

## The functions of learning outcomes as coordination mechanisms between the labour market and education system: a case study using the Maritime Management curriculum

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### Abstract

In June 2015 at the University of Split, Faculty of Maritime Studies, the project “Maritime Management for the 21<sup>st</sup> Century” started. The implementation of this project intended to promote the recognisability of the profession and qualifications in the field of maritime management on the labour market. One of the main objectives was to develop relations with the sector’s major employers through improving the quality of education by developing qualification standards and implementation of the Croatian Qualification Framework by upgrading the Maritime Management curriculum. The transparency and interoperability of data about qualification standards which give a clear definition of learning outcomes are of high importance for both the education sector and the sector’s major employers. This will help graduates to seek jobs matching their qualifications, to change jobs or to move between countries. Also, this solution will meet the demands of employers. In order to achieve this goal, the information about learning outcomes achieved by learners and units needs to be captured, managed and exchanged in common formats. This paper proposes a semantic model of the database for publishing qualification standards and developed categories of learning outcomes for standards in maritime management qualifications.

### Introduction

As a growing part of the economy, the Croatian maritime sector, especially as part of nautical tourism and the jobs related to it, needs employees who possess special skills and knowledge in the field of maritime management. The main goal of a modern university should be the education of students who, through a well-structured curriculum, gain necessary skills and knowledge. This can only be done through mutual cooperation between maritime economy employers and universities. From the university’s point of view, the relevant knowledge and skills are to be written as learning outcomes that students should accomplish during the period of study. On the other side, employers must clearly express and

recognize what competencies their future employees should have.

In the Republic of Croatia, with the regulations prescribed in the Croatian Qualifications Framework (CQF), labour market needs and universities’ curriculums should be aligned with learning outcomes (Beljo Lučić et al, 2009; MSERC, 2014).

CQF recognises qualification standards and occupational standards. The role of universities is to document their study programs with sets of learning outcomes in qualification standards. The role of an employer is a precise definition of knowledge and skills for performing jobs in occupational standards, i.e., intended learning outcomes must be recognised by stakeholders’ requirements (Pažur Aničić & Arbanas, 2015; Magalhães, Veiga & Amaral,

2016). These two standards are the main instrument that, through learning outcomes, connects the curriculum and the needs of the labour market. The main objective of the intended outcomes is to have a clear idea of what teachers want their students to learn, but also to refine how they want each topic to be understood (Biggs, 2003). Assessment of learning outcomes is one of the most important parts of the curriculum, but from the student's point of view, the assessment is the curriculum (Ramsden, 2003).

### Significance of qualification standards

According to the Croatian Qualification Framework (CQF), a qualification is a unified set of learning outcomes of certain levels, volumes, profiles, types and qualities which are gained upon finishing a study program and proved by an officially issued document. Any qualification in Croatia should be registered in qualification standards with its content and structure, i.e., with all necessary data that define it (Dželalija & Dragičević, 2016).

It is important to emphasize that Croatia started with the process of developing qualification standards only a few years ago. During occupational and qualifications standards development, a certain amount of time is required for employers and universities to cooperate together.

A transparent description of the learning outcomes of a qualification standard is essential for the ability to share information on qualifications. By managing and exchanging data about qualification standards, learners (students) in higher education and lifelong learning can better plan their careers and enhance their employability potential. Given the free movement of people for employment throughout the EU, qualification systems and qualifications have to be more comparable and transparent across Europe (EUR LEX, 2005). In order to achieve this goal, the information about qualification standards associated with units of learning outcomes, as well as the learning outcomes themselves, needs to be formally modelled so as to be able to interchange learning outcome descriptions between systems (Paquette, 2007; Sampson, 2009). Creating open web qualification databases can make it easier to access and reuse information on qualifications and contribute to their transparency.

As Biesta (2012; 2015) stated, there are three different education domains:

- qualification,
- socialization,
- subjectification.

According to the above systematization (Biesta, 2012), our opinion is that learning outcomes have to apply not only to qualification, but to all three domains.

All the above is summarized and the functions of learning outcomes as coordination mechanisms for the three mentioned education domains are proposed in Figure 1.

