Symposium of Chairs in Open Educational Resources
in conjunction with the ICDE World Conference on Online Learning
Toronto ON Canada

Open courses (micro & MOOC) and open access

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UNESCO Chair in OEP/
ICDE Chair in OER & CLARISE
Tecnológico de Monterrey, Mexico
Toronto, October 16th, 2017

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- NonCommercial
- NoDerivs
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Schedule

- Background with MOOC & micro
- Current project with 12 MOOC
  - Objective and project products
  - MOOCs team
  - Instructional model
  - Results
- Ideas for collaboration
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- Ideas for collaboration
Colaboran:

MOOC (2011-2016)

MOOC: Teaching skills & OER (2013)

1126 participants from 13 countries

Instruction mediated by 58 instructors

MOOCs: Innovation & OER (2013* and 2014**)

Participants:
20,400 (52 countries)* and
18,000 (61 countries)**

Instruction mediated by:
800* and 2500**
Instructors in Team Teaching (TA).
Micro MOOC (2016-2018)
3 Specialized Programs through MOOCs

The specialized program carries **academic credits**, providing a flexible way to start the **Master in Education** Program.

Each program includes 3 courses and culminates in a Capstone Project that allows learners to apply their knowledge.

Created by: Tecnológico de Monterrey, Coursera Platform

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Colaboran:

[Logo images] SENER, SEP, CONACYT, Fondo de Sustentabilidad Energética, CFE, ASESU, Berkeley University of California
As a group, we decided to integrate several working teams to maximize the potential of learning via the creation of a Community of Practice (CoP) for each research project.
Schedule

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- Ideas for collaboration
Project with 12 MOOC

- Project 266632 Bi-National Laboratory on Smart Sustainable Energy Management and Technology Training
- Funded by the CONACYT-SENER
- Subproject: Interdisciplinary, Collaborative and Open Innovation to train in Energy Sustainability

http://energialab.tec.mx/
Objective

Support the **formation of human resources specialized in energy sustainability**, and develop human talent with the necessary capabilities to respond to the technological conditions prevailing in the energy value chain (Electric sector), through **graduate programs, massive open online courses** that will be available nationwide, and validate through competencies certification processes.
Products

- 15,000 Formation of human resources in energy sustainability
- 10 Graduate students
- 12 MOOCs
- 2 Community Workshops
- 3 Books
- 15 Research papers
- 18 Conference participations
- 18 Short term scholar programs
- 1 Web page [http://energialab.tec.mx/](http://energialab.tec.mx/)
- 1 Social innovation lab [http://openergylab.mx/](http://openergylab.mx/)
- 1 Institutional repository with Energy OER
- 12 Technical reports
# MOOC Design and Teaching Time line

<table>
<thead>
<tr>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase 1</strong></td>
<td><strong>Phase 2</strong></td>
<td><strong>Phase 3</strong></td>
<td><strong>P4</strong></td>
</tr>
<tr>
<td>● 4 MOOC design</td>
<td>● 4 MOOC design</td>
<td>● 4 MOOC design</td>
<td>● 12 MOOC teaching</td>
</tr>
<tr>
<td>● 4 MOOC teaching</td>
<td>● 4 MOOC teaching</td>
<td>● 8 MOOC teaching</td>
<td></td>
</tr>
</tbody>
</table>
# MOOCs team

<table>
<thead>
<tr>
<th>Energy experts</th>
<th>Educational Innovation experts</th>
<th>Teaching and Learning experts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Group on Energy and Climate Change</td>
<td>Research Group on Educational Innovation</td>
<td>eLearning team</td>
</tr>
<tr>
<td>School of Engineering and Sciences</td>
<td>School of Humanities and Education</td>
<td>Teaching team</td>
</tr>
<tr>
<td>Business School</td>
<td>Graduate students</td>
<td></td>
</tr>
<tr>
<td>Expert Guests</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 23 | 11 | 22 |
MOOCs sequence

Energy: past, present & future

The Mexican Energy Reform and its opportunities

Energy Markets: business opportunities

Carbon Markets

The new electric industry in México

Commercialization

Conventional, clean Energy and its technology

Introduction to electric energy

Energy saving

Transmission

Distribution

Smart grid

General knowledge

Basic theoretical

Basic theoretical/experimental

Advanced/experimental
Learners’ profile

+ 17 years old

+ High school

Wants to learn about energy sustainability

Chooses xMOOC as a training program to achieve learning goals

CFE or industry related employees
Instructional model

Networking

Actividades

Recursos

Evaluación

Temas de energía

Gratuita
Masiva
Ubicua
Sin requisitos de admisión

Aprende (A. Autodirigido)
Practica (A. Significativo)
Interactúa (A. Social)
Demuestra conocimiento
Obtiene su constancia

Colaboran:

Tecnológico de Monterrey
SENIOR
CONACYT
FONDO DE SUSTENTABILIDAD ENERGÉTICA
SEP
TECNOLÓGICO NACIONAL DE MÉXICO
ARIZONA STATE UNIVERSITY
BERKELEY UNIVERSITY OF CALIFORNIA

CFE
INSTITUTO NACIONAL DE ENERGÍA Y ENERGÍAS MÉTRICAS
Learning path

Página descriptiva

Mensaje de bienvenida  Encuesta de inicio  Forma de trabajo  Autodiagnóstico inicial  Temas del 1 al 5  Examen final  Autodiagnóstico Final  Conclusión
Educational innovation elements

Gamification

• A question is presented to learners about the content they have studied.
• Badges are assigned to learners that solve the question based on how many opportunities and how long it took them to finish the exercise.

