Title	Education and training for maritime spatial planners
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Publication date	2019-01-24
Original Citation	Calado, H., Fonseca, C., Ansong, J. O., Frias, M. and Vergílio, M. (2019) 'Education and Training for Maritime Spatial Planners', in Zaucha, J. & Gee, K. (eds.) Maritime Spatial Planning: past, present, future, Cham: Springer International Publishing, pp. 441-468. doi: 10.1007/978-3-319-98696-8_19
Type of publication	Book chapter
Link to publisher's version	http://link.springer.com/chapter/10.1007/978-3-319-98696-8_19 - 10.1007/978-3-319-98696-8_19
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Download date	2023-10-01 14:54:41
Item downloaded from	https://hdl.handle.net/10468/7745

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Education and Training for Maritime Spatial Planners

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J. Zaucha, K. Gee (eds.), *Maritime Spatial Planning*,
https://doi.org/10.1007/978-3-319-98696-8_19

1 Introduction

The idea that became Maritime Spatial Planning (MSP) was initially proposed in 1976 by international and national interests in developing marine protected areas (e.g. the Great Barrier Reef Marine Park) as a response to the environmental degradation of marine areas caused by human activities (Olsson et al. 2008). The MSP concept then evolved in the North Sea, a sea basin under high human pressure, where attention was placed on managing the multiple use of marine space driven by new maritime uses, such as offshore wind, especially in areas with conflicts amongst users and conflicts between users and the environment (Olsen et al. 2014; Douvere 2008). It has developed and been implemented in about 20 countries over the past decade (Ehler et al. 2018), and a community of MSP disciplines is developing that calls for more specifically qualified professionals (Ansong et al. 2018). This development offers new opportunities for practitioners with different marine backgrounds, including planning officers, planning/policy consultants, and planning policymakers, that are emerging with the new demands of the field. MSP professionals and sectoral agencies therefore need a comprehensive understanding of the process of MSP and a range of competences and skills, including not just scientific, oceanographic, ecosystem functioning, and geospatial analytical aspects but also planning, programme management, and stakeholder engagement, amongst others (McCann et al. 2014). There is the opportunity to define and explore theories, research, and concepts in such a new field but not much practical experience or real successful cases of MSP from which to learn and to inform training materials and courses that can address training needs. Specific teaching materials and practical manuals are therefore limited. Education and training in MSP, however, must respond to challenges associated with the complexity of this particular planning process, different competence/skill needs, limitations of resources, and the transdisciplinary nature of MSP by a joint effort of disciplines (Ansong et al. 2018; Gissi and de Vivero 2016).

This chapter explores the various training needs and the competences, skills, and backgrounds needed to achieve a successful professional practice. A brief analysis of the existing MSP training resources and a more detailed analysis of an Erasmus Mundus programme specific to MSP are presented. This chapter further contributes to answering the critical questions of the most effective approaches for MSP training by gathering information from various professionals in the MSP community, including agency MSP officers, academics, policymakers, consultants, and other professionals.

2 Evolving Maritime Spatial Planning and Training

The multiple aims and objectives of MSP call for different competences, including those related to environmental, economic and social disciplines, sciences, and skills. MSP is currently a process to foster and encourage spatial efficiency, by promoting coexistence and synergies between maritime use, whilst other cross-border advantages may also have been considered.

Glegg (2014), in answer to the question "who needs training?", suggested: the planners who will be responsible for creating the plans, those with a mainly statutory responsibility to participate in the planning, and those representing a particular interest, whether commercial (e.g. marina owners or fishers) or interest-based (e.g. sailing or non-governmental conservation organisations). Individuals should be trained/educated in MSP to improve their skills, knowledge, and behaviour for a successful MSP process. Increasing MSP capacity is required at all levels and should strengthen legal, administrative, financial, technical, and human resources to address various multifaceted issues that complicate the MSP process. MSP professionals with broad skill sets and knowledge beyond traditional disciplines are urgently needed to include understanding of the legal frameworks, programme management, and social skills involved in working on interdisciplinary teams.

This very broad spectrum of educational and training targets represents different dimensions. Each target group needs a different answer and design programme, but the terms "education" and "training" in this chapter are used regardless of the public or group to be targeted but mainly referring to those directly involved in the process making of the plan.

Initial approaches to MSP implementation and training were largely focused on the consolidation of concepts, mainly because few practical experiences were available from which to draw. Progress in the practical implementation of MSP, however, has been made, and recent approaches to education and training should reflect the practical aspects of MSP to ensure that the multiple objectives of MSP are achieved (Ansong et al. 2018; Jones et al. 2016). Training and education must address these objectives to ensure that the gap between concept and practice is bridged and to emphasise the development of practical skills.

As Gissi and de Vivero (2016) stated that education/training offers a clear dominance of contents for "environmental analysis/assessment" and "maritime uses", whilst "experiences in MSP" and "planning theory" are the least represented. MSP courses may be continuous with education in the management of coastal zones, where ecological science, applied geography, and physical science are the most emphasised theoretical subjects, along with

assessment and monitoring. Another reason for the dominance is that environmental studies and marine science have a long tradition in managing marine resources from the perspective of conservation. These courses appear to be reorientations of already established programmes towards new questions and demands inherent to MSP instead of being established to cover specific areas of MSP. A new orientation associated with the combination of "environmental analysis and assessment" with "maritime sectors" has been introduced in Germany and Norway, which may have originated in the drivers for MSP involving the support of blue growth and key maritime sectors, such as renewable energy.

The different drivers for MSP, such as historical, cultural, and geographical contexts, and governance approaches based on certain marine industries or sectors in place inform the various planning approaches and the implementation of MSP (Kidd and Shaw 2014). The challenges for marine planners (such as engaging with relevant parties; assimilating marine plans into existing management; understanding the current framework; willingness to negotiate a role for marine plans; integrating science and policy to support appropriate decisions; awareness of available and important information; and identifying, involving, and maintaining the commitment of individuals in the planning process (Glegg 2014)) shape new demands on education and training with a stronger emphasis on the social dimensions.

