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CodeBLUE

COUNTRY-SPECIFIC ASSESSMENT REPORT

FOR

THE KNOWLEDGE, SKILLS AND COMPETENCES NEEDED FOR BLUE-ECONOMY TOURISM CONCERNING CURRENT ACADEMIC OFFERINGS

CODE BLUE:

CROSS-DISCIPLINARY INNOVATIVE EDUCATION IN TOURISM AND SERVICES FOR A
SUSTAINABLE BLUE ECONOMY

Grant Agreement No 2025-1-BG01-KA220-HED-000363596



Barcelona School
of Tourism, Hospitality
and Gastronomy



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CONTENTS

EXECUTIVE SUMMARY

- 01 INTRODUCTION
 - 02 SCOPE AND OBJECTIVES OF THE COMPARATIVE ANALYSIS
 - 03 METHODOLOGY AND DATA COLLECTION TOOLS
 - 04 KEY SKILLS IDENTIFIED ACCORDING TO THE EUROPEAN FRAMEWORKS
 - 05 SURVEYS AND INTERVIEW RESULTS IN PARTNER COUNTRIES
 - 06 COMPARATIVE ANALYSIS OF SKILLS ACROSS THE FIVE COUNTRIES
 - 07 CLASSIFICATION OF SKILLS BY GROUPS (ENVIRONMENTAL, TECHNICAL, DIGITAL, BUSINESS, SOCIAL)
 - 08 COMMON TRENDS AND DIFFERENCES
 - 09 SUMMARY OF FINDINGS
 - 10 ANNEXES
-
- REFERENCES



KEY WORDS AND DEFINITIONS



BlueComp

the European Union's competence framework that defines the knowledge, skills, and attitudes needed for sustainable development and innovation in the blue economy sectors



EQF

European Qualifications Framework



Blue economy

all economic activities related to oceans, seas and coasts



ICZM

Integrated Coastal Zone Management



Blue growth

the European Union's strategy for promoting sustainable economic growth and employment in marine and maritime sectors while protecting ocean and coastal ecosystems



GIS

Geographic Information Systems



CSO

Civil Society Organisations



GreenComp

the European sustainability competence framework that supports individuals in developing knowledge, skills, and values for environmental sustainability and responsible action



DigComp

the European framework that identifies the key digital competences citizens need for confident, critical, and safe use of digital technologies



MSP

Marine Spatial Planning



ESCO

European Skills, Competences, Qualifications and Occupations classification



Quintuple-helix innovation

an innovation model that explains sustainable development through collaboration among academia, industry, government, civil society, and the natural environment



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EXECUTIVE SUMMARY



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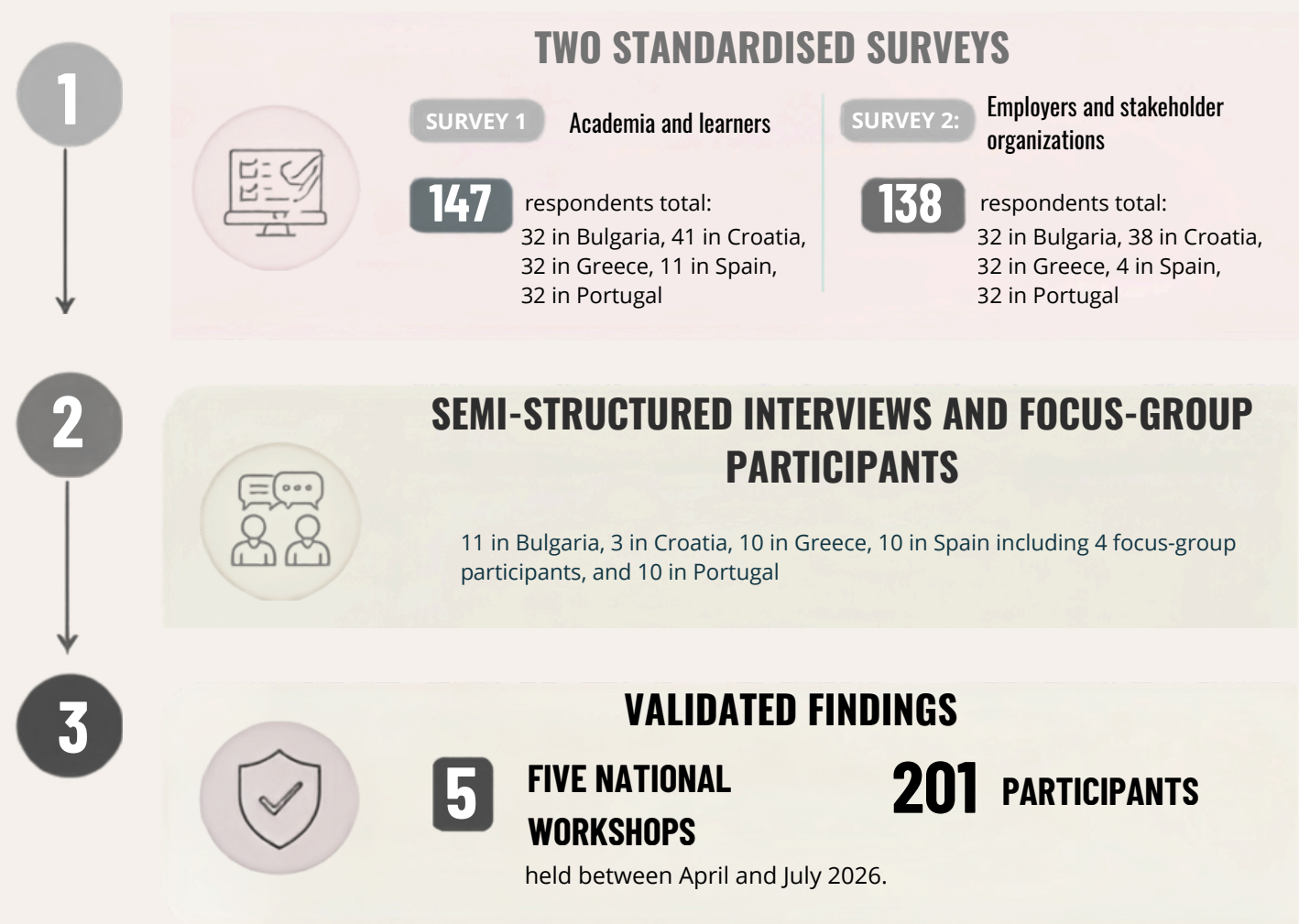
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This report presents a comparative assessment of the **knowledge, skills, and competences required for blue-economy coastal and maritime tourism**, drawing on parallel national studies conducted in five EU countries: Bulgaria, Croatia, Spain, Greece, and Portugal. Developed within the framework of the Erasmus+ project “**Cross-Disciplinary Innovative Education in Tourism and Services for a Sustainable Blue Economy**” (CodeBLUE, Grant Agreement No 2025-1-BG01-KA220-HED-000363596), the assessment maps current academic offerings against sector-identified needs, identifying gaps and priorities for curriculum development aligned with the BlueComp competence framework published by the European Climate, Infrastructure and Environment Executive Agency (CINEA/European Commission, 2025).

A mixed-methods approach was adopted to ensure a comprehensive data collection:





Across all five countries, the analysis identifies a **consistent pattern**:



while coastal and maritime tourism programmes in higher education and vocational training have developed solid foundations in hospitality management and general sustainability, they exhibit significant gaps in practically oriented blue-economy competences. The most critical shortfalls identified across partner countries include maritime safety and incident response, digital skills (GIS, marine data platforms, digital tourism tools), innovation in maritime tourism product development, integrated coastal zone management, and marine ecosystem understanding. Employer respondents consistently report that graduates enter the sector without the applied, sector-specific competences needed for a competitive and sustainable blue economy.

The findings highlight a **shared need** — across all five partner countries -



for short, flexible, practically oriented training pathways, with blended or hybrid delivery formats preferred by the majority of learners and practitioners. Micro-credentials (typically 20–30 study hours) aligned with the BlueComp framework are identified as the most viable intervention, with strong stakeholder consensus on the value of university-sector cooperation, financial support for training access, and recognition of non-formal learning. The CodeBLUE project will address these needs by developing a competence-based curriculum and micro-credential programme grounded in the evidence gathered through this comparative assessment.



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01 INTRODUCTION



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The blue economy represents a crucial and rapidly expanding sector within the European Union, intertwining economic growth with the sustainable use of marine and coastal resources. Coastal and maritime tourism form the largest segment of the blue economy, driving significant employment and contributing substantially to regional economies (*European Commission: Directorate-General for Maritime Affairs and Fisheries, 2025*). Yet, despite its importance, the integration of blue economy concepts—particularly in tourism—is limited within current vocational and higher education curricula. This creates a critical gap between academic offerings and the evolving skill demands of the sector.

Recognizing this gap, the CodeBLUE project seeks to transform tourism education through a cross-disciplinary approach that embeds sustainability, innovation, and digital competencies essential for advancing the blue economy. As a foundational step, the project output **O1: Country-specific comparative assessment report for the knowledge, skills, and competences needed for blue-economy tourism concerning current academic offerings** delivers a country-specific assessment report mapping the knowledge, skills, and competences required by the coastal and maritime tourism sector. This assessment evaluates how well these requirements are currently addressed in the academic programs across the project partner countries: Bulgaria, Croatia, Greece, Spain, and Portugal.

The report is based on comprehensive desk research, extensive surveys, and consultations with key industry stakeholders, educators, and policymakers to identify regional needs and disparities. It synthesizes findings related to:



The essential competencies for tourism professionals operating within the blue economy, including environmental stewardship, digital literacy, innovation management, and multi-sector collaboration skills.

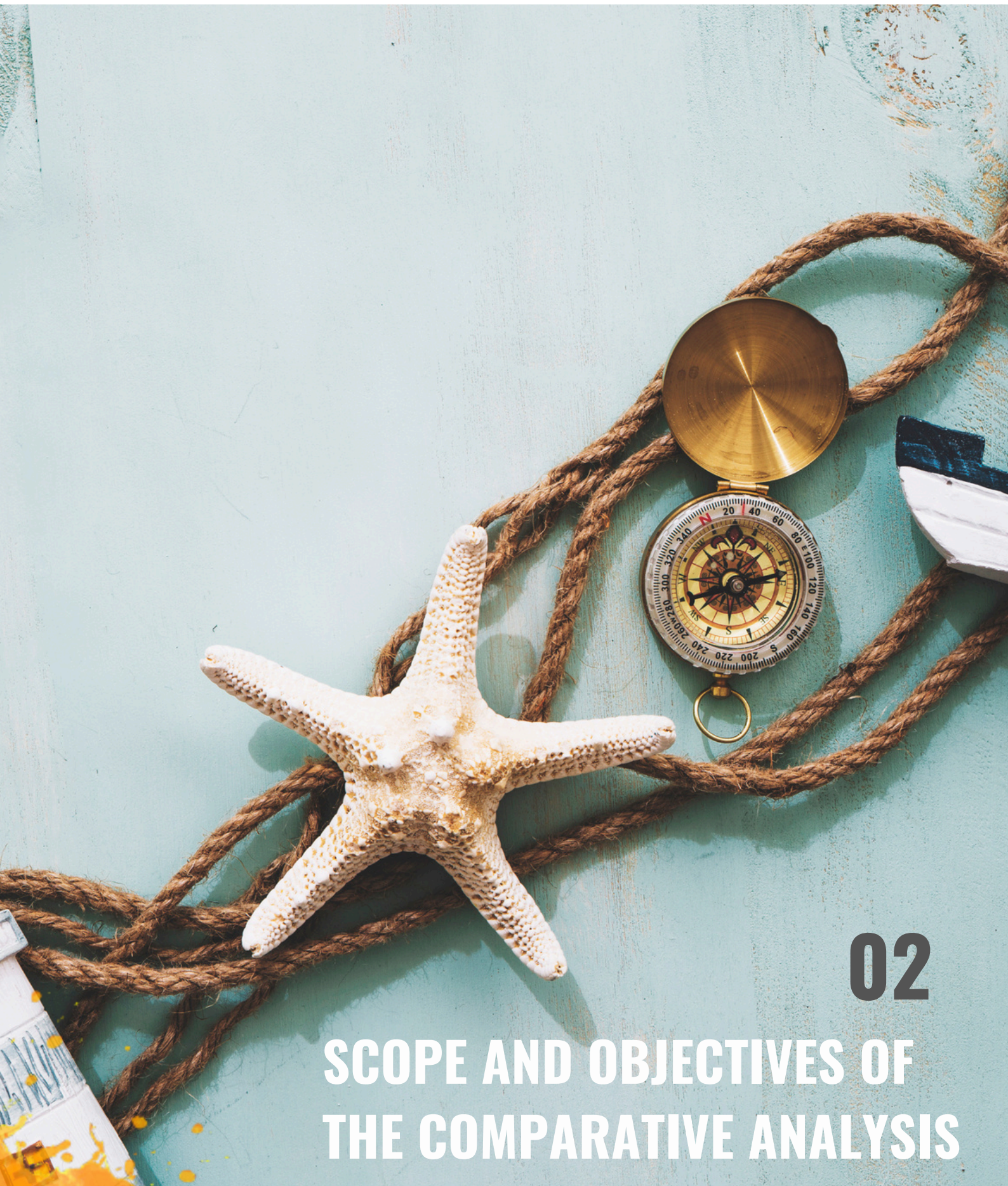


The extent to which existing curricula in higher education institutions (HEIs), continuous vocational education and training (cVET), and lifelong learning (LLL) programs cover these competencies and prepare graduates to meet sectoral challenges.



