Methodology and training material report

E2DRIVER H2020 project

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PROJECT PARTNERS

CIRCE: Fundación CIRCE Centro de Investigación de Recursos y Consumos Energéticos

FRAUNHOFER: Fraunhofer Gesellschaft zur Förderung der Angewandten Forschung e.V.

POLITO: Politecnico di Torino

EPROPLAN: EPROPLAN GmbH Beratende Ingenieure

SINERGIE: Sinergie Società Consortile a Responsabilità Limitata

ENGIE: ENGIE Lab CRIGEN

SERNAUTO: Asociación Española de Proveedores de Automoción

AEN: Automotive.Engineering.Network – Das Mobilitätscluser e.V.

MESAP: Centro Servizi Industrie SRL

MOV'EO: Pole Mov'eo – Mobility Competitiveness Cluster

EPC: EPC Project Corporation Climate. Sustainability. Communications. mbH

MERIT: MERIT Consulting House

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PUBLISHABLE SUMMARY

This deliverable is the culmination of one of the key results of the E2DRIVER project: the methodology. The first version of the E2DRIVER Methodology was created in the context of the Task 3.2 – *Development of the overall training methodology*. However, this first version was necessarily uncompleted due to the fact several aspects were not defined in that moment. This fact and the potential improvements identified in the pilot phase made necessary to perform a fine-tuning of this methodology which is materialized in the present document. Therefore, this document constitutes the final version of the E2DRIVER Methodology.

The E2DRIVER Methodology constitutes and explains the pedagogical and logistical approach that is used to successfully implement the E2DRIVER Capacity building programme in a company. Furthermore, it is a guide for trainers that will support them in the development of their activities during the execution of a one specific training.

The E2DRIVER Methodology is composed by a clear explanation of the different pedagogical innovations that are used in the project, as well as the identification of the format that has been implemented and the steps that the teachers must follow.

The ultimate goal of the E2DRIVER Methodology and this document is that the work performed in the E2DRIVER project gets the way to replicate its solution to other spheres, contexts, and sectors. In that sense, the E2DRIVER Methodology in general and the guide included will be the main content addressed in the implementation of the E2DRIVER Training of Trainers.

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1 INTRODUCTION

This deliverable justifies the work performed in the context of the Task 4.4 – *Training methodology fine-tuning*. To do so, the document is divided in three main parts plus the Annex I.

The first section describes the whole development of the task, and which have been the activities performed on it. Thus, it is detailed the requirements which should be achieved if the Grant Agreement is considered, what the consortium has done in this respect and finally the result of the task: the E2DRIVER Methodology.

Next, in section 3 and 4, the document performs an analysis of the performance of the methodology in the pilot phase implementation of the E2DRIVER training and, subsequently, the weaknesses and improvements identified are clearly detailed and explained.

Finally, the most important part of this document is included in the Annex I. In the end, the objective of this Task 4.4 is to fine-tune the methodology that was previously generated in the Task 3.2. Thus, the whole methodology created in this task is adjusted and included in the Annex I of the present document.

2 DESCRIPTION OF THE TASK 4.4 – TRAINING METHODOLOGY FINE-TUNING

2.1 Purpose of the Task 4.4.

The objective of this task is specified in the Grant Agreement as follows:

> *"Using the results and conclusions from the implementation of the capacity building programme at the Pilot Companies and the continuous analysis of the results in WP5, the developed methodology in task 3.2 will be refined and improved. The results of the monitoring and evaluation plan in the pilot companies will be analysed to facilitate the replication in other companies. This will result in a comprehensive method that will enable an easier implementation of these courses and interventions in a wide number of companies. In this task the planning, program, general objectives for training modules (co-creation sessions, introductory sessions, specific training and interactive workshops) will be revised to obtain their definitive design. These training modules will be divided into training units and the final methodology will define the concepts, specific objectives (capabilities and evaluation criteria), duration, topics, methodological strategies, learning activities, equipment, installation and resources for every training unit. Afterwards, the lessons for training the trainers in E2DRIVER final methodology will be developed as required input for Task 4.3."*

From this text it can be deduced that the main objective of Task 4.4 is the development of the final version of the E2DRIVER Methodology generated in Task 3.2 considering all the weaknesses identified during the pilot phase.

The ultimate goal is to create a comprehensible method that facilitates the implementation of courses and interventions in a larger number than in the pilot phase. In logistical terms, the pilot phase is often a period when many eventualities arise, issues that have yet not been taken into account are discovered and aspects designed in a theoretical way do not prove to be very useful in practical terms. Thus, a process of fine-tuning is necessary in order to simplify, systematise and rationalise the overall process of implementing training and interventions in companies.

