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**strENgtHening skills and training expertise for TunisiAN
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D3.4 Training reports of quality expert teams

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1. ENHANCE: project overview

ENHANCE – strENgtHening skills and training expertise for TunisiAN and MorocCan transition to industry 4.0 Era – is an Erasmus Plus project founded under the KA2 Cooperation for innovation and the exchange of good practices (Capacity Building in the field of Higher Education) programme by the European Commission under Grant Agreement N° 619130, to be conducted in the period January 2021 until January 2024. It engages 7 partners from 5 countries with a total budget of 779k€. Further information can be found at <http://eplus-enhance.eu/>.

The emergence of industry 4.0 concepts and applications brings new paradigms impacting all the industrial business domains when they need to conduct successful digital transformations or increase workshops connectivity. The evolution of Maintenance, Production and Quality Engineering (MPQ 4.0) represents the main application domains where Industry 4.0 produces effective beneficial results.

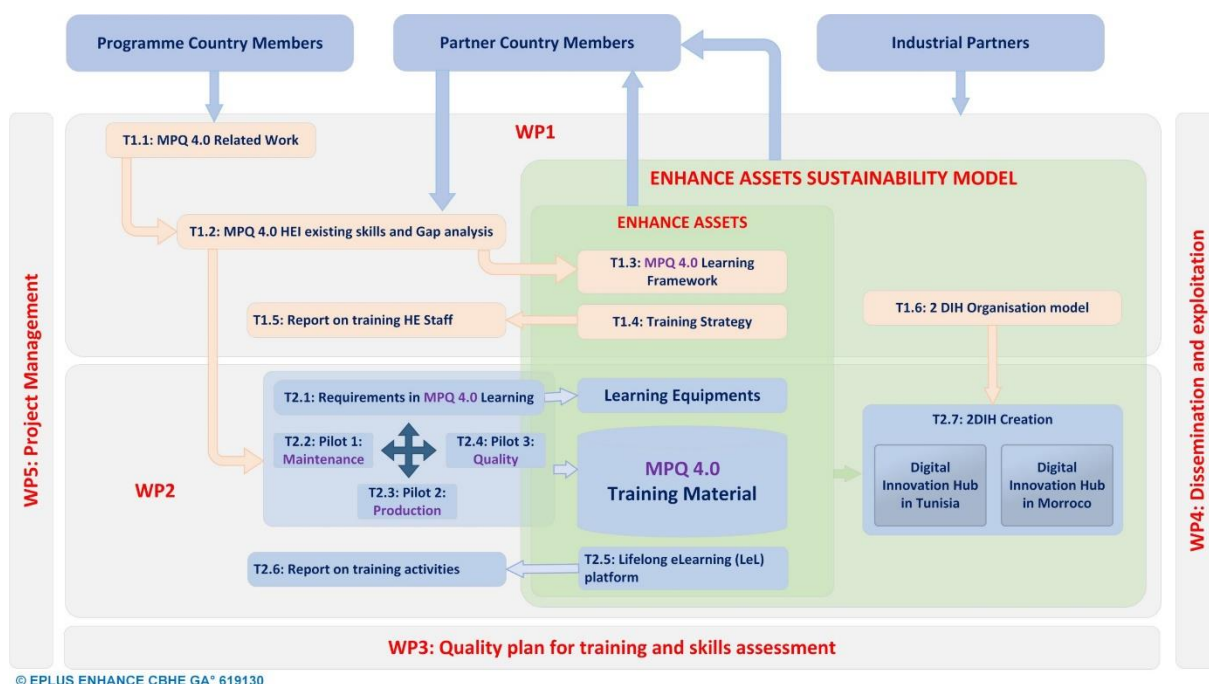


Figure 1. ENHANCE project organization.

The ENHANCE project focuses on building new MPQ training capacities at Higher Education Institutions (HEI) in Tunisia and Morocco to establish interactions between the following stakeholders:

- European universities and research institutions (from France, Germany and Portugal) confirmed MPQ 4.0 competencies, training materials, collaborative research projects, full operational Digital Innovation Hubs (DIH), technology transfer experiences, etc.
- Partner country universities (from Tunisia and Morocco) with teaching and training activities in MPQ and existing connections with their local industrial partners.

The ENHANCE project will create several outputs and two primary tangible outcomes:

- New MPQ 4.0 equipment and training materials developed in connection with the existing training programmes and consolidated through three industrial pilots. The new material will be used to train the trainers and the students in the different partner country universities.
- Two DIHs, one in Tunisia and one in Morocco to sustain the project outcomes through their reuse for training in industry.

ENHANCE aims to become the reference model for creating effective and sustainable training material for MPQ 4.0 in both partner countries with content approved by academia and industry.

2. Introduction

Industry 4.0 has brought a set of new technologies and practices that are disrupting traditional ways of working and value creation. In the era of Industry 4.0, companies face complex challenges due to VUCA environments, i.e., environments characterized by Volatility (e.g., variability of demand), Uncertainty (e.g., non-deterministic customer orders), Change (e.g., mass customization and variable complexity) and Ambiguity (e.g., unclear requirements and specifications). To meet these challenges, companies must improve the effectiveness and efficiency of their assets, upgrade their business processes to the latest technologies and best practices, and subsequently lead digitization and transformation projects. Therefore, companies must rely on a skilled workforce, already trained on the skills and practices required to deploy and use Industry 4.0 technologies and practices effectively and efficiently. As illustrated in [Figure 2](#), the challenge is to update the curricula and delivery capabilities of Higher Education Institutions (HEI) to be able to provide such up-to-date training to their learners. Conducting a study of skill requirements for maintenance, production, and quality (MPQ) in the era of Industry 4.0 is important because it informs job seekers and skill development institutions about what to work towards and what to expect. Technological megatrends will significantly affect the skills and competencies needed, thus forcing HEIs to develop strategies and skills and to innovate in terms of pedagogy to meet these requirements.



Figure 2. Challenges requiring new skills in Industry 4.0.

2.1. Purpose of the document

This document is developed as the deliverable of activity T3.4, which is part of Work Package WP3 (Quality plan for training and skill assessment) of the ENHANCE project. The objective of WP3 is to describe the ecosystem of quality of project pillars and components:

1. quality of project deliverables
2. quality of project intermediate outcomes
3. quality of development processes
4. quality of interaction and transfer mechanisms (from trainers to trainers, and from trainers to learners)
5. quality of monitoring, control, and continuous improvement of project activities
6. quality of communication and dissemination
7. quality of sustainability mechanisms

The specific objective of deliverable D3.4 is to focus on item number 4, to train a team of Experts to be able to manage project processes, guarantee the quality of project deliverables, and oversee the development of the three pilots in accordance with the requirements, specifications, recommendations and best practices of a quality standard. The team will also monitor the sustainability of the activities and added value through the Competence Centres (CC) and Digital Innovation Hubs (DIH) beyond the end of the project.