Identification of gaps and opportunities for curriculum enhancement, considering the differing economic, environmental, and policy contexts of the Black Sea, Adriatic, Mediterranean, and Atlantic basins.

By providing a detailed and comparative assessment, O1 supports evidence-based strategy development for integrating blue economy principles into tourism education. This will enable educational institutions to adapt their offerings to better equip students and professionals with the multidisciplinary competencies needed to drive sustainable innovation in coastal and maritime tourism. Ultimately, the report lays the groundwork for designing a modular, flexible, and micro-credential-based curriculum that responds to the dynamic demands of the blue economy while reinforcing the green and digital transitions in higher education.



02

SCOPE AND OBJECTIVES OF THE COMPARATIVE ANALYSIS



The comparative analysis conducted within the CodeBLUE project aims to provide a detailed understanding of the current state of tourism education concerning the blue economy across the five EU countries with extensive and economically vital coastal regions on national (Bulgaria and Portugal) and European level (Spain, Greece and Croatia). This scope recognizes the transnational nature of the blue economy, wherein shared challenges and opportunities exist across diverse coastal environments — the Black Sea, Adriatic, Mediterranean, and Atlantic basins – and sectoral structures of the coastal communities. The analysis seeks to capture and compare the knowledge, skills, and competences required by the coastal and maritime tourism sector in each partner country while examining how these are reflected in existing academic curricula at higher education, vocational training, and lifelong learning levels.

2.1. Scope of the Comparative Analysis

A. Sectoral and Geographical Coverage

The focus of CodeBLUE project and the analysis is on tourism with coastal and maritime tourism in particular. Still, in surveying of the knowledge, skill and competence needs, the functioning of the sector within the integrated coastal ecosystems was considered, the spatial planning of the coastal areas were kept in mind to identify what education resources are needed to make sure that tourism functions in harmony with the natural, social and economic environments along the coasts.

In addition, the analysis encompasses diverse ecosystems and economies across five countries representing different European marine basins. This geographical diversity allows the project to identify commonalities and regional specificities in skill requirements, educational approaches, and sectoral challenges related to blue-economy tourism. By doing so, the analysis supports the design of adaptable curricula that respect local and regional contexts while promoting overarching sustainability principles.



B. Multidisciplinary and Multi-Skill Focus

Given the inherent interdisciplinarity of sustainable blue economy tourism, the scope covers the main sets of knowledge, competencies and skills coming from the BlueComp Framework that are trained in different academic disciplines beyond conventional tourism studies. These are aligned with the Blue Economy Skills Survey^[1] (European Commission, 2025), that guided the initial structuring of the blue competences in Europe in 2025, including:

- o *Environmental and Marine-Science Skills*
- o *Technical and Operational Skills*
- o *Digital Skills*
- o *Business and Innovation Skills*
- o *Social, Cultural, and Communication Skills*

Accordingly, perspectives from environmental science, marine biology, engineering, digital technologies, heritage management, and innovation studies were tacitly examined alongside business and hospitality education. This broad lens ensures the identification of comprehensive knowledge and skill sets crucial for holistic and future-proof tourism education.

C. Academic and Vocational Training Programmes

The analysis covers the perspectives and scope of curricula offered by higher education institutions (bachelor, master, and doctoral levels), continuous vocational education and training programs, and lifelong learning courses. It considers formal degree programs and to a limited extent qualification courses offered in mainstream education to evaluate flexibility and responsiveness to labour market demands.

D. Stakeholder Engagement and Needs Assessment

The comparative analysis integrates insights from the education sector, including representatives of academia and students, as well as employers as the primary “users” of educational outcomes. The latter include businesses, public authorities, non-governmental organizations, and community organizations with an interest in tourism development in coastal areas^[2]. Surveys, interviews, and workshops provide both qualitative and quantitative data, reflecting the real-world needs and expectations of the tourism sector within the blue economy framework.

^[1] Conducted by the Directorate-General for Maritime Affairs and Fisheries (DG MARE) of the European Commission as part of a year-long European study aimed at analysing skills needs, existing training programmes, and gaps in the blue economy across EU Member States. The survey was carried out in September and October 2024 and involved 233 respondents from various blue-economy sectors. Participants included representatives of European and national business associations, whose responses reflect consolidated positions of numerous companies operating in relevant marine and coastal sectors. Most respondents came from Spain, Italy, Greece, France, and Portugal.

^[2] The five stakeholder groups in the quintuple-helix innovation model together with academia (Carayannis, Barth, & Campbell, 2012; Taratori, et al., 2021) which the CodeBLUE research refers to.



2.2. Objectives of the Comparative Analysis

As an output, the Comparative Analysis is designed to:

A. Identify Sectoral Competence Needs	To delineate the essential knowledge, skills, and competences required for professionals working in blue-economy tourism. This includes environmental sustainability, digital skills, innovation capability, and cross-sectoral collaboration competencies necessary to navigate evolving challenges in coastal and maritime tourism.
B. Assess Alignment of Academic Curricula	To evaluate how current academic and vocational programs incorporate blue economy themes, including sustainability practices, environmental management, and digital transformation specific to coastal tourism. This assessment will reveal the extent of thematic integration, pedagogical approaches used, and alignment with labour market requirements.
C. Compare Regional and National Variations	To highlight differences and similarities across partner countries and marine basins in the perceptions and prioritization of the knowledge, skill and competencies that are needed for the sustainable development of tourism within the blue economy and to identify the relevant prospective learning objectives of a novel multidisciplinary curriculum on blue-economy tourism.
D. Support Pathways for Curriculum Enhancement	To develop practical recommendations for integrating blue-economy modules into vocational and higher education.
E. Promote Cross- Border Knowledge Exchange	To facilitate dialogue and cooperation amongst partner countries, fostering mutual learning and dissemination of best practices. The analysis aims to build a foundation for sustained transnational collaboration in blue economy tourism education, research, and innovation.

By fulfilling these objectives, the comparative analysis achieves the specific project objective to enhance the quality and relevance of tourism education for the blue economy. In doing so, it contributes to the overall CodeBLUE project objective of transforming tourism education by fostering interdisciplinarity, improving quality, and equipping academia, students, and practitioners with the skills needed for innovation and sustainability in coastal and maritime tourism.



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03

METHODOLOGY AND DATA COLLECTION TOOLS



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The comparative assessment report synthesises evidence collected through parallel national studies conducted between February and April 2026 in the five CodeBLUE partner countries — Bulgaria, Greece, Spain, Portugal, and Croatia – to assess how blue economy skills and competences are currently addressed — or overlooked — in tourism education (Annexes 2-5).

These studies were conducted following a common methodological framework developed within Work Package 2 of the Erasmus+ CodeBLUE project to ensure comparability of the results across the participating countries. The framework is grounded in EU policy instruments, most notably the BlueComp Competence Framework (2025) (European Climate, Infrastructure and Environment Executive Agency (CINEA), European Commission, 2025), GreenComp (European Commission and Joint Research Centre, 2022), DigComp 2.2 (European Commission, 2022), and the Blue Economy Skills Survey (European Commission, 2025). These references ensure that all research instruments and outputs are aligned with European standards and qualifications levels (EQF/ESCO), enabling cross-country comparability and relevance to EU policy priorities such as sustainability, digitalisation, and the green transition.

The surveys covered 24 skills aligned with the competence clusters of BlueComp focusing on those that were considered by the project partners as most relevant for tourism sector:



Environmental and Marine-Science Skills

going beyond general awareness, CodeBLUE targets decision-oriented ecological literacy, including the ability to assess cumulative ecological impacts, apply precautionary principles, and make informed decisions about limiting or suspending activities when ecosystems are at risk.



Technical and Operational Skills

covering maritime safety, risk management, and equipment use, with a distinctive focus on integrating ecosystem and animal welfare protection into operational protocols, and managing tourist expectations when environmental constraints apply.



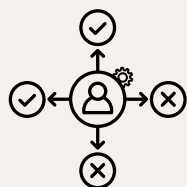
Digital Skills

addressing GIS, mobile applications, online platforms, and real-time communication — with a critical lens on whether digital tools are used to intensify or to monitor and limit ecological pressure.



Business and Innovation Skills

encompassing sustainable product development, ecotourism, and stakeholder engagement, with emphasis on demand management over demand creation and circular economy approaches.



Social, Cultural, and Communication Skills

covering maritime safety, risk management, and equipment use, with a distinctive focus on integrating ecosystem and animal welfare protection into operational protocols, and managing tourist expectations when environmental constraints apply.

The **first stage** of the surveys consisted of **desk research**. This preparatory phase reviewed national and international policy documents, academic studies, labour-market reports, and sectoral strategies related to tourism, maritime development, sustainability, and skills needs. It also maps the existing academic and vocational education and training (VET) programmes relevant to tourism and the blue economy. The desk research provided the contextual basis for understanding how current curricula respond to labour-market needs and emerging transitions such as the green and digital transformation.

The **second stage** used **structured surveys** as the primary quantitative data-collection tool. Two separate online questionnaires were designed to capture perspectives from different stakeholder groups:



SURVEY 1: **Academia and learners**

It explores awareness of the blue economy, interest in thematic modules, self-assessment of digital, environmental, and communication skills, and preferences regarding training formats and duration.

The survey was completed by 147 respondents in all project countries – 32 in Bulgaria, 41 in Croatia, 31 in Greece, 11 from Spain and 32 from Portugal.



SURVEY 2: **Employers and stakeholder organisations** operating in coastal and maritime tourism

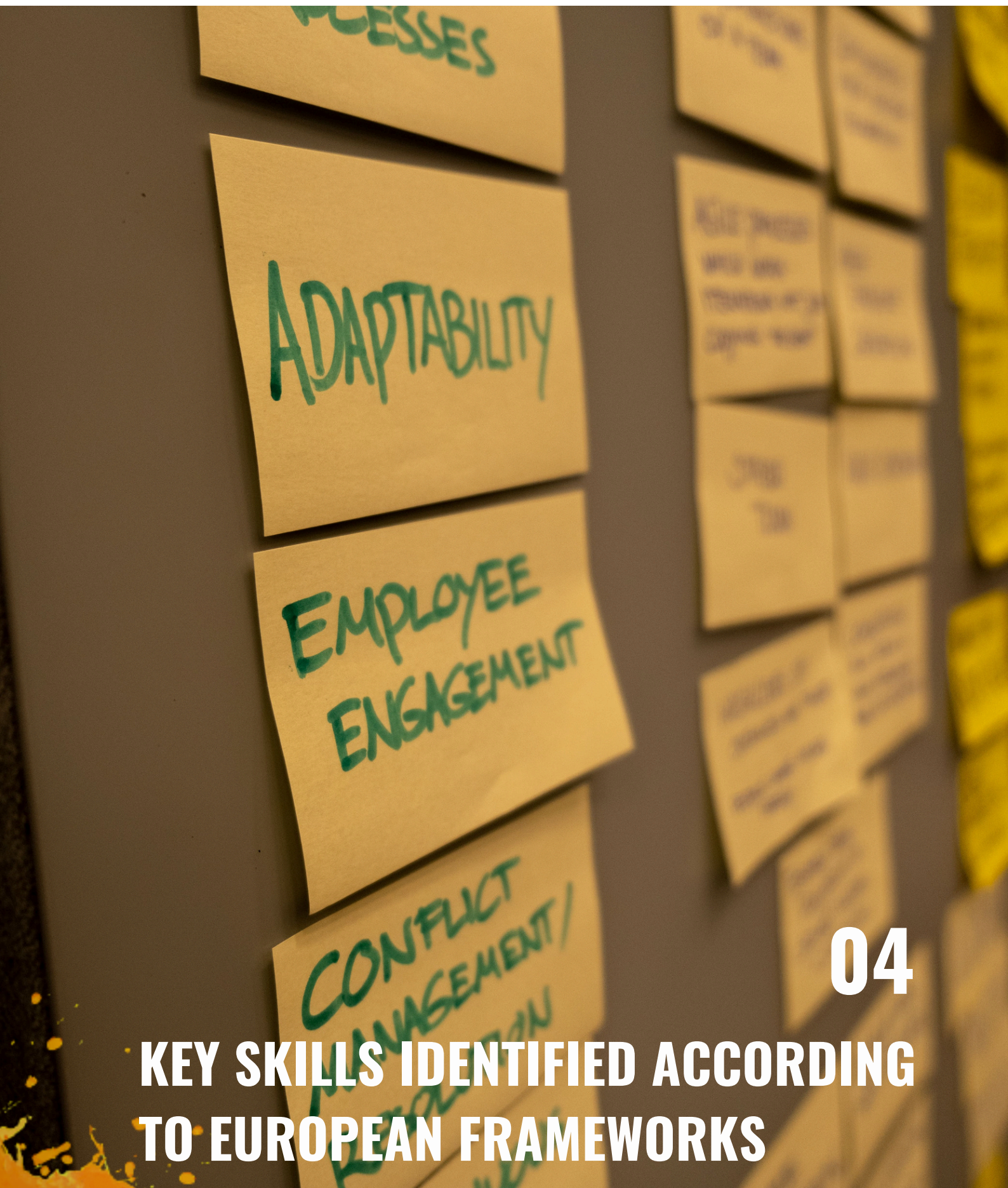
This survey collected standardised information on the relevance of specific competences, recruitment challenges, existing training practices, skills shortages, and recommendations for workforce development. The survey was completed by 138 respondents in all project countries – 32 in Bulgaria, 38 in Croatia, 32 in Greece, 4 from Spain and 32 from Portugal.



