



**EXPERIMENTATION AND VALIDATION OPENNESS FOR LONGTERM
EVOLUTION OF VERTICAL INDUSTRIES IN 5G ERA AND BEYOND**

[H2020 - Grant Agreement No.101016608]

Deliverable D6.1

Training Material and SMEs and Startup Acceleration Program Activities (Intermediate)

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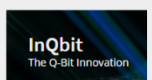
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GLOSSARY

<i>Abbreviations/Acronym</i>	<i>Description</i>
3GPP	<i>3rd Generation Partnership Project</i>
5G	<i>5th Generation of Mobile Networks</i>
API	<i>Application Programming Interface</i>
CAPIF	<i>Common API Framework</i>
CI/CD	<i>Continuous Integration & Continuous Delivery</i>
CLI	<i>Command Line Interface</i>
DoA	<i>Description of Action</i>
EU	<i>European Union</i>
GA	<i>Grant Agreement</i>
IIoT	<i>Industrial Internet of Things</i>
IoT	<i>Internet of Things</i>
MOOC	<i>Massive Open Online Course</i>
NEF	<i>Network Exposure Function</i>
NetApp	<i>Network Application</i>
NPN	<i>Non-Public Network</i>
Q&A	<i>Questions & Answers</i>
QoS	<i>Quality of Service</i>
RAN	<i>Radio Access Network</i>
SDK	<i>Software Development Kit</i>
SEAL	<i>Service Enabler Architecture Layer</i>
SME	<i>Small and Medium Enterprise</i>
ToC	<i>Table of Contents</i>
WP	<i>Work Package</i>

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EXECUTIVE SUMMARY

This document, namely Deliverable 6.1 “Training Material and SMEs and Startup Acceleration Program Activities (Intermediate)”, represents an intermediate report on the plan and the activities performed in Task 6.1 “Developers-oriented Events and Related Training Material” and Task 6.2 “SMEs and Startup Acceleration Program” during the initial twelve months of Work Package 6 (WP6 from M7 to M19). This activity has progressed towards the achievement of Milestone Ms5 “Training Material and Startup Acceleration Program fully active”.

More precisely, it is presented:

- the plan and the methodology for the preparation of training material and the related activities as conducted in the framework of Task 6.1 and, also,
- an SME-targeted plan and engagement strategy, under the title EVOLVED-5G acceleration program as defined in the framework of Task 6.2.

Task 6.1 activities include online open courses for developers and any other outreach activity that targets the transfer of knowledge from the project to any interested external. Already within the reporting period, initial training materials in different areas have consolidated on a series of free on-demand open training courses published as MOOCs on well-known educational platforms. Additionally, several training activities have taken place as developer-oriented events, such as workshops or seminars, providing training on EVOLVED-5G technical topics promoting the engagement of open-source and academic communities towards the embracement of the EVOLVED-5G project and the associated technical achievements developed.

Task 6.2 activities were around the design of the acceleration program, where specific activities are defined for the business acceleration of SMEs and Startups. In addition, several organizations around Europe have been contacted and have been engaged, with the major goal to foster a Community Building among developers, SMEs and stakeholders around the EVOLVED-5G project and its technical outcomes.

WP6 objective in total, is to provide everything needed in the above-mentioned Community to guarantee the success of the project during and after its completion, ensuring its continuation, visibility and awareness, and promoting a further exploitation of the EVOLVED-5G technical achievements in the frame of the industry sector, as well as potentially in any other sector.

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1 INTRODUCTION

1.1 PURPOSE OF THE DOCUMENT

This deliverable is the first of a series of four WP6 reports to be delivered by the project consortium during its 36-month work plan. The primary objective of this first report, entitled “Training Material and SMEs and Startup Acceleration Program Activities (Intermediate)”, is to describe the strategy adopted by EVOLVED-5G consortium towards two fundamental programs that foster the creation of a Community of developers, SMEs and other stakeholders around the EVOLVED-5G project, namely the EVOLVED-5G Community. These two fundamental programs are:

1. Training Program: is focused on the creation of training materials and on-demand open online courses regarding the technical framework and technical developments of the project, and the realization of training activities such as technical seminars in academic institutions and developer-oriented events.
2. Acceleration Program and Community Engagement: is designed to enable innovation agencies to foster the innovation for SMEs providing an Acceleration Program of 5 months duration, the acceleration Library with online resources for training, and The Train the Trainer Program to upgrade the skills of the agencies in a learn-by doing approach using EVOLVED-5G tools.

There will be an updated version of this document, Deliverable 6.3, to be released towards the end of the Project (M36), with the final implementation details of these two programs carried out during the rest of the Project.

1.2 STRUCTURE OF THE DOCUMENT

The deliverable is organized in the following manner:

- Section 1. Introduction: This section describes the Purpose of the Deliverable, the structure and target audience.
- Section 2. Training Program: This section describes the Training Program created in EVOLVED-5G including the training content description, training methodology, training planning and expected outcomes, in addition to the activity performed, the On-demand Open Training Courses developed and the Training Events realized.
- Section 3. Acceleration Program: This section describes the Acceleration and Community engagement program that is built around three pillars: The Acceleration Program directed to SMEs and with focus in Business Models; The Acceleration Library, a set of learning resources in online format, and The Train the Trainer Program that provides tools to Innovation agencies to upgrade their skills with a “learn by doing” approach.
- Section 4. Conclusions: Final summary that includes the way forward for Tasks 6.1 and 6.2 for the rest of the project.

1.3 TARGET AUDIENCE

The scope of this deliverable is to expose implementation details for both the Training program and the Acceleration program. Its intention is to be accessible to a broad variety of research individuals and communities.

The target audiences are described below:



D6.1 Training Material and SMEs and Startup Acceleration Program Activities (Intermediate)

GA Number 101016608

- **Project Consortium:** To validate that EVOLVED-5G tools and processes are well documented and can be disseminated by producing training material that third parties can use for accelerating innovation agencies.
- **Industry 4.0/Industry 4.0 developers and Factories of the Future (FoF) vertical groups:** To set a common understanding of the technologies and the design principles that underline the Certification Process design and its implementation, along with the Marketplace release process, and get access to training material that SMEs can use to take advantage of EVOLVED-5G innovations by using the tools and processes defined.
- **Other vertical industries and groups:** To seek impact on other 5G-enabled vertical industries and groups in the long run. Indeed, the training material is vertical agnostic, so it can be used in any vertical domain.
- **Scientific audience, general public, and the funding EC Organisation:** To document the work performed by the project and justify the effort reported for all relevant activities. The scientific audience can also get an insight of the design approach and underlying components behind the EVOLVED-5G Certification Process and Marketplace implementation, and get a hands-on approach by leveraging the training material and the acceleration program defined.

2 TRAINING PROGRAM

With the term *Training* in EVOLVED-5G project, we refer to the process of teaching project team members, or other audiences, the skills and knowledge regarding the technical aspects and topics related to the project developments, vision, and framework, as well as to associated technical procedures.

It is important to have a training plan in place to ensure that project members, as well as potential users, are able to properly deploy and make use of the different technical artefacts available, as well as to apply processes such as the verification or validation of code, or to perform specific developments tightly related with the project.

Internal training within the project allows for a quicker and more effective knowledge acquisition on those topics. Furthermore, it allows for a higher awareness on those developments and processes, and an improved alignment between the different members and technical Work Packages, who work together on the overall technical development of the project, but on different elements and performing very different roles. Thus, due to these benefits, internal training potentially leads to a more efficient joint technical development, and higher quality on technical outcomes.

Moreover, it is also important to note that from a user perspective, without training material or training activities, users out of the boundaries of the project will be likely unable to use the software to its full potential.

The success of a software project is dependent on many factors, but two of the most important are the existence of proper **training material** and **training outreach strategy**.

On the one hand, training materials ensure that users acquire the required knowledge to use the different software or hardware elements. Without documentation and training materials, users will likely be unable to employ the software, and may even give up on it entirely.

On the other hand, an outreach strategy for training allows potential users to become aware of the technical resources of the project, how to use them and which are their key advantages and application potential.

It has been demonstrated over and over again in numerous examples in the last decades, that just the development of high-quality technical products, technologies or frameworks, is not sufficient for their success. It is necessary to reach as many potential users as possible, make them aware of the existence of the technical developments performed, and, very importantly, how to use them.

A training outreach strategy is essential for making potential users aware of the software and its benefits and for convincing them to make use of it, opening up the possibility for a future adoption. Moreover, this strategy is also important in order to foster the creation of a community, able to provide feedback, visibility and support to the project. In this sense, an outreach strategy for training has been defined and applied in the scope of the EVOLVED-5G project.

In this section, it is described:

- The training plan of the EVOLVED-5G, as well as the training methodology applied for the development of training materials, including on-demand open courses, hosted in

well-known educational platforms such as UPVx¹ and EDx², and an outreach strategy designed for the organization and performance of developer-oriented events and seminars with a training aim. Those training events conjointly with the publication of training courses, will allow for a high reach of the EVOLVED-5G technical outcomes, their utilization and application, and it will promote the development of a community of developers and academia.

- The activity performed in the frame of the EVOLVED-5G training until the submission of this deliverable in M19, along with the outcomes and results obtained. In this regard, in this document it is presented the different on-demand open training courses that have been already developed and published in well-known educational platforms, as well as the different training events performed.

2.1 PURPOSE, OBJECTIVES AND PLAN

The EVOLVED-5G training strategy is mainly focused on the creation of training materials and courses and the realization of training activities to instruct participants on EVOLVED-5G technical topics and software developments.

The training activity in the frame of the EVOLVED-5G project has a two-fold scope:

- INTERNAL TRAINING: towards covering internal needs for training within the EVOLVED-5G project, through the provision of materials and courses, as well as through internal training sessions or webinars.
- EXTERNAL TRAINING: towards allowing external audience to become familiar to EVOLVED-5G vision, knowledge and technology assets. The EVOLVED-5G external training is performed through the creation and publication of free on-demand online courses, hosted in very well-known educational platforms, and the realization of activities for training those audiences by a) organizing training events and b) participating in key events by providing a relevant EVOLVED-5G training activity. Those events are mainly technical seminars in academic institutions and developer-oriented events. Both aforementioned means, online courses and events for training: a) facilitate the engagement of external stakeholders (e.g., developers, open-source community, academia), b) foster the use of the EVOLVED-5G framework for developing and validating 5G NetApps for Industry use cases, c) indirectly, as a result, spread the technological innovations of the project, d) facilitating their future adoption within the open-source and academic communities and other stakeholders.

Thus, the training activity of EVOLVED-5G, has the following objectives:

- The generation of a set of training materials for programmers to leverage the workspace and tools provided by the project for the development, verification and validation of NetApps. These training materials include the aforementioned Open Training Courses, which are built upon the knowledge and training materials on a specific EVOLVED-5G technical topic, such as for example NetApp Development.
- Contribution to and management of the internal training in the project.
- The organization of training events for developers and academia, such as seminars, workshops, meetups, hackathons or other types of developer-oriented events.

¹ <https://www.upvx.es>

² <https://www.edx.org/es>

- The participation in developer-oriented events to exchange knowledge about the technological choices adopted in the project and their actual implementation, and to perform activities that provide training on relevant EVOLVED-5G technical topics.
- To foster the engagement of open-source and academic communities, towards promoting the awareness, higher visibility, support and further embracement and continuity of the outcomes of the project.
- To promote the creation and nurturing of a community of developers around the EVOLVED-5G project.

2.1.1 Training areas

Based on the EVOLVED-5G concept as well as the different phases of the NetApp lifecycle and the different environments of the EVOLVED-5G Framework (referring to the development, verification, certification, validation and publication of NetApps), several **knowledge areas in the scope of EVOLVED-5G have been identified**, in which it is considered necessary or convenient the application of training. Those training areas are the following:

- General topics related with EVOLVED-5G
- Concept of NetApp
- EVOLVED-5G Architecture
- Development of NetApps
- Verification of NetApps
- Validation of NetApps
- Certification
- Marketplace
- Application of NetApps in Industry
- NetApps and developed vertical applications

For each training area specific material is prepared, and at least one training course publicly available as a MOOC -an online open course accessible on-demand to massive audience- will be released or has already been released.

After thorough discussions along with the EVOLVED-5G technical leaders and the consortium members involved in technical WPs, **a set of specific topics and concepts to be addressed in the different training areas** has been identified.

In this regard, from a more detail-grained perspective, those training materials and courses will cover explicitly the following key topics and concepts:

- General EVOLVED-5G-related concepts
 - 5G
 - NPN
 - Industry 4.0
- 5G Core programmability (related to several training areas)
 - NEF exposure
 - SEAL
 - CAPIF
- Concept of NetApp
- Overall view of the EVOLVED-5G architecture Onboarding of NetApps
- Slicing (RAN / Core)
- Development of NetApps:

- Use of EVOLVED-5G SDK
 - EVOLVED-5G GitHub
- SDK-CLI
 - Pipelines
 - NetApp Template
 - SDK Libraries & details of APIs within the libraries
- Verification of NetApps
 - Verification concept and process
 - Verification environment: CAPIF tool & NEF emulator
 - Verification tests
 - Use of the NEF emulator & details of APIs within the emulator
 - Use of CI/CD pipelines & open repository
 - Details of CAPIF & details of APIs within the CAPIF
- Validation of NetApps
 - Validation concept
 - Validation methodology and infrastructure
 - Creation and execution of tests
- Certification
 - Certification concept
 - Certification process
 - Release of a NetApp to marketplace
- Marketplace
 - Use of the Marketplace (as a developer and as a user)
 - Recommendations for the provision of documentation for future developers
- Potential of using NetApps in Industry 4.0 (business perspective)
- NetApps and developed vApps

2.1.2 Expected training outcomes

The EVOLVED-5G training, encompasses different types of outcomes or training elements as listed below:

- **Training Material:** documentation and materials for training such as tutorials or cookbooks for the different elements, procedures and software artefacts related to the EVOLVED-5G framework.
- **Training Events:** live events devoted to training on a specific EVOLVED-5G training area, addressed generally to academic students and developers, although they can reach and be open to other audiences. They are two main types of training events within the EVOLVED-5G training program: developer-oriented events, addressed to developers, and seminars, focused on academia audience, researchers and students. Those live events can take place either online, on a presential mode or following a hybrid format that allows both modalities (online & physical).
- **Training Courses:** free open online courses as MOOCs, accessible to global audience that constitute a hybrid type of outcome encompassing both training materials and also training event features. Training courses contain lessons taught in videos on-demand, which differently to training events do not constitute live events, which require the presence (physical or remote) of all participants during a fixed date and time in which take place. Instead, they are on-demand asynchronous classes that, despite not having a live event format, allow the interaction between all their participants: students have

the opportunity to make questions and consultations to instructors offline, and, in this line, the courses provide a forum space for discussion among instructors and students enrolled on each of the lessons. Moreover, it must be noted that training courses apply a set of pedagogic techniques for optimal online learning. Some of those techniques are, for example, the use of follow-up questions to maintain attention active and reinforce the acquisition of new concepts and new knowledge; or the application of specific rules on the creation of video contents, such as the instruction of recording videos with short duration, which allow for easily gain complete attention from the trainees.



Figure 1. EVOLVED-5G Training Outcomes

The achievement of these actions is supported by:

- The previous definition and establishment of a methodology for the production of training materials and open training courses, along with the provision of supporting materials for this production, such as guides or templates.
- The previous identification of the different areas and contents on which training has to be addressed, seen in previous section, as well as via which manner.