Therefore, Task 3.4 and its deliverable D3.4 focus on:

1. Identifying relevant quality standards for learning content, teaching pedagogies and delivery processes to be developed as part of the ENHANCE project.
2. Choosing the quality standard that is best suited to the project.
3. Certifying project team members to become Experts of the identified quality standard.
4. Providing a procedure to train the trainers on the recommendations and best practices of the selected quality standard, based on the advice and guidance of the certified Experts.
5. Providing a procedure to ensure the development of quality deliverables, outcomes, and processes, as well as the quality and sustainability of activities beyond the project.

2.2. Reference documents

This document is developed as the deliverable of activity D3.4, which is part of Work Package WP3 (Quality plan for training and skill assessment) of the ENHANCE project. Therefore, this document complements the deliverable of activity D3.1, which describes the strategic quality plan,

2.3. Applicability

This document focuses on the quality of mechanisms, behaviour and performance required from trainers to contribute to the quality of project activities, interactions, processes, outcomes, and deliverables, and to ensure the quality of interaction and transfer mechanisms (from trainers to trainers, and from trainers to learners).

2.4. Definitions

Training is teaching, or developing in oneself or others, any skills and knowledge or fitness that relate to specific useful competencies. Training has specific goals of improving one's capability, capacity, productivity and performance. It forms the core of apprenticeships and provides the backbone of content at institutes of technology (also known as technical colleges or polytechnics). In addition to the basic training required for a trade, occupation or profession, training may continue beyond initial competence to maintain, upgrade and update skills throughout working life. People within some professions and occupations may refer to this sort of training as professional development.

Train the Trainer is a model that is often used in the workplace. The trainer trains other employees and at the same time teaches them to train others. The training programme is intended for (starting) trainers, teachers, and educators to optimise and professionalise their current method.

The Training of Trainers (ToT) model is intended to engage expert trainers in coaching new trainers that are less experienced with a particular topic or skill, or with training overall. A ToT workshop can build a pool of competent instructors who can then teach the material to other people.

Certification is the provision by an independent body of written assurance (a certificate) that the product, service, or system in question meets specific requirements. It is the formal attestation or confirmation of certain characteristics of an object, person, or organization. This confirmation is often, but not always, provided by some form of external review, education, assessment, or audit.

2.5. Acronyms

CC: Competence Centre
DIH: Digital Innovation Hub
MPQ: Maintenance, Production, and Quality
LF-MPQ4.0: Learning Framework for Maintenance, Production and Quality 4.0

2.6. Structure of the document

The document is organised in 5 main sections:

Section 2: Justifying the need for quality expert team certification

Section 3: Identification of relevant standards

Section 4: Impacts of identified standards on the development of project activities

Section 5: Certification selection and deployment

Section 6: ENHANCE Training activities

3. Justifying the need for quality expert team certification

The global methodology that drives the development and the structure of the ENHANCE project is presented in Figure 3. The ENHANCE project will contribute to create valuable training assets as well as different stages of trained resources to maximise the acquisition of MPQ 4.0 concepts, skills, and technologies.



Figure 3. Presentation of the global methodology.

3.1. Motivations of trainer certification

As described in the introductory section of this document, and as illustrated in Figure 2, the challenge of the ENHANCE project is to provide up-to-date learning content to the learners, and to train them in such a way that they can meet industrial socio-technical expectations related to industry 4.0 technologies, capabilities, and best practices. Updating the curricula and delivery capabilities of Higher Education Institutions (HEI) lies at the heart of this challenge. The actors of this challenge are trainers, who are required to design, develop, deliver, and improve content to peers and to learners. The best trainers create environments that encourage innovative thinking and positive change.

To reach excellence, there is a pressing need for certified trainers, able to experience and transfer the latest methodologies and technologies for capacity-development activities. Many certification institutions argue that certification is a long-term commitment that demonstrates dedication, credibility, and level of mastering the training and competencies to stakeholders, including managers, clients (e.g., users and learners), staff members and professional peers. Certification provides clear evidence of the investment a certified resource has made in his/her Training and Talent Development career and represents a concrete milestone in the profession.

Certified trainers meet strict international standards, professional practice, and educational requirements before earning a recognized certificate or license of practice. Certified trainers are usually required to stay current in the Training and Talent Development profession, for example through recertification after a prefixed period. This requirement guarantees compliance to up-to-date state of the art knowledge, skills, technologies, and practices, which is particularly valuable in industry 4.0 VUCA and ever evolving environments.

3.2. Trainer involvement in project activities and deliverables

To be specific to the ENHANCE project, trainers participate in the design, development, deployment, delivery, transfer, evaluation and improvement of learning material, content, and evaluation. They are also asked to provide sustainability and continuous improvement evidence that go beyond the period of the project, for example through CC and DIH activities.

Figure 4 shows the organization and planning of content development till month M18 of the project.

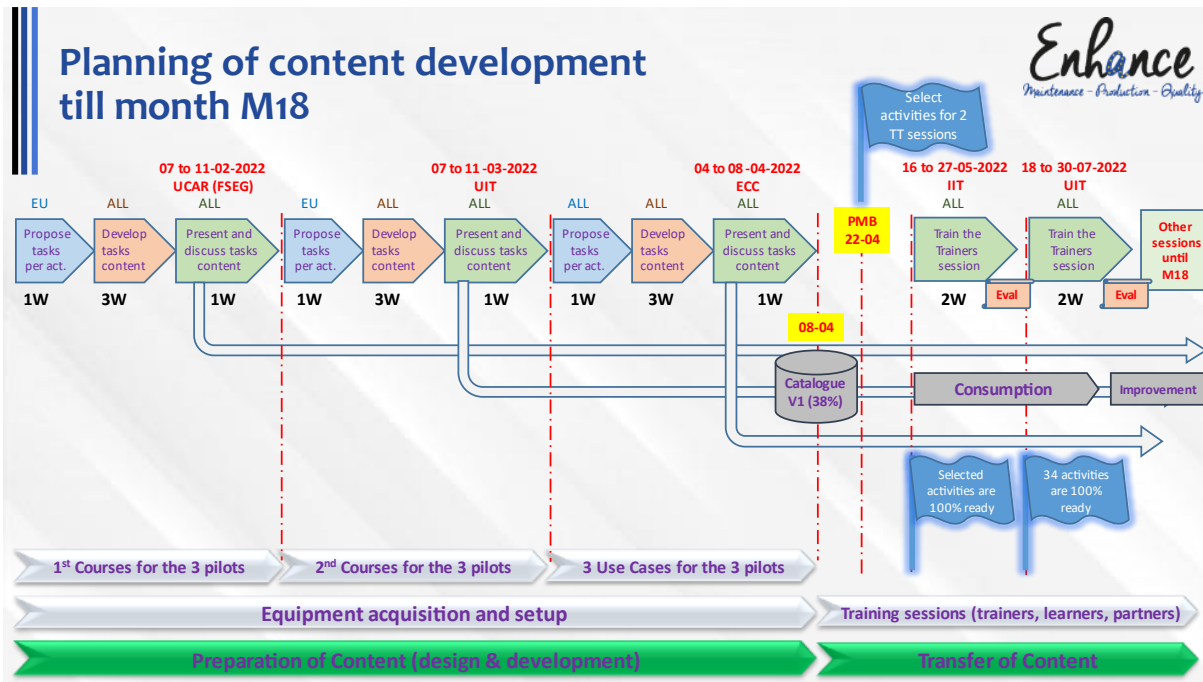


Figure 4. Planning of content development till month M18 of the project.

