Fishers' SeaofSkills through an E-learning Platform

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Abstract: The fisheries sector is recognized as one of the pillars of economic activity in Mediterranean coastal communities and is considered a cornerstone of the EU Blue Growth Strategy and of the Integrated Maritime Policy. The extent of its contribution to sustainable economic growth depends on the establishment of better fisheries management protocols as well as on the development of fishers' knowledge, skills and competences since fishers are the key stakeholders in the management process. The existing fishers' qualifications can be further consolidated through vocational education and training. Vocational education and training for fishers in Greece, Malta and Turkey is not streamlined and has not been developed along the latest E.U. recommendations on education that include web-based education. The SeaofSkills Consortium of Partners, consisting of a total of nine organizations, originating from Greece, Malta, Turkey, Spain and Ireland, and availing themselves of co-funding by the Erasmus+ Programme of the European Union, has developed a common training toolbox for small-scale fishers, who, by definition, use fishing vessels under 12 meters with passive gear. The suggested educational model provided to the target group through a common e-learning platform aims to promote transformative learning, flexibility, cooperativeness, and individualization at the micro-level within the same target group. The aims at the macro-level include the provision of greater access to adult participation in quality lifelong learning programmes, the bridging of the digital divide, as well as the enhancement of social and regional cohesion. The project outputs within the vocational education and training sectors also aim, indirectly, to support the sustainable management of living marine resources within the Mediterranean.

Key words: e-learning platform, vocational education, training, small-scale fishers, Erasmus+ SeaofSkills

Introduction

The fisheries sector is now widely recognised as one of the pillars of development and the extent of its contribution to sustainable development, economic growth, food security and safety highly depends on the knowledge, skills and competences of fishers (E.U.-DG Maritime Affairs and Fisheries, OECD-Fisheries, FAO-Fisheries and Aquaculture, IMO-Fishing Vessel Safety). Vocational education and training has

a central role in responding to the changing sector needs and new challenges faced by the target group (ILO-Vocational Guidance and Training; Cedefop 2004; Cedefop 2011; Cedefop 2011a; Cedefop 2013; Cedefop 2015a). When education and training are commonly offered through an e-learning platform, the spill-overs also spread to areas outside the adult education sector, namely leading to greater digital, social and regional cohesion (Council of Europe, 2005; European Commission: Electronic Platform for Adult Learning in Europe).

The work undertaken to consolidate fishers' knowledge, skills and competences through an e-learning platform and reported upon in this study was developed through funding by the Erasmus+ Programme of the European Union. The project 'Enriching Fishers' Knowledge, Skills and Competences [SeaofSkills, contract no. 2014-1-ELO1-KA202-001658]' was accepted for three years' funding by the State Scholarships Foundation/IKY, the Hellenic Erasmus+ National Agency in 2014**.** The SeaofSkills Consortium consists of the following partners: the 'Maria Tsakos' Public Benefit Foundation-International Centre for Maritime Research and Tradition (Project Co-ordinator, Greece), University of Malta (Malta), Ege University (Turkey), University of the Aegean (Greece), The Spanish National Research Council (Spain), Research & Innovation Strategy Experts (RISE) (Greece), Chios Chamber of Commerce (Greece), Hellenic Centre for Marine Research (Greece) and AquaTT (Ireland).

The authors through this paper aim to provide an overview of the design of the SeaofSkills e-learning platform, through which the education and training toolbox developed within the framework of the project SeaofSkills is offered for use to three main target groups. Namely, those groups are comprised by fishers, who use fishing vessels under 12 meters with passive gear, fishers' trainers and vocational education and training providers. The geographical scope of this initiative includes Mediterranean countries and, more specifically, Greece, Turkey and Malta, where fishers' vocational education and training is not streamlined and is not developed along the latest E.U. recommendations on education that include web-based education (SeaofSkills field survey, 2015).The objectives of this paper not only include the presentation of the e-learning platform developed within the framework of the project but also the depiction of the rationale behind its development, for a sector where web-based education is not common practice, as well as the positive multi-level side-effects awaited by its implementation.

The paper is organised into five sections: section 1 provides an overview of the SeaofSkills project including main deliverables, the rationale behind their development and expected impact; section 2 depicts the basic concepts of e-learning; section 3 presents the educational framework; while section 4 provide a bird's eye on the educational contents and the methodology based on which the material was developed.