The **third stage** of data collection consisted of **semi-structured interviews and focus groups** with experts and sector representatives. Interviews were conducted online or face-to-face, particularly in the coastal regions of Bulgaria where direct observation of work environments can improve data quality. The interviews provided deeper insight into operational realities, emerging trends, work processes, competence gaps, and future training needs that cannot be fully captured through surveys alone. They were particularly valuable for interpreting quantitative findings and validating sector-specific needs. In total, 44 experts were interviewed – 11 in Bulgaria, 3 in Croatia, 10 in Greece, 6 interviewees and 4 focus-group participants in Spain and 10 in Portugal.

The preliminary survey results were presented and validated with the national stakeholders during national workshops gathering 201 participants on 22 April 2026 in Greece, 24 April 2026 in Bulgaria, 29 April 2026 in Spain, 29 May 2026 in Portugal, 3 June and 24 July in Croatia.

The mobilization of large numbers of stakeholders in the field research and endorsement of the survey results confirms the validity of the results and creates a realistic overview of skill-building needs for blue-economy tourism in the CodeBLUE countries. Together, the surveys, interviews, desk research, and national workshops constitute an integrated evidence base designed to close the gap between sectoral skill needs and current educational provision — ultimately informing the development of an innovative, cross-disciplinary blue economy curriculum for coastal and maritime tourism.



04

KEY SKILLS IDENTIFIED ACCORDING TO EUROPEAN FRAMEWORKS



The key skills and competencies about blue economy in the European Union in general have been presented and organised in competence clusters are presented in BlueComp. Developed through literature review, thirteen sector-specific focus groups, and comparative analysis with existing EU frameworks, it provides a structured, cross-sectoral reference for identifying and developing the skills needed for a sustainable, digital, and competitive blue economy across marine and maritime industries.

The framework is organised into four thematic dimensions, each containing a set of competences that apply across all blue economy sectors — from fisheries and coastal tourism to offshore energy, maritime transport, and marine biotechnology. Also, BlueComp considers the developments of the other two EU competence frameworks that outline the skill, knowledge and competences, needed for the green and digital transition, namely GreenComp and DigComp and LifeComp, positioning marine-specific competences within the broader EU framework architecture for green, digital, and social transitions. Last, but not least, BlueComp is fully aligned with the European Skills, Competences, Qualifications and Occupations classification (ESCO), enabling its use in job-matching platforms, occupational profile development, and public employment services.

BlueComp is designed as a modular tool — a "competence puzzle" — that different stakeholders can assemble to fit specific roles or learning pathways. Educators and training providers can use it to structure learning outcomes and design micro-credentials. Policymakers can use it to shape upskilling strategies and align funding priorities. Employers can apply it to define job profiles and plan workforce development. Project consortia and researchers can use it as a reference for capacity-building in innovation initiatives, in addition to the other existing qualifications at sectoral, national, regional and other levels.

The “puzzle” approach was used by the CodeBLUE Team to create its project-specific competence map with 24 model skills, needed for blue-economy tourism that were surveyed in the country-specific project studies (Annex 1).



DIMENSIONS		COMPETENCES	
A	Understanding the blue Economy	A.1.	Ocean Literacy
		A.2.	Blue Systems Thinking
		A.3.	Blue Economy Regulations
B	Digital and Data Skills	B.1.	Data and digital proficiency
		B.2.	Digital communication
		B.3.	Cybersecurity and maritime safety
		B.4.	Open science and data sharing
C	Sustainability and resilience	C.1.	Sustainable resource management
		C.2.	Circular economy principles
		C.3.	Climate adaptation and coastal resilience
		C.4.	Ecosystem-based management (EBM)
D	Business innovation and governance	D.1.	Value chain thinking
		D.2.	Leadership and blue innovation
		D.3.	Blue finance and investment
		D.4.	Ethical and participatory governance

Table 1: Structure of the BlueComp framework

Source: (European Climate, Infrastructure and Environment Executive Agency (CINEA), European Commission, 2025)



Code BLUE - Skills and Competence Map

24 competences - BlueComp/ ISCED-F/ EQF alignment

A Understanding the blue Economy

B Digital and Data Skills

C Sustainability and resilience

D Business innovation and governance

Competence

BlueComp dimension

EQF level

1 - Environmental and Marine - Science Skills

Understanding marine ecosystems and biodiversity

A

6

Sustainable management of marine resources

C

6

Assessment of climate risks in coastal zones

C

6

Integrated Coastal Zone Management (ICZM) and MSP

A

C

6

Basic knowledge of marine pollution

A

C

5

Environmental and impact assessment

A

C

6

2 - Technical and Operational Skills

Fundamentals of maritime safety

A

B

4-5

Responding to maritime incidents

A

B

5

Working with maritime equipment

A

B

5

Practical water sports skills

A

4-5

Maintenance of marine infrastructure

A

C

5

Operational risk management in a maritime environment

A

B

5-6

3 - Digital Skills

Working with GIS for maritime and coastal areas

A

B

6

Use of digital nautical and navigation charts

A

B

5-6

Using mobile applications for marine forecasting

A

B

5

Collection and analysis of marine and tourism data

A

B

6

Digital communication with tourists

B

4-5

Management of online travel platforms

B

5-6

4 - Business and Innovation Skills

Innovations in marine and coastal tourism

D

6

Sustainable development of new tourism products

C

D

6

Marketing and branding of sea destinations and products

D

6

Management of marine and coastal tourist attractions

D

6

Alternative forms of marine tourism (eco, adventure, cultural)

D

6

Working with partners and stakeholders

D

5-6

Source: Own Elaboration



05 SURVEY AND INTERVIEW RESULTS IN PARTNER COUNTRIES





The following subsections present a summary of the key results from surveys, semi-structured interviews, and national workshops conducted in each partner country. Together, these data provide the empirical foundation for the comparative analysis and classification of blue-economy tourism skills and competences presented in subsequent sections of this report.

5.1. Survey and Interview Results in Bulgaria

RESPONDENT PROFILE AND AWARENESS

The Bulgarian national study was conducted by the Varna University of Management in the context of the Black Sea coastal region, which has strategic significance for the blue economy given Bulgaria's hosting of the 2018 Burgas Ministerial Declaration "Towards a Common Maritime Agenda for the Black Sea."

Survey 1 attracted 32 respondents predominantly from vocational education (teachers 59.4%), higher education (faculty 15.6%), and students (9.3%). Survey 2 included 32 employer and stakeholder respondents, with NGOs and local organisations (21.9%), restaurants and food service providers (21.9%), and training providers (15.6%) best represented. Eleven semi-structured interviews were conducted covering local authorities (2), educational institutions (3), NGOs (2), and commercial enterprises (4), and findings were validated at a national workshop on 24 April 2026.

Awareness of the blue economy concept was notably low among Bulgarian academic respondents. Only 43.8% described themselves as "somewhat familiar," while 25% were not familiar at all. Despite this, coastal and maritime tourism was rated as very or extremely important for the blue economy by 81.2% of respondents, indicating a practical sector-level recognition that outpaces conceptual understanding of the blue-economy framework itself. Employer respondents demonstrated a similarly fragmented awareness, with a significant share unable to identify specific "blue skills" by name while nonetheless prioritising many of the same competences.



KEY SKILL GAPS IN THE ACADEMIC SURVEY

Bulgarian academic respondents identified the biggest curriculum gaps in digital tools, innovation, and applied maritime skills. GIS/digital mapping was the top gap (absent for 53%), followed by a cluster of forward-looking competences barely covered: innovation in maritime tourism (47%), new product development (44%), and digital platforms/online communication (37% each). Technical gaps also stood out in marine safety (50%) and marine infrastructure exploitation/maintenance (43.7% each). Interviewees additionally flagged needs in marine ecosystem understanding, environmental impact management, and cross-sector collaboration. By contrast, curricula cover environmental sustainability awareness, hospitality management, customer service, and basic business communication well – reflecting a traditional hospitality focus that leaves applied blue-economy skills largely underdeveloped.



TRAINING PREFERENCES

Bulgarian employers echoed these priorities, stressing stakeholder collaboration, new tourism service development, and digital marketing/communication tools. Sixty-nine percent of academic respondents favoured 10-20 hour trainings, matching the proposed micro-credential format, with blended/hybrid (47%) and online (41%) delivery preferred due to the coastal workforce's geographic spread and limited access to in-person training in smaller resorts. The national workshop confirmed these preferences and added calls for Black Sea-specific content and a holistic national blue economy strategy.



5.2. Survey and Interview Results in Croatia

RESPONDENT PROFILE AND SECTORAL CONTEXT

Croatia's national study was conducted by PAR University of Applied Sciences in a context of exceptional economic dependence on coastal tourism, which contributes approximately 75% of blue-economy employment and gross value added (GVA), and around 11–11.4% of national GDP (Institute of Economics Zagreb, 2024; EU Blue Economy Observatory, 2023).

Survey 1 attracted 41 respondents, predominantly higher education students (59%) and alumni (32%) enrolled in business management, sustainable tourism, and hospitality programmes. Survey 2 attracted 38 employer respondents, spanning NGOs and community organisations (16%), food service providers (16%), accommodation establishments (13%), and sports and entertainment businesses (13%). The majority of employer respondents (63%) reported 1–6 years of professional experience. Three expert interviews were conducted (a professor emeritus in hospitality, a travel agent specialising in maritime transport, and an EU Projects Officer at a maritime heritage centre), and two national workshop webinars validated findings with sector participants.

The economic context is critical for interpreting Croatian findings: with coastal tourism so dominant in the national blue economy, skills gaps in this sector have disproportionate macroeconomic consequences. Yet Croatia still lacks a fully integrated national blue-economy strategy, and the current approach to skills development is fragmented across sectoral policies, vocational curricula, and EU-funded projects (World Bank, 2022). The new modular vocational curriculum for maritime navigators introduced at the end of 2024, operational from 2025/2026 represents progress for specialised maritime education, but has not yet influenced broader tourism workforce development (Narodne novine, 2025).



SKILLS IMPORTANCE, COVERAGE AND EMPLOYER SCARCITY

Academics rated environmental impact management, risk prevention (both 90%), and marine equipment operation (88%) as top competences—showing strong awareness of practical sector needs. Yet curriculum coverage lags badly: maritime safety (19.5%), GIS/digital mapping (22%), water sports (22%), and coastal zone management (24%) were rarely covered. Even the best-covered areas—stakeholder collaboration, environmental impact management, and risk prevention (all ~64%)—reflect only partial integration.

Employers reported severe skill scarcity in innovation in maritime tourism (79%), alternative tourism development (74%), marine ecosystem understanding and coastal zone management (66% each), and infrastructure maintenance (66%). Notably, four of the six most-valued employer skills are digital—mobile navigation (58%), online communication (50%), digital maps/forecasts (47%), and digital platforms (42%)—showing operators increasingly expect new hires to come digitally equipped.



