

D2.3 Reference document of Data set of career and training pathways

Next BlueGeneration

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1. INTRODUCTION

The Next BlueGeneration will provide individualised career guidance and self-assessment to students through the BlueGeneration Game. This game will deliver information and career pathway options for the selected sectors. The sectors of Nautical Tourism, Maritime Transport, Marine Biotechnology, Aquaculture, and Ocean Literacy will be the primary areas of focus. To create an interactive career path project will determine the specific data needed to accurately describe career and training options in the targeted blue economy sectors.

These data include:

- Career Descriptions: Detailed information on job roles, responsibilities, and working environment
- Training Options: Information on educational programs, certifications, and other training opportunities required for the successful execution of the tasks per occupation; for the selected sectors.
- Soft skills reflecting the current and previously needed skills (during career development) to pursue a career in the selected blue sector and occupation.

The present deliverable is reflecting the data gathering that will be utilized in the BlueGeneration Game development and will feed all the different pathway options.

The BlueGeneration Game will assess the users soft skills in an attractive gaming format and will then deliver the results to the Blue careers Pathway Tool to provide information about occupations in the different Blue Economy sectors in a format that is tailored to the preferences of the individual young user.

The objective of this deliverable is to identify, analyse and process the data gathered, based on the methodology developed (Deliverable 2.1).

For this data was collected systematically and processed into a database in a structured format so that it can be easily accessed and utilised by the BlueGeneration Game to be developed in WP3 and the interactive Blue Careers Pathway Tool to be developed in WP4.

The target KPIs to receive data from different occupations and trainings in the surveyed Blue Economy sub-sectors were:

- 150 for established sectors of Nautical Tourism, Maritime Transport, Shipping,
- 90 for emerging sectors of Aquaculture, Marine Biotechnology, Marine Conservation/ Ocean Literacy

To achieve this goal the consortium developed a dedicated questionnaire addressing the most critical occupations per sector and the partners invited professionals to provide those data. The following delegation has been decided based on the partners expertise:

- EBI & Sea Teach for Nautical Tourism,
- Submariner for Marine Biotechnology and Aquaculture,
- PFRI, NTUA and CMMI for Shipping & Maritime Transport and
- ACTeon and EMSEA for Marine Conservation/ Ocean Literacy

The deliverable is structured as follows:

Section 2: The data collection methodology and the qualitative results.

Section 3: The qualitative analysis of the gathered data

Section 4: The use of the data in the project tools

2. METHODOLOGICAL APPROACH AND DATA COLLECTION

2.1 Structure of the questionnaire for data collection

For data collection a dedicated questionnaire has been designed by the partnership. The first step was the identification of the key occupations for each sector. Partners provided one list per sector, namely Marine Conservation/ Ocean Literacy, Maritime Transport, Shipping (Shipbuilding & Ship repair), Marine Biotechnology, Nautical Tourism and Aquaculture.

The structure of the questionnaire is as follows

- Name of the Occupation

- Detailed description of task and responsibilities per occupation
 - Description of the occupation (max. 4-5 sentences: Definition of "Occupation/job" = a set of work tasks performed by one person with the appropriate knowledge, abilities and skills. The job description should clarify what people of a certain job should achieve through their work in the work environment).
 - List the main three (3) tasks to performed under this occupation.

- Type of employment (more than one answer is possible)
 - i. permanent
 - ii. occasionally
 - iii. seasonal
 - iv. several months on - several months off

- Working environment where the work is performed (more than one answer is possible):
 - i. office
 - ii. workshop
 - iii. outdoors
 - iv. onshore
 - v. offshore
 - vi. frequently away from home/office/base

- Working hours of the job (only one answer is possible)
 - i. Fixed
 - ii. Flexible
 - iii. Both possible

- Work Schedule (only one answer is possible)
 - i. Work during day time hours
 - ii. Work during night time hours
 - iii. Work in shifts
 - iv. All of the above

- Identification of the working environment
 - i. Essential physical requirements, such as climbing, standing, stooping, often changing position by bending over, turning the body, etc
 - ii. Physical effort/lifting
 - iii. Desk-bound occupation
 - iv. Other

- Rating the required level of soft skills per occupation. For each soft skill from those identified in the deliverable 2.1, the expert rated its importance on a scale between 1 to 5 (1 = not important and 5 = very important)

In Annex I, are presented the comprehensive questionnaires tailored to each sector.

2.2 Identification of occupations to be surveyed

The first step was the identification of the key occupations for each sector to ensure that a wide range of occupations were surveyed and to avoid repetitions or overlaps due to different naming of the same occupation. The expert partners therefore provided each one list for their sub- sector, namely: Marine conservation/ Ocean Literacy, Maritime Transport, Shipping (Shipbuilding & Ship repair), Marine Biotechnology, Nautical Tourism and Aquaculture.

illustrates the targeted occupations for each of which a representative was identified and asked to complete the survey and provide the necessary data.

Table 1 Selected occupations per sector

Acquaculture	Marine Biotechnology	Marine Conservation/ Ocean Literacy	Marine Transport	Nautical Tourism	Shipping & Shipbuilding
Aquaculture Manager	Marine Pharmacologist	Marine Educator	Master & Chief Mate	Charter Fleet manager	Naval Architect
Fish Farm Technician	Marine Biotechnologist	Marine Biologist	Officer in charge of a navigational watch	Dive instructor	Shipyard Manager
Aquatic Veterinarian	Marine Geneticist	Conservation Communicator	Chief Engineer and Second Engineer	Pleasure boat instructor	Project Manager
Marine Biologist	Marine Microbiologist	Aquarium Educator	Officer in charge of an engineering watch	Skipper on private and charter vessels up to 24m	Production Supervisor
Aquaculture Engineer	Bioinformatics Specialist	Conservation Officer	Electro technical officer	Boat broker	Marine Engineer