Section 1: The SeaofSkills Project

The *SeaofSkills* Consortium, funded through the Erasmus+ Programme, has developed education and training material for small-scale fishers, who use fishing vessels under 12 meters, with passive gear. The topics covered are the following: a. Cold Chain Quality Management, b. Technology Used in Fishing Vessels, c. Safety at Sea, d. Ecosystem Approach to Fisheries, e. Entrepreneurship and EU Funding Opportunities. In order to spearhead an effective use of this material and its

implementation, two Guides are also developed, namely a. Guide for Fishers' Trainers and b. Implementation Manual for vocational education and training Providers. The Guide provides a detailed description of the education and training material, while providing a bibliography for further reading by the trainers, as well as general guidelines on adult education principles and practices for efficient teaching and training. The Implementation Manual has been developededf or the vocational education and training providers, such as those based in lifelong learning centres and vocational training centres. The Manual includes recommendations on how to upgrade the management and quality assurance processes that will upgrade the running of the centres and will allow for an efficient and effective provision of trainings to fishers.

The main aimof providing a three-tiered education and training toolbox to fishers, to fishers' trainers and vocational education and training providers is to increase the quality of the education and training offered to fishers, while upskilling and reskilling them with clear benefits for all the stakeholders involved. More specifically, the SeaofSkills project has been designed and implemented in such a way so as to achieve a multi-level positive impact within the main target group, namely, the fishers, to the community at large. The project, by fostering and improving the quality and attractiveness of vocational education and training for fishers and addressing existing challenges of the fisheries and vocational education and training sectors is expected to impact: fishers and their families, fishers' trainers and vocational education and training providers and, indirectly, the local coastal community.

More specifically, it is expected that the empowered (through training) fishers will be able to sustain their income, their competitiveness and economic viability, while also improving their safety at sea. The expected indirect impact should not be underestimated; beyond developing personal qualifications and practical experience, this empowerment through skill development can be considered as "socially profitable" in the sense that it offers credit or esteem for fishers and contributes positively to their psychological and social well-being.

Upskilling and reskilling fishers, while improving the quality and their performance at work also contributes to economic development, growth and social cohesion. The European Commission has presented its Social Investment Package: Towards Social Investment for Growth and Cohesion, so as to address the growing risk of poverty and social exclusion arising from the ongoing economic recession. One of the tools being promoted to address the aforementioned problems is the strengthening people's skills and capacities (European Commission, 2013). In addition, the OECD Skills Strategy aims at fostering a cross-government, peer-learning approach towards bridging the anticipated gap in new skills in the workforce and towards optimising the use of existing skills in the workforce to promote economic growth and social inclusion. Skills have become the global currency of 21st century economies. Without sufficient investment in skills, people languish on the margins of society, technological progress does not translate into productivity growth and countries can no longer compete in an increasingly knowledge-based global economy. At a time when growing economic and social inequalities are a major challenge, effective pro-skill development policies must be part of any response to address this challenge. But this 'currency' depreciates as skill requirements of labour markets evolve and individuals lose the skills they do not use. For skills to retain their value, they must be continuously maintained and upgraded throughout life so that people can collaborate, compete and connect in ways that drive economies forward (OECD, 2012).

Society as a whole will also benefit as the project aims at furthering the protection of the environment, the marine ecosystem and fostering food security. In addition, the project will embed and popularize the notion of vocational education and training in sectors that until now have not encountered and adopted similar activities. Regional cooperation will facilitate people's mutual understanding and coordinate practices. It can act as "cultural understanding".

The SeaofSkills project will directly affect vocational education and training providers and trainers, since its aim is to consolidate the provided education and training by improving their quality and attractiveness to fishers. The education and training material has been developed along a learning outcomes approach and along E.U. tools such as the European Credit System for Vocational Education and Training (ECVET) and the European Qualifications Framework (EQF). The training course material is accompanied by a Guide for Trainers, and will therefore augment existing abilities for a quality implementation. Through programme publicity and dissemination activities, awareness and demand for skilled fishers will increase; a new or renewed (depending on the case) field of activity for vocational education and training providers and trainers will evolve.

Through the level-analysis lens, the SeaofSkills project is expected to have an impact at local, regional, national, European and international levels. More specifically, the project targets local communities through various means, namely:(a) local partners are included in the partnership, hailing from areas traditionally engaged in fishing, (b) local training needs will be identified in order to develop the training material, (c) local fishers will participate in training activities, and (d) Living Labs are going to operate at the local level. All these activities aim at addressing the fisheries issue on the local level and help develop a new culture of sustainability, viability and entrepreneurship that will eventually contribute to the economic development of the local communities.

