tresipunt.com

TeSLA project - Towards an evaluation system reliable online
Moodle Moot Spain 2018

Antoni Bertran, Moodle Plugin developer (UOC)

28/06/2018

Funded by
the European Union

Project Number: 688520 – TESLA – H2020-ICT-2015/H2020-ICT-2015
Agreement Number: 688520

TeSLA
Adaptive trust-based e-assessment

Antoni Bertran

@tunyafix
@ abertranb@uoc.edu
@ antoni@tresipunt.com

- CTO 3ipunt (2004)
- Moodle Partner
- Office of Learning Technologies UOC
- UOCs LTI
- xAPI and Calliper
- UOC Data Mart

3i.

https://www.tresipunt.com

What does (e)Learning mean?

- ✓ The teaching and learning process is conducted (totally or partially) through the **net**
- ✓ **Wide range** of LMS & VLE
- ✓ Use of **ICT tools** and resources
- ✓ Teacher as a **facilitator**
- ✓ Learner: **autonomous,** responsible, **(pro)active**.
- ✓ E-assessment processes with personalised and continuous feedback
- ✓ No traditional universities

Definition of (e) assessment & considerations

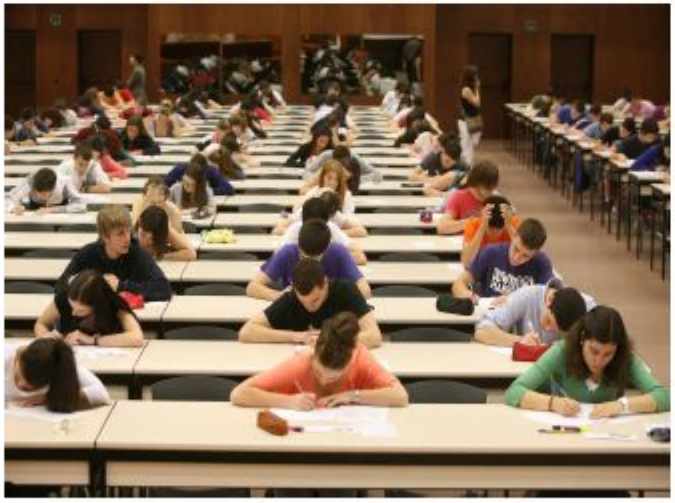
E-assessment is a continuous electronic assessment process where information and communication technology (ICT) is used to present, solve, record and evaluate assessment activities (Crisp, 2007).

- ✓ Summative, continuous and formative **assessment models coexist**
- ✓ Activities **easy to correct** or **automatic** correction is **proliferating** (i.e. tests, multi choice exams).
- ✓ Continuous assessment is combined with **final exams.**
- ✓ Blended/Online universities maintain **on-site final exams.** It is considered the most **reliable** way to verify **students identity.**

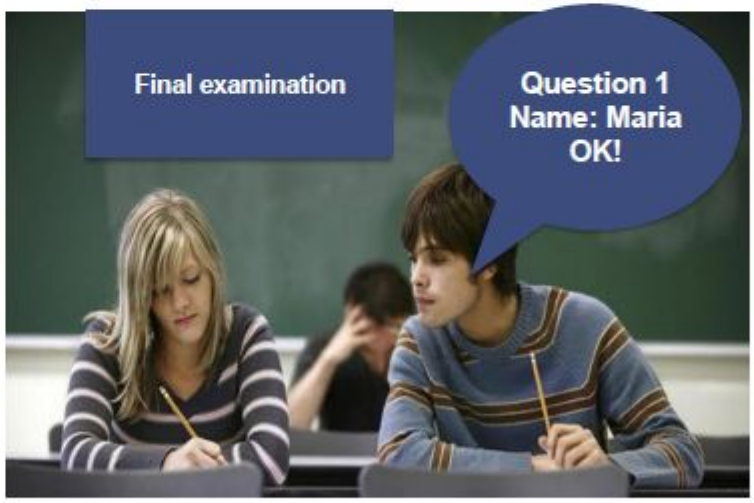
Real scenario

traditional exam/ assessable activity – 1 [crime_scene]

Crime Scene



Trad copy



TeSLA
Adaptive trust-based e-assessment

traditional exam/assessable activity - 2 [solution_1]

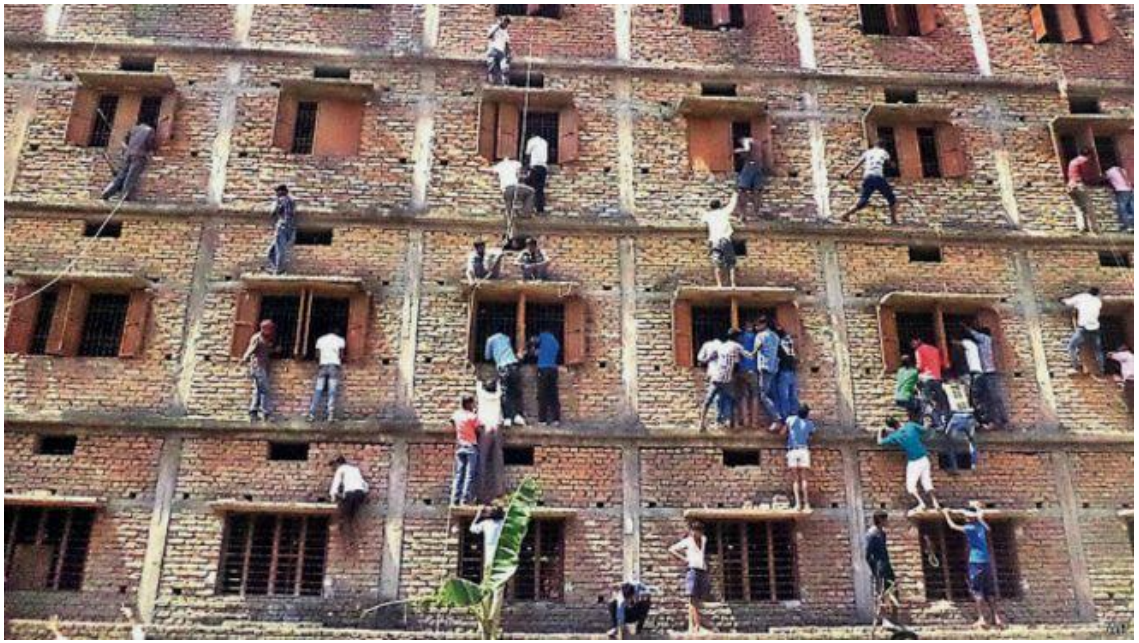
3 tresipunt.com

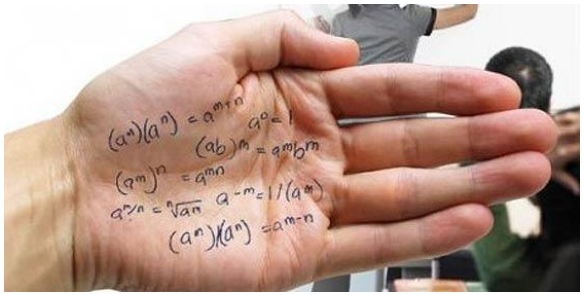
TeSLA
Adaptive trust-based e-assessment

traditional exam/assessable activity - 3 [unlimited_imagination]