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Hatchery Manager	Marine Bioprocess Engineer	Diver	Environmental officer	Boat maintenance mechanic	Structural Engineer
Water Quality Specialist	Marine Farmer/ Marine Farm worker	Skipper	Bosun	Animation staff (on cruise ships)	Mechanical Engineer
Fish Nutritionist	Factory worker	Project/ Programme Manager for Ocean Literacy	Able body seaman	Chef on boats or in cruise ships	Electrical Engineer
Fisheries Biologist	Marine Bioprocess Engineer	Science communicator	Ordinary seaman	Marina manager	Insurance assessor
Seaweed Farmer	Skipper	Marine Ecologist	Ships mechanic	Marina worker	Quality Assurance Inspector
Shellfish Farmer	Natural Product Chemist	Policy Advocate	Oiler	Watersport manager (Kayak, Windsurf, Paddleboard, Kitesurf, new water toys)	Safety Officer
Aquatic Ecologist	Marine Biosecurity Specialist	Volunteer Coordinator	Wiper	Administration staff in watersports company	Welding Supervisor
Aquaculture Research Scientist	Marine Biotechnology Research Scientist	Fundraiser	Electrician	Lifeguard	Welder
Fish Health Inspector	Marine Bioproduct Development Specialist	Marine reserve/park/MPA manager	Chief cook	Charter Fleet administrator	Pipefitter
Aquaculture Production Supervisor	Aquatic Toxicologist	Marine reserve/park ranger	2nd cook	Boat Cleaner	Electrician
Aquaculture Sales & Marketing Specialist	Marine Bioremediation Specialist	Policy officer	Chief steward	Gelcoat Specialist	Carpenter
Environmental Compliance Specialist	Marine Biotechnology Quality Control Analyst	Project officer/assistant	Mess boy	Boat Painter	Plumber



Fish Processing Technician	Marine Biotechnology Regulatory Affairs Specialist	Programme officer/assistant	Safety of navigation coordinator (Coast Guard Officer)	Entertainer on cruise ships	Rigger
Feed Mill Manager	Marine Bioproduct Sales and Marketing Specialist	Field research assistant	Harbour Master	Wildlife and eco-tourism Guide	Painter
Aquaculture Economist	Marine Biotech Patent Examiner	Environmental consultant	Shipbroker	Tourism development officer	Sheet Metal Worker
Aquaponics Technician	Marine Biotechnology Project Manager	Marine policy specialist	Fleet manager	Marketing and PR Specialist	Machinist
Marine Policy Advisor	Lab Technician	Public outreach coordinator	Maritime pilot	Electronics engineer	Fitter
Sustainable Aquaculture Specialist	Marine Biosensor Developer	Citizen science project coordinator	Ship's Agent	Yacht Plumber	Shipwright
Aquaculture Supply Chain Manager	Biomaterial Scientist	Coastal zone manager	Marine Cargo Inspector	Air-condition engineer	Dockmaster
Scientific Diver	Marine Biotech Consultant	Marine GIS specialist	Marine Classification Surveyor	Boat carpenter	Crane operator
Aquaculture Equipment Designer	Algal Biotechnologist	Marine social scientist	Port Captain	Sales person	Forklift operator
Aquaculture Policy Analyst	Marine Biotechnology Policy Analyst	Marine biodiversity officer	Ship's crew manager	Sailmaker	Supply Chain Manager
Marine Agronomist	Marine Biotechnology Entrepreneur	Marine eco-tourism developer	Port authority director	Boat Builder	Inventory Control Specialist
Seaweed Product Developer	Data Analyst	Marine ecosystem services valuation specialist	Vessel traffic coordinator	Crew trainer	Logistics Coordinator
RAS Technician	Genomics Researcher	Ocean literacy-curriculum developer	Ship's superintendent	Marine Journalist	Human Resources Manager
RAS System Designer	Bioinformatics Database Manager	Marine eco-tourism guide	Vessel operations organizer (port & terminal sector)	Nautical Project Manager	Administrative Assistant



Seaweed Processing Technician	Grant writer	Event organiser	Yard operation organizer	Boatyard manager	Purchasing Agent
Aquaculture Environment Impact Analyst	Enzyme Technologist	Marine eco-artist	Voyage planner	Insurance broker	Environmental Compliance Officer
Microalgae Biotechnologist	Clinical Research Coordinator	Dive instructor	Flag State inspector	Nautical R&D Researcher	Marine Surveyor
Microalgae Biofuel Researcher	Biotech Outreach Coordinator	Safety Diver for Ocean Documentaries	Port State control inspector	Marine Photographer	Draftsman
Microalgae Fermentation Technologist	Molecular Scientist	Creative consultant for marine conservation	Vetting inspector	Boat Software Engineer	Computer-Aided Design (CAD) Technician
Skipper	Bioimaging Specialist	Underwater photographer/ Video Filmer	Bunker surveyor	Yacht Deckhand	Inspector
Fish Welfare Specialist	Biotech Equipment Specialist	Coastal community liaison	Loading master	Watersport worker (Kayak, Windsurf, Paddleboard, Kitesurf, new water toys)	Hydraulic Technician
	Ethics Specialist		Ship chandler	Yachting concierge	Joiner
	Biotech Marketing Strategist		Maritime environment control inspector	Boat Chandler	NDT Technician (Non-Destructive Testing)
	Conservation Biotechnologist		Docking master	Yacht surveyor (for insurances, sales)	Sandblaster
	Biotech Product Manager		Designated person ashore - DPA	Boat Delivery skipper	Insulation Installer
			Company security officer	Nautical Interior Designer	IT Support Specialist
			Port facility security officer - PFSO	Boat After Sales & Customer Service	Planner/Scheduler
			Port transportation worker	Onboard Hospitality Manager	Security Officer
			Technical assets operator	Compass Adjuster	Training Coordinator



Warehouse worker	Watersport instructor (Kayak, Windsurf, Paddleboard, Kitesurf, new water toys)	Finance Manager
Operational planner	Safety coding agent	Customer Service Representative
Crewing officer	Boat upholsterer	
Recruitment officer	Yacht Stewardess	
Training officer		
Crewing advisor		
Crane operator		

2.3 Quantitative survey results

The partners collated the data required according to the agreed methodology in Deliverable 2.1. This task was led by NTUA and supported by the sectoral experts for the different sub-sectors, as follows:

1. EBI/ Sea Teach for Nautical Tourism,
2. Submariner for Marine Biotechnology and Aquaculture,
3. PFRI/ NTUA and CMMI for Shipping & Maritime Transport and
4. ACTeon and EMSEA for Ocean Literacy/ Marine Conservation

The unit of measurement was the number of professions/ occupations and trainings, and the target values were a total 150 for established sectors of Nautical Tourism, Maritime Transport, and Shipping (50 each) and 90 for emerging sectors of Aquaculture, Marine Biotechnology, and Marine Conservation (30 each). The expert partners for each of these sectors activated their respective network of stakeholders to complete the surveys.

