



**ENGINEERING and INDUSTRY
INNOVATIVE TRAINING FOR ENGINEERS
(ENGINITE)**

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IO4-Task 8: Finalization of the ENGINITE training programme







Prepared by CUT



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Consortium

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Task 8: Finalization of the ENGINITE training programme

Taking into account the results derived from the Consolidated Evaluation Report, the finalization of the ENGINITE Training Programme was carried out, in the context of a reflective activity. In particular, for the finalization of the ENGINITE training programme the members of the ENGINITE consortium and the ENGINITE trainers were asked to participate in a face-to-face reflective activity. The reflective activity took place during the 4th project meeting, which took place on April 9th and 10th 2019 at the Cyprus University of Technology, and it had a duration of three hours.



(a)



(b)



(c)



(d)

Figure 29a-d. Snapshots from the reflective activity

As part of the activity, which took the form of a focus group, the participants were asked to reflect on the two phases of the ENGINITE pilot training programme (Phase1: Training programme and Phase2: Structured internship) in order to report and discuss:

- The **Strengths (Positive elements)** of the ENGINITE pilot programme
- The **Weaknesses (Negative elements)** of the ENGINITE pilot programme
- The **Opportunities (Unexpected positive elements)** emerged during the implementation of the ENGINITE pilot programme

- The **Threats (Unexpected challenges)** emerged during the implementation of the ENGINITE pilot programme

In particular, the focus group was based on the SWOT (Strengths-Weaknesses-Opportunities-Threats) analysis model (see Appendix for the focus group protocol). What follows below is the presentation of the main findings derived from the reflective activity.

Phase 1: The ENGINITE training programme

A. Strengths (Positive elements)

The ENGINITE trainers and the consortium members highlighted a total of nine (9) main strengths (positive elements) of the ENGINITE training programme. In particular, according to the feedback received during the focus group:

The ENGINITE training programme...

- **...was based on Problem-based Learning (PBL) as a novel pedagogy:** PBL provided a quite different form of instruction when compared to the traditional instructions. This facilitated combination of academic knowledge and hands-on experiences
- **...covered managerial skills not included in the university (or at least not appreciated):** The engineers who participated in the training programme not only had the opportunity to develop their managerial skills, but they were also provided the opportunity to put these skills in context and in action
- **...was provided for free for the participants:** There were no fees and costs for attending the ENGINITE training programme
- **...used real case studies:** All of the trainees had the opportunity to investigate and find out more about authentic industrial problems
- **...addressed towards a multidisciplinary audience:** The design of the programme was intentionally “open” and not bounded in or oriented to a particular discipline of engineering. As such, it was attended by young engineers derived from different disciplines (e.g. chemical engineers, environmental engineers, mechanical engineers, etc.).
- **...included a mixture of managerial and technical knowledge courses:** In this way it promoted the development of both young engineers managerial and employability skills, while also contributing to the increase of their technical knowledge
- **...was delivered by a group of trained and experienced trainers:** Most of trainers participating in the ENGINITE training programme, not only had academic knowledge and expertise in their field, but they had been also trained at the outset of the ENGINITE project, in order to be able to apply the PBL approach in their courses
- **...was short but intensive:** it was completed in a short period of time (in a total of three months)
- **...required by the participating engineers working in multi-disciplinary groups:** In this way, the training programme promoted team-building, while also contributed to the

development of the participating engineers' communication and collaboration skills. At the same time, this multidisciplinary and collaborative context, replicated real industry settings.

B. Weaknesses (Negative elements)

The ENGINITE trainers and the consortium members highlighted a total of seven (7) main weaknesses (negative elements) of the ENGINITE training programme. In particular, according to the feedback received during the focus group:

The ENGINITE training programme...

- **... composed by a significant number of courses:** According to the trainers 4-5 courses would be enough – especially those ones that targeted the development of young engineers' managerial and employability skills E.g. project management in action & Innovation
- **...took place in a challenging timeframe for the young engineers:** The participating engineers were asked to attend a sequence of 8 courses, which took place back-to-back, during the afternoons (after a long day, especially for the engineers who were attending the programme after their work)
- **...addressed a relatively limited pool of candidates:** As the ENGINITE courses took place at the Cyprus University of Technology, at Limassol, and the Technical University of Crete, at Chania, the Training programme attracted mostly young engineers especially from Limassol and Chania
- **...lacked cohesiveness between the provided courses:** There were many independent courses with independent case studies and problem-based scenarios - It would be nice to have a common problem running through
- **...did not involve the recruited companies/industries/organizations:** The ENGINITE companies/industries/organizations were only involved in the internships. However, representatives from the companies could play a significant role during the training of the young Engineers
- **...did not allow much time to trainers for coordination and preparation:** As the courses, were provided back-to-back and with no intervals, there was not enough time for the trainers to coordinate, communicate and change or adapt their courses accordingly.
- **...was delivered, in some cases, by trainers with limited experience in PBL:** ... Not all the trainers had the opportunity to attend the short-term ENGINITE joint staff training events. As such, the course structure and the PBL approach was not clear for all trainers

