Guidelines for development of Professional Digital Learning materials

Pedagogical methodology within InnoEnergy

This document gives you some guidelines of how to approach the task of creating a professional digital learning product for InnoEnergy. You will also need to follow the **EIT Handbook**[1] recommendations on learning objectives.

What is a MOOC?

A MOOC is an educational offer that stands for "Massive Open Online Course":

- **Massive**, in the sense of no limit to attendance.
- **Open** in the sense that it can be accessed by anyone anywhere as long as they have an Internet connection.
- **Online -** Offers possibilities for interaction such as social media channels, forums, blogs or RSS feeds to build a learning community.
- **Course** materials such as videos, readings, and others structured around a set of learning goals in a defined area of study and limited in time.
- Includes assessment or evaluation, self-assessment or peer assessment.
- Sometimes it can be offered with virtual tutoring classes or even with a **blended learning model**.

What is InnoEnergy looking for?

MOOCs are well known for being free-of-charge, high-quality online educational offerings from Universities. Professional Digital Learning products based on the MOOC model, are fee-based, high-quality courses driven by inspiring professors and industry experts. These products pursue the goal of financial sustainability, for both InnoEnergy and developing partners.

This type of digital educational products help us better promote life-long learning serving individuals who use online courses to advance their careers as well as organisations that support the continuous learning of their workforce.

Professional digital courses cover the areas of sustainable energy, innovation and entrepreneurship. See our Thematic Fields[2] in sustainable energy to know more about the different addressable topics in sustainable energy.

The course should be delivered on our digital-learning website "The Institute of Sustainable Energy[3]". It can be available to the public in the general section or in a private section customised for our customers.

The **professional digital learning products or services** should be offered online and can be complemented with

[1] *EIT Handbook:* http://eit.europa.eu/sites/default/files/EIT-Handbook-Planning-Labelling-Reviewing.pdf
In "Annex I – Terms and concepts" there are some transcripts from the EIT Handbook.

[2] *InnoEnergy Thematic Fields:* http://www.innoenergy.com/thematic-fields/

[3] *InnoEnergy e-leaning website "The Institute of Sustainable Energy":* http://www.ise.innoenergy.com

on campus or on-site activities at companies. Blended courses may thus be submitted, offered in combination with virtual tutoring classes, coaching services, or additional in-place or online learning tools such as a remote laboratory.

These courses can be tailored for a small or a global audience. If the professional digital course is provided to smaller groups and in a private way this is called SPOC (Small Private Online Course).
If the course is focused to a small audience, the idea is that these courses are scalable so they could be used for a small group of people or for a thousand of them.

Pre-requisites of the educational proposal

- All submitted proposals must have a clear business model and a defined ROI.
- The educational offering needs to include a professional digital course. In addition, **educational products or services** can be also offered online, on-campus or on-site at companies. Blended courses may thus be submitted, offered in combination with virtual tutoring classes, coaching services, or additional in-place or online learning tools such as a remote laboratory.
- **At least one of the partners needs to have previous experience in the development of MOOCs or similar online courses.** If none of the partners has the expertise required, InnoEnergy can recommend an additional partner to fulfil the goal and the needed requisites for the proposal to be elected.
- The course must be included on the catalogue of InnoEnergy digital learning website http://www.ise.innoenergy.com/, for commercialisation.
- The educational product should not exceed 1.5 ECTS or 40 student learning hours.

Planning and designing the course

The following course design guidelines should be applied to InnoEnergy professional digital learning to ensure courses are well designed from a pedagogical perspective.

1. Write down your **aims/objectives**. This should be the answer to the question: 'What is the purpose of this module/course/programme of study?' Document target groups and the context of the new course.

2. Describe what will be the **Unique Selling Proposition** and clearly state what will be the **key takeaways** for the course applicants.

3. Identify and formulate the **overarching** "**Intended Learning Outcomes (ILOs)"**[4] for learners. This is the general knowledge, skills, competences and attitudes, the learner should have acquired after the course expressed in assessable language. (*See the section "Tips to write a high quality intended learning outcomes".)*

4. Formulate **specified ILOs**[5] on module and task levels. Make sure that all the specified learning outcomes from the different tasks and modules covers the overarching learning outcomes.

[4] *See definition of overarching ILO in Annex I – Terms and Concepts*

[5] *See definition of specified ILO in Annex I – Terms and Concepts*

5. Design **aligned teaching**[6], ensuring assessment strategy fits and aligns with the learning outcomes. Work with the assessment before creating the content of the course might feel a bit odd, but this will force you to really formulate what the learner should be able to do after completing the course. The goal is that the learner develops the aimed competences, not that the learner goes through some learning material.

