regarding marine environments.

From remaining three public organisations, two report providing such activities to some extent, while one (public educational centre) stands out by offering a lot of initiatives aimed at fostering global citizenship and highlighting the impact of human activities on marine environments.

Similarly to the previous section, such disparity can be explained by organisations' core roles which determine the level of their involvement in specific areas.

4.9.9. Innovation and Technology

The survey responses from Spain reveal differing levels of engagement with innovation and technology in studying, monitoring, and protecting water ecosystems.

While three public organisations report they utilise innovative technologies to some extent, one public organisation shows high engagement in this area. Conversely, two organisations—a public organisation and the primary/secondary school—report very little use of innovative technologies. This suggests a need for broader and more consistent adoption of technological advancements across all institutions to enhance creativity and problem-solving skills related to water ecosystems.

However, additional information provided by CSIC indicates that there are certain activities where technology is utilized, in combination with theoretical and experimental sessions with students and teachers. Such example is Little Oceanographers Congress, an annual programme running for the last eight years which attracted pupils (aged 10-12) and primary school teachers from various domains in Catalonia: Music, Arts, etc. In the academic year 2018-2019, this programme, which aims to foster the curiosity of children and turn them into young scientists through research and experimentation on ocean physics, also received support of the Spanish Foundation for Science and Technology. (Petits Oceanografs, 2024)

4.9.10. Community Engagement

According to the survey findings, there are inconsistent levels of community engagement in water conservation across various organisations in Spain.

While four public organisations and the primary/secondary school involve local communities and stakeholders in water conservation efforts to some extent, one public organisation (foundation) reports very little engagement.

This highlights a need for significant improvement in fostering community involvement, particularly in recognising and integrating traditional knowledge and practices related to the sea and rivers. To enhance the effectiveness of water conservation initiatives, a more consistent and comprehensive approach is needed across all organisations.

4.9.11. Environmental Justice

The survey responses from Spain reveal significant disparities in addressing environmental justice among different organisations.

Two public organisations (educational programme and centre) report a strong focus on environmental equity and advocating for fair access to water resources, while the majority of respondents indicate very little or no effort in this area.

This inconsistence highlights a critical need for improvement in ensuring fair and equitable access to water resources across all communities, particularly those disproportionately affected by environmental issues.

4.9.12. Adaptation and Resilience

The survey responses from Spain reveal varying levels of commitment to building adaptation and resilience to climate change impacts among different organisations, as their core roles determine the level of their involvement in specific areas.

While one public organisation demonstrates a strong focus on preparing for future challenges related to water health, including sea level rise and ocean acidification, three public organisations and the primary/secondary school show minimal efforts in this area. Another public organisation (foundation) reports no engagement at all,

These findings underscore the need for a more unified and proactive approach across all organisations to enhance adaptation and resilience to climate change impacts affecting water ecosystems. It is crucial for organisations to prioritise integrating climate resilience education into their programs. This includes fostering awareness and preparedness among students and communities about the challenges posed by climate change to water health. By strengthening these efforts and ensuring consistent implementation of resilience-building initiatives, organisations can better equip future generations to tackle environmental challenges effectively and safeguard water resources for sustainable development.

4.9.13. Lifelong Learning

The survey responses from Spain reflect varied approaches to promoting lifelong learning and passion for water conservation among different organisations.

The level of engagement widely varies among the survey respondents, depending on their principal roles: while one public organisation demonstrates a strong commitment to fostering ongoing exploration and advocacy for water issues, three organisations show only limited efforts in this area. One public organisation (foundation) shows lack of engagement in this approach, while the primary/secondary school reports engagement to some extent.

To enhance lifelong learning and promote a sustained passion for water conservation across all sectors, it is recommended that organisations increase their efforts in integrating water issues into educational frameworks. This can include developing comprehensive programs that span formal education settings and extend into community-based initiatives.

4.9.14. Further comments on country's maturity

The prevailing message received from the respondents in the survey underscores a strong need for collaborative actions aimed not only to expand educational opportunities, but also to cultivate a deeper appreciation and proactive engagement in addressing challenges related to water conservation and sustainability.

4.9.15. Challenges limiting the development of Blue Education

The survey responses reveal several challenges limiting the development of Blue Education in Spain. These challenges include: inadequate funding for dedicated blue education activities, lack of an evaluation framework for such activities, bureaucratic hurdles, and insufficient attention given to marine and freshwater topics within the broader environmental education framework. Additional barriers include limited teacher knowledge on ocean and freshwater issues, curriculum constraints, lack of interest and training among teachers, difficulty accessing water and marine environments, and inadequate integration of innovative teaching methods.

These findings underscore a complex environment where multiple factors hinder the progress of Blue Education initiatives. Addressing these challenges will require coordinated efforts involving policymakers, educational institutions, teachers, and community stakeholders to enhance funding, develop comprehensive evaluation frameworks, improve teacher training and knowledge, and promote innovative teaching approaches.

4.9.16. Prioritised topics in Blue Education

The survey responses identified certain priorities which highlight the comprehensive scope of Blue Education initiatives needed to enhance understanding, stewardship, and sustainability of marine and freshwater environments in Spain.

The priorities include topics such as: freshwater and marine biodiversity, climate change impacts on marine environments, ocean literacy and environmental awareness, coastal zone management and resilience, sustainable fishing practices and aquaculture, and the connection between human health and ocean health.

Additional priorities identified encompass ocean acidification, maritime history and cultural heritage, indigenous knowledge and traditional practices related to water ecosystems, promotion of blue careers among students, citizen science and community engagement in ocean monitoring, marine technology and innovation, and understanding regional sea/ocean dynamics including sea currents and marine geology.

4.9.17. Interest in BlueLightS project activities

The survey responses indicate a willingness among several organisations in Spain to collaborate with BlueLightS partners for testing solutions aimed at strengthening Blue Education in the country, as three public organisations and one private/public primary/secondary school expressed their readiness to engage in such collaborative efforts. However, two public organisations indicated they were not willing to participate in these initiatives.

4.9.18. Collaboration preferences

The survey responses from various organisations in Spain demonstrate a wide range of interests in collaborating to strengthen Blue Education initiatives. Public organisations and educational institutions are interested in diverse forms of collaboration, such as jointly developing curriculum materials or lesson plans, conducting research on challenges and solutions in Blue education, organizing teacher training sessions, and sharing best practices and teaching methods.

There is also enthusiasm for reassessing evaluation frameworks, fostering partnerships with freshwater and marine stakeholders, and devising strategies for integrating Blue education at national or regional levels. Furthermore, some organisations are eager to pilot a "blue" school label, participate in conferences, or engage in communities of practice aimed at enhancing Blue education projects within schools.

These collaborative interests indicate a strong commitment to advancing Blue education through coordinated efforts and partnerships across Spain's educational and stakeholder communities.

4.9.19. Experimentation needs

By addressing these barriers collaboratively, there is potential to foster greater awareness, understanding, and engagement in blue education among students and the broader public in Spain.

Based on the survey analysis supplemented by insights from an interview with CSIC, there is widespread familiarity and engagement with Blue Education initiatives across the surveyed organisations. While this indicates a unified commitment to promoting marine and environmental awareness, there are notable disparities in the integration of interdisciplinary approaches and experiential learning opportunities, suggesting a need for more consistent strategies and support across institutions. Such disparity could be explained by different priorities of surveyed organisations, where certain elements are more emphasized than the others; for example, although organisation such is ICM finds environmental justice crucial for all citizens, this area is not among their core aims as a marine research centre, Moving forward, Spain could enhance partnerships among stakeholders, and collaboratively addresses identified barriers. This could be done on a local/national level, through partnerships with relevant institutions and organisations such as SeaTeach, but also through networks such are Network of Blue Schools and its version at a regional and national level, and platforms which promote collaboration among schools across different countries. Additionally, international collaboration could facilitate the transfer of knowledge in specific educational areas[30] and promote the importance of Blue Education to a broader community.

4.9.20. Connection to Key elements of educational systems

In Spain, the experimentation recommendations are focusing on the following key elements: The improvement of **teaching methods**, as evidenced by the emphasis on interdisciplinary approaches and experiential learning opportunities. **Community and parental involvement** are highlighted through the encouragement of partnerships among stakeholders and collaboration with organisations such as SeaTeach. The recommendations also point to the importance of sustainability and environmental awareness as core themes of Blue Education. Additionally, there is a focus on **capacity building and professional development**, highlighted by the mention of networks like the Network of Blue Schools and international collaboration for knowledge transfer.

4.9.21. Resources on activities/initiatives in Spain gathered through the survey

Related to examples of initiatives in Spain, the respondents shared the following links:

- http://www.institutdenautica.barcelona/
- https://elmarafons.icm.csic.es/?lang=es
- https://esport.gencat.cat/ca/arees_dactuacio/escolar/esport-blau-escolar/index.html
- https://icmdivulga.icm.csic.es/la-mar-de-medusas/
- https://paticientific.org/
- https://petitsoceanografs.icm.csic.es/
- https://viulavela.cat/
- https://w13.bcn.cat/APPS/wprpae/general/Presentacion.do?method=verContenido

[30] Educational area is a project led by one or more classes in which pupils collectively reflect on the conservation of a small piece of land of their choice. This approach is supported by France's Ministry of Education, and will be conducted by BlueLightS' partner from France L'Office français de la biodiversité (OFB)

- https://weareblueschools.eu/ca/inici/
- https://www.22diesen22peus.com/es
- https://www.barcelona.cat/barcelonasostenible/ca/centres-educatius/recursos/mirada-blava
- https://www.barcelona.cat/barcelonasostenible/ca/escoles-sostenibles
- https://www.barcelona.cat/barcelonasostenible/es/centros-educativos/actividades/espacios-de-intercambio-del-alumnado/joves-lemergencia-climatica
- https://www.barcelona.cat/plalitoral/ca/programa-de-promocio-i-divulgacio-de-la-cultura-maritima
- https://www.barcelonacapitalnautica.org/cultura/podcasts/ (podcasts)
- https://www.barcelonacapitalnautica.org/en/formacio/education/
- https://www.barcelonacapitalnautica.org/en/rc-sailing-barcelona-university-regatta/
- https://www.barcelonacapitalnautica.org/en/sustainability-and-innovation-2/decarbonization-of-leisure-boats/
- https://www.barcelonacapitalnautica.org/en/sustainability-and-innovation-2/oceans/
- https://www.barcelonacapitalnautica.org/esport/vela-inclusiva/
- https://www.barcelonacapitalnautica.org/exposicio/
- https://www.icm.csic.es/es
- https://www.miteco.gob.es/es/ceneam/recursos/mini-portales-tematicos/reeducamar.html
- https://www.observadoresdelmar.es/documents/resources/Guia-docent-MicroplasticWatchers.pdf

4.10. Blue education in Sweden

4.10.1. Status of Blue Education in Sweden

The analysis of the status of Blue Education in Sweden is based on six responses, which come from different organisations: four from a public educational institution, three of them being a university and the other a secondary school, one from a freshwater and marine research institute, and another from a public organisation.

The data provides insights into different aspects of their involvement in Blue Education activities in Sweden. In this short report, we attempt to summarize the key findings and draw some initial conclusions.

4.10.2. Focus areas in Blue Education

In response to the question about familiarity with Blue Education initiatives in Sweden, all organisations except for one respondent have already contributed to Blue education activities. The most common types of activities undertaken include organising workshops/seminars on Blue education, organising field trips or outdoor educational programs and activities, and collaborating and partnering with national research and/or academic institutions.

Only one university and the research institute reported implementing research projects addressing Blue education and setting up a programme supporting Blue career and skills, while only a secondary school and a university reported promoting Blue careers and skills.

4.10.3. Initiatives or other programs

Only one respondent (university) reported not being familiar with any initiative or program related to Swedish Blue education. However, other organisations reported a variety of networks, universities, projects and initiatives dedicated to promoting water and marine education.

- Swedish University of Agricultural Sciences – SLU Centre for Nature Interpretation - Network for Limnic Education: The SLU Centre for Nature Interpretation is a knowledge centre and meeting place for nature interpretation and nature guides, aiming to contribute to an increased knowledge on the understanding of the relationship between individuals, nature, and Sweden's cultural landscapes. The Centre also runs the Network for limnic education that aims to raise awareness on water and outdoor aquatic environments by acting as a repository for a variety of articles, methods, tools, and activities - including webinars, study visits, meetings – on the topic.

- Swedish Institute for the Marine Environment - Marine Network for Water Education: The Swedish Institute for the Marine Environment contributes to contributes knowledge and advice for sustainable management of the sea Through expert dissemination, research reviews, analyses and syntheses. The institute also runs the Network for the Marine Environment, which facilitates collaboration between all stakeholders working on ocean awareness and on the connection between humans, oceans and water.

- Ocean Blues: A project funded by Formas - a Swedish Research Council for sustainable development – and coordinated by the Centre for Sea and Society at the University of Gothenburg. The project aims to have individuals from different positions and backgrounds – school pupils, researchers, employees at the University of Gothenburg – to discuss the threats to the marine environments and identify possible solutions for action towards a more sustainable future.

- Stockholm University – Baltic Sea Lesson Bank: An initiative that gathers material about the sea and sustainable materials for teachers to use throughout their lessons and get inspiration from. The materials are produced by researchers, communicators and educators at Stockholm University's Baltic Sea Centre, in collaboration with the Baltic Sea Science Center at Skansen with funding from the BalticSea2020 Foundation.

- Voice of the Ocean: A Swedish non-profit organisation based in Stockholm and Gothenburg that conducts and promotes scientific research, education, and communication concerning the sea, marine ecosystems, and the overall marine environment.
- World Wildlife Fund for Nature (WWF) Sweden: The overall organisation is dedicated to preserving wilderness and reducing the human impact on the environment. The focus areas of the Swedish branch include "Sea & Fishing'' and "Fresh water''. The aim here is to protect biodiversity and facilitate the sustainable use of natural resources both in Sweden and globally.
- Swedish Society for Nature Conservation: A Swedish non-profit association that works with other global environmental organisations for a sustainable culture and future. The categories tackled within their "Sea and water'' focus include "Fisheries and aquaculture'', "Sea'', and "Lake and freshwater''.
- Sportfiskarna: A Swedish non-profit organisation centred around sport fishing and around representing anglers in Sweden. The main aim is to ensure sustainable sport fishing that fish stocks are plentiful and healthy and that the waters are clean.
- Marine Knowledge Centre in Malmö: The Knowledge Centre works with other marine organisations at different levels – local, national, and international – to provide access to knowledge about the sea and to strengthen humans' relationship with it, through educational methods and marine projects.
- Klubban Biological Station: A service institution belonging to Uppsala University located by Gullmarsfjorden, on the Swedish west coast, for researchers and students to study marine biology.
- Havets Hus: The largest aquarium in the Nordic countries, located in Lysekil just across the Gullmarsfjorden.
- Erken Laboratory: A research station by the shore of Lake Erken and belonging to Uppsala University, where students and researchers can study water quality, climate effects on aquatic systems, circulation of nutrients, and population and community dynamics in lakes. The Laboratory has developed an extensive monitoring programme for Lake Erken.
- Norrtälje Nature Centre: An organic, outdoor-based science centre. The centre's work with water mainly concerns projects and activities related to the construction of wetlands, water conservation and nutrient retention.
- Nature Schools Network: a formal network of nature schools with the aim to develop new strategies and material for the pedagogical methods used in outdoor and natural sciences teaching in Sweden, Estonia, Lithuania and Latvia.
- Children's Summer Lab at Tjarnö Marine Laboratory: A summer science camp for children who want to learn more about marine life, organised by the University of Gothenburg.

- Summer Science Camp at Tjarnö Marine Laboratory: A summer science camp for students in upper secondary school's Natural Science programme where students get to try working as researchers, organised by the University of Gothenburg.

- Kosterhavet National Park: comprised primarily of water and underwater environments, it is Sweden’s first marine national park and is located in the municipalities of Strömstad and Tanum.

  For more information on the initiatives and programmes, see section *Resources on activities/initiatives in Sweden gathered through the survey.*

4.10.4. Interdisciplinarity

While most survey respondents reported offering interdisciplinary water education activities to a moderate extent, the research institute and a university indicated very low level of engagement in interdisciplinary approaches.

Such answers suggest that, while the Swedish organisations in this specific sample are implementing interdisciplinarity within their activities, more guidance is needed on this aspect to ensure greater interdisciplinary integration across all sectors.

4.10.5. Experiential Learning

While colleges/universities and some schools reported moderate engagement in providing hands-on experiences, field trips, and practical activities for students to interact directly with water ecosystems, freshwater and marine research centres and certain colleges/universities showed minimal involvement in experiential learning. Public organisations also demonstrated moderate engagement in offering these opportunities.

These findings highlight varying levels of experiential learning across different organisation types in Sweden, suggesting opportunities for increased collaboration to enhance educational experiences related to water ecosystems.

4.10.6. Sustainability

Responses regarding promoting an ethos of conservation and sustainable water show varying degrees of commitment among the different organisations in the sample. Not only is there variation across the types of organisations, but also within the organisations, more specifically the public educational institutions.

Looking at the four public educational institutions alone, their answers for sustainability efforts vary for each. The secondary school - together with the public organisation - reported major efforts for sustainability. However, one university indicated moderate efforts, another very little, and a last one answered “I don’t know’’ to this question. Finally, the research institute reported incorporating sustainability to some extent.

Such a variance in responses suggests that that there is a need for more cohesion between Swedish organisations, both similar and different in nature, when it comes to highlighting the importance of water biodiversity and conservation.

4.10.7. Cultural and Historical Context

Five of the six organisations in Sweden reported very little recognition of the cultural and historical context of the ocean and the marine environment in their Blue education activities, with only the public organisation expressing moderate efforts in this area. Such responses portray a very clear need for all the different types of organisations represented in the survey to further explore the historical relationship between individuals and the sea.

4.10.8. Global Citizenship

Four organisations - two educational institutions, the public organisation, and the research institute - expressed implementing a moderate sense of global citizenship and responsibility in their water and marine environment initiatives. Only one educational institution demonstrated a low level of engagement to fostering global citizenship.

One university expressed uncertainty about its commitment to this aspect of education, which may indicate a need to further define global citizenship and responsibility within blue education activities so that organisations understand if and how this is being implemented and can adjust their approaches accordingly. However, it is important to note that this university did not already contribute to Blue education activities: this may also explain the organisation's uncertainty about the question.

Overall, the responses indicate consensus that more efforts can be made to install a notion of responsibility towards local, national, and international water environments.

4.10.9. Innovation and Technology

The survey investigated on the level of engagement in using innovative technologies and scientific developments for studying, monitoring, and protecting water ecosystems in Sweden. Gathered responses revealed similar levels of engagement across organisations: five respondents reported a moderate commitment to innovation and technology, and only one organisation deviated from the majority of responses, indicating moderate engagement in this field.

4.10.10. Community Engagement

All organisations except one - a university - revealed similar levels of community engagement within their Blue education activities. Indeed, the public organisation, secondary school, research institute, and two universities all expressed moderate involvement of the broader community in water conservation efforts. The remaining university expressed uncertainty about this question. However, such a response may be justified as this university was the one that indicated it had not already contributed to Blue education activities.

The most common type of Blue Education activity in which organisations reported already being involved was collaboration and partnership with national research and/or academic institutions. The resources reported by respondents also support such a collaboration. In fact, many initiatives such as the Klubban Biological Station, the Erken Laboratory, or the Summer Science Camp are specifically designed to connect researchers and students together.

However, further efforts may be needed to establish greater collaboration between stakeholders outside of research and academia, to increase community engagement in Blue education initiatives.

4.10.11. Environmental Justice

Most respondents reported addressing issues of environmental equity related to water resources and opportunities to a minimal extent. It follows that more efforts are needed to ensure environmental justice is addressed in Blue education activities and programmes. Additionally, the organisation that has not already engaged in water system activities reported uncertainty to the question. The research institute expressed a lack of engagement to addressing environmental justice.

Therefore, major efforts are needed not only to increase the attention towards implementing fair and equitable access to water resources and opportunities among organisations, but between organisations, too. This is an important working point for organisations: given the great and ever-increasing environmental disparities, addressing such issues is key to increasing environmental awareness and empathy.

4.10.12. Adaptation and Resilience

Respondents from various educational institutions and public organisations in Sweden provided insights into their efforts regarding adaptation and resilience in the face of climate change impacts, particularly concerning water health challenges such as sea level rise and ocean acidification.

Respondents agree that the organisations they represent need to improve their adaptation and resilience efforts to prepare students for future sea and water challenges. Indeed, while only two organisations reported moderate efforts, these are one university and the public organisation, the remaining four reported very little effort.

4.10.13. Lifelong Learning

Similarly to the adaptation and resilience question above, responses show similar levels of commitment across different organisations, with most organisations reporting minor commitment to promoting a lifelong learning passion for water conservation and learning. Here, too, the only organisations reporting moderate commitment to lifelong learning in Blue education activities are one university and the public organisation.

To promote a culture of lifelong learning, opening the wide array of opportunities Sweden's water conservation organisations, programmes, and initiatives to individuals of different ages and backgrounds is required. Also, ensuring the continuation of such activities over time, uniting efforts across educational sectors, and involving the wider community could help foster continuous learning for sustainable water practices.

4.10.14. Further comments on country's maturity

Comments on Sweden's approach to Blue education programmes and initiatives point to the complexity of assessing the country's overall level of maturity, given the diversity of efforts between and within regions, and the lack of collaboration between the stakeholders.

Respondents commented that there are many water conservation initiatives at the national level, and therefore, that water education is well-represented in Sweden as a whole.

However, coordination between the different stakeholders can be improved to have more joint efforts in addressing the issues. Furthermore, the extent to which water education is carried out varies considerably between and within regions. One respondent commented that the number of teachers available contributes to the extent to which ocean literacy is addressed in each school, underlying the importance of teachers' commitment to Blue education topics.

4.10.15. Challenges limiting the development of Blue Education

The organisations that responded to the survey identified main challenges that limit the development of Blue Education in Sweden. These are: lack of funding to support dedicated blue education activities, and lack of teachers' general knowledge on ocean and fresh-water topics and issues hinder Blue education initiatives. Additionally, lack of educational resources that can help supporting the development of blue education activities, lack of teacher training on blue challenges and issues, curricula constraints, insufficient integration of innovative teaching methods, and insufficient attention paid to blue in the general framework of environmental education also limit the development of Blue education in this country.

Fewer organisations reported challenges related to bureaucracy, difficulty in accessing water and marine environments, lack of parental interest and appetite for Blue education activities, and limited interest and involvement of local communities in the topic.

