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Use of MOOC/SPOC and Flipped classroom

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SHARING MINDS, CHANGING LIVES

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Use of IrriX MOOC/SPOC



- Introduction: MOOC, SPOC and flipped classroom
- Active learning and flipped classroom
- Beta test of MOOC/Flipped classroom
- Short comments on production of online MOOC material
- Concluding comments

What is it ?



- **M****O****O****C** = **massive** **open** **online** course
 - **Massive** is order of magnitude of 1000's but low 5% completion
 - **x****M****O****O****C** (**e**x_tended; video-lecture), **c****M****O****O****C** (**c**onnectivity; networking oriented)
- **S****P****O****C** = **small** private **online** course (can be **L**oo**C**; **L**= local)
 - Small is class/lecture room size (e.g. 20 to 200)
- **Flipped** classroom = **student-centered** teaching by **well prepared & active** students; (< > teacher centered lectures with passive students)
 - teacher becomes rather an observer/facilitator
 - Preparation often by **online** material (... but **not** necessary)

Online *is an important keyword*



- Classroom with black/white board (or often with **powerpoint presentation**) is **not anymore** the key location where (passive) learning happens
 - **Online** both learning + students **distributed in time and space**
- Sharing **Online** material between universities/institutes on an international scale
- Can be linked to **online** communication/information
- But **not** a **quick** or/ **neither** a **cheap** fix !! Rather high investment and requires **educational and ICTS support**

Ambitions/objectives with IrriX



■ Have a successful MOOC

- Contributing to **better irrigation (70% of world wide water use; 40% of food production; less Water for more Food)**

■ Publicity for Water Resources Engineering (IUPWARE)

- Attracting good students (VLIR ICP MSc course)
- Setting up research & education cooperation projects with partners

■ Use in teaching (as SPOC) by preclass prep & flipped class

- "Irrigation and drainage" for Bio-irs LB/ACE (agronomy ?=> **40% of food**)
- "Irrigation agronomy" for IUPWARE
- Our students can get a certificate for free (complying with the MOOC)

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Vision rector Wageningen Univ. (WUR)

■ Short 1 minute video:

<https://youtu.be/kChuwH1gC1I>

- Oriented to food production/provision in a sustainable way



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First form of Massive Distance learning.



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Professor in front of a large aula

(>100 students do **passive** listening & taking notes; M-generation with smartphones)
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Active students in small groups

(professor walking around facilitating)

Independent **preclass** learning => prepare the flipped classroom by a MOOC



- How to access the material ?
 - normally **online** (but not necessarily; "old fashioned" paper book)
- Where is the material ?
 - MOOC/SPOC (but traditional handbooks/workbooks are in principle also possible)
- What activities in the (pre-)learning ?
 - Video, exercises, questions to answer, text, presentations
- How to ensure the pre-learning and coming well-prepared to the learner-centered activities
 - Test ? Bringing some results/output to step 2 ?

In general online rich environment



- Short videos of 5 to 7 minutes, adjusted to attention span of Smartphone generation
- Exercises; quiz with fast automatic response + suggestions
- Video illustrations as contextualisation: example of [Don René interview](#) in Potosí (<> powerpoint with static photos)
 - Giving better virtual extra reality experiences (but not a substitute to field/laboratory work; rather complementary)

Engaged learning in class (after self-study)



- [Collaborative learning](#) in small groups
 - Each student makes a **short summary/ synthesis** ; **formulates a question** and submits to the lecturer before the contact moment; lecturer selects questions for group discussions
 - Each group discusses questions to understand the material/concepts (avoiding misconceptions)
- [Applying the key concepts](#) to cases; examples; problems in groups

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MOOC (ready for launch in end October 2019) **IrriX**
(*Irrigation efficiency; More Food with Less Water*)
Integration into Irri-Agro & Irri-Drai; **Module 3 & 4 in Beta-trial** (March/April 2019)



=>Central focus is **irrigation efficiency (IrriX)**

- *Module 1: What is irrigation efficiency (future to be integrated)*
- *Module 2: Irrigation requirements (covered by classical teaching; future to be integrated))*
- **Module 3: Field application efficiency**
- **Module 4: Water conveyance and distribution efficiency**
- *Module 5: Integrated view and case studies (can be integrated in integrated water management course)*

