

# Developing a high quality Online Course for Chemistry Educators without a budget

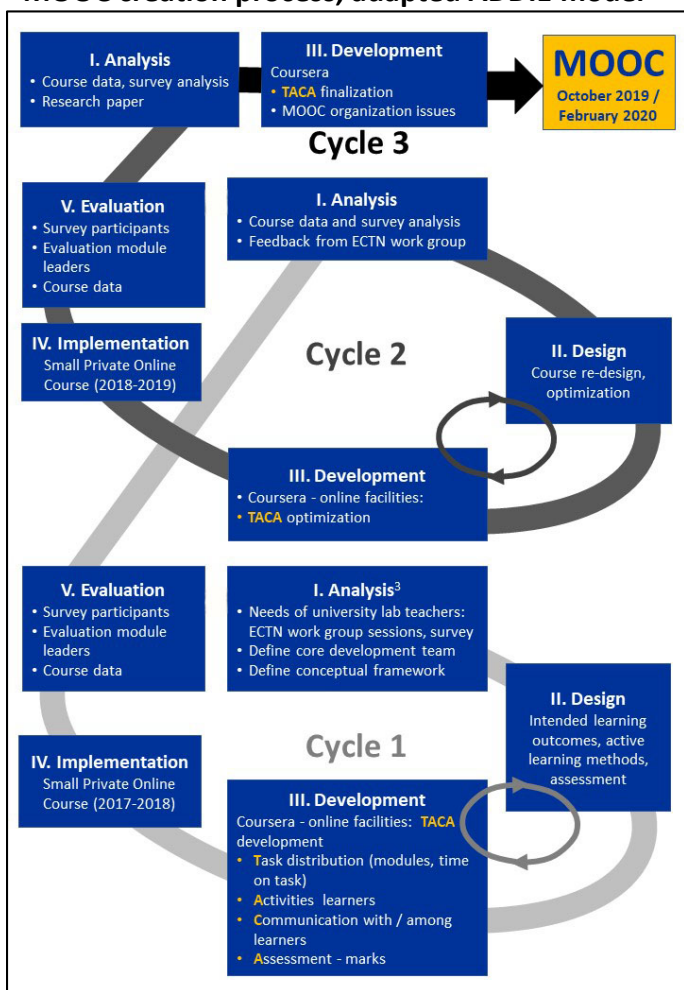


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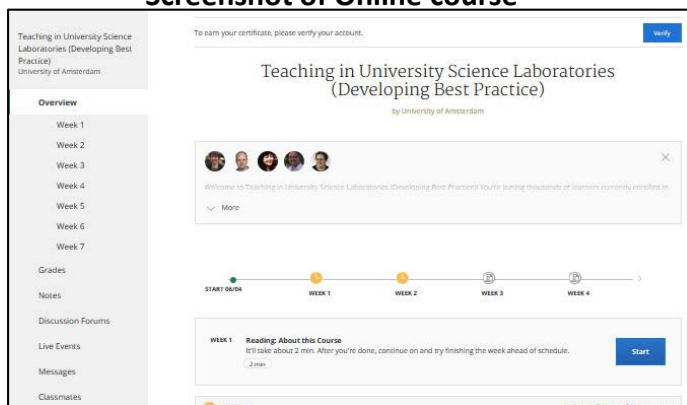
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Designing and teaching of laboratory classes are two essential competences of most STEM lecturers. To improve teaching in laboratory classes, the European Chemistry Thematic Network (ECTN) Working group on Lecturing Qualifications and Innovative Teaching Methods has developed a free online course entitled Teaching in University Science Laboratories (Developing Best Practice) and published it on the MOOC (massive open online courses) platform Coursera. The course has six modules, each of them requiring approximately two hours of your time.

## MOOC creation process, adapted ADDIE model<sup>1</sup>



## Screenshot of Online course



The creation of the MOOC with six modules followed an adapted ADDIE (Analysis, Design, Development, Implementation, Evaluation) model<sup>1</sup> and it has been made available for two iterations (Dec 2017 & Nov 2018) as a Small Private Online Course (SPOC). Each module ran for one week and had one leader. The participants were very positive about the course. The completion rate of the second SPOC with 144 participants from 22 countries was 60%. This is very high in comparison to average completion rates of MOOCs (about 15%)<sup>2</sup>.

This course was developed without any special budget apart from the time and effort of the team provided on a voluntary basis. During the design/development phases the team met biweekly online to discuss progress.



Students and lab teacher at University of Amsterdam, Photo: Leony Brok  
From October 2019 the MOOC for lab teachers will run on Coursera twice a year.

**Contact and more information about the course:** ECTN website <http://ectn.eu>, see Work groups: Lecturing Qualifications and Innovative Teaching Methods, see Online course.

## References

- Peterson, C. (2003). Bringing ADDIE to Life: Instructional Design at Its Best. *Journal of Educational Multimedia and Hypermedia*. 12 (3), pp. 227-241.
- Hollands, F. M., & Tirthali, D. (2014). MOOCs: expectations and reality. Full report. Center for Benefit-Cost Studies of Education, Teachers College, Columbia University, NY.
- Brouwer, N., Fleerackers, G., Hrastelj Majcen, N., Maciejowska, I., McDonnell, C., Mocerino, M. (2016) Online course to improve university laboratory teaching practice, VIRT&L-COMM.10.2016.1.

## I. Analysis

- Course data, survey analysis
- Research paper

## III. Development

- Coursera
- **TACA** finalization
  - MOOC organization issues

**MOOC**

October 2019 /  
February 2020

# Cycle 3

## V. Evaluation

- Survey participants
- Evaluation module leaders
- Course data

## I. Analysis

- Course data and survey analysis
- Feedback from ECTN work group

## IV. Implementation

Small Private Online  
Course (2018-2019)

# Cycle 2

## II. Design

Course re-design,  
optimization

## III. Development

- Coursera - online facilities:
- **TACA** optimization

## V. Evaluation

- Survey participants
- Evaluation module leaders
- Course data

## I. Analysis<sup>3</sup>

- Needs of university lab teachers:  
ECTN work group sessions, survey
- Define core development team
- Define conceptual framework

## II. Design

Intended learning  
outcomes, active  
learning methods,  
assessment

## IV. Implementation

Small Private Online  
Course (2017-2018)

# Cycle 1

## III. Development

- Coursera - online facilities: **TACA**  
development
- **T**ask distribution (modules, time on task)
  - **A**ctivities learners
  - **C**ommunication with / among learners
  - **A**ssessment - marks