Trainers are the corner stone in the design of content organization and planning illustrated in Figure 4, which shows two main phases: preparation of content, and transfer of content.

The preparation of content involves two processes in parallel. The first process deals with the acquisition of material: identification of requirements, technical specifications, tendering process, supplier selection, procurement, installation, set up, start up and ramp up. This first process will ensure all necessary equipment is available by the end of content preparation, to be used in the deployment and refinement of learning content.

The second process deals with the development of the three pilots: Maintenance, Production and Quality (MPQ). Figure 5 shows a UML class diagram to represent a pilot. Each pilot includes 2 courses and 1 use case. Each course is composed of a set of activities, and each activity is composed of a set of tasks accompanied by tutorials and/or case studies. Each use case is a lab activity that uses equipment.

The transfer of content involves the conduct of training sessions. Several classes of audiences are targeted and therefore scheduled progressively in time. Train the trainer sessions are first scheduled to enable the trainers who developed the learning content to transfer it to those peers and colleagues in partner institutions who are interested in the content and impacted by it. Such sessions will enable preliminary evaluation of content and further improvement and refinement.

Then train the learner sessions are scheduled to transfer learning content to learners (students, industrial partners and other interested stakeholders, such as administrative staff).

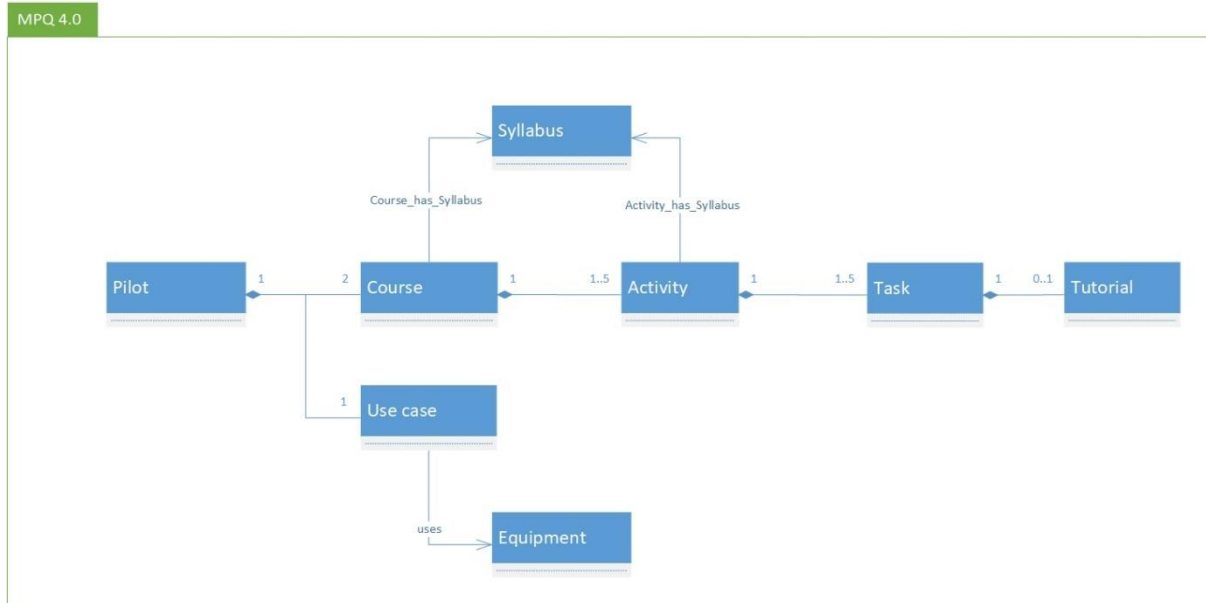


Figure 5. UML class diagram to represent a pilot.

Three reasons justify the need for quality expert team certification:

1. Trainers participate in the design, development, implementation and transfer of learning content and material (each item of Figure 5) to peers (train the trainers) and to learners (train the learners). Therefore, all activities, processes, outcomes, and deliverables need to satisfy project and stakeholder requirements. A quality certification raises awareness about stakeholder need satisfaction.
2. Trainers are at the frontline to adapt the curricula of their respective institutions to be able to include the newly developed learning content. This should be done in compliance with institutional processes, quality management and assurance systems, accreditations, and certifications. A quality certification raises awareness about compliance to institutional requirements and specifications.
3. From a sustainability perspective, trainers need to have a level of abstraction that enables them to continue the development/adaptation of learning content and material after the project time boundaries. Quality processes and deliverables need to be insured after the scheduled end of the project and need to be pursued within Competence Centres and DIH.

Consequently, there is a great advantage to have certified trainers, able to conduct project activities, processes, and interactions, and to obtain deliverables that meet recognized and proven quality standards. At least, a certification insures there is a quality mindset that guarantees satisfaction of requirements, compliance with specifications, and pursuit of excellence.

4. Identification of relevant standards

This section identifies those quality standards that are most relevant to project requirements.

4.1. ISO 9001:2015 Quality management systems

ISO 9000 (ASQ, 2022) is a family of international standards on quality management and quality assurance developed to help organizations effectively document the elements necessary to maintain an effective quality system. This family of standards is not specific to a particular industry and can be applied to organizations of any size. ISO 9000 can help an organization satisfy its customers, meet

regulatory requirements, and achieve continuous improvement. It should be considered as a first step or the basic level of a quality system.

ISO 9000 is a series, or family, of quality management standards, while ISO 9001 is a standard within the family. ISO 9001:2015 (ISO, 2022a) specifies the requirements for a quality management system when an organization:

- a) must demonstrate its ability to consistently provide products and services that meet customer requirements and applicable legislative and regulatory requirements, and
- b) aims to improve customer satisfaction through the effective application of the system, including system improvement processes and ensuring compliance with the customer and applicable legal and regulatory requirements.

