BlueDivet

Blue economy digitalization skills for VET students

Analysis on the state-of-the-art: Blue market needs & Academic offer

Project Result

Co-funded by the European Union

Contents

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Introduction

As mentioned on "Blue Economy: A New Digital Horizon for SMEs and Freelancers", digitalization is an essential enabler for success in the Blue Economy, as technological advances are crucial for the development of these innovative business initiatives. Here are some reasons:

- **Efficiency and Management:** Utilizing digital tools enhances efficiency across sectors like fishing, aquaculture, and maritime logistics. Effective resource management and cost-saving measures are vital for the success of maritime logistics, supply chain enhancement, and the surveillance of maritime transport, benefiting small-scale transport and import-export enterprises.
- **Technological Innovation:** Sustaining the Blue Economy demands ongoing innovation, with digitalization facilitating the exploration and development of new technologies. This is evident in the management of ocean energy facilities and data analysis, presenting opportunities for SMEs and independent professionals to contribute their expertise by creating advanced technological solutions like autonomous underwater vehicles, marine monitoring sensors, and enhanced navigation systems.
- **Monitoring and Conservation:** Digitalization enables real-time monitoring of ocean health and marine biodiversity, essential for sustainable resource management and ecosystem preservation. Thus, digitalization plays a crucial role in effectively managing aquaculture systems, monitoring water quality, and optimizing production.
- **Customer Experience:** Within coastal tourism and logistics, digitalization enables a more personalized experience, spanning from online bookings and the promotion of tourism services to the tracking of transoceanic shipments.

If we review at a European level the state of- the-art of the demands and needs of the blue growth labour market, we can draw that specific knowledges are required but still difficult to acquire with the current

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academic offer. This means that job opportunities are being lost in a sector as specific and promising as digititalization in the sustainable blue economy mainly for the VET students where the presence of digitalization content on the study programa are low as showed on the results of the survey performed.

Blue & digitalization related projects

There are very few projects related to digitisation within the sustainable blue economy and less framed within vocational training and job search. Some of them are presented below, although only MATES has a part oriented towards blue digitalization.

MATES Pilot Experiences

MATES' objective is to develop a skills strategy that addresses the main drivers of change to the maritime industry, in particular shipbuilding and offshore renewable energy. Both sectors are strongly linked and require new capacities to succeed in an increasingly digital, green and knowledge driven economy. In the webpage several blue digitalization course can be found, as ED2MIT: Education and Training for Data Driven Maritime Industry or MOOCs on Industry 4.0 and the naval sector.

BlueDIGITAL

BlueDIGITAL is a pilot experiment from the UNDP Accelerator Lab that applies digital tools and solutions to improve segments of the Blue Economy ecosystem and value chains for fisherfolk, government, tourism industry partners and the general public as consumers. In doing so, this proposed concept aims to reduce digital divides exposed by COVID-19 by introducing innovative, online measures within sectors of the Blue Economy in the Eastern Caribbean.

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Bringing innovation and learning in TVET

https://unevoc.unesco.org/bilt/BILT+-+Digitalization

Digitalization also permeates everyday life in TVET institutions across the globe, changing in a substantial way many aspects of the learning programmes. Scaling up the reach of TVET while promoting individualization of the teaching and learning processes is just the start of the current transformation of TVET, which contributes to building inclusive societies where all persons are equally supported to grow socially and economically.

Teachers, trainers, and students are on the frontline of the changes stemming from digitalization, and they are required to regularly update their competencies. Teachers are expected to be knowledgeable about new pedagogical approaches and classroom technology, and to design and use digital content. Students must familiarize themselves with relevant hardware and software, and develop digital competencies. In this setting, artificial intelligence, cloud computing robotics, 3D printing, the Internet of Things, and advanced wireless technologies stand out as topics where new competencies are required.

Objective

The aim of the forms designed was to answer a series of questions that would allow us to design a course adapted to both the needs of the companies and the capacity of the VET centers.

The form created for the companies was design to answer:

- To find out the level of digitalization of the company.
- To find out how many vocational students they have.
- The problem for digitalization and hire VET students to develop these jobs.

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And the VET center form was for:

- Know if the VET was offering a formation related with digitalization.
- Detect the lacks for digitalization formation in the VET centers.
- Get the number of students that are searching Jobs on the Blue Economy market and related with digitalization.

Methodology

Two different type of forms was created in order to be able to get the information needed to fulfil the goals and get a better understanding of the situation of the digitalization on the blue economy related companies and if the skills demanded were align with the VET study programs. Se crearon dos formularios diferentes, uno para empresas y otro para VET, cada uno traducido a 4 idiomas.

Companies

VET

More than 160 companies from Spain, Bulgaria, Greece and Malta were contacted and more than 40 VET centers getting 39 answers from companies and 25 from VET. We have received answers mainly from the participants countries on the project.

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Blue digitalization on companies

When was your company founded?

Less than 3 years ago	10
3-6 years ago	2
6-9 years ago	2
More than 9 years ago	24
Other	1

Figure 1 When was your company founded?

