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Availability of educational materials and training courses on blue economy and marine spatial planning (MSP): A global review

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Abstract
This study reviews the available education material and training courses on Blue Economy and Marine Spatial Planning. The two concepts are relatively new and communities, researchers and therefore marine ecosystem and resource managers need to understand them better through training or experience. Education curriculum for the concepts respond to its complexity, current status and trends for a holistic comprehension. 47 courses sampled indicate Europe as the leading blue economy and marine spatial planning course hosting region and curriculum development. Training courses form the bulk of the courses offered and target mostly professionals with marine related educational background. Ongoing courses and on demand courses also make the largest percentage of the courses offered. The review further shows that there is an ongoing increase in educational material and training sources related to these concepts while embracing technology by having virtually available on-demand courses. Reduction or removal of fees on the on demand or short training courses will attract and encourage more participants.

Keywords: Blue economy, marine spatial planning, education materials, training course

1. Introduction
The blue economy entails the use of ocean resources sustainably to achieve economic growth, improve livelihoods and create jobs while preserving the quality of the ocean ecosystems. The concept fosters better stewardship of our ocean which comprises assets that cannot be monetarily valued including cultural values, carbon storage, biodiversity, and coastal protection [1]. The blue Economy concept is guided by several principles including sustainable and inclusive growth and development, reducing the risk of over exploitation and risky methods of extraction and usage of the ocean's resources, enhancing the welfare of coastline communities in terms of economic opportunities and social protection and ensuring resilience of countries to natural disasters and the impact of climate change [2]. **/
It is an economic asset that has contributed significantly to the GDP/economies of coastal countries [3]. Therefore, for a right and responsible way of benefiting and sustaining the coastal and ocean resources it's important to engage creative and applicable strategies that will urge blue economy sustainability. The concept is gaining global popularity and so harnessing its benefits requires institutional collaboration hence bringing together multiple sectors, players and capacity building to catalyze expertise [4, 5]. Capacity development activities and training have been identified as one of the gaps hindering successful exploitation and sustainable management of blue economy sectors [6]. A number of researchers have cited lack of enough technical training and advanced academic programs related to blue economy [7]. Many countries recognize the need for more knowledge on blue economy including the development of education skills, research, expertise, and knowledge [8]. Ocean literacy focusing on training and education on blue economy is encouraged to improve maritime stakeholders' understanding on marine resources sustainable utilization enabling them to make realistic projections as far as blue economy is concerned [9].
As much as blue economy is an essential contributor to economic growth [10], its prospect for growth is experiencing challenges due to marine resources overexploitation and climatic

pressures threatening its sustainability [8]. The UN notes that the Blue Economy is assisting in achieving the Sustainable Development goal 14 that focuses on Life below water. This goal calls for the protection of aquatic resources by minimizing overexploitation, therefore for a sustainable blue economy [11], there has to be a strategic and integral approach to the utilization of the marine space hence the recommendation of Marine Spatial Planning concept.

Marine Spatial Planning is a conservation tool for marine sustainability or a public process of analyzing and allocating spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that have been specified through a political process [12]. It's a practical way of allocating marine spaces to rational use and interaction among its users so as to balance demand for development with the need to protect the marine ecosystem, while effectively delivering ecological, social and economic benefits in an open and planned way within the national planning framework [13, 8].

There exists ecosystem-based MSP and economic based MSP [14, 15]. Meanwhile Global MSP is based on integrated, adaptive, forward planning and participatory framework (or tool) that analyses human uses and activities of specific marine areas in order to allow consistent decision making to achieve social, ecological and economic objective. MSP platform is made on the bases of social, institutional, legal and political threats. It takes into account the spatial and temporal conditions which require good understanding and application for success.

MSP and Blue Economy participatory experience and knowledge is more dominant in the managing and implementing stage that depend on professionals who are trying to understand the concept alongside their professional practice. The reason being the newness of the concepts and the limited opportunities available for personal development [16]. These concepts have been introduced from a zero baseline, having pulled people from different professionals therefore education capacity is still developing mostly having their content added into existing marine related programmes. Equipping professionals with a formal education will improve the concepts understanding and increase success in implementation. The education framework should be cross-disciplinary focusing on knowledge and skills development since the concepts integrates environmental and economic perspectives of marine resources. It should also be learning-centered and enable continued practice-based learning[16]. Education curriculum related to blue economy should be able to respond to its complexity and help professionals understand the concept [17] eventually bringing together a new body of practitioners drawn from related professions.