In the realm of the Nautical Tourism, feedback from 57 individuals hailing from 10 different countries have been gathered, with a majority from Spain. In the Marine Biotechnology sector, the partners received responses from 38 individuals in 10 different countries, mostly from Germany and Sweden, while in Aquaculture, 58 individuals responded, representing 13 countries. In the Maritime Transport sector, responses from 58 individuals were received whilst responses from 74 individuals were received in the Shipping sector, representing 8 countries, mostly resident in Greece. For the Marine Conservation/Ocean Literacy sector responses from 60 individuals were received.

All responses were then reviewed by the expert partners, double entries for same occupations compared and summarized, some inconclusive data removed or if necessary, slightly corrected.

This resulted in datasets for a total of 275 occupations which will be the base of information for project's Career Pathway Tool.

Table 2 KPI's vs. Survey responses

Values of data collected for occupations: KPI's vs. Survey Responses and results			
	KPI	Responses received	Occupations after review
Nautical Tourism	50	57	51
Marine Biotechnology	30	38	27
Aquaculture	30	58	34
Maritime Transport	50	58	51
Shipping	50	74	50
Ocean Literacy/ Marine Conservation	30	60	62
Total	240	345	275

3. QUALITATIVE DATA ANALYSIS

The gathered data from the survey were assembled in a joint Excel data file and revised for further use by the programmers of the BlueGeneration Game and the Pathway Tool.

In the following this deliverable showcases an analysis of the gathered data along the questions asked in the survey.

These are

- Type of employment
- Working schedule
- Working hours
- Workplace environment
- Soft Skill rating

which were chosen in order to add to individualised career pathway suggestions that not only build on the individuals’ personal soft skills, but also take into account the person’s preferences and add to the level of information.

3.1 Analysis of types of employment in the six Blue Economy sub-sectors

This section explores the type of employment across six maritime and marine sectors. Employment in these sectors can be categorized into four main types: permanent, occasional, seasonal, and several months on - several months off. These types reflect the stability, flexibility, and cyclical nature of jobs in each sector.

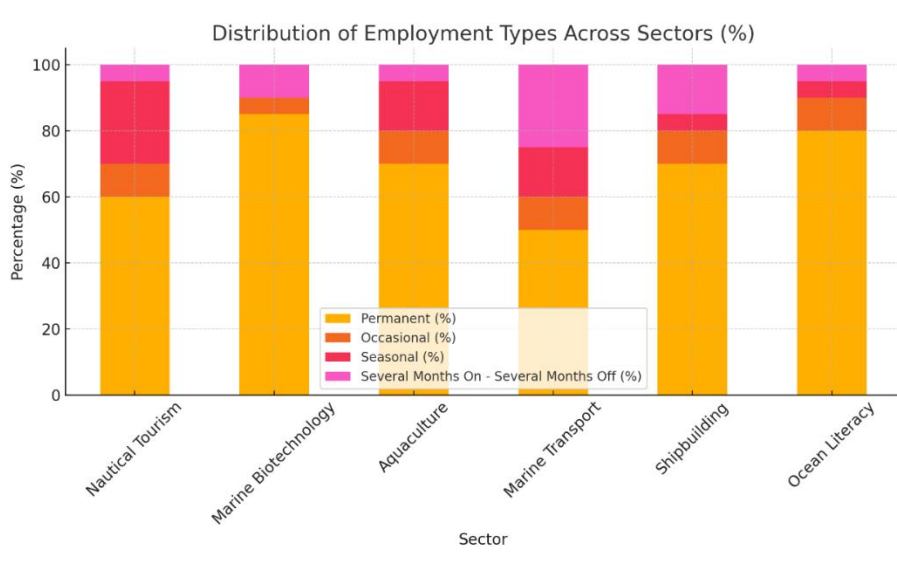


Figure 1 Distribution of employment types across sectors

Nautical Tourism

In Nautical Tourism, 60% of roles are permanent, particularly for jobs like Dive Instructors and Office Managers, where year-round services are needed. 10% of roles are occasional, such as Event Coordinators hired for specific tours or events. 25% of jobs, such as Boat Crew Members and Seasonal Workers, are seasonal, tied to peak tourist seasons. Finally, 5% of roles fall under several months on - several months off, primarily for long tours or expedition-based work.

Marine Biotechnology

In Marine Biotechnology, 85% of roles are permanent, particularly for Lab Technicians and Research Scientists working on long-term projects. 5% of jobs are occasional, such as specialized Consultants hired for specific projects. There are no significant seasonal roles in this sector, but 10% of roles fall under several months on - several months off, typically for field-based research where work is conducted in cycles.

Aquaculture

In Aquaculture, 70% of jobs are permanent, especially for Farm Managers and Aquaculture Educators overseeing long-term production and training. 10% of positions are occasional, including Environmental Assessors brought in for specific research projects. 15% of roles are seasonal, particularly for Field Workers or Technicians working during specific farming cycles. Finally, 5% of positions operate under several months on - several months off, especially for field-based research and offshore projects.

Marine Transport

In Marine Transport, 50% of roles are permanent, particularly for Port Administrators and Logistics Coordinators, who manage year-round shipping activities. 10% of jobs are occasional, including Temporary Dock Workers hired for specific shipments or projects. 15% of roles, such as Seasonal Crew Members, are tied to busy periods in international trade. The remaining 25% of positions, including Ship Captains and Long-Haul Crew Members, work on a several months on - several months off schedule to accommodate long voyages.