The project benefits will also penetrate the regional communities of Greece, Turkey and Malta by combining the local needs of the three regions and integrating them into a common training material. Joint scientific and entrepreneurship opportunities may also be exploited and a sustainability culture will be promoted in the sense of regional development.

The project, therefore, is expected, through its adaptation to and incorporation of the changing requirements and new developments within the fisheries and vocational education and training sectors, to contribute to the national and regional economic framework. The project results will be available and will be disseminated nationwide. The project is also expected to contribute to the understanding and implementation of E.U. policies and recommendations on the fisheries and vocational education and training sectors.

By mapping and incorporating the E.U. framework in its design and list of deliverables, the project is expected to further support the implementation of European policies, as well as consolidating their efficiency and effectiveness on the ground. Finally, the projects' goals coincide with those of the E.U., namely of an economically viable and competitive fishing industry, sustainable fishing activities, involvement of appropriate stakeholders, development of a culture of environmentally and economically sustainable entrepreneurship, as well as of an upgrading of the skills and competences of human capital.

The project is also expected to have an impact on the understanding and incorporation of international frameworks and standards, such as the International Maritime Organization's Standard Marine Communication Phrases and the International Convention on Standards of Training and Certification and Watchkeeping for Fishing Vessel Personnel (IMO-Fishing Vessel Safety). These have been taken into consideration for the training needs analysis and the development of the training material. The aim of furthering the understanding of international developments also supports the strengthening of ongoing co-operation between the E.U. and international organisations, such as the IMO, on issues related to vocational education and training in the fisheries sector.

The main anticipated impacts emerging from the SeaofSkills project will be measured after September 2017, which marks the end of the project and the launch of its sustainability phase, when the project deliverables will go entirely online. Before moving on to delve into the web platform structure and operation, the paper will introduce the basic concepts of e-learning.

Section 2: Basic Concepts of E-learning

E-Learning is the use of Information Technology (IT) to deliver information for education and training. Essentially, e-learning is an alternative way to teach and learn. E-Learning is basically a web-based system that makes information or knowledge available to users or learners and disregards time restrictions or geographic proximity (Alonso et al. 2005; Sun et al. 2007). The great advantages of e-Learning include liberating interactions between learners and instructors, or learners and learners, from limitations of time and space through the asynchronous and synchronous learning network model (Katz, 2002; Trentin, 1997).

The origins of the term e-Learning are not certain, although it is suggested that the term most likely originated during the 1980's, at the same time that another mode - online learning – was being delivered (Moore et al. 2011). Some scholars refer to e-learning as "communication and learning activities through computers and networks (or via electronic means)" (Schank, 2002; Roffe, 2002; Sambrook, 2003; Tsai and Machado, 2002). Fry (2000), defines e-learning as "delivery of training and education via networked interactivity and a range of other knowledge collection and distribution technologies". Bleimann (2004), stated that e-learning is a self-directed learning that is based on technology, especially web-based technology. He also stressed that e-learning is collaborative learning.

Internet and web technology is an important factor in e-learning (Wong, 2007). Today, E-Learning is a web-based system that makes information or knowledge available to users or learners and disregards time restrictions or geographic proximity, permits liberating interactions between learners and instructors, or learners and learners (Violante and Vezzeti, 2012). Horton (2001) defines e-learning as "the use of Internet and digital technologies to create experience that educate fellow human beings". Hamid (2002) and Lytras, Pouloudi and Poulymenakou (2002), mentioned that e-learning evolved around IT to enhance its learning potential. Evans and Hasse (2001), pointed out that technology is indeed needed in e-learning to educate the learner through the usage of two-way video, two-way computer interaction, cable, satellite downlinks and Internet. Wong (2007), defines e-learning as learning activities that involve computers, networks and multimedia technologies.

The development of e-Learning system for a university course, vocational seminar or business training has been justified through several reasons (Violante and Vezzeti, 2012):

- it is easier for a large number of participants to successfully and more completely acquire instructional content;
- decreased expenses and waste of time of the students for travelling to the class venue;
- better impression of the teacher/instructor and the institution which organized the instruction;
- more efficient use of available financial resources which make the time and effort financially worthwhile;
- an opportunity to master new educational technologies and join the contemporary trends;
- an opportunity to evaluate the profitability of investing into e-education.