The EU framework Directive on MSP 2014/89/EU recognized the challenges blue growth is facing and the need for Marine spatial planning to forester sustainable blue economy [18]. Considering this the second international conference on MSP at UNESCO headquarters, Paris in 2017 in collaboration with IOC-UNESCO and European commission's Directorate- General for Maritime Affairs and Fisheries (DG MARE) developed the joint Roadmap to accelerate maritime/marine spatial planning worldwide (MSP roadmap). In the implementation or MSP roadmap, they agreed to perform a series of training on MSP and sustainable blue economy at various location globally as part of phase one of the MSP global Initiative (2018-2021). The MSP training materials used have been translated into the UN official language and additional material developed in 2022 to increase its application and impact globally. Partner organizations have accepted to volunteer in giving MSP training in their institutions and share the material with interested parties. The MSP challenge materials target public employees, private actors, civil society representatives, young professionals and students in the ecosystem-based MSP and sustainable blue economy programmes (MSP challenge, 2022).

The Blue economy and MSP are both relatively new concepts and communities, researchers and marine ecosystem and resource managers especially in developing countries need to understand them better through training or experience. Training propagated by readily affordable training sessions and easy acquisition of educative material will offer a more refined version of BE and MSP. This will thoroughly prepare experts and bring to their attention the broader picture of the concepts thus churning out experts who are able to develop regional, country or ecosystem-based implementation of these concepts. In order to achieve sustainability in this area, training of incoming or prospects in this field is necessary to pass on the knowledge acquired through experience with BE and MSP. Regular training brings to the attention of expertise the improved and updated version of these concepts based on their application so far.

Apart from the major involvement of research and management institutions in BE and MSP implementation, there is a gap on its training and availability of training resources. Lack of integration of blue economy and MSP in the education curriculum or training impedes the development of basic knowledge and skills for a successful and sustainable blue economy and MSP practices. Therefore, this study is to review the availability of educational material and training sources on blue economy and Marine Spatial Planning (MSP) worldwide. The findings will form a basis from where educational needs on blue economy and MSP can be developed further.

1.1 Objective

1. To assess the available educational and training materials in higher learning institutions and organizations on blue economy and MSP. This includes whether it is a training manual, programme, unit or a policy that mentions anything on training.
2. To identify the areas of BE and MSP where training materials are available.
3. To identify the training gaps and Make recommendations that can support the development of an effective blue economy and MSP.

1.2 Research questions

1. Are there educational and training materials in higher learning institutions and organizations on blue economy and MSP?
2. What areas of BE and MSP are training material available?
3. What are the training gaps and recommendations that can support the development of an effective blue economy and MSP?

2. Methodology

A review of secondary information data available including.

1. **Open publicly available data:** This include a scan through websites, magazines, policy documents to

retrieve data on BE and MSP relevant to this study.

2. **University websites and program descriptions:** This includes retrieving university programs and any other data on BE and MSP posted on university websites or and the description of their programs.
3. **Scientific literature:** Various scientific papers and articles published as BE and MSP training resources.
4. **Expert scientific opinions or advice:** This includes any records of expert scientific opinions or advice on BE and MSP
5. **Government sources and institutional records:** This includes a scan through the government sources and institutional records and retrieve any material related to BE and MSP relevant to this study.

3. Result and Discussion

A total of 47 courses were sampled using the key words 'Blue economy' and 'Marine Spatial Planning' as their titles. Below is a comprehensive analysis of the education and training material available.