Shipbuilding and Repair

In Shipbuilding and Repair, 70% of jobs are permanent, particularly for Welders, Engineers, and Project Managers working on long-term shipbuilding projects. 10% of positions are occasional, especially for Specialized Technicians brought in for specific repairs or upgrades. 5% of roles are seasonal, typically for workers hired during peak shipbuilding periods. The final 15% of roles, particularly in repair work, follow a several months on - several months off schedule, based on project timelines and urgent repair needs.

Ocean Literacy

In Ocean Literacy, 80% of roles are permanent, especially for Educators and Program Managers who work in educational institutions and public engagement programs year-round. 10% of

positions are occasional, often for Guest Speakers or Consultants hired for specific events. 5% of roles are seasonal, particularly for Public Engagement Officers working during major outreach campaigns. The remaining 5% of jobs operate on a several months on - several months off basis, typically for specialized projects or field research.

3.2 Analysis of working schedule across the six Blue Economy sub-sectors

This section explores the working schedule patterns across six maritime and marine sectors. The working schedules across these sectors can be categorized into four main types: daytime hours, nighttime hours, shift work, and roles that encompass all of the above. These schedules are driven by each sector's operational demands, whether related to seasonal fluctuations, emergency repairs, or long-term projects.

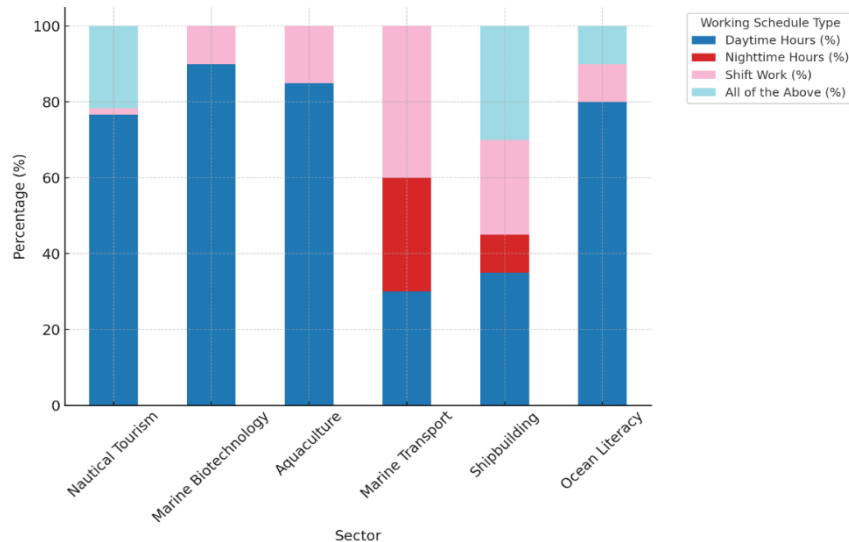


Figure 2 Distribution of working schedule type

Nautical Tourism

In Nautical Tourism, 76.67% of roles work during daytime hours, including positions such as Dive Instructors and Tour Guides, where activities are scheduled during daylight. A small proportion, 1.67%, work in shifts, while 21.67% of positions, such as Boat Crew Members and Event Coordinators, fall under all of the above, requiring flexibility to work across multiple schedules, especially during peak tourism seasons.

Marine Biotechnology

The Marine Biotechnology sector predominantly operates within daytime hours (90%), particularly in lab-based roles like Marine Microbiologists and Lab Technicians. Around 10% of jobs, such as those involved in field research or project management, involve shift work or flexible

hours, allowing researchers to adjust based on specific marine conditions or project timelines. There are no roles reported to work nighttime hours or require all of the above schedules.

Aquaculture

In Aquaculture, 85% of jobs operate during daytime hours, particularly for roles like Aquaculture Educators and Seaweed Commercializing Experts. However, 15% of positions, such as Scientific Divers and field researchers, require shift work, often adjusting to environmental or species management conditions. There is no significant presence of roles that operate exclusively in nighttime hours or involve all of the above schedules.

Marine Transport

Marine Transport has one of the most varied working schedules. Only 30% of jobs, such as Port Administrators and Logistics Planners, adhere to daytime hours. A significant portion of roles, 40%, including Ship Captains and Port Workers, work in shifts to accommodate global shipping schedules, while 30% of positions require nighttime hours to manage 24-hour shipping operations. There are no roles categorized under all of the above in this sector.

Shipbuilding and Repair

In Shipbuilding and Repair, 35% of jobs, including Design Engineers and Project Administrators, follow regular daytime hours. Another 25% of roles, such as Welders and Ship Repair Technicians, involve shift work to meet project deadlines, and 10% of roles involve nighttime hours to handle urgent repairs. Additionally, 30% of positions in shipbuilding require flexibility across all of the above, depending on project urgency and repair schedules.

Ocean Literacy

In Ocean Literacy, 80% of roles, such as Program Managers and Educators, work during daytime hours, particularly in structured environments like schools and educational centers. However, 10% of positions, especially Public Engagement Officers and Event Coordinators, work in shifts to manage outreach events and workshops. Another 10% of roles require flexibility to work under all of the above schedules, adapting to various engagement activities that may occur during evenings or weekends.

3.3 Analysis of working hours across the six Blue Economy sub-sectors

This section explores the working hours patterns across six maritime and marine sectors: Nautical Tourism, Marine Biotechnology, Aquaculture, Marine Transport, Shipbuilding and Repair, and Ocean Literacy. The working hours in each sector can be categorized into three main types: fixed, flexible, or both possible. These schedules depend on the sector's operational demands, the nature of the job, and the need for adaptation to external factors like weather, seasonal demand, or project deadlines.

