CIRCVET

CIRCULAR ECONOMY PRACTICAL TRAINING MATERIALS
FOR PLASTIC MANUFACTURING INDUSTRIES

R1.1 – Teaching Methodology

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1. Introduction

The traditional classroom model, where the students remain passive, and sitting at their desks listening to the lesson, is being replaced by new teaching methodologies, by a wide range of professionals. There are more and more people who question their efficacy and believe that innovative methodologies are needed that are more motivating to the students, where they actively participate in the construction of knowledge and constitute a model that attends to the individual needs of each individual.

Regarding the general teaching methodology to be used in the CircVET project it will be based on the Flipped Classroom methodology (both in their blended and on-line learning meanings) so that the set of materials to be developed can be enhanced using technological infrastructure, digital resources, and students' lifestyle, with a view to promoting differentiated education and promoting opportunities and significant learning, seeking to foster autonomy and flexibility to the learning pace of each one, to achieve educational success and the academic development of all students.

This methodology seeks to involve teachers and educators in the preparation of materials to support the learning, structured so that they can be used by students wherever and whenever they want – anywhere, anytime. In the Flipped Classroom model, the teacher plans learning opportunities for students, providing materials in an organized format for self-learning, which can happen out of a classroom, for example, at home.

This task will aim at the creation, development and use of an innovative, flexible, and integrated methodological approach to the learning done by teachers and trainers, as opposed to traditional methodologies that are too expository and theoretical and will promote the adoption of innovative practices using open and flexible learning/teaching tools that will be fully developed under the project's scope.

2. What is a Flipped Classroom?

The Flipped Classroom was first coined with the idea that class lectures are recorded and watched at home while the teacher assists students with homework in school. Technology makes this very basic scenario a real possibility. Through the years the Flipped Classroom concept has become more sophisticated with an increased benefit to the student. While lectures still may be ported for home use, teachers have found powerful ways to utilize class time beyond homework help. The Flipped Classroom has become more of a Flipped Learning experience. While instructional videos may be viewed at home, teachers are providing higher order learning activities at school to compliment the home learning experience.

While a traditional classroom is teacher-centred, a Flipped Classroom is student-centred.

In the traditional classroom model, teachers first explain each topic, and then assign homework. In the flipped classroom model, students first view the topics outside of class, and then use class time for inquiry-based learning.

A flipped or reversed classroom uses educational technologies to leverage valuable classroom time. Once students have covered material traditionally covered in lectures outside of the classroom, teachers can focus on learning-based activities in the classroom, like practical activities, and deliver more one-on-one, customized assistance.

3. How does a Flipped Classroom contribute to student learning?

Unlike the traditional classroom model, a Flipped Classroom puts students in charge of their own learning. By providing lectures online, educators give students the opportunity to learn at their own pace. Once a student masters a concept, he can move on. Also, students who need more time to master a concept won't get left behind. This means all students are not working on the same area at the same time in and out of the classroom.

In the Flipped Classroom environment, the teacher becomes the guide off to the side, acting as more of facilitator, helping and guiding small groups and individuals toward learning success.
This model adjusts to what are the CircVET project goals and target groups (students: I-VET and companies' workers: C-VET). CircVET's approach is to evaluate the individual needs of an applicant and to build-up a personalized training, following this scheme:

