Use of MOOC/SPOC and Flipped classroom

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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?

- **MOOC** = massive open online course
  - Massive is order of magnitude of 1000’s but low 5% completion
  - xMOOC (extended; video-lecture), cMOOC (connectivity; networking oriented)

- **SPOC** = small private online course (can be LooC; 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)

**Vision rector Wageningen Univ. (WUR)**

- Short 1 minute video:
  [https://youtu.be/kChuwH1gC1I](https://youtu.be/kChuwH1gC1I)

- Oriented to food production/provision in a sustainable way
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2018-2019

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First form of Massive Distance learning...

Efficient in student/professor ratio but not in learning by students

Capacity for 814 students

30 m distance

1 professor

Distractions…
Active students in small groups
(professor walking around facilitating)

Professor in front of a large aula
(>100 students do passive listening & taking notes; M-generation with smartphones)

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 Online

Bio-ir and WRE students randomly mixed

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](mailto:Brian.Carthy@kuleuven.be)
  - MSc graduate of Water Resources Engineering
  - Responsible prof [Guido.Wyseure@kuleuven.be](mailto:Guido.Wyseure@kuleuven.be)
- To discover all difficulties; need for improvements
- Evaluation afterwards of study load, teaching effect,… + leading to improvements
- MOOC in [edX](https://www.edx.org) at [KULeuvenX](https://www.kuleuven.be)
- Framework of IUPWARE
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

2018-2019

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.

2018-2019
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…)

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partner in development

vlir uos
SHARING MINDS, CHANGING LIVES

KU LEUVEN
Global Minds

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