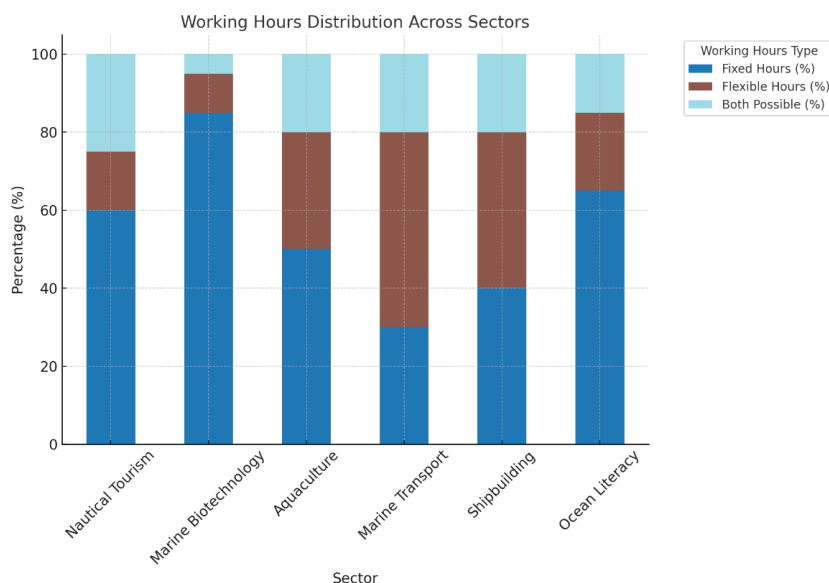


Figure 3 Distribution of working hours type

Nautical Tourism

In Nautical Tourism, 60% of jobs follow fixed working hours, especially for roles like Office Managers and Marketing Coordinators, where work is scheduled during specific daytime hours. Around 15% of jobs have flexible working hours, such as Event Coordinators and Marine Photographers, who need to adjust their schedules based on client needs or event timings. The remaining 25% of roles, including Boat Crew Members and Dive Instructors, have schedules where both fixed and flexible hours are possible, particularly during peak tourist seasons when demand fluctuates.

Marine Biotechnology

In Marine Biotechnology, the vast majority of roles—85%—have fixed working hours, particularly for Marine Microbiologists and Lab Technicians who work in controlled lab environments. Only 10% of jobs, such as Field Researchers, follow flexible hours, allowing them to adjust based on fieldwork conditions or project deadlines. A small percentage, 5%, report that both fixed and flexible hours are possible, particularly for Project Managers who need to manage research teams while also adapting to project timelines.

Aquaculture

In Aquaculture, 50% of jobs have fixed working hours, particularly in positions such as Aquaculture Educators and those involved in commercial operations like Seaweed Production. Another 30% of roles have flexible hours, especially for field-based roles like Farm Managers and Environmental Monitoring Experts, where work is dependent on environmental conditions. For the remaining 20% of positions, including Scientific Divers, both fixed and flexible hours are possible, depending on operational requirements and research demands.

Marine Transport

In Marine Transport, 30% of jobs have fixed hours, particularly for administrative roles like Port Administrators and Logistics Coordinators. A significant proportion, 50%, have flexible working hours, especially for Ship Captains, Port Workers, and Crew Members, whose schedules must adapt to the needs of international shipping routes. The remaining 20% of roles report both fixed and flexible hours, typically in support roles where tasks can vary depending on port activity and shipping schedules.

Shipbuilding and Repair

In Shipbuilding and Repair, 40% of roles, including Design Engineers and Project Administrators, follow fixed working hours during regular business days. About 40% of jobs, such as Welders and Ship Repair Technicians, have flexible working hours to accommodate project deadlines and urgent repairs. The final 20% of positions, especially in construction or maintenance management, report both fixed and flexible hours, depending on project needs and timelines.

Ocean Literacy

In Ocean Literacy, 65% of roles have fixed working hours, particularly for Program Managers and Educators working within structured school or educational systems. Around 20% of jobs, such as Public Engagement Officers and Workshop Leaders, operate on flexible schedules to manage outreach programs and events. The remaining 15% of roles, including Event Coordinators, report both fixed and flexible hours, depending on the timing of public events and educational workshops.

3.4 Analysis of workplace environment in the six Blue Economy sub-sectors

This section explores the workplace environment across six maritime and marine sectors. In these sectors, various working conditions apply, including exposure to hazardous environments, exposure to weather and working environment, and other special conditions. Many roles involve more than one of these factors, depending on the nature of the job.

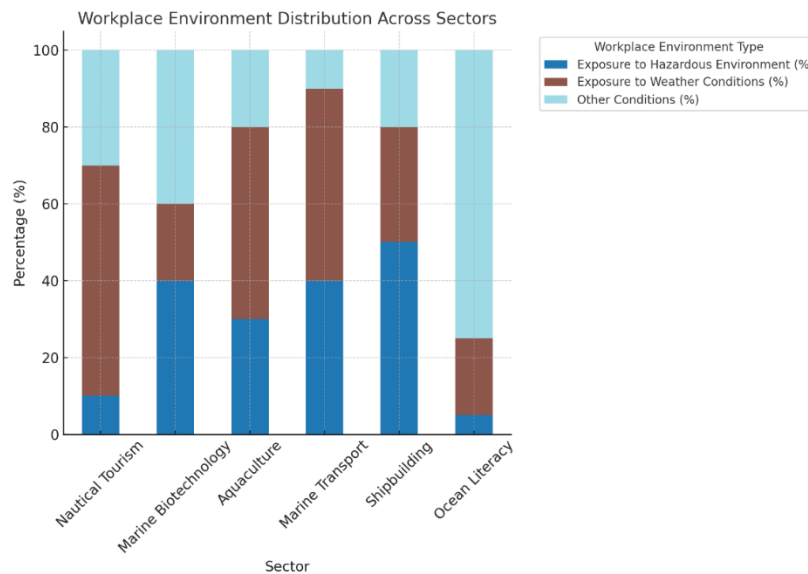


Figure 4 Distribution of employment type

Nautical Tourism

In Nautical Tourism, 10% of roles face exposure to hazardous environments, mainly for jobs involving boat mechanics and diving equipment technicians who handle chemicals and technical gear. 60% of jobs, including Dive Instructors, Boat Crew Members, and Marine Photographers, are exposed to weather conditions such as extreme heat, wind, or humidity, as they spend a significant amount of time outdoors. The remaining 30% report other conditions, which include long hours on boats and irregular work environments, particularly during tours or expeditions.

