AMMIL: a methodology for MOOCs, Flipped Classrooms or Online courses

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The creation of the methodology

First **MOOC** created in **2013** for MiriadaX (https://miriadax.net/)
- "Design in HTML, CSS and JavaScript of Web and FirefoxOS Apps"
  - ~15,000 registered, ~12,500 started and ~2,500 finished
  - ~2,500 persons finished 70 learning micro-activities (100%)
- Over **200,000 persons** have registered in **8 editions** offered

"**Internet Computing**" course, 3rd year Telecom Eng. Grad.
- A flipped class-room course methodology was being developed
  - Objective: transform the course material for self-learning

**AMMIL** focusses on improving the quality and effectiveness of self-learning materials
- Validated in **MOOCs** and the"**Internet Computing**" flipped class-room
Basic MiriadaX Rules

☀ Record **micro-lectures** of between 3 and 12 minutes
  - Evaluate every **micro-lecture** with some exercise
    - The **micro-lectures** can be grouped in modules

☀ ¿How can I **break a lecture** into several **micro-lectures**?

☀ ¿How to **evaluate** small **micro-lectures**?

☀ ¿How to **motivate** the learner **to continue**?
Some questions for the first MOOC

**Type of MOOC**
- Short **nanoMOOC** of 1 or 2 weeks
- Longer **MOOC** lasting between 3 and 5 weeks
- **Specialization** or **microMaster** composed of 6-10 nanoMOOCs

**Topic of the MOOC**
- Most likely something related with one of my courses
- The most successful MOOCs focus on
  - "Life long learning"
    - **New knowledge** or **capacities** demanded **professionally**

**Side-objetives of the MOOC**
- To **flip my class-room** in part or all my course
- As an **entry** to an online, but closed program
- ...
AMMIL Methodology*

- Active
- Meaningful
- Micro
- Inductive
- Learning

*AMMIL has been used and validated in xMOOCs on JavaScript programming using PBL.
*The recommendations may be useful in other types of MOOC, but have not been validated.
The Components:
Modules, uActivities, uObjectives, uExamples & Evaluations
Transforming Lectures

- **uObjective** (micro-objective)
  - Each **uActivity** must have a well defined learning **uObjective**
    - Each **uObjective** must focus only in one **concept** or **element** which can be evaluated

- **uActivity** (micro-activity)
  - Must **explain**, **illustrate**, **practice** and **evaluate** the learning objective
  - They are usually supported by
    - **Slides** (Title plus 4-6 slides, maximum 10)
      - Each slide should have also a clearly defined learning (nano)Objective
    - **Video** (of between 3 to 12 minutes, never over 15min)
    - **Documentation** (Usually Web pointers)
    - **Evaluation** (several choices)
The uExamples

◆ **uExample** (micro-example)
  - **Realistic** example(s) with **minimum complexity** illustrating the **uObjective**
    - Must illustrate **only** the new aspects being explained in the **uActivity**
    - Must fit in **one slide**!

◆ Each **uActivity** must have one or more **uExamples**

◆ **Recomendation:** develop **uExamples** from the **uObjectives** (before the slides and evaluations)
  - The development of good **uExamples** needs a lot of effort
The evaluations are also learning activities

- They should consolidate and lead to a better understanding of the topic

Test (mainly for uActivities)

- A test should cover the uObjective exhaustively
  - Should cover all use-cases (the good and bad ones) and review all the implications of a theory or concept

P2P (Peer to Peer) Exercise

- Evaluation with an open exercise (& creative)
  - Each learner is corrected by other learners (Peers)

Autoevaluators of programs, simulators, virtual labs, etc.

- Evaluate automatically exercises: programs, simulations, experiments, ..

uEvaluations and module evaluations

- uEvaluations evaluate a uActivity and should be simple
- Module evaluations evaluate several uActivities and should be creative
The Global View:
The syllabus and the learning trail
Syllabus and content

- **A MOOC** is a framework for **self-learning**!