3. Please select the sectors that are more relevant to your activity

Maritime transport	11
Aquaculture and fisheries	7
Shipyard and ship repair	8
Coastal and sea tourism	6
Marine Biotechnology	1
Marine renewable energy	2
Harbour	6
Marine environment	8
Marine Monitoring Systems	4
Other	10

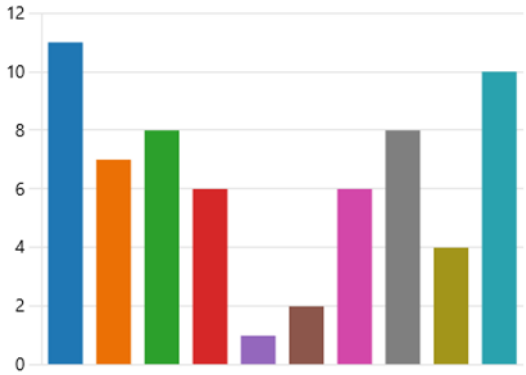

Figure 2 Please select the sectors that are more relevant to your activity

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Figure 3 Number of Employees

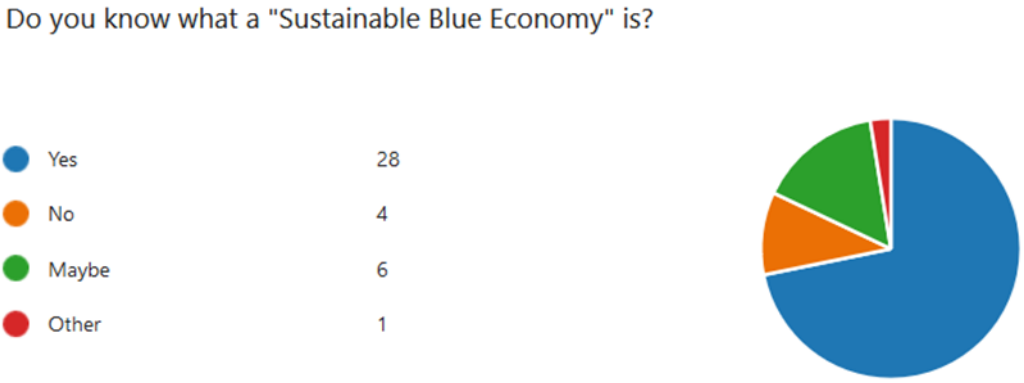

Figure 4 Do you know what a "Sustainable Blue Economy" is?

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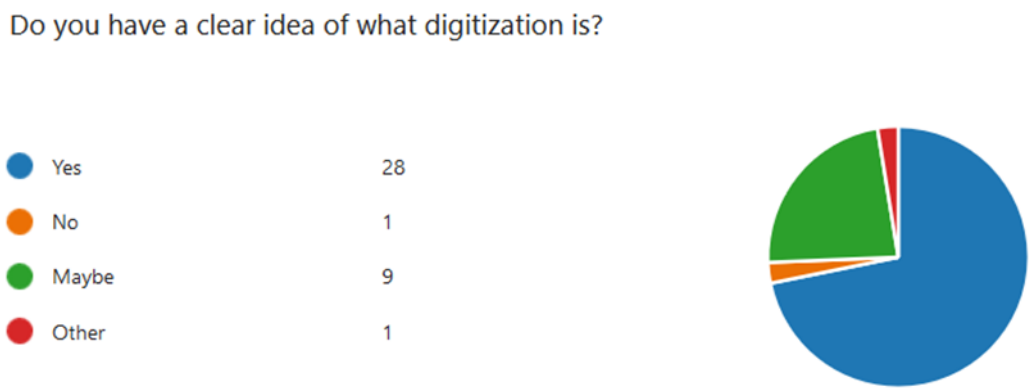

Figure 5 Do you have a clear idea of what digitization is?