6. Develop the **syllabus**[7] and a progression of tasks and activities that will support learners in building the target knowledge, skills and attitudes. Create content that will support **active learning**[8] and the learning needed to achieve the specified ILOs.

   Start with deciding what content you need and then reflect on what format that would be suitable for that type of content. Digital content could come in many formats; it may be recorded lectures, e-Books, animations, video of a study visit, remote labs etc. You may of course combine digital and printed material with more blended and teacher led sessions, workshops, work in groups, assignments etc.

7. Now you have all your intended learning outcomes, assessments and learning content. It is time to be creative and make an interesting course out of this. We believe in problem-based learning or as we prefer to call it challenge driven learning, education to underline the components of design thinking, learning creativity and the role education can play in solving business and societal challenges. It is also really motivating for the learner to solve real-life challenges and problems that are relevant for him or her.
   Ensure a balance between instructor presence and social/peer interaction. And don't forget to create an environment that promotes critical thinking in relation to the content area.

8. At last, it is the time for production and testing. Guidelines document for the details on digital production and testing is described separately.

Recommendations: general aspects to consider for the creation of a Professional Digital Course

The elements of the content hierarchy are:

- Course: a course is a self-contained unit that is composed of a number of learning modules.
- Learning module: collection of learning objectives related to be able to perform one specific task/content segment. Linked to big learning outcomes: performance, condition, criteria, and measurement indicators.
- Learning nugget: a collection of learning elements supporting an intended learning objective (ILO), consisting of meaningful learning activities.
- Learning elements: media elements, which can make up a learning activity or learning nugget. These elements have production metadata: author, production date, and topic.

Some additional aspects to consider:

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[6] *See definition of aligned teaching in Annex I – Terms and Concepts*

[7] *See definition of syllabus in Annex I – Terms and Concepts*

[8] *See definition of active learning in Annex I – Terms and Concepts*

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- **The online course should not exceed 1,5 ECTS or 40 student learning hours**.
- The course duration of a typical MOOC should not be longer than 7-8 weeks. If the course is too long, usually a good idea would be to split up a regular lecture into two digital courses.
- Each week of the course should have about 30 to 45 minutes of video. Video is usually the main learning content and a good practice is to split it into smaller video content nuggets. Nevertheless, other materials could be used too and should be available as well.
- All videos must be shorter than 7 minutes. A good idea again would be to plan between 3 and 5 minutes per video. Studies show that longer videos lead to loss of learners.
- Each week there should be activities and interaction tasks for the learners.
- The total time needed for a typical digital course designed for corporate training should not exceed 2-3 hours per week.
- Each video should only have one learning goal that is clearly visible and described.
- Each video should have an
    - Introduction consisting of about one sentence,
    - Description of the learning goal of the video for the learner.
    - Explaining the topic and conclude with summarizing of the learned facts, again in one sentence.
- Videos should be focused and not contain any unneeded clutter.
- The course should contain an introductory video before its start, and an overall final video in which all the learning objectives throughout the MOOC are recaptured. This can be short, but adds to the learning.

Tips on how to write high quality Intended Learning Outcomes

All learning outcomes should:

- Be clearly written (easy for the student to understand);
- Describe the result of the learning (not processes and activities performed during the study unit);
- Deal with the course content; and
- Describe visible use of knowledge: 'After the end of a course/module… the student should be able to...'.

For **specified** learning outcomes, we also need to add **assess ability**, meaning the use of what are often called action verbs, which makes them possible to assess. As an example, a student's understanding is not possible to assess, neither is being aware of or becoming familiar with, whereas abilities to define, explain, calculate, differentiate, categorise, compare, and so on, can be clearly demonstrated in an assessment task.

