



Cátedras *Telefónica*
Telefónica



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

Juan Quemada <juan.quemada@upm.es>

ETSI Telecomunicación

UPM - Universidad Politécnica de Madrid



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 y ~**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**?

AMMIL Methodology*

◆ Active

◆ Meaningful

◆ Micro

◆ Inductive

◆ Learning

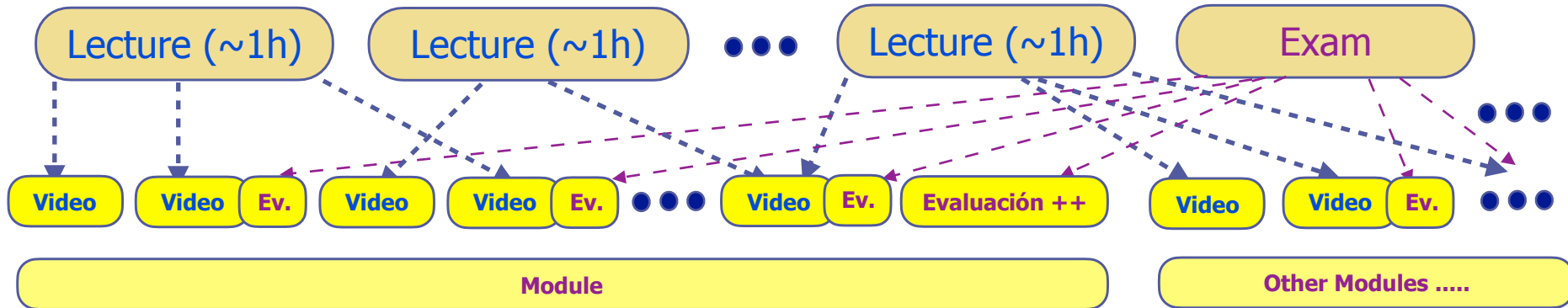
*AMMIL has been used and validated in xMOOCs on JavaScript programming using PBL.

*The recommendations may be useful in other types of MOOC, but have not been validated.

The Components:

Modules, uActivites, 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

Evaluations

◆ 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

The learning trail

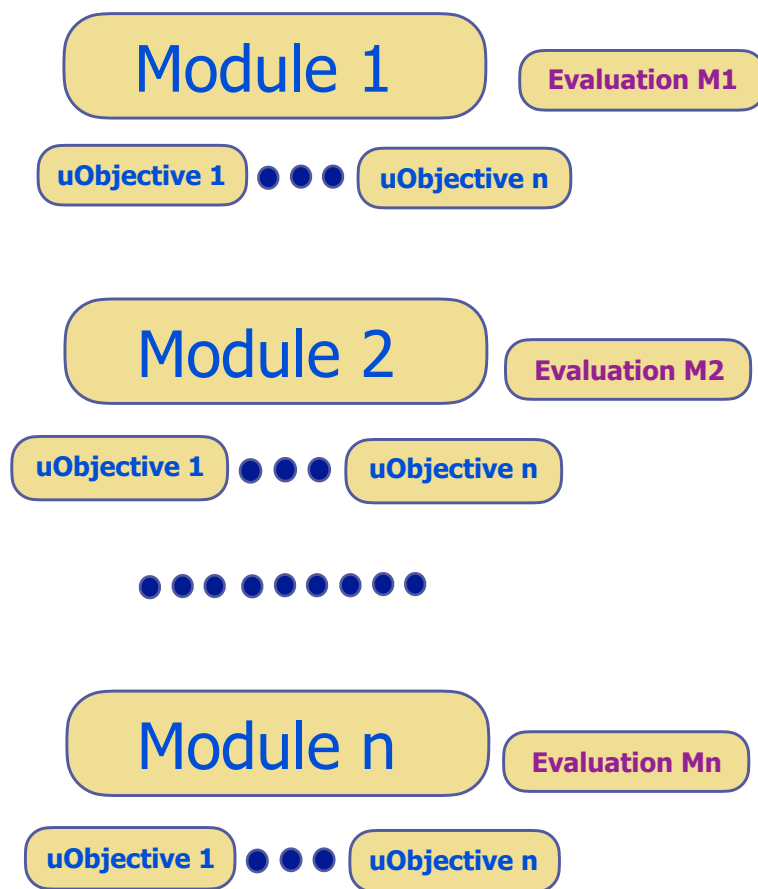


- ◆ The **order of uObjectives** defines the **learning trail**
- ◆ It must imply **meaningful learning** (D. Ausubel)
 - Constructing new knowledge on preexisting or already acquired knowledge
 - ◆ **Relating always** the new knowledge with already acquired one
- ◆ It must be **inductive** and go **from 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