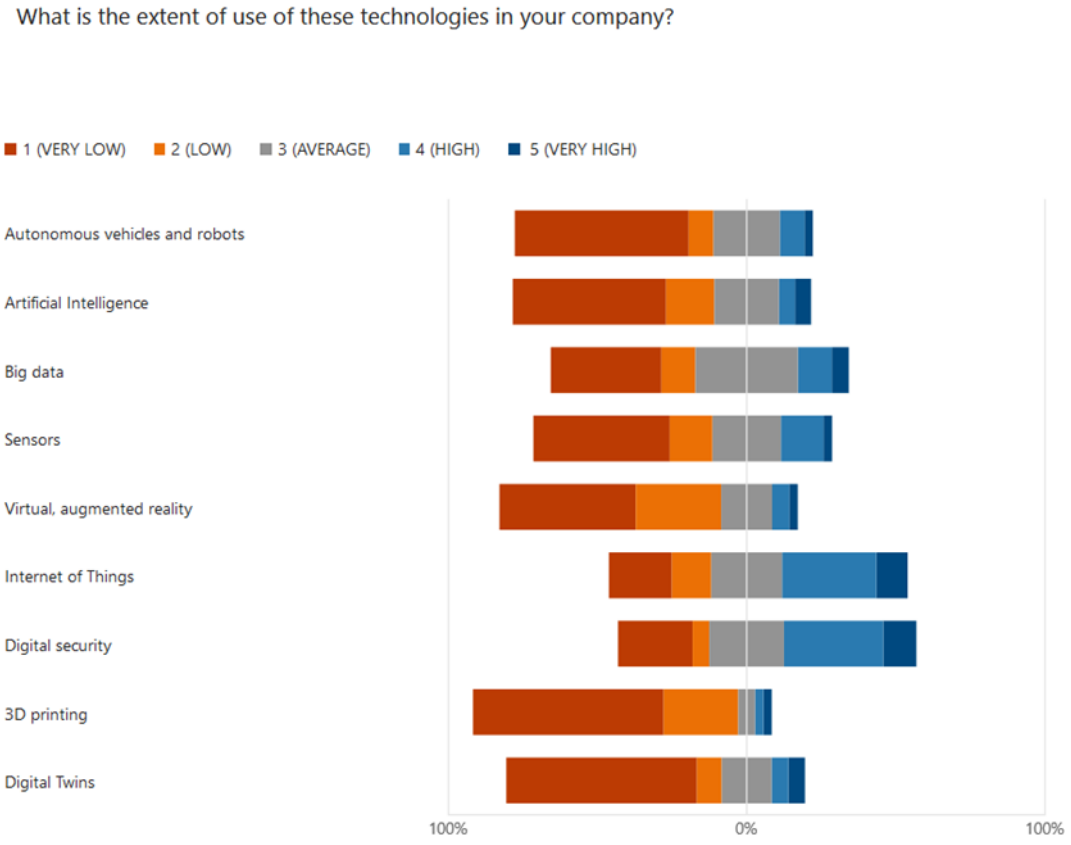

Figure 6 What is the extent of use of these technologies in your company?

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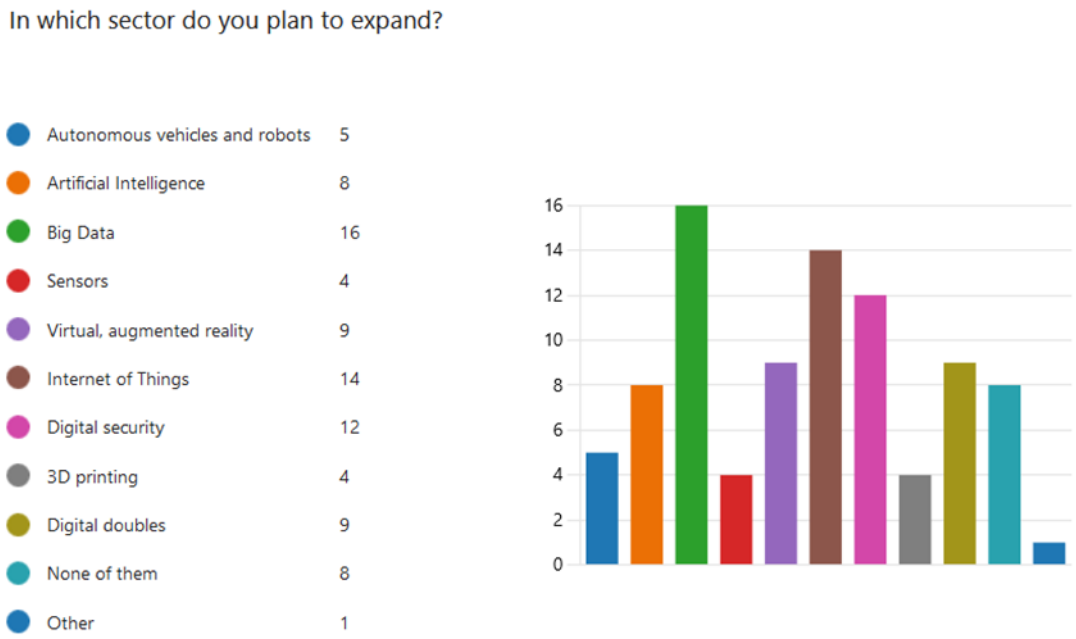

Figure 7 In which sector do you plan to expand?