- The **complete** "syllabus" should be **explained** in **uActivities**
  - Everything **evaluated** must have been **explained**
  - Everything **explained** must be **evaluated** (in uActivities or modules)

- Activities focussed in **creativity, study, info search**, etc.
  - Can exist, but should be explicitly **planned** as such

- The **scientific method** metaphor helps to identify uObjectives
  - It **validates** all the implications of a theory with experiments
    - For **learning** every implication of the theory must be **practiced** with uActivities
      - In order to obtain a proper understanding of all aspects of a theory
The learning trail

◆ The order of uObjectives defines the learning trail

◆ It must imply meaningful learning (D. Ausubel)
  ▪ Constructing new knowledge on preexisting or already acquired knowledge
    ◆ Relating always the new knowledge with already acquired one

◆ It must be inductive and go from the particular to the general
  ▪ It must illustrate always with uExamples, especially particular cases
    ◆ First the vocabulary, then particular cases, then generalisations and abstractions, etc.

◆ It must be based on PBL (Project or Problem based learning)
  ▪ A project or problem guides the learning process
    ◆ It motivates the learner and helps him in understanding the context and benefits of learning
Putting all together
Steps to create a MOOC

- Identify **first** the **modules**
- The the **module evaluations**
  - Evaluations must be motivating and enriching
    - The evaluations will help in determining the uObjectives included in a module
- Define then the **uObjectives**
- And then the **uExamples**
- Define after it **slides** and **uEvaluations**
- And finally **record** the **videos**
  - When everything else is ready

*Several iterations* are usually done, some top-down and some bottom-up

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SAGA Recording Studio

- Allows **agile** and **efficient** video recording without support persons
- The lecturer **starts** and **stops** the recording
- The lecturer sees what's being recorded
- The videos don't need **post-production**!
  - The system inserts opening and closing videos
- The **recording** can be repeated if necessary
  - Repeating the recording requires a small effort

https://www.youtube.com/playlist?list=PLo4CW_btA6obYiAXJ9_4yyXsINoGhN_eQ
Video Recording

❖ Before creating the **first MOOC**
  - The material for **2-3 videos** or for a small **module** should be prepared and recorded asap
  - It is important to get **familiar** with the new learning environment

❖ Preparing a **script** before recording a video is a must

❖ Videos should be recorded when all the other **material** is **finished**
  - Final changes or corrections will be less painful
    ✧ i.e. changing slide templates or other corrections may oblige to record all videos again!

❖ The slides are usually **improved** during the first recordings
  - The slides should not be definite before the end of the recordings

https://www.youtube.com/playlist?list=PLo4CW_btA6obYiAXJ9_4yyXsINoGhN_eQ
Course survey 2017/18: Internet Computing (76 of 300 students answered)

- Attended classroom regularly
  - 27 (35.53 %)
- Watched videos
  - 69 (90.79 %)
- Finished MOOC 2 (GIT)
  - 12 (15.79 %)
- Finished MOOC 2 (HTML, CSS,JS)
  - 19 (25.00 %)
- None of the above
  - (9.21 %)

Usefulness of uLecture Approach

- No opinion
  - 3 (3.85 %)
- 1 (not useful)
  - 2 (2.56 %)
- 2
  - 5 (6.41 %)
- 3
  - 17 (21.79 %)
- 4
  - 26 (33.33 %)
- 5 (very useful)
  - 25 (32.05 %)

Usefulness of classroom lecture videos in Moodle

- No opinion
  - 1 (1.32 %)
- 1 (not useful)
  - 2 (2.63 %)
- 2
  - 4 (5.26 %)
- 3
  - 10 (13.16 %)
- 4
  - 17 (22.37 %)
- 5 (very useful)
  - 42 (55.26 %)

Screencast videos for programming exercises in Moodle

- No opinion
  - 0
- 1 (not useful)
  - 0
- 2
  - 4 (5.26 %)
- 3
  - 0
- 4
  - 2 (2.63 %)
- 5 (very useful)
  - 70 (92.11 %)
MOOCs have a huge impact and outreach
  - Their impact on education and universities should still be very strong

The flipped class-room based on MOOCs
  - Has a huge potential for universities

The most difficult and costly thing when creating the MOOCs was
  - The definition of a good sequence of uObjectives (many trials)
  - The development of good uExamples for the uLectures
  - The development of a good project for the PBL

The lecturer focusses more in content production with this approach
  - And in facilitating self-learning with high quality materials

Videos are not only useful in MOOCs
  - They have a very high "productivity" and "efficiency" in learning activities in general

Conclusiones
Thanks for your Interest!