

Improvement of Environmental Noise Management Skills on Audits: initial results achieved in the frame of the Erasmus+ Project on Noise Training

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ABSTRACT

Environmental noise has been increasing day by day and this leads to serious health problems. European Union Environment Action Programme committed to decrease noise pollution, moving closer to levels recommended by World Health Organization by 2020. One of the key legislative instruments for achieving this is Environmental Noise Directive (END). European Commission Report on Evaluation of END published in 2016 highlighted the variances across Europe in terms of implementation of national strategies for environmental noise management (ENM). These variances in terms of practice and approaches to training bring the need for greater knowledge and practice exchange with using innovative developments. This is the primary focus of “Noise Training Project (NTP) ” financed by EC under Erasmus+ Program. The main objective of NTP is to promote vocational skills of technical and administrative staff working on ENM. Within the project’s

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scope, a survey was performed to analyse staff's perception regarding their training needs and training courses they have previously attended to. In this extent, a new curriculum focusing on environmental noise will be developed. The comparative analysis on ENM applications between project partner countries will also be introduced. In this article, the main structure of the project, its objectives and progresses are presented.

Keywords: Environmental noise, training, qualifications
I-INCE Classification of Subject Number: 07

1. INTRODUCTION

The World Health Organization (WHO) has identified environmental noise pollution as the second most hazard environmental type of pollution after air pollution, especially in densely populated urban areas [1, 2]. This is further substantiated by a report from the European Environment Agency (Noise in Europe 2014, EEA Report No 10/2014), stating that exposure to excessive noise results in 8 million European Union (EU) citizens suffering from sleep disturbance, over 900 000 cases of hypertension and at least 43 000 hospitalisations per year, causing – at least – 10.000 premature deaths in Europe per year [3]. Moreover, EU Environment Action Programme to 2020, 'Living well, within the limits of our planet', committed to significantly decrease noise pollution in the Union, moving closer to levels recommended by the WHO, by 2020 [4].

One key legislative instruments for achieving this aim is the Environmental Noise Directive (END), relating to the assessment and management of environmental noise [5]. The European Commission's Report on the Refit Evaluation of END, published at the end of 2016, highlighted the differences across Europe in terms of implementation of national strategies for environmental noise management, and, with that, there is inevitably considerable variance in the quality of "lived experience" of the public administrations who are responsible of the application of this Directive [6]. Therefore, European variances in terms of noise management practice and in approaches to the training is such that there is need for greater knowledge and practice exchange with using the innovative developments with cooperation transnationally so that our collective practice is enhanced. This is the primary focus of Noise Training Project (NTP) financed by EC under Erasmus+ Program Strategic Partnership Projects on Vocational Training. The partners of this project are Antalya Provincial Directorate of Environment and Urbanization from Turkey, Universidad Politécnica de Madrid from Spain, University of Florence and Vie. En. Ro. se Ingegneria Srl from Italy.

NTP aims to help the improvement of the skills and practices of staff working on environmental noise management using innovative methods through the well-developed project partners on these issues. Moreover, it is aimed to develop sharing of good practices on noise management in audits between European countries, since they are a essential instrument to improve the acoustic quality of urban environments. The main outputs of the project will be a common curriculum on environmental noise and the handbooks on legal, technical and communicative aspects of environmental noise management.

The main activities in the project are aimed at the delivering of intellectual outputs, the organization of multiplier events and the implementation of learning-training activities and deliverables in the form of curriculum development content and delivery methodologies. The methodology to be applied to carry out the above-mentioned activities consists in the following main points:

- Development of curriculum concerning the main legislative, communicative and technical aspects related to the environmental noise management field;
- Development of digital aids and material for blended learning on noise;
- Trialling of developed curricula and tools by focus groups from each Country involved in the Project;
- Materials updating, trialling and optimization, with the help of external experts.

This paper mainly focuses on the process to develop the curriculum. Therefore, firstly the requirements for acoustic experts and technicians in three project partner countries are compared and the results on training need analysis is briefly presented. At the final part, the need for the harmonized curriculum is explained and its initial draft basis described.