In summary, Ansong et al. (2018) examined the existing educational materials, such as those supported by Intergovernmental Oceanographic Commission—United Nations Educational, Scientific and Cultural Organization (IOC-UNESCO), on the educational dimension of increasing MSP capacity, mostly through its web platform, sharing experiences from all over the world, and the publication of MSP manuals and guides. The European MSP Platform provides in-depth information on specific aspects of MSP and complementary information on MSP processes and projects of European Union (EU) member states. OpenChannels is another important platform due to its role in disseminating MSP initiatives, tools, and literature and for promoting and supporting debate. IOC-UNESCO and the EU are the main international actors in increasing MSP educational capacity, with initiatives such as Erasmus Mundus Master Course in Maritime Spatial Planning (EMMCMSP), the ERASMUS+ Strategic Partnership for MSP, and the Marie Skłodowska-Curie Action Planning in a liquid world with tropical stakes: solutions from an EU-Africa-Brazil perspective (PADDLE project). Some public administrations have also held MSP training projects for MSP and sectoral officers such as in the case of Poland and the Marine Management Organisation (MMO).

Practical teaching approaches in MSP education are still being developed, but experience in terrestrial planning can be instructive for MSP training and education. Ritchie et al. (2015) outlined some practice-oriented approaches to planning education that can be used in MSP education. Mock inquiry, one of these approaches, can be transferred to MSP training. This model uses a role-play format to develop student understanding of the framework that enables planning decisions. Student teams study a real planning application that has been refused but not appealed. The module culminates in a live simulated mock planning inquiry, chaired by practicing planners, for students to obtain a practical understanding of the issues and challenges of planning. Experiential approaches to learning that give prominence to soft skills, such as the ability to collaborate, work in groups, read social cues, and respond adaptively, are also needed.

3 Europe and Maritime Spatial Planning Education

The education offered is characterised by multiple combinations of contents and methods generated by different interpretations of what MSP has been and what is now being practised in Europe and other countries. New educational initiatives in MSP should respond to this complexity by (1) developing the transdisciplinary approach that began to be adopted at the beginning of this process and (2) including the successive environmental- (ecosystem-based management) and economics-based (blue growth) foci that dominate the present approach to marine planning (Gissi and de Vivero 2016).

Ansong et al. (2018) stressed the need for a process approach to cover the entire MSP cycle by referring to the paradigm shift in recent teaching experiences, from MSP being used as an environmental approach and managing conflicts amongst uses to a more holistic approach for coordinating sectoral policies, facilitating transboundary cooperation, and planning advantages. Flannery et al. (2018) argue that MSP negotiations examined as a boundary object ("something which brings diverse stakeholders together, which each view from their own perspective, yet negotiate a common understanding of—provides a theoretically driven analysis of the processes through which actors collaborate or act so as to deny the actions of others") facilitate a greater understanding and explanation of the negotiation process, co-option, and domination that occur within MSP initiatives, balancing powers, invested interests, and conflicts. Increasing MSP capacity was therefore defined as a process by which the abilities of individuals, institutions, and their networks are developed

and enhanced for making effective and sustainable decisions about the temporal and spatial ordering of human activities in the marine space.

EMMCMSP is a two-year advanced professional Master's degree programme designed within the Erasmus Mundus 2013–2019 programme, with the participation of three European universities: Università Iuav di Venezia, University of Seville, and University of the Azores. This particular Joint Master's degree course intends to prepare students to become specialists in MSP, operating both in public institutions and as independent professionals or researchers. The course was designed to provide students with skills to plan, design, and evaluate projects and policies, which consider terrestrial, coastal, and marine dimensions, and to develop their ability to manage decision processes towards an adaptive and integrated approach. The course familiarises students with key issues involved in policy formulation and planning strategies for maritime space to improve the management of resources from environmental, economic, social, and legal perspectives within the framework of maritime policies. The EMMCMSP degree course is organised into four terms, including practice-oriented classrooms, a period of internship in different countries, and the development of a final thesis.

This Erasmus Mundus programme in MSP, integrated in the cooperation and mobility programme in the field of higher education that aimed to enhance the quality of European higher education and to promote dialogue and understanding between people and cultures through cooperation with third countries (Decision No 1298/2008/EC (EC 2008)), has currently completed its 5th edition cycle. Considering its EU funding support, its international dimension, the successful employment of former students, and the tripartite academia as its basis (Portugal, Spain, and Italy), this Master's degree course is used as an example to support a brief analysis of the present educational interests. It has also to be stressed that this course was designed during the discussion of the EU Directive on MSP (Directive 2014/89/EU (EC 2014)), and great effort was dedicated to incorporating the various demands of the Directive published at the end of the first year of the Erasmus Mundus Master course on MSP.

The five editions of the EMMCMSP have already welcomed about 60 students from several countries. More than 50% of the students come from Asia or Africa, and the number of students has been stable throughout the editions. Seven students in the 2nd edition were from Asia, which is the highest number of students from a particular region in all editions. The popularity of the EMMCMSP in these regions is probably due to the aim of the Erasmus Mundus programme to improve cooperation with Third World countries and to the extensive connections with these regions.

The number of students (six) from the EU peaked in the 2nd edition but decreased to only two in the 5th edition, which was surprising because MSP has become very popular due, for example, to the MSP Directive and the efforts towards a blue-growth economy encouraged by the Commission. The programme, however, provides only two or three grants per edition for EU students, which is probably mainly responsible for the level of bias towards these countries. This gap in MSP EU training strongly needs to be addressed. South America has provided the largest increase in the number of students, from only one student in the 1st edition to four students in the last edition. Is it just chance or has the coordination office been more active in advertising the EMMCMSP in South America because MSP is not yet developed enough to justify the increasing interest in the EMMCMSP?

Almost one-third of all students from all editions have had a background in architecture or engineering (Fig. 19.1). The number of students with a background in environmental science and geography is slightly lower but is also close to one-third. The difference in the trend of these two categories, however, is notable; the number of students with backgrounds in architecture and engineering has been steadily decreasing over all editions, but the number of students with backgrounds in environmental science and geography has remained the same. Justification for the background in architecture may be because architecture is an extension of land-use planning, where many architects are specialists. The number of students with backgrounds in marine biol-