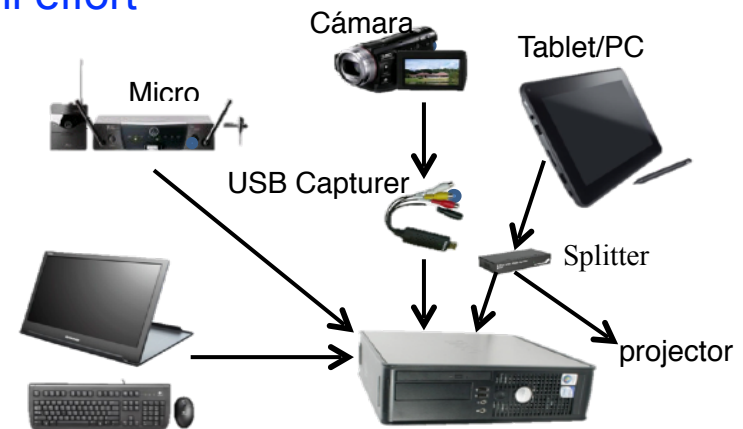
- ◆ Identify **first** the **modules**
- ◆ The the **module evaluations**
 - Evaluations must be motivating and enriching
 - ◆ The evaluations will help in determining the uObjectives included in a module
- ◆ Define then the **uObjectives**
- ◆ And then the **uExamples**
- ◆ Define after it **slides**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



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

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**

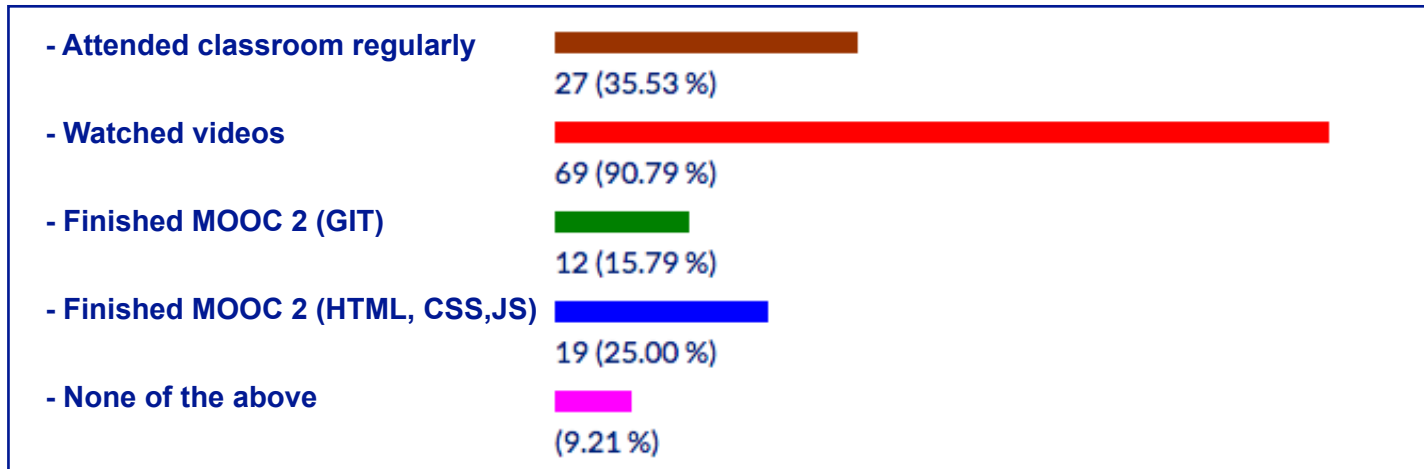
- Final changes or corrections will be less painful
 - ◆ i.e. changing slide templates or other corrections may oblige to record all videos again!

◆ 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)



Usefulness of uLecture Approach



Usefulness of classroom lecture videos in Moodle



Screencast videos for programming exercises in Moodle



Conclusiones

◆ **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

Thanks for your Interest!