2. COMPARATIVE ANALYSIS OF THE REQUIREMENTS FOR ACOUSTIC EXPERTS AND TECHNICIANS

2.1. In Italy

In Italy, according to the national law n. 447/1995 transposing the EU Directive 2002/49 as modified by the Legislative Decree 42/2017, Profession of acoustician can be practiced only after registering in the professional register of “Technicians expert on acoustics”, actually managed by the Ministry of Environment. Those with a technical or scientific bachelor’s or master’s degree and at least one of the following requirements can enter in this register:

1. having successfully passed the final examination of a University Master with at least 12 credits on acoustics, including at least 3 for acoustic laboratory activities;
2. having successfully passed the final examination of a specific course on acoustics for “Technician expert on acoustics”;
3. have obtained at least 12 university credits on acoustics, including at least 3 for acoustic laboratory activities;
4. have obtained the title of PhD, with a doctoral thesis on environmental acoustics.

Those who possess requisites, which can be assessed as equivalent, acquired in another Member State of the European Union, can be enrolled in the same name list.

Regarding the above mentioned course for “technician expert on acoustics”, only those with a technical degree (engineering, architecture, etc.) can access this course, which has to be taught by universities, institutes or research institutes, registers, colleges and professional orders. For the purposes of the recognition of the qualification as a technician expert on acoustics, the course must respect the following requirements: a) the duration of the course can not be less than 180 hours, of which at least 60 of practical exercises; b) the courses are recognized by the Region in which they are organized and are valid throughout the Country; c) the minimum contents of the course must correspond to those indicated in the following list: fundamentals of acoustics, sound propagation and room acoustics, procedures for noise measurements, regulations, road traffic noise, aircraft and harbor noise, European Union regulation, building acoustics, criteria for planning, mitigation and control of noise emissions, noise and vibration in working places, legal acoustics,

training on the use of sound level meters and relative software, training on the use of building acoustics software, training on the use of noise propagation software.

With reference to the Professional update, every 5 years the technician must participate in refresher courses of at least 30 hours, spread over at least 3 years. The suitability of the educational qualifications and professional requisites is verified by the Regions.

2.2. In Spain

There is no regulated profession addressing acoustics in Spain, and therefore, there is not any regulated education or training, nor specific training requirements for carrying out work related to the management or measurement of environmental noise in Spain.

The general requirement is established at state level by a Royal Decree that develops the Spanish law on environmental noise regarding the acoustic zoning, quality targets and acoustic emissions. This law states that, in order to ensure that the results obtained in the noise assessment processes are homogeneous and comparable, the competent authorities shall ensure that the bodies responsible for carrying out such assessments have adequate technical capacity. They shall also ensure the implementation of control systems to ensure the correct application of the evaluation methods and procedures established in this royal decree for the performance of acoustic evaluations.

Each autonomous region has the competences to define how to implement this general purpose requirement, although not all of them have decided to define specific criteria. For instance, Andalucía defines “competent technical staff” as a person who has academic qualifications or sufficient professional experience to carry out acoustic studies and tests, as well as to issue certificates of compliance with quality standards and noise prevention. It is considered as professional experience working in the field of noise pollution for more than five years and having carried out a minimum of twenty studies and tests. Acoustic measurements may be carried out by competent technical personnel, provided that they are carried out within the framework of a quality assurance system in accordance with the standard UNE-EN ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. Although it is not essential that the laboratories that perform measurements are accredited by the National Accreditation Body (ENAC), the requirements they must meet are fundamentally the same. The management requirements are very similar to those indicated in the UNE-EN ISO 9001:2008 standard (document control system, from offers to reports, supplier evaluation, periodic audits, and establishing policies of continuous improvement). Technical requirements, in addition to those related to testing methods, equipment, sampling and data analysis and data quality assurance, include training requirements for personnel. The laboratory must have trained and experienced personnel who are properly supervised during their qualification and who must be retrained to maintain it. Nevertheless, the training criteria do not explicitly mention any type of academic level or qualifications, nor do they refer to specific training courses or contents. The training requirements are defined by each laboratory and are evaluated by a technical auditor.