In line with the methodology, this task involves defining the planning, programme and general objectives of the modules, as well as the objectives, duration, topics, methodological strategies, equipment, facilities and resources. At this point it is important to clarify that, although it was preliminarily defined that the courses would be divided into "co-creation sessions, introductory sessions, specific training and interactive workshops", when the methodology of the project was established, the focus was modified and a division was made between "adjustment session, E2DRIVER training, virtual reality and workshops for change agents". In this way, while maintaining each and every one of the exercises required in the Grant Agreement, an approach was established that was considered more appropriate and simpler for easy implementation. In any case, the justification for this modification can be found at the beginning of the guide for trainers that it is going to present in the Annex I.

2.2 Development of the Task 4.4.

Taking into account the objectives explained above, during the development of Task 4.4. different actions have been defined in order to improve the project approach, not only for the replication phase expected from January 2022 on, but also for the exploitation after the end of the project. The set of activities carried out can be divided into three packages:

- Collection of all inputs on possible improvements to be implemented in the methodology and the platform.
- Adjustment of the new methodology and platform to overcome these weaknesses and constitute a clear, simplified, efficient and effective approach.
- Creation of additional tools and systematization of existing tools to be clearly presented to E2DRIVER trainers and to those who can take advantage of the E2DRIVER methodology in the exploitation after the project.

Regarding the collection of improvements to be implemented, a key point was the information received from deliverable 4.3 where a report on the performance of the pilots was made. Two internal workshops of the E2DRIVER partners were held on the 28th and 29th September 2021 to evaluate the performance of the methodology, the platform and the training materials in the development of the pilot phase. These three tools, the deliverable and the two workshops, made it possible to become aware of the key points that needed to be confronted and improved.

Then, in order to finally decide which aspects needed to be improved and which would not add real value, two exercises were carried out. On the one hand, in terms of the platform, a meeting between CIRCE and EPC to define exactly what could be done to improve the platform's functionalities was held. After this meeting, the conclusions were transferred to the University of Valencia, as developer of the platform, so that it could proceed to implement the improvements in the platform.

Regarding the methodology, CIRCE was in charge of carrying out an improvement and simplification exercise that was subsequently validated by SINERGIE, as the leader of the exploitation of the training part, and by FRAUNHOFER as key partner in the post-training actions leading to the calculation of the project's impact. In terms of methodology, in addition to change the procedure, a considerable effort has been made to systematise all the tools, templates and documents. This allows to carry the implementation in a more effective and efficient way.

2.3 Result of the Task 4.4.

Ultimately, the outcome of Task 4.4 can be summarised as follows:

- A more user-friendly platform.
- A systematised methodology and where the post-training counselling part of the E2DRIVER methodology becomes a fully-fledged phase of the E2DRIVER methodology.
- Minor adaptations of the training materials.

The following sections identify in more detail what was identified in the methodology and the platform as a potential improvement and what improvements have finally been implemented.

3 THE METHODOLOGY AND PLATFORM IN THE PILOT PHASE

3.1 Performance of the E2DRIVER Methodology in the pilot phase.

The methodology proved to be a powerful tool for the training of the companies involved in the project. However, several issues were identified as having potential for improvement in the pilot phase:

1. Given the novelty of the methodology where the Ontological Flip Teaching pedagogical paradigm and different customisation modalities were integrated, the trainers sometimes showed that they were not very aware of the way in which the training activities had to be carried out This can be considered the main challenge that the fine-tuning process faced.
2. In line with the above, several teachers were confused about which tools, templates or documents they had to use for each methodological step.
3. In the first phase it was thought that some of the training materials were not necessary to have them in the national languages. However, the need to complete the translation of all the training materials was identified.
4. Regarding the methodological terms, the link activity proved to be a strange element on many occasions for the trainers. Since they didn't understand the purpose of it, they were not able to correctly approach it. Moreover, even in those cases where the essence of this exercise was understood, it was seen that the "pure" implementation of this approach posed problems due to the sensitive company information that could be dealt with in such academic papers.
5. Some of the meetings and time estimates were not accurately considered when compared to the actual implementation of the meetings.
6. In the area of tutorials, the need to harmonies the number of them in the online part of the training was identified. It was also identified the need for an initial course tutorial in which it was clearly explained how the course would work and how to register on the platform.
7. It was also found that the expected face-to-face hours for the companies often did not match what finally was implemented in the pilots. For example, in many pilots, joint trainings were implemented for all groups except technicians and operators. In others the sessions were divided into two halves to allow for a break, etc.
8. In terms of evaluation, the final mark was calculated as a 70% of the exam and a 30% of the link activity. Given the nature of the training, where the ultimate aim is for the company to be able to implement improvements rather than obtain a diploma, it felt that this might not be the assessment scheme and that aspects such as participation in exercises and practices should be taken into account.
9. As for the diplomas, due to the fact that it has not been possible to agree on a common format, the delivery took a long time. The need to shorten the deadline for delivering the diplomas was highlighted.
10. Finally, and in any case, the methodological scheme needs to be made more flexible in order to fully adapt to the needs of the companies.