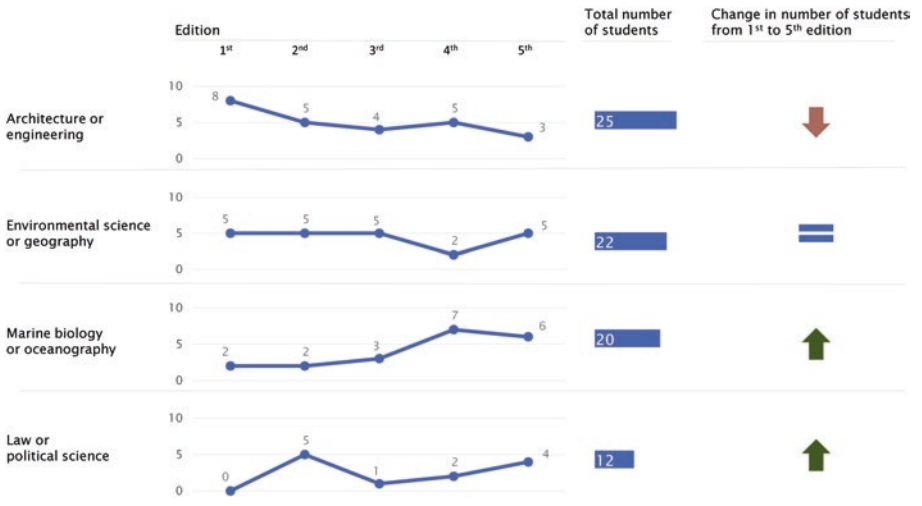

Fig. 19.1 Number of students in the Erasmus Mundus Master Course on Maritime Spatial Planning per background and edition

ogy and oceanography, in contrast, has increased remarkably since the 1st edition, which is perhaps logical because MSP has a strong environmental component, at least in Europe. What is interesting, however, is that the number of students with this background has not been high from the beginning.

The fewest students across all editions had backgrounds in law and political science.

In addition to the geographical origin of the students, the kind of issues looked for when deciding to integrate EMMCMSP is also worth analysing. Most theses are about governance and ecosystem-based management. More than one-third of students decide to write their theses on the issue of governance, and the number of theses about this topic has been slightly increasing since the 1st edition (Fig. 19.2), which is not surprising because governance is such a broad topic. The number of theses about other topics has remained stable across all years.

Almost half of the students of all editions decided to focus their theses as a recommendation to a certain topic (Fig. 19.3). Writing recommendations has been the favourite output of all editions except the 2nd. This kind of output decreased remarkably in the 2nd edition in favour of "lessons learnt". Writing about supports to decision-making has not been popular in any edition. In fact, the number of this kind of output topic is decreasing drastically.

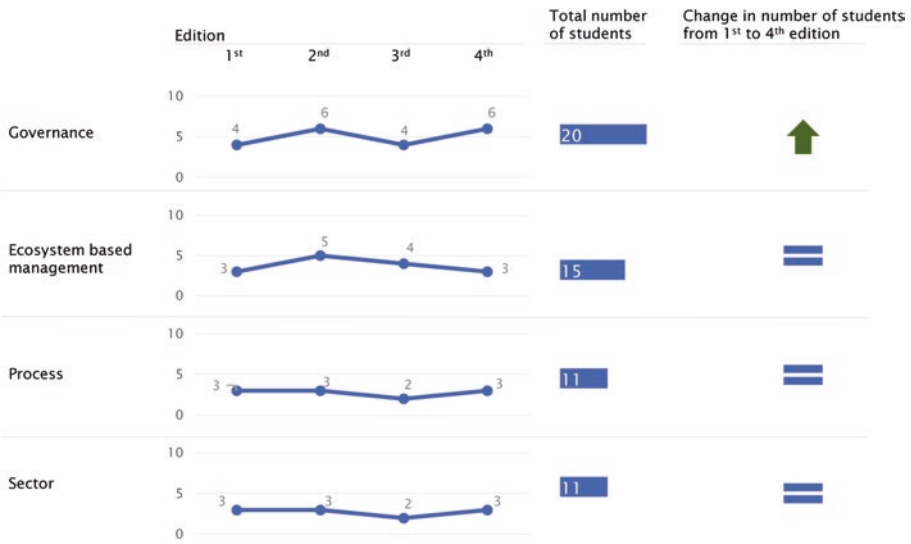

Fig. 19.2 Number of theses from the Erasmus Mundus Master Course on Maritime Spatial Planning per theme and edition

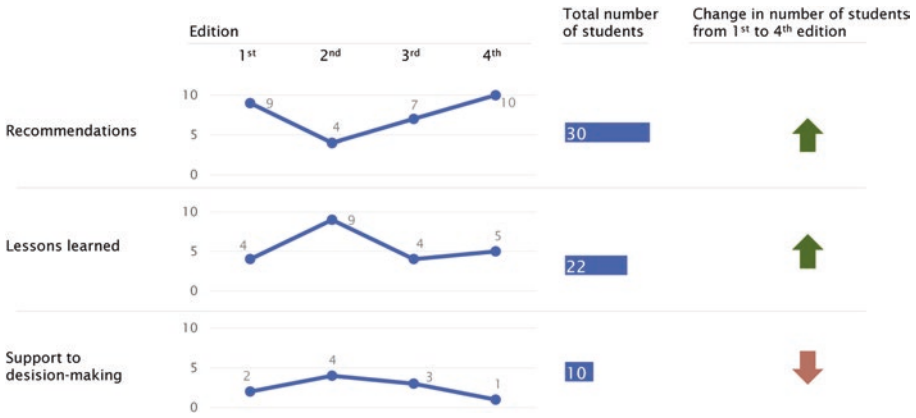

Fig. 19.3 Number of theses from the Erasmus Mundus Master Course on Maritime Spatial Planning per topic and edition

Almost 40% of all these deal with Step 3 in Fig. 19.4 "Organising the MSP Process" from the UNESCO "A Step-by-Step Approach toward Ecosystem-based Management" (Ehler and Douvere 2009). Steps 8 "Implementing the plan" and 5 "Analysing existing conditions" are the foci of one-third of the theses. In addition to the personal preferences of the students, the available time for the elaboration of the thesis may have influence on the chosen topic. Steps in the process involving stakeholders' engagement will be more difficult to develop in a short period of time. It is also worth mentioning that steps are sequential and, for example, future condition cannot be addressed without a proper analysis of the current conditions. In what concerns the step for evaluation, as not many plans are implemented, it is expected that not many theses are developed under this topic.

EMMCMSP has reached its initial programming, and new editions are dependent on the approval of a new cycle of studies by the Erasmus programme. The educational offer, however, still exists under other opportunities.