TRAINING PREFERENCES AND KEY BARRIERS

Croatian academics showed strong interest in blue-economy training, with 56% willing to take a dedicated course and 63% preferring blended/hybrid delivery for its mix of flexibility and hands-on practice. Employers, however, favoured in-person (63%) and hands-on training (55%), given that operational maritime skills can't be fully learned online. Employers rated financial subsidies (79%) and more practical content (76%) as the top training solutions, while low awareness of opportunities (68%) and time/funding constraints (63% each) were the main barriers. Interviewees noted Croatia's extensive mandatory seafarer training already exists, so CodeBLUE micro-credentials should complement rather than duplicate it.



5.3. Survey and Interview Results in Greece

RESPONDENT PROFILE AND AEGEAN CONTEXT

Greece's national study was led by the University of the Aegean, whose island-based campuses provide a distinctive and directly relevant context for blue-economy tourism education. Greece's national study focused on academic programmes in tourism, hospitality, and related fields across the Aegean archipelago.

Survey 1 attracted 32 respondents, predominantly postgraduate students (50%) and undergraduates (46.9%), with one professor. The profile was overwhelmingly young (most respondents under 35) and predominantly female (75%), reflecting the demographic composition of tourism and hospitality programmes in Greece. Survey 2 attracted 31 respondents from private hospitality businesses (32.8%), public institutions and local authorities (22.6%), and other sector organisations. Ten semi-structured expert interviews were conducted, and findings were validated at a national workshop on 22 April 2026.

Greece's coastal and maritime tourism economy is among the most globally prominent, built around the Aegean and Ionian islands, with strong connections to maritime heritage, yacht tourism, diving, and island eco-tourism. The country's blue economy is heavily dependent on tourism, with maritime transport and fisheries representing secondary but important sectors. Blue economy familiarity among academic respondents was moderate at 2.6/5, with the concept most strongly associated with sustainable tourism (3.9/5), marine ecosystem protection (3.8/5), and the circular economy (3.7/5) in open-text associations. This association pattern reveals that Greek tourism students frame the blue economy predominantly in conservation and sustainability terms, rather than as a broader economic development framework encompassing innovation, digital transformation, and workforce development.



CURRICULUM ANALYSIS AND SKILL RATINGS

The Greek curriculum is partially structured: most programmes partially cover marine/coastal tourism (56.3%), fully cover marine sustainability (65.6%), and include interdisciplinary courses (62.5%). But maritime safety is absent from 71.9% of programmes—the highest gap among all partner countries—and environmental studies/marine ecology is missing from 53.1%. Governance/planning (21.9%) and communication skills (18.8%) show smaller gaps, significant given the ecological and regulatory complexity of the Aegean islands.

Greek academics rated all four skill clusters similarly important—technical (4.1/5), environmental (4.0/5), digital (3.9/5), business/innovation (4.0/5)—yet coverage, especially for technical and safety content, lags behind. Interviewees confirmed this mismatch, noting island tourism demands versatile professionals combining water sports coordination, environmental interpretation, cultural heritage facilitation, and emergency response—a mix no single existing curriculum provides.



TRAINING PREFERENCES AND MOTIVATIONS

Greek academic respondents expressed strong preferences for blended or hybrid training (56.3%), with 25–30-hour micro-credentials favoured by 40.6% of respondents. Key motivators for engaging with blue-economy training were skills acquisition (78.1%), ECTS credit recognition (59.4%), and access to theoretical knowledge (50%). These data point to a learner population that is both practically motivated (seeking directly employable skills) and academically engaged (valuing formal recognition through credit-bearing credentials). Employer respondents from the hospitality and public institutional sectors emphasised the value of practical training components and expressed interest in structured cooperation between the University of the Aegean and Aegean island tourism businesses for placement-based skill development. The national workshop confirmed the strategic importance of positioning CodeBLUE micro-credentials as credit-bearing supplements to existing tourism degree programmes, rather than as standalone vocational certificates.



5.4. Survey and Interview Results in Spain

RESPONDENT PROFILE AND NATIONAL CONTEXT

The Spanish national study was led by CETT – Barcelona School of Tourism, Hospitality and Gastronomy, a specialist higher education institution with extensive links to Catalonia's coastal and maritime tourism sector. Spain is one of the world's leading tourism economies, with the sector contributing 12.6% of national GDP and 12.3% of total employment; coastal tourism specifically accounts for approximately 70% of blue-economy employment and 64% of blue economy GVA (EU Blue Economy Observatory, 2023).

Survey 1 attracted 11 respondents, primarily lecturers (55%), undergraduate students (27%), a Master's student, and a researcher. Survey 2 attracted 4 employer respondents, representing a training/education provider, two NGOs, and a public foundation, making it the smallest employer sample among partner countries. The quantitative data were substantially enriched by six semi-structured interviews (April–May 2026), a focus group with four participants from marine-sector organisations (25 March 2026), and a national validation workshop in hybrid format on 29 April 2026 attended by sector stakeholders from across the Catalan coast.

Spain presents a distinctly different profile from other partner countries in terms of blue-economy awareness. Six of the eleven academic respondents described themselves as “extremely familiar” with the blue economy concept, and all four business respondents (100%) confirmed familiarity with the “blue skills” concept. This comparatively high awareness reflects Spain's engagement with EU maritime policy processes, its active blue economy research community, and CETT's own institutional involvement in sustainability and blue-economy initiatives.



SKILL GAPS: QUANTITATIVE AND QUALITATIVE FINDINGS

Despite high awareness, the Spanish survey shows clear, measurable gaps between competence importance and actual coverage—the most precise gap data among all partner countries: risk prevention (4.73 vs. 3.00, gap –1.73), stakeholder collaboration (4.64 vs. 3.18, gap –1.46), maritime safety (4.45 vs. 2.82, gap –1.63), innovation in maritime tourism (4.45 vs. 2.91, gap –1.54), digital skills/GIS (4.09 vs. 2.73, gap –1.36), and marine tourism marketing (4.00 vs. 2.82, gap –1.18).

Spanish employers rated all environmental and marine-science skills at the maximum 5.0/5, underscoring ecological stewardship as essential. Digital marine data collection topped importance (5.0/5) despite a notable coverage gap; marine tourism marketing and stakeholder collaboration also scored 5.0/5, reflecting a business focus on networking and differentiation. Top barriers were funding, course availability, and qualified trainers (all 4.33/5); preferred solutions emphasised university cooperation and financial support (both 5.0/5).



QUALITATIVE INSIGHTS FROM FOCUS GROUPS AND INTERVIEWS

Focus group and interview participants identified additional competence needs not captured in the 24-item survey. These included: community consultation and participation processes for integrated coastal management; global coastal governance and international marine policy literacy; regulation of marine resource exploitation within tourism contexts; citizen science approaches to marine monitoring; regenerative tourism education that actively restores coastal ecosystems rather than merely avoiding damage; and seasonal adaptability competences that reflect the dual demands of high-season service delivery and off-season maintenance, training, and product development. Participants universally reported that current tourism graduates lack “ocean culture” — an integrated understanding of marine environments, their ecological dynamics, and their relationship to the communities and economies that depend on them. This concept goes beyond discrete skills and points to a broader educational transformation needed in coastal and maritime tourism programmes.

5.5. Survey and Interview Results in Portugal

RESPONDENT PROFILE AND ALGARVE CONTEXT

Portugal's national study was led by the KIPT Research Collaboratory focusing on the Algarve region — Portugal's primary coastal tourism destination — serving as the main research context.

Survey 1 and Survey 2 each attracted 32 respondents; the academic sample included educators, students, and alumni, while the employer sample reflected a highly educated and experienced profile, with 93% holding higher-education qualifications and 63% reporting more than ten years of professional experience. The Algarve contributed the largest share of employer respondents (40%), followed by the North (27%) and Lisbon (17%). Ten semi-structured interviews were conducted with highly positioned representatives of key Algarve blue-economy institutions: Turismo do Algarve, the Centre of Marine Sciences (CCMAR), the Regional Development Commission of Algarve (CCDR Algarve), Green Colab, the Research Centre for Tourism, Sustainability and Well-being (CINTURS), the Marine and Environmental Research Centre (CIMA), senior researchers from the University of Algarve, and maritime transportation and coastal animation operators. Findings were validated at a national online workshop on 29 May 2026.

Portugal's key finding is a stark gap between tourism enrolment scale and blue-economy content integration. Of 456,032 higher education students, about 5% study services, nearly half of them (49%) in tourism/hospitality. Yet only 28% of existing programmes include any blue-economy content, leaving roughly 72% of tourism students without exposure to the marine, coastal, digital, or sustainability competences the sector increasingly requires (University of Algarve internal analysis, 2026).



EMPLOYER AND INTERVIEW FINDINGS

Portuguese employers ranked environmental impact management, sustainable coastal practices, climate-risk knowledge, and digital tourism platforms highest (all 4.5/5), with tourism product management close behind (4.3/5). Training priorities centred on new service development (4.44/5), alternative product creation (4.33/5), product management and stakeholder collaboration (both 4.11/5), and digital platforms (4.00/5)—reflecting a strong push toward product innovation as the Algarve matures as a coastal destination and seeks higher-value, year-round tourism.

Interviews offered the most detailed skills-gap picture among all partner countries: 8 of 10 interviewees flagged environmental/marine-science skills as the top gap, 6/10 cited technical/operational skills, and 5/10 cited social/communication skills. Specific gaps included waste and water-treatment management, coastal zone management, and maritime tourism regulation. All 10 interviewees stressed the need for interdisciplinary competences spanning marine science, sustainability governance, and tourism management—a combination current single-discipline programmes don't offer.



TRAINING PREFERENCES AND STRATEGIC PRIORITIES

Training delivery preferences among Portuguese learners and practitioners showed strong emphasis on practical, hands-on formats (highlighted by 8/10 interview respondents), short modular courses (7/10), and blended or hybrid formats (5/10). Motivations for training were led by skills acquisition (83%), micro-credential certification (52%), and networking opportunities (48%), suggesting that Portuguese coastal tourism professionals are highly practical and credential-oriented in their approach to professional development. Main barriers were low awareness of opportunities (62%), limited course availability (62%), insufficient funding (55%), and time constraints (48%). The most highly valued solution was more practical training (90%), followed by university cooperation (62%), short courses and micro-credentials (55%), and financial support (52%). Portugal's stakeholders articulated four strategic curriculum priorities for CodeBLUE: environmental and sustainability competences, digital and data skills, business innovation and tourism product development, and social skills — a framework that serves as a useful strategic organising principle for the entire transnational curriculum design process.



06 COMPARATIVE ANALYSIS OF SKILLS ACROSS THE FIVE COUNTRIES



The comparative analysis presented in this section synthesises quantitative survey data and qualitative interview findings from all five partner countries to identify cross-national patterns, structural gaps, and country-specific variations in blue-economy tourism skill provision. The analysis is structured around the five BlueComp competence clusters (European Climate, Infrastructure and Environment Executive Agency, 2025), with reference to specific importance and coverage data from national surveys. Figure 1 provides a visual overview of average skill cluster importance ratings by country, illustrating both the commonalities and differences in prioritisation across the partnership.

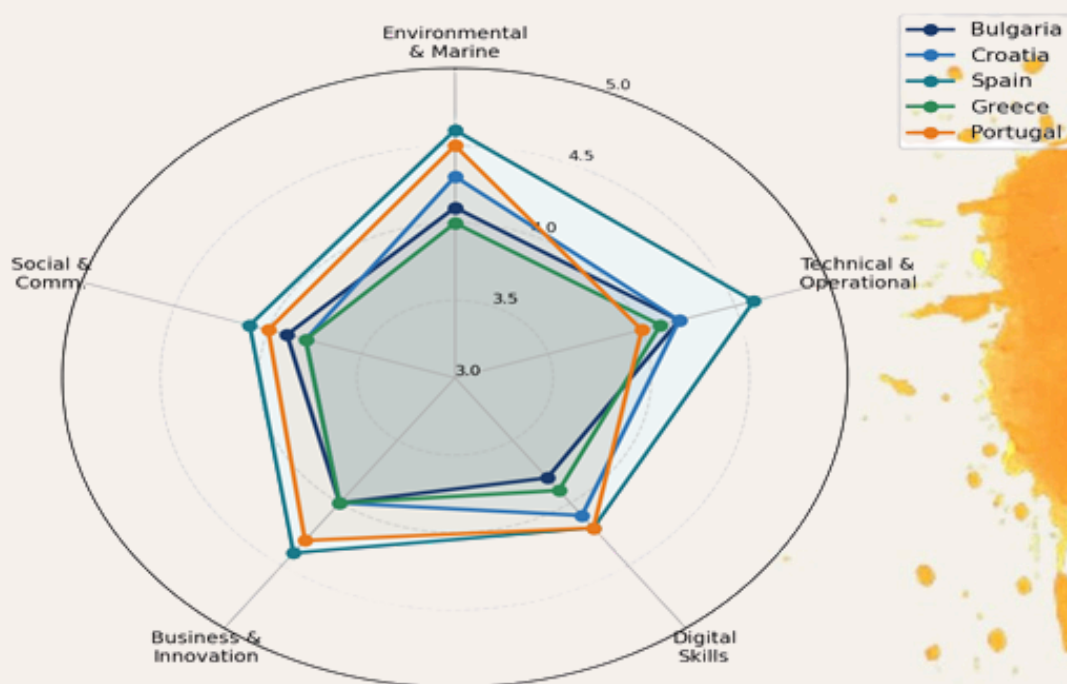


Figure 1. Average skill cluster importance ratings by country (academic respondents, scale 1–5).