3

tresipunt.com





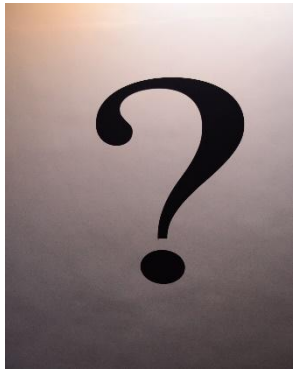
The e-assesment process as a cornestone

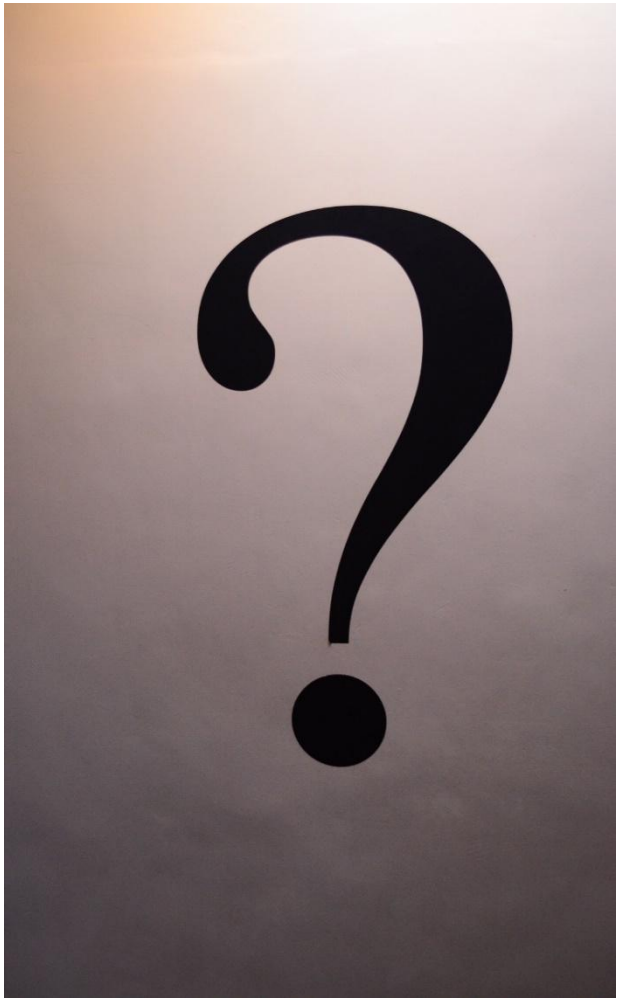
- The education has evolved with ICT but NOT e-assessment processes
- We believe that ICT can make the educational system more reliable and credible

Challenge

to update the whole Educational process through e-assessment

Best solution?





Authentication and Authorship

tresipunt.com

An Adaptive Trust-based e-assessment System for Learning

Overview

Call submitted
Horizon2020 – INFORMATION AND COMMUNICATION TECHNOLOGIES
Topic: Technologies for better human learning and teaching.
Type: Innovation Action, with Large Scale Pilots.

Funded by
the European Union

Project Number: 688520 – TESLA – H2020-ICT-2015/H2020-ICT-2015
Agreement Number: 688520