The Marine Planning and Management Master Course at the University of Liverpool is another initiative oriented towards MSP. This course is a full-time (12 months) or part-time (24 months) programme open to all first-degree subjects. The MSc in Marine Planning and Management is also designed on a multidisciplinary approach and provides graduates with the knowledge and skills required to meet the job opportunities arising from the recent adoption of MSP and related developments in marine conservation and maritime industries. Some topics selected by students for development in their dissertations include implementation of MSP in Portugal, global food security, find-

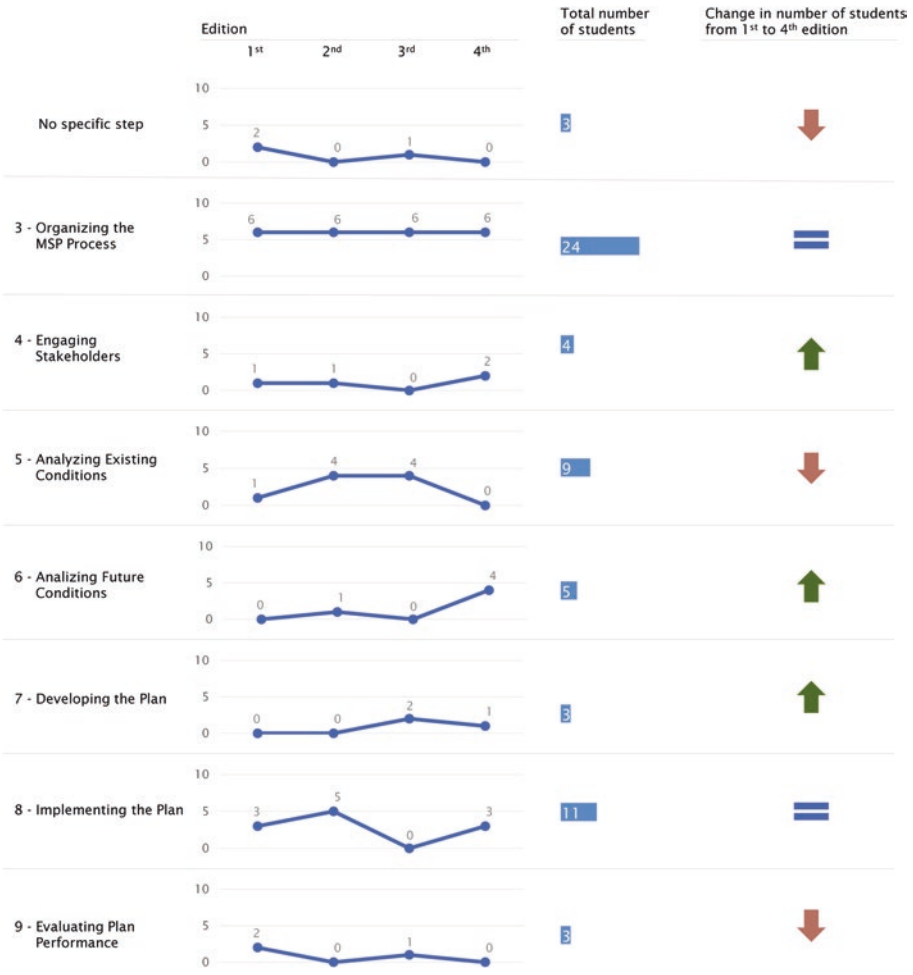

Fig. 19.4 Number of theses per MSP step and edition (MSP steps from the UNESCO "A Step-by-Step Approach toward Ecosystem-based Management" (Ehler and Douvere 2009))

ing space for aquaculture, stakeholder participation in marine planning in the UK, success factors for offshore wind energy, China's system of marine functional zoning, assessing the value of sand-dune systems in north-western England, stakeholder involvement in the Irish Sea Conservation Zone project, reducing the impact of offshore wind farms on seabirds, and mitigating the impacts of tidal barrages (Marine Planning and Management MSc 2018). This analysis, however, focused only on a programme designed from the beginning to cover the needs of the MSP process based on EU trends.

The new Strategic Partnership for MSP is a cooperation to address current issues in the emerging field of MSP, with the overall aim to reach a common understanding and transdisciplinary approaches on a transnational level for higher education. The partnership will present a common European educational agenda and is expected to have some degree of tailoring and downscaling of proposals to the different MSP training and educational needs covering the EU. Other initiatives, including ad hoc initiatives, were also developed, namely SeaPlanSpace (a project aiming to strengthen the competences of employees of administration and the private sector, as well as students and university graduates, in the area of MSP and sustainable marine governance (University of Gdańsk 2018)), BONUS BaltSpace (a summer school for early career professionals and PhD students (The Baltic University 2018)), and the MSP Course for professionals (Maritime Spatial Planning in the Baltic Sea Region 2018).

4 Skill and Competence Needs

As a discipline or planning process such as MSP evolves, the skills and competences necessary for its proper development and implementation also evolve. A bipartite approach was developed to identify the upcoming needs for skills and competences in MSP. Firstly, skill and competence needs were identified based on "Marine spatial planning—A Step-by-Step Approach toward Ecosystem-based Management" by Ehler and Douvere (2009) and on the Davies et al. (2011) study on "future working skills". Secondly, skill and competence needs for MSP were discussed by consulting a pool of MSP professionals.

4.1 Skill and Competence Needs Based on the Maritime Spatial Planning Process

Davies et al. (2011) proposed ten key working skills needed by professionals to be active and effective for the next ten years. The study concluded that skills for rationality (the ability to determine the deeper meaning or importance of what is being expressed), social intelligence, novel and adaptive thinking, cross-cultural competency, computational skills, new-media literacy, transdisciplinarity, design mindsets, cognitive-load management, and virtual collaboration are relevant across a range of professions. These skills are summarised in Table 19.1. Marine spatial planners and professionals need to be

Table 19.1 Competences of a marine planner/marine planning team based on the MSP process

Maritime planning process and activities	Skills and knowledge	Background and expertise
Defining/selecting the planning area *Discussion on boundary of the planning area based on jurisdictional boundary, patterns of maritime activities and bio-regions.* Collecting and understanding existing information *and plans available in the planning area*	Existing jurisdictional boundaries, bioregions, dialogue, intuitive reasoning, rationality	Legal and policy expertise, ecologists, marine geographers, spatial planners, social scientists
Stakeholder engagement/ consultations *Identification of stakeholders, when & how to engage them*	Stakeholder analysis, stakeholder engagement tools, facilitation, negotiation, communication	Social scientists, specialists in graphics and geographic information systems (GISs), communication experts
Gathering data & evidence/ stock-taking *Collecting, storing, and managing scientific data and information for the planning area*	Data-collection methods, spatial-database management, existing governance system, digital thinking, intuitive reasoning, rationality	GIS, specialists in data and information technologies, statisticians
Definition of visions and objectives *Definition of visions and objectives of the planning area are based on evidence and engagement*	Policy analysis, logical framework analysis, scenarios, facilitation, negotiation	Legal and policy expertise, terrestrial planning, communication expert, social scientists
Analysis of current and future conditions *Issue identification, spatial conflicts, options/ alternatives, scenarios* *Analysing current and future spatial/temporal trends and requirements*	GIS, scenario analysis, sector assessment, synthesising information, spatial analysis, socio-economic analysis, environmental analysis, intuitive reasoning, rationality, spatial planning	Marine scientists and technical specialists, for example, oceanographers, ecologists, surveyors, statisticians, economists, terrestrial planners, environmentalists, heritage and cultural specialists, GIS specialists, specialists in data and information technologies, social scientists Sectoral interests such as fisheries and marine industries