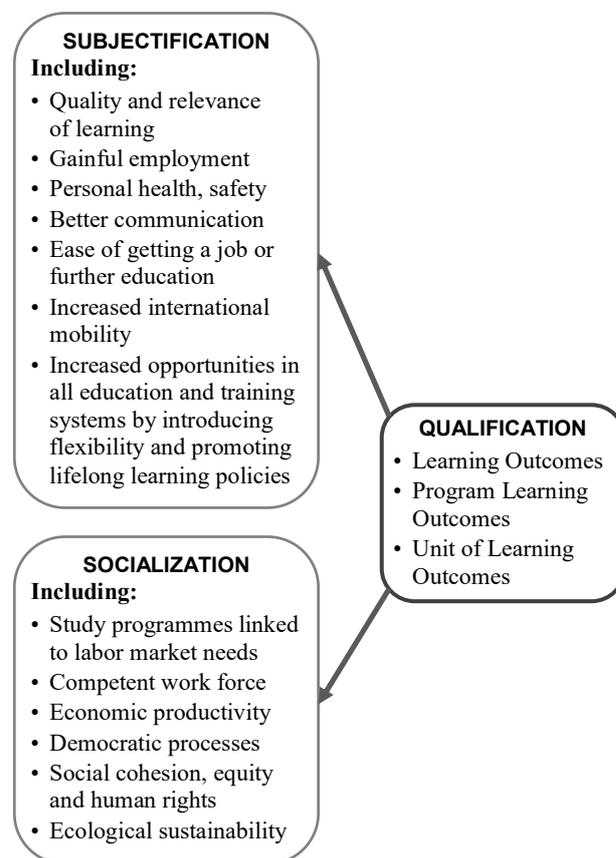


Figure 1. Relationship between learning outcomes and education domains

### Semantic model of qualifications database

An important part of this common language is an agreed 'semantic database schema'. Such a schema tells IT systems, search engines and web portals how to search for information and how to use existing sources already available on the web.

In the next section, the Croatian semantic database schema for competence description are proposed and modelled. The essential feature of the semantic model is its capability to establish direct and indirect relationships between multiple hierarchical conceptual structures. This feature is needed because of the variety of unit learning outcome frameworks that are relevant for one and the same qualification standard.

The semantic data model will benefit various user groups:

- **Instructors/teaching staff** who use it to publish their information.
- **Stakeholders** who use it to publish and review information, such as partners, awarding bodies or ministries.
- **Public or private online service providers** that have an interest in information on qualifications, such as online job portals and career guidance services, training platforms or search engines, can reuse the published information.
- **Jobseekers, students, learners, employment advisers** and recruiters will benefit from the more transparent information on qualifications.

Semantic modelling is also called conceptual modelling. A semantic model consists of entity types, relationships and attributes. An entity type is an object from mini-word. Attributes provide

a description of the properties of an entity type in a domain. Every entity type must have at least one attribute that can be used to uniquely identify the entity type. That attribute is known as the entity's primary key(s) and is denoted as PK in the model. Relationships are capable of linking up entities. The proper use of relationships is important in showing how entity types are related. Typical examples: one-to-one, one-to-many, many-to-many (for more information see Gornik, 2005).

The semantic model of a qualification database is expressed as a UML model (Figure 2).

The proposed data model points to the general need for all those engaged in education and training and in labour market policy to work together. It can contribute to a coherent, transparent and more integrated qualification system. Any one study program can develop several qualifications, as is obvious from the data model (Figure 2). It is a matter of

