



Co-funded by the
Erasmus+ Programme
of the European Union



Project: Network of Competence on Internet of Things
[NEON]

Project ID: 618942-EPP-1-2020-1-AT-EPPKA2-CBHE-JP

Work Package 6: Quality Control and Monitoring

Title: D6.5 Report on tools for monitoring student
enrolment and
employability/employment/entrepreneurial
statistics of graduates

Lead Organization: UC3M

**Participating
Organizations:** UC3M, UdelaR, UCU.

Editors: Rosina D'Eboli, Nicole Imbert

Contributors: Matías Miguez, Alfredo Arnaud, Joel Gak, Ana
García Armada, Lianet Méndez-Monsanto

Disclaimer:

"The European Commission support for the production of this publication does not constitute an endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein."

Deliverable data	Work Package and Outcome ref.nr	WP6 D6.5
	Title	Report on tools for monitoring student enrolment and employability/employment/entrepreneurial statistics of graduates
	Type	<input type="checkbox"/> Teaching material <input type="checkbox"/> Event <input type="checkbox"/> Learning material <input checked="" type="checkbox"/> Report <input type="checkbox"/> Training material <input type="checkbox"/> Service / Product
	Description	This report will explain how the tools for monitoring student enrolment and employability/employment/ entrepreneurial statistics of graduates will be developed and deployed. Part of these tools will be integrated into the project's web portal while part will be realized through questionnaires and surveys collected via social networks such as LinkedIn for business community and AngelList for entrepreneurial/startup community.
	Date	05.06.2023
	Language	English
Target groups	<input checked="" type="checkbox"/> Teaching staff <input checked="" type="checkbox"/> Students <input type="checkbox"/> Trainees <input checked="" type="checkbox"/> Administrative staff <input type="checkbox"/> Technical staff <input type="checkbox"/> Librarians <input checked="" type="checkbox"/> Industry partners, Higher education authorities, Partner Universities management and coordinators.	
Dissemination level	<input type="checkbox"/> Department / Faculty <input type="checkbox"/> Local <input type="checkbox"/> National <input type="checkbox"/> Institution <input type="checkbox"/> Regional <input checked="" type="checkbox"/> International	
WP6 Lead Organization	UC3M	
Participating Organizations	UC3M, UNS, Udelar, UCU.	
Task	T6.5 Collect questionnaires and surveys via social networks (LinkedIn, AngelList). T6.6 Monitor student enrolment statistics in the region. T6.7 Establish a monitoring system for employment statistics of graduates. T6.8 Establish a monitoring system for entrepreneur attitude and newcos (by means of surveys, databases, etc.).	

Revision History				
Version	Date	Author(s)	Organization(s)	Brief description of change
1	23.02.2023	Nicole Imbert	UCU	Initial draft.
2	03.03.2023	Rosina Deboli	UdelaR	Draft chapter 3.
3	05.06.2023	Nicole Imbert	UCU	Final revision 1
4	06.06.2023	Ana García Armada	UC3M	Final revision 2

Table of Contents

1. Introduction	6
2. Objectives	6
3. Proposed Surveys and Data Analysis	6
3.1. Questionnaire 1	6
3.2. Questionnaire 2	8
3.3. Questionnaire 3	8
3.4. Questionnaire 4	9
4. Conclusions	9
6. References	10

1. Introduction

In the following deliverable, **D6.5** "Report on tools for monitoring students enrolment and employability/employment/entrepreneurial statistics of graduates", the mechanisms used to monitor the quality of the project in terms of students' and graduates' activities will be displayed. Afterwards, the collected information will be analyzed. This report is part of the work in the **WP6**: "Quality Control and Monitoring", which is led by UC3M. The tasks to be accomplished are listed below.

- **T6.5** Collect questionnaires and surveys via social networks (LinkedIn, Angellist).
- **T6.6** Monitor student enrolment statistics in the region.
- **T6.7** Establish a monitoring system for employment statistics of graduates.
- **T6.8** Establish a monitoring system for entrepreneur attitude and newcos (by means of surveys, databases, etc.).