All requirements of ISO 9001:2015 are generic and are intended to apply to any organization, regardless of its type or size, or the products and services it provides.

In the introduction to ISO 9001, there is an explanation of the Process Approach and how important this is to implement a Quality Management System that is compliant with the ISO 9001 requirements. In addition to this, there is a note about the methodology known as “Plan-Do-Check-Act” (PDCA) being applied to all processes. It then shows a graphic, which shows a very rough overview of how the standard requirements fit within a PDCA cycle.

PDCA is an iterative design and management method used for the control and continual improvement of processes and products. PDCA is a cycle that was originated by Walter Shewhart and made popular by Edward Deming – two of the fathers of modern quality control. This concept is a cycle for implementing change which, when followed and repeated, would lead to repeated improvements in the process it was applied to. This is a model for improvement that is sustained, rather than just a one-time quick fix, and it is for this reason that it is applied to the ISO 9001 standard. The ISO 9001 standard has, as a main goal, the continual improvement of the Quality Management System.

4.2. ISO 21001:2018 – Management systems for educational organizations

ISO 21001:2018 (ISO, 2022b), Management systems for educational organizations (EOMS), is an international standard published by the International Organization for Standardization (ISO) and published on May 01st, 2018. It specifies the requirements for a management system for educational organisations (EOMS), where such an organisation:

- a) must demonstrate its ability to support the acquisition and development of skills through teaching, learning or research.
- b) aims to increase the satisfaction of learners, other beneficiaries, and staff, through the effective application of its EOMS, including processes for system improvement and ensuring compliance with the requirements of learners and other beneficiaries.

All requirements of ISO 21001:2018 are generic and intended to apply to any organization that uses a curriculum to support skills development through teaching, learning or research, regardless of the type, size, or method of delivery. ISO 21001:2018 can be applied to educational structures within large organizations whose core business is not education, such as vocational training departments.

The use of ISO 21001 in HEI quality assurance may prove a noteworthy development with potentially significant influences on accreditation processes. The ISO 21001:2018 is poised to have a significant impact on critical elements of quality assurance in higher education. Depending on the nature and extent of existing quality assurance structures, three potential use scenarios of the new standard appear possible: ISO Alongside, ISO Instead, and ISO Inside. The Standard may be used as an adjunct to existing quality assurance approaches (ISO Alongside). Some quality assurance systems may opt to incorporate the attainment of ISO 21001 certification as the determinant of holding an accredited or

approved status (ISO Instead). Finally, the achievement of ISO 21001 certification may serve as a pre-requisite to the application for specific recognitions or accreditations (ISO Inside) (Gilbert, 2020).

5. Impacts of identified standards on the development of project activities

The **ISO 9001 standard** emphasizes the PDCA methodology for continuous improvement of products and processes. That is why the PDCA methodology has been adopted and applied on project activity development processes and deliverables to improve the content after each training session (cf. Figure 6).



Figure 6. PDCA methodology applied to project activity development processes and deliverables.

With respect to **ISO 21001**, it has been taken account of the integration of the modification of the existing programs through the adaptation of existing courses to abide by already existing program accreditation requirements at partner institutions, and to ensure the immediate consumption and sustainability of the developed activities.

6. Certification selection and deployment

After the adoption of the course, activities, and tasks of the MPQ domains, it is necessary that a training effort be undertaken in favour of HEIs staff members to allow them to understand the new normative provisions and the acquisition of knowledge necessary for the quality assurance of the project. It is in this context that the ENHANCE project has stimulated the constitution and training of a network of LF-MPQ4.0 trainers and the development of a training program dealing with the fundamental aspects of quality assurance. The members of this network will be called upon to conduct training workshops for different categories of audiences: peers, students, executive learners, and administrative staff of their respective organizations.

6.1. Selection of the AFNOR quality manager certification

The quality manager training and certification program as proposed by the AFNOR organization is developed on the concepts of the ISO 9001: 2015. This program proposes a set of theoretical and practical modules helping experts to master tools, methodologies, reference frames, audit technics, documentations, etc. related to the quality of processes in any type of organization, thus being sufficiently generic to include Higher Education Institutions. Getting this knowledge will help trainers in Tunisia and Morocco to understand common industrial problems and the best practices to setup and improve projects in industry.

The ENHANCE project brings new skills and technologies helping to implement the concepts of industry 4.0 in the domain of maintenance, production, and quality. At the deliverable D1.2, the requirements

of Tunisian and Moroccan industrial partners were collected to guide the improvement process of the 8 existing training programs in the 4 partner countries. Adopting ENHANCE industry 4.0 technologies as developed on the 42 proposed training activities and mastering the process of developing digital transformation projects in industry will be a valuable challenge to develop. The upskilling of PC trainers (figure below) will be maximized when trained through the ENHANCE activities and certified using the selected AFNOR training and certification program: “Quality Manager”.



Figure 7: upskilling of PC trainers

The content of the “quality manager” training and certification program is summarized in the following both figures.