In other regions, similar requirements are established for bodies responsible for noise measurements. In Valencia or Castilla y León, ENAC is the approved accreditation body, while in Catalonia, there is a specific body in charge of accreditation. Besides these regulatory requirements, or the lack of any in several regions, the National Institute of Qualifications officially defined in 2010 a qualification named “Control of noise, vibrations and acoustic insulation”, the main characteristics of which are defined below:

- It lies with the professional branch of Safety and Environment. The level associated to this qualification within the scope of the European Qualification Framework (EQF) is 5, which is related to a Higher non-universitary studies
- It is defined on the basis of three different skill units:
 1. UC1617_3: Perform first level maintenance of acoustic measurement instruments, and participate in the planning of the tests. This a basic skill unit for the qualification of a technical assistant that will be in charge of the preparation and maintenance of instruments, and basic data collection;
 2. UC1618_3: Carry out preliminary operations and data collection of noise and vibrations, collaborating with in the production of reports and noise maps. This skill unit is closely related to the execution of environmental noise measurements;
 3. UC1619_3: To carry out the previous operations and data collection for the determination of the acoustic isolation, collaborating in the accomplishment of predictive studies of acoustic insulation. This skill unit is closely related to the execution of building acoustics measurements.
- Absolutely linked to the skill units of the previous point, three training modules are defined: a) Module 1 (60 hours). Planning and maintenance of acoustic instruments; b) Module 2 (150 hours). Noise and vibration tests and reports; c) Module 3 (150 hours). Acoustic insulation tests and reports

2.3. In Turkey

In Turkey, the requirements for the acoustic experts and technicians depend on the type of study to be carried out in the scope of National Regulation on Assessment of Environmental Noise and Management (RAMEN) which was driven into force firstly in 2005 harmonized with the END. The main works consists of preparing strategic noise maps, strategic action plans, environmental noise measurements for preparing the acoustic reports for industrial plants or environmental noise level assessment reports for the facilities, enterprises or entertainment places etc. Depending on the type of work to be conducted, the staff must attend the corresponding course [7]. They should take the standardized training course given by the institution which has implemented the protocol defined by the Ministry of Environment and Urbanization. There are mainly 6 different certificate/training programs as listed below;

- A1: Introduction to Acoustics and Field Measurements (max. 15 hours)
- A2: Engineering Acoustics (includes noise measurements and preparation of noise assessment reports) (max. 30 hours)
- B1: Noise Report and Noise Mapping for Industrial Plants (max. 36 hours)
- B2: Traffic Noise Mapping and Reporting (max 30 hours)
- C1: Building Acoustics (max. 30 hours)
- C2: Noise Action Planning (max. 40 hours)

The national regulation identifies the requirements for the experts who will give those training courses on certificate programs. In this extent, university lecturers who have conducted theoretical or practical work and those who have completed post graduate and doctoral programmes in topics of expertise announced by the Ministry shall be considered to have the level of expertise to conduct the works specified under this regulation.

Those who will prepare the acoustic reports which includes both noise measurement and noise mapping for the plants under the Regulation on Environmental Permits and Licences shall be graduates of engineering, architecture and science faculties of universities. In addition to this, they should have the level of expertise to conduct these works. Technical staff should have certificate of A2, B1 or B2. The laboratories shall be accredited under ISO 17025 and shall have pre-qualification/competency certificate to be obtained from the Ministry according to measurement and calculation standards specified for the businesses as TS ISO 9613-2, TS ISO 8297, TS EN ISO 3744, TS EN ISO 3746, TS ISO 1996-2 and TS 9315 (ISO 1996-1).

Those who will prepare environmental noise level assessment reports for businesses and installations, factories, facilities, enterprises, entertainment venues, etc. not included in under the Regulation on Environmental Permits and Licences shall be graduates of engineering, architecture and science faculties of universities. Moreover, they shall have the level of expertise to conduct these works. Technical staff should have certificate of A1 if they only perform noise measurement, but in order to elaborate reports they must have, at least, A2 certificate. The laboratory carrying on these shall have pre-qualification/competency certificate to be obtained from the Ministry according to measurement standards specified for the businesses as TS ISO 1996-2 and TS 9315 (ISO 1996-1).

Those who will prepare the noise maps and action plans shall be graduates of engineering, architecture and science faculties of universities, preferably who have participated in preparation of noise maps in international projects and similar works and they should have certificate of B1 to prepare noise map for industrial plants and B2 to prepare noise maps for transportation sources. Having A2 certificate is prerequisite for participating the B1/B2 training programs. For preparing action plans, they should have C2 certificate and preferable who have made application projects isolation, traffic planning and noise barriers. Having A2 and B1 or B2 certificate is prerequisite for participating C2 certificate training program.

In both Italy and Turkey the acoustics expert (acoustician) is a regulated profession and therefore training requirements are established for the personnel who practice acoustics. While in Italy the level of training has a general character for practicing the profession in any field of acoustics, in Turkey the requirements are adapted to the specific functions to be performed by the technician, so different certificates of competence are established. For its part, in Spain this profession is not regulated, so there are no training requirements to exercise it.