(*continued*)

Table 19.1 (continued)

Maritime planning process and activities	Skills and knowledge	Background and expertise
Development of plan policies/measures *Measures and alternatives to achieve planning objectives and visions*	Existing sectoral policies, activity planning, analysis of existing governance system, communication, facilitation, negotiation	Sustainability appraisal, legal and policy expertise, sectoral interests, social scientists, growth strategies and regeneration
Plan approval and adoption *Review of draft plan to include comments and inputs from consultations with necessary arrangements for approval*	Policies and legislation	Legal and policy expertise, social scientists
Plan implementation *Ensuring coordination, compliance, and enforcement of measures and policies defined by the plan*	Project/organisational management	Sectoral interests and agencies
Monitoring and evaluation *Reporting and monitoring the progress of the plan and necessary planning reviews*	Understanding a "logic model" and indicators, existing monitoring programmes	Statistical and reporting experts, social scientists
Management of the planning process/other competences *Coordination and organisation of the various activities and processes*	Programme/project management, systems thinking, and management processes	Terrestrial planning, project managers, social scientists
Additional skills	Politics and legislation	

Adapted based on Ansong et al. (2018)

trained to deal with current and future challenges and requirements. Ansong et al. (2018) also proposed a set of skills and backgrounds needed for MSP based on MSP practice and informed by inputs from MSP professionals. Table 19.1 lists the steps identified by Ehler and Douvere (2009) in the maritime planning process and is therefore a combination where the skills developed by Davies et al. (2011) were juxtaposed against the background and skill set for a marine spatial planner/team by Ansong et al. (2018) to demonstrate that rationality, social intelligence, and computational thinking skills are largely covered and emphasised in MSP practice according to professionals. Transdisciplinarity, novel and adaptive thinking, design mindsets, and cognitive-load management are implied in these MSP skills and backgrounds,

whilst cross-cultural competency, virtual collaboration, and new-media literacy are not referred to or indicated.

Cross-cultural competency is not emphasised probably because statutory MSP processes are normally within national jurisdictions. Stakeholder engagement, however, is expected to cater to different cultures and understand how they can be brought into the MSP process. MSP is changing, and international cooperation will become increasingly important in the future. MSP education and training should therefore cater to training professionals to deal with different cultural settings. Virtual collaboration is an important skill for MSP professionals, which has been noticed in MSP projects and partnerships between institutions in different countries, due to upcoming technologies, which allow for hosting audio-visual meetings between professionals and stakeholders and amongst the wider MSP community. Integrating new-media literacy into MSP educational programmes is also closely linked to developing virtual collaboration skills. Using new-media platforms and presenting visually stimulating information is also a critical skill to be developed. Experience has demonstrated that more effort is needed in such an area to engage more with marine stakeholders in understanding MSP issues.

Additional emphasis on developing practical skills such as critical thinking, insight, and analytical capabilities in MSP education and training is needed.

4.2 Skill and Competence Needs: Expert Consultation

Professionals who have worked in MSP and active professionals currently developing activities in the MSP sphere have the most experience in the field and can probably best illustrate the skills and backgrounds needed by future MSP professionals. Active professionals also constitute potential employers, and many represent institutions in charge of or associated with MSP processes that have already been or will be developed. A pool of professionals, not intended to be representative of MSP practitioners but rather representative of the different dimensions in need of MSP specific skills, was invited to collaborate in this study, contributing their knowledge of the current needs for MSP skills and competences. This pool was organised to include professional categories: policymakers/governmental agencies, scientific representatives, industry/sectoral professionals, consultants, and professionals with MSP experience (Fig. 19.5). The pool was drawn from different countries/regions in the EU where MSP processes have already been implemented, plans have already been developed, and agencies have legitimacy in the MSP process (namely England, Scotland, and Germany). The majority of the respondent

Fig. 19.5 Professional categories included in the pool of professionals

professionals have been teachers, tutors, and/or facilitators in any type of specific training in MSP. Masters courses and other types of training (e.g. short courses) are the most common training format in which the respondents have taught, followed by seminars and summer schools. The questions were organised into three sections: the first focused mostly on the background and past training of the professionals; the second focused mostly on the skills and backgrounds currently needed in MSP; and the third focused mostly on the issues that MSP training should include.

Training Attended by Respondent Professionals

More than half of the respondents had attended at least one type of training in the last five years. The most common type of training was games, followed by seminars, workshops, and other types of training, all at the same level (Fig. 19.6a). Master courses, summer schools, and fieldwork were the least attended types of training. Games and workshops seem to be suitable for professionals to become updated on MSP evolution. Opinions about the benefits of the training to the professionals on a scale of 0 to 5 were divided, but the professionals generally considered their training to have been beneficial (Fig. 19.6b). None of the respondents considered that the training was not at all beneficial (value zero for benefit). The most selected levels of benefit, quantified by the number of answers, were medium (level 3) and high (level 5).

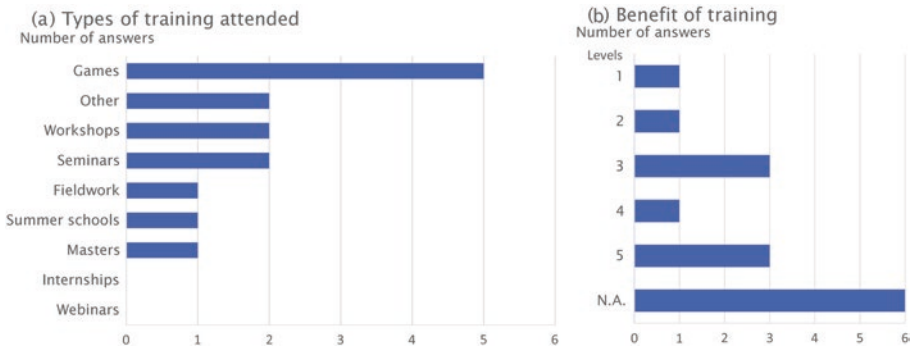

Fig. 19.6 (**a**) Main types of training attended by professionals in the last five years and (**b**) level of benefit of the training to the professionals