TeSLA
Adaptive trust-based e-assessment

Consortium

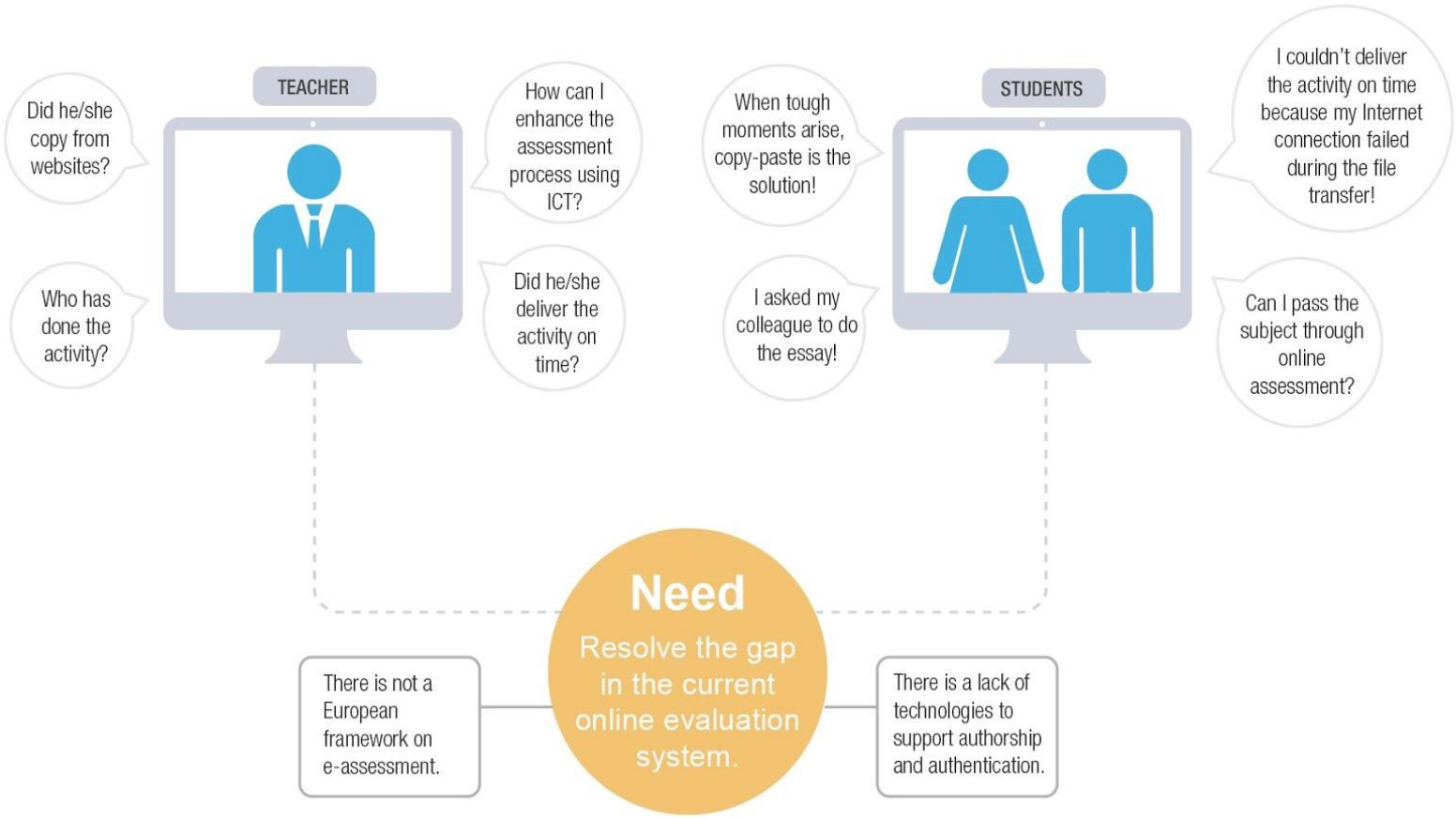
3 tresipunt.com

18 Partners (130 members)

8 Universities 3 Quality Agencies 4 Research Centers 3 Enterprises

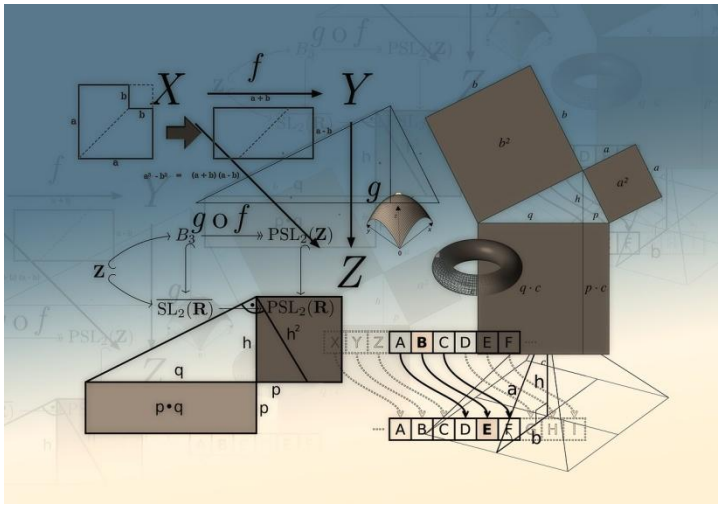
UOC
ENQA EUROPEAN ASSOCIATION FOR QUALITY ASSURANCE IN HIGHER EDUCATION
UNIVERSITÉ DE NAMUR
AQU Agència per a la Qualitat del Sistema Universitari de Catalunya
LPLUS
Open Universiteit www.ou.nl
Св. Климент Охридски
The Open University
prot Soluciones Educativas
INSTITUT Mines-Télécom
Imperial College London
Технически университет София
ANADOLU UNIVERSITY
UNIVERSITY OF JYVÄSKYLÄ
EQANIE European Quality Assurance Network for Informatics Education
INAOE
idiap RESEARCH INSTITUTE
Watchful Keep IT secret.

TeSLA concept



Main objective

The overall **objective** of the TeSLA project is to define and develop **an e-assessment system**, which ensures learners **authentication and authorship** in online and blended learning environments while avoiding the time and physical space limitations imposed by face-to-face examination.



The TeSLA project will **cover teaching and learning processes as well as ethical, legal and technological aspects**.

TeSLA
Adaptive trust-based e-assessment

Status

3 tresipunt.com

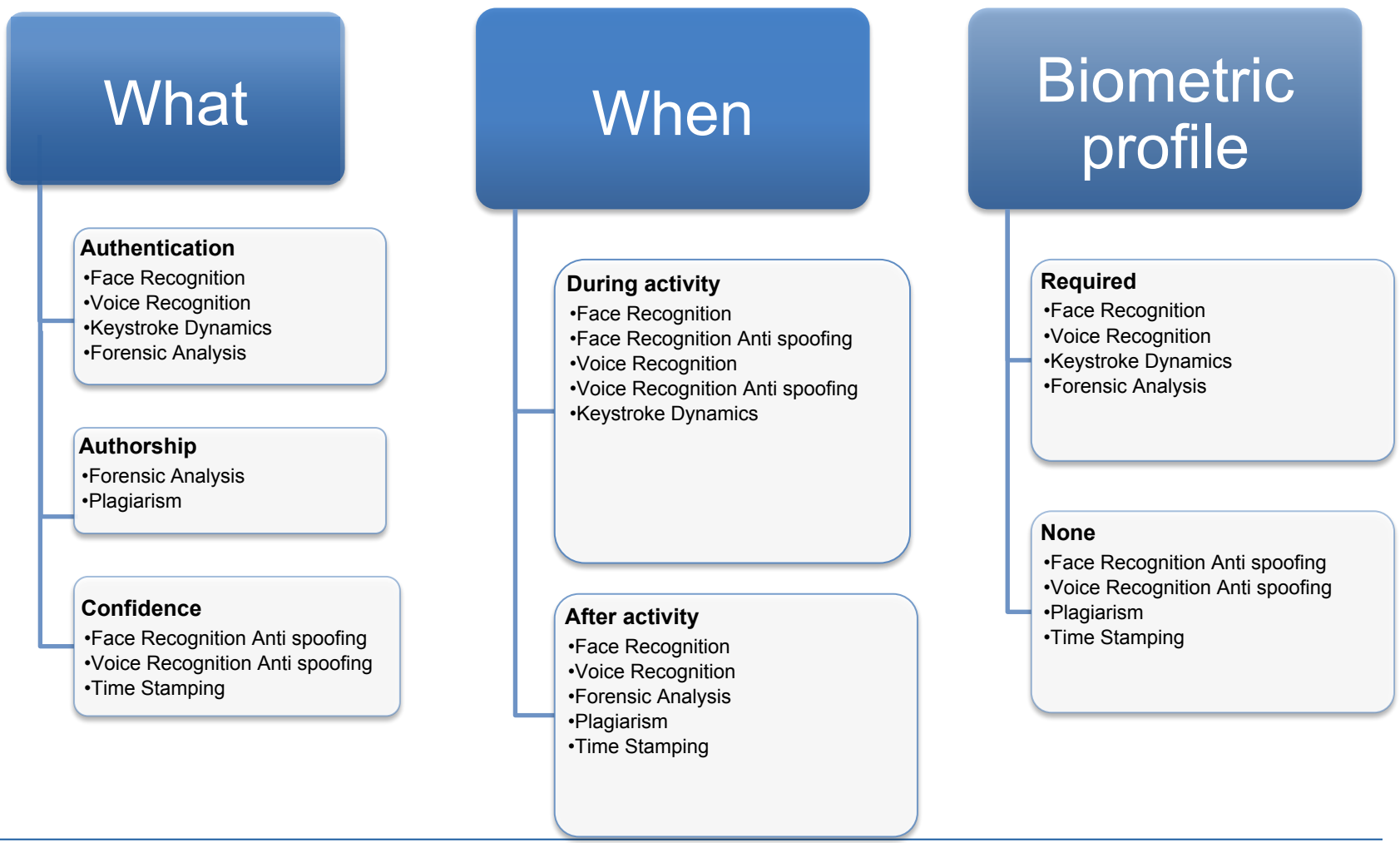
- 3rdB Pilot
- Testing system in 7 Universities
- A free version will be distributed to schools, higher education institutions and vocational training centers, although a commercial-premium version will be also launched on the market.
- More information on http://www.tesla-project.eu

Instruments

Instruments in TeSLA system

- Each instrument is considered a black box
- TeSLA does not care on what the instrument is doing, only the result
- Instruments selected taking into account standard learner resources
  - Webcam
  - Microphone
  - Keyboard
- Enrollment
  - Some instruments require to learn a model for the learner (biometric profile)
  - Special activities (‘enrollment activities’) are designed to gather required information