Note: Values are estimated means from national survey data; see individual national reports for full data table (Annexes 2-6).

This section presents a cross-country comparative analysis of the five BlueComp skill clusters, drawing on Survey 1 (academic respondents), Survey 2 (employer and stakeholder respondents) and interview data from all five partner countries. The analysis highlights both universal gaps shared across the partnership and country-specific variations that reflect local sector structures and educational contexts.

6.1. Environmental and Marine Science Skills

Environmental and marine science competences are the most consistently prioritised skill cluster across all five partner countries, with Spain recording the highest average importance scores (4.64/5 for marine ecosystem understanding and climate risk knowledge) and Portugal rating environmental impact management and sustainable practices at 4.5/5 among employers. In Greece, environmental skills received a mean importance score of 4.0/5 from academic respondents, while in Croatia environmental impact management was rated very important by 90% of Survey 1 participants. Bulgaria, despite its lower blue-economy awareness overall, demonstrated strong recognition of environmental skills importance through interview data, with all interview respondents emphasising marine ecosystem understanding as a non-negotiable foundation for sustainable coastal tourism.

The curriculum coverage picture is considerably less encouraging. In Greece, 53.1% of academic respondents reported that environmental studies and marine ecology were absent from their programmes. Croatian employers noted significant shortages in practical application of environmental skills, particularly relating to ecological carrying capacity management and climate adaptation planning. Bulgaria and Croatia show the largest gaps between the theoretical importance attributed to environmental competences and their actual integration into tourism curricula. Portugal and Spain have more developed coverage of general sustainability content, but both identify ICZM, MSP, and applied marine ecology as critical areas requiring significant strengthening. Figure 2 presents a cross-national comparison of the most critical curriculum gaps.

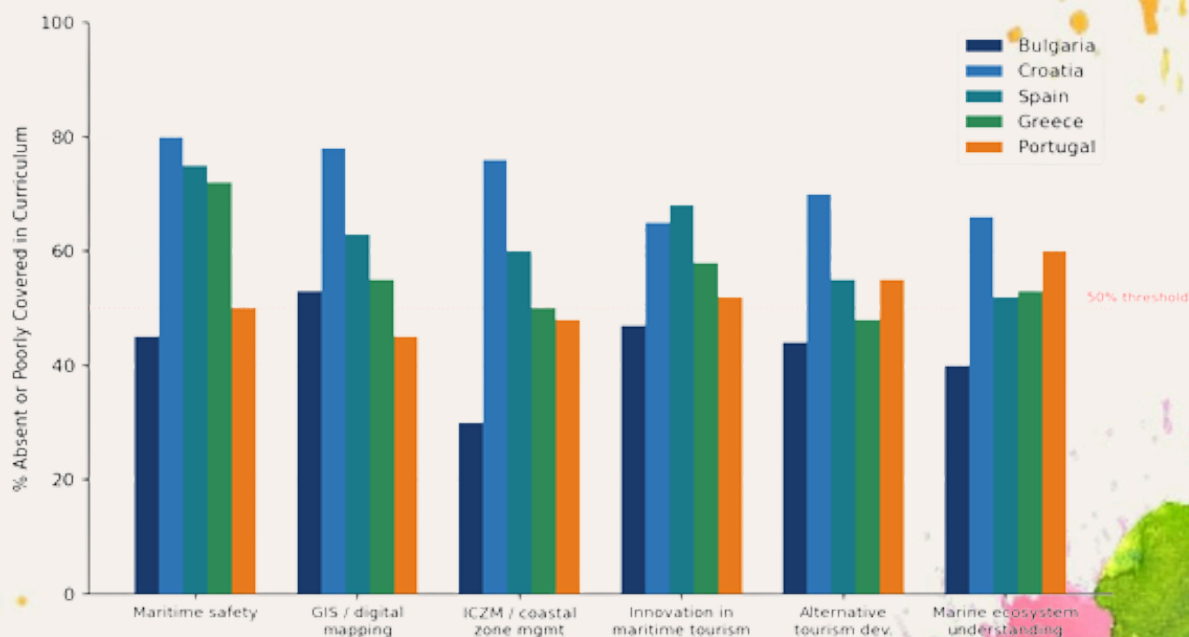


Figure 2: Critical curriculum gaps by country — percentage of respondents rating key skills as absent or poorly covered in academic programmes



The persistent gap in ICZM and MSP coverage is particularly significant from a policy perspective. Integrated coastal zone management is a European legal obligation under the ICZM Protocol (2008) and the EU's Integrated Maritime Policy, yet the study reveals that tourism education in all five partner countries fails to prepare graduates for the governance roles they will increasingly be expected to play in coastal destination management. This points to a structural curriculum gap that goes beyond individual skill development and reflects a broader disconnection between academic tourism education and the evolving regulatory landscape of European coastal management.

Environmental and marine science competencies — including marine ecosystem understanding, environmental impact management, sustainable coastal practices, climate risk awareness, and integrated coastal zone management (ICZM) — were rated as highly important across all five partner countries. In Portugal, employer respondents gave environmental impact management and sustainable practices the highest importance scores (4.5/5 each). In Spain, marine ecosystem understanding and climate risk knowledge were rated at 4.64/5 by academic respondents. In Croatia, environmental impact management was the top-rated competence (90% of Survey 1 respondents), and in Greece, environmental skills received an average importance rating of 4.0/5.

Despite high importance ratings, actual curriculum coverage of environmental and marine science skills is inconsistent. Bulgaria and Croatia show the largest gaps: in Bulgaria, marine-ecology-focused content is reported as largely absent, with interview respondents highlighting the need for content on marine ecosystem understanding and environmental impact management. In Greece, 53.1% of Survey 1 respondents reported that environmental studies and marine ecology were missing from their programmes. Spain and Portugal show somewhat stronger coverage of general sustainability themes, but both report critical gaps in more specialised areas such as ICZM, MSP, and applied marine ecology for tourism contexts.



6.2. Technical and Operational Skills

Technical and operational skills represent the single most consistently underserved cluster across all five partner countries. Maritime safety and incident response emerged as the most critical gap in every national study: in Greece, 71.9% of academic respondents reported maritime safety as absent from their curricula; in Croatia, the figure was 59%; in Bulgaria, risk prevention and incident response were among the top training needs identified through interviews; and in Spain, maritime safety showed the second-largest importance-coverage gap (-1.63). Water sports instruction, coastal zone management, and marine infrastructure maintenance were similarly underrepresented across countries, with Croatia reporting coastal zone management coverage at only 24.39% and water sports at 21.95%.

Water sports instruction and supervision were similarly underrepresented: Croatian data showed 21.95% coverage, while Bulgaria and Greece identified water sports as prominent gaps in both academic programmes and employer workforce training. Coastal zone management and marine infrastructure maintenance were rated as very scarce by 66% of Croatian employers, and the Portuguese interview data confirmed that technical operational knowledge is the second most frequently cited competence gap (6/10 interviews).

The structural challenge with technical and operational skills is that they require significant investment in physical infrastructure (boats, safety equipment, marine environments), qualified instructors (typically with sector certification), and logistical arrangements that conventional university programmes are poorly positioned to provide. The CodeBLUE response — developing micro-credentials that can be delivered in partnership with coastal tourism businesses and maritime training centres — directly addresses this structural barrier by shifting practical skill delivery to the sector rather than attempting to replicate it within academic institutions (Interreg Italy-Croatia MareSkill Programme, 2025).

The low coverage of technical skills reflects a structural challenge in tourism higher education across all five countries: academic programmes have historically prioritised management, hospitality, and cultural dimensions of tourism over applied technical maritime competences. This mismatch is particularly acute in countries with high blue-economy tourism intensity (Croatia, Spain, Greece), where sector employers must invest significantly in on-the-job technical training for new recruits.



6.3. Digital Skills

Digital skills and competences — encompassing GIS and marine spatial data tools, digital tourism platforms and booking systems, online tourist communication and marketing, and marine data collection and analysis — represent the second most consistently underserved cluster. In Bulgaria, 53% of academic respondents reported that GIS and digital mapping were absent from curricula; digital tourism platforms and online communication were absent for 37% each. In Croatia, GIS coverage was reported at only 21.95%. In Spain, digital marine data analysis was identified as the scarcest employer skill, with a significant importance–coverage gap of –1.36 for digital and GIS skills. In Greece, digital skills received an average importance rating of 3.9/5 but were notably underrepresented in coastal tourism programmes.

The digital skills gap is compounded by the rapid evolution of the tourism technology landscape: digital booking platforms, data analytics, and AI-assisted visitor management tools are increasingly central to coastal tourism operations, yet tourism education has not kept pace. Portugal's employer respondents rated digital tourism platforms at 4.5/5 in importance while simultaneously noting their absence from workforce training pathways, and Portugal's strategic framework explicitly identifies digital and data skills as one of four priority areas for the prospective CodeBLUE curriculum.

6.4. Business and Innovation Skills

Business and innovation skills emerge from the comparative data as the cluster where the gap between academic provision and sector demand is most strategically significant. Innovation in maritime tourism was rated as very scarce by 79% of Croatian employers, and showed a –1.54 gap in Spain; alternative tourism development was scarce for 74% of Croatian employers and the second-highest rated training need in Portugal (4.33/5). The Portuguese survey found new tourism services development as the single highest-rated employer training priority (4.44/5), and Bulgaria's interview data identified innovation in maritime tourism as the competence most urgently requiring curriculum development.

This cluster points directly to the strategic transformation challenge facing coastal tourism in all five partner countries: the need to move from volume-based, highly seasonal mass tourism models toward more diversified, higher-value, year-round blue-economy tourism offerings. Achieving this transformation requires workforce competences in product design, innovation methodology, business model development, and stakeholder partnership management — competences currently absent from most tourism curricula in the partner countries. Figure 3 presents a cross-national comparison of employer-rated skill scarcity, underscoring the universal prioritisation of innovation and business development competences.

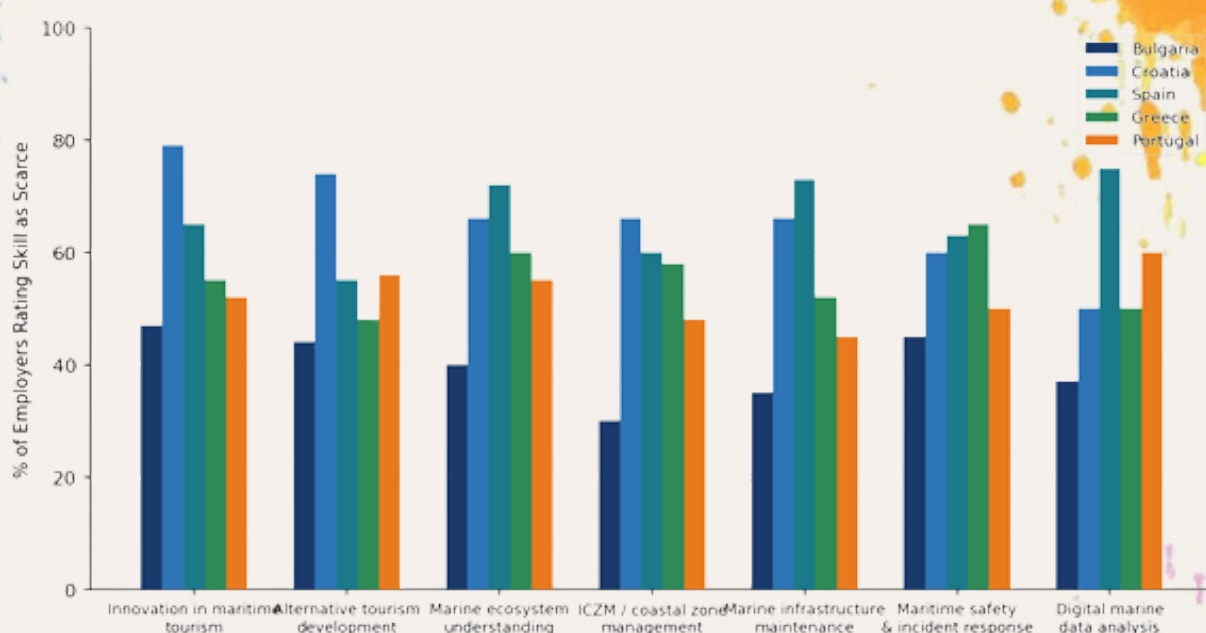


Figure 3. Most scarce blue-economy tourism skills by country – employer survey respondents (% rating skill as scarce or very scarce)



6.5. Social, Cultural and Communication Skills

Social, cultural, and communication competences were raised as a research aspect during the interviews and focus group discussions. Working with partners and stakeholders was the best-covered skill in Croatian academic programmes (65.85%), and communication competences were generally rated as adequately addressed in Greek, Portuguese, and Spanish curricula. However, qualitative data from Spain's focus group and interviews reveal emerging needs in more specialised dimensions of social competences that standard tourism curricula do not yet address.