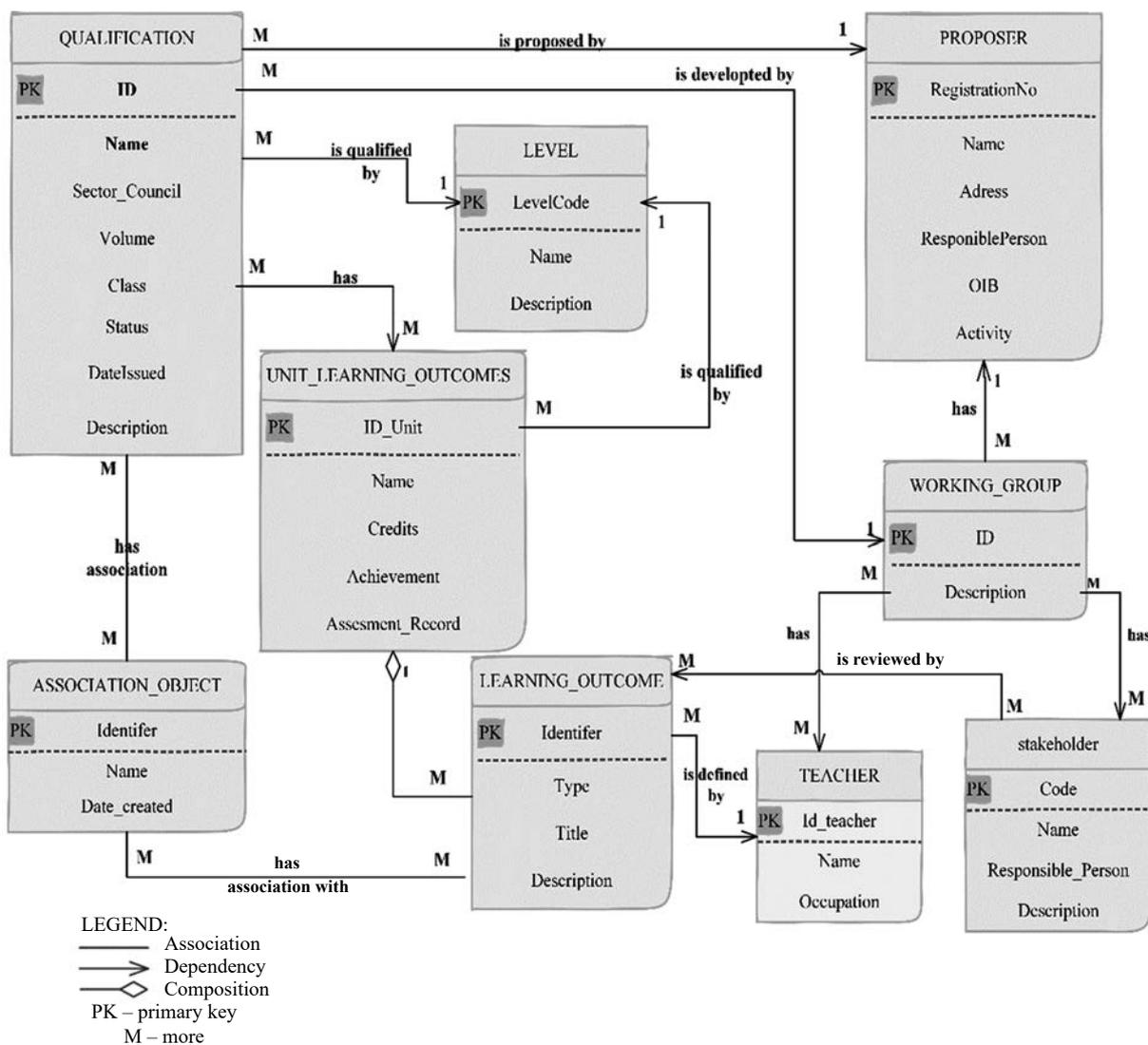


Figure 2. The conceptual schema of a qualification database

choice how learning outcomes of the study program courses are associated with the unit-of-learning outcomes. Also, qualifications differ one from another in terms of the level of abstraction with respect to particular concepts, as well as the scope of conceptual coverage. From this model, three categories of information which arise from qualifications can be easily recognized: basic characteristics of the qualification, learning outcomes and quality assurance.

For the data model shown on Figure 2 there are nine main entity types and they are connected with above mentioned categories.

The basic characteristics of a qualification give the basis for transparent classification of the qualification and include the following entities.

*Qualification* – This entity type represents qualifications. It has an official name with the clearly indicated profile of the qualification and has an identifier. The attribute ‘Description’ describes a role of the qualification for which the qualification standard is proposed. Also, it describes opinions of other potential providers of programmes that would lead to the acquisition of the proposed qualification.

*Level* – This element captures ranking information about the learning outcomes and qualifications. It denotes the complexity and the scope of the acquired learning outcomes, and it is described by means of a set of level indicators/descriptors. The level of the qualification may be expressed according to the European Qualification Framework (EQF Level) (EQF, 2008; 2013). Each qualification is qualified to only one level.

The second category of the qualifications form is the list of learning outcomes, which has to be logically organised, from the overall qualification learning outcomes, through to units-of-learning outcomes.

*Learning\_outcome* – Learning outcomes are the core entity to express the content of qualification standards. Its type defines whether the learning outcome is knowledge, skill or competence. Further information about the element is provided by a human-readable title and description of the learning outcome. Each unit of learning includes a set of learning outcomes, but individual learning outcomes must be within only one unit of learning. Each learning outcome is defined by only one teacher.

*Unit\_Learning\_Outcomes* – This element represents the unit-of-learning outcomes. It has a title of the proposed unit of learning. Its credit defines the proposed volume of the unit of learning outcomes. ‘Achievement’ describes the material and human resources necessary to acquire the unit of

learning outcomes. ‘Assessment record’ describes the assessment process and examples of assessment for all learning outcomes within the proposed unit-of-learning outcomes. It has a reference level. Each qualification has a list of units-of-learning outcomes. However, one set of unit-of-learning outcomes may belong to one or more qualifications.

The third category of the qualifications, which is related to the quality assurance system, includes the following entity types:

*Proposer* – A proposer could be a university or faculty, an organization who proposes and publishes a qualification. A proposer can propose one or many qualifications, but one qualification must be proposed by only one proposer.

*Working\_Group* – Each proposer must have one or more working group. A working group can develop one or more qualifications. It is composed of stakeholders and teachers.

*Stakeholder* – This entity type represents the group of employers, partners or other actors who have an interest in developing qualifications. This group may also evaluate and review learning outcomes.

*Teacher* – This entity type represents all teachers in a working group. They also propose learning outcomes.

*Awarding\_Body* – This entity represents a registered institution, agency or body (official or otherwise) that verifies the qualifications standard or issues a qualification or certification.

*Association\_Object* – The generic entity type of extended directed associative relationships between the qualifications/learning outcomes and a semantic asset from another framework (e.g., occupation standards) and national and international acts, such as CQF, EQF, ESG, The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) (IMO, 2010). Each qualification or learning outcome can be related to one or more objects.