The market targeted by Web Based Learning (WBL) has been variously defined to include the following groups (Andrade et al. 2008; Violante and Vezzeti, 2012):

- working adults who do not have the desire or resources to attend on-campus programs,
- adults in jobs where their employers (e.g., the high technology sector) cannot afford to accede to long leaves of absence,
- adults in Third World countries or isolated communities who do not otherwise have access to brick and mortar institutions,
- single parents or economically disadvantaged adults who have to work full time,
- working adults who have to travel considerable distances to attend regular programmes,
- students who need or want an alternative to on-campus programmes for economic, social, personal, or practical reasons.

Web-based learning differs from conventional learning in that it is student-centered, knowledge-centered, assessment-centered, and community-centered (Lowyck and Pöysä, 2001; Violante and Vezzeti, 2012). Web-based learning environments have transformed the roles of instructors, students, and course materials so much that a new relationship has emerged between these three actors/elements of learning (Fu et al. 2009). The web-based e-learning system (WELS) has emerged as a new tool for skill training and knowledge acquisition, encouraging both academia and industry to invest resources in the adoption of this system (Shee and Wang, 2008).

Additional expected positive benefits accrued through the operation of the SeaofSkills e-learning model will emerge through the transformative learning outcomes. The Transformative Learning Theory (TLT) as defined by J. Mezirow is a cognitive adult learning theory that results in changes in meaning perspectives that have developed over an individual's lifetime based upon their life experiences. Engagement in transformative learning requires adult characteristics that include emotional maturity, awareness, empathy, and control (Mezirow, 2000; Kear, 2013; McAllister, 2015).

A necessary component of the Transformative Learning Theory is becoming critically reflective of assumptions underlying content, process, or premise through instrumental and communicative learning, which is again only developmentally achievable in adulthood. Transformative learning may be considered as a process

which leads learners to re-evaluate their past beliefs and experiences, and is central to Mezirow's Transformative Learning Theory (Mezirow, 1997, 2000; Kear, 2013).

Section 3: Educational Framework

The SeaofSkills educational framework was developed along the latest EU recommendations on innovative pedagogical strategies that include web-based education

Some studies state that, although online learning has advantages over traditional face-to-face education, the costly high failure rate of e-Learning success deserves careful attention, even atthe preparatory phase (Piccoli et al. 2001; Violante and Vezzeti, 2012).

In order to design an e-Learning system in Fishers' education and training and to improve and stimulate the process of knowledge acquisition in an e-learning context, the following has been attempted:

- to indicate the final users and benefactors of distance learning modules in Fishers' education and training (research market);
- to gain deeper understanding of the learning theories, the communication tools and technology dimension (basic concept of e-Learning) as well as
- to identify which pedagogical approach and information and communication technology is to be employed (educational framework, web development tool).

The SeaofSkills Fishers' E-Learning Platform through the aforementioned analysis is based in AETCM (Asynchronous Education of Technological Courses Model*),* which entails the teaching of technological/technician cognitive objects (Papachristos et al. 2010; Papachristos et al. 2011). The teaching material includes not only theory but also concretisation skills, that presuppose the use of all senses, and which don't exclusively include manual work. In addition, the process of learning in such a cognitive one that it cannot be characterized in terms of discrete activities such as memorization, rationalisation and rethinking. It also includes more composite processes, such as creation, and feedback. This model has the following characteristics (Papachristos et al. 2011; Violante and Vezzeti, 2012; Jonassen et al. 1999; Terkowsky et al. 2009):

- Educational Material (course material, bibliographic sources and self-assessment material).
- Media (in digital form: text, pictures, etc.).
- Teaching Methods (lecture, demonstration, individual work).
- Time of Education (at the beginning of each course, an overall course time load is suggested to the fishers. This time load is not obligatory for the fishers and it can be increased or decreased depending on the rhythm of learning).
- Learning Theories (the teaching material based on Blooms taxonomy &constructivist approach).

