Digital and Data Skills Training to Enable the Digital Transformation of the Maritime Industry

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Emerging data economy, as a part of the more general Fourth Industrial Revolution (referred to as Industry 4.0) is powered by the convergence of previously disconnected fields such as Cloud Computing, Big Data, Data Science and Analytics (DSA), Artificial Intelligence (AI), Internet of Things (IoT), robotics, mobile technologies, 3D printing, nanotechnology and biotechnologies, that all are based on automation and digitalisation of organisational, manufacturing and business processes. Industry 4.0 will be characterized by fast development, a high level of technology convergence, and the increased role of knowledge, skills, and human factors to enable the continuous and sustainable development of a digital society.

Sustainable development of the modern data driven economy requires specific digital and data skills which in general are common but in many cases not native for non-computer/IT domains. Addressing demand for digital and data skills requires cooperation between computer/IT specialists (and educators) and re-thinking and re-designing both traditional educational models and existing courses to reflect the multi-disciplinary nature of data driven technologies and application domains.

This practice paper presents the results of MATES project on developing the curriculum and training materials on digital and data skills for maritime industry. In the framework of the ED2MIT (Education and Training for Data Driven Maritime Industry) Pilot Experience focused on creating a sustainable training framework for developing and improving digital and data skills for future/ongoing digitalisation of the maritime industry. This work was coordinated by the University of Amsterdam. The goal was to bridge the gap between the original Data Science and Information Technologies community and maritime professional community with the recognised demand for data and digital skills and facilitate knowledge transfer between two professional communities.

This ED2MIT effectively used the EDISON Data Science Framework (EDSF) and corresponding skills management and curricula development methodology, which was proposed in the EDISON project and is currently used in multiple domains that require Data Science and general digital and data competences [1,2], and skills which have been defined according to European Digital Competence framework DigComp2.1 [3] and further aligned with the recently published DigComp2.2 [4]. Using EDSF accelerated the development of the training courses to support the demand for general digital and data skills by all types of professions and workers that will work with the future data driven and AI enabled processes, manufacturing and operation.

Set of training materials on digital and data technologies, developed in ED2MIT, cover the main competence areas defined in DigComp and extended with the required competences for data driven processes and technologies: Data driven technologies and Data Management, Cloud Services and Cloud Economics, Data Science and Big Data Analytics, Digital content creation, access and management, Data driven and digital transformation and organizational capacity building.

The training materials can be used for "training the trainers" from the maritime industry to ensure wider dissemination and impact of the MATES project. The materials and curricula can be customised and adapted to organisational processes and tasks as well as used by universities, VET and professional training organisations. In this way, the ED2MIT can contribute to developing effective methodologies for digital skills

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Four training tutorials were delivered for maritime community to address critical competence areas in digital transformation of the maritime industry:

Introduction to Big Data and Data Management for Maritime Industry

Industrial Data Spaces, Organizational Data Management and Governance for the maritime sector

Big Data Infrastructure Technologies for Data Analytics

Introduction to Data Science & Analytics Foundations for the maritime sector

The developed course on Data Management and Governance provides all basic information on organizational data management, including FAIR (Findable, Accessible, Interoperable, Reusable) data management principles [5], and can be used to provide external training to support the recognised by industry the DNV-GL Data Quality Assessment service, which is provided as a paid service [6].

Further Developments

The experience of developing ED2MIT courses revealed insufficient definition of the digital skills in DigComp for industrial practitioners. There is an intention to provide suggestions for further DigComp development

Further adoption of the digital and data training will require a special program and follow on projects which tasks would be to develop training (primarily goal) and education (secondary goal) programs and courses adapted to maritime context and create trainers on digital and data technologies from the maritime sector(s): Training for trainers. This program should use the MATES project and ED2MIT results.

ED2MIT results and key outcomes provide a direct contribution to European goals and provide added value in developing digital and data skills for the maritime industry addressing priority for digital skills outlined in the New skills for Europe Agenda [7].

References

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