### **Methodology of defining learning outcomes in the field of maritime management**

During an 18-month project, “Maritime management for the 21<sup>st</sup> century”, the Faculty of Maritime Studies, together with its partners from the maritime economy, developed standards of qualifications that students will gain upon graduation from the maritime management curriculum. One of the main goals of this project was to make this study program more visible and suitable to the maritime economy sector for future employers.

In the process of creating the occupational standard, one of the first steps was to use a survey to collect data from employers on key tasks, as well as on the knowledge and skills required for the performance of the profession. The important part of occupational standards, besides the key tasks, specific skills and knowledge, and also a great input variable for faculties and universities, are sets of competencies which are also included in occupational standards. Sets of competencies are directly connected with qualification standards, i.e., units-of-learning outcomes.

By collecting secondary data, through a focus group with all key stakeholders within the maritime sector, as well through detailed analysis of labour market needs, it was determined that, for successful execution of tasks, general competencies have a major role, in addition to specific competencies.

As stated by McGarrah (2015), lifelong learning skills provide a basis for learning and working. They are extremely important for social inclusion, employment, and lifelong learning. The general problem regarding development, monitoring and assessment of these skills is that there is no integral test for skills measurement. Nevertheless, it is important to point out that the lack of tools for measuring lifelong learning skills should not affect the future integration and development of these skills in educational programs.

According to the Common European Framework of Reference for Languages, competencies are defined as a set of knowledge, abilities, and characteristics of one person (Council of Europe, 2001; 2009).

During the creation of maritime management occupational and qualification standards, the importance of general competencies and lifelong learning skills is also taken into consideration. General competencies, i.e., key competencies, present added value in the labour market and they can be transferred to a different job through the labour market. Therefore, it is important to include these competencies in education on international and national levels (Gedvilienė & Bortkevičienė, 2013).

As sets of competencies and units-of-learning outcomes are a main connection between qualifications and occupation standards, it is important to describe the process of linking them. During a survey of occupational standards, besides determination of key jobs and related knowledge and skills, a task-force on elaboration of the survey results has done a quite extensive job of associating so-called sets of competencies with units of learning outcomes. It was important to properly assign every skill and item of

knowledge, i.e., to determine where it belongs (general or specific) and how it can be gained. For this process, the survey of occupational standards was of paramount importance. In this survey, employers also indicated how they consider individual knowledge and skills are acquired; whether through education, work, or a combination of both.

Regarding the distribution of specific and general competencies for maritime management qualifications and related occupational standards for “Manager in marinas and nautical tourism,” it was concluded that almost 60% (58% to be precise) should be assigned to general competencies, while the rest belong to the specific competencies. For maritime engineers, the most important general competencies are communication skills, IT skills and knowledge of a foreign language (Bjekic, Bjekić & Zlatić, 2015; Slišković, Ukić & Marušić, 2016).

Figure 3 shows how to match occupational standards, different jobs, competencies and learning outcomes in the field of maritime management.

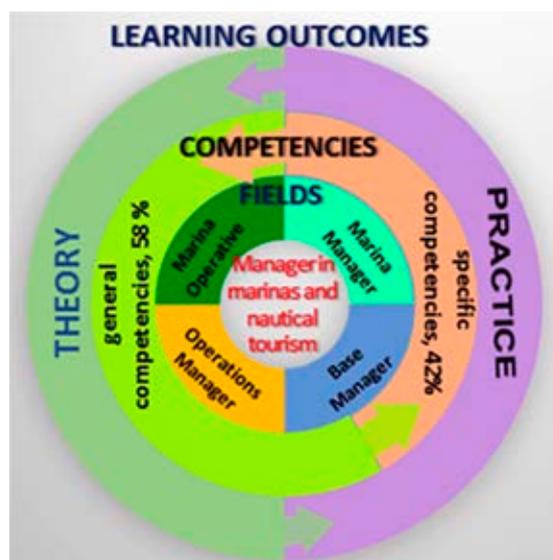


Figure 3. Relationship between occupational standards, competencies and learning outcomes

The process of creating qualification standards may be quite extensive and time-consuming, due to fact that the labour market offers various kinds of jobs which are updated daily, whether it is a matter of employers seeking new competencies or just reversals of trends.

Within a maritime industry, that process is even broader due to the fact that there are different areas of the maritime economy. It is well known that shipping and ports are often considered to be the main drivers of economic development; in Europe alone, it is estimated that 4.78 million people are employed

in maritime-related activities (Policy Research Corporation, 2008).