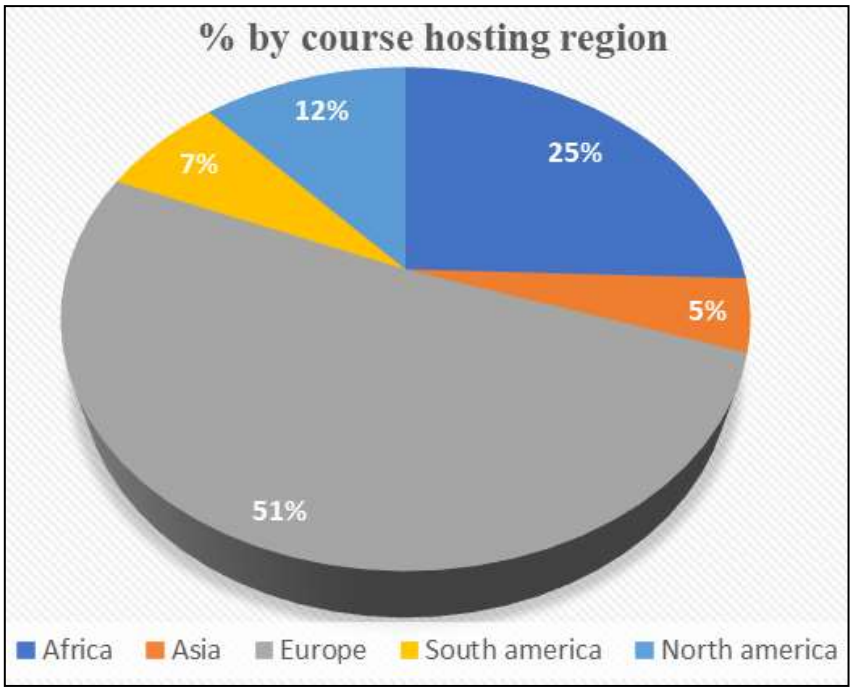


Fig 1: Course hosting by region

Most courses were hosted in the European region (51%), followed by the African region (25%) Figure 1. In terms of the period when these courses have been done, the review indicates that the highest number of trainings have been done in the first four months of 2024 as shown in Figure 2. Several course levels were observed with Technical courses for professionals taking the bulk of the courses identified (Figure 3 & 4).