2.1.3 Training Plan

The EVOLVED-5G training plan outlines the objectives, training materials, courses, events and outcomes expected, along with the timeline for performing the planned actions in this regard. While the objectives and the definition of the expected types of outcomes have been detailed in previous sections, here we focus on the related time plan.

It should be noted that the training activity is strongly dependent on the progress of the technical activity of technical work packages, as this progress determines the timeframe for the creation of related training materials, and also the technical elements and procedures from EVOLVED-5G that can be presented and shared in training events to external audiences.

Training materials have to be developed with the right timing, once new framework elements and software artefacts are developed, and technical procedures are defined. Those training materials are polished as the technical elements get more mature, and feedback from project members and even external users is received and applied.

Training courses on specific training areas in the EVOLVED-5G project are built upon the technical outcomes of WP3, WP4 and WP5, and on the related training materials developed. These courses, as already seen in this document, aim to cover all key contents that a trainee should know about an EVOLVED-5G technical topic in a very didactic way, allowing external audiences (in especial, developers and academia) to be aware of the EVOLVED-5G technical vision, the different framework elements and their use, different processes regarding NetApps, or other topics addressed.

2.1.3.1 Plan for training material & courses

As explained, the different materials and courses have different timeframes for their production and release, depending on the specific contents addressed.

Training courses regarding general topics related to the EVOLVED-5G context, but not devoted primarily to EVOLVED-5G technical developments, do not have a tight dependence on the progress of the technical WPs, nor a strongly restrictive timeframe for their preparation and publication. For this reason, they were planned to be generated without having tight time limitations for its production during the WP6 lifetime. The role and mission of those courses are:

- to provide training to external audiences on these general topics, which represent part of the context of other training courses, reflecting transversally the EVOLVED-5G view, specific contribution or relation to this general area.
- to redirect the attention of these publics to EVOLVED-5G technical topics, naturally linked, inviting to take other EVOLVED-5G courses, as part of an engagement strategy. It should be noted in this regard that it is easier to reach target audiences not aware of EVOLVED-5G or the concept of NetApps with courses on a general topic related to the project context and introduce then EVOLVED-5G. This strategy facilitates their engagement.

In this regard, one course regarding Industry 4.0 has been developed and it is in process of publication. Also, an EVOLVED-5G Architecture course is foreseen with no specific restrictions on its delivery date.

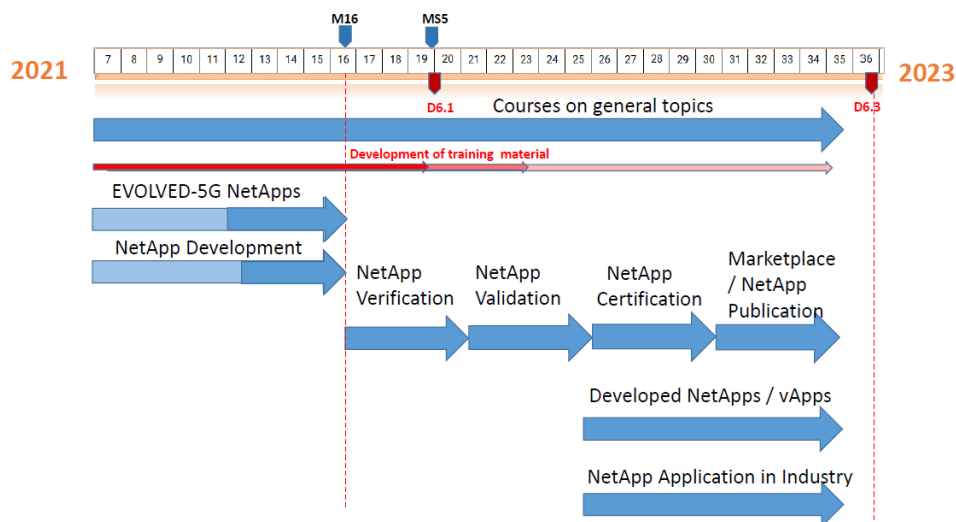


Figure 2. EVOLVED-5G Time Plan for Training Material & Courses

Training courses regarding NetApp development and the EVOLVED-5G NetApp concept were planned to be generated before the end of Period 1 at M16, when the first versions of the EVOLVED-5G NetApps were expected, and the development of NetApps was a process already

tested and fully mature. These courses are currently available at UPVx online platform. Of course, the key training materials that EVOLVED-5G SMEs required for performing the development of NetApps were needed in advance, and they were ready before M12 as planned, enabling to start NetApp programming. The EVOLVED-5G NetApp Development course is at an important extent based on those initial training materials.

The following training courses will be progressively generated during the second period of the project (P2). The first one will be the course devoted to NetApp Verification, and the preparation of the required materials has already started. The production of this course could only start recently, after the definition in the technical WPs of the verification tests to perform on a NetApp using both the CAPIF tool and the NEF emulator.

According to the initial training plan, this course will be followed by the Validation, Certification and Marketplace courses, which will be created and released in this order. Those courses were planned to be developed progressively in a sequential manner, starting the production of one course once the previous one is delivered.

Finally, close to the end of the project, it is foreseen to release a course regarding the application of NetApps in Industry and another one about the different use cases, NetApps and the vertical Applications developed and employed in EVOLVED-5G.

Changes on this plan are not foreseen at M19, except on the delivery time of the Marketplace course. This training course will be possibly available sooner than expected, as far as the Marketplace is currently on a very advanced state, as well as the NetApp publication and purchase processes, which are tightly related to this EVOLVED-5G framework element.

Further details about the courses and its production can be seen in section 2.2, devoted to the EVOLVED-5G training materials and courses.

2.1.3.2 Plan for training events

The other main elements in the training plan are training events and training activities.

It is considered on the T6.1 plan both the organization of training events addressing external audiences and the participation on external key events with a training activity such as a workshop or a seminar.

The type of events targeted for training are developer-oriented events, addressed to developers, and seminars, focused on academia audience, researchers, ICT professionals and university students. Those events can be workshops, meetups, seminars, webinars, hackathons, or other types of events that serve for the purpose of training. More details about the type of events addressed can be found in section 2.3, devoted to the EVOLVED-5G training outreach strategy.

In addition to this external training, internal training activities within the project take place as training sessions or webinars when required in order to allow a quick and effective communication among all the project members involved in technical activities of new developments or new technical procedures, and the instructions for its use or for performing further development upon them. This action enables a better alignment and coordination between the different tasks and processes in the different technical Work Packages, leading to higher productivity and efficiency in this regard, and it also ensures that the whole project is on the same page regarding technical development.

The following image depicts the time plan and targets regarding the realization of training events with an external scope, allowing the outreach of external audiences to the project consortium.

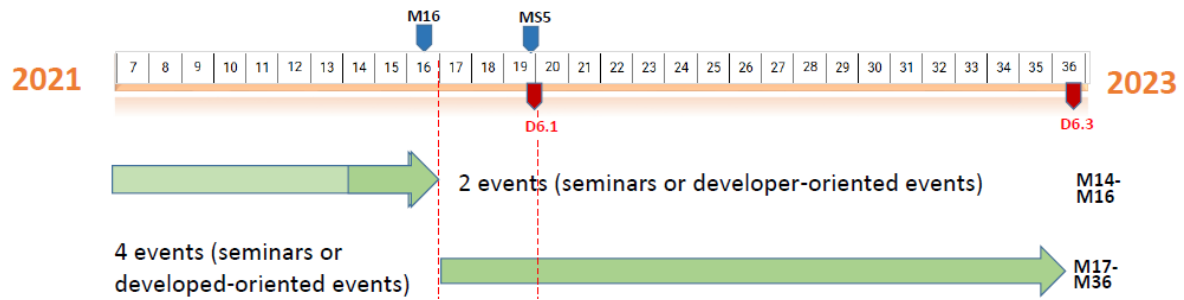


Figure 3. EVOLVED-5G Time Plan for Training Events

Training events were not foreseen in the first part of the T6.1 lifetime, as far as it was necessary a certain maturity on the technical progress of the project for its realization. In this regard, training events made more sense in a more mature stage than in an earlier stage, as far as during the first part of the project lifetime many framework elements were under development and some visions, procedures were being defined and were not consolidated yet. For this reason, the organization and participation on external events for training was initially expected to take place at the end of Period 1 (M14-M16). In this regard, the first event took place at the end of M11 –earlier than expected-, while the majority of training events took place after M14, as foreseen.

The EVOLVED-5G training plan had a target for the organization of or participation on 2 training events during Period 1, and up to 4 events during Period 2. As it can be seen in section 2.3.2, the target of 2 events for P1 was accomplished and outreached with the realization of 4 training events, which contained internally a total of 12 different training activities. On the other hand, 2 events have already taken place at M19 fulfilling at an important extent the target for the second Period of the project (M17-M36).

The pandemic outbreak was obviously a notable obstacle for the realization of these events. The organization of some of them was strongly discouraged at that period, and it is understood that there were fewer key events eligible for participation by providing training activities on them. Moreover, this pandemic situation hampered at some extent the realization and hosting of physical events, but this difficulty was overcome by the usage of online and hybrid attendance approaches.

2.2 TRAINING MATERIAL AND COURSES

Training materials and courses are, as seen, expected outcomes of T6.1 and fundamental elements for both internal and external training.

In this regard, materials of different types are developed in order to allow proper understanding and training regarding technical elements and procedures. Those training materials are typically tutorials, guides and other documentation with a special focus on their user-friendliness and clarity.

These materials constitute the basis of the open online training courses, which, as seen, are built upon the topics and knowledge addressed and contained in the EVOLVED-5G training materials. Furthermore, many of those materials will be integrated, referred or linked in the training courses.

As far as a main objective of the training program is to reach as many interested external publics as possible, it was decided to publish the EVOLVED-5G training materials presented with guiding videos, as Massive Open Online Courses or MOOCs [3]. On the one hand, this type of courses can potentially reach massive audiences. On the other, they allow for interaction between all participants, trainers and trainees, and this feature favors engagement and supports community creation.

A MOOC [3] is a Massive Open Online Course, with open access via the web, aimed at large-scale interactive participation, and it is offered free of charge. It is important to note that a MOOC is designed to provide a flexible and interactive learning experience and it is not a traditional online course. Instead, a MOOC is designed to be much more similar to a seminar, with the goal of promoting interaction and discussion between participants. This type of courses employs web-based tools to create an interactive learning environment; students make use of them to complete assignments, take quizzes, and to participate in online discussions. MOOCs web infrastructure include forums, chat rooms or other communication channels for allowing interaction between participants.

The reason why MOOCs have a potential massive audience, encompassing a very diverse and wide variety of publics, are their special features:

- First, they provide open access via the web, making the online course available to anyone, anywhere in the world, with the only requirement of having an internet connection. MOOCs are not constrained by geographical boundaries or traditional educational barriers.
- Second, this type of courses has typically a very good visibility, as they are generally host in well-known educational platforms, and are easily searchable and findable over the internet. This means that any person with internet connection is able to easily find
- Another reason why a MOOC can reach large, massive audiences is its low cost. Most MOOCs are offered free of charge, or for a very low fee. This feature makes them accessible to a wide range of people, regardless of their financial situation.
- Finally, MOOCs can also attract massive public because they are flexible and convenient. MOOCs can be taken at any time, and from anywhere. These features make them ideal for busy people who want to learn on a topic, but who cannot commit to a traditional face-to-face course.

In this regard, the EVOLVED-5G courses are conceived as series of short videos along with additional materials conforming a MOOC, being available online. To that end, the course resources will be hosted in the specialized educational platforms UPVx³ [1] and EDx⁴ [2], ensuring their visibility and accessibility, and also allowing free access to any audiences interested on the topics addressed.

2.2.1 Training methodology for the production of training materials and courses

This section addresses the methodology for the creation of materials and courses.

For training materials, several instructions and procedures have been iteratively established, based on a tight communication and cooperation between technical Work Packages (WP3, WP4 & WP5) and WP6, maintaining a special focus on WP3, as stated in the DoA.

³ <https://www.upvx.es>

⁴ <https://www.edx.org>

The creation of such training courses is a complex process that requires a very tight cooperation between consortium partners, Work Packages and the application of pedagogic methods and techniques on the scope of MOOC creation for providing high-quality courses. Due to these reasons, it requires the use of a specific methodology for its correct production. The designed methodology for this aim is described in the following subsection. Internally in the project, in the frame of T6.1, several live documents and guides were developed to assist with the management of training documentation and their production process. Moreover, several templates for the creation of courses and training materials were provided.

2.2.1.1 Methodology for Training Course Production

The methodology chosen for the production of training courses is detailed in this section. This methodology has been applied for more than 30 years in academic instructions and has been progressively adopting improvements based on pedagogy studies, that resulted on a consolidated set of procedures and techniques that provide high results on online learning with both academic, technical and general audiences [3][4].

Each course explains a didactic unit on a topic from the list of training areas described in Section 2.1.1. This topic represents the content to be addressed on the course. As seen, the courses have a MOOC format, and they are composed by a set of videos explaining the aforementioned topic, along with tests, follow-up questionnaires, and, when required, additional materials as PDF documents.

For the production of each MOOC, first of all the contents and authors need to be identified. For all EVOLVED-5G training courses foreseen, key contents to address have already been detailed, as stated in section 2.1.1. In this line, main authors for every MOOC were proposed at a first stage of T6.1, according to their expertise on the topics addressed in the training course, and their role regarding them in the project. Those authors can invite or request other partners to collaborate on their courses.

In order to start the course production, UPV, as T6.1 Task Leader and as a partner with strong expertise on the education field, will define the structure of the course, and in this regard, will design an initial set of slides. On each slide it is explained a piece of the course content and it is indicated the expected time for presenting the specific slide in a video. This time indicates the duration of the video that will be produced with the slide. Each slide will be assigned by UPV to one partner, along with an associated task. This task will consist on the improvement of the slide and the recording of a video explaining the slide content.

The whole set of videos, employing the set of slides and meeting the associated recording timing, will compose the MOOC course, explaining the topic addressed along the slides.

Thus, the key elements of this methodology are:

- **COURSE:** Didactic Unit that explains the content of a training topic from the set of training areas from section 2.1.1, which will be released as a MOOC, with an online format.
- **SLIDE:** Each individual sheet of a course presentation, which contains a specific piece of the course content on it, and it has assigned an associated time for performing its presentation on a video recording. This time is indicated initially in the slide as a note.

- **TIME:** Precise amount of time for the realization of a slide content explanation, which will be recorded in a video.
- **TASK:** Assignment to a specific partner regarding a course slide. The partner will have to improve the slide to present its content, recording on the computer his or her presentation of the slide content on the indicated time, creating a short video for the MOOC. These videos have to meet specific format and quality standards: it is important to note that videos have to be recorded with high sound quality and a standard resolution of 1920x1080 pixels. Moreover, they should follow specific guidelines and didactic techniques for MOOC teaching.