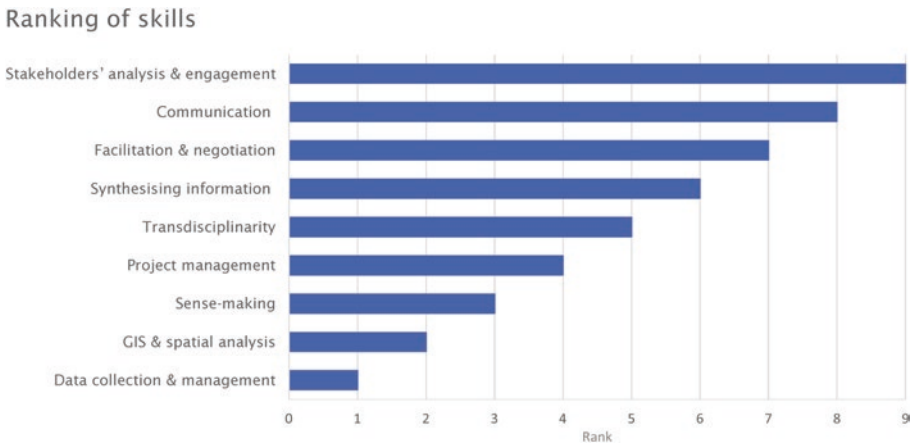

Fig. 19.7 Ranking of the importance of skills needed by an MSP practitioner, according to the expert respondents; highest values indicate more important skills

Benefit levels 1, 2, and 4 were also selected, demonstrating that the professionals recognised the benefit of their training.

Skills Needed by an Maritime Spatial Planning Practitioner

A set of skills needed by an MSP practitioner was proposed and presented to the professionals, who were asked to rank the skills in order of importance. They were also asked if other skills were needed by MSP practitioners. The results were compiled to represent skills of higher importance with higher values and skills of lower importance with lower values (Fig. 19.7).

The ability to analyse and engage with stakeholders was identified as the most important skill needed by an MSP practitioner, amongst the suggested set of skills. Communication and skills for facilitation and negotiation were identified as the next most important. Skills for synthesising information, transdisciplinarity, and project management were categorised as moderately important. Rationality, geographic information system (GIS) training, and spatial analysis were considered less important, and data collection and management were considered the least important.

Additional skills identified by the professionals were:

- Political skills and navigating politics, such as understanding processes of law, policy, and decision-making and understanding the legislative framework of MSP and its constraints,
- Spatial-planning skills (itself a set of skills including some of the above),
- Understanding social and natural sciences and the ability to take a holistic view,
- Capacities dealing with neighbouring countries and cultures,
- Being neutral and assertive, and
- Presentation skills (which might be also included in the suggested skill of communication) and the ability to write clearly (particularly policies).

Backgrounds Needed by an Maritime Spatial Planning Team

Similar to the previous question, a set of proposed backgrounds needed by an MSP practitioner was proposed and presented to professionals, who were asked to rank the backgrounds by order of importance. The professionals were also asked if other backgrounds were needed by MSP practitioners. The results were compiled to represent backgrounds of higher importance with higher values and backgrounds of lower importance with lower values (Fig. 19.8).

Spatial planning was considered the most important background, followed by marine sciences, legal framework, and social sciences. Industry and technology, GIS, and other environmental sciences were ranked as moderately important. In descending order, economics, political science, communication sciences, and transportation and statistics were considered the least important.

Additional backgrounds identified by respondent professionals included

- Administration,
- Modelling marine physical processes,
- Facilitation and moderation, and
- Conflict management.

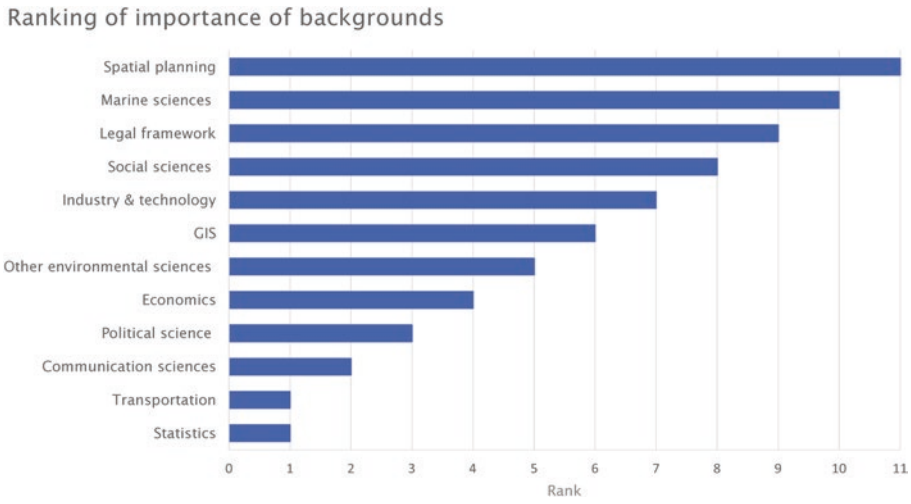

Fig. 19.8 Ranking of importance of backgrounds needed by an MSP practitioner, according to the expert respondents; highest values indicate more important backgrounds

Importance of Specific Training and the Most Important Areas of Knowledge

On a scale from 0 (level of no benefit) to 5 (level of highest benefit), none of the respondents considered that training in MSP was not important to practitioners (value 0 for importance) or selected importance level 2. Importance level 4 was the most selected (Fig. 19.9), followed by levels 3, 5, and 1, demonstrating that the professionals considered specific training to be important or very important for MSP practitioners.

Several areas of knowledge were considered by professionals as important to be covered by specific training in MSP. Similar answers were grouped to shorten the list and identify the most consensual areas of knowledge (Fig. 19.10). This question was an open question, and the results overlapped to some degree with the results for the *ranking of skills* and *ranking of backgrounds*. Most of the professionals agreed that stakeholders' identification and engagement, governance, legal and political frameworks, and spatial-planning theory and practices should be covered by specific MSP training. Stakeholders' analysis and engagement was the highest ranked skill, whilst spatial planning was the highest ranked background. For governance, legal and political frameworks, and administrative and economic frameworks, MSP training should focus on country- or region-specific contexts, and training, including real-world examples, was considered of utmost importance.