3. TRAINING NEED ANALYSIS

Together with the experience of the professionals and academics that make up the consortium, it was considered necessary to obtain an external point of view, from those who from the different areas of the administration, or working in consultancies or laboratories carry out work related to the measurement and management of environmental noise. Therefore, a questionnaire was developed to determine the training

need for vocational skills on environmental noise management applications on legal, technical and communicative basis and to determine the main problems faced with during the audits. It is delivered to related authorities in each project partner country as Turkey, Italy and Spain. The results of the questionnaire developed under the Noise Training Project give the important findings and clues to improve the vocational skills of staff working on environmental noise management applications and to provide the information at which points to be met for the training needs. The summary results are given below for each project partner Countries.

3.1. In Italy

First of all, since the most of the respondents (65,8% of them) are from Municipalities, and they do not actually make the measurements, but only require to other institutions (the environmental protection agencies) to carry out them. Most of the respondents considered that the courses contributed positively to their professional career and agree with the duration and the content of the course. This is in line with the fact that 70% of the respondents considered that they have sufficient knowledge on legislative aspects on environmental noise control. However, it is necessary to consider that these data have been provided by personnel who do not carry out measurements and do not produce technical reports but only verify them.

The most common problems outlined by respondents concern the management of outdoor temporary activities, in particular, there are difficulties in organizing environmental noise controls in a short period of time and the lack of instrumentation and processing software is also highlighted. There is consensus among respondents about the importance of raising awareness of the noise problem among policy makers, about the necessity of establishing a continuous noise monitoring system and about managing quiet areas in agglomerations [8].

As a general remark to improve the quality of representativeness of the findings, it would be interesting to convey the questionnaire also to environmental protection agencies that really make the noise audits.

3.2. In Spain

In Spain the questionnaire was distributed through the network of contacts and social networks of the Research Group I2A2 of the UPM, and with the support of the Spanish Society of Acoustics. Thanks to the collaboration maintained with some members of different city councils, the online survey had some diffusion in their departments of environment. However, it did not have the support of the police forces that regularly carry out acoustic inspections, so it was not possible to gather in the study the opinion of this type of personnel in relation to their level of training and their needs.

Although the average time required to complete the survey was only 7 minutes, many of those who initiated the survey drop out after a few questions and only 36 people made it to the end. Even so, the results allow us to obtain an overview of some of the technical and training problems faced by environmental acoustics professionals in Spain. Most of the participants in the survey were part of acoustic laboratories or consultancy firms specialized in the field. Probably related to this is that almost all (97%) have a university education, and more than 5 years experience in the field of environmental acoustics (70%).

Most of the participants have taken at least one course about environmental noise management or measurement. With more than 46% of them taking the course from

external institutions, and more than 30% during their university education. 67% agree with the duration and the content of the courses, and 90% believe that those courses contributed positively to their existing work.

Most of the respondents considered that the courses contributed positively to their professional career and agree with the duration and the content of the course. According to the contents, it seems that the courses address more frequently basic concepts in acoustics, while those aspects related to environmental noise directive are not so common among the courses. Only a few of the courses included aspects such as diffraction, fft analysis, aircraft noise assessment, noise monitoring or measurement uncertainty.

Regarding noise audits, the participants declared that those related to entertainment premises are the most frequent. An open question was asked about the 5 main problems the respondent use to face during a noise audit. We have grouped those problems into 9 categories, from which the more frequent are related to Background Noise, International Standard issues, and detection of Noise Stages:

- Regarding Background noise, respondents pointed that the high residual noise level and its variability during the measurement was the most problematic. They also have issues when the residual noise level is similar to the noise source level and again the solution they offer is to measure in a quieter period.
- With regard to the problems with international standards and laws, they have problems to follow all the requirements of the standards, so they have to interpret the requirement in certain way.
- They have reported problems to identify noise phases in long-term monitoring.

3.3. In Turkey

In Turkey, the questionnaire was delivered to provinces, municipalities and laboratories and it was performed online on June of 2018.

