



THE TU DELFT ONLINE LEARNING EXPERIENCE: FROM THEORY TO PRACTICE

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Introduction

In 2014 TU Delft started an innovation programme to educate the world and improve quality of education based on online learning. The programme included open (OpenCourseWare and MOOCs) and online (Professional Education, Bachelor and Master) courses. Lecturers of TU Delft have shared their knowledge in MOOCs with more than 750,000 learners around the world. Next to the open courses, more than 800 learners enrolled in our online courses.

Adopting new instructional strategies based on online learning elements has had a very positive impact in TU Delft's overall education, benefiting traditional on campus education and contributing to the changing need in educating engineers (Kamp, 2014). Naturally, blended learning has arisen on campus, where online learning materials are reused in a flipped classroom approach with very positive results: higher completion rates, higher average grade, more flexibility for students to interact with the course material and more flexibility for teachers in choosing which elements to include in the interactive classroom sessions (van Valkenburg, 2015).

The development of TU Delft online courses is based on the Online Learning Experience (OLE), a pedagogical model that supports the development of our courses and strives for increasing quality. The creation of the OLE was an important step for TU Delft, contributing to the development of online courses in a more systematic and consistent way, guiding all course development teams through the realisation of several shared educational principles.

Last year, when we presented the OLE at the 2015 EDEN Conference in Barcelona, we were still at an early stage of its development, collecting fundamental background to support it and feedback from online learning experts. Although we only had a collection of ideas translated into 8 principles, it was clear that the model needed to be flexible in order to accommodate many educational scenarios that coexist among TU Delft's Faculties, but with a clear and useful purpose to help improve the quality of our online education (Jorge, Dopper & van Valkenburg, 2015). This paper describes how the OLE is applied in practice.

The main goal of the OLE is to improve the quality of our online education by setting course design and development principles to support course teams. At the same time, the OLE can be used as a tool to promote reflection before the course starts to set expectations, and in the end

to evaluate and plan improvements for the next run. In the next sections we'll describe the OLE in both ways – as course design principles (guidelines) and as a tool (the radar graph).

The OLE course design principles

The OLE holds 8 principles to support course teams in the design and development of online courses. The model was elaborated based on the foundations established by distance learning experts (Moore, 1991; Keegan, 1996; Palloff & Pratt, 1999; Garrison, 2000; Peters, 2000; Anderson, 2003; Garrison & Anderson, 2003; Salmon, 2011; Salmon, 2013; Bates, 2015) and the know-how of the TU Delft Online Learning Course Development Team.

Flexible (in time, space & content)

- Course schedule considers learner's needs in terms of workload and deadlines. All important dates are communicated in the first week of the course or even before its start.
- Course is based on asynchronous communication, with synchronous moments (when existent) clearly announced in the beginning of the course, taking in account learner's needs.
- Learners can explore the course content in a non-linear way and complete the required tasks, managing their time individually according to the course schedule. Learning units have a minimum length of 1 week.
- Learners can choose their learning path relevant to their learning needs. This involves being able to choose educational resources, learning methods and subjects to study, offering opportunities for personalization while reaching the learning outcomes.

Diverse (activities, resources & assessment)

- Learners carry out different types of learning activities throughout the course, both individual and collaborative.
- Learners are assessed using a variety of forms of assessment, both formative and summative, aligned with the learning objectives and activities.
- Course provides a diversity of high quality educational resources (video, audio, text, hypertext, images, and graphics) throughout the course to enhance learners' knowledge.

Inclusive (accessible, cultural & gender)

- Course provides educational resources in alternative formats to match different learner's needs.
- Learners can access the course and operate effectively using the most common devices and download educational resources for offline learning or reuse.
- Learners can easily navigate in the course. Course is well structured, has a consistent user interface with common styles, formats and layouts.
- Course content is presented using a gender inclusive and multicultural approach.