These maritime-related activities are dispersed through so-called “traditional maritime sectors”, from which the most important ones for on-shore based jobs are:

- Maritime services (jobs such as: research and development, education, classification and inspection, bunkering, maritime insurance, maritime financing, maritime brokerage, maritime law, crewing, associations, government services, etc.);
- Seaports (jobs such as: cargo-handling, shipping related storage, agency, maritime logistics and forwarding, port authorities, wide range of other activities and jobs in: ports, offshore, tourism, risk management, managing shipping market risk, brokering charters, booking cargo slots, etc.);
- Recreational boating (jobs such as: boat chartering and renting, marinas, inland boat basins, supporting services concerning the construction of and trade in recreational vessels, etc.) (Policy Research Corporation, 2008).

As there are different levels of qualification, there are also various kinds of occupational standards. One qualification can be linked to different or similar occupational standards, but also one occupational standard can encompass many different jobs. Different levels of qualification are connected with certain occupational standards via the accompanying learning outcomes, which are written in such a way that they can be transferable. For example, qualifications on the seventh level include learning outcomes that have been developed at level 6. In this way, depending on the complexity of each job, an individual maritime management student who has gained a qualification at the seventh level can perform the majority of the above-mentioned operations and jobs, whether related to the ports, boat chartering or maybe crewing. These numerous possibilities will be explained below with concrete examples, since there are specifically developed modules of learning outcomes for maritime management. From this division, it will be seen that a single developed qualification actually encompasses a variety of competencies,

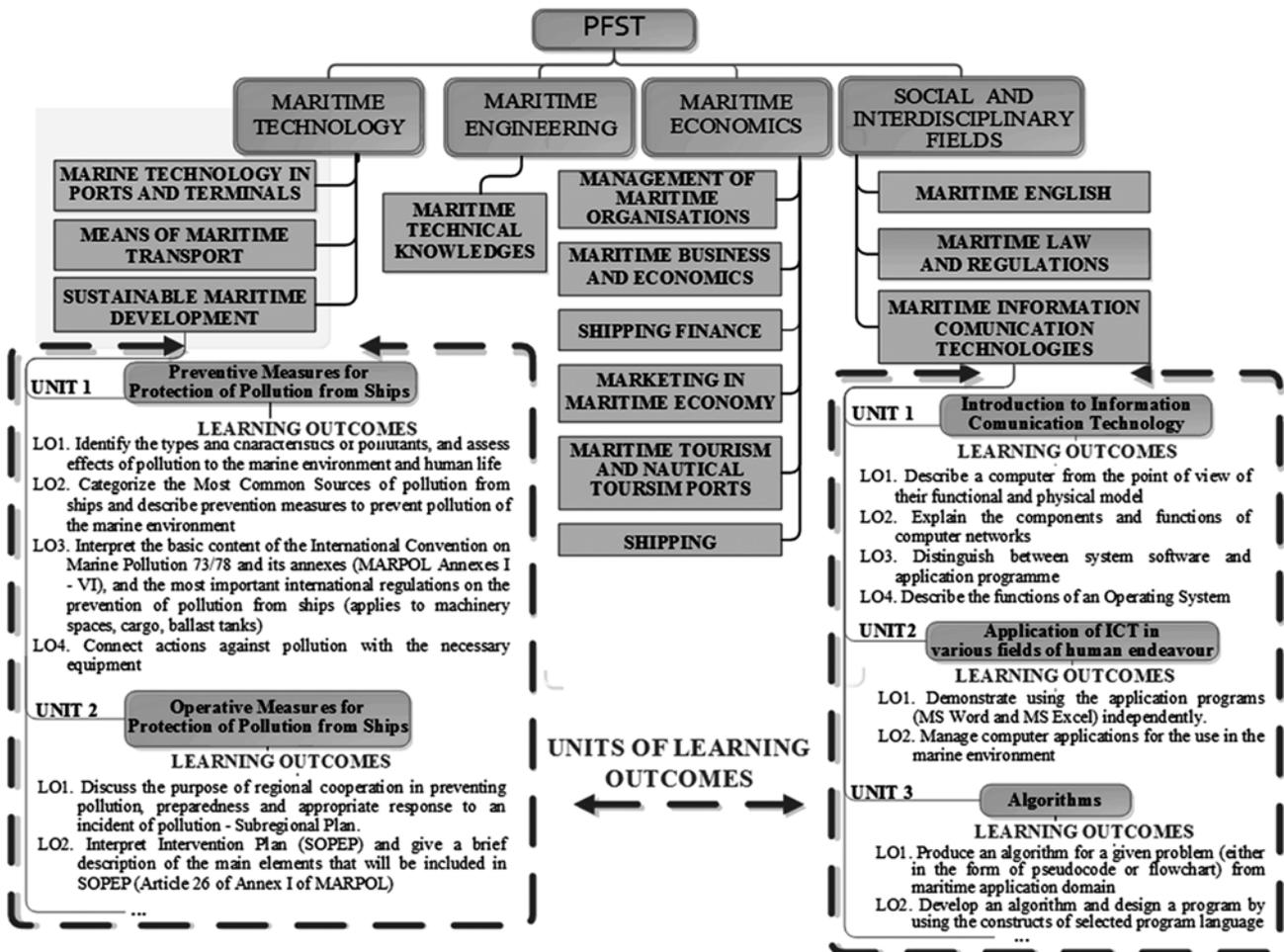


Figure 4. Main modules of learning outcomes in field of maritime management (Gudelj et al., 2017)

i.e., knowledge and skills, upon gaining which, each student can work in different sectors of the maritime industry.