4.10.16. Prioritised topics in Blue Education

Some Blue education topics were identified as priorities by most organisations in Sweden: ocean literacy and environmental awareness, promotion of blue careers among students, and get to know your regional sea/ocean. Such topics were often highlighted in the missions of the blue education organisations, programmes, and initiatives reported by the survey respondents. For example, Voice of the Ocean, Marine Knowledge Centre in Malmö, and Havets Hus are all aimed at increasing ocean literacy and marine knowledge, as well as are centred around getting to know the regional environment and strengthening humans' relationships with it.

Half of the surveyed organisations reported the importance of highlighting freshwater and marine biodiversity and ecosystems, freshwater and ocean conservation and sustainable management, Blue economy and sustainable development, and citizen science and community engagement in ocean monitoring.

Only the research institution mentioned maritime history and cultural heritage, and ocean governance and policy frameworks as priority topics, while the secondary school indicated ocean acidification and its effects on marine life as such. Overall, Sweden has strong initiatives in some aspects of Blue education, but there is still a need to expand to better understand cultural history and governance in marine environments, to further enrich Blue education efforts across the country.

4.10.17. Interest in BlueLightS project activities

Five organisations demonstrated their interest in collaborating with BlueLightS project partners to jointly work on strengthening Blue education in Sweden. The public organisation was not willing to engage in such a collaboration.

4.10.18. Collaboration preferences

Considering that the public organisation did not indicate interest in collaborating in the BlueLightS project activities with the project partners, only five out of six surveyed organisations responded to this question.

Most organisations expressed a preference for participating in conferences for sharing their experiences and practices, and for developing a national/regional strategy for integrating "blue'' into education.

The research institution and a university expressed interest in organising and participating in online or in-person workshops and in exchanging/sharing best practices and teaching methodologies.

The secondary school and a university showed a significant interest in co-developing curriculum materials or lesson plans and in joining the Blue Education Community of Practice (Blue Edu CoP). However, only the secondary school commented on the benefits it would like to receive from joining the Blue Edu CoP. Essentially, as the school is on its way to establishing a similar community of practice in Strömstad through the Life at Sea day activity, joining such a community could help them to connect with and gather other companies, organisations, schools, etc. to join their community and get support for their activity.

4.10.19. Experimentation needs

Overall, as shown by the resources shared by survey respondents, Sweden is rich in water conservation initiatives and programmes, with many of them investing in future generations by offering interesting courses on marine life and water systems, possibilities to connect with researchers and work together. However, as highlighted by survey respondents, more efforts are needed to ensure that such initiatives are not concentrated in one region or area of Sweden only but spread throughout the country.

While for some areas, such is interdisciplinarity, Blue education activities are developed to some extent, there is an area for improvement and further action related to sustainability, historical and cultural context recognition, and environmental justice. This could be tackled by addressing uncertainty among organisations about sustainability practices through **training sessions** and sharing best practices, which can highlight the importance of Sweden's sea and marine species and the benefits that they bring to the landscape, ecosystem, and human life as a whole. To increase engagement in historical and cultural context recognition for Blue education activities, organisations could focus more on how water systems, oceans, and the sea enrich Sweden's cultural and historical background. Here, organisations could bring further theoretical/cultural knowledge to their Blue education activities, through field trips and practical activities, such as for example visiting specific organisations to explore their expertise in the area.

To increase environmental justice, organisations should focus on **addressing environmental issues between different areas of Sweden**, as opposed to concentrating efforts in one regional area only, and strive to involve as many stakeholders as possible, individuals of different ages and backgrounds, to also promote lifelong learning within Blue education activities and initiatives.

To ensure water conservation education efforts are equally distributed both between regions and within regions in Sweden, further **collaboration between the existing Blue education initiatives** and programmes is needed. Jointly working on a reduced number of activities on the selected Blue education priority topics may help to achieve further environmental awareness impact and involve the broader community as a whole.

4.10.20. Connection to Key elements of educational systems

In Sweden, the experimentation recommendations are focusing on a number of key elements. The improvement and enrichment of **teaching methods** is evidenced by the development of courses on marine life and water systems, and the opportunity to connect with researchers. **Community and parental involvement** are highlighted through efforts to spread initiatives throughout the country and involve a wide range of stakeholders. Sustainability is a core theme, with a focus on training sessions and sharing best practices. The recommendations also touch on the historical and cultural context of water systems and the need for environmental justice, emphasizing the importance of addressing regional disparities and promoting **lifelong learning**.

4.10.21. Resources on activities/initiatives in Sweden gathered through the survey

Related to examples of initiatives in Sweden, the respondents shared the following links:

- https://liu.se/en/research/forum-for-outdoor-education
- https://probleu.school/stromstad-gymnasium/
- https://vattenriket.kristianstad.se/aterskapa-ostersjons-livskraft-pedagogiskt-material/

- https://www.gu.se/en/sea-society
- https://www.havsmiljoinstitutet.se/havsmedvetenhet/marina-natverket-for-vattenpedagogik/aktiviteter-inom-natverket
- https://www.stromstad.se/specialsidor/gymnasiet/stromstadgymnasium/gymnasieprogram/haveticentrum.4.1fe0d4b916b5c488d8b65aa.html

5. Key Challenges and recommendations

Following the country analysis and considering the limited sample size and diversity of stakeholders which impacts the polyphony of the findings, we identified the following **challenges,** presented in **Figure 5**. Identified challenges as the bottlenecks to development of Blue education across experimentation countries.

Figure 5. Identified challenges

Below are concrete examples of the identified challenges:

- **Lack of Educational Resources**: There is a significant shortage of educational resources tailored to support the development of blue education activities.
- **Challenges related to teachers' knowledge, engagement and training:** Many teachers lack sufficient knowledge and training on ocean and freshwater-related topics and issues, hindering effective teaching in this area. There is also a notable lack of interest among teachers to integrate blue education into their curriculum.
- **Financial Constraints**: Insufficient funding poses a barrier to implementing dedicated blue education initiatives.
- **Collaboration:** Finding appropriate "blue" partners and stakeholders for collaboration is challenging.
- **Curricular Limitations**: Existing curricula constraints hinder the incorporation of blue education effectively.
- **Evaluation Frameworks**: The absence of standardized evaluation frameworks for blue education activities makes it difficult to assess their impact.

- **Policy and Institutional Barriers:** Institutional and policy-related obstacles hinder the integration of blue education into broader educational frameworks.
- **Community and Parental Engagement:** Limited interest and involvement from local communities and parents do not support the efforts to promote blue education.
- **Technological Integration:** There is insufficient integration of technology in teaching and learning processes for blue education.
- **Bureaucratic Challenges**: Bureaucratic processes often slow down or obstruct the implementation of blue education initiatives.
- **Innovative Teaching Methods:** There is a lack of integration of innovative teaching methods (e.g., project-based learning, outdoor schooling) which could enhance blue education.
- **Environmental Education Framework**: Blue topics receive insufficient attention within the broader context of environmental education.

Addressing these challenges requires joint efforts from policymakers, educators, stakeholders, and communities to enhance awareness, provide resources, offer training, and create supportive policies that Prioritise and integrate blue education effectively into school curricula.

Additionally, based on the survey findings indicate the following trends shared by the surveyed countries:

- There is a **disparity** in the level of involvement and integration of Blue education activities across most countries, regardless of organisation type. In certain cases, this can be explained by different allocation of available resources, while for some locations, it can be due to geographical position and certain municipal limitations.
- Throughout the experimentation, there is a need for greater **synergies on local and regional level** between relevant stakeholders, including various sectors and types of organisations: educational institutions, NGOs, research institutes, private and public organisations etc.
- In addition to emphasizing local expertise and collaboration, there is a need and opportunity to **spread knowledge on international level,** which can be conducted through unified actions, and participation in international events organised in multiple locations, such is the The BlueNIGHTs . Additionally, this type of collaboration can be enriched by sharing expertise in specific areas in which certain countries excel. Such example are educational marine areas, where France can share knowledge and methodology with other experimentation countries engaged in similar initiatives.

Finally, the survey revealed some topics, presented in **Figure 6**, as the prioritised areas. Most respondents highlighted climate change impacts on marine environments as the primary concern. These impacts are not only central to SDG 14 (Life Below Water) but also have significant implications for other goals, such as SDG 1 (No Poverty), SDG 2 (Zero Hunger), SDG 3 (Good Health and Well-being), SDG 8 (Decent Work and Economic Growth), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), SDG 15 (Life on Land), and SDG 17 (Partnerships for the Goals). By addressing these, and other priorities and challenges identified by the survey respondents, we can work towards a more sustainable and resilient future.

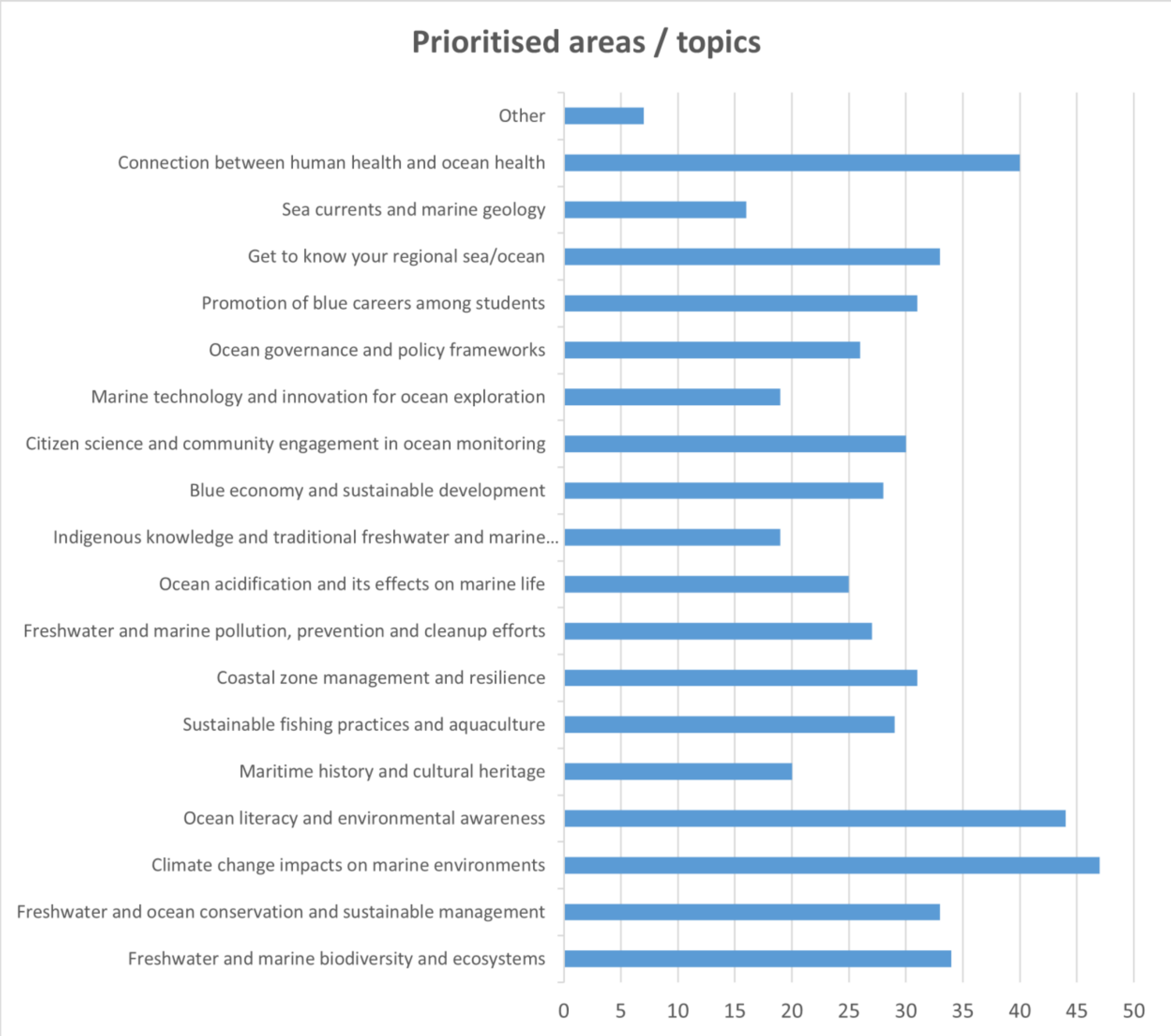

Figure 6. Prioritised areas

6. Conclusions

In this report, we made the first steps towards understanding the current state of Blue education in experimentation countries, and identified common challenges and prioritised areas which can guide its enhancement. We also provided an overview of the fundamental elements of the traditional educational system, and identified how each experimentation country connects to these elements, aiming to support the countries in designing impactful experimentation plans.

According to the initial survey findings, there are many initiatives and programmes on Blue Education currently ongoing in the experimentation countries, but also some challenges which require collaborative efforts.

The observed patterns indicate that **strong synergies and collaboration** can significantly improve the current state of Blue education in respective countries and ensure high quality of teacher training activities and educational resources, which would equip the educators with necessary knowledge on marine and water ecosystems and ocean literacy. Additionally, **engaging wider communities** and promoting lifelong learning which exceeds from the formal educational setting and covers different forms of learning, can further empower the citizens to contribute to the sustainable use of the water ecosystems and their protection. Furthermore, **collaborative efforts between different stakeholders** - teachers, organisations, policymakers etc. can help to raise awareness, allocate resources and develop supportive national policies which integrate Blue education into school curricula.

Moving forward, we recommend this report is further enriched with the **experimentation plans**, which will be presented in the workshop scheduled for September 2024. Additionally, these plans, which will be presented by each of the experimentation countries will help identify those proposing similar experimentations and **leverage the strengths of each partner**, fostering collaboration and joint efforts in the advancement of Blue education.

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8. Annex 1: BlueLightS Survey

Objective and methodology of the study

About the BlueLightS project

Blue Education is an approach that Prioritises environmental awareness, sustainability, and holistic learning related to marine and aquatic ecosystems[31].

BlueLightS aims at strengthening blue education in Europe and works on four axes that are central to the project's legacy by:

- Significantly increasing the number of blue challenges implemented in schools as well as the number of accredited blue schools joining the European Blue school network.
- In coherence with the inclusiveness principles of the EU Green Deal, contributing to the diversification of blue education projects/activities in schools, including schools from inland territories, vocational schools, schools for children and youth with disabilities etc.
- Contributing to enhancing the quality and ambition of blue education projects by applying open schooling and citizenship education principles that are key to (future) citizens' engagement into blue sustainability. Bringing the blue education concept and vision into the (national) education system of EU Member States, mobilising education stakeholders into the co-design and experimentation of a blue education framework, as well as the development of road maps for strengthening blue education.

Survey objectives

This questionnaire aims to investigate current understanding and collect information on the level of implementation of key principles of blue education and identified challenges in the respective countries. It also intends to gather information on stakeholders' willingness to take part in the experimentation process.

[31] UNESCO (2020). Education for sustainable development: a roadmap. United Nations Educational, Scientific and Cultural Organisation, Paris. https://unesdoc.unesco.org/ark:/48223/pf0000374802?posInSet=2&queryId=a2c9f83b-44cc-413a-a283-e48884ddcaa3 © UNESCO 2020

Instructions

This questionnaire is aimed at stakeholders from the education community from all countries of the European Union[32] and associated to the European Union[33]. BlueLightS partners are invited to identify education stakeholders that cover a diversity of components of the education system, mandates and responsibilities and share this questionnaire with them. The questionnaire (in English) can be filled directly by willing stakeholders or by the BlueLightS partner who contacted them during an interview (potentially carried out in national language). Partners, together with EUN and ACTeon, might organize follow up focus groups (with at least 3-4 stakeholders per country) to gather collective feedback on the initial information collected as a means of consolidation (to be further discussed and decided on a case by case basis). In such case, the BlueLightS partner might contact again respondents or provide the contacts of respondents to the project coordinator.

Kindly do not include any personal data in this survey (name, email, phone number) as such entry will be considered illegible. When sharing the questionnaire with interested parties, kindly focus on your country so we can trace data to individual countries and carry out the final analysis.

Once you submit the questionnaire, you be able to make edits only if you have Microsoft 365 account. In such case, at the final stage of submitting the answers please click on “save my responses”. This way, a link will be saved on your Microsoft account, and you can amend your responses later.

Duration

Participating in this survey should require no more than 25 minutes. The questionnaire will be open from April 30 to June 17, 2024, at 23:59 CEST. Sharing your experience and opinions is crucial to identifying the current state of play and conditions of blue education, identifying key challenges as well as suitable solutions from the local and national levels.

Contact

If you have questions regarding this survey, please contact Ivana Kovac (ivana.kovac@eun.org), with Evita Tasiopoulou (evita.tasiopoulou@eun.org) and Irene Pateraki (irene.pateraki@eun.org) in CC.

Privacy Notice

If you proceed with filling in the survey, you acknowledge that:

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32 Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

33 Albania, Bosnia and Herzegovina, Faroe Islands, Republic of North Macedonia, Georgia, Iceland, Israel, Liechtenstein, Moldova, Montenegro, Norway, Serbia, Switzerland, Turkey, Ukraine and the UK

- This survey, which is conducted through MS Forms, is anonymous and does not include any personally identifiable questions. The ''Anonymous Responses'' setting has been turned on, and therefore personal information including name, surname, and email address are excluded from respondents' results, which means that no personally identifiable respondent information will be collected or stored by European Schoolnet as the owner of this survey.
- EUN will only report average responses to questions in the survey, not individual answers. In our evaluation report, we might use quotes coming from your survey answers without sharing the name of the person who made the quote.
- This survey is conducted through MS Forms which processes this survey and may therefore collect, store and/or transfer respondents' IP addresses in accordance with its own terms and conditions which can be found at: https://privacy.microsoft.com/en-us/privacystatement

For any questions regarding how your data is handled, please contact: privacy@eun.org.

Survey

Respondents' background information

1. In which country is your organisation based?

- Albania
- Austria
- Belgium
- Bosnia and Herzegovina
- Bulgaria
- Croatia
- Czech Republic
- Denmark
- Estonia
- Faroe Islands
- Finland
- France

- Georgia
- Germany
- Greece
- Hungary
- Iceland
- Ireland
- Israel
- Italy
- Latvia
- Liechtenstein
- Lithuania
- Luxembourg
- Malta
- Moldova
- Montenegro
- Netherlands
- Norway
- Poland
- Portugal
- Republic of Cyprus
- Republic of North Macedonia
- Romania

- Serbia
- Slovakia
- Slovenia
- Spain
- Sweden
- Switzerland
- the United Kingdom
- Türkiye
- Ukraine

2. What type of organisation do you represent?

- Private/public educational institution: primary / secondary school
- Private/public educational institution: college / university
- Non-profit organisation
- Public organisation
- Network organisation/association
- Private company
- Freshwater and marine research organisation/centre/institute
- Other (please specify)

3. Please provide the name and status of your organisation (public, private, NGO…)

Blue Education in your country

4. Has your organisation already contributed to Blue education activities?

- Yes
- No

(if yes, proceed to next question (5). If no, proceed to question 7)

5. What types of activities or initiatives has your organisation undertaken in relation to Blue Education? Please select all that apply.

- Organising workshops or seminars on blue education
- Developing blue educational podcasts or short e-products
- Integrating a specific “Blue” element in the Curriculum
- Organising a dedicated “blue” training program for teachers
- Setting up a programme for supporting Blue education initiatives
- Organising field trips or outdoor educational programs & activities
- Collaborating and partnering with environmental/conservation organisations
- Collaborating and partnering with local/national Blue business and industry
- Collaborating and partnering with national research and/or academic institutions
- Developing awareness campaigns or events promoting Blue education
- Implementing research projects addressing Blue education
- Developing a strategy or policy on Blue education
- Promoting Blue careers and Blue skills
- Other (please specify)

6. In connection to the previous question, please provide any related links, resources etc. (open field)

7. Are you familiar with any initiatives or other programs related to Blue Education in your country? If yes, please provide additional details and/or relevant links for further information (scale at which it is organised, expected outputs, focus of the initiative, used methodology, how was the impact of the activities measured, etc).

8. Based on your previous answers please indicate your country’s maturity in relation to the current level of application of the following Blue Education dimensions (UNESCO, 2022; Litvinov, 2022; McGregor and Christie, 2021):

	Not at all	Very little	To some extent	A lot
Interdisciplinarity: Integrating various subjects such as science, geography, history, literature, and art to provide a comprehensive understanding of water systems and their interconnectedness with other aspects of life				
Experiential Learning: Providing hands-on experiences, field trips, and practical activities that allow students to directly engage with water ecosystems, fostering a deeper appreciation and understanding of the ocean.				
Sustainability: Promoting an ethos of conservation and sustainable use of water resources, emphasizing the importance of protecting water biodiversity and ecosystems for future generations.				
Cultural and Historical Context: Recognizing the cultural significance of the ocean in different societies and exploring the historical relationship between humans and the sea, including maritime traditions, exploration, and trade.				
Global Citizenship: Encouraging a sense of responsibility and global citizenship by highlighting the interconnectedness of water and the impact of human activities on marine environments, regardless of geographical location.				
Innovation and Technology: -Utilizing innovative technologies and scientific developments to study, monitor, and protect water ecosystems, while also fostering creativity and problem-solving skills among students.				

	Not at all	Very little	To some extent	A lot
Community Engagement: Engaging local communities, stakeholders, education, and citizens in water conservation efforts, recognizing their traditional knowledge and practices related to the sea, rivers etc.				
Environmental Justice: Addressing issues of environmental equity and advocating for fair and equitable access to water resources and opportunities for all communities, particularly those disproportionately affected by environmental degradation.				
Adaptation and Resilience: Building resilience to climate change impacts and preparing students to address future challenges facing water health, including sea level rise, ocean acidification, and extreme weather events.				
Lifelong Learning: Promoting a lifelong passion for water conservation and learning, encouraging ongoing exploration, advocacy, and engagement with water issues beyond formal education settings.				

9. If you have any further comments about your country's maturity, please provide your answer here. (open-ended field)

Experimentation and challenges

10. Which of the following challenges have limited the development of Blue Education in your country?

- Lack of teachers' general knowledge on ocean and freshwater-related topics and issues
- Lack of funding to support dedicated Blue education activities

- Lack of educational resources that can help supporting the development of Blue education activities
- Lack of the evaluation framework for Blue education activities
- Curricula constraints
- Lack of interest from teachers
- Lack of appropriate “blue” partners/stakeholders
- Lack of teacher training on blue challenges and issues
- Difficult access to water & marine (outside) environments
- Policy and institutional barriers
- Lack of parental interest and appetite for Blue education activities
- Limited interest and involvement of local communities in the topic
- Insufficient integration of technology in teaching and learning processes
- Insufficient support for students’ academic, social and emotional needs
- Bureaucracy
- Insufficient attention paid to blue in the general framework of environmental education
- Insufficient integration of innovative teaching methods (project-based teaching, outdoor schooling, etc.)
- Other (please specify)

11. Are there any specific topics or thematic areas within Blue Education that you believe should be Prioritised in your country?