Marine Biotechnology

In Marine Biotechnology, 40% of jobs involve exposure to hazardous environments, particularly for Lab Technicians and Marine Microbiologists handling dangerous chemicals or radiation. Only 20% of positions, such as Field Researchers, are exposed to weather conditions when conducting fieldwork. Around 40% of roles, especially in research labs, report other conditions, such as exposure to artificial lighting and long hours in controlled environments.

Aquaculture

In Aquaculture, 30% of jobs involve exposure to hazardous environments, including water quality managers and researchers handling chemicals used in water treatment and species monitoring. 50% of positions, particularly Farm Workers and Scientific Divers, are exposed to weather conditions, given their outdoor work in varied climates. The remaining 20% report other conditions, often related to handling aquatic animals or the physical demands of the work.

Marine Transport

Marine Transport has 40% of roles exposed to hazardous environments, especially for Port Workers and Ship Mechanics who handle heavy machinery, explosive cargo, or hazardous materials. 50% of roles, including Ship Captains and Crew Members, face exposure to weather conditions, as they spend extended periods at sea in varying weather conditions. The final 10% experience other conditions, such as long voyages and the confined spaces on ships.

Shipbuilding and Repair

In Shipbuilding and Repair, 50% of roles report exposure to hazardous environments, particularly for Welders, Engineers, and Repair Technicians working with heavy machinery, chemicals, and explosives. Around 30% of jobs, particularly in shipyards, face exposure to weather conditions, such as temperature changes and loud noise. 20% report other conditions, like long hours and exposure to artificial lighting in confined spaces during repairs or construction.

Ocean Literacy

In Ocean Literacy, 5% of roles, particularly those involved in public aquarium operations, are exposed to hazardous environments, such as chemicals used in water treatment. 20% of jobs, including Public Engagement Officers conducting outdoor events, are exposed to weather conditions. The majority, 75%, report other conditions, such as artificial lighting and long hours in educational settings like museums and schools.

3.5 Soft Skills Rating

During the surveys, experts were asked to rank the critical soft skills for each job position based on a list of skills proposed during workshops. 1-Means not important and 5 means very important. The results are presented in the following tables for each sector. Afterwards, partners conducted a detailed analysis for each sector to determine the weighted value of each skill for the relevant entity. The resulting ratings are as follows:

Aquaculture

For **Aquaculture** workers/experts the most valuable and needed soft skills are **Communication** with an average of 4,62, followed by **Problem Solving** with 4,60 and **Adaptability** with 4,42 out of 5. On the other hand, **Customer Service** only received an average of 3,11 and was mentioned 9 times as “not important”, followed by **Creativity** with an average of 3,69 and mentioned 5 times as not important, and **Resilience**, with an average of 3,93 and being one of the most balanced skills as per importance.

	Average	Count of 5	Count of 4	Count of 3	Count of 2	Count of 1
Teamwork	4,38	31	15	8	1	0
Adaptability	4,42	28	22	5	0	0
Creativity	3,69	17	20	7	6	5
Problem Solving	4,60	40	10	3	2	0
Curiosity	4,05	19	24	8	4	0
Work under pressure	4,16	25	17	10	3	0
Communication	4,62	40	9	6	0	0
Critical thinking	4,27	29	15	8	3	0
Attention to Detail	4,35	29	18	6	2	0
Time Management	4,31	25	23	6	1	0
Customer Service	3,11	11	10	17	8	9
Resilience	3,93	17	18	19	1	0
Ethical Awareness	4,20	27	14	12	2	0
Safety and responsibility at work	4,18	29	14	8	1	3

Figure 5 Soft Skills Assessment - Aquaculture

Marine Biotechnology

For **Marine Biotechnology** workers/experts, the most valuable and needed soft skills are **Problem Solving** with an average of 4,73, followed by **Analytical Skills** with 4,55 and **Attention to Detail** with 4,52 out of 5. On the other hand, **Leadership** only received an average of 3,42 and was mentioned 3 times as “not important”, followed by **Creativity** with an average of 3,68 and mentioned 5 times as slightly important.

	Average	5	4	3	2	1
Attention to detail	4,52	25	10	2	0	1
Time Management	4,5	22	14	1	1	0
Problem solving	4,73	29	8	1	0	0
Creativity	3,68	10	11	12	5	0
Flexibility	4,10	13	18	5	2	0
Adaptability	4,31	16	18	4	0	0
Analytical skills	4,55	26	9	2	0	1
Curiosity	4,18	18	10	9	1	0
Leadership	3,42	12	7	7	9	3
Follow procedures	4,05	14	15	7	1	1

Figure 6 Soft Skills Assessment - Marine Biotechnology

Nautical Tourism

For **Nautical Tourism** workers/experts, the most valuable and needed soft skills are **Problem Solving** and **Attention to Detail** with an average of 4,71, followed by **Communication** with 4,65 out of 5. On the other hand, **Leadership** only received an average of 3,78 and was mentioned 6 times as “slightly important”, followed by **Work under Pressure** with an average of 3,96 and mentioned 4 times as slightly important.

	Average	5	4	3	2	1
Teamwork	4,44	35	11	7	2	0
Adaptability	4,62	37	15	3	0	0
Problem solving	4,71	43	8	4	0	0
Following Procedures	4,18	22	22	10	1	0
Multitasking	4,11	25	17	8	4	1
Work under pressure	3,96	22	13	16	4	0
Communication	4,65	41	9	5	0	0
Leadership	3,78	19	11	19	6	0
Attention to Detail	4,71	40	14	1	0	0
Time Management	4,36	26	24	4	1	0
Customer Service	4,33	37	7	5	4	2
Initiative	4,24	25	20	8	2	0

Figure 7 Soft Skills Assessment - Nautical Tourism

Maritime Transport

For **Maritime Transport** workers/experts, the most valuable and needed soft skills are **Following Procedures** with an average of 4,07, followed by **Communication** with 3,82 out of 5. On the other hand, **Leadership** only received an average of 2,98 and was mentioned 9 times as not important as well as 8 times as “slightly important”, followed by **Flexibility** with an average of 3,16 and mentioned 11 times as slightly important, and once as not important. The numbers of this sector are so much lower than the other 5 sectors.