Specifically, we used the Bloom taxonomy for learning outcomes (Bloom, 1956). The Bloom taxonomy is the classification of teaching and learning objectives within three learning domains: cognitive (knowledge and cognition), psychomotor (skills) and emotional (attitudes and values). This taxonomy is also applied for learning outcomes to be classified following the three considered domains. Additionally, in this contribution, learning is defined with the constructivist approach, positing that learning processes are socially constructed: "Learning is an active process of

constructing rather than acquiring knowledge, and instruction is a process of supporting that construction rather than communicating knowledge" (Collins and Halverson, 2009; Terkowsky et al. 2009; Jonassen et al. 1999; Lave and Wenger, 1991; Reeves et al. 2005; Latour, 2005; Terkowsky et al. 2009).The next figure shows the structure of the adopted educational model:

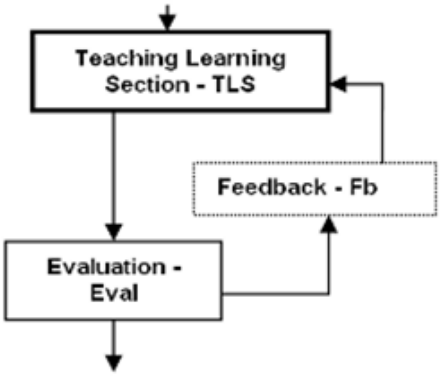

Figure 1. Educational Framework of Fishers' SeaofSkills E-Learning Platform (source: Papachristos et al. 2011).

The framework contains:

- TLS: courses are offered in a linear order. These courses are mandatory for all fishers, since they provide the necessary educational material of the course. Each course is divided in thematic educational units presented sequentially. The fisher should complete the previous unit in order to continue to the next one (typical procedure). At the end of each course, the fishers are assessed.
- Feedback: each section connects fisher(s) and the educators and has the format of partial bidirectional communication serving the following needs: evaluation tests, lesson feedback transfer, and educational evaluation of the system by the user—fishers.
- Evaluation: Tests (quizzes) according to the educational material & structure.

The structure of the curriculum is developed based on three components (Fig. 2):

- Course, which describes the study of a particular topic within a wider study area.
- Unit, which describes a specific part of the course.
- Learning outcome, which describes the final output achieved in terms of knowledge, skills and competences.

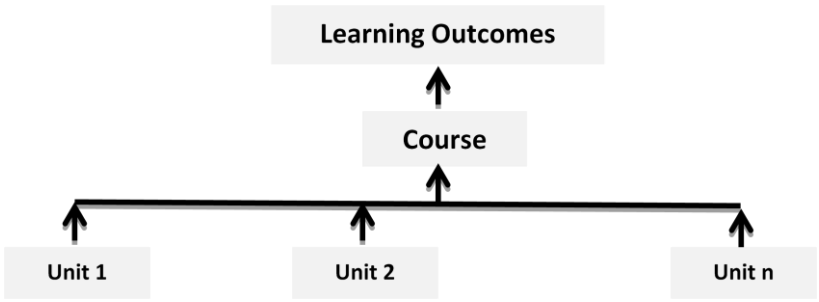

Figure 2. The structure of the curriculum of Fishers' SeaofSkills E-Learning Platform.

At the course level, the following information is depicted:

- Title Course
- Description (brief statement describing the nature of the course and its objectives, what the candidate can expect to learn and an overview of course activities)
- Duration (in hours and days)
- Candidate's profile/prerequisites (e.g. any course requirement in terms of minimum level of knowledge and skills and competences candidates should have before embarking on the course)
- Award (e.g. number of credits)
- Mode of delivery (e.g. face-to-face, online)
- Provider details

At the unit level, the following information is included:

- Title Unit
- Description (statement to provide guidance on the content and context of each unit and its aims)
- Entry level (description of the minimum level of knowledge, skills and competences candidates should have before embarking on the unit)
- Supplementary information (any relevant information not included in previous sections such as guidance on delivery and assessment of the unit, estimated duration, etc.)

Within each unit, the following information regarding learning outcomes is presented:

- Title
- Knowledge, skills and competences (description of the knowledge, skills and competences that are essential for achieving the outcome)
- Evidence requirements (statement of what candidates have to do, and to which level, to demonstrate that they have achieved the outcome)
- Assessment method (e.g. oral and written examinations, practice, critical incident analyses, case studies, essays, presentations, reports, continuing assessments, examinations and project work, portfolio and self- or peer reflection)