Totally, 225 staff responded this questionnaire. Most of the respondents (70% of them) were from Provincial Directorates of Environment and Urbanization and 18% of them from municipalities and 7.8% of them from laboratories working on directly noise measurements and audits. More than 50% of them have 1-5 years' experience and 40% more than ten years. About 29% of them carry out an acoustic measurement at least once a week, 29.5% of them conduct between one and five audits per month. When considering the noise sources to be audited, it is seen that the noise audits are mainly related with recreational activities (78% of respondents stated), workplaces/factories (stated by 64% of respondents) and air conditioners and ventilation system mostly coming from the big shopping centres and markets were selected in third place (51.1% of the participants).

The most reported problem (15% of the respondents) concerns the negative attitude towards the technical staff during the audits and noise measurements (on both sides, the facility owners and the complainers). The secondly most encountered problem is the legislative procedures for workplace operating licence given by the Municipality because the regulation on operating licence does not include strict limitations to prevent the recreational places locating near or adjacent to residential buildings. The third problems stated by 10.6% of the respondents is the deficiency in staff's knowledge on noise measurements and standards due to deficient training courses mostly based on the theoretical information. The solutions for the problems encountered is given as follows; conducting noise audits by Municipality and give authority them by law is mostly stated

solution by 20% of the respondents. This is followed by increasing the regular training for staff on environmental noise (based on in situ practice rather than theoretical) stated by 18.7% of the respondents and not to give music allowance to the premises near the residential areas is mostly stated one in the third rate by 13.3% of the respondents.

Over 30% of respondents reported that they agree with the duration and the content of the course. Moreover, 40% of them feel the courses on environmental noise management contributed positively to their professional career. In legislative basis; most of respondents (64%) consider that they have sufficient knowledge on legislative aspects on environmental noise control, but having lower knowledge on the international standards in this field (25%). Moreover, most of the respondents (78%) agree that environmental noise audits conducted by municipalities which are already authority to give work permission license would be more effective. In technical basis; 65% of the respondents considered that they need training on basic knowledge acoustic concepts. Moreover, 50% of respondents considered that they have difficulty in computations of tonality/impulse/low frequency during the preparation of noise assessment reports. In communicative basis, 39% of respondents admit to have difficulty on communication with the people having noise complaint and with person responsible for the noise source.

There is wide consensus on the importance of raising awareness of the noise problem among policy makers (92% of the participants). Regarding the effectiveness of continuous noise monitoring system to control the noise, the 78.5% of technicians believe that it could improve the processes. 90,8% of respondents consider that the design and implementation of quiet areas would be effective for the management of environmental noise.

In general, we can say that the participants in the study consider that the courses they have received have contributed positively to their professional development in the field of acoustics. It is also considered that the duration of the courses is adequate, however, in many cases a longer duration of the practical part is suggested as opposed to the duration of the theoretical classes. There is also considerable consensus on the need to improve the awareness of citizens and policy makers in order to make the fight against noise more effective.

4. CURRICULUM PROPOSAL

As a result of a detailed analysis of the situation in the three countries, and also considering some existing schemes in other European countries, the project is working on the development of a common curriculum that can serve as a basis for international professional recognition in relation to the execution of measurements and environmental noise management. The NTP project partners have identified 3 interrelated professional profiles that require different levels of training in order to perform different types of tasks, all of which are necessary in noise management:

- **Environmental Noise Measurement Technician (Technician):** Their main work is done in the field, performing in situ measurements and collecting other field data, related to the execution of noise inspections, simulations, noise maps. It must have sufficient autonomy to be able to produce reports that comply with regulatory requirements. Its functions include the handling of measuring instruments and the application of technical procedures that are applicable in each case. Their work must be coordinated and controlled by a worker with a higher level of qualification.
- **Environmental Noise Engineer (Engineer):** They will be the maximum