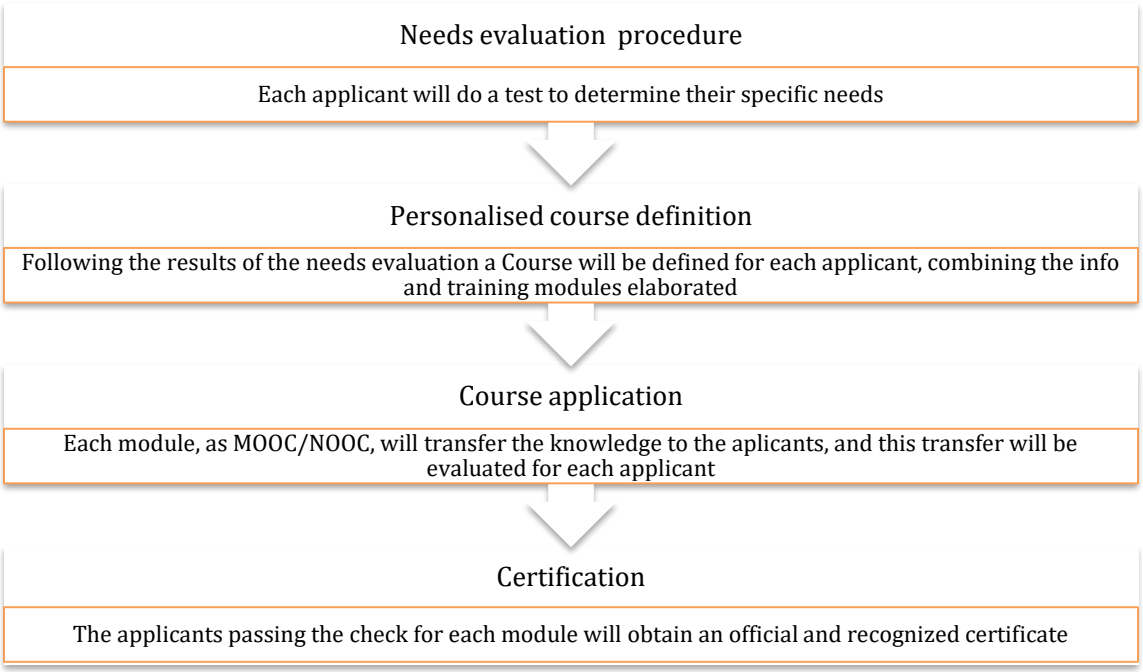

Figure 1 – CircVET implementation scheme

This system for active professional (C-VET) will be applied as well for future professionals learning in the training system (I-VET), with slightly adaptations as required for the formal accreditation system. In this last case, the training curricula will be pre-defined, and equal for all the students in the group, using the modules and materials developed.
Apart from this, the project will be supported by an e-learning platform. This digital learning environment, aiming at empowering partners to deliver a large variety of learning experiences to the project's audience, helping them develop specific values, knowledge, and skills enhances and supports the chosen teaching methodology. This digital learning environment will support multimodal learning experiences, based on text and audio-visual content in different languages, permitting partners to adapt or create learning content that is relevant to different national realities.
The e-learning site covers a set of features as:

- Hosting MOOCs/NOOCs for the delivery of the training to C-VET and I-VET
- Allowing to choose a personalized itinerary according to professionals needs (through an assessment)
- Having a mentor and trainer's space
- Allowing on-line meetings for mentoring
- Including a management space for the accreditation system

The main benefits of implementing Flipped Classroom as the teaching methodology are related to flexibility for attendance of the classes, the promotion of student collaboration and concept mastery exercises, in particular connecting with real cases from industry and companies; the creation of a student-centred environment,

increase of students engagement, teachers/mentor availability for one-on-one interaction also through the e-learning platform, everyone works at their own pace and students take on the responsibility for their learning.
Although some challenges can also be found with Flipped Classroom teaching methodology related with the degree of commitment of the students once there is no guarantee students will watch the online lecture at home and come to class prepared, support for a Flipped Classroom is needed from other teachers, school administrators, and students; although allowing each student to work at their own pace may be extremely beneficial for the students, it may lead to a larger workload for the teacher/mentor. Having to manage multiple students working on multiple assignments within multiple standards may become time-consuming as well as standardizing testing/evaluation.

4. How to implement Flipped Classroom teaching methodology?

The implementation method of Flipped Classroom does not obey to a pre-established methodology.
The implementation process is based on the connection with one or several on-line tools and some features must be ensured:

- The learning material should be available before the presential classes take place
- The discussion topics are raised by the students and might come from doubts that arise from the previous study of the content available
- The collaboration between students arises from the discussion of the topics
- The students are allowed to go deeper in the topics by themselves being supported by the teacher/mentor

Despite this, the chosen teaching methodology for the CircVET project will comply with the following guidelines:

i. Each module will be made of a set of materials (text, internet websites, books, videos, …)
ii. Each module will provide information to deepen the subject (text, internet websites, books, videos, …)
iii. Each module should provide practical examples that allow the student to relate the given content with their reality
iv. Each module will have practical exercises so that the student can practice the acquired knowledge
v. Video lectures should be kept short, ideally less than 20 minutes
vi. For I-VET, in classroom context, the class time should be used to answer questions and do group work deepening the contents previously studied, doing exercises, debating ideas or other kind of group interactions
vii. For C-VET, a chat room, forum, or similar, should be used to interact with teachers/mentors as well as peers so that students can clarify their doubts and debate their ideas
viii. Each module will provide evaluation materials so that the acquisition of knowledge can be accessed

By implementing this methodology, it is expected that the student, in class/learning session, do exercises, debate, develop projects, group work and solve problems with the teacher assuming a position of guidance or tutor. Out of class/learning session the student will read, watch videos, do research and find alternative learning materials so that he/she acquires knowledge about the topics in each module.
In particular for the I-VET case it is important that the teachers, before implementing this methodology, inform the students in advance about the methodology that will be used, involve the students in planning and preparing for this and offer an open discussion on how the students feel about the methodology and their expectations. It is also important to guarantee that all the students can access the internet.
As a student-centred methodology Flipped Classroom puts the teacher on the side-lines, its role will be helping the students and not convey information. By creating an environment where students learn from each other and at their own pace, the teacher becomes a guide, offering more time for individual and small group guidance.

As a suggestion, when in class, in the first 10 minutes the teacher clarifies student doubts and after that involves them in practical activities like problem resolution, experiments or computational simulations in small groups. During this process the teacher walks around the room guiding students and clarifying doubts that might arise. In a Flipped Classroom, students should walk into class already instructed on the day's topic and take an active stance contributing to the learning of their colleagues through their explanations. This process will contribute to the acquisition of other competences, related to collaborative work – know how to listen and communicate ideas, how to contribute to a discussion, respect and be flexible in a conflict situation. Gamification can also be considered so that the students keep motivated, and well prepared. Rather than units, students will move from one "level" to the next and rather than passing a test, they will "unlock" the next level, as an example.

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