- Freshwater and marine biodiversity and ecosystems
- Freshwater and ocean conservation and sustainable management
- Climate change impacts on marine environments
- Ocean literacy and environmental awareness
- Maritime history and cultural heritage

- Sustainable fishing practices and aquaculture
- Coastal zone management and resilience
- Freshwater and marine pollution, prevention and cleanup efforts
- Ocean acidification and its effects on marine life
- Indigenous knowledge and traditional freshwater and marine practices
- Blue economy and sustainable development
- Citizen science and community engagement in ocean monitoring
- Marine technology and innovation for ocean exploration
- Ocean governance and policy frameworks
- Promotion of blue careers among students
- Get to know your regional sea/ocean
- Sea currents and marine geology
- Connection between human health and ocean health
- Other (please specify)

12. Would you be willing to collaborate with BlueLightS partners for testing some solutions that might help strengthening blue education in your country?

- Yes
- No

(if yes, proceed to next question (13). If no, proceed to the final step and submit the survey)

13. If you are interested in joining our BlueLights activities for testing and experimenting some solutions and activities, please contact us at cop@blue-lights.eu

14. Which type(s) of collaboration would you be interested in?

- Co-developing curriculum materials or lesson plans
- Updating textbooks with “blue” contents

- Conducting joint research projects or studies (e.g. on the bottlenecks for Blue education, solutions for addressing these bottlenecks, conditions for delivering impacts…)
- Organizing and participating in training sessions for teachers
- Organising and participating in online or in-person workshops
- Exchanging/sharing best practices and teaching methodologies
- Revisiting current evaluation framework for integrating a “blue component”
- Strengthening the "blue“ into existing sustainability initiatives and programmes
- Building partnerships between education and freshwater/marine stakeholders to strengthen blue education
- Developing a (national, regional) strategy for integrating the “blue” into education
- Developing and test a “blue school” label in your own country/region
- Participating in conferences for sharing your experiences and practice
- Joining a Community of Practice on Blue education in Europe for peer-to-peer sharing and learning
- Other (please specify)

15. *If you selected the field Joining a community of Practice, can you please describe what would you expect from such community? What benefits would you like to receive?*

THANK YOU FOR PARTICIPATING IN THIS SURVEY!

This survey has been designed by the European Schoolnet for the project BlueLightS.

European Schoolnet
Transforming education in Europe

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9. Annex 2: Experimentation Roadmaps

These roadmaps constitute a plan for the 22 months of experimentation (December 2024 to October 2026) in each country. They have been written by each countries' experimentation partners, taking into account the results from the previously described survey and from BlueLightS' Deliverable 2.1. The roadmaps per countries are the result of a co-building process of experimentation, with several iterations during year 2024 with BlueLightS' partners and associated partners.

9.1. Roadmap for Croatia

Partner in charge: University of Zadar.

9.1.1. Context of the experimentation in Croatia

Croatia has over 6000 km of coastline and more than 31000 km2 of marine surface. This data indicates Croatia's strong connection to the sea in the context of geography, history, economy, culture, and tradition. The Adriatic Sea is priceless to Croatia and its citizens and is one of the main parts of national identity. A healthy and sustained Adriatic Sea is a baseline for Croatia's blue economy, which is strongly oriented toward tourism and fisheries. According to Eurostat (July 2024), Croatia has the highest renewable freshwater resources among the EU countries. At the same time, there is an obvious lack of blue content in formal education in schools. This can be explained by the lack of blue content in teachers' university study programs, lack of teacher training, insufficient blue content in textbooks, lack of political awareness about the importance of blue education, and consequently, lack of political willingness to include more blue into formal education. There are almost no opportunities for in-service and pre-service teachers to be trained in marine and freshwater topics, which they can use in their work. Teachers' education is organized as pre-service education and professional training. During their formal education at the university level, they can study Primary education programmes which qualify them for primary teaching level (first 4 years of formal education where future teachers gain education and knowledge from all the subjects they will teach as teachers). Also, they can study at university programmes to become teachers of some of the specific subjects such as biology, chemistry, physics, art, language etc. In some cases, there are professionals in, for example biology, maths, chemistry, IT, but they haven't finished study programmes for being a teacher, so they have to take, additionally, the course which compiles a set of pedagogical subjects to be able to teach in schools.

On the other hand, there are many non-formal blue education initiatives provided by NGOs, marine protected areas (MPAs), research institutions, universities, and aquaria, which are poorly connected to formal education and among each other. These non-formal initiatives provide different opportunities for bringing the blue closer to formal education.

To improve the overall state of blue education in Croatia, bridges should be made between formal and non-formal education and initiatives, and opportunities for teachers in terms of lifelong learning and training should be created. Teacher training for in-service teachers is not obligatory in Croatia. But it is needed for professional advancement. There should be more blue teaching materials (textbooks, toolkits, etc.) that teachers could use in their everyday work.

Improving the state of blue education in Croatia can lead to a more blue society where citizens are aware of the importance and the role of the sea and water for their lives, health, economy, and well-being. Consequently, this can lead to better marine and freshwater conservation and sustainable use of marine and freshwater resources.

The starting point for the Croatian experimentation can be summarized with the following points:

- Lack of existing and available teaching materials related to blue education in the Croatian language.
- Lack of existing teacher training in blue education.
- Minimal marine and freshwater content in formal education.
- Disconnection between non-formal and formal education.
- Existing collaboration between the Education and Teacher Training Agency and UNIZD.

9.1.2. Opportunities

The existing collaboration between the Education and Teacher Training Agency (Associated partner) and UNIZD offers a great chance to improve opportunities for teacher training. This partnership allows the program to be promoted effectively among teachers, and the Agency's certification makes it more appealing for them to join.

Many ongoing initiatives are coming from the NGOs and other stakeholders. However, they are fragmented, mostly local, and lack strong connections to teachers and formal education. This program can create a more unified approach to teacher development by integrating these efforts into a cohesive framework.

Croatia's economy depends on blue sectors, creating a solid basis for adding blue topics to the school system. Aligning education with these blue priorities could attract more interest and funding, making it a smart opportunity.

Strong communication channels with teachers from previous projects are a key asset. While they often rely on individual efforts, these relationships provide a solid foundation for outreach, increasing the chances of successful program implementation.

9.1.3. Risks

Lack of awareness about the importance of blue education in Croatia: The sea and water resources are vital to Croatia's economy, culture, and environment, forming the backbone of key industries such as tourism, fishing, aquaculture, maritime trade, and agriculture. Despite this, there is a significant lack of awareness among the public and policymakers about the importance of blue education in sustaining and enhancing these sectors. Many people and decision-makers may not fully recognize how important it is to educate the next generation about the sustainable management of these resources, resulting in low engagement and participation.

To mitigate this potential risk, targeted communication and outreach with educational stakeholders using the top-down and bottom-up approach should be initiated. Communication with policymakers and leaders in the education sector will highlight blue education's economic and environmental importance to Croatia's future and demonstrate how integrating blue education into the formal educational system can foster innovation and long-term sustainability. Targeting teachers, parents, and students should emphasize how the knowledge of blue topics directly impacts their communities and livelihoods, which can help raise awareness about the significance of blue education for Croatia.

Lack of political will to support blue education: Political support is essential for the successful integration of blue education into Croatia's school system. Without the support of policymakers, efforts may encounter significant obstacles, such as insufficient funding or a lack of sustained commitment, which may hinder the integration of blue topics into the educational system.

A close collaboration with the Education and Teacher Training Agency, which operates under the Ministry of Science, Education, and Youth, will be established to mitigate this risk. Showcasing successful examples from other countries where blue education has been effectively implemented can highlight such programs' long-term benefits and importance. This approach will help build a strong case for including blue education as a national priority, ensuring the necessary political support and resources.

9.1.4. Proposition for experimentation in Croatia

Elements of experimentation

To address the identified needs, we chose several practical changes:

- Map of existing blue education initiatives in formal and non-formal education.
- Panel discussion with and for education stakeholders to facilitate dialogue and collaboration, helping to address and integrate blue education topics more effectively.
- Teacher training development to ensure educators are well-prepared to teach blue education effectively.
- Develop educational materials in Croatian for teachers/educators to ensure the content is accessible and relevant to the local context.
- Teacher training certification will formally recognize the educators' qualifications and make the training program more appealing.
- Connection of non-formal education initiatives with teachers
- Promotion of the university course 'Selected topics of marine science' for primary education teachers, developed and performed at the University of Zadar to other higher education organizations. This is a subject based on ocean literacy (OL) content, adapted for pre-service teachers to ensure that future educators have access to specialized knowledge on marine education thus preparing them to integrate these concepts effectively into their future classrooms.

Objectives, level of ambition

Objective 1. Setting the baseline of blue education in Croatia - HIGH

Objective 2. Initiate dialogue between education stakeholders - HIGH

Objective 3. Increase opportunities for teachers to engage in blue education - HIGH

Objective 4. Enable communication between education stakeholders related to blue education – MODERATE

Experimentation activities

1/ Mapping and reporting on the existing blue education initiatives in formal and non-formal education

Mapping blue education activities and initiatives by developing and distributing the questionnaire to assess the current state of existing blue education initiatives will provide data about formal and non-formal initiatives performed by NGOs, MPAs, research institutions, universities, etc., and an opportunity to connect existing initiatives. We will look for teacher training certified by the Education and Teacher Training Agency, teachers' handbooks/toolkits, university programs for teachers that include blue content, etc.

2/ Panel discussion with and for the education stakeholders

The panel discussion aims to foster dialogue among various education stakeholders about integrating blue education into formal school programs. This event will bring together representatives from educational institutions, government bodies, non-governmental organizations, textbook publishers, blue economy experts, school principals, and most importantly, teachers. The goal is to discuss the current state of blue education in Croatia, identify challenges and opportunities, and develop collaborative strategies to advance the incorporation of blue topics into the educational system. This discussion will also serve as a platform to share best practices and innovative approaches from other regions or countries.

3/ Teacher training program

The teacher training program incorporates the principles and dimensions of Ocean Literacy, which are currently underrepresented in Croatia. This training will equip educators with a deep understanding of Ocean Literacy, including the interconnectedness of marine and freshwater systems, the critical role of the ocean in regulating climate, the importance of marine biodiversity, and the interconnectedness of humans and the sea, highlighting how human activities impact marine environments and vice versa, the importance of the ocean for the society. By including these elements, the training will aim to fill the gaps in Croatian education, enabling teachers to effectively communicate the significance of ocean, marine, and freshwater issues, ocean-society connection to their students. The teachers participating in the training will be empowered and encouraged to develop a Blue Challenge project in the following school year and join the Network of Blue Schools thus connecting the WP3 and WP4. This training will address the issue of inclusivity by inviting teachers to provide insights from their experience on this topic in relation to blue education which will be. It will be available to teachers from different regions in Croatia (inland, rural, costal, etc.). After the end of the curse teacher will evaluate it.

4/ Teacher training certification

A certified training program, which is officially recognized, is required for professional development credits. Through certification provided by the Education and Teacher Training Agency, we emphasize the program's importance and encourage teachers to participate and integrate blue topics into their curricula.

5/ Development of educational material in Croatian language for teachers/educators

Educational material in Croatian should be tailored for teachers and educators and widely distributed. This material can include lesson plans, teaching guides, and multimedia resources focused on blue education and Ocean Literacy. The aim is to ensure that teachers have access to high-quality, nationally relevant teaching resources that support the effective teaching of blue topics.

6/ Connecting formal and non-formal education initiatives with teachers and educators

Facilitating connections between formal and non-formal education initiatives with teachers, such as those promoted on platforms like the Facebook page "More u škole" ('Sea to schools'), enables the integration of non-formal learning experiences with classroom activities. It promotes collaborative projects that bridge the gap between informal and formal education. The aim is to enrich the educational experience and provide students and teachers with a more comprehensive understanding of blue topics.

7/ Promotion of the university course 'Selected topics of marine science'

We will share the experience of the organization and delivery of the course as a “good practice” to other primary education study programmes in Croatia at other universities.

Timeline

March 2024: Setting a social media channel to connect formal and non-formal education initiatives and activities with teachers

April - July 2024: Mapping the existing blue education initiatives in formal and non-formal education

September 2024: Panel discussion with and for the education stakeholders

September 2024 – February 2025: Reporting on the existing blue education initiatives in formal and non-formal education

February – July 2025: Creating the content of the teacher training

February – July 2025: Development of educational material in Croatian language for teachers/educators

August - September 2025: Implementation of the teacher training

October 2025 – January 2026: Adaptation of the teacher training content

February – September 2026: Teacher training certification

Partnerships

A network of active NGOs was created based on previous projects and activities. The University of Zadar will continue existing collaborations and establish new ones with local and national organizations. Some of them are the NGO Aurelia—Association for Biodiversity Conservation (http://aurelia.hr/), the NGO Marine Explorers Society - 20000 Leagues (http://www.drustvo20000milja.hr/language/en/home-2/), the NGO Blue World Institute of Marine Research and Conservation (https://www.blue-world.org/), etc.

The scientific and operational support will be provided through partnerships with scientific institutes: Institute of Oceanography and Fisheries and Ruđer Bošković Institute.

Educational and promotional activities will be supported through a partnership with the Aquarium Pula (https://aquarium.hr/en/about-us).

The promotion of the UNIZD course 'Selected topics of marine science' for primary education teachers, developed and performed at the University of Zadar, will be facilitated through partnerships with the University Department of Marine Studies at the University of Split and Faculty of Natural Sciences at the University of Pula.

To reach the teachers at all formal education levels, we will collaborate with their regional teachers' councils. They meet a few times a year, which allows us to disseminate results and establish connections. Additionally, we will inform national South Eastern Mediterranean Sea Project (SEMEP) coordinators and motivate them to communicate our ideas at their annual meeting.

To ensure more ocean and water content reaches the teachers and students, we will directly communicate with textbook publishers and editors, involving them in our regular activities throughout the experimentation process.

Education and Teacher Training Agency is the associated partner crucial for achieving proposed objectives. It represents a bridge between the Ministry of Science, Education, and Youth, teachers, and schools. Their role in distributing information about planned activities will be very important. This partnership will promote and support blue education among the teachers' community and help with the teacher training certification process.

Role and responsibilities (governance of the experimentation)

University of Zadar will be in charge of:

- Setting the baseline of blue education in Croatia – identifying challenges and opportunities for blue education in Croatia.
- Initiate and facilitate dialogue between education stakeholders.
- Organize and perform Teacher training.
- Preparation of the Teacher training program for certification.
- Develop education materials for teachers in the Croatian language.
- Initiate social media channels to enable communication between education stakeholders related to blue education.

Education and Teacher Training Agency (associated partner) will be in charge of:

- Setting the baseline of Blue Education in Croatia – identifying challenges and opportunities in blue education in Croatia
- Initiate and facilitate dialogue between education stakeholders
- Teacher training certification

The teachers involved are expected to

- Participate in teacher training
- Engage in social media

9.1.5. Upscaling potential

The results from this experimentation can be scaled up effectively to reach a broader audience and create a significant impact in the following ways:

- Developed certified teacher training programme will be shared and delivered by the Education and Teacher Training Agency. This will engage more teachers and allow to build a growing network of teachers equipped with blue education knowledge, thereby increasing the program's reach and influence.

- The experimentation results can serve as a starting point for implementing blue education in formal education, and we can encourage broader adoption and support from educational authorities and institutions.

- The educational materials developed through this experimentation process will be available to many teachers, enhancing their ability to teach blue topics. These resources will support educators across various regions, ensuring consistent and impactful delivery of blue education content. They will be shared among the European Blue Schools Network, Eco-Schools (https://www.eko.lijepa-nasa.hr/) network and to the national SEMEP network, but also regional educational authorities.

9.1.6. Monitoring and evaluation

A questionnaire for non-formal education stakeholders will be developed and distributed, to learn more about the existence and availability of blue education activities and resources

This will be complemented by a Panel discussion – an event to gather educational stakeholders (teachers, representatives of the Ministry of Education, representatives of the Education and Teacher Training Agency, textbook publishers and authors, etc.) and start the initial discussion about blue education in Croatia.

A teacher training course performed – 2-day teacher training related to blue education (content will be determined in the later phase of the project). This will be evaluated through an evaluation form – a form will be developed for the evaluation of the teacher training. The certification of the teacher training will be one of the indicators of its success.

9.2. Roadmap for Finland

Partner in charge: Finnish Environment Institute (Syke)

9.2.1. Context of the experimentation in Finland

The main elements of Finland's national context relevant to experimenting with Blue Education in the Finnish education system are:

1. **Current Lack of Formal Blue Education Integration:** Blue Education is not currently part of Finland's national education curriculum. Although Finland's extensive focus on water-related topics reflects the abundance of lakes and the Baltic Sea, Blue Education lacks formal inclusion as a separate framework.

2. **Incorporation within Sustainable Future Framework:** Water systems education exists as a component of the larger sustainability and environmental curriculum, but without a dedicated focus. This implies that, for Blue Education to thrive, it might initially need to fit into existing sustainability frameworks.

3. **Geographical Influence on Education Focus:** Education around water systems in Finland varies depending on the school's proximity to water bodies. Coastal schools emphasize the Baltic Sea, while inland schools often focus on local lakes. This geographical distinction highlights an opportunity to tailor Blue Education content to align with local environmental conditions.

4. **Existing Educational Networks:**

    - **LUKEMA:** Run by the Finnish National Agency for Education, LUKEMA supports teacher training in various subjects, making it a potentially valuable partner in equipping educators to adopt Blue Education content.

    - **UNESCO Baltic Sea Project (BSP):** With over 25 UNESCO Baltic Sea Project schools in Finland, this network promotes collaboration and material development around Baltic Sea topics, providing a pre-existing platform for Blue Education themes.

    - **LUMA Network:** Focused on mathematics, environmental science, and technology, LUMA's partnerships with 11 Finnish universities support schools with resources, specialized classes, and a scientific focus. This network can potentially offer a science-oriented foundation for Blue Education within the broader environmental science curriculum.

5. **Need for Teacher Initiative:** Due to the decentralized approach, the implementation of water systems education currently depends heavily on individual teacher initiative and interest. Integrating Blue Education might, therefore, require sustained support and resources to enable teachers to engage without increased workload. Our co-operation with **BMOL** (the Teachers Union of Biology and Geography) opens an avenue to easily and reliably reach the teachers.
6. **Support from Science/Nature Centers**: Finnish science/nature centers have contributed to marine literacy through selective projects with certain schools, which have raised awareness of marine issues. BlueLightS project offers an approach for systematic, nationwide dissemination, which may help bring Blue Education into widespread implementation with the Finnish National Agency for Education's collaboration.

These contextual factors highlight the existing structures, limitations, and potential partners that can influence how Blue Education could be developed, promoted, and potentially standardized within Finland's education system.

Considering these elements of context, BlueLightS' experimentation in Finland will aim to establish Blue Education as a distinct concept within the national education program to elevate the focus on marine and freshwater environments, ensuring they receive equal attention across Finland in both curriculum and student interest. Additionally, we intend to expand the Blue School network to include most of Finnish schools, though this will require significant effort as none are currently involved.

This experimentation allows us to pursue these goals while learning from the experiences of other countries. It also provides a platform to share our own insights from working with schools, developing tailored educational materials, and organizing events that deepen students' understanding of our work.

9.2.2. Opportunities

Existing connections to teachers and especially the UNESCO Baltic Sea Schools network offer a valuable opportunity to enhance collaboration between us and the schools. Through these connections, our data portals (Waterinfo.fi and MarineFinland.fi) can be used to disseminate learning materials more widely.

The LUKEMA network, which focuses on teacher education, creates an opportunity for us to collaborate on materials and seminars to support teachers in implementing Blue Education concepts.

BMOL (associated partner), the Teachers Union of Biology and Geography, is another excellent resource for identifying teachers' needs and establishing communication channels. Information on upcoming events and data portals could be effectively shared through BMOL, reaching a broader audience of educators.

We have also already established cooperation with the Finnish National Agency for Education, our most critical partner in introducing Blue Education in Finland. Marine literature is already considered as a national program and there even is a local committee in Finland for the UNs Decade of Ocean Sciences led by Prime Minister´s Office. A Syke representative in the committee has been leading the process to develop a Finnish plan for Ocean literacy. As the ocean literacy is already recognized as important topic it will give us an opportunity in this project to develop and expand it further.

Additionally, we could explore ways to utilize the LUMA network, which is organized by universities and aimed primarily at schools and students, to support Blue Education.

Through these combined connections, we can raise awareness of the need for Blue Education in the national education curriculum. Should we succeed in implementing Blue Education on a national level, we can leverage these networks to distribute materials provided by the Finnish Environment Institute (Syke) and other organizations.

9.2.3. Risks

Description of risk	Proposed risk mitigation measures	WP concerned
Limited interest from stakeholders from the education community (likelihood: medium, severity: medium)	Utilize other connections and networks increase the interest of Blue Education in schools. Once enough schools have taken interest in Blue Education, the topic gathers more interest with stakeholders.	WP1 – 2
Potential lack of interest from schools to participate in the calls (likelihood: low, severity: high)	Provide more information on the benefits of joining the networks.	WP4
Difficulties in evaluating the state of maturity and place them into categories/levels (likelihood: medium, severity: low)	Our co-operation with BMOL (Teachers Union of Biology and Geography) could prove a useful avenue to evaluate the current state of maturity.	WP1 – 2
Difficulties in evaluating long term impact over only 3 years (likelihood: high, severity: low)	Timeline of BlueLightS-project may not match with the timeline where Finnish national agency for education can change the national education program and some schools that currently have national development project may change next year as the projects end and new ones are selected. If we get Finnish schools to join the Blue Schools –network, it would be possible to evaluate long term impacts from their developments.	WP3
Competition with other fields on what national education program should include (likelihood: low, severity: medium)	Marine theme could be included in multiple other fields as well. Joining the marine literature with other topics could also prove useful	WP2

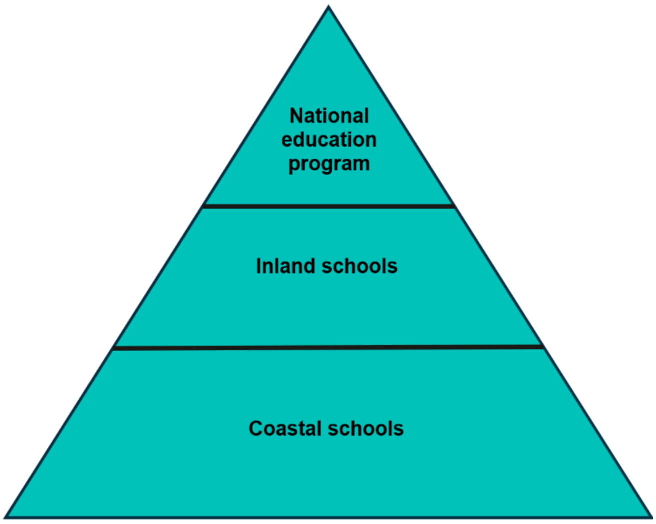
9.2.4. Proposition for experimentation in Finland

Elements of experimentation

We aim to shift how natural watersheds are approached in Finnish education. The current model, which integrates watershed education into broader context, does not provide profound education and understanding of the subject. It also lacks a thorough exploration of the connections between freshwater and marine environments. By introducing Blue Education into the national education program—or at minimum, raising awareness in schools about its importance—we can enhance the quality and consistency of marine and freshwater literacy nationwide.