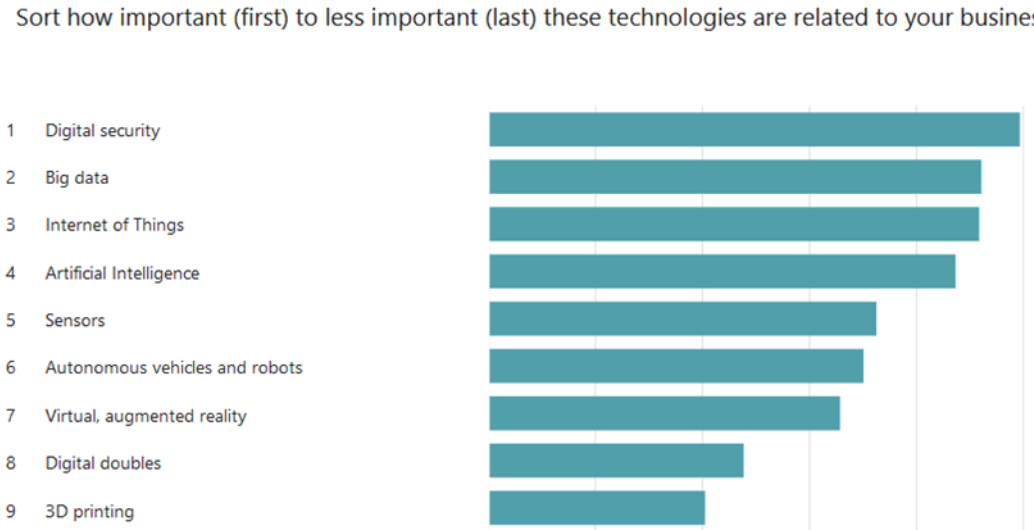

Figure 8

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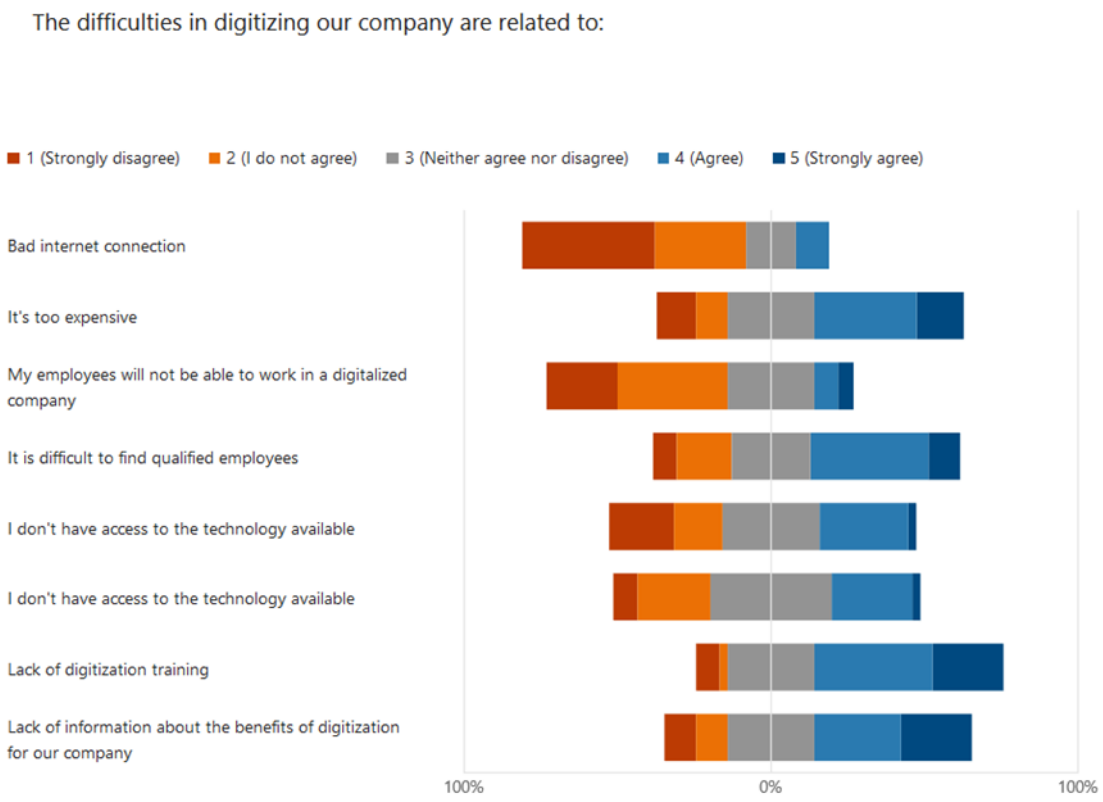

Figure 9 The difficulties in digitizing our company are related to:

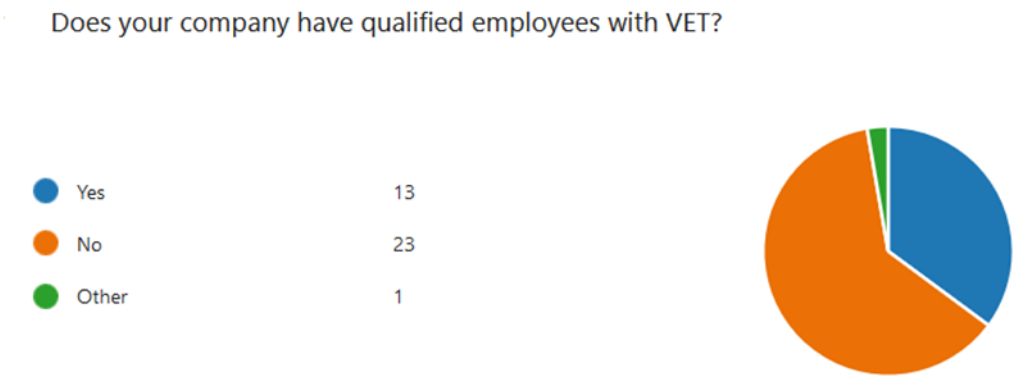

Figure 10 Does your company have qualified employees with VET?

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Figure 11 What is the percentage of employees with vocational qualifications (VET) who perform digitalization-related tasks in your company?