Planning



- Registration into MOOC via URL
 - Invitation e-mail via Toledo: common module
- **Module 3** opens 15 March 9 AM
 - Pre-class to finish 26 March
 - **Flipped classroom 28 March**
- **Module 4** opens after module 3 (28 Mar 12 UTC)
 - Pre-class to finish 24 April
 - **Flipped classroom 25 April**
- **Pre-class preparation compulsory before class.**

Flipped classroom



- **Only after compulsory pre-class** preparation
 - edX system registers the use of the MOOC, solving exercises
 - Sorry, big brother watching...
 - Every student sends (deadline 24 hours before meeting)
 - **General question on the material**
 - **What was the most difficult concept to understand/master ?**
 - **What would be interesting to expand (beyond the module)**
- Flipped classroom in **randomly selected groups of 5** (mixed bio-ir / IUPWARE students)

Explanation and discussion in random peer groups of ~ 5 students:



Not in a special classroom !

Move the tables/chairs + Wifi for **O**ne



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Bio-ir and WRE students randomly mixed

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Activities in flipped classroom

- Every **randomly** selected group (of 4 to 5 students) explains/discusses questions (from preclass) (40 minutes) **se**
 - Chairperson (**randomly selected**) in every group explains to the group
 - Not an examination ! But a way to avoid misconceptions + enforcing good understanding
- Plenary summary + feedback of the important points from the discussion in groups (10 minutes)
- Exercises by the same groups (randomized data)



Impact on the evaluation



- Counts as **one exercise** if well executed
 - No need to submit at the end an exercise on this part
- **Theoretical question on exam** as before (list of questions will be provided)
- Not complying with the pre-class conditions means
 - No access to the flipped classroom
 - Minus 10/20 per module on the exercise (so 0/20 if no attendance)


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Beta-test of the IrriX MOOC + SPOC



- Supported by Brian.Carthy@kuleuven.be
 - MSc graduate of Water Resources Engineering
 - Responsible prof Guido.Wyseure@kuleuven.be
- To discover all difficulties; need for improvements
- Evaluation afterwards of study load, teaching effect,... + leading to improvements
- MOOC in  at KULeuvenX
- Framework of IUPWARE



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The use IrriX MOOC

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Large investment in IrriX

- +/- 90 000 € (grant 60 000€ by Global Minds)
 - One person year for a research associate (RA)
 - Script production, video recording in studio or field, producing + editing videos by Premiere Pro + subtitle corrections in Youtube
 - 8000 € for a 2 minute trailer (professional Limel team: director, camera + sound man + video editor)
 - Jobstudent for producing illustrations + animations
 - 3000 € 4K Video camera, special micro's, tripod, larger screen, creative adobe suite software, PC's (one for rendering is advised)
 - Travel cost to Latin America for RA for video taping
 - **Not** my time (+/- 40% of past year) + **not** travel costs in VLIR-projects



Few numbers on IrriX

- The 4K recorded video requires 0.5Gb per minute (=> several 100's Gb storage on Dropbox not Box...+ on external Terra SSD-HD)
- 45 video's on IrriX with total duration of 3h37 min
 - Youtube-Video's in HD resolution is about 8 Gb
 - Average 4min 50 per video
 - 29 video's in studio, 11 in the field (mainly Bolivia, Ecuador & Peru/ Spain (Soilcare EU project) and Belgium), 5 interviews



Probably release IrriX MOOC

- Run: end of October 2019
- “**instructor paced**” during 6 weeks; English version
- Spanish version in preparation in cooperation with UMSS, Cochabamba and others.

Added value for cooperation



- “Young” developing institutes have **MOOC/SPOC** material available
- Young lecturers with PhD can make use of this material
- Modern teaching methods are possible (active and not passive learning)
- Being part of a larger international community for teaching university courses

- But it should become a **two-way interaction/cooperation**:
 - Case studies and problem cases can be delivered by cooperating institutes
 - Ownership by creating videos/ modules as contribution to improving the “**MOOC/SPOC**”
 - C of “**MOOC/SPOC**” could also stand for **collaboration** not only for **Course**

General conclusions



- **Large investment** in time and expertise => collaboration & cooperation + MOOC-development support needed
- Can be **shared within several courses** => share experiences/ development effort
- Supports educational model of **deep active learning** => flipped classroom
- **Local open** or **Small Private** use versus **Massive open** but same material (only names...)

IrriX is supported by:



Belgium
partner in development



Global Minds



Interuniversity Programme in
Water Resources Engineering

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