Through this project, we also need to assess schools’ specific needs for educational materials that can strengthen students' marine literacy. Collaborating with BMOL and LUKEMA, both of which have extensive insight into the current state of student and teacher education, would be invaluable in this process. This partnership would also be an excellent opportunity to evaluate teacher training needs and identify what types of materials or additional training would most benefit them.

Objectives, level of ambition



Our primary objective is to integrate Blue Education into the national education curriculum. However, we recognize that achieving this goal may require more effort than we are currently capable of, as education programs are deeply political matters, with decisions ultimately resting in the hands of politicians. Additionally, the timelines for BlueLightS project and the Finnish National Agency for Education present challenges; there may not be an available window to implement the necessary changes in national educational program during this project. Thus, the concept of Blue Education must remain a key focus until we can facilitate these changes in the national curriculum. Currently there are work focusing on futures work in comprehensive schools. One of these is vision work that assesses the type of need that exists for further developing comprehensive schools and the capabilities that education should offer for the future. Most likely national education program isn´t going to make any larger changes before these tasks are done, but we can attempt to join the discussions and raise the awareness on Blue education within the vision work.

Another ambitious goal is to encourage inland schools to incorporate more marine education into their education. Understanding the connection between freshwater and marine environments is essential, as nearly all of Finland belongs to the drainage area of the Baltic Sea. Establishing connections between inland and coastal schools could pave the way for future collaborations, such as joint courses or field trips to various environments. This initiative will require tailored educational approaches, as interest in education is often locally driven. While the Baltic Sea may seem distant to some schools, Blue Education should start with local issues and gradually expand to include topics related to the Baltic Sea. The cause-and-effect relationship must be clear; the Baltic Sea should not feel remote after all. Effective communication about marine topics is crucial, not only within schools but also for a broader audience. This could even inspire a school project where students gather local opinions on the Baltic Sea and their immediate environment, exploring potential links between the two.

Lastly, we aim to engage as many coastal schools as possible in more profound Baltic Sea education while also broadening their perspectives on freshwater ecosystems. These schools are prime candidates for the Blue School network and represent our initial step toward raising the awareness and interest on marine education. Coastal schools can also start to collaborate with inland schools to strengthen the connections between marine and freshwater environments.

Both goals, addressing inland and coastal schools, will also involve identifying the necessary educational materials and collaborating with existing networks like BMOL and LUKEMA to develop new resources that can be utilized and further refined during and after the project. These objectives will also focus on fostering and enhancing cooperation among networks, schools, and other organizations, promoting the opportunities these connections will create.

Experimentation activities

Educational materials

Portals and other dissemination channels

We have multiple data portals currently in use in Finland, which can be further utilized to disseminate educational materials to teachers and schools. We plan to promote these resources at our events and the annual EDUCA fair, the largest event for the education and training sector in Finland.

To better understand the need for educational materials, we will collaborate with BMOL, LUKEMA, and LUMA. Together, we will discuss the creation of relevant materials, teacher training programs, and potential courses for schools. These networks will also serve as effective channels for distributing the developed educational resources and may provide platforms for training seminars, building on our existing experience with LUKEMA. Additionally, we will arrange meetings directly with teachers to gain firsthand insights into their educational circumstances and needs. This knowledge will help the creation of educational material even after the project.

Finnish UNESCO – Baltic Sea Project Network (BSP)

We will hold a meeting with Baltic Sea Schools to explore cooperation and network development among these schools and others. The Baltic Sea Project, part of the UNESCO Associated Schools Network, aims to unite teachers and students from Baltic Sea countries in pursuit of a common goal: to enhance environmental awareness in future generations, promote environmentally friendly attitudes, and support the development of marine literature among young people. These objectives align well with our goals of fostering connections and enhancing education and training opportunities.

LUKEMA

LUKEMA network in co-operation with Otaniemi Highschool is a great partner in this project. We have already held a meeting for the planned events for the year 2025 and other possible tasks that could strengthen the marine literacy in Finland. With LUKEMA and Otaniemi Highschool we can together organize events and training for teachers and educational event for students. LUKEMA can also help us with communication to other schools in the network.

Finnish Blue Schools

The first Blue Schools in Finland could play a pivotal role in advancing the BlueLightS initiative aimed at enhancing marine literacy. By collaborating with these newly designated Blue Schools, we can establish connections with other schools and showcase the innovative educational practices and materials that can be employed to strengthen Blue Education. This cooperation between schools could yield significant benefits, potentially creating a spillover effect where the positive impacts of Blue Schools extend to other schools. It may also inspire more schools to seek membership in the Blue School network or other existing networks in Finland.

National education program

We must continue our discussions with the Finnish National Agency for Education and the Ministry of Education and Culture to determine effective methods for increasing marine literacy within the educational framework. Our highest ambition is to integrate Blue Education into the national education curriculum. Additionally, we are seeking funding to enable researchers to visit schools, providing hands-on experience with educational materials and field trips focused on natural watersheds.

Timeline

2024 May: LUKEMA-network event, Syke Baltic Sea literacy presentation.

2024 May: Webinar presentation for Finnish Baltic Sea Project schools' teachers about available Blue Education materials and BlueLightS-project.

2024 April – July: Mapping Finnish schools for the survey.

2024 October: Planning meeting with Finnish UNESCO school coordinator.

2024 November: Planning meeting with LUKEMA coordinators.

2024 November: Meeting with Ministry of Education and Culture for funding the Marine Literacy development.

2024 December: Meeting with Finnish National Agency for Education on upcoming work with the project.

2025 January: Meeting with French, Romanian and Swedish partners on Educational Marine Areas and how we could implement the method in our countries.

2025 – 2027 January: Yearly EDUCA-fair where we can spread information of our work and try to identify the need in schools with BMOL co-operation. Each year we could develop our part in the event further and create a final seminar within the EDUCA-fair in 2027.

2025 February: Coordination meeting with LUKEMA coordinators.

2025 April: Tvärminne course for teachers by LUKEMA

2025 May: HighSchool Days in Jyväskylä in co-operation with LUKEMA

2025 – 2026 August: Baltic Sea Day and day before it dedicated for schools as we present our work in Research Vessel Aranda.

2025 Autumn: "Let's shower the students with Baltic Sea information." -event in co-operation with LUKEMA and Otaniemi Highschool which is dedicated for students, and they will learn more about the Baltic Sea and our work. It is also great opportunity to hear from the students, what they would like to learn from oceans.

2026 November: Attending the Autumn Days organized by BMOL

2027 Spring: Creating a themed number in Natura-newspaper for teachers, BMOL

Partnerships

We have multiple partnerships to help us with our project of raising awareness of marine literature and trying to introduce Blue Education in national education programmes. Some of these partnerships can have a direct impact towards the Finnish national agency for education, while others can play more supportive roles.

BMOL

Teachers Union of Biology and Geography is a great partnership that can help us with evaluating the current maturity of Blue education. BMOL can also support us with spreading the material and information regarding Blue Education.

Finnish UNESCO Baltic Sea project

Existing network of UNESCO BSP is a direct connection to schools that could already be interested in joining the Blue School – networks. These schools are also most likely interested in Blue education and can support us making it more visible topic in the discussions of joining it in the national education program.

LUKEMA-network

LUKEMA-network is a direct connection to the teachers and their education as well as to the Finnish national agency for education which organizes the network. Introducing Blue education in LUKEMA-network events and spreading the interest towards the teachers could be a great method in our way to introduce Blue education nationwide.

“Rotary Club”, The Finnish Nature Association, WWF, Keep the Archipelago Tidy -organisation etc.

Our connections to multiple NGOs are a great asset since these organisations are spreading environment education and organizing events not just for students, but to the larger audience as well.

Nature centres

Many of our municipalities have their own nature centres that is available for citizens to visit. Schools can also make organized field trips to the nature centres which can provide guided tours.

Green flag schools

Green flag schools are a potential school network to reach the inland schools. These schools already have the interest towards nature and are excellent first step to create the connection between marine and freshwater environment education.

LUMA-network

Luma-network is driven by universities in Finland and focuses mainly on students. They are co-operating with LUKEMA-network, and we can investigate this co-operation and try to find synergies between these networks and possibilities for us to co-operate with.

The Finnish Association of Nature and Environment Schools

Possible network to co-operate with. The network offers environmental education services for schools and kindergartens on local level. It also promotes nature and environmental education in Finland. LYKE-network consists of centers governed by municipalities, governmental organizations, enterprises, and associations. The network also maintains the Mappa.fi webpage that contains educational material for teachers to search. Educational material from Syke is also distributed through this network.

Role and responsibilities (governance of the experimentation)

Finnish national agency for education is the main stakeholder in our experimentation. Through this agency we can introduce the idea of Blue education and present how it could be integrated in the national education program. The role of the Finnish national agency for education is to then prepare the idea forward if we manage to succeed in our work. The motion then goes to the Ministry of education and culture for acceptance.

Role of Blue Schools in the experimentation

The role of the European Blue Schools is to set an example for our schools of Blue education and Blue School – network. Once we have Blue Schools of our own in Finland, they can then continue the work of setting an example.

9.2.5. Upscaling potential

Through this experimentation we can introduce the Blue School - network to Finnish schools and therefore increase the awareness and interest in Blue Education. The Blue Schools would be then capable of creating connections to other schools and co-operate with them and through the existing school networks in Finland. Through these networks, Syke and other organizations could also distribute education materials, provide possible field trips and summer camp and give talks in classes.

Another possible upscaling would be to establish marine literacy in other school subjects and not just the most common biology and geography. For example, history and chemistry could also use topics related to their education and well as any language education that could use marine literacy topics as educational material in their learning of the new language.

Once the number of schools taking part in the Blue Education in its informal form, we could call it by reaching the critical mass, as it would be something that the political discussions could no longer avoid. This can increase the pressure to implement the formal version of Blue Education in the national education program.

9.2.6. Monitoring and evaluation

The indicators to measure change and assess its impact will primarily include the number of schools that join the Blue School network, the attendance at various events, and surveys conducted for schools. While not all schools can join the Blue School network, the number of schools willing to invest in enhancing their Blue education serves as a significant indicator of our impact. This also includes schools that are actively working to improve their education through our collaboration, not just those applying for the Blue School network.

At the EDUCA fair, we will track attendance at our booth and other activities we organize during the event. Teacher training seminars will also be evaluated based on the number of participating teachers, and school events should account for the number of classes or students present. During these events, we can conduct brief surveys to monitor changes in responses throughout the project, and we will send a more comprehensive survey at the end of the project to those with whom we have collaborated.

9.3. Roadmap for France

Partner in charge: French Office for Biodiversity (OFB)

9.3.1. Context of the experimentation in France

France already has a solid network of schools applying a blue education programme, called Educational Marine Areas. This programme is supported by the Ministry for Education, Ministry of Ecological Transition and Territorial Cohesion and the Ministry of Overseas territories.

Other stakeholders, such as Tara Foundation, Surfrider, Ifremer, are developing Blue education tools, mainly based on citizen science.

In secondary education, there are also programmes dedicated to blue education, but targeted on blue economy or on national navy (Classes Enjeux Bimer, Classes Enjeux maritimes)

As the OFB is responsible for managing educational areas, the experiment will focus on strengthening the blue dimension of this programme. The OFB will also work with the other players involved in blue education in France (Ministry of Education, research institutes, etc.) in order to develop synergies between the various actions carried out.

An educational area is a small natural territory managed in a participatory manner by the pupils of a school, collège or lycée. Supervised by their teachers and an environmental education organisation, the pupils meet in the form of a "children's council" and take all the decisions concerning their educational area.

This concept was born in 2012, in the Marquesas Islands (French Polynesia), from the imagination of the children at Vaitahu primary school, who wanted to protect the bay in front of their school. The project is supported by the Marquesas cultural federation Motu Haka, the Marquesas Islands community of communes, Tahuata primary school and, at national level, the former Marine Protected Areas Agency (now the OFB) and IFRECOR. An educational area can be marine or terrestrial: it is referred to as an EMA ("educational marine area") or an ETA ("educational terrestrial area").

Currently, there are more than 1000 educational areas: 327 EMAs and 635 ETAs, which are reaching about 40 000 children.

9.3.2. Opportunities

There is a strong momentum around educational areas in France and abroad. The French biodiversity strategy has set a target of 18,000 educational areas by 2030, i.e. 1/3 of French school classes. In 2024-2025, France is organizing the Year of the Sea, culminating in the UNOC. During this year, educational marine areas will be given special attention.

There is also an undergoing work with the Ministry of education to create training materials for teachers on educational areas (a MOOC and a training kit to enable trainers to run face-to-face training courses for teachers on educational areas)

These dynamics open up great prospects for the development of educational areas.

More broadly, there are many research institutes and NGOs (Tara Foundation, Ifremer, Surfrider Foundation, etc.) in France that are developing tools for blue education, particularly in the area of citizen science.

All these programmes offer many opportunities for schools to organise one-off or more regular activities on blue education.

At the European level, the European network of blue schools also offers opportunity for schools developing blue education projects to be part of a European network and be linked to other schools. This is an opportunity for educational marine areas to be part of a broader network.

9.3.3. Risks

Two main risks can be highlighted at the national level:

- *Diminishing importance of EMAs in the wider dynamic of educational areas*

In recent years, the number of ETAs has increased considerably while the number of EMAs has stagnated. There is a risk that the focus will be mainly on ETAs and that EMAs, and more generally blue education, will gradually be given less importance in the network of educational areas.

- *Multiplication of Blue Education programmes without joint work between stakeholders*

The number of players developing Blue Education programmes is both an opportunity and a risk. While it gives teachers many opportunities, it can also mean losing teachers among too many possibilities and creating competition between projects that may be complementary.

Achieving BlueLightS' objectives (increasing the number of blue schools and disseminate the "blue" in the education system) will help mitigating these risks, as it will be explained in the next parts of the plan.

- *Significant increase in the number of educational areas in the coming years without the necessary support*

If this development is not accompanied by the necessary support, in terms of training and funding in particular, it could lead to a drop in the quality of projects. To encourage the education system to take ambitious account of environmental education and blue education issues, training and funding are essential.

9.3.4. Proposition for experimentation in France

Elements of experimentation

Our experimentation is intended to meet BlueLightS' goals (increasing the number of blue schools and and disseminate the "blue" in the education system). By meeting BlueLightS' goals, it will also answer the two risks we highlighted.

To better disseminate the blue in the education system, our experimentation will focus on giving new dynamic to educational marine areas. To do so, we will first collect data on what EMAs need to be given a new dynamic and on existing good practices, and then implement actions. We have already ideas on what could be structuring to reinforce blue education into educational areas network and French education system:

- *Enhancing links between EMAs and ETAs, especially through common work on water;*
- *Better work with other stakeholders developing blue education tools and coordinate our efforts;*
- *Better work with French MPAs and municipalities to reinforce the dynamic around blue education in their territories;*
- *Build a long-term dynamic around educational areas in France by strengthening partnerships, training and the sustainability of funding sources;*
- *Promote the potential of educational areas to change our relationship with life and the ocean, through research programmes.*

These actions will also permit to augment the number of blue schools in France, by spreading the "blue" in educational terrestrial areas and by launching / reinforcing a dynamic around blue education in MPAs and municipalities.

It will have an impact on various elements of the educational system considered as key for the development of blue education: training of educators, governance, educational resources, assessment and evaluation, integrating new pedagogical practices into the classroom, and funding.

In order to augment the number of blue schools in France, the experimentation aims also develop links with the European network of Blue Schools, and make it easier for schools certified as EMAs to be recognized as Blue schools.

This experimentation plan will be adaptable throughout the project, depending on the results of the actions undertaken and the needs that may emerge. The actions that will be taken as part of the experiment from September 2025 will depend heavily on the results of the consultations and actions carried out during the 2024-2025 school year.

Objectives, level of ambition

The implementation of the BlueLightS' objectives translates into two objectives in our experiment: reinforce dynamic around educational marine areas in France, and foster cooperation between blue education initiatives in France.

These two objectives can be translated into different sub-objectives, with quantified targets where relevant:

- *Increase in the number of educational marine areas in France (500 EMAs by the end of the project);*
- *Organise events during the Year of the sea (Specific activities for educational areas during the Year of the Sea, to be confirmed, and 2 events at UNOC);*
- *Develop twinning between EMAs / ETAs (10 twinning by the end of the project);*
- *Get EMAs automatically recognised as blue schools at the EU level;*
- *Develop a toolkit for EMAs in Europe;*
- *Develop training modules on educational areas;*
- *Organise meetings between stakeholders developing blue education programs;*
- *Pick up two strong actions to conduct together.*

Blue education is already well integrated into the French education system. Through BlueLightS, we aim to build on this momentum by strengthening the network we've created and giving it new opportunities: links between land and sea, links with other countries, etc.

Experimentation activities

Collection of information / good practice / additional needs with teachers and other stakeholders (managers of marine protected areas, NGOs supporting EMAs, etc.) to focus on one or two experiments to be carried out during BlueLightS (i.e. development and use of low-tech tools for observing the sea, twinning between educational areas at river basin/sea basin level, etc.).

Implementation of activities during the Year of the Sea to create more links between EMAs and ETAs: these activities could serve as experiments, to be replicated after the Year of the Sea.

→ *Discussion/working group with one or two players in blue education in France (Ifremer, Tara Foundation, etc.) and identification of themes to be worked on together to support the development of EMAs and BlueLightS experiments;*
→ *Offering an online training course and a face-to-face training kit on educational areas, both marine and terrestrial, for teachers and support structures, to help set up quality projects;*
→ *Conducting a survey about financing needs of educational areas and find ways to diversify their funding to ensure sustainable financing for these projects;*
→ *Make it easier for EMAs to be recognized as blue schools, and once certified at the French level, being automatically certified as an EU blue school.*

Timeline

September 2024 – January 2025

- Gather information / good practice / needs from teachers and other stakeholders. To do that, 3 actions will be conducted:

- *Survey of regional groups managing educational areas on projects underway in their region, on how EMAs can be better promoted and on how land-sea links in educational areas could be improved.*
- *A meeting with French marine protected areas ("parcs naturels marins", "parcs nationaux", etc.) on what would be needed to strengthen the EMA network.*
- *Bilateral meetings with project holders who implemented interesting projects to understand the hindrances and levers they have met.*

These three actions will allow us to identity 2 to 3 structuring actions to be implemented as part of the experiment.

- Identify and prepare activities to be carried out during the Year of the Sea (in relation with other French partners implementing the Year of the sea in France)

- Think about common actions to be conducted with other players in blue education in France (brainstorming with Génération Mer, meeting with Tara Foundation)

- Resume discussions with the European network of blue schools to automatically include schools that have been labelled as marine educational areas.

- Work on the teacher training programmes

January - June 2025

- Carry out activities for the Year of the Sea / UNOC

- Reflection on the experiment in France to be set up in September 2025: concrete preparation of the 2 to 3 structuring actions decided after the webinar.

- Continue the work with other player in blue education in France

- Organisation of a webinar for French teachers interested in twinning schools (land-sea twinning, or with another EU country) or other blue projects, and presentation of European funding opportunities for this purpose.

- Work on the teacher training programmes, in cooperation with RAME (associated partner)

- Long-term work on financing strategies

- Data collection on the effects of EMAs, obstacles and levers, by RAME

June – October 2025

- Final preparation of the 2 to 3 structuring actions to be implemented as part of the experiment, and launching in September 2025

- Continuation of the Year of the sea’s activities

- Preparation of twinning in EU (if needed preparation of a toolkit for using Erasmus+ in educational areas, organisation of a second webinar on the topic.)

October 2025 - June 2026

- Evaluation of the experiments conducted as part of the Year of the Sea

- First twinning between French EMAs and EMAs from other EU countries

- Experimentation in France of the 2 to 3 structuring actions to be implemented as part of the experiment (schools being part of these experimentation will apply to the Bluelights call to be financed). Through this experimentation, common work will be done as much as we can with other blue education stakeholders in France (for pedagogical support, for instance).

- Availability of the educational area MOOC, followed by the face-to-face training kit.

- Long-term work on financing strategies.

- Analysis and interpretation of RAME's research results, scientific communications and publications, conferences and outreach work.

June 2026 - End of the project

- Evaluation of the experiments carried out and strategy to disseminate the results in the network.

- Transmit these evaluations/lessons learned to WP2, in order to feed task 2.3 on the design of recommendations to strengthen blue education in Europe.

- Long-term work on financing strategies

Partnerships

We will develop or reinforce various partnerships during the project, with different goals:

- Marine protected areas (parc nationaux, parc naturel marin…): reinforce the dynamic around educational marine areas (facilitating a network for sharing experience, best practices, etc.)
- Local authorities ("Association des élus du littoral") : Consider how these local authorities can facilitate the setting up of marine educational areas in their schools, and facilitate an exchange of experience between these local authorities.
- French stakeholders on blue education (Ifremer, Tara Ocean, Surfrider, etc.): Exchange ideas on our different projects to see how we can work better together.
- Collectif Génération Mer (communauté d'acteurs engagés qui sensibilise à la protection du monde marin animé par la direction générale française des affaires maritimes, de la pêche et de l'aquaculture) : joint work to disseminate educational marine areas via their network
- French ministry for education: Joint work on strengthening the blue dimension of educational areas (in training, in the activities offered to the network, etc.).
- Research project RAME (aimed at assessing the impact of educational marine areas on pupils)

The associated partner (RAME research group) will provide us with expertise and an outside view of the experiment, both to advise us on the actions we plan to implement and to help us evaluate the results of the experiment. The RAME research group is pursuing several objectives through action research in 4 French regions, both in mainland France and overseas. To measure the impact of EMAs on pupils' relationship with nature, a qualitative, longitudinal study is being carried out over one school year. The quality and quantity of interactions with nature are cross-referenced with verbalisations in situations and during accounts of experience to understand the process (brakes/levers) of transforming the relationship with nature. Interviews are also conducted. Questionnaires, psychological tests, children's drawings and comprehensive interviews are used to measure changes in pupils' representations of nature. To understand the obstacles and the levers that encourage teachers to become involved in a scheme such as the EMAs, and to understand the development/deployment of the EMAs in the region, interviews were conducted with teachers, environmental educators, political leaders, and archives were collected (administrative, documentary, press, etc.).