Section 4: Educational Contents

The SeaofSkills contents were developed by scholars and professionals active within the fisheries sector. It was based on desktop research and on a needs analysis, which was undertaken through a field survey conducted at target areas in Greece, Turkey and Malta. The questionnaire was designed within the SeaofSkills project by experts from the nine organisations implementing the project and was pilot tested prior to full deployment. What followed the pilot test was a review so as refine and optimise it on the basis of the feedback provided. The content of the following topics being covered through SeaofSkills was subjected to an extensive evaluation by the target group and experts in the field (e.g. within informal training sessions held with stakeholders) before being finalised. The core topics of Fishers' SeaofSkills E-Learning Platform covered are the following (Fig. 3):

I- TECHNOLOGY USED IN VESSELS

- Fishing boats and equipment
- Equipping of boats used in SSF (Small-Scale Fisheries)

- Fish finders
- Navigation equipment
- Hydraulic and mechanized fishing gear
-

II- SAFETY AT SEA

- Lifesaving appliances
- Abandonment of vessel and survival skills
- Man overboard situations
- First aid and fishermen health
- Poisonous marine species
- Vessel stability
- Fire on the vessel and fire fighting
-

III- COLD CHAIN QUALITY MANAGEMENT

- Post-harvest handling
- Processing and packaging
- Cold storage and distribution
- Reduction of physical, organoleptic (sensory) and nutritional losses
-

IV- ECOSYSTEM APPROACH TO FISHERIES

- Ecosystem principles
- Protection of fish stocks
- Fisheries legislations
- Marine food web and fisheries
- Marine Protected Areas (MPAs)
- Jellyfish blooms and invasive marine species

Following is an example of some of the screen sequence after selecting the Safety at Sea module.

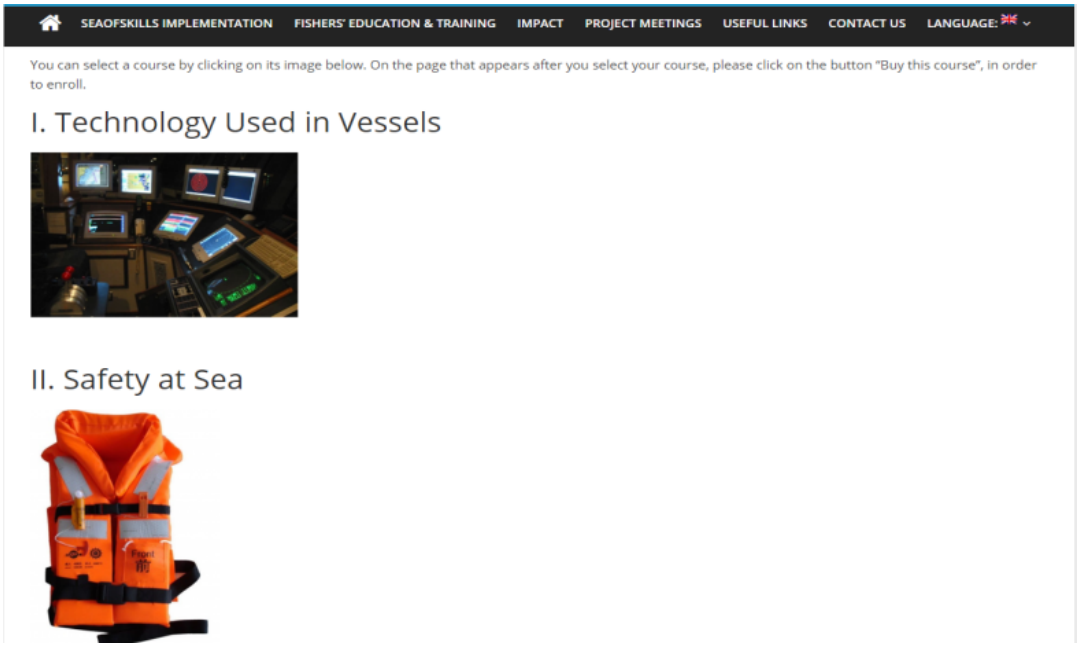

Figure 3. Fishers' Training Material (source: http://seaofskills.eu/?page_id=509).

Every educational material contains documents and power points (Fig. 4):

Figure 4. Educational material (fishermen health aspects, available in Greek & English) (source: http://seaofskills.eu/?page_id=509).

There is a fifth topic covered at the e-learning platform, that is Fishers' Entrepreneurship and EU Funding, where fishers can find the core principles of entrepreneurship, while being provided with useful case studies of entrepreneurial practices in different countries, as well as the relevant funding frameworks provided through the European Union.