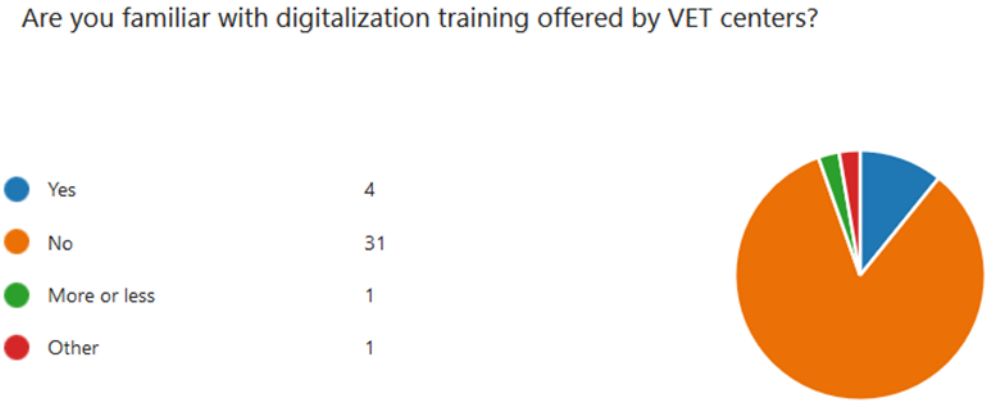

Figure 12 Are you familiar with digitalization training offered by VET centers?

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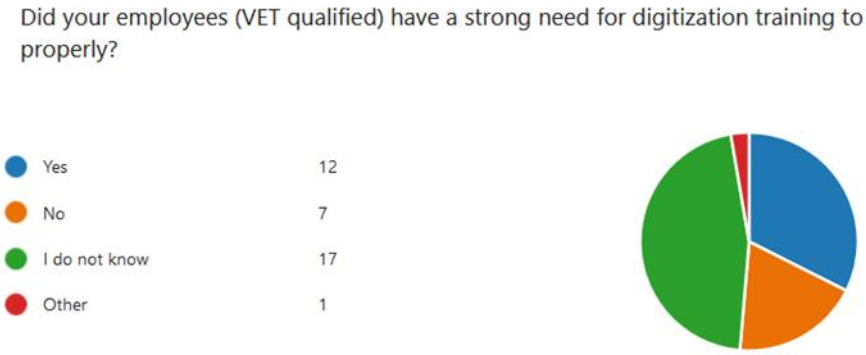

Figure 13 Did your employees (VET qualified) have a strong need for digitization training to perform their tasks properly?

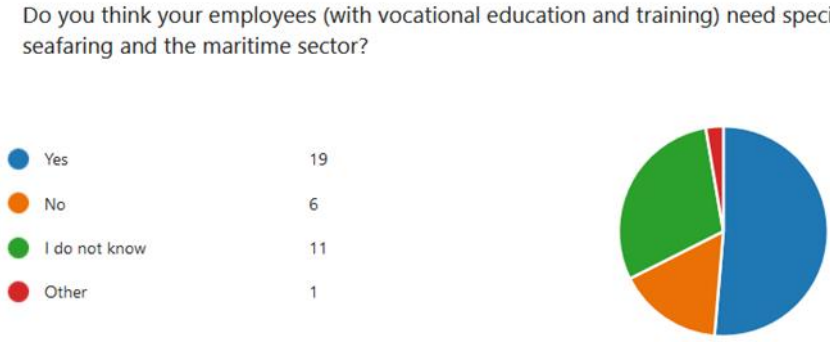

Figure 14 Do you think your employees (with vocational education and training) need specific knowledge related to seafaring and the maritime sector?

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Blue digitalization on VET Centers