<p>afnor</p> <p>FORMATION SUR LE METIER RESPONSABLE QUALITE</p> <p>Les objectifs de la formation</p> <ul style="list-style-type: none"> Acquies une vision globale et complete de la fonction qualite Approprier les methodes et outils qualite indispensables : diagnostic, plan d'actions qualite, tableau de bord, audit qualite, resolution de problemes... Construire un projet qualite, le faire vivre et savoir rendre chacun acteur de la demarche. Identifier les points clés pour réussir une certification ISO 9001 et construire son plan d'actions. <p><u>CYCLE 1 - FOCUS SUR LES FONDAMENTAUX AU METIER DE RESPONSABLE D'AUDIT-400URS</u></p> <p>INFORME ISO 9001</p> <p>1 - Comprendre la logique de l'ISO 9001 92015</p> <p>La logique de la norme ISO 9001, les 10 chapitres et leurs exigences principales.</p> <p>2- <u>Repondre aux exigences de la norme 8001 V2015 : outils clés</u></p> <ul style="list-style-type: none"> L'analyse du contexte interne et externe de l'organisation; L'écoute des parties intéressées, l'approche processus, l'analyse des risques, l'étude de données; La responsabilité de direction; Le rôle moteur de la direction et de l'encadrement; Formulation de la politique qualité; Responsabilité et autonomie qualité; La planification du SMQ; Formuler un plan d'actions dans une logique de prévention et d'amélioration; Les processus supports; La maîtrise documentaire : les procédures clés, les enregistrements qualité à créer... La gestion des compétences et des connaissances; L'adaptation des ressources, infrastructures et environnement; Réalisation des activités opérationnelles: achats, conception, vente, production etc. Évaluation des performances qualité et amélioration. <p>AFNOR AFNOR INTERNATIONAL - TUNISIE Imme Golden Towers - Bur A.2.B.A.2.9 - Centre Urbain Nord - Tunis- Tunisie Tel : +216.71.948.008, Email : tunisie@afnor.org</p>	<p>afnor</p> <p>MISE EN SITUATION Exercices de traduction des chapitres de l'ISO 9001. Présentation d'exemples concrets de réponse aux exigences.</p> <p>II. APPROCHE PROCESSUS / TABLEAU DE BORD ET INDICATEURS QUALITE</p> <p><u>1/ L'essentiel de l'Approche processus</u></p> <ul style="list-style-type: none"> La notion de processus, les enjeux du management par les processus, ses bénéfices, ses limites. Le choix des pilotes et la notion de management transversal associé. De l'identification des processus au pilotage: les étapes clés. <p><u>2/ Construire la cartographie des processus de l'entreprise</u></p> <ul style="list-style-type: none"> Comprendre l'objectif. Appliquer une méthode structurée pour identifier ses processus métiers, supports et managériaux. Représenter visuellement l'ensemble des processus: notion de cartographie. Les matrices FSA (fonctions-stratégie et attentes) pour valider la cartographie et identifier les processus stratégiques. Les pièges à éviter. Présentation d'exemples de cartographie de processus d'entreprise. Décrire le processus. Intégrer les fiches d'identité processus. Intégrer les éléments économiques dans les processus : l'efficacité et l'efficience Performance et maturité du processus Les gains, les pertes, les évolutions <p><u>3. Piloter et améliorer un processus</u></p> <ul style="list-style-type: none"> Mesurer la performance du processus dans une optique "qualité-coût-délat". Faire la différence entre indicateurs de performance et de surveillance. Faire le bilan du processus, fixer les objectifs de progrès, formaliser son plan d'actions. Préparer et organiser des revues de processus. Savoir identifier les opportunités. <p>AFNOR AFNOR INTERNATIONAL - TUNISIE Imme Golden Towers - Bur A.2.B.A.2.9 - Centre Urbain Nord - Tunis- Tunisie Tel : +216.71.948.008, Email : tunisie@afnor.org</p>	<p>afnor</p> <p><u>4- Construire le tableau de bord Qualité</u></p> <ul style="list-style-type: none"> Choisir les indicateurs qualité (internes, externes pour mesurer la qualité réalisée). Exploiter le tableau de bord qualité comme outil de pilotage de votre projet. <p>MISE EN SITUATION Exercices et cas pratiques</p> <p>III. APPROCHE RISQUES (Identification & Traitement)</p> <p><u>1/ Les enjeux de l'Approche Risques et Opportunités</u></p> <ul style="list-style-type: none"> La notion de risques et opportunités au sein d'un SMQ (Système de Management de la Qualité) : ce que dit la norme ISO 9001 V2015, le vocabulaire ; bénéfices d'une logique de prévention, d'amélioration et d'anticipation ; ancrer cette logique dans l'analyse et la compréhension du contexte. Utiliser la SWOT comme outil de synthèse. <p><u>2/ Mettre en oeuvre une démarche de prévention basée sur les risques</u></p> <ul style="list-style-type: none"> Identifier collectivement les risques à différents niveaux : stratégiques, processus, produits et services. Savoir identifier et évaluer simplement les risques réels qualité sur les processus en prenant en compte la gravité et l'occurrence. <p>MISE EN SITUATION Exercices et cas pratiques</p> <p>AFNOR AFNOR INTERNATIONAL - TUNISIE Imme Golden Towers - Bur A.2.B.A.2.9 - Centre Urbain Nord - Tunis- Tunisie Tel : +216.71.948.008, Email : tunisie@afnor.org</p>
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Figure 8. Content of the certify the trainer session 1: Fundamentals of quality management.