These include: community consultation and participatory processes for integrated coastal management; facilitation of citizen science initiatives for marine environmental monitoring; intercultural competences specific to maritime heritage tourism; and regenerative tourism education approaches that actively engage local communities as co-creators of sustainable coastal tourism products. Portuguese interview respondents (5/10) identified social and communication skills as a significant gap, particularly in contexts requiring cross-sector collaboration between tourism, marine science, and governance institutions. Across all countries, the social skills cluster shows the narrowest importance-coverage gap, suggesting that existing tourism education has been more successful in addressing interpersonal and communication competences than technical, digital, or environmental ones.



07

CLASSIFICATION OF SKILLS BY GROUPS (ENVIRONMENTAL, TECHNICAL, DIGITAL, BUSINESS, SOCIAL)





Based on the comparative analysis of survey, interview, and workshop findings across all five partner countries, the knowledge, skills, and competences needed for blue-economy coastal and maritime tourism can be systematically classified into five clusters aligned with the BlueComp framework. For each cluster, the most frequently identified priority competences and proposed training topics are listed below.

7.1. Environmental and Marine Science Cluster

The environmental and marine science cluster addresses the foundational ecological and sustainability knowledge that all blue-economy tourism professionals require, regardless of their specific functional role. Drawing on the comparative survey data, the most critical priority competences within this cluster are: understanding of marine ecosystems and biodiversity (universally identified as a critical gap across all five countries); knowledge of climate risks and adaptation strategies for coastal areas (rated 4.5/5 by Portuguese employers, 4.64/5 by Spanish academics); sustainable practices in coastal and maritime tourism operations (rated 4.3/5 by Greek employers); environmental impact assessment and monitoring in tourism contexts; integrated coastal zone management (ICZM) and maritime spatial planning (MSP); and marine pollution awareness and waste management.

Recommended training topics for this cluster, as identified by partner country stakeholders, include: marine ecology field modules on Aegean, Adriatic, Atlantic, and Black Sea ecosystems and their seasonal dynamics; climate vulnerability assessment for coastal tourism destinations; green certification and eco-label systems applicable to hotels, tour operators, and transport providers; practical environmental impact assessment tools for tourism project planning; ICZM and MSP literacy for tourism managers operating in regulated coastal zones; and sustainable waste and water management practices in beach and marina operations. The Portuguese interview data additionally highlighted marine protected area management and ecosystem services valuation as emerging priority topics, reflecting the growing integration of marine conservation and tourism governance in Algarve planning processes.

This cluster encompasses the foundational scientific and ecological knowledge that blue-economy tourism professionals need to operate responsibly in marine and coastal environments. Priority competences identified across partner countries include: marine ecosystem understanding and biodiversity awareness (identified in all five countries as a critical gap); environmental impact assessment and monitoring in tourism contexts; knowledge of climate risks and adaptation strategies for coastal areas; sustainable practices in coastal and maritime tourism operations; integrated coastal zone management (ICZM) and maritime spatial planning (MSP); and marine pollution awareness and waste management in coastal tourism settings. In Portugal, four of the ten interviewees specifically highlighted the need for content on marine protected areas and ecosystem services, which are increasingly relevant to certification-based sustainable tourism development.



7.2. Technical and Operational Cluster

This cluster covers the applied, hands-on skills required for safe and effective operation in coastal and maritime tourism environments. Priority competences include: maritime safety procedures and incident response protocols (the most universally absent competence across all five countries); water sports instruction and supervision; operation and basic maintenance of marine equipment; coastal zone and small port management; emergency procedures in marine environments; and navigation basics relevant to coastal tourism operations. All five country studies emphasise that this cluster is the most poorly served by existing academic programmes, and that addressing it will require practical, field-based training components that go beyond conventional classroom delivery.

Given the practical nature of these competences, effective delivery requires field-based components: on-water safety drills, rescue simulation exercises, marina and port site visits, and hands-on equipment operation sessions. The CodeBLUE micro-credential design should ensure that technical and operational modules are delivered in partnership with accredited maritime training providers, harbour master offices, and certified water sports instructors in each partner country, ensuring that credentials align with national maritime safety certification requirements.

7.3. Digital Cluster

The digital cluster encompasses a rapidly evolving set of competences that cut across all sectors of blue-economy tourism. Priority training topics identified across partner countries include: geographic information systems (GIS) for tourism planning, visitor flow management, and coastal resource mapping; digital tourism platforms including booking systems, channel management tools, and customer relationship management (CRM) applications; marine data collection, visualisation, and interpretation tools; online communication, digital marketing, and social media management for coastal tourism brands; use of mobile and web-based navigation tools; and application of digital tools for environmental monitoring and sustainability reporting. The Croatian and Bulgarian data highlight mobile navigation systems and online tourist communication as the most operationally immediate digital priorities for their coastal tourism workforces, while Spanish and Portuguese data point to a greater urgency around marine data analysis and GIS for destination management planning.

The pace of digital transformation in tourism demands that micro-credential content in this cluster be designed for regular updating. The CodeBLUE curriculum architecture should therefore include a modular digital skills component with built-in revision cycles aligned to technological change, potentially developed in collaboration with tourism technology providers and sector associations operating across partner countries.



7.4. Business and Innovation Cluster

The business and innovation cluster addresses the entrepreneurial and strategic competences required to transform blue-economy tourism into higher-value, more diversified, and more sustainable sector offerings. Priority training topics include: design and development of innovative maritime and coastal tourism products (marine heritage tours, responsible whale-watching, dive tourism, kayak eco-tours, culinary sea-to-table experiences); development of alternative and off-season tourism products to address seasonality challenges; tourism product management, pricing, and distribution strategy; business plan development for blue-economy SMEs and social enterprises; stakeholder partnership building and co-creation methodologies aligned with the quintuple-helix model of sustainable innovation; and new tourism services development incorporating technology, environmental responsibility, and local community engagement.

Spain's qualitative findings add important dimensions to this cluster, including community consultation as a prerequisite for legitimate and sustainable innovation in coastal destinations, and global coastal governance literacy as a competence for tourism professionals seeking to engage with international blue-economy frameworks and funding mechanisms (EU Maritime and Fisheries Fund, EMFAF; Interreg programmes; UN Ocean Decade). Croatia's national study highlights entrepreneurship education as a specific gap within the business cluster, with both employers (79% rating innovation as very scarce) and interview respondents emphasising that Croatian coastal tourism is "sustainability-ready but innovatively underdeveloped."

7.5. Social, Cultural and Communication Cluster

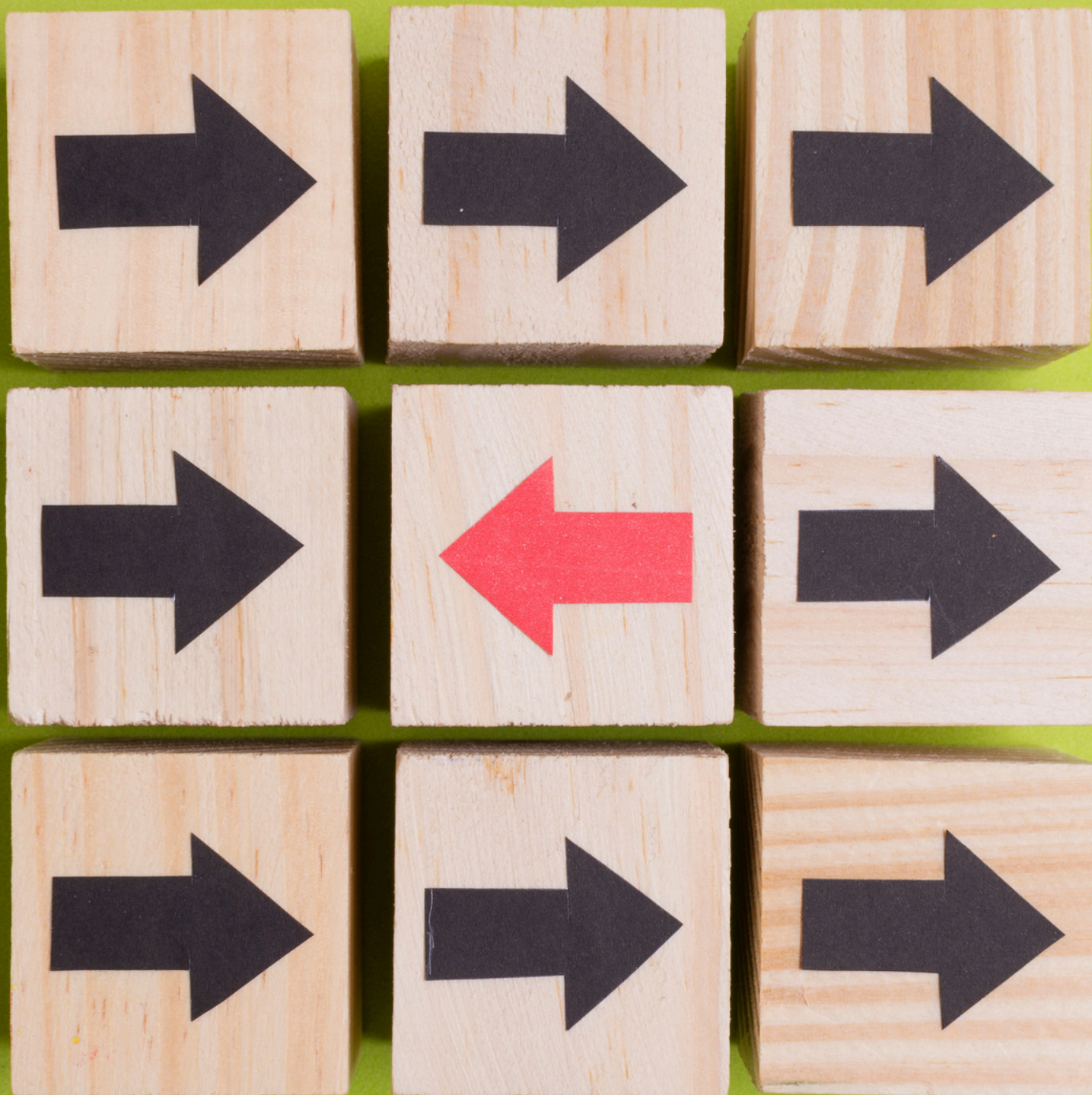
The social, cultural, and communication cluster, while the best-covered in existing curricula, contains important emerging dimensions that go beyond conventional hospitality communication training. Priority topics for CodeBLUE training development in this cluster include: intercultural communication in multilingual, multi-national coastal tourism environments; stakeholder and community engagement for participatory coastal destination governance; maritime cultural heritage interpretation and storytelling for diverse visitor audiences; facilitation of eco-volunteering and citizen science activities in marine environments; working with visitors with disabilities and elderly tourists in accessible marine tourism contexts; and regenerative tourism education that positions tourists as active participants in marine ecosystem stewardship rather than passive consumers of coastal resources.

Portugal's interview data and Spain's focus group findings converge on the importance of "ocean literacy" as a meta-competence underpinning the social and communication cluster: the capacity to understand, communicate, and inspire action around the relationships between human communities and marine ecosystems. While ocean literacy is not a single trainable skill, it represents a cross-cutting dispositions framework that should inform the ethos and pedagogical approach of the entire CodeBLUE curriculum.