	Average	5	4	3	2	1
Teamwork	3,51	10	20	14	10	1
Multitasking	3,45	7	21	18	8	1
Problem solving	3,44	11	19	11	11	3
Following Procedures	4,07	21	22	7	5	0
Flexibility	3,16	3	16	24	11	1
Work under pressure	3,42	6	25	11	12	1
Communication	3,82	16	19	14	6	0
Leadership	2,98	7	11	20	8	9
Willingness to learn	3,24	6	19	14	14	2
Time Management	3,38	4	26	13	11	1

Figure 8 Soft Skills Assessment - Maritime Transport

Shipping (Ship repair and Shipbuilding)

For **Shipping (Ship repair and Shipbuilding)** workers/experts, the most valuable and needed soft skills are **Working under Pressure** with an average of 4,44, followed by **Problem solving** with 4,25 out of 5. On the other hand, **Leadership** only received an average of 3,33 and was mentioned 6 times as not important as well as 10 times as “slightly important”, followed by **Flexibility** with an average of 3,75 and mentioned 8 times as slightly important, and once as not important.

	Average	5	4	3	2	1
Teamwork	3,98	21	21	7	3	3
Multitasking	4,05	27	12	9	6	1
Problem solving	4,25	30	14	7	3	1
Following Procedures	4,22	21	27	5	2	0
Flexibility	3,75	16	19	11	8	1
Work under pressure	4,44	33	15	5	2	0
Communication	4,05	22	23	3	5	2
Leadership	3,33	12	16	11	10	6
Willingness to learn	4,20	24	20	9	2	0
Time Management	4,16	23	21	8	3	0

Figure 9 Soft Skills Assessment – Shipbuilding & Ship Repair

Ocean Literacy/ Marine Conservation

For **Ocean Literacy/ Marine Conservation** workers/experts, the most valuable and needed soft skills are **Problem Solving** and **Communication** with an average of 4,69, followed by **Critical Thinking** with 4,58 out of 5. On the other hand, **Leadership** only received an average of 3,91 and was mentioned once as not important as well as 5 times as “slightly important”, followed by **Creativity** with an average of 4,11 and mentioned 5 times as slightly important. The average numbers of this sector are higher than the numbers of the other 5 sectors, having 5 soft skills with an average higher than 4,56.

	Average	5	4	3	2	1
Communication	4,69	42	9	4	0	0
Critical Thinking	4,58	35	17	3	0	0
Teamwork	4,56	37	13	4	1	0
Creativity	4,11	25	16	9	5	0
Empathy	4,15	24	17	12	2	0
Networking	4,36	31	16	6	1	1
Leadership	3,91	19	19	11	5	1
Adaptability	4,56	34	18	3	0	0
Problem solving	4,69	41	11	3	0	0

Figure 10 Soft Skills Assessment - Ocean Literacy

4. CAPITALISATION OF THE DATA IN THE BLUEGENERATION TOOLS

The survey was designed to requested data that will serve the development and functionality of the BlueGeneration Tools. The project gathered through the survey comprehensive data sets for 275 occupations in the Blue Economy, which will be used in the next steps as baseline data and information.

4.1 BlueGeneration Game Development

The rating of the relevant soft skills for the occupations in the six different sub-sectors has resulted in a database that will be valuable for matching the users personal scores from the Blue Generation Game to the soft skills needed in the different occupations.

The results of this matching will then be the baseline of the Blue Careers Pathway Tool.

4.2 Blue Careers Pathway Tool

The data gathered for each of the 275 occupations will serve as filtering and guidance data, especially with regard to education levels and mobility options between the sectors.

Furthermore, from the concept of the survey and received data set, a draft job card design was developed, to illustrate how these data received can be displayed to the user.

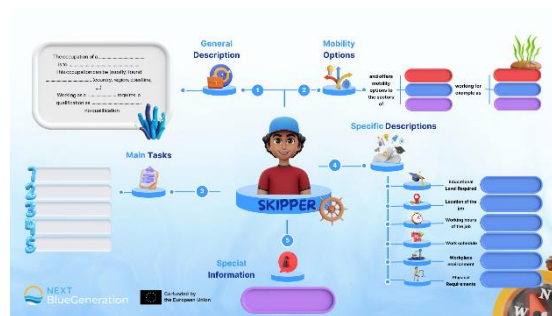


Figure 11 Job Card 1st draft

4.3 MOOC

All collected data and their use will be incorporated into the MOOC for the teachers and will provide them with background information to further support the students in their use of the Next BlueGeneration Tools.

APPENDIX I
Sample Questionnaire

Questionnaire "Next BlueGeneration Survey - Aquaculture"

QUESTIONS

Q1. Your country of residence/ work?

Question type: Short text, required: YES

Code	Type	Value
text	Answer	Respondent input

Q2. Would you like to receive the results of this survey and stay in touch with the Next BlueGeneration project?