As stakeholders play an important part in the creation of qualification standards, inputs from the labour market are essential for defining appropriate learning outcomes in accordance with qualification standards. This means that it is quite important to connect employers' needs, i.e., knowledge and skills, with learning outcomes that students gain through each course. Stakeholders from the maritime economy recognized four main modules of learning outcomes as follows:

- Maritime Economics,
- Maritime Technology,
- Marine Engineering,
- Social and Interdisciplinary areas.

**Table 1. Elaboration of learning outcomes category “Maritime Tourism and Nautical Tourism Ports”**

Modul of LO	Category of LO	Units of LOs
Maritime Economics	Maritime Tourism and Nautical Tourism Ports	Structure of nautical tourism market
		Development plans and strategic orientation in nautical tourism
		Nautical tourism management and organization
		Application of acquired knowledge and skills in nautical tourism
		Marina as a business organization and industry of marina
		The marina construction, arrangement and equipment, activities and offer
		Realization of marina management functions
Marina Competitiveness (strategy) and performance of the marina		

**Table 2. Overview of necessary attributes for unit-of-learning outcomes “Structure of nautical ports market”**

Unit of learning outcomes	Structure of nautical ports market
Learning outcomes	LO1. Construe the term “market“ within nautical tourism (NT). LO2. Present activities, organization, and offer on nautical tourism market. LO3. Discuss recreational boating, boats, and consumers. LO4. Construe nautical tourism infrastructure.
Mandatory or Elective	Mandatory
ECTS credit for set of learning outcomes	1.5
Course enrolment requirements and entry competences required for the course	None
Material and human resources necessary to acquire a set of learning outcomes	University teacher whose area and field of election into research or art rank is within technical science, technology of transport. Suitable size classroom considering the number of students (1.2 m <sup>2</sup> per student). Computer classrooms connected to the Internet.
Material and human resources necessary for the evaluation of a set of learning outcomes	University teacher whose area and field of election into research or art rank is within technical science, technology of transport. Suitable size classroom considering the number of students (1.2 m <sup>2</sup> per student). Computer classrooms connected to the Internet.
Method for evaluation of learning outcomes	Formative evaluation of learning outcomes is carried out during classes through independent and team scientific research, writing essays and/or term papers, presentations, discussions and written tests of the valued knowledge and appropriate skills. Summative evaluation of learning outcomes is carried out at the end of the semester in the form of written and oral exams. Achieved results of successfully carried out scientific and research tasks, tests and the overall work, individually and in groups during class are also taken into account. On the written exam, students answer questions to verify theoretical knowledge and skills (a combination of open and closed questions).
Examples of learning outcomes evaluation	Examples of evaluation: LO1. 1) Assess the market structure and trends in nautical tourism. 2) Interpret maritime economy and the role of “blue economy”. 3) Present market segments in the NT. LO2. 1) List the organizations that implement traffic control and operations in the NT. 2) Classify the types of products and services in the NT. 3) Present activities in nautical tourism. LO3. 1) Explain the types of recreational navigation. 2) Analyse the characteristics of the main groups of consumers (tourists-boaters). 3) Compare the requirements of the crew, vessel owner, nautical tourists and other consumers. LO4. 1) Compare seaports and nautical tourism ports. 2) Compare the nautical/tourist resources of the Republic of Croatia, the Mediterranean, the EU and others. 3) Evaluate the role of utility connections in the Republic of Croatia. 4) Determine the role of port authorities.

Based on the main competencies those potential employers emphasized, a working group from the Faculty of Maritime Studies developed learning outcomes for the Maritime Management study program. The hierarchy of defining learning outcomes (Figure 3) comprises four levels:

- (1) Main modules of learning outcomes (i.e., general outcomes);
- (2) Categories of learning outcomes (specific outcomes);
- (3) Sets of learning outcomes;
- (4) Specific learning outcomes of the course.

Each set of learning outcomes should be evaluated and they represent a component that the professor tests and evaluates. This connection is shown in the schema of a qualification database (i.e., assessment record) shown in Figure 2. When learning outcomes are tested and evaluated, i.e., a student gains the defined skills and knowledge, then it can be transferred.

Figure 4 shows the main modules and principles of classification of learning outcomes (Gudelj et al., 2017). In further figures and tables, we will use **abbreviation LO for learning outcomes**.

For example: within the module “Maritime Economics” are categories: Management of Maritime Organisations, Maritime Business and Economics, Shipping Finance, Marketing in Maritime Economy, Maritime Tourism and Nautical Tourism Ports, Shipping.