Within the framework of BlueLightS, OFB's associate partner will therefore be able to support experimentation, in France and in the other experimentation countries, via:

- Communication on the obstacles and levers and the possible solutions that could be devised and tested (for example in secondary schools, with the setting up of a working group on the subject, or via the follow-up of the work that will be carried out on the land-sea link in the EMAs and ETAs);
- Contributing to the creation of training tools for teachers and support structures;
- Sharing, via the community of practice and by organising conferences or webinars for other partners, the results of research into the role of the physical / bodily dimension and the sensitive approach in blue education.

Role and responsibilities (governance of the experimentation)

OFB is piloting the experiment. A person entirely dedicated to the project will organise, monitor and evaluate the experiment. This person will work closely with the teachers involved in the experiment and with other stakeholders.

The direction of the experimentation will be decided by working groups involving teachers and other stakeholders involved in EMAs and blue education in France.

Depending on the activity, various players will be involved in the governance and will participate in its organisation and evaluation:

- The national steering committee for the experiment in France
- Regional groups in charge of educational areas
- Marine protected areas
- Those promoting blue education in France
- Research project RAME
- BlueLightS partners for experiments outside France

Role of Blue Schools in the experimentation

EMAs is a kind of blue schools. The aim of this experiment is to provide Blue Schools in France and abroad with an effective, tried and tested tool, and to develop EMAs quantitively and qualitatively. To achieve this, there will be work to do with the European Commission and EMSEA to ensure that a school awarded the EMA label is automatically recognised as a Blue School. This will have four impacts:

- bringing a new methodology to increase the number of blue schools in Europe.
- a significant increase in the number of Blue Schools in the EU (+300 EMAs in France).
- Improving the quality of Blue School projects by providing teachers with a ready-to-use, ambitious methodology.
- Strengthening the Blue Schools community by developing twinning between EMAs and bringing together teachers from different countries to work on the same project.

9.3.5. Upscaling potential

This experiment will have great potential for dissemination. In France, the tools tested during the experiment could be disseminated to all education areas (+300 EMAs, +1000 ETAs today, with a goal to reach 18 000 educational areas by 2030).

Beyond the BlueLightS project, this experimentation will be anchored in the long term, feeding into the objectives of disseminating blue education in the educational system through educational areas network, during and after the project. This will be done in several ways:

- Setting up long-term partnerships with strategic players in the field of blue water education, which will last beyond the Blue lights project

- Integrating the land-sea link as an important component of educational areas, by disseminating educational proposals made available to teachers in the long term (twinning mechanism between schools, scientific data collection protocol, etc.).

- Helping to strengthen key aspects of the expansion of educational areas in France, through training and funding.

- Participate in the creation of a European network of EMAs, in liaison with the key players in the countries involved (agencies equivalent to the OFB, ministries of education, network of European blue schools, etc.).

9.3.6. Monitoring and evaluation

OBJECTIVE	INDICATORS (WILL EVOLVE ACCORDING TO WHAT WILL BE EXPERIMENTED)	INDICATIVE QUANTITATIVE OBJECTIVE BY THE END OF THE PROJECT
REINFORCE DYNAMIC AROUND EDUCATIONAL MARINE AREAS IN FRANCE, BUT ALSO ABROAD	Increase in the number of educational marine areas in France	500 EMAs in France
	Organise events during the Year of the sea	Specific activities for educational areas during the Year of the Sea (tbc) 2 events at UNOC
	Develop twinning between EMAs / ETAs	10 twinning by the end of the project
	Experiment educational areas abroad	3 experimentations abroad
	Get EMAs automatically recognised as blue schools at the EU level	/
	Develop a toolkit for EMAs in Europe.	/
	Develop training modules on educational areas	/
DEVELOP LINKS AND FOSTER	Organise meetings between stakeholders developing blue education programs	/

COOPERATION BETWEEN ALL BLUE EDUCATION INITIATIVES IN FRANCE	Pick up two strong actions to conduct / together

9.4. Roadmap for Greece

Partner in charge: Hellenic Centre for Marine Research (HCMR)

9.4.1. Context of the experimentation in Greece

The basic elements of national Greek context relevant to the experimentation are: a) the special framework of labs of skills for primary and middle schools working on 4 different axes which are health (e.g. sex education, mental health), environment (e.g. ecology, climate change, culture heritage), social behaviour (e.g. human rights, volunteerism, inclusivity), and careers (including robotics and STEM); b) the framework of the adoption of a terrestrial/coastal marine/freshwater ecosystem by schools set by the Greek Ministry of Education one year ago (December 2023). Erly November 2024, the new framework of Greek School Curriculum was announced characterized by sustainability education and citizenship including the above-mentioned frameworks.

There is now a moderate level of maturity of the country regarding blue education and it seems that there is a good “ground” to develop further blue education and integrate it into school curricula of Greece.

9.4.2. Opportunities

Researchers and other scientists from HCMR have a great experience in participation of ERASMUS+ projects (e.g. BlueS_Med, MED EDUC, YOU4BLUE, Fins into the water) and other EU-funded projects (e.g. HE CONNECT, EU4Ocean BlueMinds4Teachers, MARBEFES, GES4SEAS) promoting Ocean Literacy issues to different target groups such as primary, secondary and university students, teachers of primary and secondary level and other marine educators, blue professionals (e.g. water sports) etc. Moreover, researchers from HCMR participate in two UN Ocean Decade Action Programmes related to Ocean Literacy approach (e.g. Scientists for Ocean Literacy led by EuroGOOS Working Group on Ocean Literacy, The Science We Need for the Mediterranean Sea We Want (SciNMeet led by IOC)). In addition, HCMR personnel join different associations and working groups focusing on Ocean Literacy (e.g., EMSEA-Med region Working Group, OL Working Group of EuroGOOS) while publishing scientific articles and editing special issues in scientific journals (Mogias et al., 2019; 2022; Mokos et al., 2020; 2021; Andriopoulou et al., 2022; Koulouri et al., 2022; Cheimonopoulou et al., 2022), organizing OL sessions in Conferences and Symposia (e.g., Marine and Inland Waters Research Symposium held in Porto Heli (Greece) in September 2022; EuroGOOS Conference held in Galway (Ireland) in October 2023) while issuing policy brief documents (Eparkhina et al., 2021). HCMR also includes in its infrastructures Cretaquarium facility with high education, dissemination and communication potential (e.g. ~20.000 students and 300.000 individuals visit Cretaquarium every year). Furthermore, HCMR collaborates with environmental education research partners (e.g., Democritus University of Thrace). The last ten years Greek teachers express their interest for their schools to become members of the Network of EU Blue Schools while Greek young people express their interest in blue education (young ocean ambassadors) as visits of schools are regularly organized at HCMR premises every year (~2000 students).

BlueLightS is a European project giving opportunities to build on previous experiences, sharing good practices, multi- and inter-disciplinary collaborations and ensuring reliable and visible results by attracting school principals, teachers and other blue education stakeholders. Teachers at Greek schools are interested in funding blue projects already developed and implemented but also many more to design while the calls for the blue challenges will give funds to some of these schools. In addition, there are several Greek teachers who are interested in the network of EU Blue Schools and within the framework of the project there will be the opportunity for many more to know about it through dissemination and communication events. The framework of labs of skills for primary and middle schools working on 4 different axes (health, environment, social behaviour, careers) and the framework of the adoption of a terrestrial/coastal marine/freshwater ecosystem by schools set by the Greek Ministry of Education are proper for the teachers and schools to work on blue education under the umbrella of sustainability education and citizenship strategy in Greece. The availability of educational resources and know-how from the partners of the projects will also be very useful for the training of Greek teachers on OL issues and blue careers.

9.4.3. Risks

There is a possibility that teachers and schools that will be selected for the experimentation may not respond to the needs of the experimentation. In this case, more teachers and schools will be selected for the experimentation and supported by the Greek partners. There is also the possibility to have more-than-expected interest expressed by Greek teachers and schools. In this case, HCMR personnel will ask for more support from their partners.

9.4.4. Proposition for experimentation in Greece

Elements of experimentation

Among the aims of this project is to integrate blue education into the Greek school curricula in a flexible and adaptive way while under the umbrella of the new framework of Greek school curricula characterized by sustainability education and citizenship (e.g., SDGs, labs of skills, eco-schools, green schools, sustainable schools) as the ocean plays an important role in our daily lives (e.g. food, oxygen, climate regulation, blue careers). There are Greek teachers that work on blue projects or want to work on blue projects, but they need training in order to know more, they need to feel more confident for designing and developing blue projects, they need to find out about content knowledge on ocean issues, they need to learn about pedagogical strategies, and integrate blue economy key concepts and blue careers into their classrooms. The new framework on sustainability education and citizenship gives the opportunity to elaborate more on the labs of skills, the adoption of the coastal marine/freshwater ecosystem, the concept of Educational Areas developed by French partners (OFB), the educational sources and know-how from other partners of the project for ocean and freshwater issues and blue careers.

Objectives, level of ambition

Our goal is to co-work and co-develop with potential blue stakeholders at different levels (e.g. students, teachers, principals of schools, school consultants, Directorates of primary and secondary education, Institute of Educational Policy closely collaborating with Greek Ministry of Education, Universities of Education and Marine/Freshwater

Research, NGOs, Centres of Education for the Environment and Sustainability) in order to integrate in a multi- and inter-disciplinary way ocean and water issues into the new framework of Greek school curricula on sustainability education and citizenship by:

- Supporting schools that will work on coastal marine and freshwater ecosystems and follow the experimentation plan of the project (supporting also these schools and more for applying to the blue challenges calls)
- Setting up a mechanism such as Educational Marine Areas concept proposed by OFB for the Greek schools to work on blue projects
- Supporting training of teachers by disseminating already existing/adjusting educational resources and know-how from the project's partners on OL issues and blue careers
- Developing assessment tools for the implementation of blue projects
- Developing a network of Educational Marine/Freshwater/Terrestrial Areas supported by institutions in different areas of Greece and in collaboration with them (e.g. MPAs, Universities, Research Centres, NGOs, Centres of Education for the Environment and Sustainability)

Experimentation activities

To achieve the above-mentioned objectives, meetings, presentations, discussions will take place with principals of schools, teachers and other stakeholders a) to co-design and co-develop blue projects based on the experimentation plan (Educational Marine Areas concept, teachers' training on OL issues and blue careers) included and adjusted in the new framework for sustainability education and citizenship; b) to support them for the implementation of the experimentation plan; c) to organize webinars or seminars for teachers' training on OL issues and blue careers.

Timeline

End of November-beginning of December 2024: Schools to be selected for the experimentation phase I

December 2024: Establishment of the Greek blue education stakeholders' network

December 2024-May 2025: Implementation of the experimentation phase I-collaboration with the stakeholders' network

June-July 2025: evaluation of the experimentation phase I

October 2025: Presentation of the results of the experimentation phase I to the Greek blue education stakeholders' network-lessons learnt

End of November-beginning of December 2025: Schools to be selected for the experimentation phase II after lessons learnt from experimentation phase I

December 2025-May 2026: Implementation of the experimentation phase II-collaboration with the stakeholders' network

June-July 2026: evaluation of the experimentation phase II

October 2026: Conclusions, lessons learnt, recommendations presented to the Greek blue education stakeholders' network

Partnerships

- OFB (France): Educational Marine Areas concept to be adjusted to the Greek reality (coastal marine and freshwater ecosystems)
- SeaTeach (Spain) and Camden (Ireland): educational material and know-how for teachers' training on blue careers
- UNIZD (Croatia), and possibly other partners (Portugal, Finland): educational resources and practices for teachers' training on OL issues
- Primary and secondary schools (students, teachers, principals) working on blue projects related to coastal, marine and freshwater ecosystems
- Region of Crete and Directorates of Education of Attica as well as school consultants for supporting teachers and schools for the experimentation plan and blue projects applied for the network of EU Blue Schools
- Institute of Educational Policy for supporting integration of blue education in the framework of sustainability education and citizenship
- Network of EU Blue Schools and EMSEA for supporting schools applying blue projects
- Universities of Education and Marine/Freshwater Research, NGOs, Centres of Education for the Environment and Sustainability for supporting experimentation plan and integration of blue education into Greek school curriculum

The associated partner (Democritus University of Thrace) will provide support on:

- educational research and experience
- tools for assessment of the Greek schools that will implement the experimentation phase
- tools for assessment of the Greek schools that will apply for blue challenges calls
- contacts and collaborations with the Greek educational stakeholders

Role and responsibilities (governance of the experimentation)

HCMR will scientifically support Greek schools for the implementation of the experimentation phase (e.g., fieldwork, lab activities, Cretaquarium, educational resources)

Democritus University of Thrace will contribute with assessment tools for the implementation of the experimentation phase and development of blue schools' network in Greece while being in close collaboration with the Greek blue education stakeholders

The Region of Crete and Directorates of Education in Attica will facilitate contact between schools, teachers, principals and other stakeholders

Institute of Educational Policy will support for integrating blue education in the school curricula according to the new framework of sustainability and citizenship

OFB will support for the development and adjustment of the concept of Educational Marine Areas to Greek reality (coastal marine and freshwater ecosystems)

SeaTeach, CAMDEN, UNIZD and other partners (Portugal, Finland, Sweden) will provide with educational resources and know-how for teachers' training

NEBS and EMSEA will support for developing a network of Greek blue schools

A network of Greek blue education stakeholders including Universities of Education and Marine/Freshwater Research, NGOs, Centres of Education for the Environment and Sustainability will be developed for supporting experimentation plan and integration of blue education into Greek school curriculum

Role of Blue Schools in the experimentation

- All schools will apply for becoming members of the Network of EU Blue Schools
- Training courses/modules for teachers
- Educational resources and inspiring projects for teachers
- Exchange of experiences and best practices between teachers and schools of the Network

9.4.5. Upscaling potential

The flexibility and adjustment of the concept of Educational Marine Area in Greece can be integrated in the Greek framework focusing on sustainability education and citizenship and upscaled to reach out a critical mass of Greek schools.

Training modules and courses as well as educational resources (translated into Greek) can substantially support Greek teachers and make them feel confident for designing and developing blue projects within the new Greek framework on sustainability education and citizenship.

Greek schools, by becoming members of the NEBS, will share experiences and exchange best practices while they will have continuous support and access to issues and topics relevant to the marine and freshwater environments.

9.4.6. Monitoring and evaluation

To monitor our progress, we will develop tools that will assess and evaluate the experimentation phases I and II in relation to different OL dimensions such as knowledge, attitudes, behaviour, emotions, activism, communication (surveys, questionnaires).

The indicators foreseen are the following:

- Number of Greek schools, teachers, students that will participate in the experimentation
- Number of Greek schools that will become blue schools during the project
- Number of different Greek stakeholders participating in the CoP
- Number of webinars/seminars for teachers (number of teachers-participants)
- Establishment of a network of Educational Marine/Freshwater Areas in Greece
- Establishment of training modules for teachers focusing on OL issues, pedagogical strategies, blue careers
- Establishment of a network of Greek blue education stakeholders
- Establishment of a Greek hub of network of EU Blue Schools

9.5. Roadmap for Ireland

Partner in charge: The Camden Trust

9.5.1. Context of the experimentation in Ireland

The Irish education system is made up of primary and secondary schools where children attend from the age of 6 to 18. Third-level in Ireland is provided mainly by universities, institutes of technology and colleges of education. The Irish Government and the social partners view education as strategically interlinked with national planning, and the Department of Education undertake a high level of public engagement in the formulation of the education policy and curriculum development.

In Ireland, education is a critical driver of economic success and social progression. Therefore, included as part of the public education system are policies that incorporate the development of key skills and competencies. The primary school curriculum reflects the educational, cultural, social and economic aspirations of Irish society and core subjects are divided into the following key areas: Language, Mathematics, Social, Environment and Scientific Education, Arts Education (including Visual Arts, Music and Drama), Physical Education, Social, Personal and Health Education.

The Government also sees education playing a crucial role in tackling social exclusion. Through the education system the Government aims to provide full access to life chances and opportunities to avoid and break the cycle of disadvantage. For example, some schools are designated as DEIS schools. This means that extra funding is provided to a school where a number of students in the area might come from a "disadvantaged" background.

For the last 20 years, Ireland has focused on becoming a knowledge-based economy. This has included ensuring that the education system from primary school though secondary and third level all provide opportunities in developing students' skills in the fields of math's, physical sciences, biological sciences, technology and engineering. These skills are considered critical elements in achieving and maintaining economic competitiveness and securing continued prosperity. More recently, the transition to move towards a low carbon society is building momentum in Ireland. The projections for Ireland delivering on its climate action plans and policies is well short of both the European and National emission reduction targets. It is therefore recognised by the Government that an increased scale of effort is required to achieve the required reductions across all sectors.

Primary schools in Ireland are being encouraged by the Department of Education to adopt an approach of teaching using thematic learning in line with the core subjects taught on the curriculum in primary schools – addressing societal issues such as climate change, pollution, and sustainability. The Primary School Curriculum Framework (2023) provides a guide to enhance learning, teaching and assessment for children in primary school. The Framework supports a variety of pedagogical approaches and strategies with assessment central to learning and teaching. As part of the Primary School Framework (2023), key competencies and skills have been defined. This includes being a digital learner, being mathematical, communicating and using language, being creative, being an active citizen, learning to be a learner, and fostering wellbeing.

Building on the foundation of primary level education, secondary level education aims to provide a comprehensive learning environment where students are prepared for third level education, or for immediate entry into the workplace. Ireland's Climate Action Plan 2024 includes promoting jobs that promote sustainability, such as the development of renewable energy resources (including ocean energy), assessing climate impacts in coastal and marine waters, as well as identifying, designating and managing Marine Protected Areas. With a focus on carbon reduction and sustainable development, the Department of Education has launched the new Senior Cycle subject Climate Action and Sustainable Development. 43 schools will be taking part in the introduction to Climate Action and Sustainable Development from the start of the 2025 / 26 school year. Climate Action and Sustainable Development subject in school will develop students' capacity for informed and meaningful understanding of a number of interconnected core concepts and principles related to climate action and sustainable development – that also relate to the marine.

The BlueLightS experimentation in Ireland aims promote of the "blue" (ocean, lakes and rivers) education in the classroom and schools, and develop opportunities where initiatives can promote sustainable education in Ireland.

The Irish primary and secondary school in Ireland both have in the past had limited references to marine and the ocean taught as a subject or strand within the curriculum. Although the primary school curriculum references to learning about the seas, lakes and rivers and also includes examples of using SDG themes, the new the Primary School Curriculum Framework (2023) enables teachers to have the flexibility to include ocean literacy and marine education through cross curricular activities. The secondary school curriculum is less flexible, yet Transition Year is designed to give students, usually aged 15-16 years, the tools necessary to make informed choices about their future study and possible university or other Third Level choices.

In recent years, research conducted in the EU and Ireland have identified the main barriers to teaching marine content and ocean literacy in both primary and secondary schools. Those include teachers having a lack of knowledge about the marine, a lack of access to fit-for-purpose content, as well as having an overloaded curriculum (Fauville et al. 2019; Dromgool-Regan 2018).

It is also evident from this research that the Department of Education values other Government Departments and agencies taking the lead (and funding) programmes that support teaching marine themes in the classroom. This includes the Marine Institute's Explorers Education Programme that has been delivering marine education to schools for over 20 years through outreach in schools. It also has provided teachers training, 3rd level student teacher workshops and carried out ongoing assessment and evaluation. The Programme has also played a lead role in the development of marine education resources to encourage marine thematic learning.

The current situation and conditions that influence the experimentation in Ireland highlight that the school system continues to rely on the support of outreach teams supporting teachers deliver marine themes in schools. This calls for an extended programme in Ireland that engages schools in mainstreaming blue education within the national curriculum. This includes promoting marine projects as excellent examples of thematic learning as part of the Primary School Curriculum Framework (2023). Following this, secondary school teachers also need support and resources in the delivery of new subjects being introduced on the secondary school curriculum.

Camden Education are in keen to support opportunities where:

- Selected schools take part (through the BlueLightS selection process) in the Blue Challenges innovative projects in Ireland.
- Schools take part in BlueLightS pilot projects that promote mainstreaming blue education in the curriculum.
- Support and help are provided to schools to join the EU Blue schools' network – as part of the BlueLightS programme.

9.5.2. Opportunities

Camden Education have identified four key opportunities with the recent developments of the primary and secondary school curriculum that supports promoting blue education and sustainability in Ireland.

1. **Providing Support for the Blue Challenge Experimentation**: Camden Education will provide support to schools that have been selected for the Blue Challenge (by the BlueLightS WP4 partners) to deliver a series of innovative projects promoting the Blue Challenge Experimentation.

   This will involve developing and creating contacts with stakeholders including members of the local, regional and national community that schools may be able to work with on their project, as well as forming collaborative support.

   Camden Education will draw on its experience mentoring the schools throughout the project stages. This will include establishing key activities, timelines, forming partnerships and collaborations with the schools and key stakeholders, recommending key resources that stakeholders have developed that can be used, reviewing upscaling, monitoring and evaluation of the projects.

   Promotion of the schools' successful projects will be shared through media and social media channels as well as contacts with the IOLN (associated partners) newsletter. The schools will be encouraged to take part in showcasing the results of their project at a series of national events to engage the wider education community and stakeholders.

   Other media outlets that promote using marine themes on the curriculum will also be considered. This includes attending and exhibiting at national educational events such as the BT Young Scientist Exhibition, promoting the success of marine themes used on the curriculum on Ireland's national RTE Junior television and radio programs, National newspapers. The BlueLightS collaborations with schools and stakeholders in Ireland will also be celebrated by entering Ireland's National Education Awards.

   Further promotion of the Blue Challenge Experimentation and the BlueLightS Pilot carried out in Ireland will be presented at educational events in Ireland and the EU as a Poster Presentation, written article for journals, and or other research and educational journals.

2. **Testing Blue Education for national upscaling:** Camden Education will work with key stakeholders and education outreach programmes in Ireland to develop a BlueLightS Pilot with primary and or secondary schools. The aim of the pilot will be upscale and mainstream blue education supporting the Primary School Curriculum and support the secondary school senior cycle key subjects (as noted above).