Supportive (guidance & feedback)

- Course team is approachable, welcoming, responsive and conscious of their diverse learners' needs, creating a positive atmosphere to learn. Course team monitors progress on a regular basis and contacts learners to support and motivate.
- Course team facilitates, monitors and encourages participation, active discussion and peer learning contributing to the development of a learning community.
- Learners are provided with timely expert advice on questions and individual feedback on assignments within a stated response time, helping them advance their competence.
- Learners receive timely regular and relevant updates from the course team (e.g. announcements, reminders, Q&As).

Interactive (learner – learner/teacher/content)

- Learning activities ensure learner-learner, learner-course team and/or learner-content interactions to promote active engagement.
- Independent educational resources provide learners with automatic feedback through self-assessment activities (e.g. quizzes, tests), enabling learners to expand and test their knowledge and understanding.
- Learners are encouraged to share experiences, discuss, support, challenge and learn from each other, leading to the development of a learning community that builds effective and relevant knowledge.
- Online social networking opportunities are provided in order to build and support a learning community (e.g. social forum, social networking sites).

Active (learning by doing)

- Activities are engaging, interesting and relevant, promoting learning by doing.
- Learners are required to actively contribute in the learning activities.
- Learners are provided with clear instructions that explain the learning activities in detail (learning objectives, tasks, timeframe, expected outputs and assessment).
- The amount of time spent on activities is greater than the time spent passively reading/watching.
- Learning activities drive the usage of resources in order to develop competences rather than delivering new information to the learner.

Contextual (real world situations & problems)

- Learning objectives help learners transfer knowledge into practice, including the application of technical and scientific knowledge within their own context.
- Learners are challenged with problem solving activities based on real life (authentic) examples and case studies, whether provided by the staff or shared by the learners as part of an activity or discussion.
- Real world examples (including from different national contexts) and best-practices are presented in the educational resources to make it more relevant for learners.

Innovative (new tools, strategies & insights)

- Learners experience an innovative learning method or technology (e.g. virtual lab, simulator) that contributes to the learning outcomes and has a positive impact on the course (e.g. pass rates, satisfaction, motivation).
- Learners have access to the newest insights in research provided by top academic teachers, opening up their possibilities to develop ideas, establish new synergies and connections.

The OLE as a tool: the radar graph

The OLE radar graph is a tool to promote reflection and critical thinking, offering the opportunity to improve an online course. The exercise should be done by the course team (teachers and teaching assistants) and support staff (e-learning developer and product manager) before the course starts, in order to anticipate opportunities for improvement and at the same time establish expectations, taking into account several aspects (e.g. the number of learners, their needs and the specificities of the course).

In order to generate these course insights to be analysed and discussed during the course development process, the OLE guidelines are used as criteria, rated on a scale from 0 (not at all/inexistent) to 5 (exemplary/excellent). The results (%) are then plotted on a radar graph to get a visual insight of the course. Feedback from all players involved in the teaching & learning process is collected after the course runs, including student's data (collected from surveys and extracted from the learning management system), to compare and draw reflective conclusions, contributing to an improved version of the next run of the course.

When using the tool, it should be understood that different types of courses origin different types of patterns revealed in the graph. Although some courses may have strong similarities, especially when they are part of a same programme, each course takes into account the learners needs in order to develop the most effective teaching and learning experience for that situation.

In order to test the tool, insights from teachers and support staff (eLearning developers, instructional designers, product managers, managers) involved in the conception, design and development of online courses were gathered in an online learning seminar held at the TU Delft in October 2015. The input received from the participants for the different types of courses offered by TU Delft allowed us to create a visual representation of each, plotted on a radar graph, as shown in Figure 1.