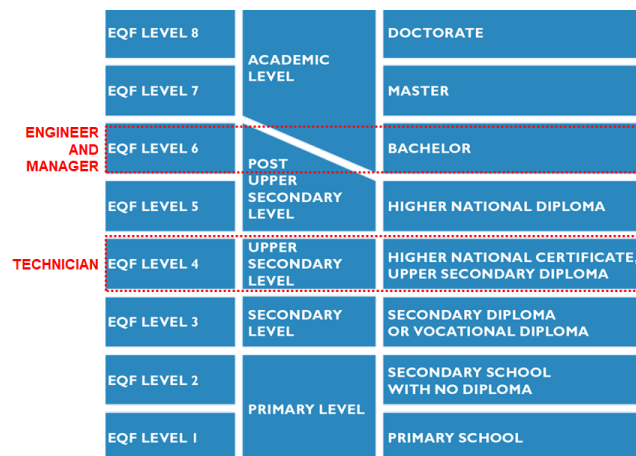
responsible for the technical work, performing an interface function between the different parties involved in noise management (competent authority, acoustic emitters and potential receivers). Their work, together with that of the technicians under their control, must allow them to support the evaluation and inspection of noisy activities, the preparation of noise maps and action plans, or the implementation of specific actions to mitigate noise levels. They must provide support to environmental managers or local authorities to define and/or put in place the acoustic part of urban planning, including the definition of objectives, strategies, etc. They will also act as forensic assistants to judges in legal disputes regarding noise. This qualification includes the basic knowledge and skills also necessary for Technicians, but they will have the highest level skills on theoretical and practical aspects, and a deep knowledge of the regulation involved.

- **Environmental Noise Manager (Manager):** This is the technical staff closest to the policy makers of a municipality or the top management of a company. In general, these personnel will manage functions of a wider scope than the management of environmental noise, but, in what derives from this field, they must have basic theoretical and practical knowledge of general acoustics, and advanced knowledge of the applicable regulation, as well as of the concepts whose management must be carried out. This knowledge and technical skills will allow them to identify the needs of the municipality or company in the field of acoustics that should be shared with the other departments in order to make a correct definition of the tasks to be implemented. In addition, their capacities will allow them to follow up and monitor the work presented to them by third parties, as well as checking its quality and adequacy.

Given the objectives pursued, it is especially important to take into consideration the existing regulatory framework in the European Union: Directives 2005/36/EC on the recognition of professional qualifications [9] defines the basis for the rules that allow professionals to work in another EU country, including several definitions a) regulated professions, b) professional qualifications, c) evidence of formal qualifications, and d) regulated education and training.

The European Qualifications Framework (EQF) is a common European reference framework whose purpose is to make qualifications more readable and understandable across different countries and systems. This is important to support cross-border mobility of learners and workers and lifelong learning across Europe. 39 European Countries currently involved in its implementation [10]. Turkey is committed to providing the Turkish Qualifications Framework, harmonized with the European Qualification Framework [11]. We have established the relationship between the 3 professional profiles and the levels of qualification required for each of them, according to the scale defined in the EQF. This relationship defines the academic level required and also allows describing the training requirements and skills to be developed, accordingly.

Figure 1: Foreseen integration with the EQF



Level	Knowledge	Skills	Responsibility and autonomy
	In the context of EQF, knowledge is described as theoretical and/or factual.	In the context of EQF, skills are described as cognitive (involving the use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments).	In the context of the EQF responsibility and autonomy is described as the ability of the learner to apply knowledge and skills autonomously and with responsibility
Level 4	Factual and theoretical knowledge in broad contexts within a field of work or study	a range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	exercise self-management within the guidelines of work or study contexts that are usually predictable, but are subject to change; supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities
Level 6	Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study	manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts; take responsibility for managing professional development of individuals and groups

Currently, the requirements established by regulation in Turkey or Italy, as well as in other European Countries, cover, in different ways, the professional profiles equivalent to what NTP refers to as technician and engineer. However, we have not found any international reference on the existence of a professional qualification equivalent to the NTP manager, being one of the main contributions proposed by the project. Together with the definition of the three professional categories, the project aims to define a curriculum that allows the complete definition of the education required to acquire each of the three levels of qualification corresponding to these categories, each of which will consist of :

- A list of competence units,
- A definition of competence units, each of them will define a set of competencies, skills and responsibilities,
- Training modules, for each competence unit. The contents to be taught will be defined, as well as the number of hours taught in practical and theoretical contents. Each training module will specify the necessary entry requirements and the appropriate evaluation methods for both practical and theoretical teaching.

The consortium has already drafted a first version of the curriculum, contemplating the number of class hours presented in the following table:

Professional profile	Practice hours	Theory hours	Total hours
Technician	32	36	68
Engineer	60	126	186
Manager	8	92	100

In brief, this draft will be submitted for consultation to stakeholders from different fields, both academic and professional, as well as from different countries, especially Italy, Turkey and Spain. Feedback from these external collaborators will be extremely valuable in strengthening the curriculum, and will allow progress to be made in some particularly sensitive areas, such as the definition of practical cases for student assessment.

5. ACKNOWLEDGEMENTS

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