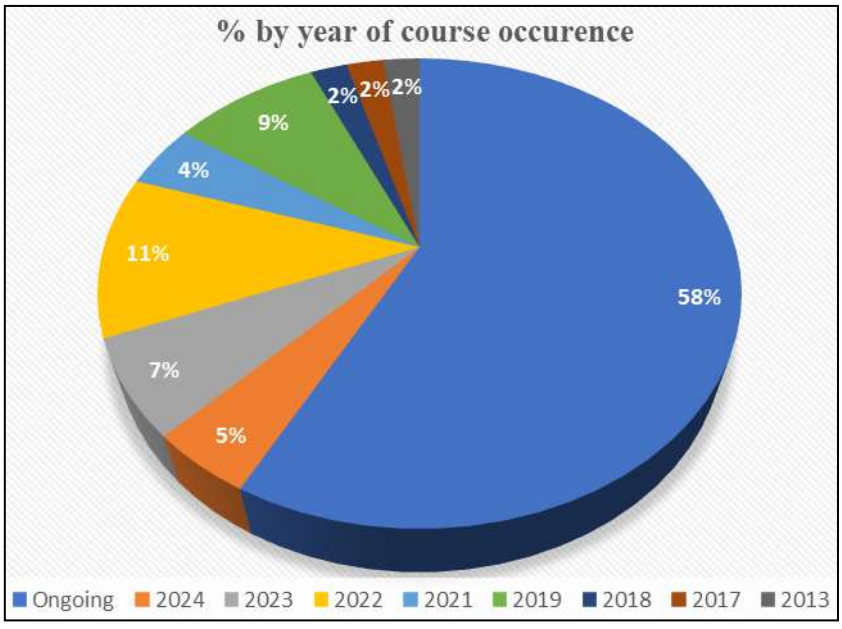
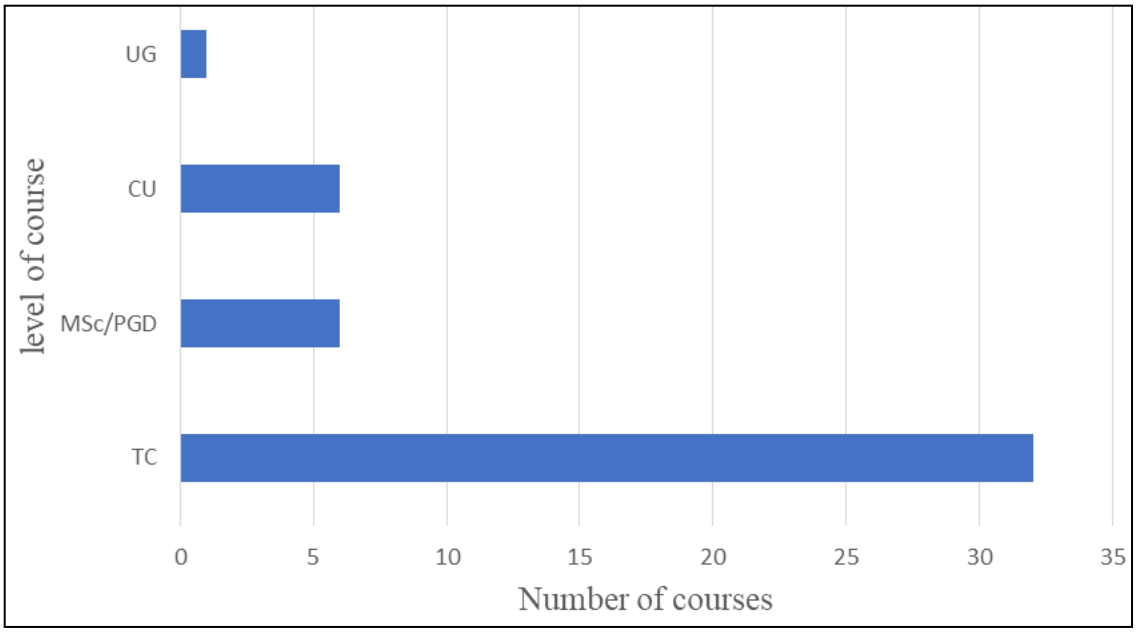
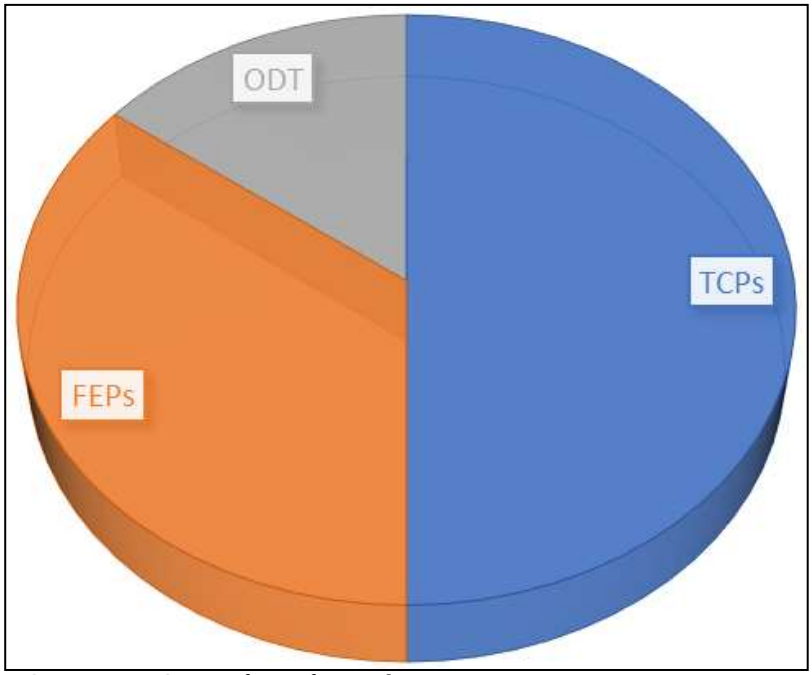


Fig 2: Year of course occurrence



UG- undergraduate degree
CU- Course unit
MSC/PGD- Master/post graduate diploma
TC- Training Course

Fig 3: Level of course offered



TCPs- training Courses for professionals
FCDs- formal education programmes
ODT- on demand training courses

Fig 4: Category of course offered

A successful blue economy and Marine Spatial Planning entails changing the mindset towards a holistic and integrative approach for a spatial economic planning and development. Awareness of blue economy and MSP is critical for all stakeholders hence the importance of training and making available training materials for all interested parties as a way of empowering the key actors. Regions have developed training guide for example the United Nation Economic Commission for Africa has produced a training guide on Africa's blue economy, a policy handbook 1 and 2. This has influenced most Africa blue economy course content and encouraged the organization of blue economy training courses for capacity building in various African countries including Kenya (e.g Kenya Blue Economy skills training) and Tanzania (Marine Spatial Planning and sustainable Blue Economy training).