The authors and contributors of the report are all the leaders of the tasks listed before: Universidad Católica del Uruguay (UCU), Universidad de la República (UdelaR) and Universidad Carlos III de Madrid (UC3M).

2. Objectives

The purpose of quality control and monitoring (QCM) is to ensure the recollection of data and evaluation of the project's activity progress. The assessment will focus on the following items:

- New courses offered, improved teaching and lab facilities.
- Training of teaching staff.
- Student feedback.
- Achievement of objectives.
- Impact of the project at the single universities and at regional/national level.

The external assessment members will be asked to verify the content of the QCM reports, and to give recommendations on areas that could be further developed and improved. Indicators will consider report analyses, surveys, and questionnaires.

3. Proposed Surveys and Data Analysis

The surveys will be conducted online and distributed through various channels to reach the target audience:

- LinkedIn
- Angellist
- Email threads of institutional addresses.

● 3.1. Questionnaire 1

The aim of this survey is to evaluate the needs of graduates about Internet of Things (IoT) based on their experiences in the industry. For this purpose, an in-depth analysis of the abilities and knowledge that graduates acquired during their studies on the topic was conducted.

Initially, the participants will be requested to provide details concerning their academic background. Subsequently, they will be required to describe their present professional engagements, and specifically, whether they have been involved in any activities related to the Internet of Things (IoT). In such instances, the respondents will be requested to assess their competencies in IoT before taking the said activities, and also, subsequent to having gained experience.

The participants will indicate whether their university provided them with knowledge about IoT and in which academic degree it occurred. Finally, they will be requested to indicate their willingness to work in the field of IoT, and whether they are inclined to further enhance their IoT competencies through the pursuit of relevant courses.

In this questionnaire, 75 individuals responded, with most stating they hold a degree in electrical engineering. Of the participants, 44% reported having experience in the IoT industry and were requested to evaluate their competencies for designing and implementing IoT projects when they started working in the area. The results of this evaluation are displayed in the image below.

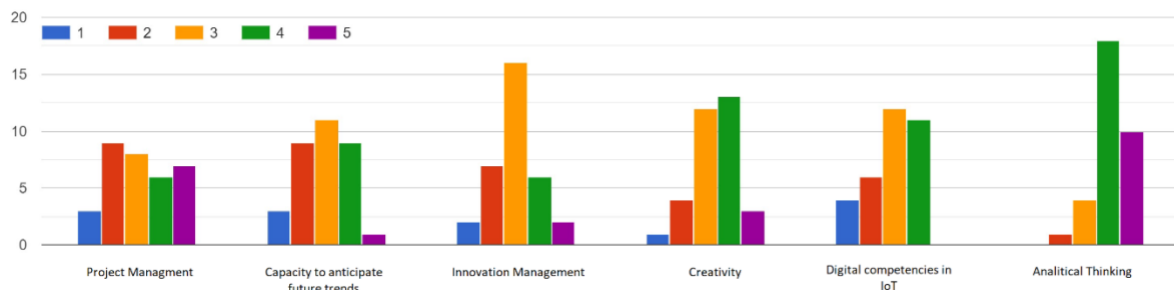


Figure 3.2.1. Results to the question “Rate from 1 to 5 how developed were the following competencies for designing and implementing IoT projects, when you started working in the area (1 - lack of ability, 5 - highly developed)”.

It is noticeable that the skills of analytical thinking and creativity are the most highly developed, which may be attributed to the fact that these abilities are not specific to IoT and are necessary for designing and executing all types of projects to efficiently develop solutions for problems. Furthermore, a majority of the respondents reported having an average level of ability in the areas of digital competencies in IoT, innovation management, and the capacity to anticipate future trends. However, regarding project management skills, a greater number of participants indicated a lack of ability in this area before their involvement in the IoT industry.

After that, they were asked about the areas in which they needed to enhance their skills in IoT. The options presented to them were:

- Hardware.
- Operative systems for embedded systems.
- Communication, network and protocols.
- Mobile computing.
- Distributed architecture.
- Data analysis.
- Security.
- Power management.