08

COMMON TRENDS AND DIFFERENCES





This section analyses the principal cross-national patterns emerging from the five-country comparative assessment, examining both the common trends that transcend national contexts and the country-specific differences that reflect distinct sectoral structures, educational systems, and blue-economy development stages. Figures 4 and 5 provide visual summaries of the blue-economy awareness levels, and training format preferences that underpin this analysis.

Despite the diversity of national contexts — spanning the Black Sea, Adriatic, Mediterranean, and Atlantic coasts — the five CodeBLUE partner countries reveal a remarkably consistent pattern of blue-economy tourism skills gaps and educational priorities. This section identifies the key cross-cutting trends and highlights the principal differences between national contexts.

8.1. Common Trends Across Partner Countries

The most universal finding across all five partner countries is the near-complete absence of maritime safety, incident response, and water sports instruction from tourism academic curricula. This gap is not merely about missing content — it represents a serious safety risk for coastal tourism operations. Maritime safety requires regulatory compliance with international frameworks (STCW Convention), national maritime authority certification, and hands-on practice in realistic marine environments. The fact that tourism higher education in all five EU coastal nations has systematically failed to integrate these competences suggests a structural disconnect between the academic tourism education system and the operational realities of the blue economy.

The digital skills deficit identified across all five countries reflects a structural lag in curriculum development processes relative to the pace of technological change in coastal tourism. GIS, marine data analytics, and digital booking and communication tools are now operationally central to competitive coastal tourism management, yet tourism academic programmes continue to prioritise traditional management and hospitality competences. The gap is particularly acute because digital transformation is simultaneously reshaping the sector's environmental management practices (drone-based monitoring, satellite-linked conservation tools) and its market dynamics (online distribution channels, data-driven yield management), creating a compound demand for professionals who can bridge technical digital literacy with practical tourism management judgment.

EMPLOYER AWARENESS AND ENGAGEMENT

A striking and consistently observed trend is the low level of employer awareness of the “blue skills” concept across partner countries. In Croatia, 58% of employer respondents explicitly stated unfamiliarity with the term. Similar patterns were observed in Bulgaria (25% of academics not at all familiar with the blue economy) and Greece (average familiarity score 2.6/5). Spain and Portugal showed higher conceptual awareness, linked to their institutional engagement with EU maritime policy and blue-economy research programmes. This awareness gap has practical implications for skills development: if employers do not recognise “blue skills” as a distinct, valued competence category, they are unlikely to create dedicated recruitment pipelines, training investments, or workplace learning opportunities aligned with the BlueComp framework. CodeBLUE’s employer engagement strategy must therefore include an awareness-raising component alongside curriculum development.

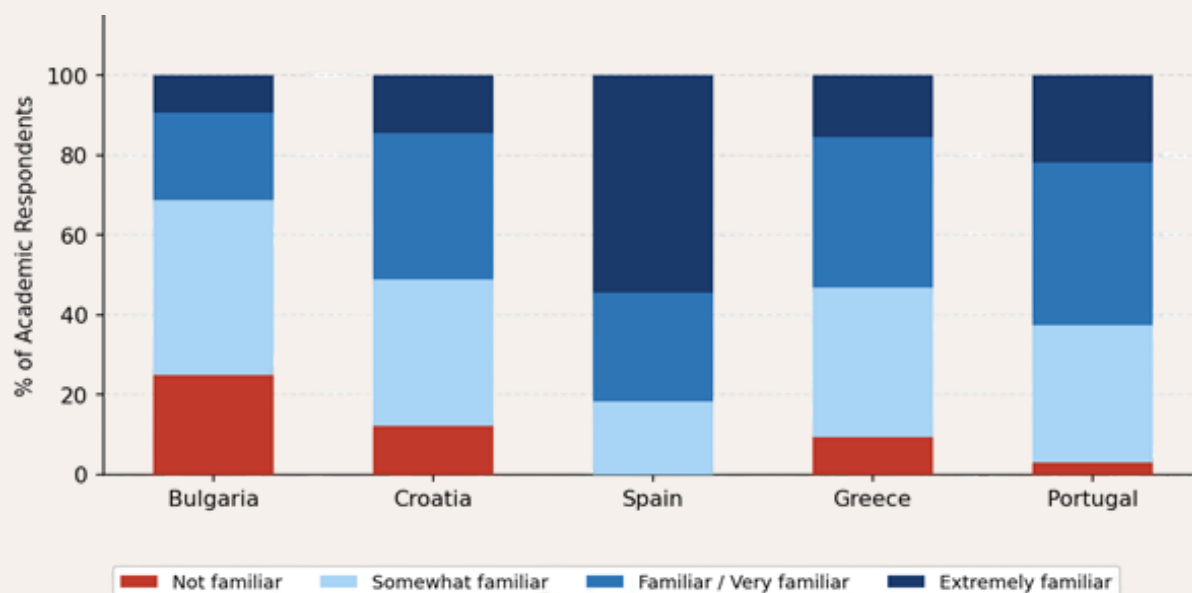


Figure 4. Blue economy familiarity – academic survey respondents by country (% by familiarity level).

The consistent prioritisation of innovation and business development competences by employers across all five countries points to a shared strategic challenge: coastal tourism sectors throughout the EU need to transition from volume-based, highly seasonal mass tourism models toward more diversified, higher-value, year-round offerings. This transition requires not just operational skills but entrepreneurial and strategic capabilities that enable tourism professionals to design new products, forge cross-sector partnerships, attract new visitor segments, and manage the financial and environmental dimensions of sustainable growth. The CodeBLUE curriculum must therefore place significant emphasis on the business and innovation cluster, ensuring that graduates can contribute to this strategic transformation of the sector.

The near-universal preference for blended or hybrid training formats, combined with the strong demand for short micro-credentials (20–30 hours), provides a clear pedagogical mandate for the CodeBLUE curriculum design. Blended delivery formats allow the practical, field-based components that characterise environmental, technical, and operational skill development to be combined with the theoretical and digital-skills content that lends itself to online delivery. This format also accommodates the geographic dispersal of coastal tourism workforces — from the Black Sea to the Adriatic and Atlantic coasts — and the seasonal work patterns that constrain access to intensive block-format training.

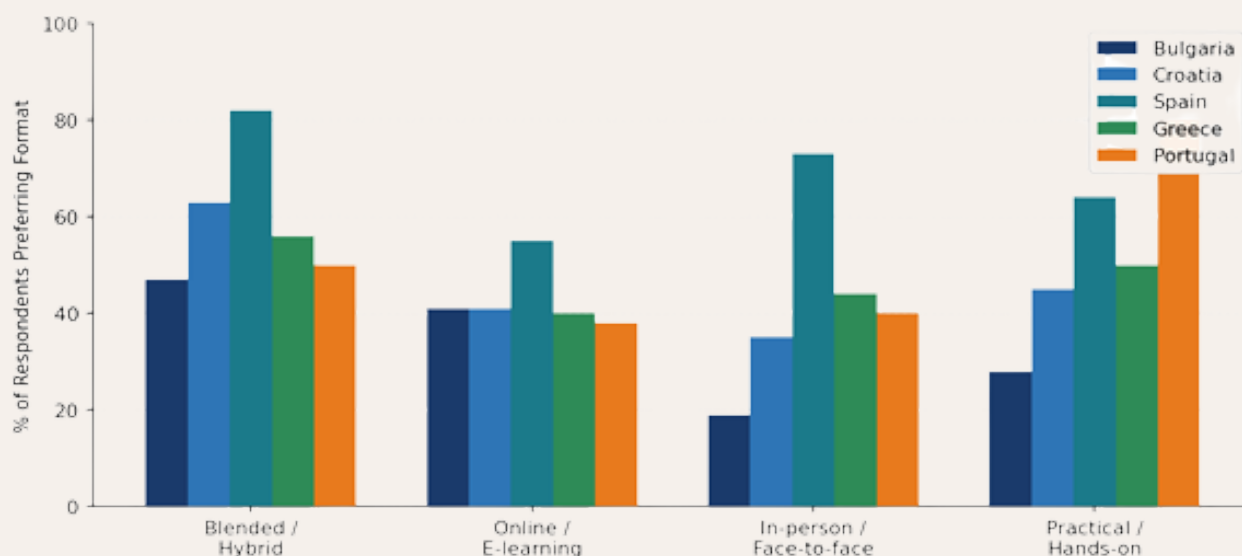


Figure 5. Preferred training delivery formats by country – academic/learner respondents (% selecting each format).

8.2. Country-specific differences

Beyond the structural similarities, the comparative data reveals meaningful differences in national context, sector profile, and priorities that must be reflected in the differentiated national delivery of the CodeBLUE curriculum.

The scale and structure of the blue-economy tourism sector vary significantly across partner countries. Croatia presents the most economically intensive case, with coastal tourism contributing approximately 75% of blue economy employment and 11% of national GDP, creating acute sector pressure for skilled graduates. Spain's coastal tourism sector (70% of blue economy employment, 12.6% of GDP) is similarly large but benefits from a more developed awareness ecosystem among academic institutions. Greece and Portugal operate at a somewhat smaller scale but with strong regional concentrations (Aegean islands and Algarve, respectively) that create intense local demand for blue-economy competences. Bulgaria's Black Sea coastal tourism sector is smaller and characterised by a higher reliance on domestic tourism, creating different competence priorities around language, online communication, and local stakeholder partnerships.



Blue economy and skills awareness is highest in Spain and lowest in Bulgaria and Croatia. Whereas 6 of 11 Spanish academic respondents described themselves as “extremely familiar” with the blue economy concept, and all Spanish business respondents knew the “blue skills” concept, Bulgarian and Croatian findings reveal substantially lower levels of conceptual familiarity. Greece falls in the middle, with moderate familiarity but strong associative thinking linking the blue economy to sustainable tourism and marine protection. Portugal shows intermediate-to-high familiarity among professionals engaged in coastal zone management, reflecting the country’s involvement in EU maritime governance processes.

Employer survey sample sizes reflect differences in sector engagement with higher education. Spain’s small employer sample (4 respondents) should be interpreted with caution; qualitative methods (interviews, focus group, validation workshop) provided the main empirical foundation for Spanish findings. Bulgaria, Croatia, Greece, and Portugal each achieved employer samples of 31–38 respondents, providing more statistically robust data. These differences in sample composition mean that direct quantitative comparisons between countries must be treated with care, and that qualitative and contextual factors are essential for interpreting the cross-national patterns.

Training delivery preferences reveal a coastal geography divide. Learners in Croatia strongly prefer blended-online delivery (63%), while Croatian employers prefer in-person formats (63%) — a tension reflecting the dispersed geography of the Croatian coast. In contrast, Portugal’s interview respondents emphasised practical and field-based training (8/10), reflecting the applied nature of Algarve’s coastal tourism operations. Spain and Greece show more mixed preferences aligning with international norms for professional development in tourism. Bulgaria shows a strong lean towards online learning (41%), which may reflect infrastructure constraints in accessing training in smaller coastal communities.



09

SUMMARY OF FINDINGS

RECAP



The development of a sustainable and competitive blue economy has become a strategic priority across Europe, with coastal and maritime tourism representing one of its most dynamic sectors. Within this context, Bulgaria holds a particularly important position due to its Black Sea coastline, established tourism destinations, maritime heritage, and growing potential for innovation in coastal services, environmental management, and year-round tourism experiences. As tourism remains a major contributor to employment and regional growth in Bulgaria's coastal areas, strengthening the human capital base of the sector is essential.

Bulgaria's coastal economy and tourism sector are at a pivotal moment, with the Burgas Ministerial Declaration and the National Sustainable Tourism Strategy 2014–2030 providing a policy framework for blue economy development that currently outpaces the educational infrastructure to support it. The national study reveals a significant awareness gap: only 21,9 % of academic respondents consider themselves familiar or very familiar with the blue economy concept, yet 81.2% rate coastal and maritime tourism as very or extremely important for the blue economy. This paradox — valuing the sector without conceptualising its blue economy dimensions — suggests that targeted awareness-raising is a prerequisite for effective blue-skills curriculum development in Bulgaria. The most critical curriculum gaps — GIS (53% absent), innovation in maritime tourism (47% absent), new product development (44% absent) — point to a curriculum strongly oriented toward conventional hospitality and service management that has not yet incorporated the applied, marine-specific, and innovation-oriented competences needed for competitive and sustainable blue-economy tourism. The high preference for online and blended training formats (47% and 41% respectively), combined with the preference for 10–20 hour modules, provides a clear delivery framework for CodeBLUE micro-credentials in Bulgaria. These should be developed with the Varna University of Management and positioned as supplementary qualifications for tourism professionals along the Black Sea coast, aligned with the specific competitive challenges of Black Sea tourism.