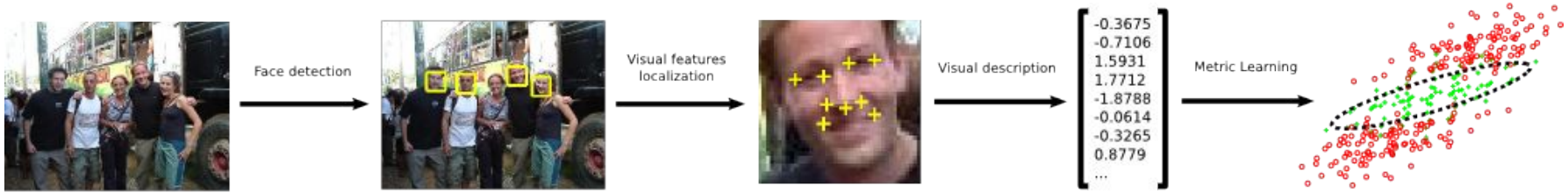
Instruments in TeSLA system



Face Recognition

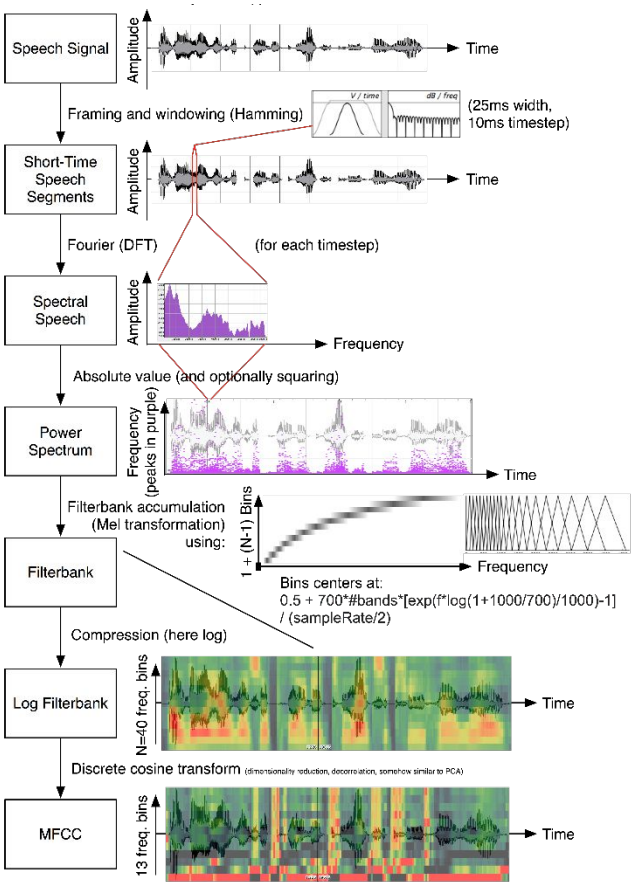
Imperial College London

- Input Data
  - Video or still images containing a face
- Goal
  - Is the user the person in the picture/video?
- Output
  - User verification score [0 – 1]
- Scenario
  - While the learner is performing an activity, images are captured and analyzed
  - Once a video activity is submitted, it is analyzed



Voice Recognition

- Input Data
  - Audio segment of about 10 seconds
- Goal
  - Is the user who is talking?
- Output
  - User verification score [0 – 1]
- Scenario
  - While the learner is performing an activity, audio is captured and analyzed
  - Once an oral activity is submitted, it is analyzed



FR and VR Anti-Spoofing

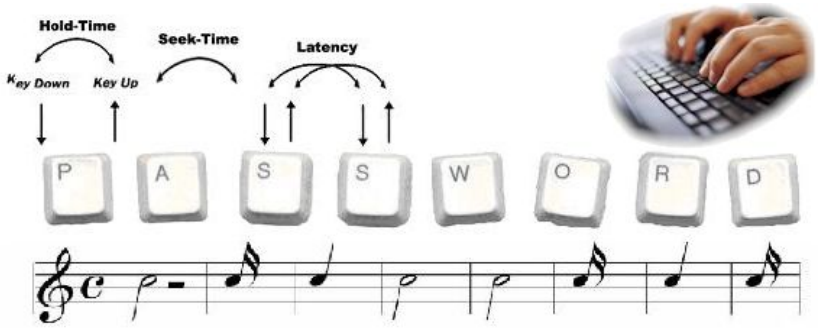
idiap RESEARCH INSTITUTE

- Input Data
  - Video in case of FR and audio in case of VR
- Goal
  - Is the user trying to fake the system?
- Output
  - Confidence value [0 – 1]
- Scenario
  - Those tools are executed in parallel to FR and VR and try to detect some known types of fakes
    - Static image in front of the webcam
    - Recorded voice playing on the microphone

Keystroke Dynamics

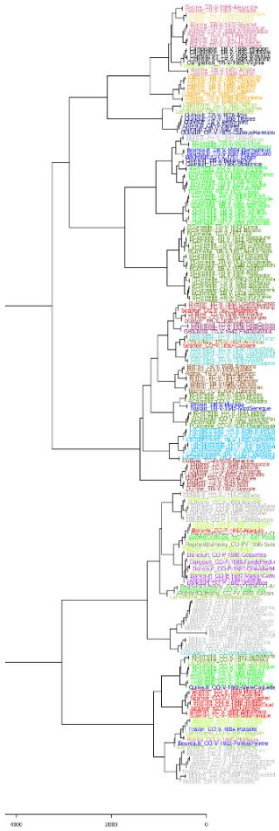
Watchful
Keep IT secret.

- Input Data
  - Keyboard events (key down and key up)
- Goal
  - Is the user who is typing?
- Output
  - User verification score [0 – 1]
- Scenario
  - While the learner is performing an activity, keyboard events are captured and analyzed



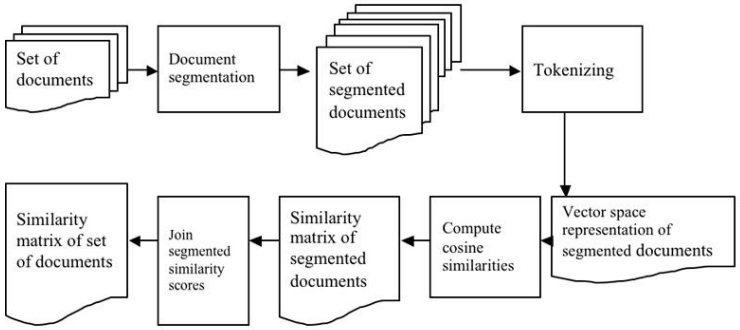
Forensic Analysis (Stylometry)

- Input Data
  - Text documents
- Goal
  - Is the user who wrote this text?
- Output
  - User verification score [0 – 1]
- Scenario
  - Once an activity is submitted (file or open questions in a quiz), it is analyzed.



