



Education of students and citizens for new materials

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EDUCATION OF STUDENTS AND CITIZENS FOR NEW MATERIALS



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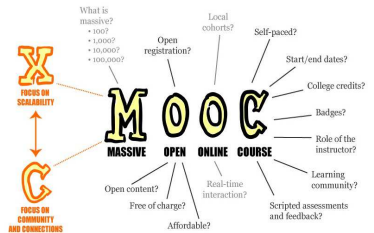
CONTEXT

- Information and Communication Technology in Education: efficiency and pleasure of attendees to learning programs.
- Enlargement of the audience: Training of citizens ; Dissemination of knowledge such as that regarding new materials.
- Consolidation of knowledge and know how of institution personals. Time management of teachers-researchers.
- Enhancement of quality standards of teaching and well adapted to new audience.

- Examples of new tools and methods for education :

- Massive Open Online Course (MOOC)
- Small Private Online Course (SPOC)
- Platforms edX, Coursera, Unow-Canvas and others based on these platforms (e.g. France Université Numérique – FUN)

- Return of experience of MOOC and SPOC at MINES ParisTech - PSL, Shanghai Jiao Tong University (SJTU) ParisTech Elite Institute of Technology (SPEIT), and Institut Mines Telecom (IMT)
- MOOC « Problèmes Energétiques Globaux » on France Université Numérique (FUN)
- SPOC « World Energy Issues – Technological Solutions » at SPEIT and SPOC « Problèmes Energétiques Globaux » at MINES ParisTech
- MOOC and SPOC « Introduction to Experimental Thermodynamics » for customers, industrial partners and pre-doctorate students
- SPOC « Understand the process, design the plant »



MOOC AT INSTITUT MINES TELECOM

- MOOC and SPOC – Balance 2013-2016



- 25% of registered scholars effectively begin the first proposed activity
- 4-6 weeks ; 2 to 5 hours of work / week ; weekly quiz or tests ; final examination
- 8% of registered learners successfully complete the MOOC

Nombre d'inscriptions d'étudiants à un MOOC de l'IMT dans le cadre de leur cursus

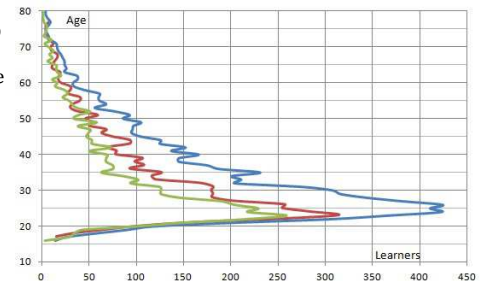


- Development of MOOC (homemade or others) use in teaching at IMT
- Assessment may be internally controlled for external MOOC and credits transferred to learners

MOOC «PROBLÈMES ENERGÉTIQUES GLOBAUX» (GLOBAL ENERGY ISSUES)

MOOC created by Renaud Gicquel, MINES ParisTech.
Six weeks MOOC with a first play on Platform FUN in 2016

- Session 1: end 14th March 2016 ; 8 947 learners; 36% F – 64% M; Master 53%; PhD 6%; Final exam: 1080; Successful exam: 848 (9.8% of registered learners); blue
- Session 2: end 24th October 2016 ; 5 531 learners; 40% F – 60% M; Master 64%; PhD 5%; Final exam: 675; Successful exam: 606 (11.1%); red
- Session 3: end 3rd November 2017 ; 5 189 learners; 40% F – 60% M; Master 61%; PhD 5%; Final exam: 502; Successful exam: 470 (9.1%); green



THERMODYNAMICS FOR NEW MATERIALS AND NEW PROCESSES

MOOC Thermodynamics Conversion of Heat: Modelization and Simulation

Session 1 from 13/2/17 to 24/4/17

Participants : 1987 - 56 % > Master – 15 % Female

Active participants: 486 (25 %)

Attendance to final exam: 238 (12 %) - Successful evaluation: 197 (9.9 %)

MOOC Thermodynamics Conversion of Heat: Classic and Innovating Cycles

Session 1 from 27/3/17 to 4/5/17

Participants: 2050 - 60 % > Master – 18 % Female

Active participants: 162 (7.9 %)

Attendance to final exam: 109 (5.3 %) - Successful evaluation: 86 (4.2 %)

INTRODUCTION TO EXPERIMENTAL THERMODYNAMICS

- MOOC for preliminary knowledge of experiences & characterization
- (1) Fundamental and basis of thermodynamics
- (2) Technique to generate phase diagrams or other thermodynamics data
- (3) Options and decisions making among various experimental methods
- (4) Settings, scaling, measure quality and measurement accuracy
- (5) Two practical filmed demonstrations of measurements
- (6) Data treatment including modeling and writing of report or publication

- Dedicated to Ms of PhD students , personal or customers of companies involved in products and processes for thermodynamics

- Self Paced in French subtitled in English

CONCLUSIONS

- Continuous development of MOOCs in Engineering Schools (e.g. IMT, SPEIT, Polytechnique) shared with other schools and a general audience.
- No dedicated platform; no specific language; no evaluation model; no fees; organized within session or as self paced.
- Appreciated by intern and extern learners; high participation to final exam.

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- Institut Mines Telecom – IMT.