Furthermore, category “Maritime Tourism and Nautical tourism and Ports” consist of 8 units of the learning outcomes which are shown in Table 1.

Upon elaboration of the learning outcomes category and units, the most important part is to develop the specific learning outcomes within each unit-of-learning outcomes. For each developed unit, it is necessary to elaborate default attributes that are presented in Figure 2. An example of elaboration of “Structure of nautical ports market” unit of learning outcomes is presented in Table 2.

## Conclusion and further work

Learning outcomes (the knowledge, skills, and competencies) achieved by the learner play an important role as a professional tool to improve the link between the world of work and education. The existing research indicates that the education sector, together with stakeholders (employers, social partners, companies and professional organizations) are players in developing learning outcomes. The labour market has set occupation frameworks for specific

areas that can differ from the qualifications of study programs in terms of ease of understanding and extent of applicability. In order to ensure correspondence among employment requirements and learning outcomes in this work, we introduced a semantic data model for capturing entities and relationships between them to enable management and exchange of achieved learning outcomes. Semantic models can be helpful in developing available data, improving it, making it easier to understand and communicating it clearly. The proposed data model points to the general need for all those engaged in education and training and in labour market policy to work together. A single study program can develop several qualifications and it is obvious that the proposed data model can contribute to a coherent, transparent and more integrated qualification system.

In Croatia, the development process of occupational and qualification standards is in its early stages, and it is only within years that it is possible to expect significant improvement in terms of the complete harmonization of the curriculum with the needs of the labour market. As stated in COM (COM, 2014), the maritime sector does not attract enough qualified staff, and a prerequisite for sustainable and competitive growth is investment in people.

Following the proposed data model and the Croatian Qualifications Framework, one of the outcomes of the project “Maritime management for the 21<sup>st</sup> century” is to develop categories of learning outcomes for the qualification standards at levels 6 and 7. It is intended to develop the qualification standards through the improvement of curriculums, based on improved outcomes that are in line with market demands and national and international legislation (STCW Convention) (IMO, 2010).

In order to strengthen and further develop lifelong learning and quality assurance of the acquisition of qualifications, we hope that this project will contribute future generations of maritime management, and marine traffic engineers in general to find their place in the world of work.

In the future, we plan to organize workshops for students to deal with the changes and demands of employers in their professional life after they graduate. Also, it is important to encourage the Faculty’s management to develop qualifications for other study programs.