The Intergovernmental Oceanographic Commission (IOC) has become the lead institution in matters MSP as it organized the first MSP workshop in 2006 and the first MSP global International guide on marine spatial planning: a step-by-step approach towards ecosystem-based management in 2009[12]. This guide brought together practical, technical, and

conceptual expertise spread globally. It documented the initial global understanding of MSP, gave an outline on the steps and approaches required in setting up an MSP process and case studies of successful and unsuccessful MSP practices by the time it was published. At this time MSP were few and this guide encouraged more countries to start their own MSPs.

The IOC has kept on updating its MSP guides over the years by producing the 2014 guide on evaluating marine spatial plans[19]. This was meant to aid marine managers and planners in fusing monitoring and evaluation into MSP. It highlighted the essence of attainable and specific objectives, achievable targets, important indicators, comprehendible management actions and integrations of stakeholders in the MSP process. The latest 2021 IOC international guide on marine/maritime spatial planning, emphasizes monitoring and evaluation, outlining specific but complementary ways to track the different stages of the planning loop [20].

These documents have been the basis for the various MSP courses found offered over the years. The objective, targeted participants and the course content have been inspired and based on the IOC guides. This therefore implies that the MSP courses and curriculum offer will keep on evolving or updated to fit the ever-advancing MSPs processes. The influence of IOC and its collaboration with the EU as pioneers of MSP training has influenced the MSP training host region making Europe the leading host region (figure 1). These two organizations dominate the list of International Organizations funding and fostering MSP courses globally.

This study found that the MSP and B.E education programs have been increasing in number over the years while noting an inclining shift towards ongoing, online or on demand courses and formal education programmes (figure 2 and figure 4). Most B. E training courses are on demand short courses offered largely online by various institutions while MSP also has quite a number of course offered on demand basis either in person as well as online. This therefore widens the target group since most of the training courses target professionals while the on-demand courses and formal education programmes are open to students and other interested parties, not necessarily with an MSP background.

The targeted participants are majorly MSP and BE professionals and students with interest in marine related studies. Most courses extensively describe its targeted participants as professionals from research institutions, Universities, governmental agencies, NGOs and private sector. Courses involving the local and indigenous communities who are direct beneficiaries, custodian and have direct influence on blue resources over years since their livelihood depend on marine resources and need to be involved in MSP plans are largely missing in the participates list. There is need for a tailor-made BE and MSP course targeting the local indigenous communities to improve their knowledge on blue BE and MSP therefore give them the confidence to actively participate in matters MSP and BE.

Due to differences in B.E and MSP strategies embraced in various parts of the world, implementation stages and improvements brought about by factors like regional and country economic, social and political differentials, B.E and MSP matters are more advanced in some regions compared to others. This therefore suggests that the B.E and MSP courses offered should be customized to fit the B.E and MSP stage of a region or country targeted while considering the targeted participants.

The short training courses form the largest percentage of B.E and MSP education and trainings offered as compared to three-to-four-year long degree courses (figure 3). This is particularly true in developing countries which have huge dependence on foreign funding. IOC-UNESCO, the EU, World Bank and governments of developed countries like the government of Netherlands have been reported to play a huge role in funding MSP courses in developing countries. This has made some regions to be over dependent on funding rendering them unable to have MSP and BE training material and events of their own hence slow or stagnant growth as far as MSP and BE are concerned.

4. Conclusion and Recommendation

1. There is an ongoing increase in MSP and BE educational material and training sources while embracing technology and having on demand courses on online platforms offered by various institutions.
2. Most on demand training courses offered online are at a fee hence the recommendation of more free courses to encourage more participants.
3. A need for custom-made training courses targeting the local indigenous community suitable specifically to regions and their level of B.E and MSP for more understanding among participants.
4. Already trained MSP professional to volunteer in training and curriculum updating in their regions, countries, or institutions so as to avoid overdependence on funding for training and training materials.
5. Increase the number of formal education programmes e.g. undergraduate and graduate degree on MSP and B.E to churn out MSP and B.E professionals who will take professional positions on the growing sector of MSP and B.E.

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