3.2 Performance of the E2DRIVER Platform in the pilot phase.

For the E2DRIVER platform, the following improvements were identified:

1. The registration process was long, tedious and resulted in learners not being able to successfully complete registration on the platform.
2. A need for the trainer to be aware of the learners' progress was identified.
3. The calendar, not being linked to any other application, made it difficult for learners and teachers to link course activities with their day-to-day professional schedules.
4. On the other hand, the E2DRIVER Community section proved not to be useful for the intended purpose of the project. It was therefore necessary to rethink this issue.

4 IMPROVEMENTS IMPLEMENTED IN THE METHODOLOGY

4.1 Improvements in the E2DRIVER Methodology.

Considering the weaknesses identified in section 3.1, below a table explaining the improvement implemented for each weakness can be found. In case a more detailed explanation of the weakness is wanted, please refer to section 3.1 using the numerical codes.

	IDENTIFIED WEAKNESS	IMPLEMENTED IMPROVEMENT
1	Lack of knowledge of the procedure on the part of teachers	In addition to the trainer's guide (Annex I), which is the most important result of this task, an excel document has been generated so that trainers can easily use it to identify what actions they need to take to follow the E2DRIVER methodology correctly. In this excel the phases, the time for each to be conducted, as well as the action and the nature of it is identified. Also, an additional part including the tracking of each task and actions to be completed has been designed. This makes it easier for the teacher to know when and how somethings has been uploaded. This also allows the training to be done in a more fluidly and efficiently manner.
2	Confusion as to which documents/templates to use at each methodological step	There has sometimes been confusion about which tool or methodological document should be used to successfully complete each task in the context of a training with a company. This is solved by including a section in the excel mentioned above which states which document should be used depending on the activity. Additionally, trainers will be provided, together with the excel, a package of documents and tools referred to in the excel so that there is no confusion about previous versions used in the pilot phase.
3	Training materials not translated from English to national language	These documents were translated into the national languages.
4	Inadaptation of the link activity to the reality of E2DRIVER	The link activity in the context of the Ontological Flip Teaching methodology is intended as an instrument to increase collective intelligence. In one of the meeting among the E2DRIVER Consortium was proposed that these academic work developed by the students could also be included in the training repository and, thus, be able to progressively increase its content. However, in the context of E2DRIVER, this point of the methodology has proven not to be fully adapted to what is needed in automotive SMEs in the field of energy and the need to identify energy efficiency measures. This academic work was a key tool for the identification of energy efficiency measures that could be implemented

		in the company and so it was used for the students to do this reflection work on measures prior to the face-to-face session. Although extremely useful, it has been difficult to use this academic work as new training materials, as this work often contained information from the company that could not be shared. In addition, some working papers were often written in an informal and sometimes schematic way, which made them not very attractive as training materials. For these, a need to rethink what the link activities in this project without compromising the original intention should be is needed, bemeaning, a tool that can help the continued growth of collective intelligence, but staying within the reasonable framework a project like E2DRIVER reaches. In this sense, the paradigm to implement the final version of the methodology will be one in which the link activity exercise serves to identify best practices and energy efficiency measures. They can easily be extrapolated to empower trainers even more for replication in other companies, allowing them to translate solutions from one company to another one with similar needs.
5	The duration of the meetings was not as planned.	Some meetings, such as the Adjustment session, turned out to be much shorter than expected. Reason being, that just on the first session was often not possible to carry out the awareness-raising action originally planned. In this way, the methodology reconsiders the possibility of reducing these meetings, but does not go as far as implementing a compulsory reduction. It maintains flexibility between the companies and the trainers to adapt as much as possible to each of the companies.
6	Lack of a common approach to tutorial sessions	The tutoring system was not defined in the first version of the methodology. It was simply suggested that tutorials should be held during the online phase to prevent students from feeling lost, to explain the topics and resolve doubts. In the fine-tuning process, there was a need to modify and homogenise the tutoring approach while maintaining a certain degree of flexibility. In this sense, it was agreed to hold a first tutorial at the beginning of the course in which the methodology of the course and how to register on the platform were explained. Subsequently, a weekly tutorial would be held throughout the online training. Ideally, these tutorials would be divided in a rational way, grouping the more technical groups on one side (technical manager, science and engineering professionals) and the management groups on the other (managers and change agent).