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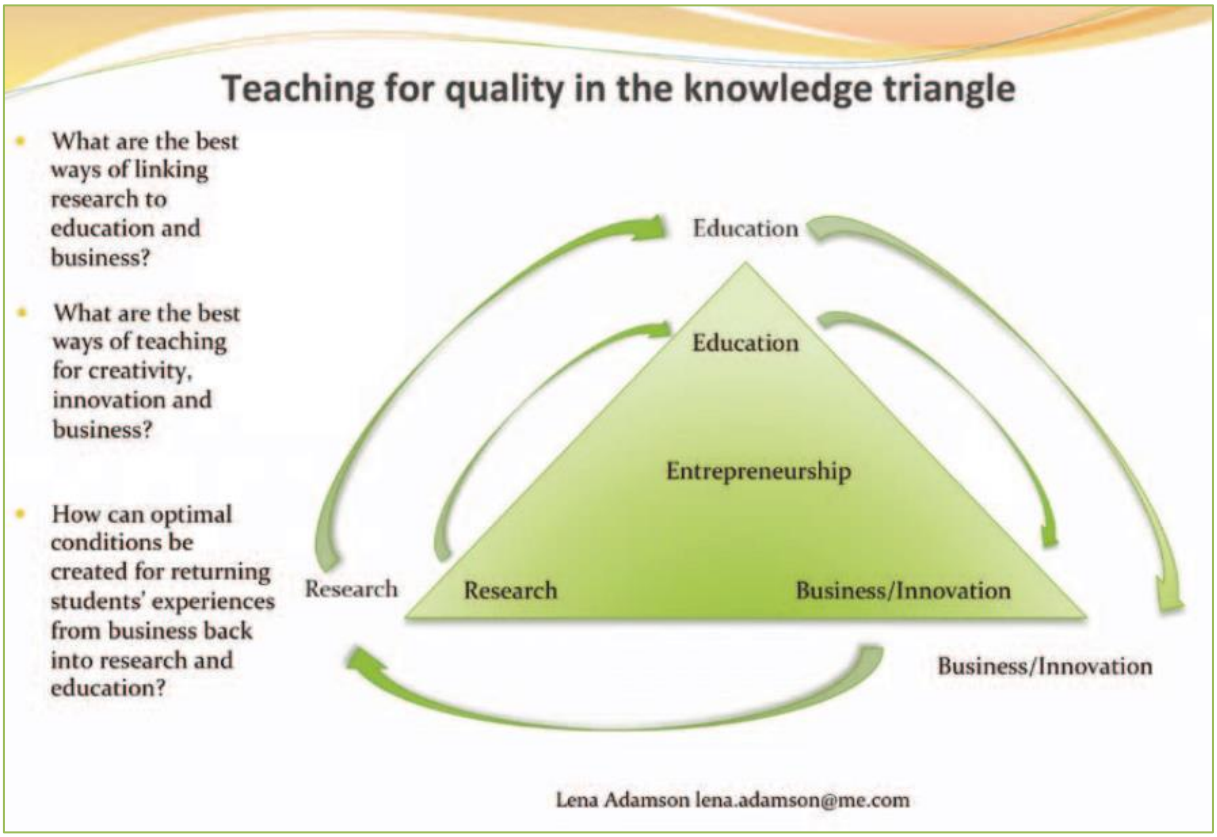
Annex I
Terms and concepts

These terms and concepts are some transcripts from the "**EIT Handbook**[9]". The EIT Handbook uses some common expressions but their definitions or relations may differ a bit from what you are used to.

The knowledge triangle

The knowledge triangle has so far mostly been presented as a theoretical concept and political marker on the changes that are needed in Europe when it comes to improving the integration between education, research and innovation/business. Through creating a simple enquiry-based process around the three nodes of the triangle, questions are raised that should to be in the mind of everyone when planning and performing the educational activities. You can see those questions in the picture below.



Learning Outcomes

There are two types of learning outcomes: intended learning outcomes (ILOs) and achieved learning outcomes (ALOs).

[9] EIT Handbook: http://eit.europa.eu/sites/default/files/EIT-Handbook-Planning-Labelling-Reviewing.pdf

Intended Learning Outcomes and other concepts

In general, the **aims/objectives** of a course or module should answer the question 'What is the purpose of this module/course/programme of study?'

The **intended learning outcomes (ILOs)** should instead specify the knowledge, skills and attitudes, which someone will be required to demonstrate in order to have completed the module/course/programme successfully. The relationship between aims/objectives and the learning outcomes should of course be very close, where the learning outcomes are derived from the aims/objectives. **Syllabuses** then, describe the content, the subject matter of a module, course or a programme. To summarize, learning outcomes describe what students will be able to do with the content in order to fulfil the aims/objectives.

Let's dig into a deeper definition:

ILOs are written statements in educational documents of what a learner is expected to know, understand and/or be able to do at the end of a learning period, i.e. the visible use of knowledge.

ILOs can be written on different levels, from qualification frameworks, to field/discipline, programme, course/module levels, and down to task level. At the top level, they are sometimes named descriptors or **overarching learning outcomes** to distinguish them from the **specified learning outcomes** on course/module and task levels. The difference between overarching and specified learning outcomes is that the former express competencies on a general level whereas the latter should always be enough specified to be possible to tie to a fit for **purpose assessment task**.