In view of an effective use of the aforementioned material and its implementation, two Guides are also developed, namely a. Guide for Fishers' Trainers and b. Implementation Manual for vocational education and training Providers. The Guide provides a detailed description of the education and training material, while providing the bibliography for further reading by the trainers, as well as general guidelines on adult education principles and practices for efficient teaching and training. The Implementation Manual has been developed with the aim of appealing to those who

administer the vocational education and training material, such as those based in lifelong learning centres and vocational training centres. The Manual provides recommendations on how to upgrade the management and quality assurance processes that will optimise the running of the centres and will allow for an efficient and effective provision of training to fishers.

The aforementioned educational content has been developed based on the following criteria and by taking into account the target group, namely, fishers in Turkey, Greece and Malta:

- Develop easy-to-grasp short and concise training material
- Make use of visual material
- Provide practical examples of demonstrated concepts
- Encourage learner's involvement by asking questions, discussions, etc.
- Restrict training time to brief sessions
- Provide the information in a practical way so the trainees see how to apply the learning outcomes after the training
- Develop an easy and quick assessment system

Stages of Development

The platform has been developed for the web environment (web based learning, WELS) in order to exploit the internet's advantages. The development methodology for the platform follows 4 phases (Fig. 5):

- Needs analysis
- Design of e-learning platform (Structure)
- development platform
- Testing

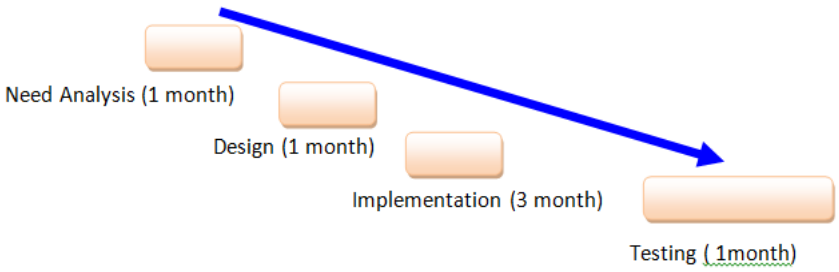

Figure 5. Development of Fishers' e-learning platform (source: SeaofSkills Project).

E-Learning Platform Structure

The general structure of the e-Learning platform includes (Fig. 6 & 7):

- Educational Material
- Exercises (Tests/quizzes)
- Manual Training

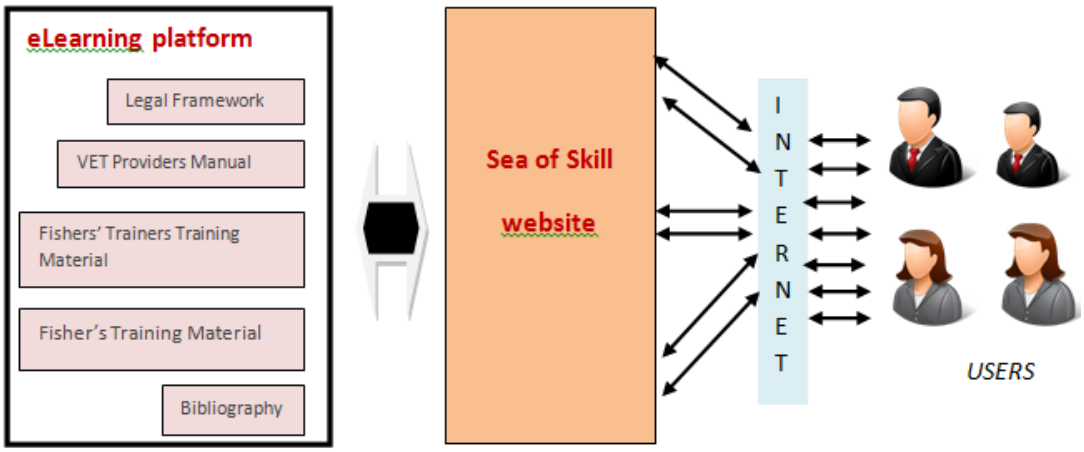

Figure 6. General structure of e-learning platform (source: SeaofSkills Project).