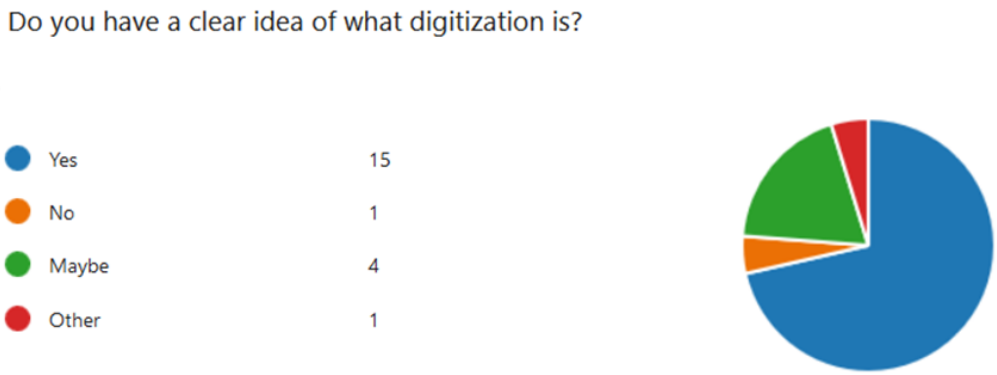

Figure 15

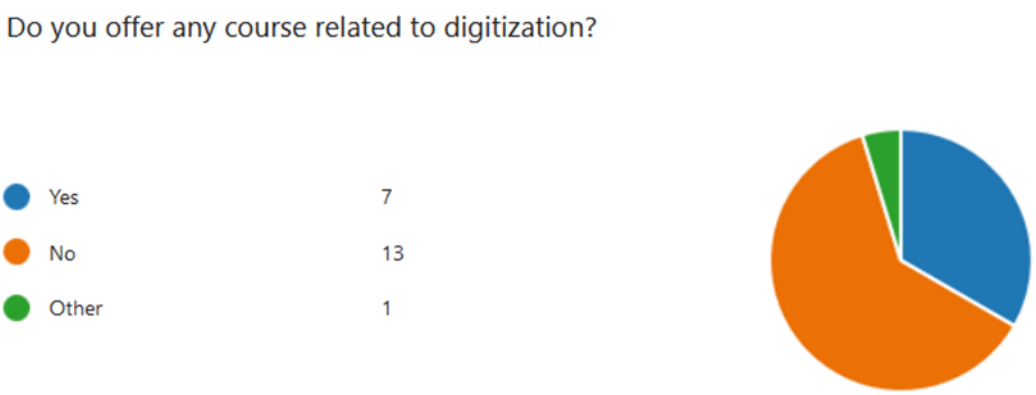

Figure 16 Do you offer any course related to digitization?

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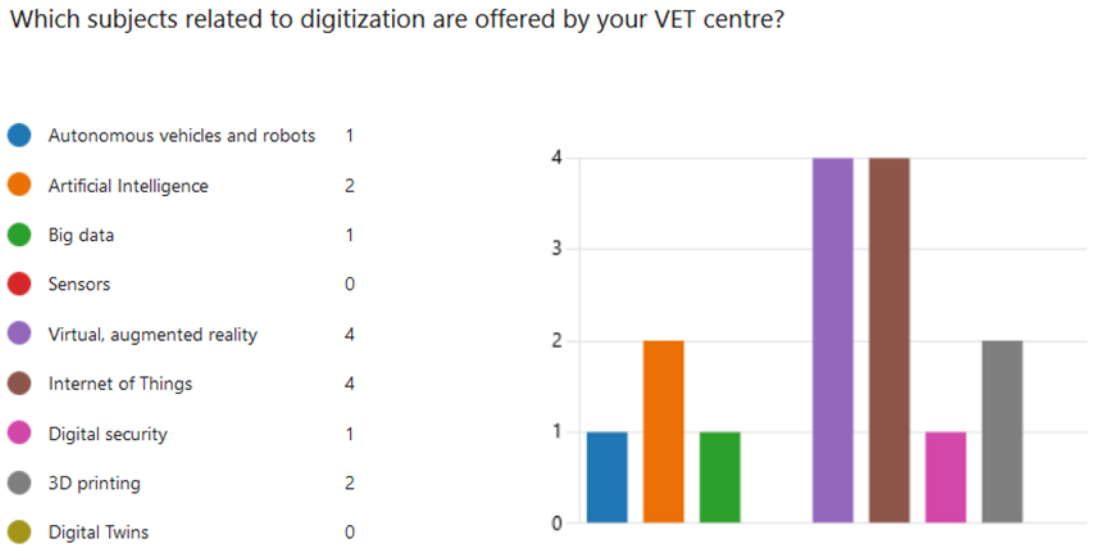

Figure 17 Which subjects related to digitization are offered by your VET centre?

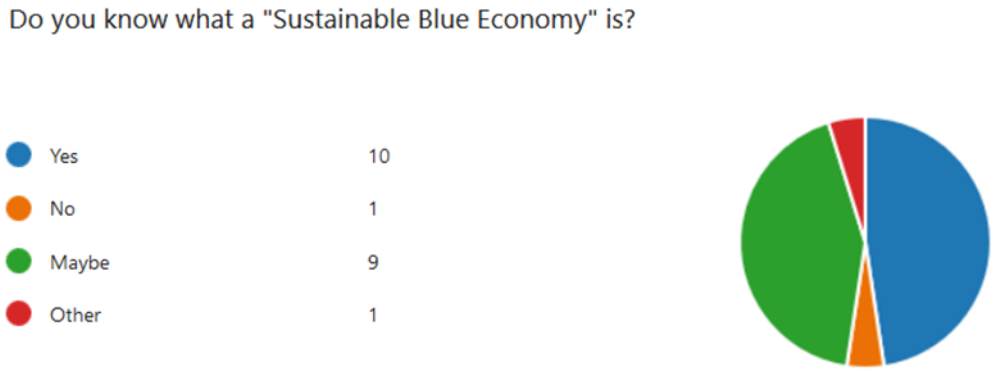

Figure 18 Do you know what a "Sustainable Blue Economy" is?