Overall, the results showed that every topic is a must to develop IoT competencies, but certain topics were highlighted as more crucial for the participants. These included security, distributed architecture,

operating systems for embedded systems, data analysis, as well as communication, networks, and protocols. Additionally, respondents were free to declare in which specific areas they lacked capacities, and the most repeated topics were the development of new technologies applying security practices, training in technologies (such as LTE-M, LoRa or 5G), communication protocols for IoT, software development and data management.

Afterward, all of the participants were asked whether their academic studies provided them with practical knowledge of IoT and if so, to what extent. About 33.3% of the graduates claimed that they had acquired the necessary skills in this area during their bachelor's degree. They specified that they received fundamental knowledge in the field of electronics, communication protocols and technologies related to IoT.

Finally, 83,3% showed interest in working in the IoT industry and enhancing their IoT competencies through the pursuit of certain courses.

The survey is available on the following link: <https://forms.gle/VvRpJgBTZfhdTJKXA>

3.2. Questionnaire 2

In this case, the objective is to assess the characteristics of professionals who have completed academic programs related to IoT. It is specifically designed to gather information about the skills and knowledge acquired during their studies, as well as the technical requirements of the current job market. As in Questionnaire 1, the participants will be requested to provide details concerning their academic and professional backgrounds. Moreover, they will be prompted to identify their areas of strength in IoT competencies for designing and implementing IoT projects, as well as the IoT domains they consider essential for their professional activities.

Subsequently, the focus of the survey will shift to IoT courses. Participants will be asked to share their opinions on whether their college provided them with sufficient practical skills in IoT topics, and whether they had the opportunity to work on IoT projects or courses related to a specific industry area (such as agro-industry, medical industry, smart grids, etc) during their academic program. Lastly, they will be requested to indicate the essential topics that, in their opinion, should be covered in an IoT course, and whether they are interested in further enhancing their IoT competencies by pursuing additional relevant courses.

The expected month of dissemination is June.

The survey is available on the following link: <https://forms.gle/JcuGQgiNdgXe9NnL8>

3.3. Questionnaire 3

This survey is aimed at employers. It was designed to assess the needs of companies related to IoT in the industry, specifically the needs that are required in this area.

It is specifically designed to gather information about the skills and knowledge regarding IoT that are required in the industry. This questionnaire is similar to Questionnaire 2, with the difference that this one is focused more on the company itself rather than on employees. As in Questionnaire 2, the participants will be requested to provide details concerning their academic and professional backgrounds. Moreover, they will be prompted to identify the company's areas of strength in IoT competencies for designing and implementing IoT projects, as well as the IoT domains they consider essential for their company activities.

Subsequently, the focus of the survey will shift to IoT courses. Participants will be asked to share their opinions on whether the company employees have sufficient practical skills in IoT topics, and whether they had the opportunity to work on IoT projects or courses related to a specific industry area (such as agro-industry, medical industry, smart grids, etc) in the company. Lastly, they will be requested to indicate the essential topics that should be covered in an IoT course, and whether they are interested in further enhancing employees' IoT competencies by pursuing additional relevant courses.

The expected month of dissemination is June.

The survey is available on the following link: <https://forms.gle/GcGdGFYsBysd4Ec88>

3.4. Questionnaire 4

The intention of this questionnaire is to solicit feedback from students regarding a specific course. Participants will be asked to evaluate various aspects of the course, including its organization, teaching staff, materials, their expectations, and perspective of the course. Additionally, respondents will be prompted to identify the IoT topics covered in the course. The given topics are listed below:

- Hardware.
- Operative systems for embedded systems.
- Communication, network and protocols.
- Mobile computing.
- Distributed architecture.
- Data analysis.
- Security.
- Power management.

The survey will conclude with an open-ended section for participants to provide further comments and feedback on their overall evaluation of the course.

An example of this survey is available on the following: <https://forms.gle/EyurHFPUHzmuHXJ58>

4. Conclusions

These questionnaires have been designed to assess the needs of the industry regarding IoT from all possible points of view, whether from the needs of graduates, employees or employers. Some of the questionnaires have already been implemented and others will be implemented by June 2023. Then, an analysis of the results will be implemented as here reported for Questionnaire 1.

6. References

- [1] NEON project proposal, 2020.