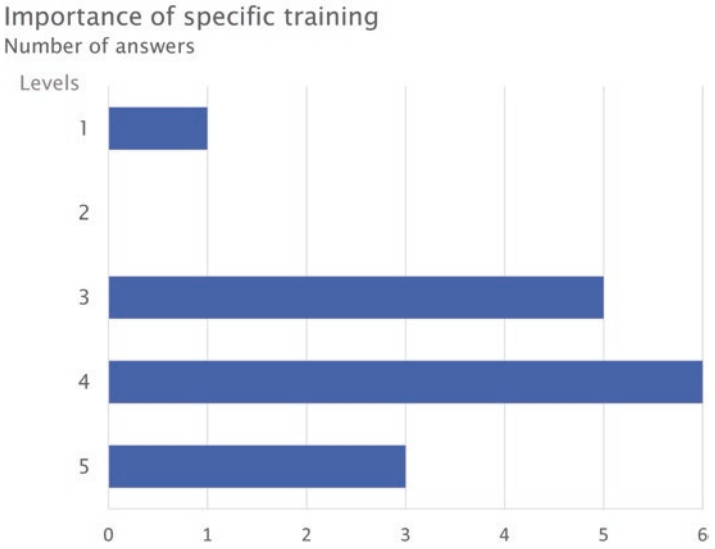

Fig. 19.9 Levels of importance of specific training for MSP practitioners

About half of the professionals considered that "hands-on" training (e.g. fieldwork and internships) was the most effective type of training and preparation for developing and implementing MSP processes (Fig. 19.11). Masters, summer schools, and workshops were also effective but with less consensus amongst the professionals. The category "others" included, for example, the professionals' references to short courses and continuous professional development. Networking was also considered a good opportunity to increase skills and backgrounds in MSP. Real-world cases and examples, problem-solving, and practical training were again considered highly effective.

Additional comments of the professionals included the reiteration of some training needs for MSP staff, namely communication (written, oral, digital media, press, public speaking), moderation and negotiation skills, knowledge of the socio-economic and cultural aspects of MSP, provision of real-world cases and examples, increased knowledge about the implementation of the ecosystem-based approach, development of innovative resource-efficient methods (e.g. online) for engaging stakeholders and increasing participation, exploring the links between MSP and terrestrial planning (land/sea interface), and a Bayesian MSP (progression from Boolean thresholds (yes/no) of area suitability to a spectrum of values of area suitability and integration of data uncertainty).

Fig. 19.10 Areas of knowledge that the respondent professionals considered should be covered by specific MSP training

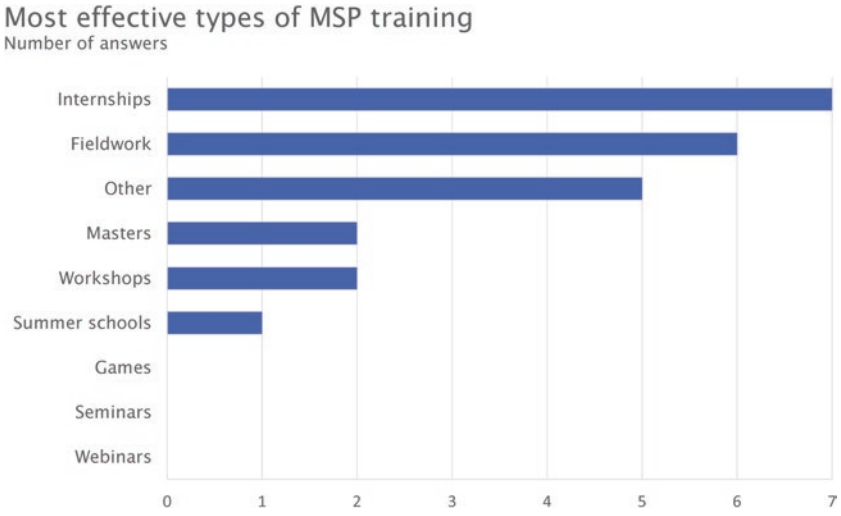

Fig. 19.11 Most effective types of MSP training according to the respondent professionals

5 Discussion and Recommendations

This chapter intended to initiate a discussion of the basic and most important skills and backgrounds important to achieve a successful professional MSP practice and how specific education and training can contribute to that end. As the practice of MSP matures, the educational supply must evolve to respond (or even anticipate) the expectations of both students and potential employers. These three dimensions (educational offer, students' expectations, and market requirements), however, often evolve at different rates creating mismatches that need to be identified and corrected.

The discussion and results indicate that skills requested by MSP practitioners are sometimes common to other practitioners or are at least considered to be general skills, because they are not specific to the MSP process and rationale. Some examples of such skills are rationality, digital thinking, and new-media literacy, including communication and writing competences (Table 19.2) and those considered future working skills identified by Davies et al. (2011). Providing future professionals with these skills will be a challenge not only for MSP but also for employers, as they are also part of a live learning process. The curriculum/syllabus of programmes in MSP, however, must reflect this challenge, and new contents in digital literacy and expression must be added.

Even though covering all subjects and disciplines is important, resources (time and funding) for MSP education and training are limited. Identifying the backgrounds and skills that contribute most to the working environment of MSP practitioners may therefore be needed to identify the issues that should be given the most attention. The ranking of the skills and backgrounds needed by marine planners and teams and by practitioners indicated that stakeholder engagement and analysis were the most prioritised, followed by communication, facilitation and negotiation, and synthesising information. These rankings support the earlier analysis that future training for MSP should focus on new-media literacy and communication and especially how these skills help to engage stakeholders, both in person and virtually. Additional skills suggested by the MSP professionals as also important, including presentation skills, ability to deal with neighbouring countries, political skills, and ability to understand various legislative frameworks, reaffirmed the need for MSP education and training to focus more on communication, legislation, and cross-border engagement skills.

The professionals suggested that spatial planning, marine sciences, legal frameworks, and social sciences were the most important backgrounds for MSP practitioners. Most students accepted into EMMCMSP have a back-

Table 19.2 MSP competences and knowledge and related skills

Skill/key drivers	MSP competences and knowledge	Definition	Summary
Rationality	Dialogue skills, intuitive reasoning Policy analysis, logical framework analysis, scenarios, understanding a "logic model" and indicators, knowledge of existing monitoring programmes	Ability to determine the deeper meaning or importance of what is being expressed	As smart machines take over rote routine manufacturing and services jobs, critical thinking or rationality will emerge as a skill on which workers will increasingly need to capitalise
Social intelligence	Stakeholder analysis, stakeholder engagement tools, facilitation, negotiation skills, communication skills	Ability to deeply and directly connect to others to sense and stimulate reactions and desired interactions	As we collaborate with larger groups of people in different settings, we need socially intelligent employees able to quickly assess the emotions of those around them and adapt their words, tones, and gestures accordingly
Novel & adaptive thinking		Proficiency at thinking and generating solutions and responses beyond those that are rote or rule-based	As automation and offshoring continue, job opportunities will require the ability to respond to unique unexpected circumstances of the moment
Cross-cultural competency	Sectors, policy, environment, socio-economic integration	Ability to operate in different cultural settings	In a truly globally connected world, the ability to adapt to changing circumstances and to sense and respond to new contexts will be necessary for all workers who operate in diverse geographical environments