   Schools (in addition to the Blue Challenge) will be involved in the pilot where they will be selected from coastal and inland counties. The first phase will be achieved working in collaboration with the Marine Institute that will pilot an innovative project for schools to become blue ambassadors. A series of “Blue resources” will be developed by Camden Education. This includes focusing on the development of content supporting Climate Change Action and Sustainable Development, as well as sustainable development and environmental care. Other content and education resources will be developed in collaboration with other stakeholders’ blue interests and strategic priorities. The content and projects will also be considered with the schools selected – pending on location and priority areas of upscaling.

   A key area identified in developing blue skills lies with addressing the use of soft skills and competencies. The pilot will aim to focus on humanities and social sciences that increase individual and community values in blue sustainability and blue careers. The project concept will be developed with schools where it is anticipated that the project will be showcased at key national marine and or educational events. The pilot project will promote:
   - communications and languages (Irish language),
   - the development of creativity and innovation through the arts,
   - building citizen science skills
   - incorporating the blue in health and well-being in the community.

   Camden Education and key partners will provide a teachers’ guide and series of presentations that can be used as an introduction to the blue theme in the classroom. Using thematic learning, teachers will be encouraged to use cross curricular activities with their class to produce the innovative blue project within their class and or school. It is anticipated that projects will focus on strengthening blue education highlighting the impacts of marine pollution and climate change on marine biodiversity and the blue environments. The resources developed will include (but are not limited to):

   - THE IMPACTS OF CLIMATE CHANGE ON THE “BLUE” – Modules will be developed / provided where children and teenagers will be introduced to iconic “blue” animals that have been affected by marine pollution and climate change.
   - “BLUE” SOLUTIONS – Modules will be developed / provided where children and youth will be introduced to a blue citizen initiative. The children will be encouraged to create innovative solutions of how to become blue citizens using their new skills in communications and language.

3. **Providing support for EU Blue Schools:** Camden Education will promote the BlueLightS with Irish schools to encourage them to become ‘blue literate’ where the schools will **join the EU Blue Schools network.**

This will include working with the IOLN (associated partner) and other stakeholders in creating initiatives to support schools in their application process to become an EU Blue School. This may include initiatives to:

- Protect and restore blue ecosystems.
- Prevent and clean up marine pollution (and its source)
- Develop initiatives towards a sustainable blue economy.

Where marine themed outreach programmes are run by other stakeholders including the Explorers Education Programme, initiatives will be included in the application process for schools to also commit to completing the application to become a Blue School.

Support will also be provided by Camden Education as a contact for schools that require advice in the application process for EU Blue Schools certification. This will be included on the IOLN and the Camden Education website with key links to become an EU Blue School.

4. **Engage in the Blue Education Community of Practice:** The success of outreach programmes and initiatives run by Camden Education have been established based on the network of key stakeholders developed in Ireland.

   Camden Education will launch the BlueLightS – Blue Challenge initiative at Galway Education Centre, the Department of Education funded CPD regional hub for teachers at all levels of education. Key stakeholders will be invited to participate in the launch including marine and 'blue' experts from the Marine Institute, BIM, SEAI, Met Eireann, EPA, and NP&W, as well as education experts from NCCA and the Department of Education.

   The former EU Commissioner for Research, Innovation and Science Máire Geoghegan-Quinn (2010-2014) who is now chairperson of Údarás na hOllscoile, the University's Governing Authority; MEP Maria Walsh; and TD Hildegarde Naughton will be invited to attend the launch.

   Schools involved in the Blue Challenge and the BlueLightS innovative project will be also invited to attend, along with teachers, parents, children and outreach teams supporting their projects.

   Other key connections have also been made with key decision makers and influencers, which will be harnessed throughout the project including state agencies such as the Marine Institute, Bord Iascaigh Mhara, Environmental Protection Agency, and Met Eireann, and the Sustainable Energy Authority of Ireland.

   This approach will ensure that there is a legacy of mainstreaming blue education through ongoing stakeholder partnerships where marine themes are integrated as part of the curriculum framework.

9.5.3. Risks

A number of primary schools have indicated an interest in taking part in the BlueLightS Blue Challenge experimentation and the BlueLightS pilot project. However, the barriers (or risks) include:

1. Teachers / Schools lack of time and interest in completing administrative tasks such as completing an application forms – with low funding being offered / and or information of the timeframe of when funding will be provided.
    - It is recommended that as part of the announcement for BlueLightS funding, organisers provide a timeline and framework for funding calls throughout the full project on the BlueLightS website. For example, when is the next call?
    - Camden Education will encourage schools participating in outreach programmes that include marine topics to apply for EU Blue School certification.

2. Teachers lack time within the school curricular system to facilitate a BlueLightS school project. Taking on a school project is challenging for school teachers' that are interested but do not have the support from other teachers in the school. For example, often school projects are facilitated through a committee with a number of teachers involved.
    - The delivery of "blue" content that supports the curriculum will be offered to teachers by Camden Education. Guidance and recommendations for project concepts and timelines will be provided to establish specific objectives.
    - Teachers guides for carrying out the school project will be provided to school teachers showing the value of the project and how it can be used to support the delivery of the curriculum through thematic learning. The guidelines for activities in the class will be developed with the first school pilot. These will be made available for other schools and outreach teams carrying out similar projects going forward. Camden Education will also recommend outreach support where schools can pay for their services and time supporting the school throughout the project – building close collaboration with teachers.

3. Secondary schools in Ireland have a very strict curriculum where opportunities for collaboration during school hours can be challenging.
    - Camden Education will approach secondary school teachers and contacts to review opportunities with schools taking part in the new climate action subject. These may include national project competitions and events that schools work towards attending.
    - Camden Education will also review the Transition Year programme syllabus, to establish a suitable collaboration.
    - Other opportunities will also be investigated where secondary schools participate in national competitions and are looking for themes for STEM projects. Attending the BT Young Scientist Exhibition with stakeholders would be beneficial.

9.5.4. Proposition for experimentation in Ireland

Elements of experimentation

Camden Education will collaborate with stakeholders to provide fit-for-purpose resources that will be freely available online for teachers and educators to use throughout the BlueLightS projects. This content will focus on thematic learning and supporting elements of the Primary Curriculum Framework (2023). The Framework will also be used to support a variety of pedagogical approaches and strategies with assessment central to learning and teaching.

Camden Education aim to provide an opportunity for additional schools to be selected to take part in a BlueLightS pilot in the development of content and creating a school project – as an exemplar for other schools to consider engaging in blue themes and mainstreaming blue education. The children and youth will:

- **Learn and understand** the things that make up the **Earth's climate system** that influence the sustainability and interconnection of our lakes, rivers and ocean. This includes learning about the atmosphere, biosphere, cryosphere, hydrosphere, and geosphere.
- **Develop their knowledge and ability to identify and understand credible facts** about the Earth's climate system and climate issues that relate to lakes, rivers and the ocean.
- Be able to **communicate** about the climate and climate change in **an informed and meaningful way – that relates to strengthening the blue in their local area.**
- Make **informed and responsible decisions** about taking climate action and the connections with strengthening Blue concepts.
- **Work together** with other stakeholders to help make a positive difference in a supportive and caring way.

The Irish BlueLightS Blue Challenge and BlueLightS pilot experimentation will engage stakeholders and decision makers to raise the profile of the project by launching the BlueLightS experimentation in Ireland through national education events. Camden Education will also develop connections with stakeholders where the promotion of blue education can be promoted through media and events. This will show the value of "blue" education included on the curriculum at primary and secondary school level with key project samples.

Objectives, level of ambition

The Irish BlueLightS programme objectives are to engage with 3 primary schools and 2 secondary schools, teachers, children, youth, and the education network, creating "blue" literate citizens through the Blue Challenge Experimentation.

The Irish BlueLightS Pilot project will work with an additional school to widen the opportunity for schools to join the Blue Schools community network to increase the promotion of blue education in Ireland and Europe. These schools will be selected as part of an innovative school project carried out in collaboration with the Marine Institute's Explorers Education Programme. Other stakeholders will also be considered throughout the pilot stages to maximise opportunities for schools to take part in BlueLightS initiatives.

Camden Education are ambitious to continue developing Ireland's "blue" education strategy in Ireland as one of our core programmes. We will continue to work with key partners towards being recognised as the leading agency in managing the coordination of EU Blue projects in Ireland – during and after the BlueLightS project has been completed.

Experimentation activities

The roll out of activities will be carried out in key stages with the Blue Challenge schools and the BlueLightS Pilot Experimentation with other schools.

1. Activities with the schools selected for the Blue Challenge will be monitored throughout the project timeframe. Pending on the school's project and location, details of activities will be confirmed once Camden Education have been informed of the successful applications.

2. The activities that will be carried out as part of the Irish BlueLightS Pilot experimentation will include primary and secondary schools working with community groups and stakeholders on school projects that incorporate the blue theme based on rivers, lakes and the ocean.

Stage 1:

As part of the **Blue Challenge**, Camden Education will act as a facilitator and mentor to the two schools selected for the Blue Challenge Project. Face-to-face meetings will be held with the school/s to establish their objectives and timelines for their project. Key contacts with stakeholders will be established with the schools where they are needed. An evaluation and funding mechanism will be put in place with the delivery of the projects.

In parallel, 3 primary schools and 2 secondary schools will be selected by Camden Education to participate in the Irish BlueLightS pilot to **design, develop and trial blue themed educational content and resources with a focus of promoting blue themes on the curriculum**. A roadmap and timeline will be established where content will be developed and reviewed, and the school will carry out the practical applications of the project. As part of the pilot process the school will apply for the EU Blue School certification to increase Blue Schools in Ireland.

As part of the development and piloting the 'blue' educational resources, Camden Education will support a series of **workshops, CPD training and third level student teachers training**. This will include developing collaborations with the IOLN, the Marine Institute's Explorers Programme, and other outreach programmes carried out by small business operators. Teachers will also be given the opportunity to provide support in the development of the content and providing accessibility to other teachers within their schools.

A **collaborative collective network with stakeholders** will be established where Camden Education will launch the Irish BlueLightS programme in Ireland with key stakeholders at the Galway Education Centre. Key Government departments, agencies, businesses, universities, education centres, members of the Irish Ocean Literacy Network, media, Blue Challenge schools including teachers, parents and children will be invited to speak and take part in the launch of BlueLightS in Ireland. The launch will be highlighting the value of "Blue Education" on the curriculum and aim to raise the profile of blue / climate education on the curriculum. Key discussions will be had with stakeholders to encourage financial support and collaboration from stakeholders in supporting BlueLightS / EU Blue projects. As part of the launch, the participants will be encouraged to sign up to the platform as a support network for school projects being implemented.

Camden Education team will work in collaboration with key stakeholders in the development of **fit-for-purpose resources that support the curricular** with the selected pilot schools. The educational resources will focus on activities that will support the curriculum in both the primary and secondary schools. The pilot project will be led by the school with support from Camden Education providing guidance. Collaborating with marine stakeholders and education networks will ensure the resources are fully and freely accessible for teachers and outreach facilitators to download from an open access library - continuing the BlueLightS legacy. The new resources will be used as part of the BlueLightS initiatives and innovative projects to showcase and promote blue education in Ireland. Limitations of online content creates barriers for schools where they have small or no printing budgets. Therefore, where possible some materials will be created as toolkits for outreach teams to use on a long-term basis.

A **pre and post evaluation** will be developed with the pilot school and the Camden Education team, where they will assess the knowledge, awareness, and engagement of the BlueLightS Pilot project. An evaluation of the barriers to teaching climate / marine related content in primary and secondary schools will be carried out. Where feasible, articles will be written for academic journals and or presented at key educational events.

Stage 2:

The next stage of the BlueLightS Blue Challenge project will be carried out with the second call for proposals from schools.

Once schools have been selected, a workshop with the teachers and stakeholders will be held to provide guidance with meeting the key objectives of the project. Timelines and allocation of support from Camden Education will be established with the schools. Content and resources will be made freely available to the schools participating in the BlueLightS and or EU Blue school projects.

A pre and post evaluation will be carried out with the schools. The post evaluation will also include feedback from the children, teachers and stakeholders to capture the findings and recommendations for the future of blue education in Ireland.

Timeline

2024:
October – November:
Promote BlueLightS call for Blue Challenge Schools / funding
Promote mainstreaming of blue education with key stakeholders at public events including:

- Galway Science and Technology Festival – Galway 10th November

July – December: Development of resources for Blue Education
November: Support Blue Challenge Schools selection process

2025:
January – June
Implement Experimentation plan for Blue Challenge schools with their projects phase 1 – monitoring experimentation / evaluation of learning outcomes, etc.

January – February:
Finalise design and print of educational resources for BlueLightS schools and initiatives including teachers and student teachers training.

Official launch of Irish BlueLightS Challenge and pilot project / workshop with stakeholders / Provide communications and photos for BlueLightS publicity

Carry out of BlueLightS Pilot Project with selected schools – complete development and pilot of resources & blue concepts for schools / work with local community groups, experts, and outreach teams, parents with teachers and educators / monitor and evaluation of learning outcomes etc.

January – December:
Promote mainstreaming of blue education with key stakeholders at public events, teachers training, and workshops including:

- BT Young Scientist Expo – Dublin 8^{th}-11^{th} January: Support EU Commission stand at exhibit promoting Blue Schools and conduct survey with teachers identifying schools that have included marine themes in projects at primary school level and or barriers to including blue themes (e.g. climate change) in secondary school.
- CPD Teachers Training – July: Support teachers training and school workshops in collaboration with key stakeholders using resources developed as part of the BlueLightS initiative.
- Showcase projects with IOLN – Date TBC: Presentation of BlueLightS school projects at Irish Ocean Literacy Network meeting with participants and schools.

January – December:
Conduct an ongoing evaluation of the barriers to teaching blue themes on the primary and secondary school curriculum.

- The NCCA (National Council for Curriculum and Assessment) are responsible for directing and advising teachers about content taught on the curriculum at a national level. The new subject that relates to Climate Action and Sustainable Development is being introduced on a phased basis with secondary schools in 2025-2026 school year. As part of the BlueLightS initiatives in Ireland, data will be collected from secondary school teachers to identify current barriers and solutions for the continued upscaling of the ocean and climate change subject across all secondary schools in Ireland.
- The pilot projects carried out by BlueLightS will be carried out with teachers, parents and students in primary schools and secondary schools in Ireland. With support from the teachers and parents, the children's input and feedback will be assessed. Data will also be collected showing children's knowledge, their ability to engage and communicate about the blue.

2026:
Jan – October:
Roll out of remaining projects

June 2026 – February 2027:
Complete co-evaluation process including surveys, workshops, recommendations etc.

BlueLightS will support initiatives to highlight and increase blue education and skills in Ireland. Through collaborations with key stakeholders a financial review of the cost and value of supporting blue education and developing blue skills in Ireland will be recommended. This may be completed in partnership with stakeholders including a third level Institute investigation and or area of research.

2027:
Facilitate ongoing and or new Blue projects with schools through partnerships.
Promote mainstreaming of blue education with key stakeholders.

Partnerships

Once the partnership with the Blue Challenge and the BlueLightS pilot school is established, Camden Education will coordinate support recruiting outreach support that can work with the school throughout the project as a facilitator / mentor. Other businesses involved in the "blue" sector, community groups, and artists that work with schools will be invited to collaborate with schools, pending the location of the schools selected and the final project concept. Camden Education will support the school by recommending key contacts to complete the project, where appropriate and / or where required. The contacts will be finalised with partners where they will be able to support the schools in the delivery of the projects.

It is anticipated that State agencies such as the Marine Institute, BIM, SEAI, Met Eireann, and small businesses and NGOs' will provide support through guidance and provision of resources for schools to use, as well as attend school visits as guest speakers.

Role and responsibilities (governance of the experimentation)

The Irish Ocean Literacy Network (IOLN) will act as associated partner throughout this project.

The IOLN organises network meetings throughout the country. A meeting with the IOLN secretariat is to be organised to establish their role and capabilities.

To date they have assisted with communications and promoting calls for EU Blue schools and BlueLightS and ProBlue calls in Ireland. This is being carried out by promoting and sharing posts on their website, social media and notices distributed by their newsletter.

Other areas of participation are to promote EU Blue Schools in Ireland:

- Providing contacts and advice in relation to key stakeholders that can collaborate on projects with schools

- Providing contacts for outreach support through the IOLN that can work with schools
- Providing contacts for supporting events and workshops e.g. invite the school and project partners to take part in a national IOLN meeting to present the BlueLightS pilot project. It is proposed that the delivery of the projects from other schools are also shared via the IOLN network meetings.

Camden Education will, from the BlueLightS Irish budget, cover the cost of travel for a member of the IOLN to a consortium meeting, or workshops, or high-level event where they can raise awareness of the BlueLightS.

Camden Education will provide introductions between the schools and key stakeholders, so as to support them with the delivery of the Blue Challenge experimentation. Schools will work directly with the stakeholders to complete their projects and timelines. It is anticipated that stakeholders will facilitate school visits, tours, class visits and presentations, field trips and educational resources for teachers.

Camden Education will co-collaborate with the Marine Institute, and the Explorers Education Programme outreach team develop the BlueLightS School pilot project and educational resources. Camden Education will facilitate the roll out of the pilot and development of resources with schools selected to take part in the pilot project. These resources will focus on **'blue education, communications and engagement'** as part of the "blue" (ocean, lakes and rivers) education objectives.

After the pilot of the project, Camden Education and the Marine Institute Explorers Education Programme will review facilitating the ongoing development and delivery of the pilot project in schools. Other collaborations with other organisations working with schools will be considered as the projects evolve.

As part of the second call 2025-2026, Camden Education will facilitate, and support school projects carried out by schools that have been selected to take part in the projects.

Camden Education will establish governance of payment for each of schools €3000 (timeframe for payment, etc.) throughout each school year. The schools taking part in the Blue Challenge Experimentation will be responsible for paying the facilitators, outreach, artists and any other 3rd parties that they are involved in the project for the expenses they incur.

Role of Blue Schools in the experimentation

It is anticipated that the Blue Challenge work package team will promote the Blue Schools benefits for schools in joining the EU Blue Schools network.

Camden Education will work with the Blue Schools team to ensure that new schools are fully registered as EU Blue Schools to receive a Blue Schools certificate. Camden Education will also provide support in the role of Blue Schools being developed in Ireland. Outreach teams working with schools will be encouraged to promote registering to become an EU Blue school.

9.5.5. Upscaling potential

After completing the first call with the selected schools for the Blue Challenge experimentation and the BlueLightS pilot, the project will be upscaled to involve other schools in Ireland throughout the project duration with key partners and stakeholders. Involving partners in the project that are keen to develop long term blue education initiatives will be encouraged to continue to support the EU Blue Schools programme and the mainstreaming of Blue Education.

Working with EU Blue Schools and the BlueLightS consortium, Camden Education foresee being a key stakeholder in continuing with “Blue” outreach in Ireland – pending funding opportunities

9.5.6. Monitoring and evaluation

With each school, a literacy quiz will be carried out to establish a baseline of knowledge with the teachers and the children (pending age group). A preliminary group discussion will be held with the participants creating a mind-map to establish what they know, what they want to learn, and what they don’t know – that they need to learn.

The stakeholders will also be encouraged to take part in the monitoring and evaluation pre and post process.

Each of the projects and participants will set SMART objectives and timelines for delivery. A list of changes impacts and goals for sustainability will be identified with the pilot school that can be used in other projects.

Interactive activities will be carried out at the beginning of the project with the children and youth to also establish their awareness, engagement and communication skills. Indicators will be set throughout the project where the facilitator / and or teacher / and children will capture and monitor the changes, impacts, and sustainability practices put in place.

Using the Likert scale, feedback from the teachers and participants will be established throughout the evaluation process. A survey questionnaire will be used with each of the schools where key questions will be asked about the learning experience and identifying future barriers for mainstreaming blue themes on the curriculum.

Photographs (for evaluation purposes) will be taken throughout the projects to monitor engagement and participation of the students work. The photographs will be evaluated highlighting key themes, participation, and project concepts that have been used based on the curriculum.

An overall evaluation of the implementation of the project will also be carried out with the schools and key stakeholders to determine the cost, barriers and future ambitions of EU blue schools’ initiatives. Face-to-face interviews will be conducted with teachers, students, participants, and other stakeholders to address the key barriers with a drive to commit to developing solutions for the future development of blue education in Ireland.

9.6. Roadmap for Portugal

Partner in charge: Ciencia Viva

9.6.1. Context of the experimentation in Portugal

Currently, in Portugal, there is a large network of Blue Schools originating from the Escola Azul program, created by the Ministry of the Sea in 2016/2017. The initiative was the result of extensive meetings with educators, scientists, NGO´s and blue economy stakeholders to find a strategy to promote Ocean Literacy in schools at a national level. Presently 470 schools are part of the network, supported by 118 partners and 19 municipalities.

Escola Azul was the first program of its kind to be established. It originated a large network that eventually led to Portugal being considered a “higher-level” country in terms of ocean literacy.

Escola Azul and ocean literacy are explicitly included in the new National Maritime Strategy 2021-2030. This Government document aligns with the UN 2030 Agenda, the European Green Deal, the Common Fisheries Policy, the EU Maritime Policy, and the Farm to Fork strategy.

Besides Escola Azul, other organizations, such as universities, public institutes and research organizations, NGOs, and municipalities, have their own environmental education/ ocean literacy programmes at the national and local levels.

The Portuguese are influenced by the country’s culture, sea-related history and geographical location, with a maximum distance to the sea of about 200 km. These factors could provide a higher appreciation and aptitude for newer experimentations relating to Ocean Literacy.

9.6.2. Opportunities

The current political situation with the change of ministries could be an opportunity in the near future. Presently the maritime affairs are split between the Portuguese Ministry of Agriculture and Fisheries and the Ministry of the Economy. Escola Azul continues to be coordinated by the Directorate General for Maritime Policy, now within the umbrella of the Ministry of the Economy.

The Education Ministry now includes Tertiary Education, Science and Innovation. This new “super-ministry” has a holistic vision of education at all levels, which could be positive for Blue Education. The acute shortage of teachers might lead the new Ministry to create a new career line for scientifically trained personnel in basic and secondary schools after suitable pedagogical training. This could be useful to support more project-oriented learning in schools.

The Ministry of Education, through the Directorate of Education, is teaming with Oceano Azul Foundation to organize a nationwide teacher training programme for Primary Education, with a view to later extending it to the rest of non-tertiary education. This would entail a change in the official curriculum, introducing ocean literacy at all levels of teaching.

9.6.3. Risks

The above-mentioned opportunities also entail risks of political origin and, therefore not possible to be mitigated by BlueLightS:

- Maritime affairs have now less visibility within the Government and in the society;
- The new "super-ministry" of Education has a huge agenda and might be too busy to consider Blue education in more detail;
- Shortage of human resources at the Escola Azul programme due to reduced budget or other.