Figure 4. Training Course Production scheme

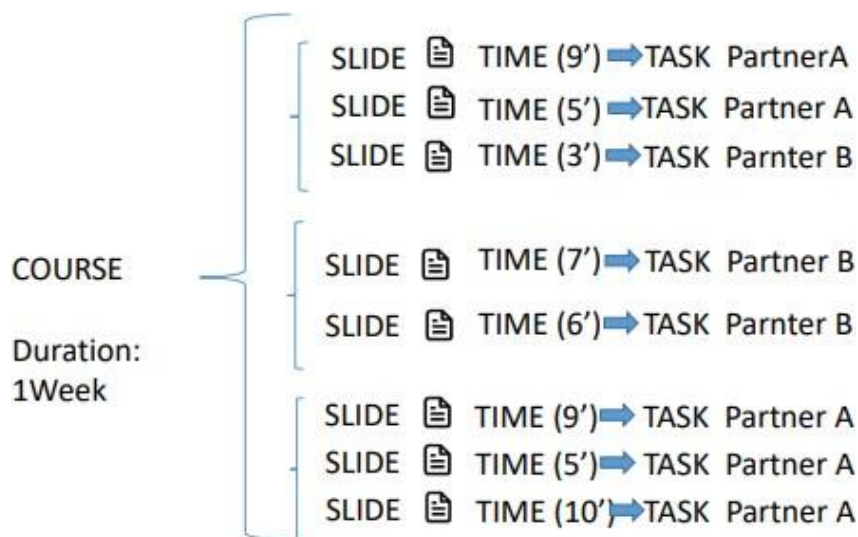


Figure 5. Visual scheme of a course sequencing example

As seen, the audience for MOOCs is global, meaning that encompasses many different types of publics due to its high reachability and accessibility as free on-demand online courses. In this sense, the training courses developed in the frame of the EVOLVED-5G project will be mainly focused on four types of audience: developer, student, researcher and general audiences. Each audience will have a different itinerary for each course, and for the whole set of courses as well.

Courses will also contain tests to allow to qualify trainees on the acquisition of the expected knowledge and skills, and enable the obtainment of course certificates. Moreover, courses present follow-up questions for reinforcing the acquisition and retention of key concepts and the maintenance of an active attention. These tests and questionnaires will be designed by UPV and the course creators.

	GENERAL AUDIENCE	DEVELOPER	STUDENT	RESEARCHER
SLIDE 1	X	X	X	X
SLIDE 2	X	X	X	X
SLIDE 3		X	X	X
SLIDE 4		X	X	X
SLIDE 5		X		X
SLIDE 6	X	X	X	X
SLIDE 7	X	X	X	X
SLIDE 8	X	X	X	X

Figure 6. Example of audience itinerary route

UPV will perform quality checks on each element developed for the course; other partners may also perform this task for specific courses.

Once the course structure, the explanatory videos teaching the lessons, tests and additional materials are ready, UPV will form the MOOC, integrating all these elements, and test it, to finally be presented for its inclusion in the educational platforms UPVx⁵ [1] and EDx⁶ [2].

2.2.2 List of courses

The open list of courses defined by the EVOLVED-5G consortium can be seen in the Table below.

TRAINING COURSE
5G & Industry 4.0
5G Technology & Vision
EVOLVED-5G Architecture
EVOLVED-5G NetApps
EVOLVED-5G NetApp Development
EVOLVED-5G NetApp Verification
EVOLVED-5G NetApp Validation
EVOLVED-5G NetApp Certification
EVOLVED-5G Marketplace
Application of EVOLVED-5G NetApps in Industry 4.0
EVOLVED-5G NetApps & vApps for the Fabric of the Future

Table 1 List of Training Courses

As mentioned in section 2.1.1, courses address the different knowledge areas on the scope of EVOLVED-5G activity and vision in which it is considered necessary or convenient the application of training, and each training area has at least one associated course.

This list of training courses is open in the way that it is indicative, and not restrictive. The list may be extended if it is considered convenient. Furthermore, courses might also be merged into

⁵ <https://www.upvx.es>

⁶ <https://www.edx.org>

a new one that encompasses the former ones, without missing any content to be addressed, being this merging merely a matter of format.

2.2.3 Developed courses

Up to the date of D6.1 delivery, the following training courses have been developed for internal and external training purposes:

TRAINING COURSE	TRAINING AREA
5G & Industry 4.0	General
EVOLVED-5G NetApp	EVOLVED-5G main concepts
EVOLVED-5G NetApp Development	Development of NetApps

Table 2 Developed Training Courses

They are available at the educational platform UPV⁷ [1] and will be incorporated in EDx⁸ [2] after one teaching cycle with enrolled students at the UPVx platform.



Figure 7. Educational platforms for online learning

The audience of these training courses is technically global, which is a main feature of MOOCs, but they are specially targeted to developer and academic publics that are willing to learn about the specific topics addressed. Those target audiences encompass technical students, developers, technical growing professionals and researchers, among others.

In particular, the “EVOLVED-5G NetApp Development” course is strongly addressed to programmers, although other publics interested on this topic can also acquire specific knowledge by taking it.

It is only required to have a valid account to enroll in the courses. Any person can access them free of cost.

The steps for accessing the course are explained as follows:

1. Create an account at UPVx if you have not registered.
 - a. Navigate to [UPVx](http://www.upvx.es) main page www.upvx.es

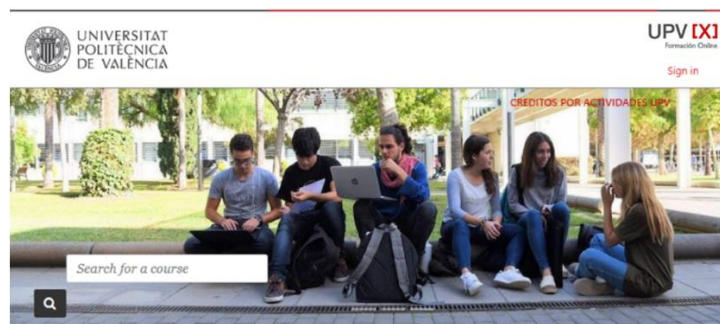


Figure 8. UPVx Educational Platform website

⁷ <https://www.upvx.es>

⁸ <https://www.edx.org>

b. Click “Sign in”

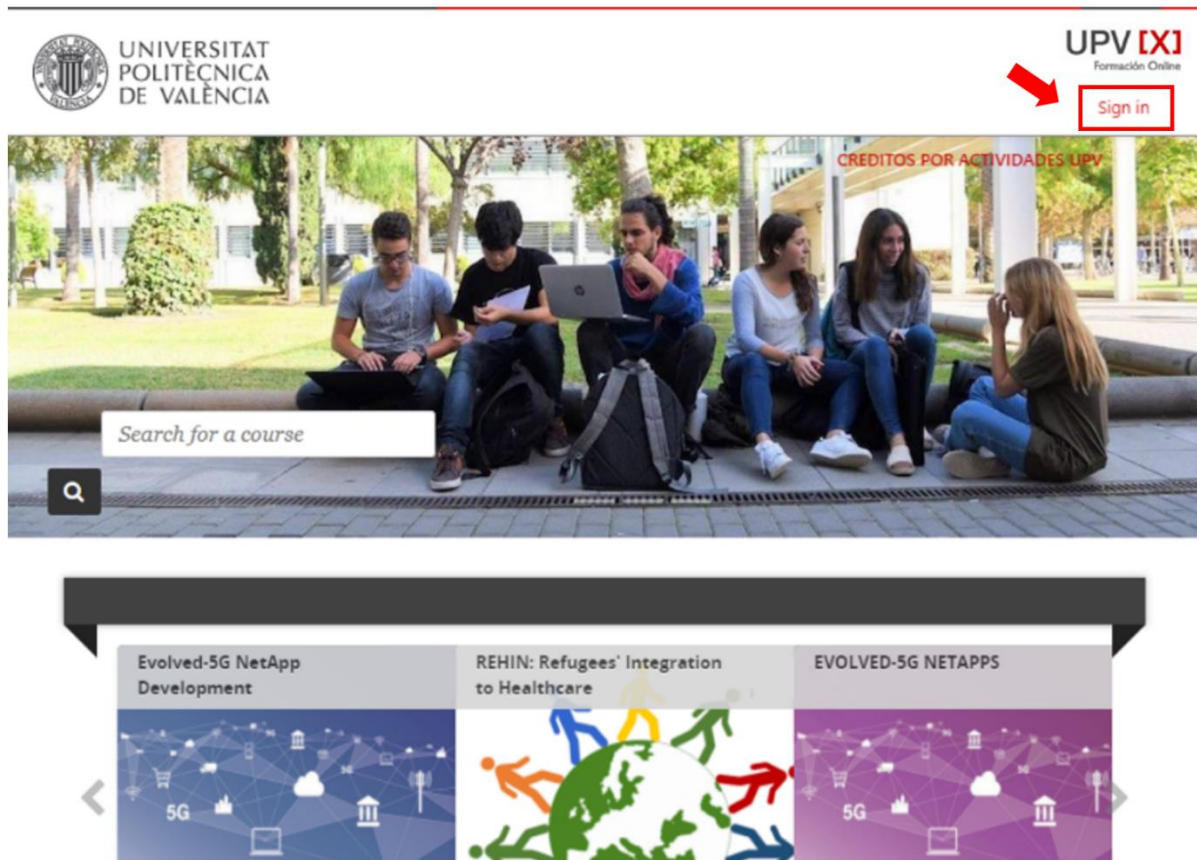
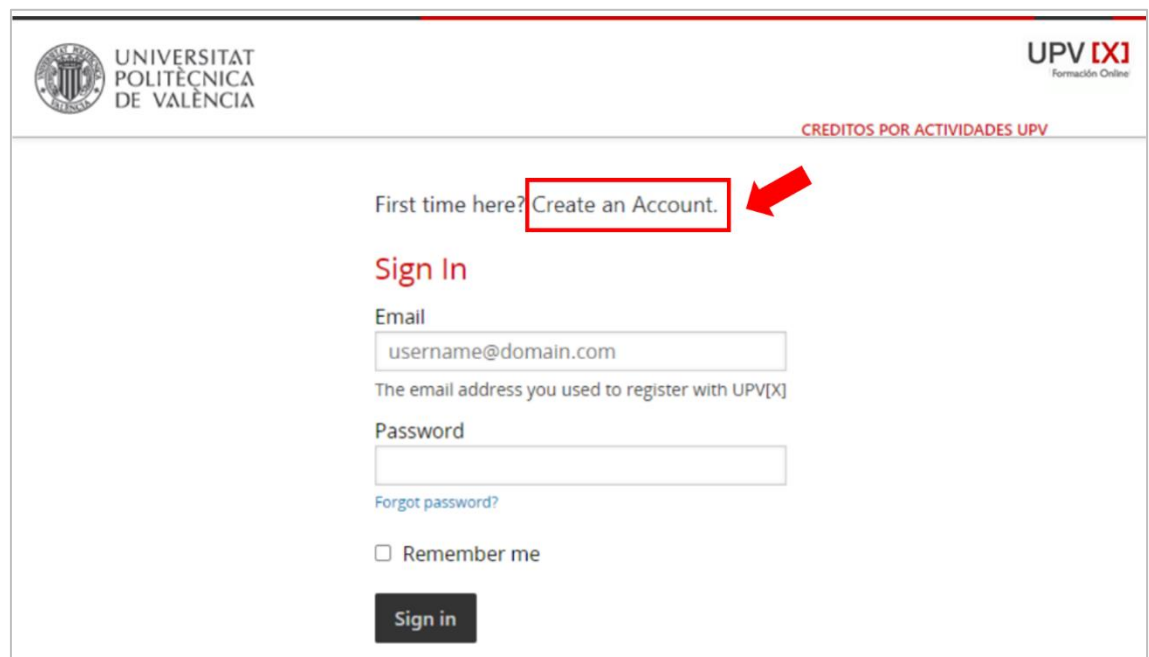


Figure 9. UPVx Educational Platform website Log In

c. Click “Create an Account”



First time here? [Create an Account.](#)

Sign In

Email

The email address you used to register with UPV[X]

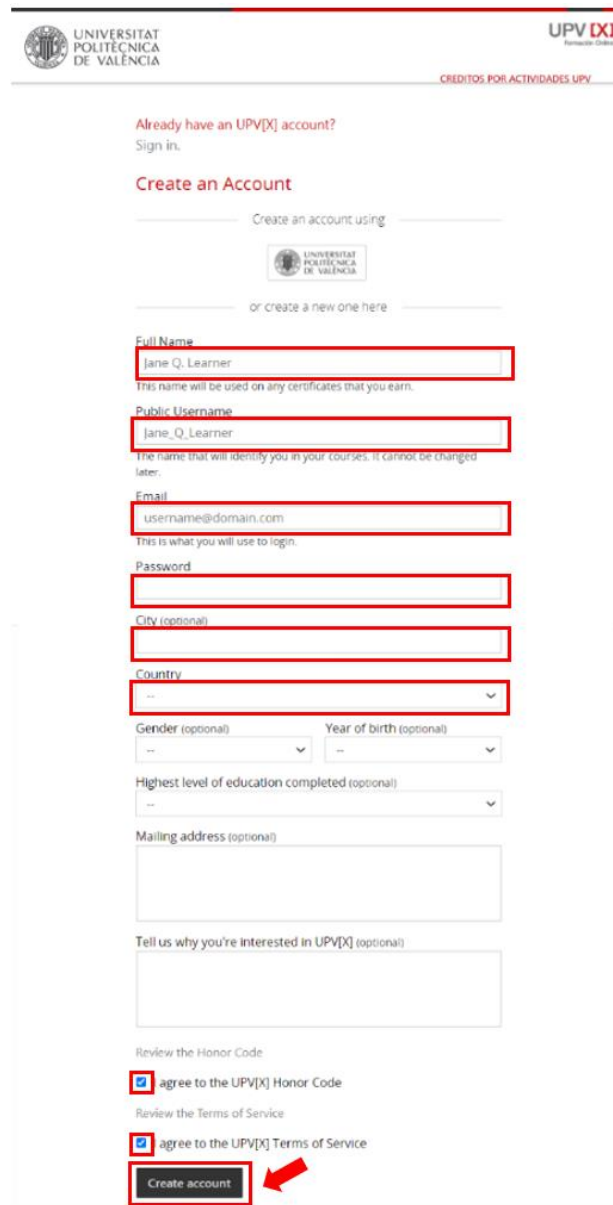
Password

[Forgot password?](#)

☐ Remember me

Figure 10. Link to create a UPVx account

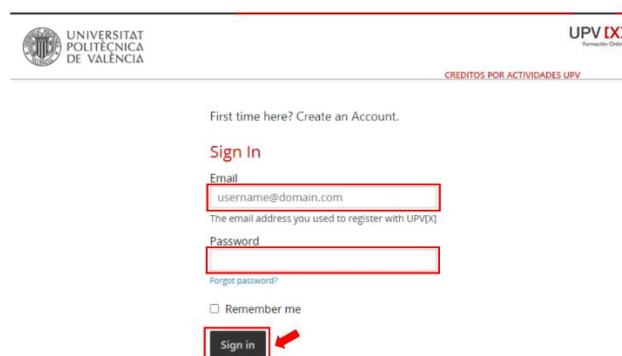
d. Fill out the registration form and create the account



The image shows the UPVx user registration form. At the top, there are logos for 'UNIVERSITAT POLITÈCNICA DE VALÈNCIA' and 'UPV EXI'. Below the logos, there is a link for 'CREDITOS POR ACTIVIDADES UPV'. The form starts with a question 'Already have an UPV[X] account?' and a 'Sign in.' link. Below this is the 'Create an Account' section. It has a dropdown menu 'Create an account using' with a selection for 'UNIVERSITAT POLITÈCNICA DE VALÈNCIA'. Below this is a link 'or create a new one here'. The form then has several input fields: 'Full Name' (with a red box around the input and a note 'This name will be used on any certificates that you earn.'), 'Public Username' (with a red box around the input and a note 'The name that will identify you in your courses. It cannot be changed later.'), 'Email' (with a red box around the input and a note 'This is what you will use to login.'), 'Password', 'City (optional)', 'Country' (a dropdown menu), 'Gender (optional)' (a dropdown menu), 'Year of birth (optional)' (a dropdown menu), 'Highest level of education completed (optional)' (a dropdown menu), 'Mailing address (optional)' (a text area), and 'Tell us why you're interested in UPV[X] (optional)' (a text area). At the bottom, there are two checkboxes: 'I agree to the UPV[X] Honor Code' and 'I agree to the UPV[X] Terms of Service', both of which are checked. Below these is a 'Create account' button, which is highlighted with a red box and a red arrow pointing to it.