Question type: Yes/no, required: YES

Code	Type	Value
Y	Answer	Yes
N	Answer	No

Q3. If yes, please leave us your email address

Question type: Short text, required: NO

Code	Type	Value
text	Answer	Respondent input

Q4. ... and please also leave us your name

Question type: Short text, required: NO

Code	Type	Value
text	Answer	Respondent input

Q5. Name of the Occupation you are describing (e.g. Dive instructor, Ocean Literacy project manager, Mechanic in the Nautical sector)

Question type: Single choice, required: YES

Code	Type	Value
A	Answer	Aquaculture Manager
B	Answer	Fish Farm Technician
C	Answer	Aquatic Veterinarian
D	Answer	Marine Biologist
E	Answer	Aquaculture Engineer
F	Answer	Hatchery Manager
text	Answer	Water Quality Specialist
H	Answer	Fish Nutritionist
I	Answer	Fisheries Biologist
J	Answer	Seaweed Farmer
K	Answer	Shellfish Farmer
L	Answer	Aquatic Ecologist

M	Answer	Aquaculture Research Scientist
N	Answer	Fish Health Inspector
O	Answer	Aquaculture Production Supervisor
P	Answer	Aquaculture Sales & Marketing Specialist
Q	Answer	Environmental Compliance Specialist
R	Answer	Fish Processing Technician
S	Answer	Feed Mill Manager
T	Answer	Aquaculture Economist
U	Answer	Aquaponics Technician
V	Answer	Marine Policy Advisor
W	Answer	Sustainable Aquaculture Specialist
X	Answer	Aquaculture Supply Chain Manager
Y	Answer	Scientific Diver
Z	Answer	Aquaculture Equipment Designer

[Answer	Aquaculture Policy Analyst
\	Answer	Marine Agronomist
]	Answer	Seaweed Product Developer
^	Answer	RAS Technician
_	Answer	RAS System Designer
`	Answer	Seaweed Processing Technician
a	Answer	Aquaculture Environment Impact Analyst
b	Answer	Microalgae Biotechnologist
c	Answer	Microalgae Biofuel Researcher
d	Answer	Microalgae Fermentation Technologist
e	Answer	Skipper
f	Answer	Fish Welfare Specialist
g	Answer	Other

Q6. If you have chosen "other" occupation, please enter here the name of the occupation:

Question type: Short text, required: YES

Code	Type	Value
text	Answer	Respondent input

Q7. Description of the occupation (max. 4-5 sentences: Definition of the term "Occupation/job" = a set of work tasks performed by one person who possesses the appropriate knowledge, abilities and skills. The job description should make it clear what people of a certain job should achieve through their work in the work environment)

Question type: Short text, required: YES

Code	Type	Value
text	Answer	Respondent input

Q8. Please list 3 main tasks to be performed in this occupation. Task 1:

Question type: Short text, required: YES

Code	Type	Value
text	Answer	Respondent input

Q9. Task 2:

Question type: Short text, required: YES

Code	Type	Value
text	Answer	Respondent input

Q10. Task 3:

Code	Type	Value
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Question type: Short text, required: YES

text	Answer	Respondent input
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Q11. Please click the relevant necessary educational level needed for the occupation (more than one answer is possible)

Question type: Multiple choice, required: YES

Code	Type	Value
1	Option	Mandatory minimum school education
2	Option	secondary school - additional years/qualification
3	Option	Secondary vocational school
4	Option	Medium level/ higher level vocational school/ education
5	Option	Faculty/university – undergraduate studies / Bachelor degree
6	Option	Faculty/university – (post)graduate studies/ Master degree
7	Option	Doctoral studies
8	Option	Additional mandatory courses (non-formal education, not in school system)

9	Option	Informal training (extra training outside school system and non-formal training, e.g. language course)
10	Option	Other
X	Answer	Option selected
text	Answer	Respondent input

Q12. Type of employment (more than one answer is possible)

Question type: Multiple choice, required: YES

Code	Type	Value
1	Option	permanent
2	Option	occasionally
3	Option	seasonal
4	Option	several months on - several months off
X	Answer	Option selected

Q13. Location of the occupation/job - the work is performed in the (please click all relevant places - more than one answer is possible):

Question type: Multiple choice, required: YES

Code	Type	Value
1	Option	office

2	Option	workshop
3	Option	outdoors
4	Option	onshore
5	Option	offshore
6	Option	frequently away from home/office/base
X	Answer	Option selected

Q14. Working hours of the occupation/job (only one answer is possible)

Question type: Single choice, required: YES

Code	Type	Value
A	Answer	Fixed
B	Answer	Flexible
C	Answer	Both possible

Q15. Work Schedule (only one answer is possible)

Question type: Single choice, required: YES

Code	Type	Value
A	Answer	Work during day time hours
B	Answer	Work during night time hours

C	Answer	Work in shifts
D	Answer	All of the above

Q16. Workplace environment (special working conditions - more than one answer is possible)

Question type: Multiple choice, required: YES

Code	Type	Value
1	Option	Exposure to hazardous environment, such as hazardous chemicals, dangerous radiation, explosive, etc.
2	Option	exposure to weather and working environment, such as extreme heat/cold, temperature changes, strong wind/air flow, humidity/rain, dust, loud noise and vibrations, artificial lighting, etc
3	Option	Other
X	Answer	Option selected
text	Answer	Respondent input

Q17. Physical requirements (more than one answer is possible)

Code	Type	Value
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Question type: Multiple choice, required: YES

1	Option	Essential physical requirements, such as climbing, standing, stooping, often changing position by bending over, turning the body, etc
2	Option	Physical effort/lifting
3	Option	Desk-bound occupation
4	Option	Other
X	Answer	Option selected
text	Answer	Respondent input

Q18. Other requirements you might find important for this occupation

Question type: Short text, required: NO

Code	Type	Value
text	Answer	Respondent input

Q19. Soft Skills: For each soft skill please rate its importance on a scale of 1 to 5 (1 = not important and 5 = very important) for the occupation/ job you described above

Question type: Scale, required: YES

Code	Type	Value
1	Dimension	Teamwork
2	Dimension	Adaptability
3	Dimension	Creativity

4	Dimension	Problem Solving
5	Dimension	Curiosity
6	Dimension	Work under pressure
7	Dimension	Communication
8	Dimension	Critical thinking
9	Dimension	Attention to Detail
10	Dimension	Time Management
11	Dimension	Customer Service
12	Dimension	Resilience
13	Dimension	Ethical Awareness
14	Dimension	Safety and responsibility at work
A	Answer	1
B	Answer	2
C	Answer	3

Q20. Any other important Soft Skills?

Question type: Short text, required: NO

D	Answer	4
E	Answer	5
Code	Type	Value
text	Answer	Respondent input