<p>afnor GROUP</p> <p>FORMATION SUR LE METIER RESPONSABLE QUALITE</p> <p>Les objectifs de la formation</p> <ul style="list-style-type: none"> Acquérir une vision globale et complète de la fonction qualité. S'approprier les méthodes et outils qualité indispensables : diagnostic, plan d'actions qualité, tableau de bord, audit qualité, résolution de problèmes... Construire un projet qualité, le faire vivre et savoir rendre chacun acteur de la démarche. Identifier les points clés pour réussir une certification ISO 9001 et construire son plan d'actions. <p>CYCLE 2 - LA BOITE A OUTILS DU RESPONSABLE D'AUDIT - 4JOURS-</p> <p>I.TECHNIQUES DE COMMUNICATION</p> <p>1. Mieux se connaître</p> <ul style="list-style-type: none"> Faire le point sur son mode de communication préférentiel. Mieux comprendre son fonctionnement et celui des autres pour entrer efficacement en relation. <p>MISE EN SITUATION Exercice d'application : Cas pratique pour choisir les outils relationnels adaptés à sa situation</p> <p>2 - Développer de la flexibilité dans ses modes de communication</p> <ul style="list-style-type: none"> Se situer dans sa fonction et dans la ligne hiérarchique. Définir les besoins d'ajustements mutuels avec ses interlocuteurs. Distinguer : perception, jugement, émotion. <p>MISE EN SITUATION Exercice d'application : Entraînement aux entretiens individuels</p> <p>3 - Dynamiser sa communication</p> <ul style="list-style-type: none"> Choisir le canal de communication le plus adapté pour un résultat opérationnel. Rendre ses réunions attractives et efficaces. Maîtriser les techniques relationnelles adaptées . <hr/> <p>AFAQ AFNOR INTERNATIONAL - TUNISIE Imm Golden Towers – Bur A 2.8-A 2.9 – Centre Urbain Nord – Tunis- Tunisie Tél. : +216.71.948.008 ; Email : tunisie@afnor.org</p>	<p>afnor GROUP</p> <p>MISE EN SITUATION Exercice d'application : Animation d'une réunion d'équipe</p> <p>4 - Faire face aux situations délicates</p> <ul style="list-style-type: none"> Analyser les situations difficiles pour les résoudre. Intervenir à bon escient en situation de conflit. Prendre du recul pour valider les bonnes pratiques en situation. Capitaliser, partager pour progresser et définir des bonnes pratiques. <p>MISE EN SITUATION Exercice d'application : Entretien de résolution de conflit</p> <p>II.GESTION GROUPE DE TRAVAIL ET CONDUITE DE CHANGEMENT</p> <p>1/ Analyser le contexte du projet de changement d'organisation</p> <ul style="list-style-type: none"> Identifier les décideurs. Cerner la problématique à l'origine du projet de transformation. Définir les contributions de chacun dans le projet. Définir le rôle du manager comme garant du succès du projet. <p>2/ Comprendre les mécanismes à l'origine des comportements humains face au changement</p> <ul style="list-style-type: none"> Identifier les étapes du changement et leur impact sur les collaborateurs concernés. Analyser les principales causes de résistance au changement. Anticiper les impacts sur les comportements et la motivation. <p>3/ Utiliser les leviers d'action</p> <ul style="list-style-type: none"> Aider les acteurs dans leur processus d'apprentissage : stratégie d'objectifs ; indicateurs. Communiquer à bon escient et utiliser les bons vecteurs : faire visualiser le futur ; les métaphores. Favoriser les échanges et les rendre facteurs de progrès : construire son propre réseau et le faire vivre . Mettre en valeur les réussites, les progrès : <hr/> <p>AFAQ AFNOR INTERNATIONAL - TUNISIE Imm Golden Towers – Bur A 2.8-A 2.9 – Centre Urbain Nord – Tunis- Tunisie Tél. : +216.71.948.008 ; Email : tunisie@afnor.org</p>
<p>afnor GROUP</p> <ul style="list-style-type: none"> la stratégie des petits pas ; capitaliser les bonnes pratiques. <p>MISE EN SITUATION Exercice d'application</p> <p>III. OUTILS DE RESOLUTION DE PROBLEMES ET D'AMELIORATION CONTINUE DU SMQ</p> <p>1/ Tirer le meilleur parti des groupes de progrès</p> <ul style="list-style-type: none"> Principes du progrès permanent : le PDCA et les actions correctives et préventives... Utiliser un vocabulaire précis : ce qu'est un problème, une action d'amélioration. différencier curatif, correctif et préventif. Les fiches progrès : faire simple et utile. S'appuyer sur les groupes de travail pour être plus efficace. Les rôles des pilotes d'action, d'animateurs de réunion. <p>2/ Résoudre un problème à l'aide de la méthode "C.A.R.R.E.D.A.S." : cas pratique</p> <ul style="list-style-type: none"> La méthode C.A.R.R.E.D.A.S. : résoudre les problèmes de manière structurée. à chaque étape : un objectif défini, un ou des outils clés. Correspondance avec la méthode 8D Planifier la mise en œuvre de la méthode <p>Choisir le problème :</p> <p>Utiliser efficacement le diagramme de Pareto ou la matrice de décision sur des critères objectifs,</p> <p>Analyser le problème :</p> <ul style="list-style-type: none"> Le QOQOCP : 7 questions pour clarifier un problème et se fixer un objectif; La méthode Est/n'Est pas, en complément. <hr/> <p>AFAQ AFNOR INTERNATIONAL - TUNISIE Imm Golden Towers – Bur A 2.8-A 2.9 – Centre Urbain Nord – Tunis- Tunisie Tél. : +216.71.948.008 ; Email : tunisie@afnor.org</p>	<p>afnor GROUP</p> <p>Rechercher les causes racines :</p> <ul style="list-style-type: none"> Travailler de manière structurée par phases; Les outils incontournables : remue-méninges (brainstorming), les 5M, les 5 pourquoi, tests terrain, l'arbre des causes <p>Rechercher et Essayer les solutions :</p> <p>Utiliser des techniques de créativité, le diagramme en arbre, des tests terrain pour trouver et évaluer les meilleures solutions</p> <p>Décider de la meilleure solution</p> <p>S'aider de matrices de décision et/ou de grilles d'efficacité pour sélectionner la solution la plus pertinente.</p> <p>Appliquer la solution choisie :</p> <p>Formaliser les actions à mener dans un plan d'actions; planifier avec le diagrammes de Gantt.</p> <p>Suivre l'efficacité des actions à chaud et à froid :</p> <ul style="list-style-type: none"> L'importance des indicateurs et des observations terrain. Programmer les mesures d'efficacité dans le temps. La présentation des résultats finaux : savoir valoriser le travail et garder en mémoire. Utiliser le modèle A3 pour garder en mémoire les informations. Les conditions de réussite de la méthode et des outils associés. <p>3/ Animer un groupe de progrès</p> <ul style="list-style-type: none"> La préparation de la séance de travail Les trois principes d'animation pour réussir ses réunions de résolution de problème : production : faire produire le groupe, inciter à la créativité, recueillir les idées. régulation : savoir gérer le flux d'informations, faire participer chacun. synthèse : organiser ses bilans, préparer la réunion suivante. Les styles d'animation, repérer son propre mode d'animation. Les responsabilités partagées entre l'animateur et les participants. <hr/> <p>AFAQ AFNOR INTERNATIONAL - TUNISIE Imm Golden Towers – Bur A 2.8-A 2.9 – Centre Urbain Nord – Tunis- Tunisie Tél. : +216.71.948.008 ; Email : tunisie@afnor.org</p>

<p>afnor GRANDPRIX</p> <p>MISE EN SITUATION Exercice d'application</p> <p>IV. INITIATION AUX OUTILS DU LEAN MANAGEMENT</p> <p>1. Vivre les concepts fondamentaux du Lean Management : Comprendre le principe du Lean</p> <ul style="list-style-type: none"> Comprendre l'origine du Lean Management pour mieux l'intégrer et identifier les intérêts Identifier les déclinaisons du Lean management : Office, IT, Design, etc. <p>2. Comprendre les principaux concepts et outils du Lean Management</p> <ul style="list-style-type: none"> Le système Kaizen pour améliorer la productivité La méthode 5S pour mieux travailler La méthode PDCA pour résoudre les problèmes Le modèle Lean management : Communication terrain, management visuel, comportements managériaux La méthode de résolution de Problèmes en Groupe (RPG/ORQC) Les autres outils du Lean : Flux tiré, pièce à pièce, Hoshin, etc. <p>MISE EN SITUATION Exercice d'application</p> <p>EXAMEN (DUREE 2H)</p> <hr/> <p style="text-align: center;"><small>AFAQ AFNOR INTERNATIONAL - TUNISIE Imm Golden Towers - Bur A 2.8-A 2.9 - Centre Urbain Nord - Tunis- Tunisie Tél. : +216.71.948.008 ; Email : tunisie@afnor.org</small></p>	
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Figure 9. Content of the certify the trainer session 2: Toolbox for quality management.

6.2. Selection of first tier Trainers for certification

To be coherent with the objective of the certification as described above, the following criteria were defined to select the resources to be trained and certified in the four institutions.

- The resource to be trained must be a permanent teacher in the partner institution
- The resource to be trained must be involved in one of the eight programmes addressed in the ENHANCE project.
- The resource to be trained must accept to be involved as trainer to train other trainers, students and industrial partners to their institution during the lifetime of the project.