The abundance of different non-coordinated offers, not necessarily aligned with teachers' needs and work conditions, might create too much "noise" in the schools and disengage teachers. A mitigation strategy would involve coordinating efforts with other actors by persuading them to collaborate for larger impact and social visibility.

Another important risk to consider is the teacher shortage in schools, which could perturb schoolwork and tighten teachers' schedules. The mitigation strategy would consist in delivering contents, trainings or challenges that are appropriated for teaching the curriculum and correspond to teachers´ needs. In addition to this, close contact with teachers must be nurtured at all times. The Sea Teachers´ Conference and other teacher trainings are essential opportunities to contact teachers. Meetings can be organized to discuss specific elements.

9.6.4. Proposition for experimentation in Portugal

Elements of experimentation

We are now at a crossroads where we need to take the next step in Blue Education. A lot will depend on whether ocean literacy is included in the curriculum, whether primary school teachers are trained, and the pace at which this will occur. Our practical proposition consists in:

- Identifying two or three schools with classes teaching some curriculum disciplines in terms of marine and freshwater topics. We should choose at least one coastal, one inland, one in an underprivileged region. Follow up on the student´s results for at least two years with the purpose of showing that it is possible to learn all the curriculum (of a certain education level) in terms of the sea.
- Including blue topics in different accredited teacher training initiatives organized by Ciência Viva, beyond the Sea Teachers Conference. In the Space Teacher Conference we can highlight the use of technology for ocean monitorization and in the Outdoor Learning Conference we can address freshwater topics. All these conferences are organized annually in collaboration with scientific institutions.

Objectives, level of ambition

Our experimentation has two levels of ambition. The higher level of ambition is:

- to include OL in the curriculum, including in the curriculum of vocational schools

- to create a slot in the curriculum for project work (as it happened before) and for field visits; an alternative to this would be to assign teacher time to projects, even developed after hours;
- to create a national teacher training program on ocean literacy involving all the relevant stakeholders, namely those who are already offering training.

The lower level of ambition constitutes of the following goals:

- Continue the strategy of showing that topics about the ocean can be inserted in all disciplines of the curriculum, in line with the Ciência Viva project “Conhecer o Oceano” (2013);
- Include project learning in teacher training: What is expected in a project? How to develop it? How to fund it?
- Blur, even more, the borders between formal and informal education by continuing to mobilize science centres, aquaria, museums, NGOs to support schools in teaching about the ocean and developing projects;
- Disseminate results as much as possible among teachers, politicians, society, media.

Experimentation activities

As a first activity, we will organize the First National Ocean Literacy Conference. The idea is to make the National OL Conference a regular event (annual or biennial). The main objectives of this event are the following:

- Gather all the essential stakeholders enhance the importance of coordinating efforts together; Ciência Viva and the National Committee for the Ocean Decade will be the main organizers, presenting a shared drive for alignment; BlueLightS coordination and the National Committee for the Decade will frame the conference in the international context;
- Build political visibility within the new decision-makers and Government;
- Build media visibility for ocean literacy in society;
- Understand the current state of the art of Ocean Literacy in Portugal;
- Creating guidelines to improve OL in Portugal in the next few years: a “roadmap” for the future.

Timeline

October 2024: Announcement and call for proposals for the Conference

5-6 December 2024: First National Ocean Literacy Conference

February 2025: Document with main findings and way forward

Partnerships

The experimentation in Portugal will involve:

- National Committee for the Ocean Decade (respected and congregating institution; includes elements who initiated the creation of Escola Azul). They will be co-organising the Ocean Literacy Conference with Ciência Viva

- Directorate General for Maritime Policy (entity formally in charge of Escola Azul)
- Research institutions

Role and responsibilities (governance of the experimentation)

Stakeholders, such as, Directorate General for Maritime Policy and Ministry of Education will be invited to participate in the Conference as part of pannels, and therefore, will contribute with interesting and valuable points for the resulting conference report of Portugal's state of play in Ocean Literacy.

Other stakeholders, like, researchers and their institutes, NGOs, national aquarium and science centres will be invited to members of the programme committee that will select all speaking participants of the conference.

Regarding teachers, students, artists, private companies and others will be invited to participate in the conference in the panels.

Note: the conference's program will be constituted by panels and workshops. The speakers of these activities and debates will apply through a call opened by the conference's organization and selected by the programme committee.

Role of Blue Schools in the experimentation

Schools for experimentation will be selected from the Escola Azul network, preferably with a Ciência Viva Club.

9.6.5. Upscaling potential

We will continue to organize the Conference on Ocean Literacy and make it happen on an annual or biennal basis.

The pilot in two or three schools can be upscaled after evaluation, to reach a larger mass.

9.6.6. Monitoring and evaluation

An extensive publication about Portugal's efforts in Ocean Literacy that constitutes a good starting point for measuring the impact of the actions undertaken within the experimentation is being prepared.

The indicators foreseen are the following:

- Number of subjects in which ocean literacy is integrated currently (eg: start of the experimentation - ocean literacy is integrated in 3 subjects, end of experimentation - ocean literacy present in all subjects = blue education)
- Number of new Blue teachers participating in teacher training initiatives.

Regarding the Ocean Literacy Conference:

- Number of speakers

- Number of participants
- Number of institutions
- Evaluation questionnaire

9.7. Roadmap for Romania

Partner in charge: Black Sea Universities Network

9.7.1. Context of the experimentation in Romania

There are currently two strategic frameworks for environmental education in Romania: the “Educated Romania” Programme; and the National Strategy on Environmental Education and Climate Change 2023-2030 (approved by Government Decision no. 59/2023).

The "Educated Romania" Programme promotes respect for the environment in the set of values underpinning the education system and envisages linking learning objectives to public policies and to the major objectives of the education system, which include, among others, environmental education, sustainability and limiting the effects of climate change.

The National Strategy for Environmental Education and Climate Change 2023 - 2030, adopted by GD no. 59/2023, is the first strategic document adopted in Romania dedicated to this field, which includes objectives and measures that refer to formal and non-formal education, human resources, teacher training, investments, open educational resources, partnerships. A national climate change and environment education programme is the main provision of the Strategy; it is designed in a flexible way, to allow teachers and students to use the available tools and to integrate the benefits of their school location/context. The development of this strategy was done following extensive consultation with associations, communities of parents and local authorities, resulted in a policy document covering four areas of action:

1/ Implementing an Education Programme on Climate and Environment;

2/ Solutions for educational resources;

3/ Infrastructure for sustainable schools;

4/ Human resources involved in climate change and environmental education.

Three actions are taken at national level in the field of environmental education and green transition:

- Green competences/environmental competences have been introduced into the key competences’ framework for primary and lower secondary education, through the amendment of the National Education Act 1/2011. In the medium term, elements of the education and climate curriculum will be integrated in a cross-curricular manner for all study years.
- The Green Week National Education Programme, a national programme of activities lasting 5 consecutive days, approved by OM no. 3629/02.02.2023 on the methodology for organising the "Green Week" programme. The aim of the programme is to support students, teachers and schools in implementing climate change and environmental activities. The Green Week Programme is planned according to the decision of each school/educational unit. The Green Week Programme contributes to the achievement of STEAM

educational objectives and the development of inter- and trans- disciplinary approach on skills, and to the development of environmentally responsible behaviours. Educational activities are diverse and can take place in different contexts: outdoor lessons, debates, role plays, photography, scenario building, documentaries, experiments, live libraries, theatre forums, legislative drama, community projects, volunteering, expeditions and trips to nature parks and protected areas. Schools cooperate with NGOs and the parent community and local institutions involved in the field.

- National Platform “Green Week”. The National Green Week Platform (https://saptamanaverde.edu.ro/), enables teachers to be creative, to become innovators of educational content, to share information and best practices on environmental education, with all learners, teachers and educational communities. The content covers a wide area of interest: protected natural areas, meteorology, natural disasters, opportunities for cooperation with NGOs/other stakeholders.

In 2022, within the National Reform and Resilience Plan, the Romanian government has defined a broad component dedicated to the education for Sustainable development, including education for Blue Economy.

Since 2019, BSUN was involved in developing activities on Blue Growth at local. National and Regional level. On 15th of January 2020, the Collaboration Protocol between Black Sea Universities Network (BSUN) and the County School Inspectorate of Constanta (ISJ Constanta) was signed. The purpose of the protocol was to establish a framework of inter-institutional cooperation for the development of joint projects, extracurricular activities for students, in-service training for pre-university teachers, facilitation of partnership projects between high schools and universities and thematic networks for the joint use of laboratories, creative rooms, sports facilities and other infrastructure elements. Through this document, BSUN committed itself to support international collaborative activities with a special focus on cooperation in the Black Sea area, in order to facilitate the understanding of the complex problems of the marine macro-ecosystem and in relation to the different types of coastal zones or ecosystems with which it interacts.

Between 9th and 10th of March 2020, the 1st International Conference on Blue Growth in the Black Sea Region: “Ecosystem Services on River-Sea Macro-ecosystems”, took place at “Ovidius” University of Constanta. The event was organized by the Black Sea Universities Network (BSUN), in collaboration with the Department of Sustainable Development of the Romanian Government, ”Ovidius” University of Constanta, the Organization of the Black Sea Economic Cooperation (BSEC) and the Black Sea Chapter of the Sustainable Development Solutions Network (SDSN).

In 2021, BSUN organized the first Mobile Caravan event, dedicated to the secondary school students, in order to promote the "blue growth" strategy with a focus on the importance of waterways, the conservation of the marine and coastal environment, as well as the prospects and implications of sustainable development in coastal areas. During the event, the young students benefited from an incursion into areas related to sustainability, the importance of the Danube River in connectivity with the Black Sea basin, as well as areas related to energy sources based on biomass for the production of renewable energy.

On 7 June 2021, BSUN organized, in collaboration with the EU4Ocean - Network of European Blue Schools and partners of the Blue Schools Erasmus+ project, a Blue Economy Teacher Training Course. During the course, the trainers who were invited to this training session presented their own experience, guidelines, working documents and software applications used for planning teaching activities dedicated to initiatives and projects promoting the Blue Growth strategy.

On May 31, 2023, the first STEM Laboratory for education dedicated to the promotion of Blue Growth was inaugurated in Constanța, at a Kindergarten, and a first Model Lesson waw organized with a team of children that were involved in nature observation activities and laboratory work, to test teaching methods. The activity was organized in online format and was transmitted throughout the network of kindergartens under ISJ Constanța.

9.7.2. Opportunities

a. The Romanian Government is involved in the implementation of the Sustainable Development Strategy that is in line with the UN 2030 Agenda for Sustainable Development. In this context, there is an Action Plan for implementing the Sustainable Development Goals that have been assumed by our country.

Between the 17 SDGs some of them are specifically referring to water as SDG 6 – Insure access to water and sanitation for all, SDG 14 – Conserve and sustainable use oceans, seas and marine resources, others are referring indirectly as SDG 12 – Ensure sustainable consumption and production patterns, SDG 8 – Promote sustained inclusive and sustainable economic growth, SDG 9 – Build resilient infrastructure and other similar. At the same time, SDG 4 – Ensure inclusive and equitable quality education is an horizontal goal that is connected to all the other SDGs.

Romania has an ambitious set of targets and indicators and already submitted the Voluntary Report that is demonstrating the commitment to the implementation of the Agenda on Sustainable Development.

In this regard, there are many calls and initiatives supported by the Romanian Government, different ministries, agencies and even the private sector to promote education on sustainable development, including education for Blue Economy. A very important resource is the National Reform and Resilience Plan for Romania, with a total budget of 30 bill. Euro and includes very important allocations for improvement infrastructure in schools, develop training of teachers and many other support activities.

b. In 2017, an Initiative was launched and supported by the European Commission (EC) to develop a joint research and innovation agenda and guide national and EU-level policymakers named as 'The Blue Growth Initiative for Research and Innovation in the Black Sea'. During the European Maritime Day 2018 in Burgas, Bulgaria (May 2018) it was launched the vision paper of a Strategic Research and Innovation Agenda (SRIA). Further, the SRIA has been launched in Bucharest in May 2019. This process was further supported by the Ministerial Declaration towards a Common Maritime Agenda for the Black Sea, endorsed by the same Black Sea countries.

The Common Maritime Agenda (CMA) for the Black Sea is a sea basin initiative to enhance regional cooperation for achieving a sustainable Blue Economy in the Black Sea. It is developed in the broader framework of the Black Sea Synergy. The CMA for the Black Sea recognizes the need for coordinated approach to address common maritime and blue economy challenges.

CMA for the Black Sea is a unique cooperation framework for the Blue Economy, reinforcing regional dialogue between participating countries and stakeholders to jointly address the challenges and opportunities of blue economy sectors in the area, ensuring environmental sustainability while fostering growth and promoting blue economy projects.

On May 4th 2023, it has been launched in Brussels the Black Sea Research and Innovation Agenda implementation plan.

Both documents, the SRIA and CMA, are supporting the education activities for Blue Economy with very specific actions.

c. In the process of modernization of the education process in Romania there were defined new approaches for integrating formal and non-formal education with initiatives like “The Week Different” and “The Green Week”.

“The Week Different” aims to develop both national curriculum competences and complementary competences, according to the priorities set annually by the Ministry of Education, focusing on the learning objectives at pre-school age, respectively on the learning needs of pre-schoolers and pupils, identified at the level of the educational unit.

The aim of the “The Green Week” program is to help prevent climate change and protect the environment and to help children to behave responsibly towards the environment.

Under these two initiatives there are many opportunities to develop formal and non-formal education activities for promoting Blue Economy.

d. In the last five years it has been noticed that there is an increasing concern of the population for the protection of the environment, the degradation of the habitats and the need to take actions.

The statistics are underlining the increasing preoccupation and at the same time there are many examples of successful involvement of the community with initiatives like “Citizen Science” of volunteer actions for protecting the environment.

This might be a very important opportunity to orchestrate the involvement of parents and relatives and to obtain a multiplication factor for the education programs on Blue Economy.

9.7.3. Risks

Lack of knowledge to initiate and develop successful education activities for the promotion of Blue Economy. Mitigation strategy: the BSUN involves 120 universities from the Black Sea Region as core competence centres on Blue Economy and specific aspects of the Black Sea ecosystems. The BSUN shall support and bridge the knowledge gaps.

Lack of infrastructure for organizing attractive activities for the students. Mitigation strategy: it has been conceived a local CoP involving the most relevant resources as the Natural Science Museum Complex from Constanta, the Constanta County Inspectorate, Ovidius University of Constanta and the Teachers' House Constanta. With this partnership it is intended to assure the required support for the interested schools.

Lack of specialized teachers for promoting education activities on Blue Economy. Mitigation strategy: in the local CoP there are involved also Ovidius University of Constanta – the Department of Psiho-pedagogy and the Teachers' House Constanta. These institutions are specialized on teaching the teachers and to implement new initiatives in education.

9.7.4. Proposition for experimentation in Romania

Elements of experimentation

In Romania, the education activities dedicated to the promotion of blue literacy and Blue Economy have the form of optional activities, with very little impact on medium and long term. Hence, the ambitions for the implementation of the project in Romania is to introduce a process-oriented approach. In this respect, the first step is to evaluate the activities that have been developed and to identify quantified learning objectives for primary, secondary and high school students. The learning objectives must be grouped in knowledge, skills and attitudes.

There will be developed dedicated analysis activities of the target groups of students from different schools. This will be designed dedicated teaching modules to reach the identified learning objectives and there will be conceived examination procedures. There will be identified teaching requirements, teaching techniques and the required infrastructure.

In this process there will be identified the requirements for supporting the teachers, as training modules for teaching the teachers. With the support of CoP members, it shall be established a network for continuous improvement of the teaching process on education for Blue Economy.

Objectives, level of ambition

Objective 1: **Defining the learning requirements grouped in knowledge skills and attitudes for primary, secondary and high school education modules.**

Level of ambition: development of minimum one set of requirements for each of the three levels of education (primary, secondary and high school).

The experimentation shall consist of the comparative analysis of the response of the teachers in formulating the learning objectives. There will be used for experiments teachers from schools from a commune, a city and a large city bounded to different water ecosystems (Danube River, Black Sea-Danube Canal, Black Sea Coast).

The goal is to have:

- 3 education modules in primary schools
- 3 education modules in secondary schools
- 3 education modules in high schools
- 9 applications for membership in European Network of Blue Schools

Objective 2: **Teaching population analysis**

Level of ambition: comparative analysis of the answers of selected student groups. There will be used for the analysis groups of students from the schools from the commune, a city and a large city bounded to different water ecosystems (Danube River, Black Sea-Danube Canal, Black Sea Coast). The goal is to have 3 teaching of teacher's modules.

Objective 3: **Testing of new techniques and methods of teaching**

Level of ambition: to standardize the minimum level format of using different methods. The following techniques will be tested:

- Multimedia online teaching tools
- Games on Blue Economy
- Blue Economy caravan to the selected schools
- Participation to art festivals on Blue Economy
- Participation to Sci-fairs on Blue Economy
- Scouting outdoor tours with defined objectives on Blue Economy
- Hands-on experiments in the classrooms (Blue Laboratory)

Experimentation activities

The activities that will be carried out as part of the experimentation are the followings:

1. 1st Workshop with associated partner and Romanian education stakeholders for the presentation of the work plan and selection of experimentation partners (November 7th, 2024)

2. Identification of the learning objectives grouped in knowledge skills and attitudes for primary, secondary and high school education modules (January 2025)

3. Evaluation of teaching population (January 2025)

4. Definition of the testing and evaluation procedures for each education module (March 2025)

5. Development of the teaching modules (June 2025)

6. Development of the training modules for the teachers (September 2025)

7. Submission of the training modules (June 2025)

8. 2nd Workshop with associated partner and Romanian education stakeholders (June 2025)

9. Training the teachers and validation of the training modules (September 2025)

10. Development and establishment of the Blue Laboratory infrastructures in the selected primary, secondary and high school

11. Implementing the experimentation plan in the selected schools with the validation of the innovative teaching methods

12. Evaluation of the results in May 2026

13. Establishment of the Continuous Improvement Network on Blue Economy (May 2026)

14. Organization of the Danube Lighthouse Workshop for sharing results and experiences (October 2026)

Timeline

Milestone 1: Definition of the learning requirements adjusted to the results of the learning population analysis - January 2025

Milestone 2: Submission of the teaching of teacher's modules for accreditation to the Romanian Ministry of Education - June 2025

Milestone 3: Validation of the teaching of teacher's modules - September 2025

Milestone 4: Validation of the teaching modules for selected primary, secondary and high school institutions - June 2026

Milestone 5: Full-fledged operation of the continuous improvement network of teachers on Blue Economy - October 2024

Partnerships

- Constanta County School Inspectorate will be involved in all activities
- Ovidius University of Constanta – Faculty of Psychology and Education Sciences will be involved in all activities – shall be involved in activities 1 to 9 and 11 to 14
- Ovidius University of Constanta – Faculty of Natural and Agricultural Sciences will be involved in activities 1, 5, 6, 8 to 14
- Constanta Didactic Teaching House will be involved in activities 1 to 9 and 11 to 14
- The selected primary, secondary and high school institutions will be involved in activities 1 to 6 and 8 to 14.

Role and responsibilities (governance of the experimentation)

- BSUN will plan the experimentation activities.
- The selected primary, secondary and high schools will implement the activities
- The evaluation will be done by Constanta County School Inspectorate, Ovidius University of Constanta-Faculty of Psychology and Education Sciences and Faculty of Natural and Agricultural Sciences and Constanta Didactic Teaching House
- Corrective actions will involve all partners

Role of Blue Schools in the experimentation

The selected schools involved in the experimentation will host and implement the planned experimentation activities – 3 schools on primary education 3 schools in secondary education and 3 high schools.

9.7.5. Upscaling potential

After the accreditation of the teaching of teacher's modules they could be provided to all schools from Romania. Starting with June 2025 the invitation will be addressed through the network of county inspectorates from Romania to all the teachers from Romania to participate to this workshops that will be in hybrid format.

All the activities that will be carried out with the implementation plan of the experimentation actions will be documented and uploaded on the web BlueLightS digital platform.

9.7.6. Monitoring and evaluation

Taking into consideration the provisions in the Romanian National Education System, the courses on protecting the environment are part of the national curriculum from primary, secondary and high schools so the baseline is that, according to the content of the national curriculum, there will be lessons and teaching activities related to the water and Blue Economy in the activities of all students at national level. Also, for regions related to water there will be non-formal activities as part of the "School Different" and "Green Week" activities.

The ambition of the BlueLightS project is to have 3 primary schools, 3 secondary schools and 3 high schools dedicated education modules with assumed objectives and planned activities for specific aspects of Blue Economy.

9.8. Roadmap for Spain

Partner in charge: Spanish Council for Scientific Research (CSIC).

9.8.1. Context of the experimentation in Spain

Spain is a country made up of 17 regions (Autonomous Communities) and, although a national educational law exists, each region has some freedom in its educational system. In BlueLightS are partners from two Spanish regions, the Balearic Islands (Sea-Teach) and Catalonia (CSIC), which is where we have more precise information.

The SDGs are part of the curriculum and, in particular, SDG14 is a good opportunity to include sea and freshwater.

Different regions have different systems connected to the environment. For example, in the Balearic Islands and in Catalonia efforts are made regarding Green Commissions and Green Schools. There is no specific blue program in any of the Spanish regions.

The new educational law (LOMLOE) includes the concept of learning situations which start from the students' areas of interest and enhance them, allowing the pupils to construct knowledge with autonomy, initiative, and creativity from their own learning and experiences. Learning situations represent an effective tool for integrating the curricular elements of different subjects through meaningful and relevant tasks and activities to solve problems in a creative and cooperative manner, reinforcing self-esteem, autonomy, initiative, critical reflection, and responsibility.

The number of schools which go to the beach is quite marginal and, when they go there, it is usually only for recreational activities. The groups that do blue projects on the beach are organised through individual initiatives by specific teachers. Non-formal education offers more marine-specific educational spaces, usually more during summer periods.

In the Balearic Islands, there are lots of educational activities related to "blue" subjects during the school year. It is not the case in the majority of the other Spanish regions. Many schools, particularly those near the coastline, are actively engaging in blue activities such as replanting Posidonia meadows, developing games to raise awareness about their conservation, promoting maritime culture, and exploring coastal protection strategies. Some schools are also incorporating technology into these efforts, creating apps to organize beach cleanups or using hydrophones to record underwater sounds. These activities are more commonly integrated into the primary education curriculum, where interdisciplinary and flexible learning approaches are emphasized. In secondary education, these initiatives are often found within elective subjects, project-based learning, or environmental commissions. However, despite this growing involvement, many schools remain unaware of the Blue Schools program, which could further support and enhance these efforts."