<table>
<thead>
<tr>
<th>Usuario</th>
<th>Tiempo en contestar</th>
<th>Número de intento</th>
<th>Insignia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usuario_1</td>
<td>00:01:23</td>
<td>1</td>
<td><img src="image1" alt="Insignia" /></td>
</tr>
<tr>
<td>Usuario_2</td>
<td>00:02:01</td>
<td>2</td>
<td><img src="image2" alt="Insignia" /></td>
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<tr>
<td>Usuario_3</td>
<td>00:12:45</td>
<td>3</td>
<td><img src="image3" alt="Insignia" /></td>
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</table>
Educational innovation elements

**Virtual reality**

- The use of this type of resources allows learners to interact with concepts and promotes active learning.
- The resources are selected on how they best support the learning experience.
Educational innovation elements

Augmented reality

- The use of this type of resources allows learners to interact with concepts and promotes active learning.
- The resources are selected on how they best support the learning experience.
Educational innovation elements

Remote lab

- Learners access the remote lab based at Tecnologico de Monterrey and complete several exercises to practice the concepts they have reviewed in the MOOC.
- There is a limited number or seats, so students have to make a reservation beforehand.
Educational innovation elements

**Biometrics**

- MOOCs are delivered on MexicoX Platform, which is provided by the Mexican government.
- To this date the platform does not offer the use of biometrics, so this functionality will be tested using an external provider.
# Phase 2 (Jan-Apr 2017): Enrollments

<table>
<thead>
<tr>
<th>MOOC</th>
<th>Enrolled</th>
<th>Certificates</th>
<th>Completions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional &amp; Clean Energy and its Technology</td>
<td>6,022</td>
<td>1,031</td>
<td>17%</td>
</tr>
<tr>
<td>Energy: past, present &amp; future</td>
<td>4,224</td>
<td>646</td>
<td>15%</td>
</tr>
<tr>
<td>The Mexican Energy Reform and its opportunities</td>
<td>4,201</td>
<td>648</td>
<td>15%</td>
</tr>
<tr>
<td>The new electric industry in México</td>
<td>2,763</td>
<td>474</td>
<td>17%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17,210</strong></td>
<td><strong>2,799</strong></td>
<td><strong>16%</strong></td>
</tr>
</tbody>
</table>
Phase 3 (Sep-Nov 2017): Enrollments

<table>
<thead>
<tr>
<th>Course</th>
<th>Enrollments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to electric energy</td>
<td>3,616</td>
</tr>
<tr>
<td>Energy saving</td>
<td>2,920</td>
</tr>
<tr>
<td>Energy Markets: business opportunities</td>
<td>2,780</td>
</tr>
<tr>
<td>Conventional, clean Energy and its technology</td>
<td>2,731</td>
</tr>
<tr>
<td>Energy: past, present &amp; future</td>
<td>2,188</td>
</tr>
<tr>
<td>The Mexican Energy Reform and its opportunities</td>
<td>2,125</td>
</tr>
<tr>
<td>Carbon Markets</td>
<td>2,007</td>
</tr>
<tr>
<td>The new electric industry in México</td>
<td>1,415</td>
</tr>
</tbody>
</table>
### Learners’ experience

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Learner’s Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Energy: past, present and future’</td>
<td>I have taken many MOOC across platforms... and few courses I have completed among them this course. When I compare it I find that this course has high quality content, resources are well made and the proposed activities are not only quizzes but more motivating such as networking and the gamification challenge, which help me to apply my knowledge and share it with others. Regards, Martha Argueta.</td>
</tr>
<tr>
<td>‘The Mexican Energy Reform and its opportunities’</td>
<td>I want to congratulate Dr. Luis Alberto Serra Barragán and each and every one of the collaborators by the brilliant integration of content, methodology, and presentation of this course, as well as the Tecnológico de Monterrey for his participation in this educational platform, congratulations. Joaquín Caballero Vázquez.</td>
</tr>
<tr>
<td>Goodnight I would like to thank Dr. Luis Sierra, the teaching staff, MéxicoX platform, and Tecnologico de Monterrey for the present course, certainly is a valuable tool for understanding and learning how to apply the energy reform. Excellent course! Thank you.</td>
<td></td>
</tr>
</tbody>
</table>
Research and publications

- Book “Energy sustainability and Innovation: training with MOOCs and educational research”. (Volume 1). España: Narcea


Research and publications

Schedule

- Background with MOOC & micro
- Current project with 12 MOOC
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  - MOOCs team
  - Instructional model
  - Results
- Ideas for collaboration
Collaboration

• Establish partnerships with experts and professors in MOOCs related areas in order to learn from other universities experience on designing and teaching MOOCs.

• Participate in short term scholar programs for Tec professors and graduate students at other universities.

• Write research papers and projects in conjunction with professors and graduate students at other universities.
Potentials and challenges that can arise from the integration of learning in Open courses (micro & MOOC) and open access

- On-going research
- Enhanced instructional design
- Shared communication
- Technical support
- Further and sustained impact on training and knowledge transference.
Monographics of open education

- Revista Virtuales-monográfico del Movimiento Educativo Abierto
  http://micampus.ccm.itesm.mx/web/division-de-ciencias-sociales-y-humanidades/publicaciones/virtualis/convocatoria12

- Monográfico en revista Comunicar (JCR, Q1)-Noviembre 2017
Invitation to stay Unesco December 2017
¡Thanks!

María-Soledad Ramírez- Montoya
solramirez@itesm.mx
Esta investigación es un producto del proyecto 266632 “Laboratorio Binacional para la Gestión Inteligente de la Sustentabilidad Energética y la Formación Tecnológica” financiado a través de Fondo CONACYT SENER de Sustentabilidad Energética (S0019201401).

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