Figure 11. UPVx user registration form

2. Log in to the [UPVx](#) platform



The image shows the UPVx Log-in window. At the top, there are logos for 'UNIVERSITAT POLITÈCNICA DE VALÈNCIA' and 'UPV EXI'. Below the logos, there is a link for 'CREDITOS POR ACTIVIDADES UPV'. The window starts with a link 'First time here? Create an Account.' Below this is the 'Sign In' section. It has two input fields: 'Email' (with a red box around the input and a note 'The email address you used to register with UPV[X]') and 'Password' (with a red box around the input and a link 'Forgot password?'). Below these is a checkbox 'Remember me'. At the bottom is a 'Sign in' button, which is highlighted with a red box and a red arrow pointing to it.

Figure 12. UPVx Log-in window

- Access the main course page (e.g., link for “[EVOLVED-5G NetApp Development](#)” course) and click on the “ENROLL” button. You can also search for EVOLVED-5G courses in the main page, using the search option, to access to them.

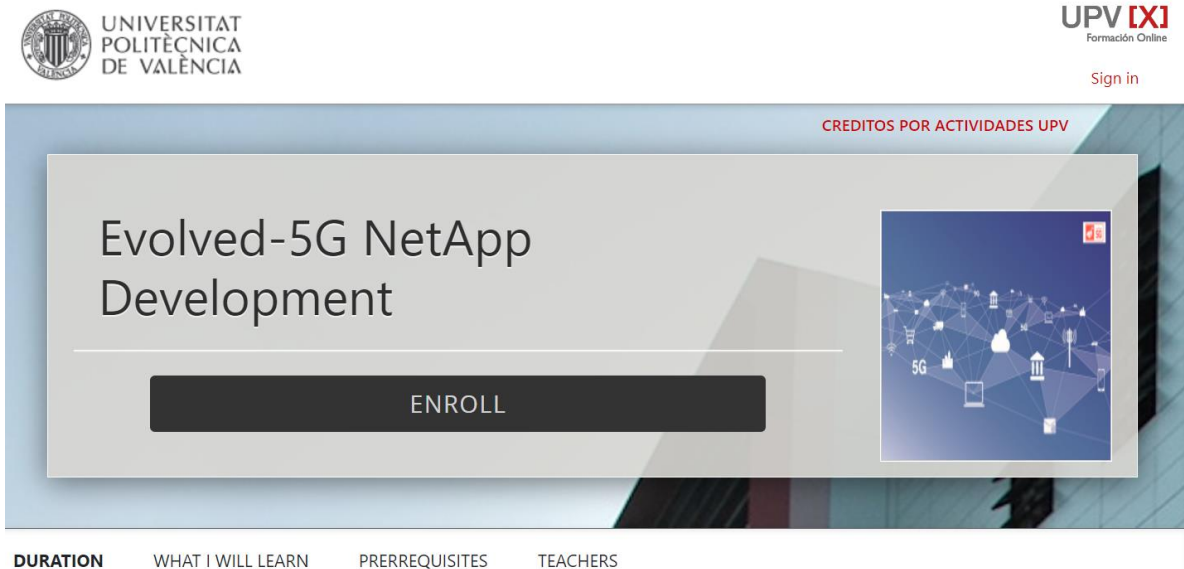


Figure 13. Example of EVOLVED-5G course main page in UPVx

- After being enrolled, you will be able to access course resources and take lessons. You also have the possibility of obtaining a course certificate.

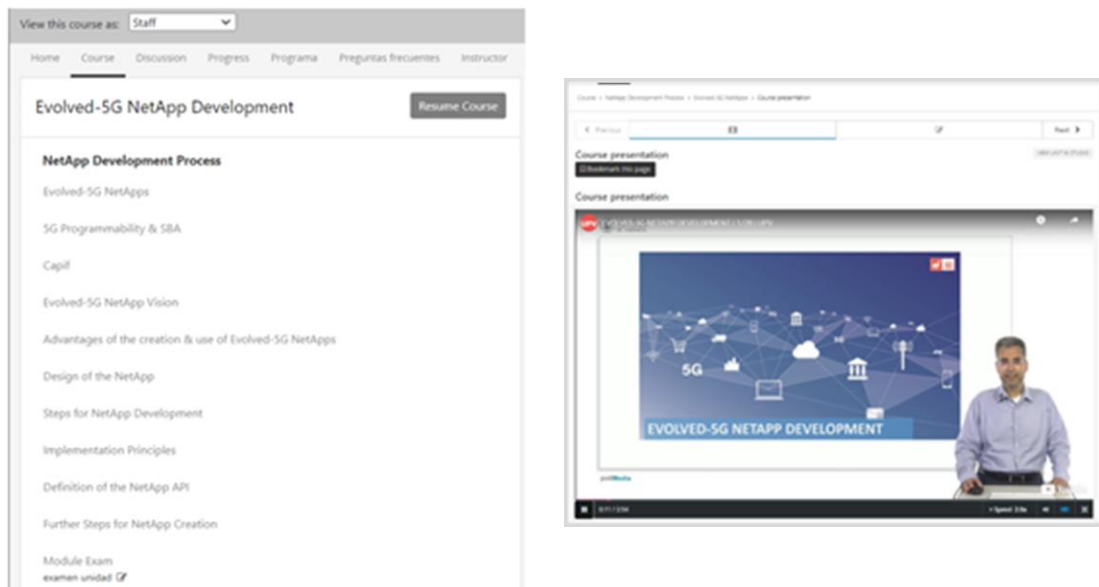


Figure 14. Navigation menu and sample contents of a training course

2.2.3.1 Training course on EVOLVED-5G NetApps

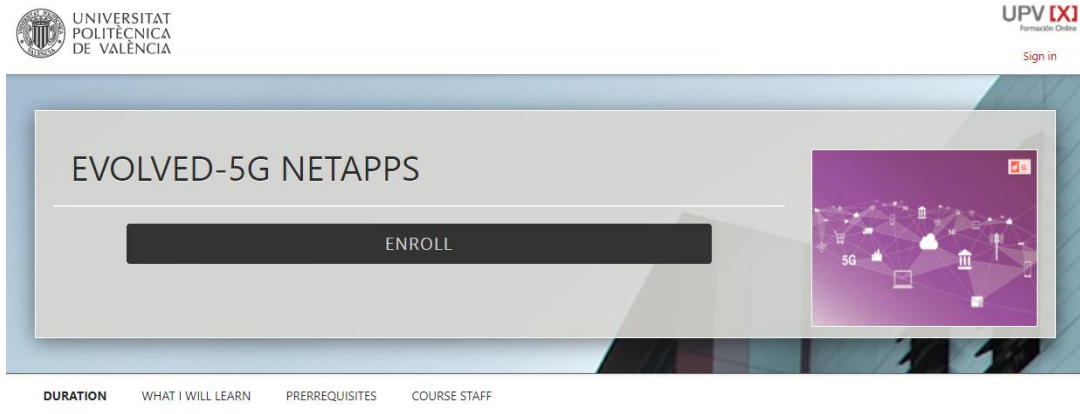


Figure 15. EVOLVED-5G NetApps Training Course

Title: EVOLVED-5G NetApps

Description: Course devoted to explain the concept of NetApp addressing the EVOLVED-5G vision in this regard, along the advantages from their use, as well as the different existing types and their lifecycle.

Structure & Contents: 1 Module

Module 1: EVOLVED-5G NetApps

- Presentation of the course EVOLVED-5G NetApps
- 5G Programmability & SBA
- CAPIF
- EVOLVED-5G NetApp Vision
- Advantages of EVOLVED-5G NetApps
- EVOLVED-5G NetApps Types
- NetApp Lifecycle
- Conclusions & Summary

Lecturer: Harilaos Koumaras (NCSRD)

Course editor: UPV (design of slides, tests & syllabus)

Duration: 1 week – Approximately 1 hour of video

Learning Objectives:

- Understand the concept of 5G programmability & its advantages
- Concept of NetApp
- EVOLVED-5G NetApp vision
- Innovation and benefits provided by NetApps
- Use of NetApps
- Potential for exploitation of NetApp capabilities on industry and other areas
- Concept of Common API Framework
- The different types of NetApp
- The EVOLVED-5G NetApp lifecycle

Materials: Videos & Tests

Resources: Course Forum

Link: <https://www.upvx.es/courses/course-v1:TecnologiasAvanzadasDeComunicaciones+evolved-5g-netapps+2022-01/about>



Figure 16. Video sample of EVOLVED-5G NetApps training course

2.2.3.2 Training course on EVOLVED-5G NetApp Development

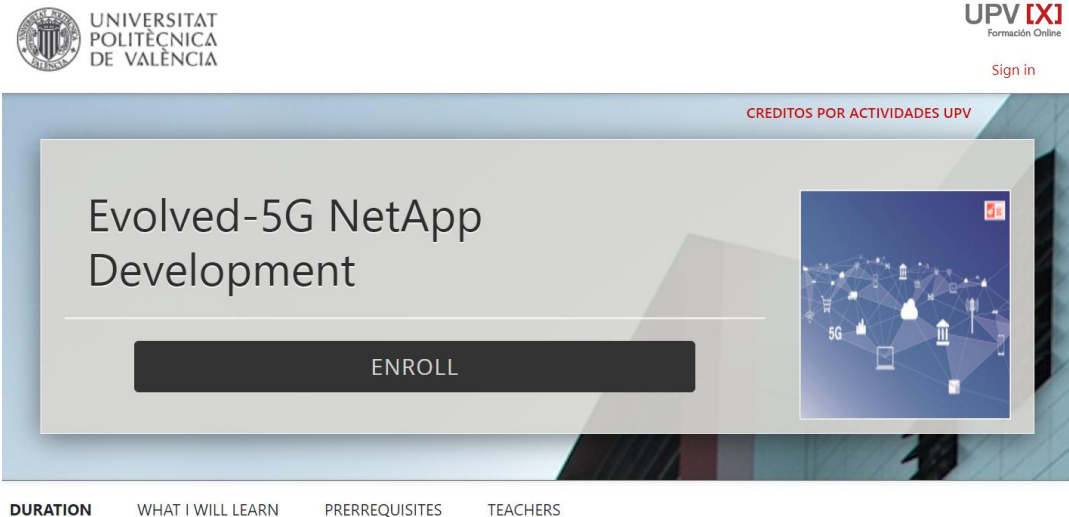


Figure 17. EVOLVED-5G NetApp Development Training Course

Title: EVOLVED-5G NetApp Development

Description: Training course for the development of EVOLVED-5G NetApps

Structure & Contents: 1 Module

- Presentation of the Course “EVOLVED-5G NetApp Development”

Module 1: NetApp Development Process

- EVOLVED-5G NetApps
- 5G Programmability & SBA
- CAPIF
- EVOLVED-5G NetApp Vision
- Advantages of EVOLVED-5G NetApps
- EVOLVED-5G NetApp Vision
- Advantages of the creation & use of EVOLVED-5G NetApps
- Design of the NetApp
- Steps for NetApp Development
- NetApp Implementation Principles
- Definition of a NetApp API

- Further Steps for NetApps

Module 2: Software Tools for NetApp Development

- Presentation of the module “Software Tools for NetApp Development
- Contents of the module
- Software tools
- Code Repositories
 - EVOLVED-5G GitHub Code Repository
 - Actions on Code Repositories
- SDK
 - What is the EVOLVED-5G SDK?
 - SDK Integrated Tools
 - SDK CLI Tool & NetApp Template
 - SDK Libraries
 - Advantages of the EVOLVED-5G SDK
 - Installation of the SDK
 - NetApp Creation with the SDK
 - Use of the SDK library LocationSubscriber
 - Use of the SDK library QoS Awareness
 - NetApp Production Pipeline (Integrated SDK tool)
- Other Tools
- Next Steps after Coding your NetApp
- Conclusions

Duration: 2 weeks – 2 hours of video

Lecturers: Dr. Harilaos Koumaras (NSCR), Ricardo Marco (ATOS), Nikos Vrionis (INFOLYSiS), Alexandros Tzoumas (Maggioli), Dr. Regel González Usach (UPV).

Duration: 1 week – Approximately 1 hour of video

Learning Objectives:

- 5G Programmability concept & advantages
- NetApp vision, innovation potential & main benefits
- Steps and process for NetApp development
- Awareness of the most important assisting software tools for NetApp development
- Use of EVOLVED-5G Code Repository
- SDK integrated tools
- EVOLVED-5G SDK installation & use
- How to start programming a NetApp from a generic NetApp template
- Use of the EVOLVED-5G SDK library LocationSubscriber
- Use of the EVOLVED-5G SDK library QoS Awareness
- Basic knowledge on NetApp CI/CD pipelines

Materials: Videos & Tests

Resources: Course Forum

Link: <https://upvx.es/courses/course-v1:TecnologiasAvanzadasDeComunicaciones+evolved-5g-netapp-dev+2022-01/about>

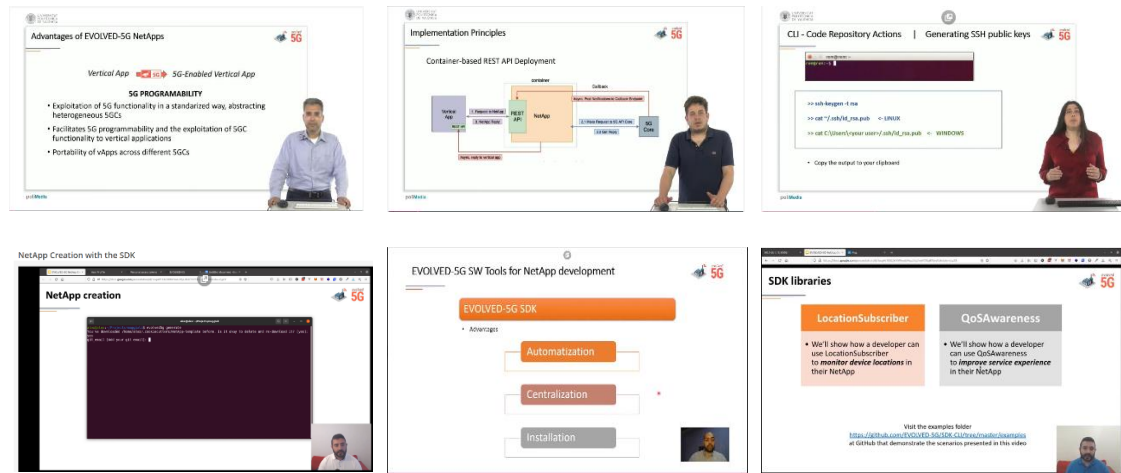


Figure 18. Video resource samples of EVOLVED-5G NetApp Development training course

2.2.3.3 Training course on 5G & Industry 4.0

Title: 5G & Industry 4.0

Description: Course regarding 5G & Industry 4.0 in which are introduced the concepts of 5G Programmability and EVOLVED-5G NetApps.