Croatia's coastal and maritime tourism sector is among the most economically significant in the European Union, contributing approximately 75% of blue economy employment and gross value added, and around 11% of national GDP. Despite this prominence, the national study reveals a persistent disconnect between academic training and sector requirements. Maritime safety, GIS, water sports, and coastal zone management were found to have critically low curriculum coverage (ranging from approximately 20–24% of programmes), while employer respondents — 58% of whom were unfamiliar with the concept of “blue skills” — consistently identified innovation in maritime tourism (79% scarce), alternative tourism development (74% scarce), and marine ecosystem understanding (66% scarce) as the most urgent recruitment challenges. The study underscores the need for practically oriented, applied training modules, with learners preferring blended-online delivery and employers favouring in-person and practical formats.



Croatia presents the most urgent case for CodeBLUE intervention among partner countries, given the extreme economic dependence of the national economy on coastal tourism (75% of blue economy employment and GVA) and the consistently low assessment of skill coverage in critical competence areas. The study reveals a sector that is “sustainability-ready but operationally and innovatively underdeveloped,” in the words of a national workshop participant: tourism graduates arrive in the sector with solid environmental awareness but without the maritime safety, GIS, innovation, or alternative product development competences that employers urgently need. The 79% employer scarcity rating for innovation in maritime tourism is the single most extreme data point in the entire comparative study, signalling a critical market failure in the supply of entrepreneurial and product-development competences that are essential for the diversification of Croatia’s coastal tourism economy. The CodeBLUE curriculum should be positioned in Croatia as a strategic national human capital development initiative, aligned with the Ministry of Tourism’s Sustainable Tourism Strategy to 2030 and the EU-funded MareSkill and BluesLinks projects that are already building cross-sector skills partnerships in the Adriatic region. The PAR University of Applied Sciences should lead on technical and operational skill modules, building on Croatia’s existing maritime education infrastructure and leveraging established relationships with Adriatic coast tourism businesses.

Spain’s blue-economy tourism sector is characterised by relatively high institutional awareness of blue economy concepts and strong engagement between academic institutions and the sector. The national study, led by CETT in Barcelona, reveals that while academic familiarity with the blue economy is high compared to other partner countries, significant implementation gaps persist between the skills taught and those demanded by coastal and maritime tourism employers. Risk prevention (importance–coverage gap of -1.73), maritime safety (-1.63), and innovation in maritime tourism product development (-1.54) represent the most urgent training needs. Employer respondents identified digital marine data analysis as the scarcest available skill (2.5/5), and proposed university–sector cooperation and financial support as the primary enablers for scaling up blue-economy skills training. Spain’s qualitative findings additionally highlight emerging needs in community consultation, global coastal governance, citizen science, and regenerative tourism education that are not yet captured in standard competence frameworks.

Spain’s national findings confirm that high blue-economy awareness does not automatically translate into adequate skills provision. Despite CETT’s institutional leadership in tourism education innovation and the high level of conceptual familiarity among academic respondents, the gap analysis reveals substantial shortfalls in risk prevention, maritime safety, digital skills, and innovation competences. The -1.73 gap for risk prevention is the largest measured in any single competence across all five countries, underlining that safety culture in Spanish coastal and maritime tourism remains a critical area for development.



Spain's national findings confirm that high blue-economy awareness does not automatically translate into adequate skills provision. Despite CETT's institutional leadership in tourism education innovation and the high level of conceptual familiarity among academic respondents, the gap analysis reveals substantial shortfalls in risk prevention, maritime safety, digital skills, and innovation competences. The -1.73 gap for risk prevention is the largest measured in any single competence across all five countries, underlining that safety culture in Spanish coastal and maritime tourism remains a critical area for development. The qualitative findings from Spain's focus group and interviews provide the most sophisticated and forward-looking account of blue-economy skill needs among all partner countries, identifying not just what is missing but proposing a transformative vision — ocean literacy, citizen science, regenerative tourism, global coastal governance — for what blue-economy tourism education should become. Spain's four business respondents (all familiar with "blue skills," all rating environmental skills at 5.0/5) provide a benchmark for the employer engagement that CodeBLUE seeks to achieve across all partner countries. CETT should leverage its Barcelona metropolitan location and its links with the Catalan coastal tourism ecosystem to develop micro-credentials that are both practically applicable and internationally marketable, positioning CodeBLUE qualifications as part of Spain's broader repositioning as a leader in sustainable blue tourism within the EU.

Greece's national study, conducted by the University of the Aegean, surveyed a predominantly young, female higher-education population with moderate familiarity with the blue economy (2.6/5). The study found that coastal and maritime tourism programmes cover general sustainability and interdisciplinary content reasonably well (present in 62–65% of programmes), but are critically deficient in maritime safety (71.9% absent), applied marine ecology (53.1% absent), and digital marine skills. Employer respondents from the hospitality and public institutional sectors rated technical and environmental competences as most important, while academy respondents consistently favoured (40,6%) blended micro-credential formats (25–30 hours) as the most appropriate training intervention. Greece's study highlights a particular opportunity: a highly motivated young learner population already engaged in tourism education and seeking additional, practically relevant blue-economy content through recognised, credit-bearing short courses.

Greece's national study, conducted by the University of the Aegean in the world's most island-dense marine tourism destination, reveals a distinctive combination of environmental awareness, moderate blue-economy conceptualisation, and critical technical skill gaps. The 71.9% absence rate for maritime safety in academic programmes is the highest among all partner countries, and the ecological sensitivity of the Aegean island environment makes this gap particularly consequential: tourism operators without adequate maritime safety training are not only a liability risk but a potential threat to the very marine ecosystems that sustain the Aegean tourism economy.



The highly motivated young learner population — predominantly postgraduate students with strong environmental awareness and a clear appetite for practical, credit-bearing training — represents an ideal initial target group for CodeBLUE micro-credentials in Greece. The University of the Aegean's multi-campus structure, spanning islands across the Aegean Sea, provides a unique platform for delivering maritime and coastal tourism training in authentic operational environments. CodeBLUE should work with the University of the Aegean to develop island-based field modules as a distinctive and replicable component of the international curriculum architecture, drawing on the specificity of Aegean marine ecology, maritime heritage, and island tourism economics.

Portugal's national assessment, led by the KIPT Research Collaboratory, delivers perhaps the most structurally comprehensive analysis of any partner country, integrating survey data with ten expert interviews from across the Algarve regional blue economy ecosystem. The headline finding — that only 28% of analysed tourism and hospitality programmes include any blue-economy skills content, despite tourism accounting for nearly half of all HE services students — represents a systemic gap that the CodeBLUE project is uniquely positioned to address. Employer and interview respondents identified environmental and marine science skills as the most critical gap (8/10 interviews), and proposed four strategic priorities that closely mirror the overall CodeBLUE framework: environmental and sustainability competences, digital and data skills, business innovation and tourism product development, and social skills. Portugal's findings, combined with those of the other four partner countries, provide a strong, evidence-based foundation for the design of a transnational micro-credential curriculum that is both locally relevant and internationally transferable.

Portugal's national assessment, led by the University of Algarve, provides the most comprehensive and institutionally engaged picture of blue-economy skill needs among all partner countries. The finding that only 28% of Portuguese tourism programmes include blue-economy skills content, despite tourism representing nearly half of all higher-education services enrolments, represents a systemic gap of striking proportions. The structured engagement of Algarve's blue-economy institutional ecosystem — marine science centres (CCMAR, CIMA), regional governance bodies (CCDR Algarve), sustainability innovators (Green Colab), and tourism research centres (CINTURS, CINTURS) — in the interview process provides CodeBLUE with an exceptional network for curriculum co-design, placement partnerships, and post-certification pathways. Portugal's four strategic curriculum priorities (environmental and sustainability competences, digital and data skills, business innovation and tourism product development, and social skills) align closely with the BlueComp framework and the emerging CodeBLUE curriculum architecture.

The strong preference for practical training (90% of interview respondents), combined with the high motivational weight of micro-credentials (52%) and networking (48%), suggests that a work-based learning model with formal credentialing — combining coastal field placements, expert network access, and recognised micro-qualification awards — would be particularly well-received in the Algarve context.



Portugal's study should be used as a benchmark for the integration of CodeBLUE curricula into existing HE programme structures, given the University of Algarve's experience in both the sector and the regional governance ecosystem.

CROSS-NATIONAL IMPLICATIONS FOR THE CODE BLUE CURRICULUM

The comparative findings across all five partner countries converge on a set of clear and actionable implications for the CodeBLUE curriculum design and delivery strategy.

1

the curriculum must be modular and flexible: the near-universal preference for 20–30-hour micro-credentials delivered in blended or hybrid formats reflects real constraints on learner time and institutional capacity that a semester-length course structure cannot accommodate

2

the curriculum must be practically anchored: the consistently identified gap between theoretical importance and applied curriculum coverage points to the need for field-based, simulation, and work-placement components that connect classroom learning to operational coastal tourism contexts

3

the curriculum must be employer co-designed: employer awareness of “blue skills” is currently too low to generate spontaneous demand for CodeBLUE graduates; building employer engagement into the curriculum design process itself, as an awareness-raising and partnership-building mechanism, is a prerequisite for the long-term uptake of micro-credentials in the sector

4

the curriculum must address the full spectrum of BlueComp clusters, with particular depth in technical/operational and business/innovation areas where gaps are most severe and employer demand most urgent. The environmental and marine science cluster, while important, is relatively better covered by existing programmes and should be developed in ways that complement rather than duplicate existing sustainability content.

5

the curriculum must be nationally differentiated while internationally transferable: the country-specific differences in sectoral context, educational system, and blue-economy development stage require that micro-credentials be locally relevant in their case studies, field locations, and partner organisations, while maintaining a shared competence framework that enables credential portability across EU partner countries and beyond.

6

the curriculum must be aligned with existing European and national frameworks including BlueComp, STCW, EQF, and national qualifications frameworks, ensuring that CodeBLUE micro-credentials can be formally recognised and integrated into wider qualification pathways.



10 ANNEXES



01 CodeBLUE Skills and Competence Map

02 Country-specific assessment report for the knowledge, skills and competences needed for blue-economy tourism concerning current academic offerings: BULGARIA

03 Country-specific assessment report for the knowledge, skills and competences needed for blue-economy tourism concerning current academic offerings: CROATIA

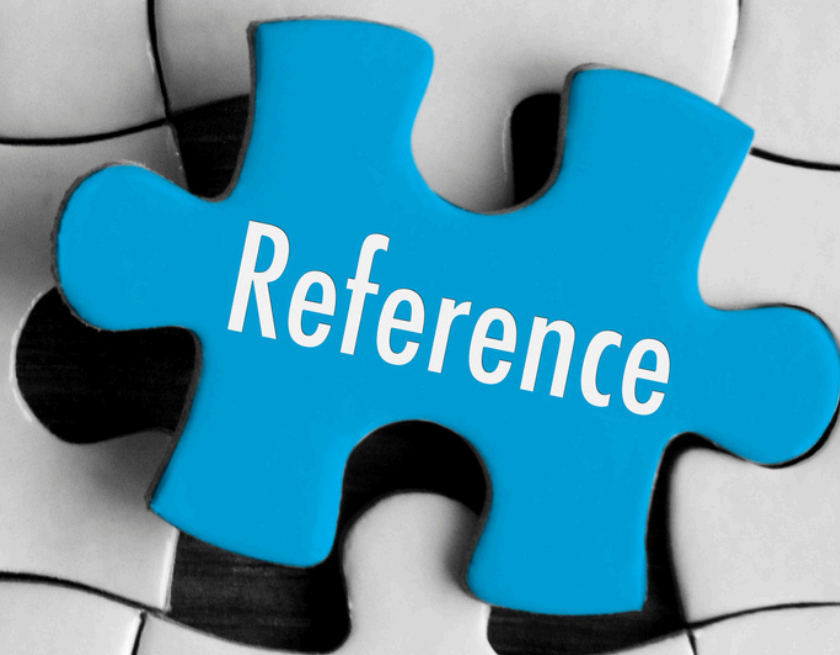
04 Country-specific assessment report for the knowledge, skills and competences needed for blue-economy tourism concerning current academic offerings: GREECE

05 Country-specific assessment report for the knowledge, skills and competences needed for blue-economy tourism concerning current academic offerings: SPAIN

06 Country-specific assessment report for the knowledge, skills and competences needed for blue-economy tourism concerning current academic offerings: PORTUGAL



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