Plagiarism

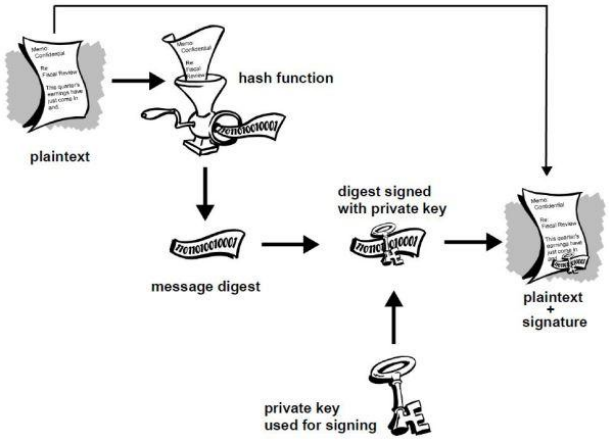
- Input Data
  - Text documents
- Goal
  - Are there similar documents to this one?
- Output
  - Similarity measure with documents in context [0 – 1]
- Scenario
  - Once an activity is submitted (file or open questions in a quiz), it is analyzed.



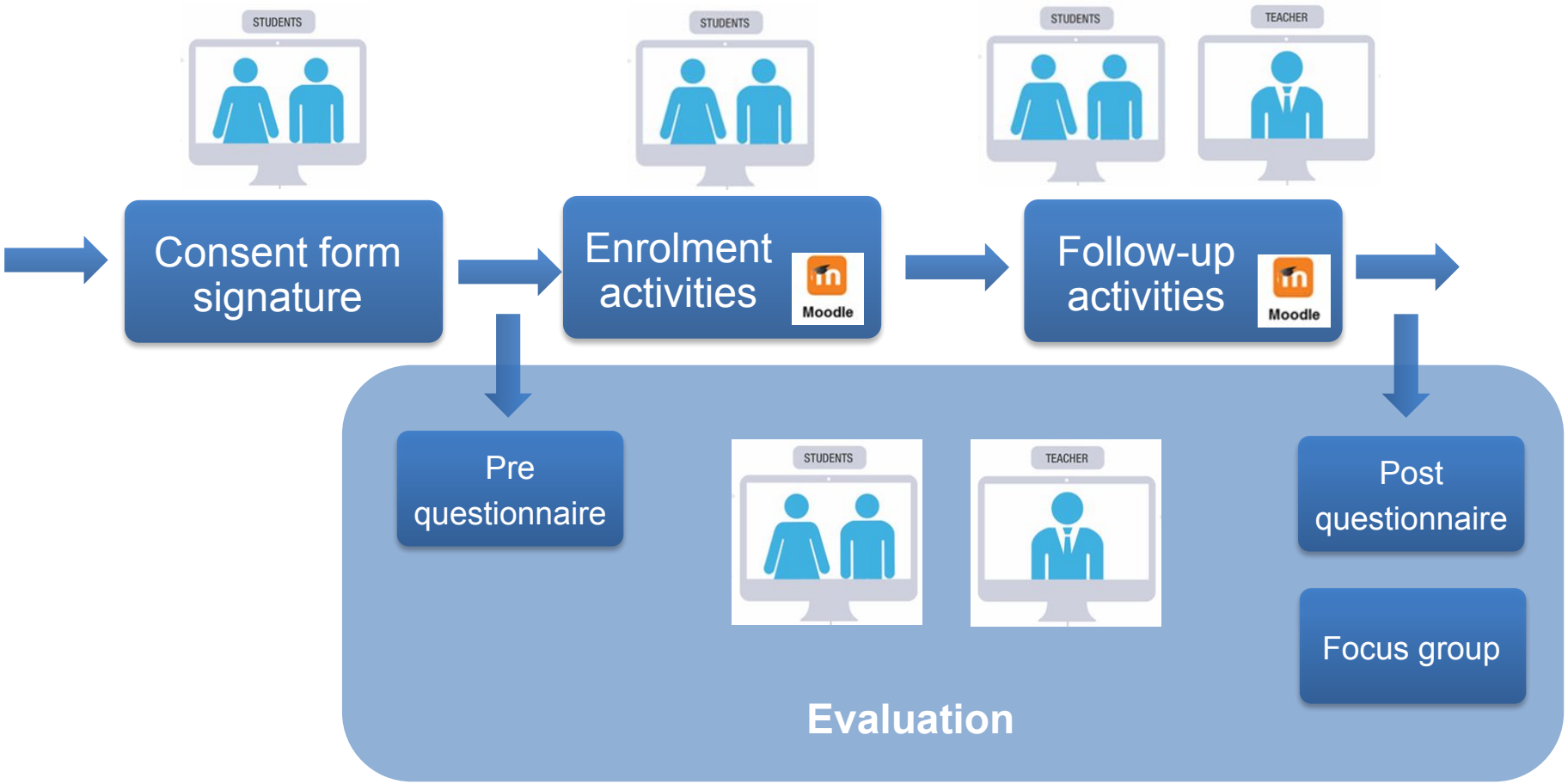
Time Stamping

INSTITUT Mines-Télécom

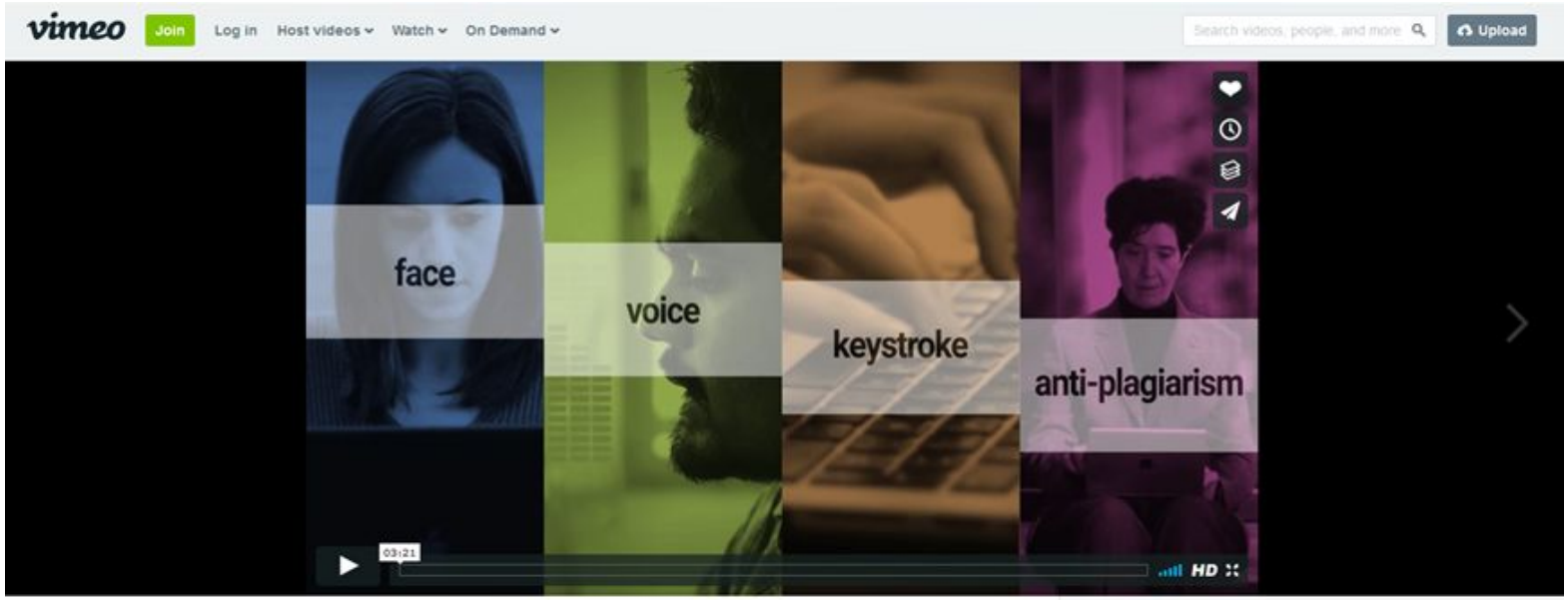
- Input Data
  - Any electronic document
- Goal
  - Has this document modified after a date?
- Output
  - Text string used as a receipt
  - Receipt can be validated => OK/Fail
- Scenario
  - Once a file is submitted (text, video, audio, ZIP, …) the system provides the learner with a receipt.
  - Teacher can use this receipt to validate the last edition of the file (i.e. accept resubmission of corrupted delivers).