There is now a growing interest in integrating Blue subjects into the education as evidenced by the following examples:

- The creation of the Spanish network of marine educators, Reducamar, from the Spanish Ministry of Ecological transition.
- Barcelona has a programme of “More Sustainable Schools” where, since last year, they included a “Blue Perspective” initiative. Since then, they mapped all the Blue initiatives dedicated to schools, from research centres, museums, NGOs, SMEs. They also developed a catalogue of available resources.
- The Balearic Government is interested in supporting the Balearic Network of Blue Schools, more specifically from the Educational Ministry and the Sea & Water Ministry, who are planning a “Blue Week” in 2025
- The Catalan network of Green Schools (which depends on the regional education ministry) started 25 years ago. In the next scholar year (2024-25), they will offer, for the first time, a training for teachers on marine sciences.

9.8.2. Opportunities

We have established the Spanish Network of Blue Schools, which currently includes eight Autonomous Communities: the Balearic Islands, Catalonia, Madrid, Castilla-La Mancha, the Basque Country, the Canary Islands, Galicia, and the Comunitat Valenciana. In the Balearic Islands and in Catalonia, thanks to the contact we have with the different networks of schools, it makes it easier to organise calls and to reach a great number of schools.

Spain has nearly 8000 km of coast. There is a good number of organisations working on marine education.

There is a growing interest on Blue Education from schools and from different regional administrations. Blue education and in general 'water literacy' is a topic that fits perfectly to be addressed in a transversal and integrative way… in that sense, the current educational context can be taken advantage of.

There are some ongoing research projects that aim to address these issues, establishing a baseline diagnosis, exploring educational possibilities, starting to evaluate some concrete proposals, and creating synergies between institutions

9.8.3. Risks

There is a patchwork of initiatives, so a great effort has to be made to be able to make them visible in a more unified way, so that we can reach more schools. The different systems of education and the different languages that coexist in Spain make it more difficult to work at a national level. That is the reason why we have started to work on a network of networks.

There is no funding at a national nor at a regional level for Blue Schools. The experimentation is a great opportunity to create some success cases that will be key in trying to convince the education ministries to support the initiatives.

The teachers are already overwhelmed by their daily work and the frequent changes of educational law. They have generally not received any specific training on marine subjects during their studies. Therefore, the teachers that are in favour of participating are the ones with personal interest about the sea. It is important that the Blue is not introduced as a new topic but as a transversal one.

A multiplication of labels can produce a counter effect as it will lessen the credibility of the labels. Moreover, different "green" programmes could appear to be in competition with the new label. One way to mitigate this risk is to not create a regional or national blue label but to only use the European one.

Language can be a barrier when schools connect with the European Network of Blue Schools. It might be useful to translate the forms and, subsequently, the resources.

Schools might fear the bureaucracy of joining a new network. A good system of support should be developed.

9.8.4. Proposition for experimentation in Spain

Elements of experimentation

The experimentation in Spain will focus on empowering the teachers, so they can use the Blue in their learning situations. We will propose to use more outdoor schooling methods and activities to help teachers and students to see the beach or riverbank as a natural environment to enjoy and study in, in a transversal way.

Objectives

Our objectives are the following:

- Give the opportunity of training to the teachers.
- Propose new methodologies which consider open schooling and experimental experiences.
- Test the Educative Marine Areas methodology.

Experimentation activities

- Provide some resources, theoretical and methodological ones.
- Assist schools in the implementation of the new methodology.
- Propose some trainings.
- Work with other entities.
- Work with official education programmes, such as the Green Schools.

Timeline

May 24 – May 25: Creation and development of the regional and Spanish networks of Blue Schools. Development of a repository of resources in local languages

June 24: contact with Catalan schools who might be interested in testing the Aires Marines Éducatives.

June 24: contact of educators' partners who might be available to collaborate in the experimentation.

July 24: choice of three Catalan schools who will participate in the testing

July 24: choice of local partners who will work with the Catalan Schools:

September 24: choice of one Balearic school to participate in the testing

September 24 – June 25: experimentation and evaluation of the Educative Marine Areas methodology.

September 24: virtual meeting with the three Catalan schools, the regional partners and the OFB.

November 24: in site meeting with the three Catalan schools, the regional partners and the OFB and first training from the OFB.

December 24-February 24: choice of the areas of the different schools.

Partnerships

- Partnership with the Catalan Green Schools programme.
- Partnership with the Barcelona More Sustainable Schools programme.
- Partnership with French Biodiversity Office (OFB)
- Partnership with environmental education organisations

For the Educative Marine Areas in Catalonia, the following partnerships have been made:

- Environmental councillor of the town where one of the experiments will take place
- Responsible for the regional parc of Toroella de Montgrí for the other two schools

For the CSIC, the associated partner is yet to be confirmed. This future partnership must help to reach more schools in a more efficient and coordinated way.

Role and responsibilities (governance of the experimentation)

The School networks will be in charge of reaching the schools, collecting different Blue initiatives and ensuring the activities will be aligned with the curriculums. They will also help on the pedagogical side.

In Catalonia, the Green Schools programme is helping in

- Reaching more schools
- Giving logistic support for the training and for the EMA experimentation.
- Contacting part of the local partners for the EMA experimentation.
- The Environmental Councillor of a town will be the local political contact for one school doing the EMA experimentation.
- The authorities in charge of taking care of the natural parc of Montgrí will be the contact point for the schools doing the EMA experimentation in that area. They will provide an environmental educator.
- The ICM-CSIC is the scientific referent for the schools doing the EMA experimentation and for the teacher having followed the training.

- OFB is the methodological referent for the schools doing the EMA experimentation.

In the Balearics, BlueLightS' partner SeaTeach will help establish contact with local stakeholders:

- The Port Authority will be involved to facilitate EMAs in the ports.
- IBSTEAM will support the distribution of training events and materials to teachers.
- Schools will nominate classes that set up EMAs.
- The local governments (Ajuntaments) will support and facilitate access and recognition of the activities of schools.

Role of Blue Schools in the experimentation

The Blue Schools will test the new methodology and evaluate it.

9.8.5. Upscaling potential

The already existing school programmes will be key to upscale the experimentation. The new regional networks will also play an important role in it. A success story could be a decisive factor to convince the government to support blue school programmes.

The partnership with government education related systems such as the Green Schools Programme in Catalonia and the More Sustainable Schools programme in Barcelona is also done so they can help to upscale the experimentations. The local education government is also contacted and invited to different activities in that sense.

The natural parc stakeholders, such as the one from the Montgrí natural parc directly work with educators who are in regular contact with the schools of their area. These are also key agents to upscale the experimentation.

All the material of the 15 hours training of the Catalan teachers and its application to the different levels of education will be ready and easily replicable.

9.8.6. Monitoring and evaluation

A monitoring plan (Gantt) will be developed with short, medium, and long-term objectives; with intermediate measurements (quarterly, semi-annual, annual) for med-term reports.

For Educative Marine Areas

At the beginning of the experimentation, no schools have tested the new methodology. Through surveys, we will evaluate the acceptance of the experimentation during the experimentation and at the end of the scholar year. Another questionnaire will be sent the following scholar year to understand the degree of acceptance of the methodology and whether or not the schools will integrate it without the support of the first year.

For teachers training

A questionnaire survey will be designed and spread before the beginning of the experimentation to test the knowledge of the teachers on the Blue, following the different dimensions of the Ocean Literacy. A survey will be spread at the end of the school year, in which some of the questions of the initial survey will be repeated.

At the end of the scholar year, another form will be passed to the teachers and to the pupils to evaluate their degree of satisfaction. That survey will be completed by individual interview to the teachers and to some of the pupils.

These will be complemented by semi-structured interviews, that will help to determine the degree of empowerment and to evaluate the capacity of the schools to carry on with the new methodology.

9.9. Roadmap for Sweden

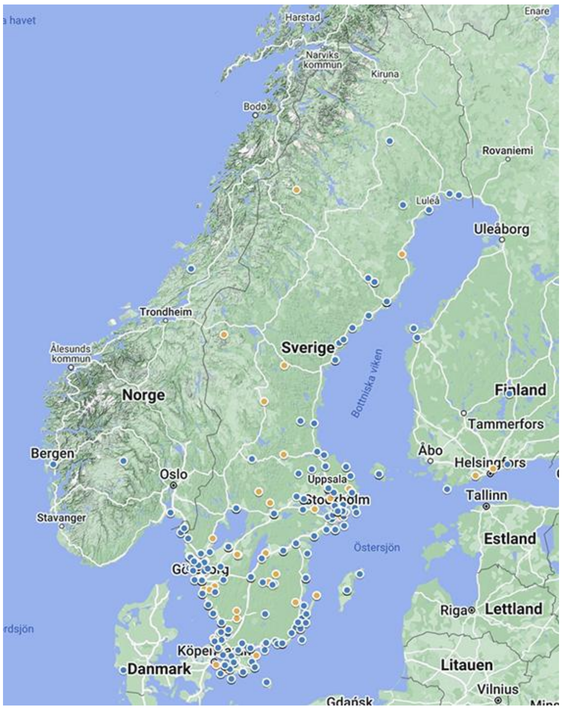
Partner in charge: University of Gothenburg.

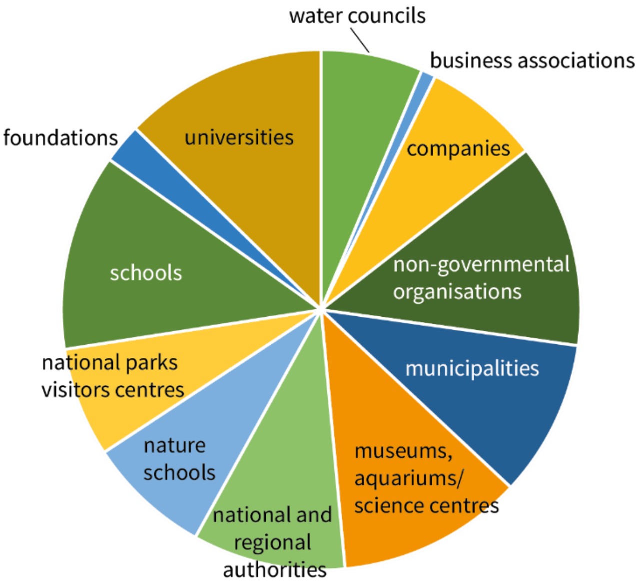
9.9.1. Context of the experimentation in Sweden

Sweden has a lot going on within blue education by maintaining quite a few water conservation initiatives and programmes. Many of them offer different types of education, both formal and non-formal about marine life and water systems. Possibilities to connect with researchers and work together also exist. Nevertheless, the survey identified that more efforts are needed to ensure that these efforts should be spread throughout the country, instead of being concentrated in one region only. In general, there is more activity in the southern part of Sweden, where in fact also the vast majority of the people live.

There also seems to be a need for better recognition of historical and cultural context. As for sustainability, even though identified as an area for improvement, working with UN SDGs is included in the curricula. However, this does not say that there can be more efforts to be made here. We will suggest a few.

The Swedish Networks for Ocean/Water Literacy consists of a number of different actors all over the country, and in a wide variety of sectors, see map (blue dots marine network, orange dots freshwater network) and graph below. The map also shows that the majority of our members are in south Sweden (there are also some members in Norway, Denmark and Finland). By using the network, we can reach out to organisations, as well as individuals working with blue education.





The starting point will be to select a few key members/organisations and design a “pilot project” which can be used as a model for further development, engaging members at a wider scale and geographical distribution.

Words linked to ocean literacy such as sea, ocean, lake, river are not specifically mentioned in the Swedish curriculum. Another part of our work to increase blue education in preschools, primary and secondary schools throughout Sweden, is to work for words linked to ocean literacy to be included in the national curriculum.

There are 26 universities in Sweden that offer teacher training programmes and courses. A third part of our work to increase blue formal education throughout Sweden is to include the blue in the teacher training courses.

9.9.2. Opportunities

Our first task will be to design a good pilot project, which can be used as a model for other potential actors and in other regions. As mentioned above we will engage existing members of the Swedish Network for Ocean Literacy in this work.

The chosen location for the suggested project is the Island of Gotland where schools, the marine research station, a science centre named Fenomenalen (in English The Phenomenal), NGOs and the local authority “The County of Gotland” all have shown interest in developing blue education in a cohesive way together with us within the BlueLightS project.

Another opportunity is that there already are a lot of schools practicing blue education in collaboration with for example aquarium, science centres, marine research stations, NGOs, nature centres and nature schools. Another task for us will therefore be to find these schools and projects and encourage them to keep up the good work and also to apply to become a part of the NEBS.

The network for ocean literacy will be very helpful tool to detect the schools already practicing blue education. The network will also be helpful in the contact with stakeholders offering blue education for the schools Our close collaboration with the freshwater network for ocean literacy, run by our associated partner The Centre for Nature Interpretation at the Swedish University of Agricultural Sciences, will be helpful in finding the inland schools practicing blue education.

The Swedish Institute for the Marine Environment has a close collaboration with the Department for Education at University of Gothenburg (UGOT), Together with colleagues at UGOT we are approaching the Swedish authority of education to get them to specifically include ocean literacy into the national curriculum. We do so through writing letters and offering our knowledge and assistance as a discussion partner.

The third part we want to include in our experimentation plan is to work for incorporation of blue education into the teachers’ training programmes and courses. We are planning to do a survey among the 26 universities we have identified to ask questions about if, and to what degree they arrange and offer courses that include ocean literacy.

This can work as a first step to make the universities aware of the importance of including blue education in the teacher's training. In this work we will try to collaborate with other BlueLightS experimentation countries, e.g. Croatia.

9.9.3. Risks

The potential risks primarily involve lack of time for partners to engage in initiatives and projects, such as this, due to high overall workload. This is a quite common situation for teachers in Sweden. Possible lack of support from the head principal in schools may also influence the possibility of engaging schools in blue education.

Moreover, this type of work tends to be closely connected to specific people, making the situation more vulnerable if someone should turn ill, simply change or lose their job. Here there is a need to keep in close touch and should someone quit, try to get the new person employed interested in blue education and ready to continue the work.

Lack of funding is always a risk that can influence the number and level of efforts. Presenting good examples, inspirational, administrative and financial support, possibly from the BlueLightS project, together with potential grants from other projects, may be used as tools to mitigate the situation.

Another risk is that few schools in Sweden are aware of the NEBS. Here we have a large task to fulfil, communicating about the NEBS and the advantages for a school to be part of it.

There is also another risk – should the funding that the Swedish Networks for Ocean/Water Literacy receive from the Swedish Agency for Water and Marine Management be cut down to less or no funding in the coming years, that may pose a threat to the overall work with encouraging blue education in Sweden.

Another risk is that we won't be able to engage the universities to include ocean literacy into the teachers' training courses or that they don't answer our survey. To mitigate this, we can be persistent in our work to explain the importance of including the blue in the teacher's training courses, as we see this as the first step to include the blue on a regular basis into the educational system.

9.9.4. Proposition for experimentation in Sweden

Elements of experimentation

We want to engage the local community on the island of Gotland, which is surrounded by the Baltic Sea, to stimulate more blue education, primarily in the schools, to make the students learn more about the ocean they live so close to.

This will be achieved by developing a project in an iterative process engaging actors from different sectors and parts of the island. A tentative name for the project is "Blue Node Gotland". There is already a large interest in this type of project, but insufficient funding, structure and coordination pose challenges.

Blue education node

The concept of "blue education nodes" is based on the fact that it is easier to bring about change if several organisations cooperate around a common interest and goal.

We want to bring together different stakeholders in the local community to create a common concept that makes it easier for schools and teachers to include teaching about oceans and water within the framework of already existing curricula. By each stakeholder contributing with their services and their special skills to the concept, a strong local connection is created. The schools also get access to teaching materials about the sea and inland waters.

To take “Blue Node Gotland”, the pilot project on the island of Gotland, as an example, the plan is as follow: The science centre "Fenomenalen" in Visby want to develop a teacher training program to strengthen their abilities to teach about ocean and inland water, both in the classroom and in the field. Fenomenalen also offers all school classes in the municipality of Gotland to visit the science centre to do experiments with water and to take water samples for further analysis.

Another part of the concept: On the coast of the northern part of the island of Gotland, Uppsala University has a marine research station, called Ar. Uppsala University offers schools to visit Ar to get an insight into the operations of a marine research station and to make field excursions to the nearby beach. Many of the schools on Gotland need to go by bus to be able to visit Fenomenalen, situated in the town of Visby, or the marine research station Ar, situated in the countryside. In order for the schools to be able to rent a bus, funding is often needed.

The Rotary Club in the district has a strong commitment to the environment of the Baltic Sea. For example, they have developed a framework for various projects called “The Baltic Sea Initiative”. The local Rotary Club is very interested to be involved in the concept of Blue Node Gotland. Rotary can also be a potential additional financier for the schools to be able to afford renting a bus for a study visit or a field trip to the coast.

Other stakeholder, like the Swedish Coast Guard and Sportfiskarna (an NGO could also be a part of the concept, offering schools different activities and material to support the teachers and enhance the blue education in the schools of Gotland.

If the pilot project of Blue Node Gotland is successful, the concept could be used as a role model for other areas or municipalities to take after. We can develop a methodology for building “blue education nodes” based on local engagement and stakeholder. The methodology could be tested in other geographical areas and in the long run even tested in other EU-countries, if there is an interest of that.

Objectives, level of ambition

The objective is to engage at least five schools on Gotland to begin with, together with the marine research centre Blue Centre Gotland/Uppsala University, the local science centre Fenomenalen, the NGO Sportfiskarna (Sport fishing/angling), the local Rotary club and the regional authority (County of Gotland).

The expected results will be a collaboration between all the actors involved, especially between the schools and the local community.

Cross-curricula work will also be a focus of the work; combining history, marine archelogy, social sciences, nature sciences and creative classes.

Experimentation activities

Experimentation activities in Sweden will consist of:

- Enable the schools to go on field trips and excursions with buses to visit the marine research centre in the city of Ar by supporting this financially.
- Design and develop 3–4 boxes with toolkits for field work, teaching about the ocean. The toolkits would be boxes with easy to handle experiment equipment for simple water samples and analyses, as well as investigation of the marine life etc.
- Developing a practical training in ocean literacy and teaching the blue by experimentation, outdoor teaching and nature interpretation. The science centre Fenomenalen is preparing for these training sessions and will as a first step offer them to schools in Gotland that they already collaborate with. Their plan is to start with the teacher training sessions in the spring 2025.
- Develop project bank, with a list of hand-on projects that can be implemented without too large efforts to make the schools inspired and interesting in working further.

Timeline

- Start Up – first project meeting, August 2024
- Further development of project plan, Sept 2024–Feb 2025.
- Participation in the Maritime Day at Gotland, Jan 2025.
- First launch of project March 2025.
- Further project implementation and development March–June 2025
- Upscaling of project August 2025–Dec 2025.

Partnerships

- Blue Centre Gotland/Uppsala University (marine biology skills and knowledge, contacts with marine scientists).
- Fenomenalen Science Centre – providing design and distribution of tools kits. School program about the challenges of the Baltic Sea. Teacher training.
- Sportfiskarna (Swedish Anglers Association) – NGO providing pedagogic aspects and experiences of marine/freshwater habitat to help fish to reproduce on the island.
- Rotary – possible sponsorship in part of this project. Outreach in the local community.
- The County of Gotland – ensuring regional support for the project.
- The Swedish Coast Guard – providing information about their work, study visits and encourage interest for their work and possible future recruitment.
- The Swedish Institute for the Marine Environment/SIME-UGOT – co-ordinator of the project.

Role of Blue Schools in the experimentation

The goal within this project is to establish at least five new EU Blue schools at Gotland. The examples of existing schools in Sweden, and the rest of the Blue School community will serve as examples for this.

We also will establish connections between Swedish schools and schools in Spain and/or Finland. For this, a collaboration process will be set up with the corresponding BlueLightS partners.

9.9.5. Upscaling potential

Three main ways for upscaling the experimentation are foreseen at this stage:

1/ Achieve better geographical distribution of activities by actively reaching out to actors up north, as well as to the east and west.

2 /Enhance the connection between marine biology, social sciences, economy, transportation, history and marine archelogy by using the versatility of different actors.

3/ Replicate the experimentation in Gotland in other potential nodes:

- Karlskrona – Sunnadalsskolan (maritime historical city and a good connection with a certified blue school).
- Strömstad – aspiring blue community with a blue school Strömstad gymnasium.
- Marina läroverket /Cedergrenska schools – aspiring blue school with a marine profile, good regional reputation as well as a developed international work, using their own ship" Älva" sailing the Mediterranean /Canary Islands to educate students and make them interested in further work within the maritime sector.
- Collaboration with the Museum of Wrecks, Stockholm.
- Develop school project and local collaboration at naturum Höga kusten.Develop collaboration with NGO Håll Sverige Rent (Keep Sweden Tidy): EU Green Flag/Blue Flag.
- There are some more cities/municipalities in Sweden that have shown interest in becoming a blue education node: Kalmar, Karlskrona, Kungsbacka, Malmö, Simrishamn, Sotenäs. Apart from these we will also aim for the inland cities. Ludvika is one of them.

9.9.6. Monitoring and evaluation

One way to measure the effect of our pilot project is to evaluate the number of Blue Schools on Gotland, before the pilot project starts and after. Right now, there are no Blue Schools on Gotland. Our goal is to have 3 blue schools on Gotland by the end of 2025, and 6 by the end of 2026.

Another way to measure the effect of our work to increase the number of Blue Schools in Sweden in general within the framework of BlueLightS, is to measure the number of blue schools at the beginning and at the end of our involvement in the BlueLightS project. As of the beginning of 2024, there were 4 Swedish Blue schools. Our goal is to have at least 24 blue schools in Sweden by the end of 2026.

The impact of the training at Fenomenalen on teachers will also be measured. For that, we will conduct interviews with teachers after they have undergone it: How have they experienced the training? Have they become more secure in their role as "blue educators"? Do they use what they learned during the continuing education? Can they develop their knowledge further? When a school has started a blue project, we can ask questions about how the teachers perceive that the students' interest in ocean and water issues has changed (or not).

Interviews with selected students who participate/participated in a blue project will also be conducted. The students will be asked questions about the students' experience, if they feel they have learned something about the sea and water and if the project changed their way of thinking, their behaviour, their commitment, etc. This will be done before and after the blue project.

To evaluate our efforts to get more Blue into the national curricula we will investigate if ocean literacy related words like ocean, sea, lake, river etc. will be included in the forthcoming update of the national curriculum.

Lastly, we will make a new survey in the end of the BlueLightS project (end of 2026) to investigate how the universities have included blue education into their teachers’ training courses.