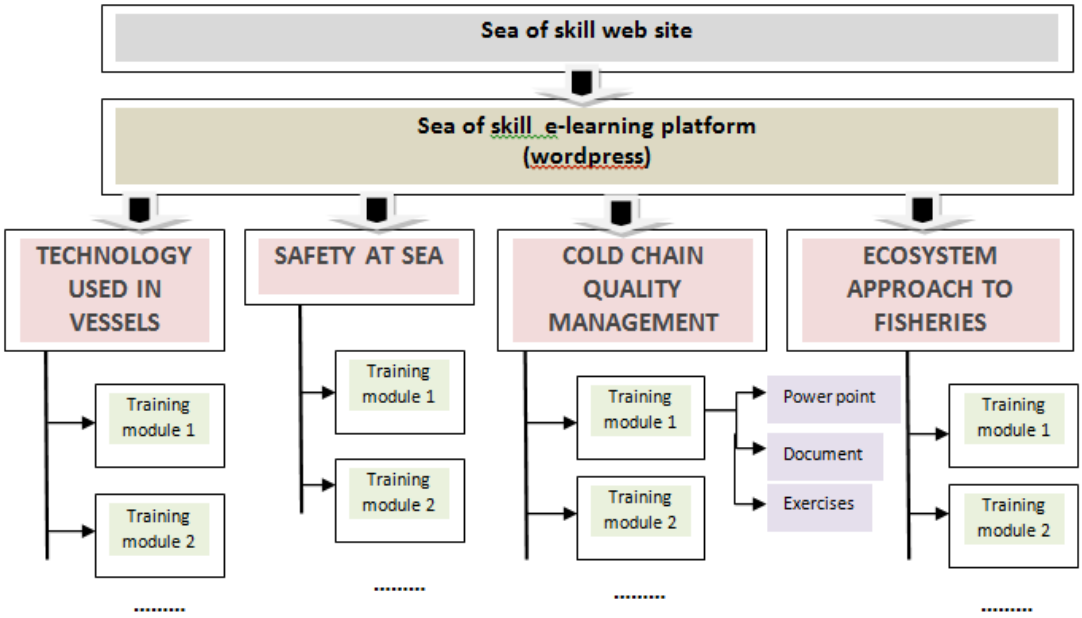

Figure 7. General structure for the Fisher's Training Material (source: SeaofSkills Project).

Evaluation

Internet has significantly impacted the establishment of Internet-based education, or e-learning. Internet technology evolution has affected all industrial and commercial activity and accelerated an e-learning industry growth. Although e-learning has been developing for several years, evaluating e-learning effectiveness is critical if companies or organizations are to further adopt e-learning systems. A considerable number of previous studies emphasize the factors which need to be considered for effectiveness evaluation. Several evaluation models are considered with specific aspects. The criteria used for e-learning effectiveness evaluation are numerous and influence one another (Tzeng et al. 2007).

We selected a quantitative approach for this evaluation, by designing a questionnaire for participants of the SeaofSkills project and for fishers-users. This questionnaire measures the following factors by using a Likert climax (Fig. 8 & 9):

- Aesthetically pleasing
- Robust structure
- Functional
- Effective presentation of courses
- Assessment (quizzes)
- Efficient use of e-mapping
- Efficient use of e-calendars
- Technological and learning capabilities of platform
- Fostering motivation

Conclusions

The research question under examination, i.e. whether it is feasible to develop common vocational education and training curricula and material available through an e-learning platform for small-scale fishers in Greece, Malta and Turkey, can be positively answered through the work undertaken within the Erasmus+ Project SeaofSkills. The challenge ahead is to launch online the developed material and to assess its efficiency and effectiveness. The main goal set by the SeaofSkills consortium is to consolidate the quality of small-scale fishers' training and to support fisheries management through an updated training toolbox, while addressing existing needs within the fisheries sector by using innovative pedagogical strategies that include web-based education.

In conclusion, opening access to and increasing adult participation in quality lifelong learning programmes lies at the heart of current EU education and training, as well as of ongoing efforts to promote economic growth and compliance with social and regional cohesion policies. Vocational education and training is relevant to key objectives set in the context of the Europe 2020 strategy and the EU Social Investment Package for Growth and Cohesion, while is crucial to reaching the target of 15% average participation by adults (age 25-64) in lifelong learning programmes by 2020. We consider that the vocational education and training framework for small-scale fishers put forward within the Erasmus+ project SeaofSkills contributes to the aforementioned goals and enhances transformative learning, while incorporating a bottom-up approach in developing curricula and in making use of innovative pedagogical tools. We hope that this initiative will also support the sustainable management of living marine resources

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