7	The duration of face-to-face sessions were not as planned.	The face-to-face sessions were planned in such a way that a 2-hour session was held with managers; a 5-hour session with science and engineering professionals, technical managers and the change agent; and a 2-hour awareness-raising session with operators. However, it was observed that in each country it was implemented with adaptations. For example, in Italy, shorter sessions with breaks were carried out and in Spain, all the face-to-face sessions were merged into one, except for the one with the operators. In view of this situation, and even though the previous paradigm is still considered the most appropriate, the door to make minor adaptation considering the needs of companies is open.
8	Lack of harmony between the assessment criteria and the actual purpose of the training	To adapt to the objective of the project, which is ultimately for companies to learn about energy efficiency measures and energy audits, the evaluation criteria are modified to give weight to the classroom part. Thus, the evaluation criteria would be as follows: 60% the exam grade, 20% the grade in the link activity and 20% the active attendance to the face-to-face sessions.
9	Delay in sending out diplomas	During the pilot phase there was a huge delay in the awarding of diplomas due to a lack of agreement on the format. However, in the replication phase the template is now clearly identified and the deadline of 1 month after the training to send them to the trainees is set.
10	Rigidity in methodology	Ultimately, one point to keep in mind is that the purpose of the project is to enable company employees to acquire the knowledge and eventually implement energy efficiency measures in their companies. Strict compliance with the methodology is secondary if the cost is not to achieve the above objectives. So, as long as the general structure of the methodology is maintained, it is not a problem if some parameters are changed to suit the needs of the company.
11	VR exercise. Some users wrote that explanations of interaction commands / buttons on the hand controllers were not totally intuitive	To add some panels with visual hints in the application and/or highlight the buttons during the explanation.
12	VR exercise. Need to put a carpet/mat to insulate the operator.	Adjust implemented.

4.2 Improvements in the E2DRIVER Platform.

Taking into account the weaknesses identified in section 3.2, below is a table explaining the improvement implemented for each weakness. In case a more detailed explanation of the weakness is needed, please refer to section 3.2 using the numerical codes.

	IDENTIFIED WEAKNESS	IMPLEMENTED IMPROVEMENT
1	Long and tedious registration process.	In the previous format of the platform, the registration process involved several steps where several consecutive steps were expected from the learner and the platform administrator. This resulted in many learners becoming tired and either giving up or simply not succeeding. Thus, the registration process has been modified in such a way that learners only have to register, and they have automatic access to the classifier test and then to the courses.
2	Inability to see trainees' progress.	A part of the platform is identified where it would be possible to see those "Observed material" boxes that students have ticked. However, the platform is technically weak when it comes to solving this problem, so a more traditional monitoring system is proposed in which the tutorials can be used by teachers to find out directly about the progress of each student.
3	Calendar not synchronised	The possibility of downloading a link has been identified thanks to which the events of the E2DRIVER platform could be downloaded to the personal calendar.
4	E2DRIVER Community not useful as planned	As the purpose of the platform is not yet clear to potential users, several solutions should be brought forward and will be addressed in the frame of the exploitation phase: the platform should be presented to the trainees as possibility to exchange and mutual learning; the platform should offer horizontal exchange between students of pilot/replication companies; activities on the platform should be monitored; active involvement should bring benefits for the users.

5 CONCLUSIONS

This deliverable has explained what the purpose of Task 4.4 was and how it was developed. Additionally, the main weaknesses identified during the pilot phase have been presented, as well as the measures undertaken to improve it.

In any case, as explained above, the most important result of this task is not to be found in the body of the deliverable but in the Annex that is below. In the Annex I can be found the final version of the E2DRIVER Methodology, which is a sort of guide for trainers that allows the replication of the designed training programmes to future experiences.

6 ANNEX I: GUIDE FOR TRAINERS