C. Opportunities (Unexpected positive elements)

The ENGINITE trainers and the consortium members highlighted a total of six (6) main opportunities (unexpected positive elements) of the ENGINITE training programme. In particular, according to the feedback received during the focus group:

The ENGINITE training programme...

- **...enabled the trainees to end up with new solutions in the provided problems:** Several of these solutions were really innovative, as they were based on “out of the box” ideas. Some of solutions could be expanded as a spin off
- **...enabled teamwork and bonding:** Through hardship and challenges resolution (both for the participating engineers, also for the consortium)
- **...enabled communication and collaboration between all the engineers:** PBL emerged as a universal philosophy which could bring together a multidisciplinary group (in our case engineers of different disciplines)
- **...familiarized the trainees with the PBL approach:** the PBL approach emerged as a guiding approach for their future careers, as well as an approach to formulate a new idea and make it happen
- **...equipped the trainers with the PBL approach:** the PBL emerged as a valuable teaching approach which could also be implemented in other educational contexts
- **...provided opportunities for extracurricular activities:** For instance, the young engineers in Greece participated in competitions such the GreenTech challenge (<https://www.greentechchallenge.gr/>). These initiatives motivated both the ENGINITE trainers and the trainees

D. Threats (Unexpected negative elements)

The ENGINITE trainers and the consortium members highlighted a total of five (5) main threats (unexpected negative elements) of the ENGINITE training programme. In particular, according to the feedback received during the focus group:

During the ENGINITE training programme...

- **...the initial target group was limited:** In order to deal with this challenge, the consortium opened up the programme to more disciplines
- **...took place in Limassol, Cyprus and Chania, Crete:** This restricted the pool of the participating engineers, as the Training programme attracted mostly young engineers especially from Limassol and Chania
- **...there was a plethora of similar programmes addressing unemployed people:** The ENGINITE consortium invested much effort and energy for disseminating the ENGINITE programme in order to recruit as many young engineers, as possible
- **...there was high employability during the announcement of the training programme:** Likewise, the ENGINITE consortium invested much effort and energy for disseminating the ENGINITE programme in order to recruit as many young engineers, as possible
- **...it was difficult to keep the participating engineers motivated for 8 weeks:** It was a long period (after a certain point their learning motivation declined)

Phase 2: The ENGINITE internship

A. Strengths (Positive elements)

The ENGINITE trainers and the consortium members highlighted a total of eight (8) main strengths (positive elements) of the ENGINITE internship. In particular, according to the feedback received during the focus group:

The ENGINITE internship...

- **...contributed to the development of the interns' networking:** Via their placement at companies / industries/ organizations the engineers had the opportunity to meet experts of the industry and more advanced engineers
- **...contributed to the enhancement of the interns' skills and knowledge:** The participating engineers had the opportunity to put in action and enhance the skills and the knowledge gained during the ENGINITE training programme
- **...provided mentoring from both sides:** The interns received feedback both from their company supervisors as well as by the ENGINITE mentors. The interns were not alone at any stage
- **...allowed interns to work in realistic and authentic settings:** It provided interns the opportunity to work on real projects and check in action their actual outcomes on real-life problems
- **...allowed interns to suggest their own projects:** It provided interns the opportunity to undertake their own initiatives and have their voices heard
- **...allowed interns' access to ideal companies / industries / organizations:** Most of the participating interns went to companies they always wanted to go and had access to potential future employers
- **...contributed to the development of the trainers and universities' networking:** The participating trainers and universities (Cyprus University of Technology & Technical University of Crete) developed also a networking of companies and industry colleagues
- **...allowed the interns' reflection and professional development:** As part of their internship, young engineers kept reflective diaries for recording their progress. This provoked their personal reflection which served as a key to their professional development

B. Weaknesses (Negative elements)

The ENGINITE trainers and the consortium members highlighted a total of three (3) main weaknesses (negative elements) of the ENGINITE internship. In particular, according to the feedback received during the focus group:

During the ENGINITE internship...