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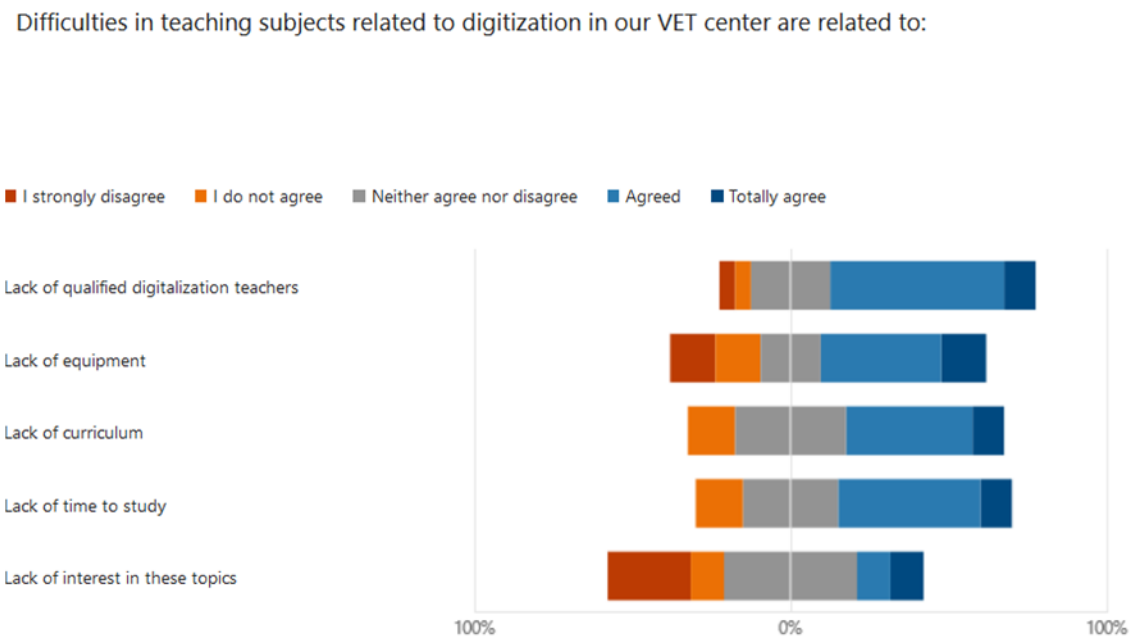

Figure 19 Difficulties in teaching subjects related to digitization in our VET center are related to:

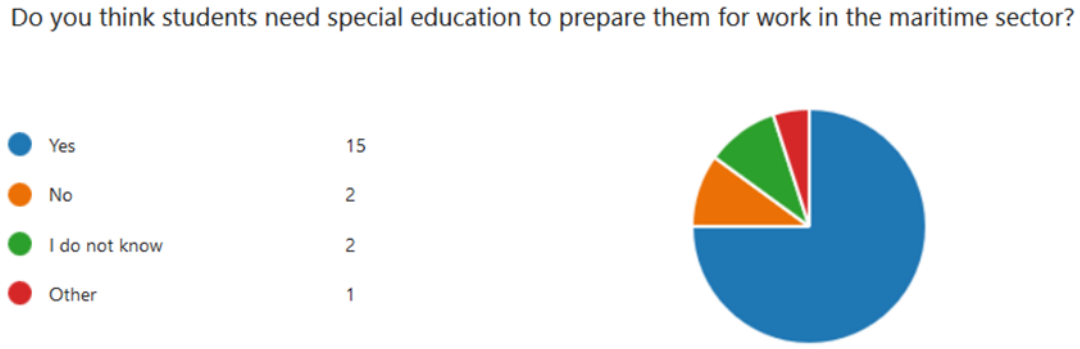

Figure 20 Do you think students need special education to prepare them for work in the maritime sector?

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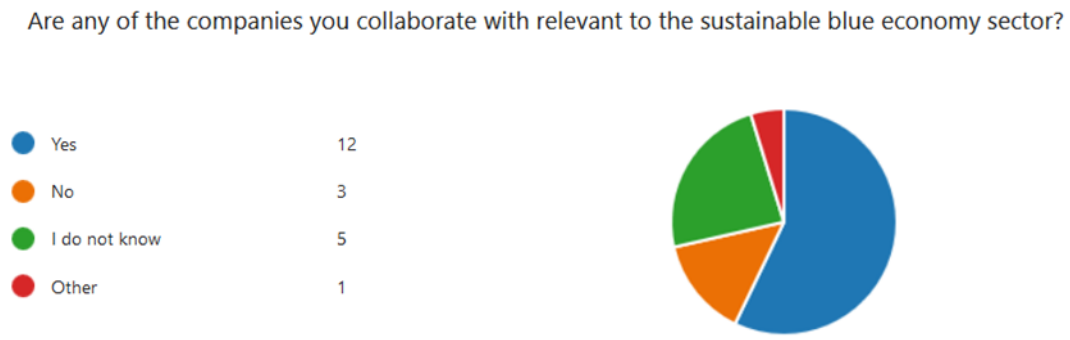

Figure 21 Are any of the companies you collaborate with relevant to the sustainable blue economy sector?