Achieved Learning Outcomes

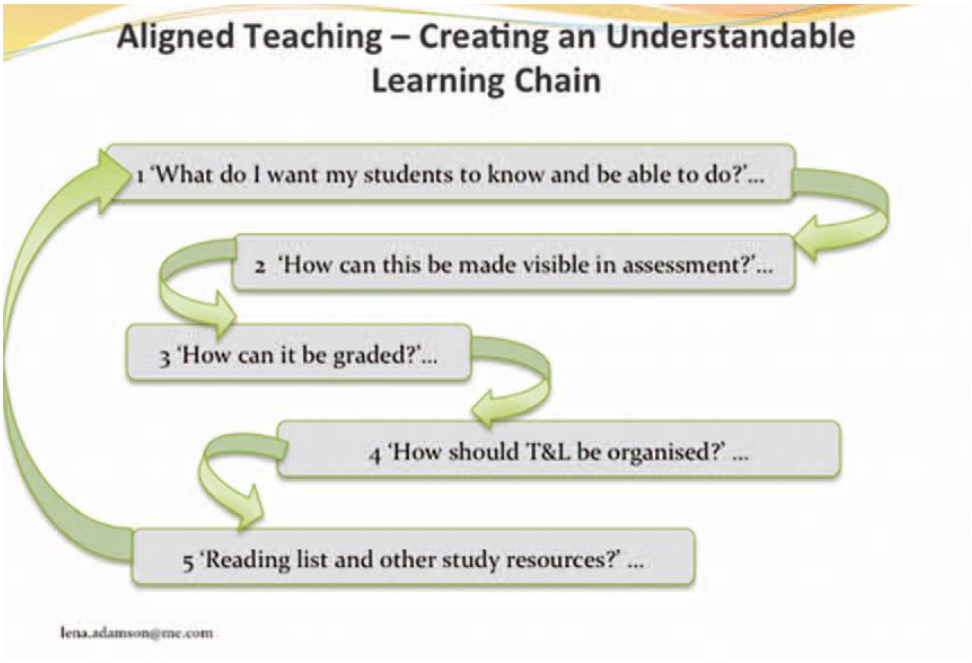
The achieved learning outcomes (ALOs) are simply what students have achieved during a study or learning process, visualised in their individual responses to different types of exam tasks.

Aligned teaching. Change the order of planning

EIT demands all course construction to be done in a different way compared to what is common for most teachers. It is called **Aligned teaching**. The main point in Aligned teaching is that the assessments are created before the teaching and learning are even planned. The advantages of this approach are quite large for on-line learning since it demands a shift from the teacher to the learner, and from creating a schedule on what exactly to learn. Here is a transcript from the EIT Handbook:

*"Higher education in the European countries has been subject to considerable change within a short period. The Bologna process has led to a radical shift in the approach to the quality of education specifically by introducing the learning outcome paradigm. The consequences are two clear shifts of perspective. The first involves those concerned in a change of focus from the teachers' activities to what students do and should do ('from teacher driven to **student-centred'**). The second change is temporal from planning the module/course or programme 'from beginning to end', to a reversal of the process. Learning outcomes are defined first, followed by decisions of fit for purpose assessment methods, and finally the teaching and learning activities and materials that support learners' efforts to achieve the learning outcomes are chosen. This is often referred to as constructive*

alignment, aligned teaching, or sometimes as the learning chain and (should) result in students not only knowing things, but also knowing what to do and how to solve real life problems. Aligned teaching gives the student a clear logic and understanding of what s/he will be expected to do and be able to achieve by the end of the study period, subject to their own efforts. By explicitly linking the learning outcomes with relevant assessment the teacher also uses one of the strongest learning forces in the system – students' motivation to succeed with their studies."



In addition to changing focus from the teacher to the student, and from the beginning to the end of the learning period, aligned teaching also changes the focus for assessment from assessment solely of learning to assessment also for learning and maybe even assessment to learn. Finally, it shifts the relationship between the teacher and the students, from teachers talking to students to teachers talking and interacting with the students[10].

Active teaching and learning

Active learning is usually defined as the teaching method in which the students become involved in various teaching activities but are also required to think about what they are doing. In other words, active learning means engaging students in activities, and also 'thinking/reflecting' on these activities.

[10] For further reference: https://visible-learning.org/hattie-ranking-influences-effect-sizes-learning-achievement/

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