(*continued*)

Table 19.2 (continued)

Skill/key drivers	MSP competences and knowledge	Definition	Summary
Digital thinking	Data-collection methods, spatial-database management, existing governance system, digital thinking	Ability to translate vast amounts of data into abstract concepts and to understand data-based reasoning	As the amount of data that we have at our disposal increases exponentially, fundamentals of programming virtual and physical worlds will enable us to manipulate our environments and enhance our interactions. Workers must nevertheless remain able to act in the absence of data or algorithms to guide decision-making
New-media literacy	Communication skills, stakeholder engagement	Ability to critically assess and develop content that uses new forms of media and to leverage these media for persuasive communication	As immersive and visually stimulating presentations of information become the norm, workers will need more sophisticated skills to critically assess these kinds of media and to use these tools to engage and persuade their audiences
Transdisciplinarity	Economic analysis, environmental analysis, intuitive reasoning, rationality	Literacy in and ability to understand concepts across multiple disciplines	The ideal worker of the next decade should be able to converse in the language of a broader range of disciplines, which requires a sense of curiosity and a willingness to learn long after their formal education

(*continued*)

Table 19.2 (continued)

Skill/key drivers	MSP competences and knowledge	Definition	Summary
Design mindset	Project/ organisational management Programme/project management, systems thinking, and management processes	Ability to represent and develop tasks and work processes for desired outcomes	Workers of the future will need to become adept at reorganising the kind of thinking that different tasks require and making adjustments to their work environments that enhance their ability to accomplish these tasks
Cognitive-load management	Policy analysis, logical framework analysis, scenarios, understanding a "logic model" and indicators, knowledge of existing monitoring programmes	Ability to discriminate and filter information for importance and to understand how to maximise cognitive functioning using a variety of tools and techniques	The next generation of workers will have to develop their own techniques for solving the problem of cognitive overload, which is due to a world rich in information streams in multiple formats and from multiple devices
Virtual collaboration	Digital thinking	Ability to work productively, drive engagement, and demonstrate presence as a member of a virtual team	Connective technologies allow us to work, share, and be productive despite physical separation, but leaders need to develop strategies for engaging and motivating a dispersed group, whilst team members need to find environments (either physical or virtual) that promote productivity and well-being

Source: Experts inputs, authors construction on Davies et al. (2011)

ground in architecture or engineering (but which has been decreasing), environmental science and geography, and marine biology and oceanography (which has been increasing). The difference between what is perceived as necessary and what is actually happening is decreasing. The reorientation of background areas of knowledge, if needed, can be achieved by the demand for particular areas as an admission requirement. This demand would also allow for shorter introduction courses, thus freeing time for some specialisation within the general MSP skills and competences. As one of the professionals said, "specific expertise is not so important, it's possible to get specialists to cover this (such as environmental science, social science, economics), but there must be awareness of the basics of each field (e.g. the difference between qualitative and quantitative data, different research methods) and the importance of all these fields to MSP".

The professionals also suggested that the most important skills for MSP practitioners to acquire were stakeholders' analysis and engagement, communication, facilitation, negotiation, and synthesising information. Most EMMCMSP theses' themes are about governance and ecosystem-based approach, with recommendations and lessons learnt as the most common outputs from the theses. The students are free to choose topics, but their judgement is noticeably disconnected from the needs of and recommendations by the professionals. Therefore, guidance must be provided. Greater contact between students and the reality of the labour market should also be promoted from an early stage to adjust the expectations of students and potential employers. These efforts need to monitor MSP evolution and evolve with it, always adapting to current needs.

On a final note, attention must be drawn to the fact that teaching and training for MSP has been analysed here assuming a certain degree of knowledge on basic concepts and skills of spatial analysis. However, this might not be the reality in some particular areas, remote and isolated communities, or some underdeveloped countries where focus sessions using friend mapping tools might be the ideal first step.

As MSP is context specific evolving with science and technology but also with market demands, one of the identified actions for training and education initiatives is to permanently update the scope of modern and emerging skills and competences in order to efficiently design curricula and syllabus.

The purpose of this chapter was not to present a detailed analysis of the existing education and training offer/methods but rather to provide a glimpse of the experience of professionals on what is needed for future MSP practice and start discussion on how this should shape a new stage on MSP training.

Training must also diversify and adapt to serve different needs and specific features and contexts: short courses for professional adaptation and evolution, postgraduate and Master courses reactive to new trends in employment, and training for stakeholders and representatives of organisations and agencies.

In conclusion, more training in specific skills and competences is need. The emphasis at all levels of training and education must be placed on skills (especially those connected to facilitation/negotiation, communication, and digital and media literacy) and not only on scientific backgrounds and support. This challenge is even more important at the level of higher education (degrees and masters which are naturally the first choice for specialisation of new professionals), traditionally designed more to provide deep knowledge on specific topics than to develop technical and social competences in a practical context.

However, since most students accepted into the EMMCMSP were coming from architecture and engineering backgrounds, it is still important that environmental sciences and ecosystem aspects remain in the core of skills to develop into future professionals in this particular case. As MSP develops, it is important that MSP education and research takes account of how plans are implemented and related skills to achieve it. Finally, interdisciplinary and transdisciplinary training allows students to develop skills and acquire knowledge in the entire range of subjects underlying MSP practice.

Acknowledgements The authors thank all the collaborating professionals who willingly answered the questions and improved the discussion with additional comments. We also thank Daniela Gabriel, who was an important source of help with the preparation of different materials, the GPSAzores project (Ref. ACORES-01-0145-FEDER-00002 GPS Azores) funded by structural funds ERDF and ESF (Azores 2020 Operational Programme, and FEDER funding from the Operational Programme for Competitiveness Factors) COMPETE, and national funding from FCT (Foundation for Science and Technology) under the UID/BIA/50027/2013 and POCI-01-0145-FEDER-006821 grants. The Open Access fee of this chapter was provided by GPS Azores project (Ref. ACORES-01-0145-FEDER-00002 GPS Azores—funded by structural funds ERDF and ESF—Azores 2020 Operational Programme).

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