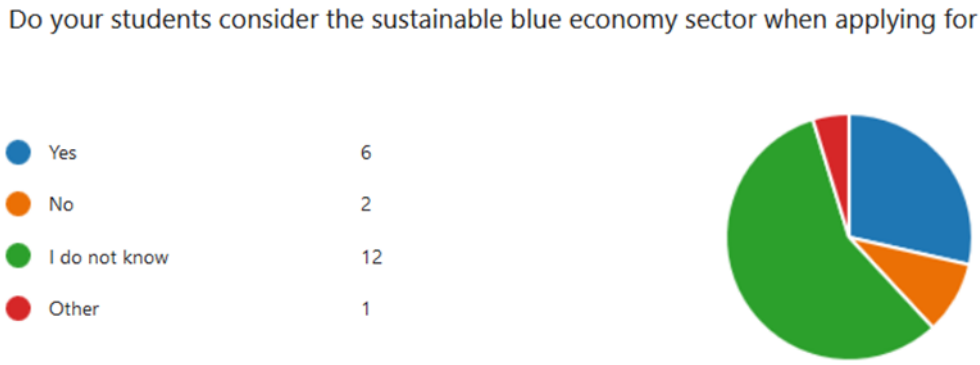

Figure 22 Do your students consider the sustainable blue economy sector when applying for jobs?

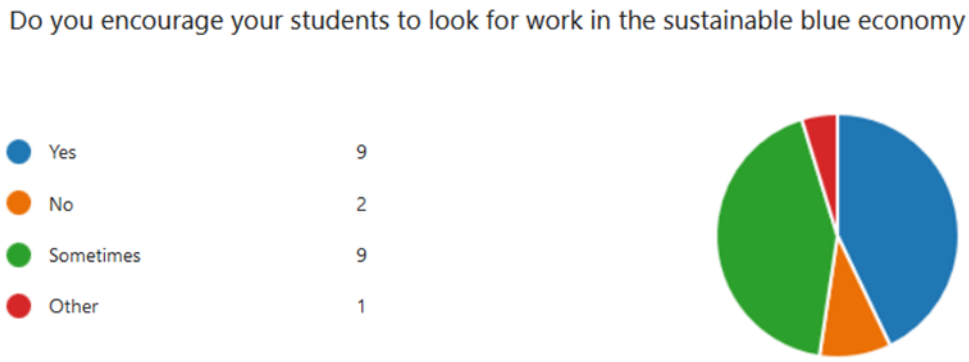

Figure 23 Do you encourage your studetns to look for work in the sustaibale blue economy sectors?

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Conclusions

Companies

The total number of enterprises that responded to the questionnaires was 39, of which 62% are more than 9 years old, followed by 26% that are newly established (less than 3 years), with maritime transport being the most represented sector (28%), followed by shipbuilding (21%). The majority (46%) are considered small enterprises with less than 10 employees, with the remaining options equally distributed.

Regarding the blue economy, 72% said they knew what the sustainable blue economy was, which was to be expected given the pre-selection of companies linked to this sector. A similar percentage said they had a clear idea of what digitalization was, but 26% answered they were not sure or did not know what it was. The technologies most commonly used by businesses were IoT and digital security, while 3D printing and autonomous vehicles were the least common. These two sectors, along with big data are the ones in which they expect to invest the most. This contrasts with the low importance given to sensoring, despite being fundamental to the development of IoT and Big Data.

Another finding worth highlighting is that AI is not one of the technologies they use most or plan to invest in, but it is one (fourth) of the most important digital technologies in their company.

The main difficulties with digitalization are, in order of importance: the lack of training in these skills for employees, the high costs and the lack of information about the benefits of digitalization for their business.

Only 33% of enterprises have VET workers, and less than 40% of these are involved in digitalization-related tasks. This may be due to the fact that around 80% of enterprises admitted that they were unaware of the training offered in vocational education related with digitalization and the lack of training of their VET

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employees in this area, 74% did not know or did not think that their VET employees were well trained in digitalization.

Finally, only 15% considered that their employees did not need training in maritime safety and security.

VET

21 responses were received from VET schools, of which 71% of schools have a clear idea of what digitalization is, but only 28% of them offer training related to this activity, with the main content offered being related to IoT and augmented reality, and only 5% offering content related to digital security. The main reasons for not offering digitalization training are the lack of trained teachers and time for training, and the lack of a curriculum that includes digitalization.

50% do not know or are not sure what the Blue Economy is, although 60% are related to companies in the maritime sector. However, only 43% encourage their students to look for jobs in sectors related to the sustainable blue economy. Despite the importance of the Blue Economy today, only 23% of students thought about looking for a job in this sector.

Finally, 71% recognize that students need specific training to work in the maritime/maritime sector.

Course design

The results obtained have allowed us to design a course that responds to the needs identified through the information gathered in the surveys. The course consists of 3 modules:

Module 1 "Blue Economy Sectors".

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In this module, students will gain a better understanding of the sectors that make up the Blue Economy and the importance of digitalization within each of them. Particular attention has been paid to providing examples of companies/institutions applying these solutions, allowing students to see real cases of application as well as possible employment niches.

Module 2 "Technologies for the digitalization of the blue economy".

Module 1 refers to different technologies related to digitalization: IoT, digital security, AI, big data, sensors, autonomous vehicles, and digital twins. In Module 2, students will find a more focused training on each of them, the most used tools and examples of their use. This will allow them to acquire the basic skills in these fields and to know the steps to take in order to continue their education or to find a job.

Module 3 "Entrepreneurship".

It was considered important to design a unique module for entrepreneurship training in the sustainable blue economy. In this module, the student will be able to acquire the necessary knowledge to start an entrepreneurial activity, to identify opportunities and to know better the entrepreneurial panorama in each of the countries participating in the project.

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