Table 1: The selected trainers from UCAR (TN) partner

Resource to be trained	Position at the institution	Professional Email Address	Example of existing course / new activity trained on the institution programme (selected for the TT session)
Sabeur Elkosantini	Permanent Professor	Sabeur.elkosantini@fsegn.u-carthage.tn	Prescriptive and adaptive decision for Quality Control
Rami Ben Haj Kacem	Permanent Professor	rami.benhadjkacem@fsegn.u-carthage.tn	IoT and BPM for Integrated VSM
Sonia Gabouj	Permanent Professor	sonia.gabouj@insat.rnu.tn	Big data and predictive inventory analytics
Feiza Ghezail	Permanent Professor	feiza.ghezail@insat.u-carthage.tn	Big data and predictive inventory analytics

Table 2: The selected trainers from IIT (TN) partner

Resource to be trained	Position at the institution	Professional Email Address	Example of existing course / new activity trained on the institution programme (selected for the TT session)
Achraf Ammar	Permanent Professor	achraf.ammar@iit.ens.tn	PLM and Digital Factory Data-driven planning/scheduling models and algorithms
Hela Bouaziz	Permanent Professor	hela.bouaziz@iit.ens.tn	Emerging uses of smart technologies for production planning and scheduling
Salma Hadj Kacem	Permanent Professor	salma.hadjkacem@iit.ens.tn	BPM for Integrated VSM
Faten Baklouti	Permanent Professor	faten.baklouti@iit.ens.tn	Emerging uses of smart technologies for production planning and scheduling

Table 3: The selected trainers from ECC (MA) partner

Resource to be trained	Position at the institution	Professional Email Address	Example of existing course / new activity trained on the institution programme (selected for the TT session)
Saber Darmoul	Permanent Professor	saber.darmoul@centrale-casablanca.ma	Maintenance planning and scheduling in Industry 4.0 contexts
Emmanuelle Armandon	Permanent Professor	Emmanuelle.Armandon@centrale-casablanca.ma	tbd

Table 4: The selected trainers from UIT (MA) partner

Resource to be trained	Position at the institution	Professional Email Address	Example of existing course / new activity trained on the institution programme (selected for the TT session)
Abdelmajid Elouadi	Permanent Professor	abdelmajid.elouadi@uit.ac.ma	Virtual Reality for simulation
Youssef Rochdi	Permanent Professor	youssef.rochdi@uit.ac.ma	Sensors' sensitivity analysis and selection
Abdelssalam Ait Madi	Permanent Professor	Abdellalam.aitmadi@uit.ac.ma	Data-driven planning/scheduling models and algorithms
Leila El Abbadi	Permanent Professor	laila.elabbadi@uit.ac.ma	PLM and Digital Factory

6.3. Organisation of the AFNOR Quality Manager certification session

The training and certification programme will be organised physically by AFNOR Tunisia in four sessions:

- UCAR – INSAT (Tunis): from 24/10/2022 to 27/10/2022 → UCAR (4 participants) + IIT (4 participants)
- ECC (Casablanca): from 31/10/2022 to 03/11/2022 → ECC (3 participants)+ UIT (3 participants)
- IIT (Sfax): from 07/11/2022 to 10/11/2022 → IIT (4 participants) + UCAR (4 participants)
- UIT (Kenitra): from 14/11/2022 to 17/11/2022 → UIT (3 participants) + ECC (3 participants)

All the modalities for the training and the certification are defined with the AFAQ AFNOR International Tunisia (<https://international.afnor.com/nos-pays/tunisie/>) as the official representative of AFNOR in Tunisia.

6.4. Transfer of Certification content to second tier trainers

The person responsible for the implementation of the action will be responsible for convening the participants, ensuring logistics, informing, and coordinating with those responsible for the project.

Table 5: Example of train the trainers transfer action

Title of the action	Training of trainers of Tunisian and Moroccan higher education institutions in quality standards (UCAR, ECC, IIT, ITU)
Responsible of the action	Nejib Maolla, ULL, Senior Coordinator of the project
Responsible for implementation	<ul style="list-style-type: none"> • Achraf Ammar, IIT, Sfax, Tunisia • Saber Elkossentini, UCAR, Tunis, Tunisia • Abdelmajid Elouadi, UIT, Kénitra, Morocco • Saber Darmoul, ECC, Casablanca, Morocco
Beneficiaries	<ul style="list-style-type: none"> • Academic staff • Students • Industrial partners • Administrative staff
Objectives	<ul style="list-style-type: none"> • Enable participants to take ownership of the new concepts of quality management standards and know how to put them into practice. • Increase trainer knowledge of quality management. • Provide HEIs with resource persons to sustain training. • Make the LF-MPQ4.0 network of trainers fully operational;
Certification training content	<ul style="list-style-type: none"> • Introductory module: The quality approach: a priority issue for the establishment contract • Module 2: The organization of the quality approach at the EES <ul style="list-style-type: none"> ○ The ISO 9001 V2015 standard • Module 3: The main tools <ul style="list-style-type: none"> ○ Environmental scan ○ Process identity sheet and flowchart ○ Improvement ○ Analysis of causes and measurement of effectiveness ○ Interested Parties ○ Risks and opportunities ○ the listening, measurement, and monitoring system ○ Supplier evaluation

	<ul style="list-style-type: none"> ○ Indicators ○ Knowledge Management ○ Document management ○ Planning ○ Audits ○ Process Review and Management Review 																								
Evaluation and performance indicators	<ul style="list-style-type: none"> ● Number and percentage of training participants who demonstrate an increase in knowledge at the end of the training program. ● % Of trainers who organize 2 PMQ4.0 training sessions 																								
Session evaluation program/ Follow-up arrangements	<ul style="list-style-type: none"> ● Following the organization of 2 training workshops, a meeting will be held between the project managers, the heads of the organization and the trainers concerned to monitor, evaluate and readjust future sessions. ● After each workshop, the training manager will analyse the evaluation sheets and questionnaires related to the measurement of the evolution of the participants' knowledge. The evaluation sheets and questionnaires will be developed by the trainers and validated by the Project Managers. ● A person from the project will be able to attend the work of the workshops. 																								
Calendar	<p>Organization of training workshops lasting 10 days for each country and per partner.</p> <table border="1"> <thead> <tr> <th>Date</th> <th>Partner institution</th> <th>Topics</th> <th>Number of trainees</th> </tr> </thead> <tbody> <tr> <td>16-27/05/2022</td> <td>IIT, Sfax, Tunisia</td> <td></td> <td>5 to 10</td> </tr> <tr> <td>18-30/07/2022</td> <td>UIT, Kenitra, Morocco</td> <td></td> <td>5 to 10</td> </tr> <tr> <td>12-23/12/2022</td> <td>UCAR, Tunis, Tunisia</td> <td></td> <td>5 to 10</td> </tr> <tr> <td>13-24/03/2023</td> <td>ECC, Casablanca, Morocco</td> <td></td> <td>5 to 10</td> </tr> <tr> <td></td> <td></td> <td>Total</td> <td>20 to 40</td> </tr> </tbody> </table>	Date	Partner institution	Topics	Number of trainees	16-27/05/2022	IIT, Sfax, Tunisia		5 to 10	18-30/07/2022	UIT, Kenitra, Morocco		5 to 10	12-23/12/2022	UCAR, Tunis, Tunisia		5 to 10	13-24/03/2023	ECC, Casablanca, Morocco		5 to 10			Total	20 to 40
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12-23/12/2022	UCAR, Tunis, Tunisia		5 to 10																						
13-24/03/2023	ECC, Casablanca, Morocco		5 to 10																						
		Total	20 to 40																						
Cost estimates	<p>For each training session, the financial contribution (documentation) of the project is in the amount of 18 000 Euros</p> <ul style="list-style-type: none"> ● Travel costs ● Costs of stay ● Documentation 																								