Structure & Contents: 1 Module

Module 1: 5G & Industry 4.0

- 5G & Industry 4.0 - Course presentation
- Introduction
- 5G
 - 5G capabilities
 - 5G enabling technologies
- Industry 4.0
- Industry 4.0 Digital Enablers
 - IoT & IIoT
 - Big Data
 - Cloud & Edge Computing
 - Artificial Intelligence (ML & DL)
 - Virtual, Augmented & Mixed Reality
 - Cybersecurity
 - Advanced Robotics
- 5G potential & role in Industry 4.0
- 5G Programmability
- Industry 4.0 Use Cases
 - Predictive maintenance
 - Remote operational assistance leveraging augmented reality
 - Other use cases
- Vision of Future
- Conclusions & Summary

Duration: 1 weeks – 1 hours of video

Instructors: UPV

Duration: 1 week – Approximately 1 hour of video

Learning Objectives:

- Basics of 5G
- The advantages and immense potential of the use of 5G.
- Industry 4.0: the forthcoming Industrial Revolution
- Digital Enablers for Industry 4.0: Cloud & Edge Computing, Big Data, Artificial Intelligence, Augmented, Virtual & Mixed Reality,
- 5G role in Industry 4.0
- 5G Programmability for enabling a deep exploitation of 5G capabilities
- Relevant Industry 4.0 use cases (e.g., Predictive Maintenance, Operational Assistance through Virtual Reality)
- Initiatives towards 5G application in Industrial environments, such as EVOLVED-5G

Materials: Videos & Tests

Resources: Course Forum

**This course and its associated materials were prepared and delivered, and it is currently in process of publication by UPVx.*



Figure 19. Video resource of 5G & Industry 4.0 Training Course

2.3 TRAINING OUTREACH

The training activity is not restricted to an internal ambit, and in the frame of Task 6.1, it has been planned its openness to external audiences to educate them on EVOLVED-5G technical topics, through the realization of training events or training activities and by the provision of open courses, as it has been explained in a previous section of this document.

The target audiences for external training are the developers' and the academic communities.

This training outreach will allow for an increased visibility and awareness on the project technical topics, technical vision and developments and as well on the project itself as a whole entity. Moreover, it promotes the attraction and engagement of academic and developers' communities, fostering community building around the EVOLVED-5G project.

Community building is essential to the success of any project, as it helps to create a sense of ownership and responsibility among community members, significantly increases the visibility of the project and the technical achievements and developments and ensures that are invested in the project's success. A strong community can provide valuable feedback and input, and can help to promote and disseminate the project's work.

The potential developer audience encompasses professionals on diverse technical areas who have an interest on acquiring or extending their knowledge on technical topics related to EVOLVED-5G. This technical audience includes the figure of growing professionals, who are

willing in exploring new technical areas and acquiring new knowledge and skills that will augment their value as technical workers. Moreover, it should be also made a special mention on the attraction of open-source community, which provides feedback, support and promotes further adoption, reusability and continuity to technical projects to which it is engaged. A main requirement for this aim is to offer public online access to the software code –which is accomplished for the majority of EVOLVED-5G developments, including NetApps-.

In the last years, it has been observed a very significant and growing interest on the provision of open-source developments and the creation of an open-source community by major software companies, such as Microsoft, due to the very relevant benefits and high impact obtained from the creation of an open-source community. This apparently paradoxical fact enlightens the great importance and benefits of building an open-source community towards software technical developments on a project.

On the other hand, events addressed to academic community at universities can potentially have an immense impact among future technical professionals, including future developers, as well as on researchers and future researchers.

In any case, the training event audience is not restricted to the aforementioned target types, but addressed in special to them. Other stakeholders may participate also in the training events, or get know about the project indirectly as a result of the realization of these training activities.

There are many benefits to promoting a developers' community of a technical project, including:

- Increased collaboration and knowledge sharing among developers.
- Improved project visibility and awareness.
- Augmented potential for attracting new developers, contributors and key stakeholders for the adoption, reusability and continuity of the technical project and vision.
- More opportunities for feedback and input from the community.
- Increased innovation fruit of the feedback, knowledge sharing and collaboration from the community. Open-source communities are often sources of innovation, since by sharing ideas and code, community members can come up with new ways of doing things that can be adopted by others.
- Enhanced project stability and quality. Due to the collaboration and feedback from external developers the quality of the software product can be significantly increased.

These benefits from are significantly enhanced when the project software code is shared and publicly accessible. Open-source code allows for:

- Increased transparency: facilitating the visibility of changes and novelties, provision of feedback and further contribution to the project.
- Increased trust: The visibility of the code and the inner workings of a project, typically augment significantly the level of trust, as it can be easily demonstrated that there is nothing to hide and the project is being run in a transparent way.

Moreover, open-source communities typically have good communication channels, which can help to resolve issues and improve collaboration, reach talented professionals willing to provide support, get better feedback on the project, increase in general the support for the project and helping directly or indirectly to build relationships with stakeholders.

The different types of training events considered for performing this outreach training event are developer-oriented events and seminars. The focus on those specific events or training activities

responds to the plan to reach and attract the specific aforementioned target audiences for the EVOLVED-5G training.

2.3.1 Outreach strategy

In the frame of the EVOLVED-5G training, it has been defined an outreach strategy for maximizing the reach and engagement with target audiences external to the project through training activities.

This outreach strategy represents a plan for the communication and engagement with stakeholders who are not currently involved in the EVOLVED-5G project. In this section, it is described the training outreach strategy planned to reach external target audiences through external training events, in order to let them know about EVOLVED-5G technical vision, details and developments, technical topics regarding the EVOLVED-5G project, and fostering their engagement with the project, project vision and the project technical developments.

This strategy is focused on the developer and academic communities as target audiences, without excluding or restricting the participation of other types of stakeholders interested in EVOLVED-5 and technical topics related to the project.

Main means for reaching the targeted audiences are the organization of training events and the participation on existing key events in this scope. Moreover, it should be noted that these audiences can be also reached through the open courses for training offered in the educational platforms UPVx and EDx. Additionally, elements such as the EVOLVED-5G GitHub repository [5] and the EVOLVED-5G Forum⁹ [6] also play a relevant role in the external training strategy. On the one hand, the EVOLVED-5G technical repository is a tool that allows trainees to access to the software developments of the project, being able to download the code repositories, to build, deploy and make use of the different elements, and also to provide feedback, or to potentially extend or reuse the code in the future. On the other hand, the Forum enables a space for interaction not only with SMEs but with external developers, researchers, students and other stakeholders interested in technical topics and developments of the project, where questions, doubts and open topics can be posted and answered by the EVOLVED-5G consortium or members of the EVOLVED-5G Community.

The different types of training activities considered for performing this outreach strategy are developer-oriented events and seminars, which are very suitable for performing training on technical topics, and they are also able to attract the aforementioned specific target audiences.

Despite of the modality of the event, which can be physical, online or present instead a hybrid approach, the training events will always be live events. In this regard, even in the case a recording of the event is offered afterwards, the activity would have been performed requiring a synchronous attendance of the participants, at a specific date and time. This fact represents a key feature that strongly differentiates this training activity from the lectures provided in the online open courses, which are on demand and provide a very different type of interaction between participants and experts conducting the training activity -they are interactive, but not in the same manner-.

Thus, in the outreach strategy for training, it is considered both the participation from EVOLVED-5G members on relevant developer-oriented events, and the organization of such events, as training activities completely devoted to training, during the lifetime of T6.1, since its start in

⁹ <https://forum.evolved-5g.eu>

M7 until the end of the project. It should be noted that training events were not expected to take place until the technical developments in the project reached a certain degree of maturity. In this regard, it was initially planned that the first stage of Task 6.1 would be primarily devoted to the development of training materials and the performance of internal training activities, and on a second stage of T6.1 in Period 1, when the technical WPs were on a more mature stage, the organization or participation on external training events was expected to progressively take place, and continue until the end of the project.

For the participation in key events with the aim of performing training activities regarding the technical part of the project, it is followed a specific procedure:

- First, within the project different key events were identified, which represented potential opportunities for participating in them providing training activities.
- Second, the potential participation with a training activity on each of them was studied, considering numerous factors such as viability and interest, the type of activity that best fit on it, the impact of the activity and the event, and the availability of the project members for performing the event and logistics aspects.
- Finally, if the participation opportunity was considered appropriate and viable, it took place its planning and realization.

For the organization of events, there is also a planning procedure established, which consists on:

- identification of a proper opportunity by the potential organiser(s).
- decision-making on its design and realization.
- internal planning within the consortium for participating partners in the event with different training activities (performed in WP6).
- announcement and promotion of the event to potential attendants, through different EVOLVED-5G communication channels (website, social media, newsletter etc.) and counting on the support and collaboration with WP7 team for this aim, considering the target audience addressed.
- Finally, the organization and realization of the event.

Moreover, during and after its execution, the training activities are well communicated through the communication channels of the project by WP7.

2.3.1.1 Developer-oriented events

A developer-oriented event in the frame of the EVOLVED-5G training is a conducted live activity under a training aim on technical topics from or related to the project, which is addressed in special to developers, and it allows the attendance and participation of external audiences to the project consortium.

These events are designed to educate developers on the EVOLVED-5G project's vision, framework and technical developments, on which NetApps play a prominent central role.

Those events are typically workshops or webinars, although other types of activities can be also performed in this scope, such as hackathons or meetups. Those types of events are defined as follows:

- A **training workshop** is understood as a meeting conducted by experts on the technical topic addressed, related to EVOLVED-5G, in which participants engage in collaborative

learning or problem-solving activities. A training workshop can be focused on a specific technical area or technical developments, such as NetApp development.

- An **EVOLVED-5G hackathon** is an event in which computer programmers and other participants involved in software development, such as interface designers or project managers, collaborate intensively on a software project, which could be for example the development of NetApps, the creation of an SDK library or the programming of a specific vertical Application making use of existing EVOLVED-5G NetApps.
- Developer **meetups** for training, which represent gatherings of people who are interested in acquiring more knowledge on a particular technical subject related with the EVOLVED-5G project. This knowledge can encompass from a technical skill to a new way of performing a process or action related to the involved development. These events allow to get developers and experts on technical topics addressed together to share information and learn from each other.
- Other events, such as **webinars** (i.e., seminars conducted over the Internet) can be considered EVOLVED-5G developer-oriented events, if they are mainly addressed to developers and not to the scope of academia or university audiences, and if they are devoted to activities related to training on EVOLVED-5G technical topics, the Project technical vision, framework and developments.

In the outreach strategy for training, it is considered both the participation from EVOLVED-5G members on relevant developer-oriented events, and the organization of such events, as training activities completely devoted to training. Those events constitute a part of the T6.1 outreach strategy.

These events represent an excellent opportunity for developers to learn about the EVOLVED-5G project and NetApps work, as well as for the project to let the technical work conducted be better known and to promote the engagement of a community of developers. These events would also provide a valuable opportunity for programmers to network with other developers working on similar technologies, projects and related areas, fostering a very valuable and enriching knowledge exchange, that can lead to new ideas and technical improvements on the EVOLVED-5G developments, and to a potential adoption of the EVOLVED-5G framework, NetApps and other developments by those programmers and stakeholders related to them.

2.3.1.2 Academic-oriented events: Seminars

The different types of events and live activities targeted to academia and university student audiences, in the scope of EVOLVED-5G training, are addressed in this section.

Seminars are the main type of event in academic environments to transmit the EVOLVED-5G vision, objectives and technical developments to university students on technical areas, who are potential future developers and technical professionals.

Seminars on technical topics regarding EVOLVED-5G are dedicated classes at universities, that do not belong to any specific subject, where students can learn about a particular topic in depth. These seminars are intended to cover both theory and practical-view application of the addressed topic.

In addition to seminars, other type of events can be considered, such as webinars (i.e., online seminars over the Internet that are not run on a physical or hybrid mode), university workshops or lectures within a subject that introduce technical topics and elements from EVOLVED-5G.

2.3.2 Conducted training outreach activities

Until the submission date of this deliverable, several training events took place in physical and digital format in the frame of the training activity of task 6.1, which are listed in the table below and described in more detail in the following subsections.

EVENT	DATE & PLACE	AUDIENCE
Seminar on Industry 4.0 Communications	Polytechnic University of Valencia, Spain 22 November, 2022	MsC students
--- Full lecture devoted to a related EVOLVED-5G topic, Industry 4.0 communications & Introduction of the EVOLVED-5G project as an Industry 4.0 5G-related innovation initiative.		
Seminar: Testing & Optimizing 5G for Vertical Industry	Faculty of Electrical Engineering of University of Ljubljana, Slovenia 2-4 February, 2022	Academia, researchers, professionals
--- Lecture on "Testing and optimizing 5G for industry verticals", in which EVOLVED-5G NetApps are presented as a technical solution on this topic.		
Innovation Course: EVOLVED-5G Project	ValenciaPort Foundation, Valencia, Spain 5-20 March, 2022	Academia, professionals
--- Course addressing the digital transformation of port sector, showing the potential of 5G & EVOLVED-5G NetApps for the digital transformation of ports & port industries.		
5G Programmability Workshop	Athens Metropolitan College, Greece 21-22 March, 2022	Academic students
--- Workshop "Introduction to 5G Systems"		
--- Workshop "5G Programmability and APIs exposure"		
--- Workshop "The NetApp Concept"		
--- Workshop "NetApp Lifecycle and Different Development Environments"		
--- Workshop on the EVOLVED-5G Community		
-- Training Demo of INFOLYSIS NetApp		
---Training Demo of INTERNET INSTITUTE NetApp		
-- Training Demo from ZORTENET		
--- Inter-ICT-41-project activity : session on "Other project views: SMART5GRID"		
Seminar on 5G Application	Polytechnic University of Valencia Valencia, Spain 30 May, 2022	Academic students
--- Lecture on "5G Application"		
--- Workshop "5G Programmability"		
-----Integrated Training Demo: NEF emulator		
--- Workshop "EVOLVED-5G NetApps"		
--- Workshop "EVOLVED-5G framework"		
--- Training Demo: INFOLYSIS NetApp & Chatbot application		
--- Training Demo: IMMERSION NetApp & Mixed Reality		
Summer School NCSR Demokritos	NCSR Demokritos, Athens, Greece 12 July, 2022	Academic students
--- Panel on EVOLVED-5G		

Table 3 Training Events performed

The events performed are composed of:

- three seminars
- one workshop
- an innovation demonstrations on EVOLVED-5G topics. A total of 19 training activities have been performed until the end of M19. course
- an EVOLVED-5G Panel presentation in a Summer School Event

As well, these events encompass internally technical sessions, workshops, training-oriented presentations and technical, providing a total of 19 different training activities performed.

2.3.2.1 Seminar on Industry 4.0 Communications

Event: Seminar on Industry 4.0 Communications

Date & Place: 22nd November 2021, at Universitat Politècnica de València (Valencia, Spain)

Event type: Seminar (physical)

Audience: MsC students

Attendance: 87 participants

Description: University seminar regarding Industry 4.0 communications, based on 5G. EVOLVED-5G was referred as an Innovation Initiative related with Industry 4.0 in the frame of the H2020 European programme.

Contents:

- General Concepts of Industrial Networks
- Standardized Architectures
- Applications in Industry and other environments

Organiser: Department of Communications of the Universitat Politècnica de València. This seminar is on the official curricula of MsC degree on Telecommunications at UPV.

Presenter: Universitat Politècnica de València (Department of Communications, UPV)

2.3.2.2 Seminar on Radio Communications

Event: 25th Seminar on Radio Communications at the Faculty of Electrical Engineering of University of Ljubljana (Participation with a Lecture)

Date & Place: 2nd-4th February, 2022, Faculty of Electrical Engineering Ljubljana, Slovenia

Event type: Seminar (hybrid mode)

Audience: Researchers, university students, industry specialists

Attendance: 70 attendants

Description: Lecture on “Testing and optimizing 5G for industry verticals”, prepared by Rudolf Sušnik, Janez Sterle and Luka Koršič (ININ) and presented by Rudolf Sušnik, in which EVOLVED-5G NetApps were presented as a technical solution on this matter.