Pilot execution

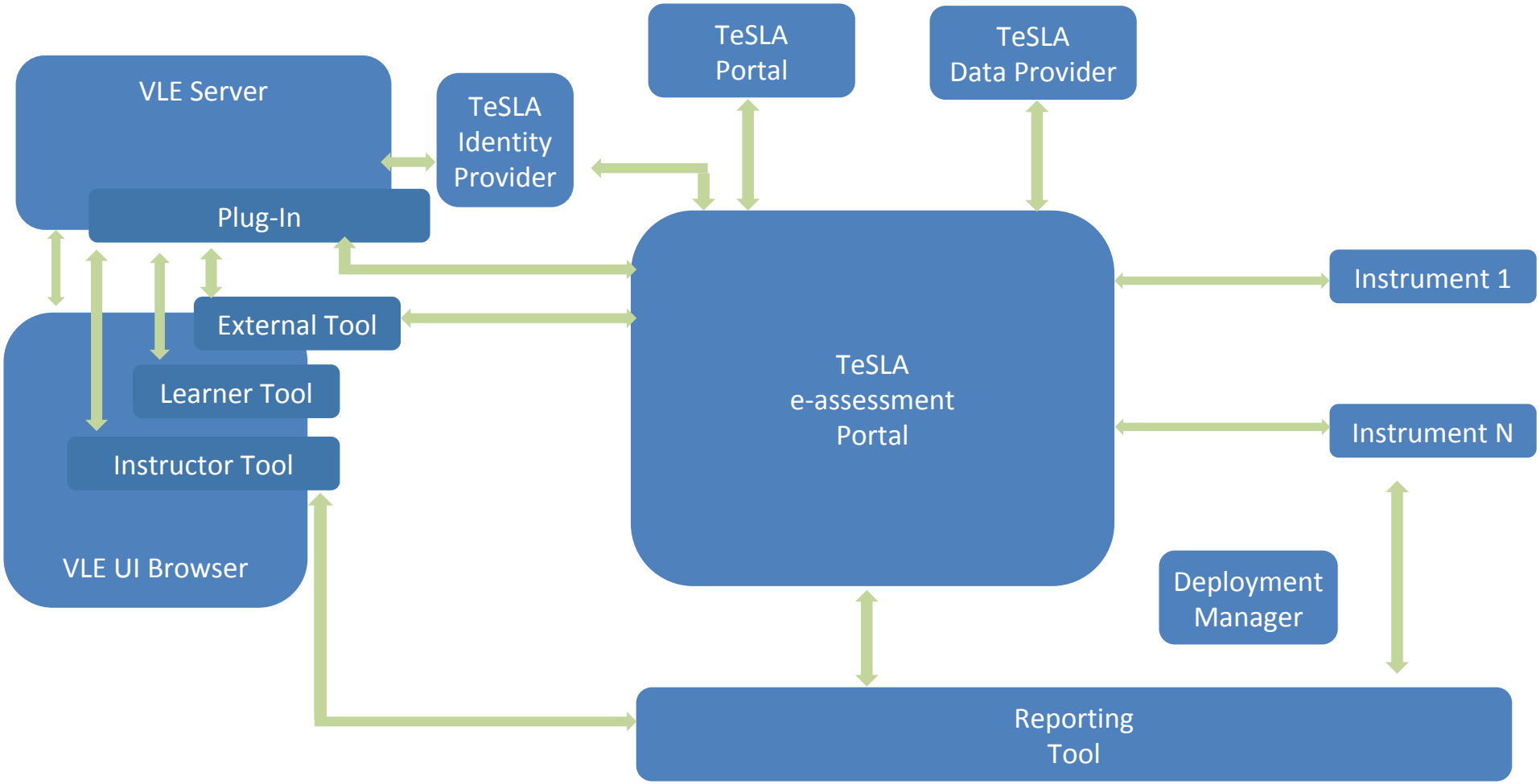


TeSLA demo



https://vimeo.com/216645337#t=29s

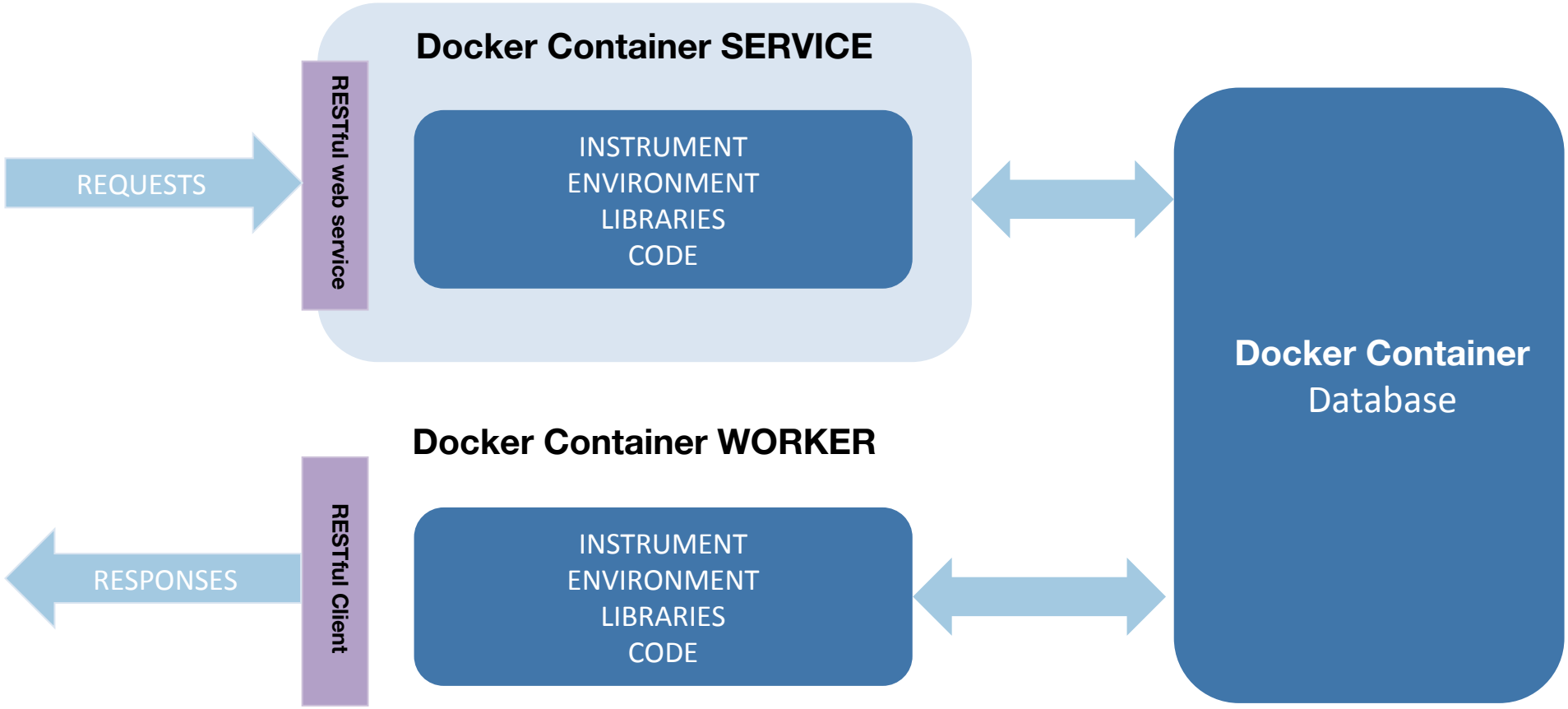
TeSLA Architecture



TeSLA Architecture

- **External tool**: usually a JS that connects with TeSLA
- **TEP**: TeSLA e-assessment Portal
- **TIP**: TeSLA Identity Provider
- **TeSLA Portal**: Portal to manage all TesSLA system for each institution
- **RT**: Reporting Tool
- **DM**: Depploy manager
- **TeSLA Data Provider**: stores instrument data

TeSLA Architecture



TeSLA
Adaptive trust-based e-assessment

3 tresipunt.com

Moodle UOC Pilots

Total Pilots Sumarization

Consentimientos: 5.262
Enrolments: 7.897
Follow-up: 9.072