7. ENHANCE Training activities

7.1. Train the trainer sessions

Figure 10 shows the organization of the train the trainer sessions. Initially (V0), only some training content is available (38%) before starting the train the trainers' sessions. This is because content is being developed progressively.

- The first training session is programmed at IIT by month 5 of year 2022. For this session, all content required by IIT is given priority and developed. By the end of this first session (V1), 70% of the total catalogue will be developed.
- The second training session is programmed at UIT by month 7 of year 2022. For this session, all content required by UIT is given priority and developed. By the end of this second session (V2), 80% of the total catalogue will be developed.

- The third training session is programmed at UCAR by month 12 of year 2022. For this session, all content required by UCAR is given priority and developed. By the end of this second session (V3), 90% of the total catalogue will be developed.
- The fourth and last training session is programmed at ECC by month 3 of year 2023. For this session, all content required by ECC is given priority and developed. By the end of this second session (V4), 95% of the total catalogue will be developed.

After each training session, an evaluation of the session is conducted, and feedback is used to improve content and delivery mechanisms according to the PDCA methodology. The full catalogue is expected to be ready by month 7 of year 2023.

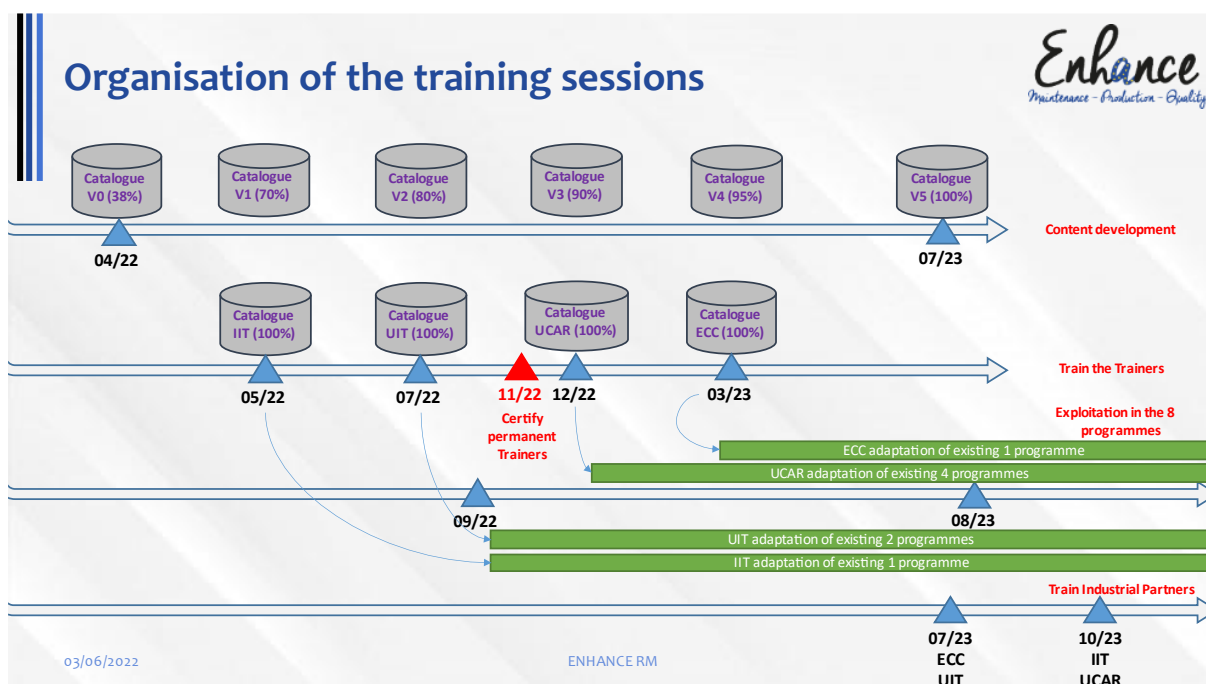


Figure 10. Organisation of train the trainer sessions.

Organization of training workshops lasting 10 days for each country and per partner.

Table 6: Train the Trainers sessions schedule

Date	Partner institution	Number of trainees
16-27/05/2022	IIT, Sfax, Tunisia	5 to 10
18-30/07/2022	UIT, Kenitra, Morocco	5 to 10
12-23/12/2022	UCAR, Tunis, Tunisia	5 to 10
13-24/03/2023	ECC, Casablanca, Morocco	5 to 10
	Total	20 to 40

7.2. Train the students

During the train of trainers' sessions, each presented training activity is discussed in terms of adaptation impacts on the existing selected courses for partner countries institutions. This adaptation effort is delegated to local trainers to upgrade their support basing on selected content provided by the ENHANCE consortium.

The train the students' activities were scheduled after the train the trainers' session for each partner. As the ENHANCE project must prove its impact on the partners countries programmes during the project lifetime, the consortium commits to use the improved content during the 2022-2023 academic year.

In the project description, we commit to train between 17 and 20 students per partner using the ENHANCE training materials or the local upgraded materials.

There is no predefined schedule targeting the courses impacted by the ENHANCE project. Between M30 and M36, each partner will evaluate the number of upgraded activities consumed by students as well as the number of students following these activities.

7.3. Train industrial partners and other senior stakeholders

During the ENHANCE plenary meetings organised in partner countries, the train of local industrial staff will be performed with the support of EU partners.

For the content, each local coordinator will use the catalogue of the ENHANCE activities to propose training sessions adapted to the requirements of their industrial partner. A transparent activities selection procedure will be proposed by each partner institution in Tunisia and Morocco.

For the scheduling of these 4 training sessions, the ENHANCE consortium commits to organised them following accordingly:

1. ECC and UIT: Plenary meeting between 26/06 and 07/07/2023 in MA
2. IIT: Plenary meeting in 23-28/10/2023
3. UCAR: Plenary meeting in 02-06/10/2023

For each session, we expect the participation of 5 to 10 industrial staff. The proposed sessions are open to other local trainers how missed their dedicated train the trainer session.