Content: “Testing and optimizing 5G for industry verticals”:

- Introduction
- The need for testing and optimizing 5G networks and services

- Methodology and analytics
- Tools
- Use cases
- Conclusions

Presenter: Rudolf Sušnik (ININ)

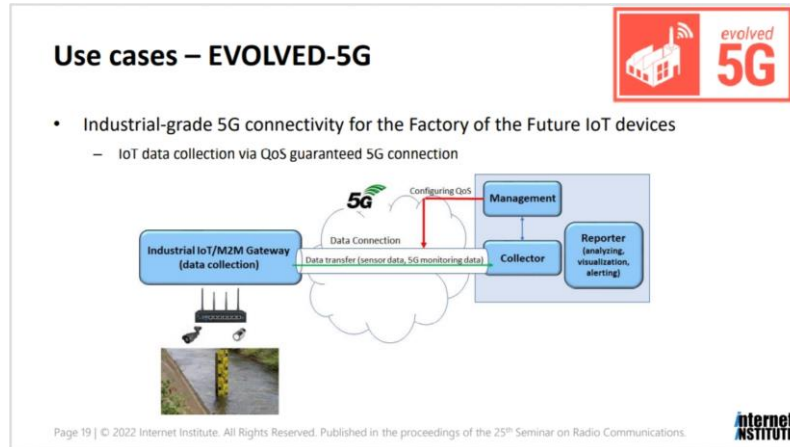


Figure 20. Presentation of EVOLVED-5G use case

2.3.2.3 Innovation course: EVOLVED-5G Project



Figure 21. Innovation course regarding EVOLVED-5G project & port digital transformation

Event: Innovation course: EVOLVED-5G Project

Date & Place: 5th March 2022, Valencia (Spain). This event was part of a series of two related courses regarding the digital transformation of the port sector, that took place on 5th and 11th March respectively.

Event type: 1-day course (physical). The course is part of a series of courses regarding the digital transformation of the port sector.

Audience: Port professionals, university students (mainly MSc students)

Attendance: 25 attendants

Description: Innovation course of UPV in collaboration with ValenciaPort Foundation and INNDUX, devoted to the digital transformation of the port sector. It was presented the potential

of EVOLVED-5G solutions for the digital transformation of the port industries, and for providing significant innovation in this sector by allowing innovative use cases enabled through the use of 5G.

Organisers: Universitat Politècnica de València (UPV), ValenciaPort Foundation and INNDUX

Presenter: Prof. Carlos E. Palau (UPV)

2.3.2.4 5G Programmability Workshop

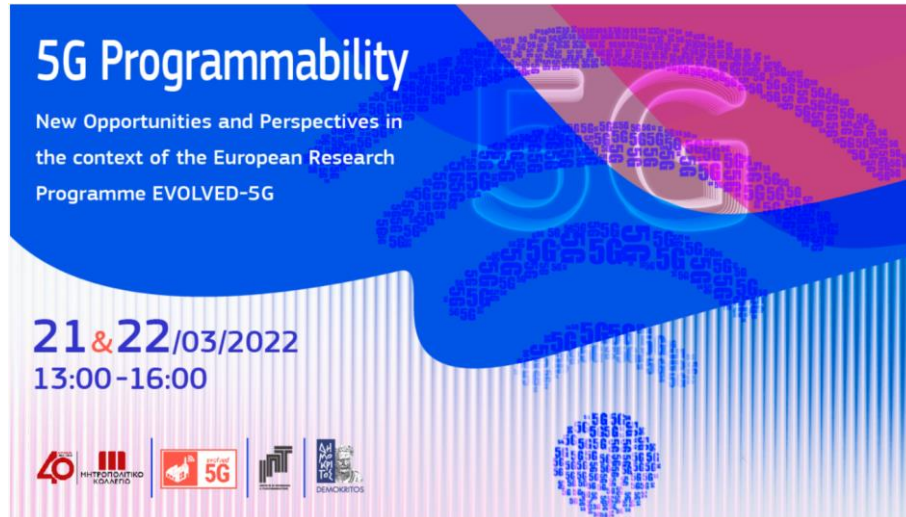


Figure 22. Banner of “5G Programmability” Workshop

Event: “5G Programmability” Workshop

Date & Place: 21st-22nd March, 2021 – Online

Event type: Online Workshop

Organisers: EVOLVED-5G & Computer Science Department of the Metropolitan College of Athens

Audience: Academic students & Professionals

Attendance: 102 (peak audience)

Duration: 2 days (6h)

Description: Workshop addressed to the Athens Metropolitan College students, on diverse topics regarding EVOLVED-5G: 5G systems, 5G Programmability, NetApp concept, the NetApp Lifecycle and Different Development Environments and the EVOLVED-5G Community. Moreover it offered several technical demos regarding NetApps and the view of another 5G-related project.

Activities:

- Workshop “Introduction to 5G Systems” by Dr. Harilaos Koumaras (NCSR-D)
- Workshop “5G Programmability and APIs exposure” by Dimitris Fragkos (NCSR-D)
- Workshop “The NetApp Concept” by George Makropoulous (NCSR-D)
- Workshop “NetApp Lifecycle and Different Development Environments” by Dr. Dimitris Tsolkas (FOGUS)

- Workshop regarding the EVOLVED-5G Community by Christina Skoubridou (ENVOLVE)
- Training Demo INFOLYSIS NetApp by Theoni Dounia (INF)
- Training Demo INTERNET INSTITUTE NetApp by Luka Koršič (ININ)
- Training Demo ZORTENET NetApp by Andreas Oikonomakis (ZORTENET)...
- Session on "Other project views: SMART5GRID" by Paula Encinar (ATOS)

Presenters: Dr Harilaos Koumaras (NCSR), Dimitris Fragkos (NCSR), George Makropoulos (NCSR), Dr Dimitris Tsolkas (FOGUS), Christina Skoubridou (ENVOLVE), Theoni Dounia (INFOLYSIS), Luka Koršič (ININ), Andreas Oikonomakis (ZORTENET), Paula Encinar (ATOS)

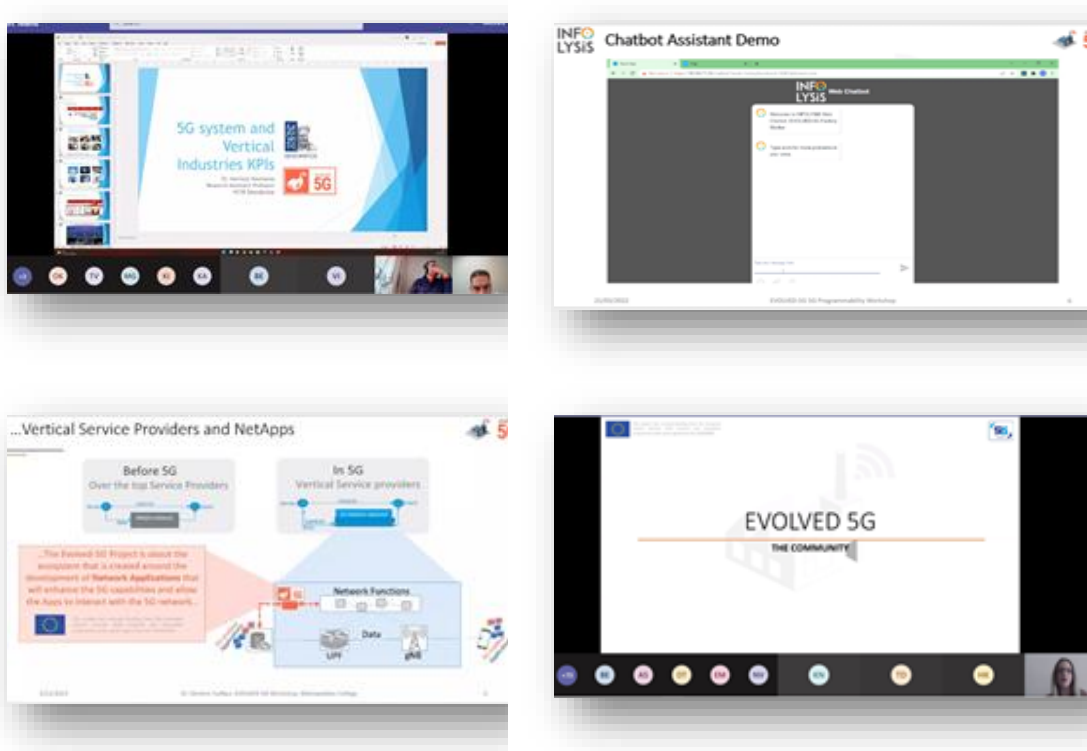


Figure 23. 5G Programmability workshop

2.3.2.5 Seminar on 5G Application

Event: Seminar "5G Application"

Date & Place: 30th May, 2021

Event type: Seminar (hybrid mode: physical event but with videoconference mode enabled)

Organisers: EVOLVED-5G & Computer Science Department of the Metropolitan College of Athens

Audience: MSc, BsC and PhD students, PhD researchers & Professionals. Mostly MSc Students.

Attendance: 44 attendants

Duration: 5h

Description: EVOLVED-5G seminar addressing the topics of 5G Application, 5G Programmability, EVOLVED-5G NetApps and the EVOLVED-5G Framework, and presenting technical

demonstrations of EVOLVED-5G NetApps and their associated vertical applications (i.e., INFOLYSiS NetApp & Chatbot and IMMERSION NetApp along with an associated Mixed Reality application).

Activities:

- Presentation of the seminar by Prof. Carlos Palau (UPV)
- “5G Application” by Dr. Regel G. Usach (UPV)
- “5G Programmability and APIs exposure” by Anastasios Gogos & Dimitris Fragkos
- “EVOLVED-5G NetApps” by George Makrouopoulos (NCSRD)
- “The EVOLVED-5G Framework” by Dr. Harilaos Koumaras (NCSRD)
- Technical demonstration of INFOLYSiS NetApp & Chatbot by Theoni Dounia (INF)
- Technical demonstration of IMMERSION NetApp & Mixed Reality by Dr. Charles Bailly (IMM)

Organiser: UPV

Presenters: Prof Carlos Palau (UPV), Dr Regel Gonzalez Usach (UPV), Anastasios Gogos (NCSRD), George Makropoulos (NCSRD), Dr Harilaos Koumaras (NCSRD), Theoni Dounia (INF), Dr. Charles Bailly (IMM)



Figure 24. 5G Application seminar

2.3.2.6 NCSR Demokritos Summer School

Event: NCSR Demokritos Summer School (Panel presentation in the event)

Date & Place: 12th July 2022 in Athens (Greece)

Event type: Panel presentation about EVOLVED-5G

Organisers: EVOLVED-5G & Computer Science Department of the Metropolitan College of Athens

Audience: M.Sc., B.Sc. and PhD students, graduates of Technological domains in interdisciplinary research

Attendance: 200 attendants

Duration: 1h

Description: Panel presentations about 5G programmability, EVOLVED-5G facility, NetApp concept during the Summer School of NCSR Demokritos.

Organiser: NCSR D

Presenter: Dr Harilaos Koumaras (NCSR D), Dimitrios Fragkos (NCSR D)

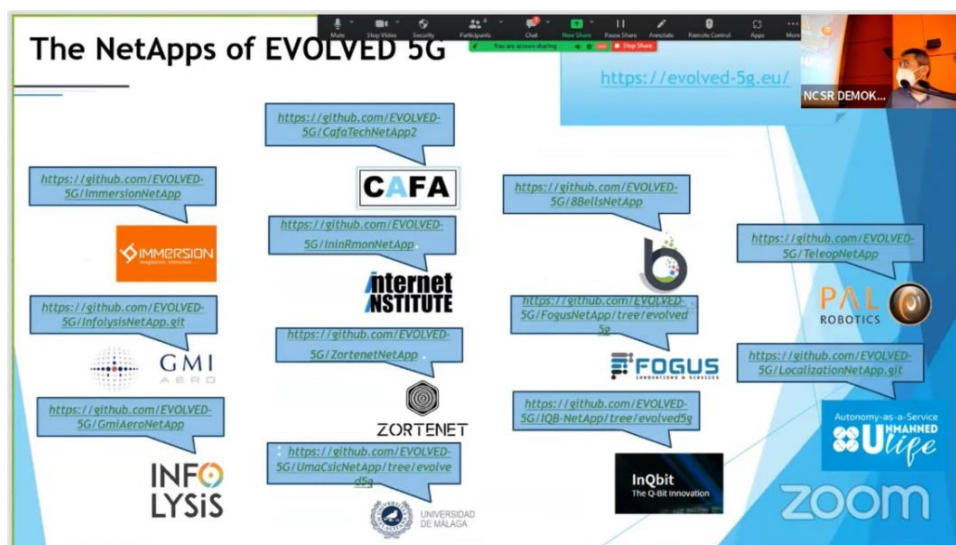


Figure 25. EVOLVED-5G Panel presentation on NCSR D Summer School

3 SMEs AND STARTUP ACCELERATION PROGRAM

3.1 ACCELERATION AND COMMUNITY ENGAGEMENT PROGRAM

Our acceleration and community engagement Program for startups includes three main elements:

- The Acceleration Program
- The Acceleration Library
- The Train the Trainer Program

3.2 ACCELERATION PROGRAM

The **EVOLVED-5G Acceleration Program** has been developed and will get piloted to test prioritised business models via a 5-month blended learning support Program, which will enable each entrepreneur to select the business model with the highest potential to deliver a scalable enterprise and develop growth plans to be implemented with support of our consortium experts. Participants will use EVOLVED-5G tools, enabling piloting and refinements.

Participant selection: A call for expression of interest will be run, targeting entrepreneurs across the full spectrum of EVOLVED-5G sectors in the EU countries. All participants will have to showcase commitment and meet specific selection criteria to ensure that the highest potential opportunities from across the regions are selected.

The Program will be delivered via a blended approach of online learning supported by a virtual mentorship Program. The first part of the Program will be 4 days of immersive training, run by the IEA team, with the support of the trainers. Over the first part of the Program entrepreneurs from the participating regions will have a) master classes on entrepreneurship, critical skills and perspectives for venture development and scaling within a 5G framework, b) sessions on assessment & diagnostics, c) live case studies (cases will include examples of), d) business model innovation workshops e) funding and finance f) networking g) action plan development.

In addition, virtual mentorship will be provided to all participants. The webinars will provide live case study examples from which the SMEs/Startups can learn as well as further input from faculty on a range of specific topics and a degree of mentoring through any live challenges the businesses might be facing at that time. These sessions will be recorded and held on a VLE where the businesses can exchange ideas and experiences via a live online dialogue function. Additional coaching and mentoring will be provided as required.

3.2.1 EVOLVED-5G Acceleration Program for SMEs and Startups

3.2.1.1 Summary

Unlocking the potential of SMEs and startups with the next generation of digital transformation. Bringing the innovation of 5G technology and EVOLVED-5G NetApps in your business for efficiency, sustainability and resilience to the vast evolution of the global economy. From smart cities applications to accurate tools for health monitoring and low-carbon energy solutions as well as detailed data monitoring, 5G technology serves as an accelerator of growth. An acceleration Program, which is open to businesses, who are looking to invest in innovation and improving their methods and services.

The Program will be delivered virtually through live and recorded Microsoft Teams e-classes and supported by a Virtual Venture Mentorship Program also held via Microsoft Teams e-meetings.