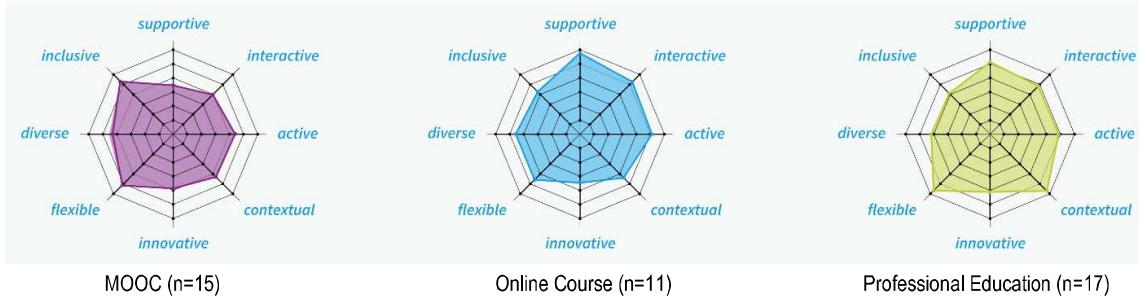


Figure 1. The OLE radar graph representation of 3 types of courses: MOOC, Online Course (Bachelor/Master) & Professional Education

In these examples we see that different types of courses originate different radar graphs. While an online course should be highly supportive with learner-teacher interactions, it's not expected that a MOOC reaches this level considering the massive number of participants. MOOCs can be seen as flexible and inclusive courses open to anyone in the world. In the Professional Education course radar graph we see that contextual is the highest ranked principle, considering that learners expect to work on real world cases and apply what they learn directly into their practice. Flexibility is also an important principle in these types of courses, considering the needs of this specific target group, namely working professionals with a full-time day job and sometimes a busy family life. Although these examples don't apply to real courses, it revealed itself as an interesting exercise to gather perspectives regarding different types of courses.

Applying the OLE in the course development process

The OLE is integrated in the different phases of the Education Quality Cycle of TU Delft Online Learning, an important component to ensure quality when developing and running a course. In each phase it has a different function, as illustrated in the yellow bar in figure 2.

1. Introduction – the OLE is presented to all course teams during the Onboarding day, a one day event to get all participants familiar with the basics of online learning and to draft a course plan with the support of the e-learning developers.
2. Guidelines – the OLE is continuously used as guidelines during the course development process, with the support of the e-learning developer.
3. Reflection – the OLE is used as a tool to draw a first radar graph of the course in order to improve it before it runs and establish expectations; this exercise is done by the course team and support staff.

- Evaluation – the OLE is used again as a tool, now also with student's data, collected using a post survey and combined in an evaluation report that contributes to an improved edition of the course.



Figure 2. Education Quality Cycle of TU Delft Online Learning

Included in this cycle are multiple surveys for the learners: pre, mid and post survey. The pre surveys give us input on what to focus in the OLE, helping us design and run online courses that fit student's needs. The post surveys are to evaluate the choices that were made in the OLE, combined in an evaluation report in order to improve the next edition of the course, as shown previously.

Present and further developments

The OLE guidelines are already an important instrument used by course teams and support staff for the design and development of TU Delft online courses. Many fruitful discussions have raised concerning the OLE, bringing up important concepts to consider and creating awareness regarding online learning practices and education in general. Putting the tool into practice in a reflective and insightful way has shown similar perspectives when thinking about different types of courses. The next step is to implement the OLE in a more systematic way.

In 2016 all courses will be designed, reviewed and evaluated using the OLE. During the evaluation meeting, after the course has run, the radar graph will be completed based on the experiences of the course team and on the information from the student surveys. In this way, we'll collect a large amount of radar graphs which can lead to valuable information about the online learning experience of participants in various types of TU Delft courses. This can help in improving TU Delft courses for next runs, gives us insight on important aspects for the different course types, which can help again in sharpening the OLE principles itself.

In conclusion, the purpose of the OLE is not to judge but to support the course design & development process, to rise reflection and critical thinking regarding online learning. We hope that the OLE will lead to the development of better online courses offered by TU Delft, more insight in online learning experiences in different course types and continuous feedback on the OLE itself.

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