			ENROLMENT				FOLLOW-UP AMB ENROLMENT					
Pilot	MATRÍCULA	CONSENTIMENTS	FR	VR	KD	FA	FR	VR	KD	FA	PL	TOTAL
P2	3096	1247	624	577	593	568	503	437	500	486	455	882
P3A	4868	1855	780	94	1105	784	650	84	994	753	661	1316
P3B	5645	2160	1112	212	894	643	806	145	711	445	1442	1866
SUMA	13609	5262	2516	883	2592	1995	1959	666	2205	1684	2558	4064

TeSLA
Adaptive trust-based e-assessment

tresipunt.com

Moodle TeSLA plugin

Moodle plugin

Overview

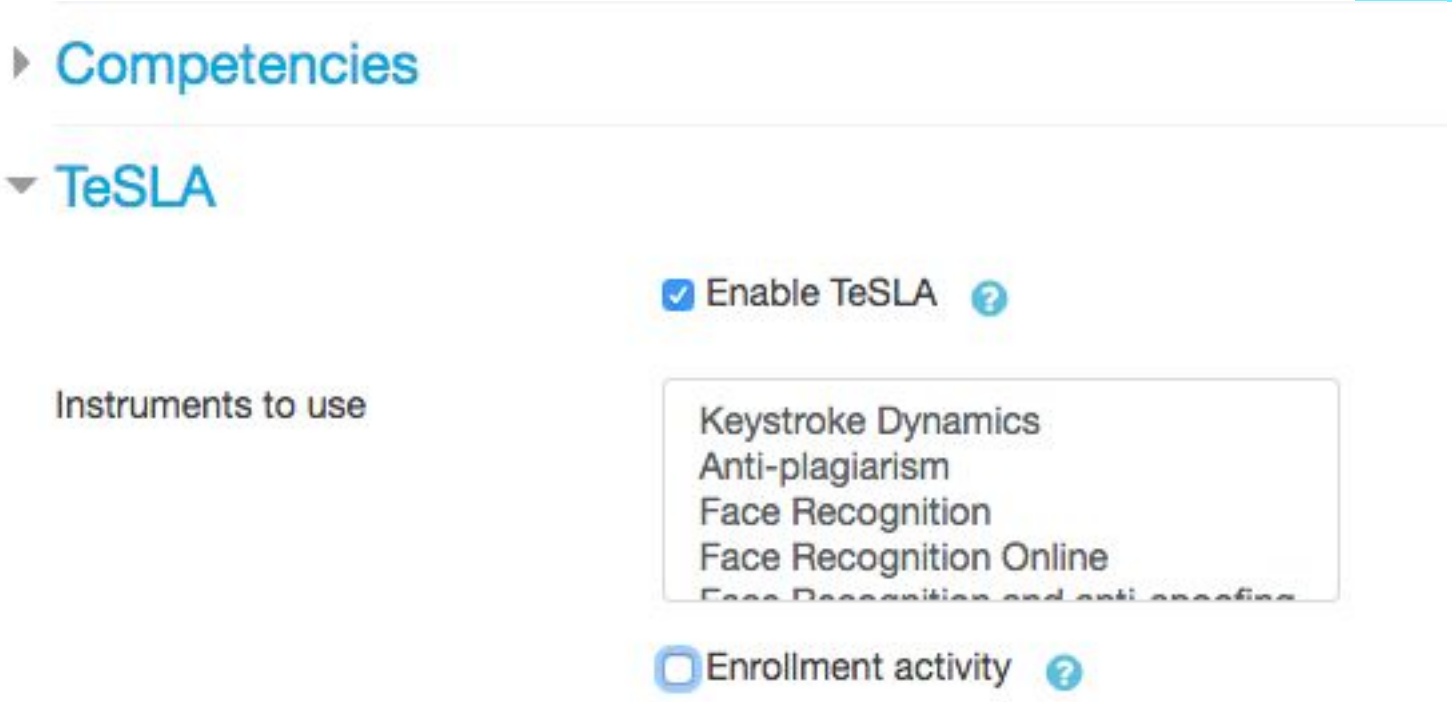
- Local plugin
- Started on January 2017
- Required Moodle version 3.1
- Scheduled tasks
- LTI Support
- Mustache
- Uses a phar with the php TeSLA library
- Internal reporting + Configurable Reports Block