3.2.1.2 *About the Program*

The first part of the Program will be 20 hours of immersive training, run by the IEA team, with the support of trainers. The first part of the Program includes the following topics: a) master classes on entrepreneurship, critical skills and perspectives for venture development and scaling within a 5G framework, b) sessions on assessment & diagnostics, c) live case studies d) business model innovation workshops e) funding and finance f) networking g) action plan development. Members of the EVOLVED-5G Industry 5.0 mentoring team will participate in trainings when needed.

Virtual Venture Support is included in the second part of the Program: Virtual mentorship will be provided to all participants. Additional coaching and mentoring will be provided as required.

Keywords:

- Innovation
- Sustainability
- Efficiency
- Data management
- Monitoring
- Job opportunity
- Digital Skills
- Economic growth
- Wireless technology
- 5G related technologies and connectivity (5G / 5G NSA, NBIoT, LTE-M)
- EVOLVED-5G NetApps

Benefits of 5G technology:

- Wireless connectivity
- Bandwidth
- No latency
- Reliability
- Data Management
- Automation
- Virtualization

Industries:

- Transportation
- Health
- Manufacturing
- Tourism
- Industry

Chapters

CHAPTER 1: INTRODUCTION (6 HOURS)

Workshop 1 - Month 1 (3 hours)

- Introduction to 5G Networks & NetApps
- 5G Architecture & Data Exchange

Workshop 2 - Month 1 (3 hours)

- EVOLVED-5G NetApps
- 5G integration for startups & SMEs

CHAPTER 2: ENTREPRENEURSHIP MASTERCLASS (6 HOURS)

Workshop 3 - Month 2 (3 Hours)

- Business Model Innovation Workshop
- Venture Development & Scaling

Workshop 4 – Month 2 (3 Hours)

- Pitching to investors & Elevator Pitch
- Funding & Finance

CHAPTER 3: INDUSTRY & CASE STUDIES (8 HOURS)

Workshop 5 - Month 3 (3 Hours)

- Industrial IoT & Data Models
- Virtualization & Automation

Workshop 6 – Month 3 (3 Hours)

- New Applications of 5G in SMEs
- New Applications of 5G in startups
- **Workshop 7 – Month 4 (2 Hours)** Data management & efficiency

CHAPTER 4: VIRTUAL VENTURE SUPPORT & BUSINESS COACHING

5G deployment in participating businesses & Business Coaching (Month 5)

- Integration of EVOLVED-5G NetApps
- Creating new products & services
- Data management & efficiency
- Market fit of new products/services
- Scaleup & Network

CHAPTER 5: DEMO DAY & PITCHING (MONTH 5) [IEA]

3.2.2 EVOLVED-5G Accelerator Call for expression of Interest

EVOLVED-5G consortium is calling for SMEs and Start-ups from Europe to apply for the EVOLVED-5G Acceleration Program, funded by the EU under the Horizon 2020 Programme, and turn their solutions into scalable businesses by adapting new digital technologies and 5G applications.

20 entrepreneurs/start-ups will be selected to join the program. Throughout the 5-month program, EVOLVED-5G consortium will build the capacities of its participants, giving them access to advanced business support, financing opportunities, technical assistance, and business networking to grow their ventures and expand them across the EU.



Figure 26. Open Call informative poster

What we offer:

- Business Support: Access to business and technical support tailored to the needs of the ventures.
- Financing Opportunities: Access to investment readiness trainings and matchmaking with investors and funding opportunities.
- Access To Markets and Network: Access to European market opportunities and support through networking events.
- Access to Digital Experts Network: Access to the EVOLVED-5G network of 5G and innovation experts.
- EVOLVED-5G Network: Access to EVOLVED-5G's network of entrepreneurs, professionals, media, funding companies and international partners.

Who Can Apply?

The call is addressed to start-ups and small and medium size enterprises (SMEs) from all the EU countries.

Commitment from the participants

A minimum of 1 member per team, experts in their project field, must be committed to participate in the accelerator activities.

The Program's Timeline & Support Stages

The Program starts in January 2023 and ends in May 2023. Below is the timeline and the description of the different support stages.

- Outreach & Selection: September 15 – December 31, 2022
- Application period: September 15 – November 30, 2022
- Evaluation period: December 1-December 20, 2022
- Selecting 15 companies.
- Information to the applicants: December 20- January 10, 2023
- Capacity Building Program: January 20– May 31, 2023

The selected start-ups will go through a 5-month capacity building Program tailored to support them in developing their green business models, access to finance and market strategies.

Pitching Day | Selection Of 10 Projects

June 2023

Entrepreneurs will pitch in front of a selected jury from the consortium members and our advisory board that will select 10 projects who will continue in the next incubation phase.

The pitching teams will be screened based on their value proposition, their innovation, the applicability of their technology, their business model and scalability potential, their implementation capacity, and finally on their pitch effectiveness.

Incubation Support

June 2023 – July 2023

The 10 selected companies will benefit from a 2-month incubation support from IEA and get in depth technical and business support. The 2-month incubation period will revolve around:

- defining a business growth roadmap for the companies and supporting them in the implementation.
- facilitating linkages with experts, investors, and professionals – giving the teams access to support programs, market and funding opportunities through IEA and its partners' networks.

3.3 ACCELERATION LIBRARY

The **Acceleration Library**¹⁰ [5] is a key instrument through which the EVOLVED- 5G consortium will deliver its acceleration Program to a wider audience– boosting the adoption of 5G application from SMEs and startups, by supporting the creation of capacity and competencies in enterprises and startups to deliver these strategies.

The acceleration Library is a web-based platform hosted on the EVOLVED-5G Marketplace¹¹ which provides learning resources, which includes some EVOLVED-5G training materials or courses, and support peer-learning, networking & partnerships. Positioned as a 'one-stop-shop', it is intended for those SMEs interested in applying 5G applications, making connections with peers, and locating the latest tools and techniques for 5G and digitalization.

¹⁰ forum.evolved-5g.eu/c/library

¹¹ <https://marketplace.evolved-5g.eu>

We developed a content guide to support the implementation of the Library. The overall purpose of the Content Guide is to:

- Provide an overview of the Library.
- Provide a forum for the continuing development of the Library framework.
- Enable Library users to submit relevant, accessible and credible content.

The Guide is not intended to be a static document. It will be re-released at points during the development of the project. Each release will have a specific focus and/or coincide with a significant point in the project's development.

This document is **Release 1 – December 2021** and is intended to stimulate discussion on:

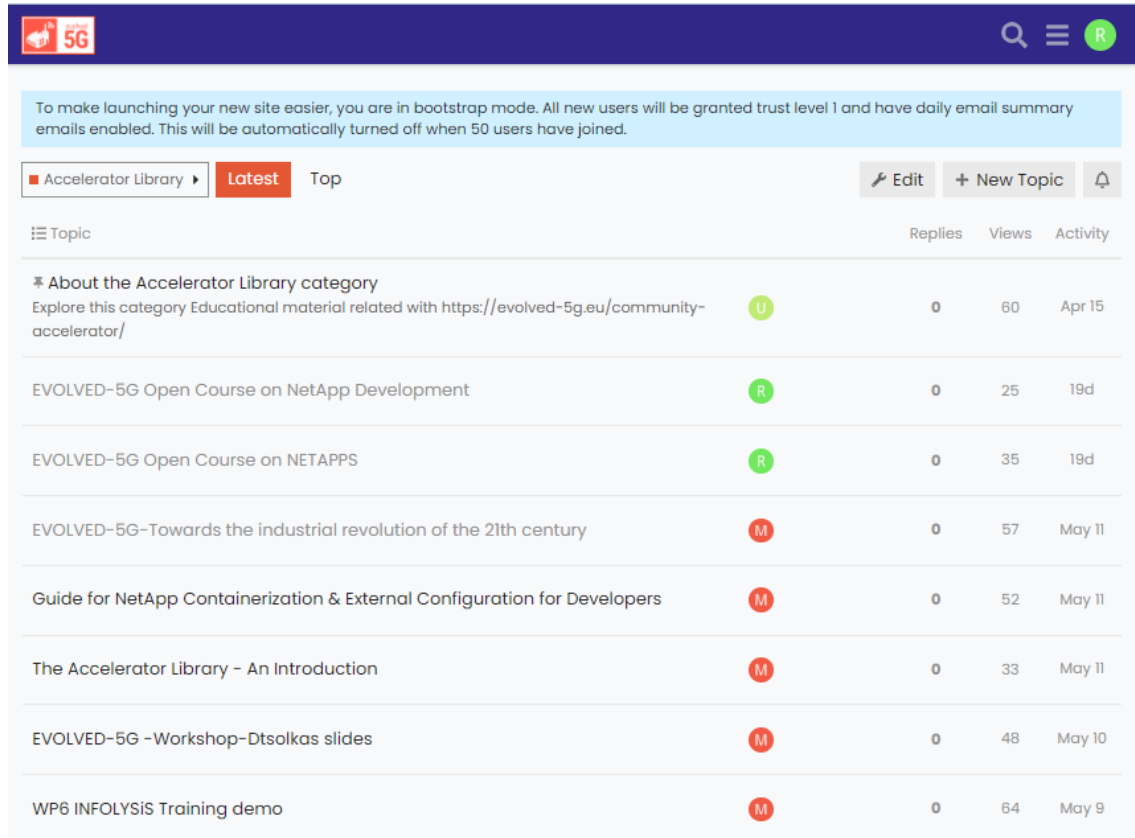
- Selection and assessment of content.
- Framework around which content is collected.
- Needs of the Library's users and how they can best be served.

It also provides users with practical guidance for the population of the Library with initial content in the form of case studies and links to existing resources.

Intended Audience

The first release of the Guide is intended for EVOLVED-5G consortium partners, reflecting the discursive nature of the Library's development at this stage.

Subsequent releases of the Guide are intended for a wider audience and they will incorporate feedback from consortium partners and the wider user-base, encouraging and assisting all users to develop and submit content for review and possible inclusion on the Library. Such material would include case studies, resources, news, articles etc.



Topic	Status	Replies	Views	Activity
To make launching your new site easier, you are in bootstrap mode. All new users will be granted trust level 1 and have daily email summary emails enabled. This will be automatically turned off when 50 users have joined.				
Accelerator Library ▾ Latest Top				
✳ About the Accelerator Library category Explore this category Educational material related with https://evolved-5g.eu/community-accelerator/	U	0	60	Apr 15
EVOLVED-5G Open Course on NetApp Development	R	0	25	19d
EVOLVED-5G Open Course on NETAPPS	R	0	35	19d
EVOLVED-5G-Towards the industrial revolution of the 21th century	M	0	57	May 11
Guide for NetApp Containerization & External Configuration for Developers	M	0	52	May 11
The Accelerator Library - An Introduction	M	0	33	May 11
EVOLVED-5G -Workshop-Dtsolkas slides	M	0	48	May 10
WP6 INFOLYSIS Training demo	M	0	64	May 9

Figure 27. Accelerator Library

3.3.1 Acceleration Library content types

3.3.1.1 *List of content types*

- Expert article
- Insight article
- Event page (pre-event)
- Event page (post-event)
- News article
- Q&A piece
- Case study
- Resource

The aforementioned content types will be described in the following sections.

3.3.1.2 *Expert article*

Summary

An opinion piece reflecting the clear view of a noted expert or industry leader.

Editorial notes

- Likely to be drawn from high profile guest speakers presenting at our events and our expert panel or our community partners.
- The piece is likely to address a single substantial topic
- They can comprise a video presentation instead of text if production quality is high
- These can be ghost-written and/or assembled from an event presentation
- These may require additional resource (writer or film crew) to put together

Language and tone

- Inspirational, direct, memorable
- Written in the first person
- The piece should take a clear position on an issue
- The central argument needs to be more than common sense – it should be possible to make a reasonable counter-argument to the author's line

Technical requirements

- High resolution header image
- Image of the expert
- 400 - 800 words text, or 200 words text & edited high res video

3.3.1.3 *Insight article*

Summary

A concise article that links an event, theme, discussion topic or news with the context.

Editorial notes

- Identifies and highlights a theme or themes arising from specific EVOLVED-5G work (e.g. event) or developments in the wider industry landscape
- Captures a range of perspectives on the chosen theme or topic
- Should quote from sources where possible
- Should link to internal and external content to provide useful context and further reading

- Can pose questions and make speculations about emerging trends
- Potential to connect past events, publications, etc, with emerging and future happenings
- Can end with a question, or speculation, that encourages debate

Language and tone

- Informative, explanatory & jargon-free
- First person, can be opinionated but not the primary mode
- Need to convey enthusiasm for the subject and excitement for interesting developments

Technical requirements

- High resolution header image
- Image of the author
- 200 - 450 words text

3.3.1.4 Event page (pre-event)

Summary

A page to provide details of an upcoming event and promote it.

Editorial notes

- Clearly articulates the benefits of attending the event
- Highlights key topics to be covered
- Highlights who the event is likely to be of interest to

Language and tone

- Persuasive, enthusiastic

Technical requirements

- High resolution header image
- Link to book/reserve tickets (e.g., Eventbrite)
- List of headline speakers with job titles
- Event location
- Price
- Minimum 50 words text
- Event Program (as soon as possible)
- Speaker photos (optional)

3.3.1.5 Event page (post-event)

Summary

A page that reflects the activity at a past event and links to related content.

Editorial notes

- Summarise clearly the topics discussed and key points raised (A top line only, Insight articles can go into more depth)
- Aims to help those who weren't there join the discussion
- Vital to document the arguments made

- Convey clearly what was valuable about the event
- Should quote from event speakers where possible

Language and tone

- Third person
- Relatively neutral tone but should convey the interest of the event

Technical requirements:

- High resolution header image
- 50 - 350 words text
- Specify what pieces of new content will be generated from the event
- Specify which existing event content (e.g., Insight article, Case Study, Q&A...) is relevant to the event
- Who were the audience (e.g., SMEs, business intermediaries, policymakers)?
- How many people attended?
- Event photo(s)
- Event video (optional)

3.3.1.6 News article

Summary

A short update from the project team, or our network of community partners and experts, about the progress of EVOLVED-5G or relevant developments in the sector. Aimed at those interested in the project and its context.

Editorial notes

- For project updates, information aimed at stakeholders about the project, FYIs and short blog-type items that doesn't qualify as insight.
- This is generally content with a short life-span that will date and that doesn't necessarily provide long term value to end users. It is however, valuable to the EC and other project stakeholders and sector intermediaries who want to get a sense of general project activity, or what's going into it, rather than just the 'outcomes' such as the content below.
- This type of content is of more general interest earlier in the project as we try to engage intermediaries in what we are doing. As more users start to use the outputs of the project, the news section becomes less relevant.

Language and tone

- First person singular or plural (I or we), where 'we' is the EVOLVED-5G team.

Technical requirements

- High resolution header image
- Image of the author
- 150 - 400 words text
- Photos to illustrate update (optional)

3.3.1.7 Q&A piece

Summary

An expert provides a brief answer to frequently asked question posed by a user.

Editorial notes

- The primary audience is new platform visitors drawn to the Q&A section through a search engine. Therefore, likely to contain a high number of EVOLVED-5G novices who are not yet familiar with the project.
- Framed as 'How do I?' and 'What is?' These Q&As are not meant to be exhaustive, but valuable short introductions to common topics
- Questions should be concise and broadly applicable
- Answers should contain links to relevant internal and external sources of information
- Answers should draw on specific experience and expertise where relevant
- Answers should reflect how solutions might vary for a range of professional circumstances

Language and tone

- Written in first person singular
- Assume little or no existing knowledge of sustainable or circular fashion
- Answers should be Informative, explanatory & jargon-free

Technical requirements

- 150 - 400 words text

3.3.1.8 Case study

Summary

Templated success stories that provide evidence of the impact of 5G for the Industry 4.0.