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## References

- BELJO LUČIĆ, R. et al. (2009) *Hrvatski kvalifikacijski okvir. Uvod u kvalifikacije*. [Online]. Available from: [https://www.azvo.hr/images/stories/HKO\\_Prirucnik.pdf](https://www.azvo.hr/images/stories/HKO_Prirucnik.pdf) [Accessed: October 20, 2015]
- BIESTA, G. (2012) Becoming world-wise: An educational perspective on the rhetorical curriculum. *Journal of Curriculum Studies* 44, pp. 815–826. doi:10.1080/00220272.2012.730285
- BIESTA, G. (2015) What is education for? On good education, teacher judgement, and educational professionalism. *European Journal of Education* 50, pp. 75–87. doi:10.1111/ejed.12109
- BIGGS, J. (2003) *Aligning teaching and assessing to course objectives*. [Online] Available from: <http://www.ut.ee/htay/Biggs.pdf> [Accessed: April 12, 2017]
- BJEKIĆ, M., BJEKIĆ, D. & ZLATICIĆ, L. (2015) Communication Competence of Practicing Engineers and Engineering Students: Education and Evaluation. *International Journal of Engineering Education* 31, 1B, pp. 368–376.
- COM (2014) European Commission. *European Strategy for more Growth and Jobs in Coastal and Maritime Tourism. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Region*. [Online] Available from: [https://ec.europa.eu/maritimeaffairs/sites/maritime-affairs/files/docs/body/com\\_2014\\_86\\_en.pdf](https://ec.europa.eu/maritimeaffairs/sites/maritime-affairs/files/docs/body/com_2014_86_en.pdf) [Accessed: April 12, 2016]
- Council of Europe (2001) *Common European Framework of Reference for Languages: learning, teaching, assessment*. [Online] Available from: <https://rm.coe.int/1680459f97> [Accessed: April 12, 2017]
- Council of Europe (2009) *Relating Language Examinations to the Common European Framework of Reference for Languages: Learning, Teaching, Assessment (CEFR)*. [Online] Available from: [www.coe.int/t/dg4/linguistic/manuel1\\_en.asp](http://www.coe.int/t/dg4/linguistic/manuel1_en.asp) [Accessed: April 15, 2017]
- DŽELALIJA, M. & DRAGIČEVIĆ, T. (2016) *Kako napisati ishode učenja?* [Online] Available from: <http://stemp.pmfst.unist.hr/wp-content/uploads/2016/01/digitalna-brosura.pdf> [Accessed: January 13, 2017]
- EQF (2008) *Explaining the European Qualifications Framework for Lifelong Learning*. [Online] Available from: [https://ec.europa.eu/ploteus/sites/eac-eqf/files/brochexp\\_en.pdf](https://ec.europa.eu/ploteus/sites/eac-eqf/files/brochexp_en.pdf) [Accessed: April 15, 2017]
- EQF (2013) *Referencing National Qualifications Levels to the EQF*. [Online] Available from: [https://ec.europa.eu/ploteus/sites/eac-eqf/files/EQF%20131119-web\\_0.pdf](https://ec.europa.eu/ploteus/sites/eac-eqf/files/EQF%20131119-web_0.pdf) [Accessed: April 15, 2017]
- EUR LEX (2005) *Directive 2005/36/EC of the European Parliament and of the Council on the Recognition of Professional Qualifications*. [Online] Available from: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32005L0036> [Accessed: April 15, 2017]
- GEDVILIENĖ, G. & BORTKEVIČIENĖ, V. (2013) *The importance of key competences in the context of lifelong learning*. Proceedings of ICERI201, pp. 4646–4653. Available from: [https://media.ehea.info/file/New\\_goals/90/9/WG3\\_2016\\_11\\_02\\_Compences\\_Gedviliene\\_648909.pdf](https://media.ehea.info/file/New_goals/90/9/WG3_2016_11_02_Compences_Gedviliene_648909.pdf) [Accessed: February 13, 2017]
- GORNIK, D. (2005) *Entity Relationship Modeling with UML. Discussion paper No. 2. IBM developerWorks*. [Online] Available from: <http://www.ibm.com/developerworks/rational/library/319-pdf.pdf> [Accessed: January 20, 2017]
- GUDELJ, A., SLIŠKOVIĆ, M. & UKIĆ, H. (2017) *Main learning outcomes modules for the qualification standards in the field of Maritime management*. Proceedings of the 7<sup>th</sup> International Maritime Science Conference, pp. 99–103. Available from: <http://www.pfst.unist.hr/imsc/> [Accessed: June 20, 2017]
- IMO (2010) *The STCW Convention & Code 2010 Manila Amendments*. [Online] Available from: <http://www.imo.org/en/OurWork/humanelement/trainingcertification/pages/stcw-convention.aspx> [Accessed: April 20, 2016]
- MAGALHÃES, A., VEIGA, A. & AMARAL, A. (2016) The changing role of external stakeholders: from imaginary friends to effective actors or non-interfering friends. *Studies in Higher Education*, pp. 1–17. doi:10.1080/03075079.2016.1196354
- MCGARRAH, M.W. (2015) *Lifelong Learning Skills for College and Career Readiness: Considerations for Education Policy*. USA: American Institutes for Research. [Online] Available from: [http://www.ccrscenter.org/sites/default/files/CCRS%20Lifelong%20Learning%20Skills%20Policy%20Considerations\\_0.pdf](http://www.ccrscenter.org/sites/default/files/CCRS%20Lifelong%20Learning%20Skills%20Policy%20Considerations_0.pdf) [Accessed: April 10, 2017]
- MSERC (2014) Ministry of Science and Education of Republic of Croatia. *Strategy of Education, Science and Technology of the Republic of Croatia – New Colors of Knowledge*. [Online] Available from: <http://public.mzos.hr/fgs.axd?id=2551> [Accessed: April 10, 2016]
- PAQUETTE, G. (2007) An Ontology and a Software Framework for Competency Modeling and Management. *Educational Technology & Society* 10, 3, pp. 1–21.
- PAŽUR ANIČIĆ, K. & ARBANAS, K. (2015) Right Competencies for the right ICT Jobs – case study of the Croatian Labor Market. *TEM Journal* 4, 3, pp. 236–243.
- Policy Research Corporation (2008) *The role of Maritime Clusters to enhance the strength and development of European maritime sectors*. [Online] Available from: [https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/docs/body/study\\_results\\_annexes\\_en.pdf](https://ec.europa.eu/maritimeaffairs/sites/maritimeaffairs/files/docs/body/study_results_annexes_en.pdf) [Accessed: April 10, 2017]
- RAMSDEN, P. (2003) *Learning to Teach in Higher Education*. London: Routledge.
- SAMPSON, D.G. (2009) Competence-related Metadata for Educational Resources that Support Lifelong Competence Development Programmes. *Educational Technology & Society* 12, 4, pp. 149–159. Available from: [http://www.ifets.info/journals/12\\_4/13.pdf](http://www.ifets.info/journals/12_4/13.pdf) [Accessed: April 20, 2017]
- SLIŠKOVIĆ, M., UKIĆ, H. & MARUŠIĆ, E. (2016) Labor Market Need Analysis as Basis for the Foundedness of Occupational Standards in the Field of Maritime Management. *Transactions on Maritime Science* 5, 1, pp. 29–39. doi:10.7225/toms.v05.n01.004