Callbacks

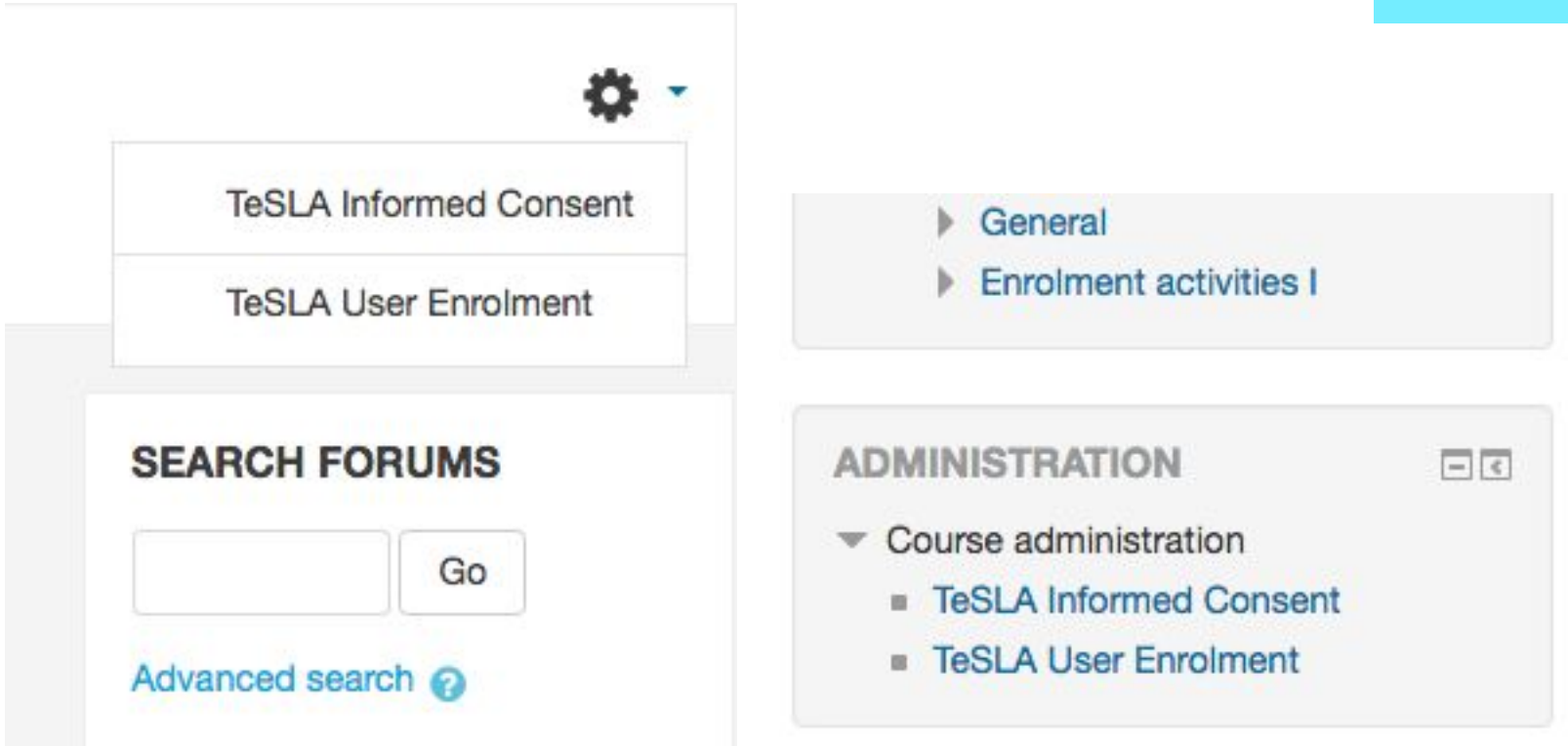
https://docs.moodle.org/dev/Callbacks

Callback	Description	Moodle version
coursemodule_edit_post_actions	Allow to save the tool TeSLA configuration.	3.1
coursemodule_standard_elements	Allow to add elements to Moodle activity/resource.	3.1
extend_settings_navigation	Allows to add TeSLA to course Menu	2.1
extend_navigation	Allows to add the required JS	2.1

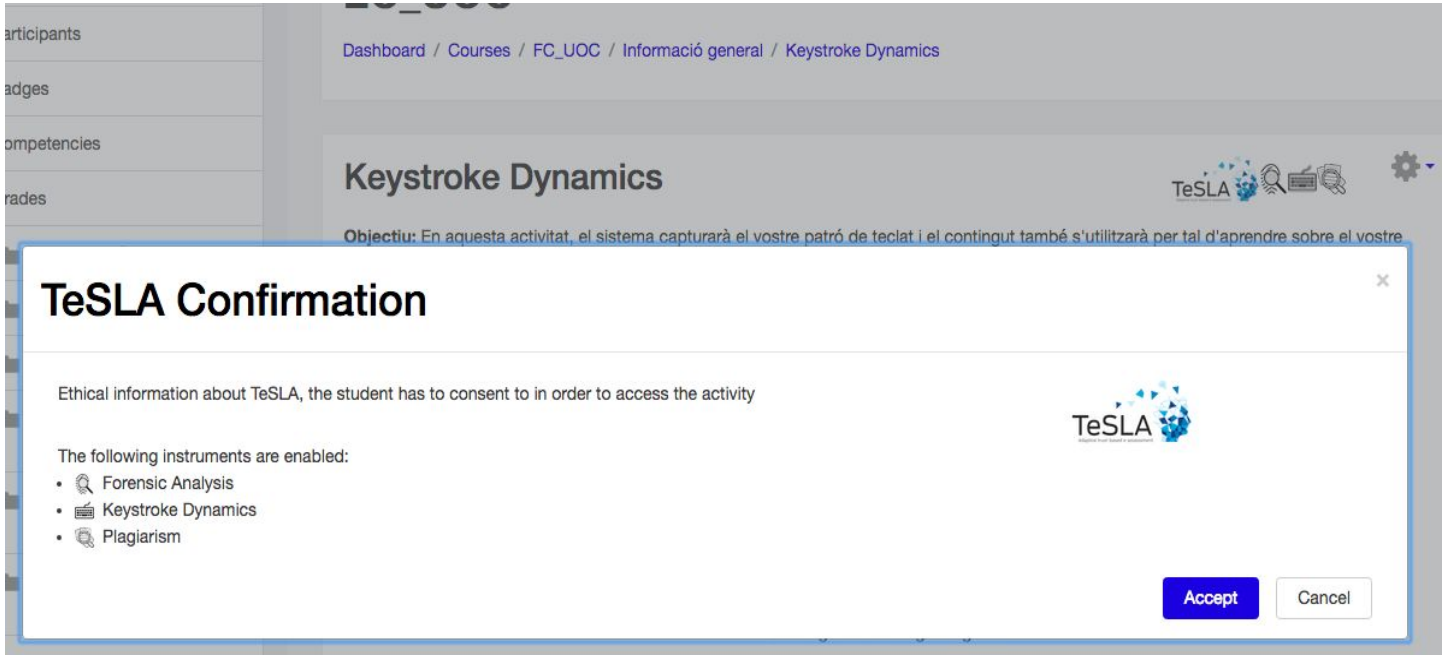
Callback: coursemodule_standard_elements



Callback: extend_settings_navigation



Callback: extend_navigation



LTI Support

- Version 1.2
- Acts a consumer and provider of LTI
- Consumer: There is external LTI provider developed on Python
  - Enrollment
  - Teacher Module
- Provider: The Tool can be accesed via LTI. Based on Juan Leyva's plugin

TeSLA
Adaptive trust-based e-assessment

tresipunt.com

Thank you!

TeSLA Project: http://www.tesla-project.eu/
Follow us on Twitter: @teslaprojectEU
antoni@tresipunt.com @tunyafix