Editorial notes

- People should be able to click a link or print them out.
- Preferably, they should include definite value statistics and be short and punchy. They are not exhaustive reports, they need to give enough info to convince a user to read on or ask more questions.
- They need to be connected with a set of related resource links

Technical requirements

- No

3.3.1.9 Resource

Summary

These are links to useful documents or webpages, valuable to a particular sector audience.

Editorial notes

- This could be toolkits or courses that helps you action something referenced in a case study (e.g., how to use the Marketplace), a relevant report, or an interesting talk on a similar theme.
- Training materials and EVOLVED-5G Training Courses are under this category.

Technical requirements

- No

3.4 TRAIN THE TRAINER PROGRAM

Train the Trainer (Program iteration workshop 1): The train the trainer will adopt a “learn by doing” approach to a) upskill the innovation agencies in the roll out of the Evolved Acceleration Program, b) evolve the larger scale training and immersion blueprint for venture development using the tools and c) finalise Program evaluation, feedback and improvement process (iteration) to be undertaken to create the final version of the tools for wider dissemination across the EU via the dissemination and exploitation (WP7) activities of the project. The session will further explore the Programs (materials and content), attendees would be a combination of trainers, innovation stakeholders and Evolved partners.

- Day 1. Exploration and Testing of Evolved Programs (framework and materials)
- Day 2. Reflection, iteration and capture of improvements and insights to evolve the Program and trainer

The train the trainer Program will be designed after the end of the acceleration Program and will be offered to our community partners for free.

3.5 ENGAGEMENT STRATEGY

Extensive efforts will be launched by the team to reach the target groups and scout ideas through the most effective communication channels. Communication efforts will be launched in two directions:

- To achieve the highest possible number of ***spontaneous applications***, when potential beneficiaries are reached by conventional communication actions.
- By deploying an intensive scouting and recruitment process of ideas and talented partners whereby the team is going beyond just calling for participation in Evolved Acceleration Program, but also actively seeking for potential partnerships and subsequently carrying out a ***pull effect*** translated into ***triggered applications***. Thereby, everything adds up.

Ideas will be scouted through:

- ***Community Partners***: People/Institutions well positioned in each country with large knowledge on the identification of contacts as potential partners and ideas.
- ***Country workshops***: To be organized in most of participating countries to generate project ideas (***hackathons***). These workshops will be organized with the help of the community partners, will include one part of appealing lectures (5G, digitalization, trends topics) and free training sessions to encourage the participation in the idea generation.
- Contacts with stakeholders to obtain information about interesting events where the talent is present, interesting partners and ideas (mainly intended to contact SMEs Partners).
- Contacts with tech partners to involve them in the ideas generation and either as experts or workshops facilitators.

The EVOLVED-5G consortium is fully aware of the importance of building up an effective network of community partners throughout Europe to accelerate results on both the dissemination and partners' engagement strategy for the forthcoming call for expression of interest, the Library and the challenge of selecting the accelerator participants with a wide geographical and sectoral balance. Consequently, special efforts must be put into the community partners' engagement strategy to scout and recruit a grand number of partners with real possibilities to enlarge our community. For the consortium, IEA and Envolve will be accountable for the community partners' engagement and management of the established network.

Its efforts are focused on identifying the right organizations, assigning them as community partners and making them part of the EVOLVED-5G community. The EVOLVED-5G consortium will collaborate with the country partners to co-organize events in as many participating countries as possible, so they trigger the participation in the EVOLVED-5G acceleration activities.

Country events will be organized according to the suggested format:

- Inspirational lectures (including 5G trends and technological advancements)
- EVOLVED-5G info session consisting of:
 - Presentation of the call for expression of interest specifications.
 - Training on how to apply and how to use the Library.
- B2B meetings
- Workshops

During the call period, IEA/Envolve will intensify all its actions in order to expand the network of community partners.

Some of the key players to be reached are listed, but not limited to, below:

- F6S (Ireland, EU)
- Lux Innovation (Luxemburg)
- Transylvania START UP (Romania)
- Bulgarian Startup Association (Bulgaria)
- Startup Latvia (Latvia)
- Startup Lithuania (Lithuania)
- University of Zagreb (Croatia)

The following organizations embraced the role of community partner until now:

- MBB (Malta)
- Deep Ecosystems (Germany)
- Uptec (Portugal)
- Vestbee (Poland, EU)
- Venture Cup (Denmark)
- Xpress (Hungary)

3.5.1 Community partners – Description, roles and benefits

Description: Community partners are people / organisations with deep knowledge of local innovation ecosystems and how the local target groups are associated; community partners are in charge of scouting potential beneficiaries for the acceleration Program and the Library. Community partners will be in contact with hubs, incubators, universities, accelerators, SMEs and start-ups (or may be part of them), collaborating with the project team to promote

EVOLVED-5G, scouting relevant ideas and potential partners within an assigned European region. Community partners may be engaged stakeholders with whom the team will work very closely to perform tasks such as representation/organization of activities to disseminate the project.

Community partners are assigned the following roles:

- Scouting relevant startups/companies.
- Collaborate in the organization of country workshops/events.
- Connect with other local relevant key players to disseminate the project and the call for expressions of interest.

Community partners gain Benefits through the following:

- Participation in the train the trainer Program
- The represented community gains relevant positioning, recognition and influence.
- Visibility in the Library
- By hosting a workshop event, relevant knowledge and value is offered to their affiliates/community without any cost.
- Business opportunities through EVOLVED-5G networks

Community partners' network is an integral part of the Dissemination and Communication Strategy of the Acceleration Program.

3.5.2 Community partners' Engagement and Management Strategy

This strategy aims to bring greater light on EVOLVED-5G and attract more applications across eligible countries

IEA will be responsible for the engagement of the Community partners and the management of the network.

Its efforts will be focused on identifying the right people/organizations, assigning them as Country Community partners and making them part of the EVOLVED-5G community. Country Community partners are organizations, well positioned in each country with large knowledge on the identification of contacts as potential EVOLVED-5G beneficiaries.

Community partners will help the project goals in many ways. They will expand its outreach, attract SMEs and startups from their respective countries and promote its results, offering greater visibility of the work being done.

The project partners will collaborate with the Community partners, in order to co-organize events in as many participating countries as possible, so that they enable the idea-generation process and the participation in the EVOLVED-5G Expression of Interest Call. These workshops will be organized with the help of the country community partners, will include one part of appealing lectures (including 5G, digitalization, technology, trends topics) and free training sessions to encourage the participation of local SMEs and startups. The best ideas will be invited to participate in the EVOLVED-5G call. During PR1 we organised 1 community event during the Beyond 4.0 exhibition that took place in Thessaloniki (October 2021). It is intended to organize at least 4 community engagement events during the project duration.

IEA will actively come into communication with potential community partners that fulfill the profile EVOLVED-5G is looking for –organizations with similar interests on promoting 5G–.

IEA prepared the engagement and management strategy for the community partners in order to facilitate this task. IEA will continuously look for new collaboration opportunities and strengthen the projects “representation” in any participating country that does not show the interest foreseen.

IEA’s activities intensity will be in line with each Call’s focus groups, meaning that IEA will intensify the Community partners network expansion actions, towards organisations active in sectors and/or regions, that are in priority.

3.5.3 The Strategy

The Community partners Strategy aims to promote the greater EVOLVED-5G’s vision as well as the implementation of the Acceleration Program, through extensive support to its community partners’ network. This Strategy provides a framework for the promotion, recruitment, retention, recognition and reward of EVOLVED-5G’s community partners at a European level. Last but not least, it encourages a responsive and supportive environment for all of the Community partners.

Aims of the Community partners Strategy are:

- Promote Community partners opportunities to everyone, who has the right profile to become one
- Engage and retain Community partners
- Ensure standards of best practice and consistency in supporting Community partners
- Recognize and reward Community partners

As EVOLVED-5G moves forward, we want to be confident that our contribution to the Community partners Network serves us well. EVOLVED-5G Community partners are a resource that we should nurture, support and celebrate. Through effective collaboration, we will continue to review the achievements of the action plan, evaluate new opportunities and monitor the resources available, to ensure we continue to work more effectively.

3.5.3.1 *Priority Axis and Action Plan*

Priority Axis 1: The consortium will work to raise the profile of Community partners and Community partners Network across the EVOLVED-5G countries.

Priority Axis 2: The consortium will provide a consistent recruitment of potential new Community partners.

Priority Axis 3: The consortium will work towards ensuring our Community partners are supported with consistency, providing opportunities and sharing information.

Priority Axis 4: The consortium will acknowledge the valued contributions of Community partners and reward them accordingly.

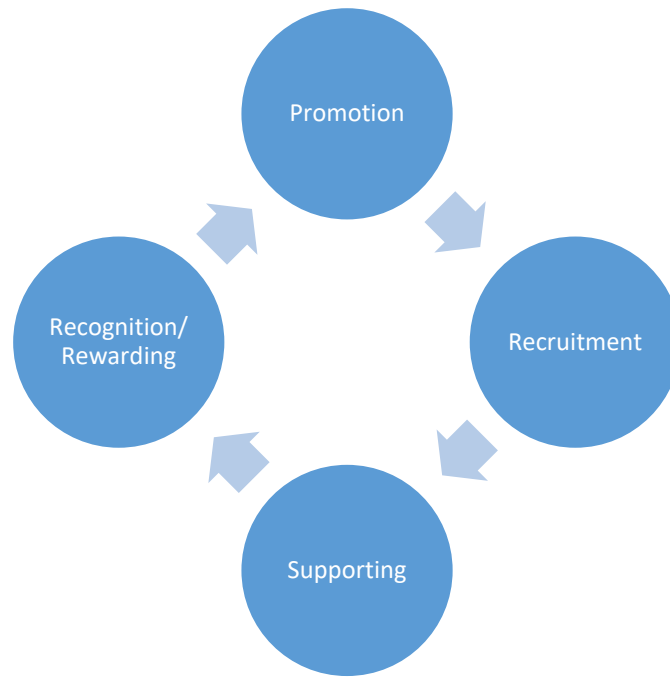


Figure 28. Priority Axis of the Engagement Strategy

Community partners Tasks

- Explore ways to raise awareness of EVOLVED-5G among your community through the participation of EVOLVED-5G Project in sectorial events organized by you that bring together SMEs, start-ups, technology providers from the community represented by your organization.
- Help us spread the word about EVOLVED-5G to your community through the publication of articles and posts on your website, social networks pages, newsletters or any sectorial magazine. We can provide you with specific communication packages to be rolled out.

Community partners Benefits

- Participation in EVOLVED-5G Train the Trainer Program
- Positioning, recognition and influence through the represented community
- Advertised profile through the EVOLVED-5G communication actions.
- Visibility through the Library.
- Relevant knowledge and value offered to their affiliates/community without any cost by hosting a workshop event.
- Business opportunities through EVOLVED-5G networks

3.5.3.2 Priority Axis 1: Promotion

The consortium will work to raise the profile of Community partners and Community partners Network across the EVOLVED-5G countries.

	Action	Measurement
1	Create a Community Partners Network page on the Library.	Review and update the profiles once per year or when required.
2	Conduct Interviews with existing community partners and put them on our Library.	Upon request

3.5.3.3 Priority Axis 2: Recruitment

The consortium will provide a consistent approach to recruitment of Community partners.

	Action	Measurement
1	Continue the identification of possible community partners.	Number of Organizations approached.

Table 4 Priority Axis 2

3.5.3.4 Priority Axis 3: Supporting Community partners

The consortium will work towards ensuring our Community partners are supported with consistency, providing opportunities and sharing information.

	Action	Measurement
1	One2 One skype meetings with community partners to identify opportunities for collaboration and define the next steps	When is needed. Number of online Meetings.
2	Send info about applications from their county (number, quality, etc) in order to check if additional promotion measures are needed.	Once per Month during the open call period.
3	Build trust and sustain transparency	Add ongoing updates about EVOLVED-5G acceleration program news
4	Open dialogue and two-way communication channels.	Ask for feedback, after each joint activity.

Table 5 Priority Axis 3

3.5.3.5 Priority Axis 4: Recognize and Reward

The consortium will acknowledge the valued contribution of Community partners and reward them accordingly.

	Action	Measurement
1	Recognized community partners can publish their articles and news using EVOLVED-5G Library.	Upon request.
2	Give social recognition, some people prefer that over financial incentives.	Send gratitude messages, emails, etc
3	Take notice of small things using social media and show them you care. Recognize the things that matter to them and make them feel pampered.	Follow them on their social media

Table 6 Priority Axis 4

4 CONCLUSIONS

In this document, it has been reported in detail the plan and activity performed within Task 6.1 “Developers-oriented Events and Related Training Material” and Task 6.2 “SMEs and Startup Acceleration Program” of WP6 during its first twelve months, from M7 until M19. The related plan and activities, led to the achievement of MS5, namely “Training Materials and Startup Acceleration Program fully active”, and launched the construction of a thriving community of startups and developers around the EVOLVED-5G project.

In this deliverable, it has been presented a detailed plan for the realization of training activities and the development of training materials and courses, along with a specific methodology for its production. In this regard, three training on-demand open courses have already been completed and several training activities and workshops have been conducted. Specifically, three events exclusively devoted to EVOLVED-5G training have been organized by EVOLVED-5G partners (i.e. a seminar, a workshop and an innovation course). Moreover, other events with a broader scope have been organized by consortium partners, which also addressed EVOLVED-5G technical topics (i.e., a seminar and a summer school event). In the frame of these events, or in other events of relevance, they have taken place eight workshops, six presentations or lectures and six training demonstrations devoted to EVOLVED-5G technical vision, technical developments and framework.

Moreover, in this deliverable it has also been reported the plan regarding the SMEs and Startup Acceleration Program. Furthermore, the Acceleration Program as well as the Train the Trainer Program have been designed and, the Acceleration Library has been launched and initial content is already hosted. The Library hosts now 12 unique resources with 563 views in total. The call for expression of interest will be launched the September 2022. In addition, the community partners programme and its engagement plan has been designed and released.

Any potential updates on the plans and actions within the framework of Task 6.1 and Task 6.2 will be reported in the upcoming WP6 deliverable (D6.2) that is mainly targeted on Task 6.3 activities. Furthermore, the final version of this document, D6.3, will be delivered at the end of the project, in M36, providing the final report on “Training Material and SMEs and Startup Acceleration Program Activities”.

5 REFERENCES

- [1] “UPVx educational MOOC platform” [Online], <https://www.upvx.es>, Retrieved 07/2022
- [2] “EDx online course platform ” [Online], <https://www.edx.org/about>, Retrieved 07/2022
- [3] Yaakob, M. F. M., & Zalli, M. M. M. (2019). An overview of massive open online courses (MOOCs), pedagogies, and distance education. Redesigning Higher Education Initiatives for Industry 4.0, 56-68.
- [4] Quintana, R. M., & Tan, Y. (2019). Characterizing MOOC pedagogies: Exploring tools and methods for learning designers and researchers. Online Learning, 23(4), 62-84.
- [5] “EVOLVED-5G GitHub Organization” [Online], <https://github.com/EVOLVED-5G>, Retrieved 07/2022
- [6] “EVOLVED-5G FORUM” [Online], <https://forum.evolved-5g.eu> , Retrieved 07/2022