- **...there was no payment for the participating engineers:** The interns did not receive any compensation or indicative payment for their services

- **...the reflective diaries were completed retrospectively by the end:** In this way, we missed the deeper meaning and essence of reflections. Mentors should scaffold better the interns during their reflections (providing support about the do and don'ts of reflections)
- **...not all trainers were assigned a trainee:** This excluded somehow some of the trainers during the internship period

C. Opportunities (Unexpected positive elements)

The ENGINITE trainers and the consortium members highlighted a total of four (4) main opportunities (unexpected positive elements) of the ENGINITE internship. In particular, according to the feedback received during the focus group:

During the ENGINITE internship...

- **...the internship companies / industries / organizations exhibited particular interest in the ENGINITE pilot programme:** This indicates that the finalized ENGINITE programme could be promoted as a VET programme to additional bigger companies and industrial units
- **...network was established between companies, supervisors, mentors, and interns:** This allowed successful collaboration between all involved stakeholders
- **...the PBL approach emerged as a life-long learning approach:** According to the interns, the PBL approach had and will continue to have a sustained impact in their professional lives.
- **...the impact of the ENGINITE project was not limited to the interns:** The company supervisors and other personnel in the company were also influenced by the PBL approach, as they were also exposed to the PBL philosophy

D. Threats (Unexpected negative elements)

The ENGINITE trainers and the consortium members highlighted just one (1) main threat (unexpected negative element) of the ENGINITE internship. In particular, according to the feedback received during the focus group:

During the ENGINITE internship...

- **...it was difficult to recruit companies / industries / organizations:** It was difficult and required several efforts for ensuring a sufficient number of companies / industries / organizations for the ENGINITE interns

APPENDIX

1. Questionnaire for the evaluation of the ENGINITE pilot training programme



Evaluation of the ENGINITE pilot training programme

Dear colleagues,

This questionnaire aims to collect your views about the ENGINITE pilot training programme.

The ENGINITE pilot training programme took the form of a postgraduate vocational training programme. The postgraduate vocational training programme was based on Problem Based Learning (PBL) pedagogy and combined advanced applied academic topics with hands-on aspects, in order to endorse the knowledge and skills of graduate engineers, preparing them for the industry of the 21st century.

Aiming to accomplish its goals the ENGINITE pilot training programme was divided in two phases: **Phase 1- Training courses** and **Phase 2-Structured internship**.

As part of the following questionnaire we would like to receive your feedback in respect with the two ENGINITE training phases.

Many thanks in advance for your collaboration!

Part A: Please complete your answer below

1. Gender

- Male
- Female

2. Age

- 25-35
- 36-45
- 46-55
- 55+
- Other.....

3. Specialization (e.g., chemical engineer, environmental engineer, civil engineer, etc.)

.....

4. Prior experience with organizing and delivering similar trainings

- Yes
- No

PART B: Taking into account the two phases of the ENGINITE pilot training programme:

Please, write down in a hierarchical order the **Strengths** of the ENGINITE pilot training programme, as it was initially designed (starting from the most important and moving on to the least important one).

- What were the main positive/strong points of the ENGINITE training pilot programme, as it was initially designed?
- What were its main advantages/virtues?

Phase 1: Training courses	Phase 2: Structured internship
1.....	1.....
2.....	2.....
3.....	3.....
4.....	4.....
5.....	5.....

Please, write down in a hierarchical order the **Negatives** of the ENGINITE pilot training programme, as it was initially designed (starting from the most important and moving on to the least important one).

- What were the main negative/weak points of the ENGINITE training pilot programme as it was initially designed?
- What were its main disadvantages?

Phase 1: Training courses	Phase 2: Structured internship
1	1
2	2
3	3
4	4
5	5

Please, write down in a hierarchical order the **Opportunities** emerged during the implementation of the ENGINITE pilot training programme (starting from the most important and moving on to the least important one). *E.g.*

- *What were the main unexpected positive elements emerged during the implementation of the programme?*
- *What variations/mutations from the "originally envisioned" training programme were beneficial?*

Phase 1: Training courses	Phase 2: Structured internship
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Please, write down in a hierarchical order the **Threats** emerged during the implementation of the ENGINITE pilot training programme (starting from the most important and moving on to the least important ones). *E.g.*

- *What were the main unexpected challenges/problems emerged during the implementation of the programme?*
- *What variations/mutations from the "originally envisioned" training programme were fatal?*

Phase 1: Training courses	Phase 2: Structured internship
<p>1.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>2.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>3.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>4.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>5.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>	<p>1.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>2.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>3.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>4.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>5.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>