One Step Ahead in the Future of Labs: Widgets, Ubiquity and Mobility

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One Step Ahead in the Future of Labs: Widgets, Ubiquity and Mobility

Education is changing...

CONTENT
INTERACTION
ASSESSMENT
CERTIFICATION

IEEE International Conference REV

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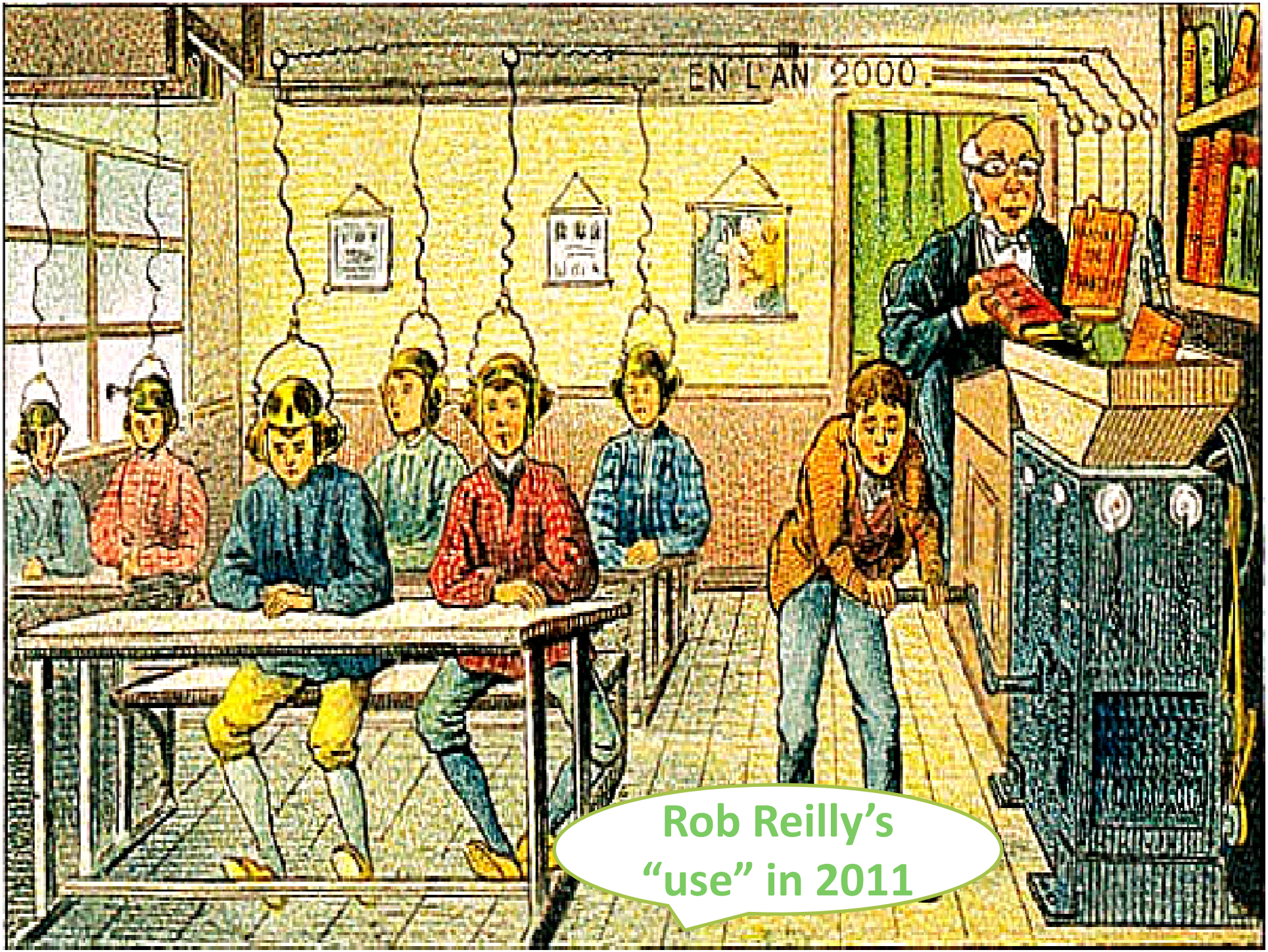

EN L'AN 2000.
Rob Reilly's
"use" in 2011

Games-like

Engaging

Social

AI-ADAPTIVE

augmented

Education is becoming ...

Mobile

Federated

analytics

OPEN

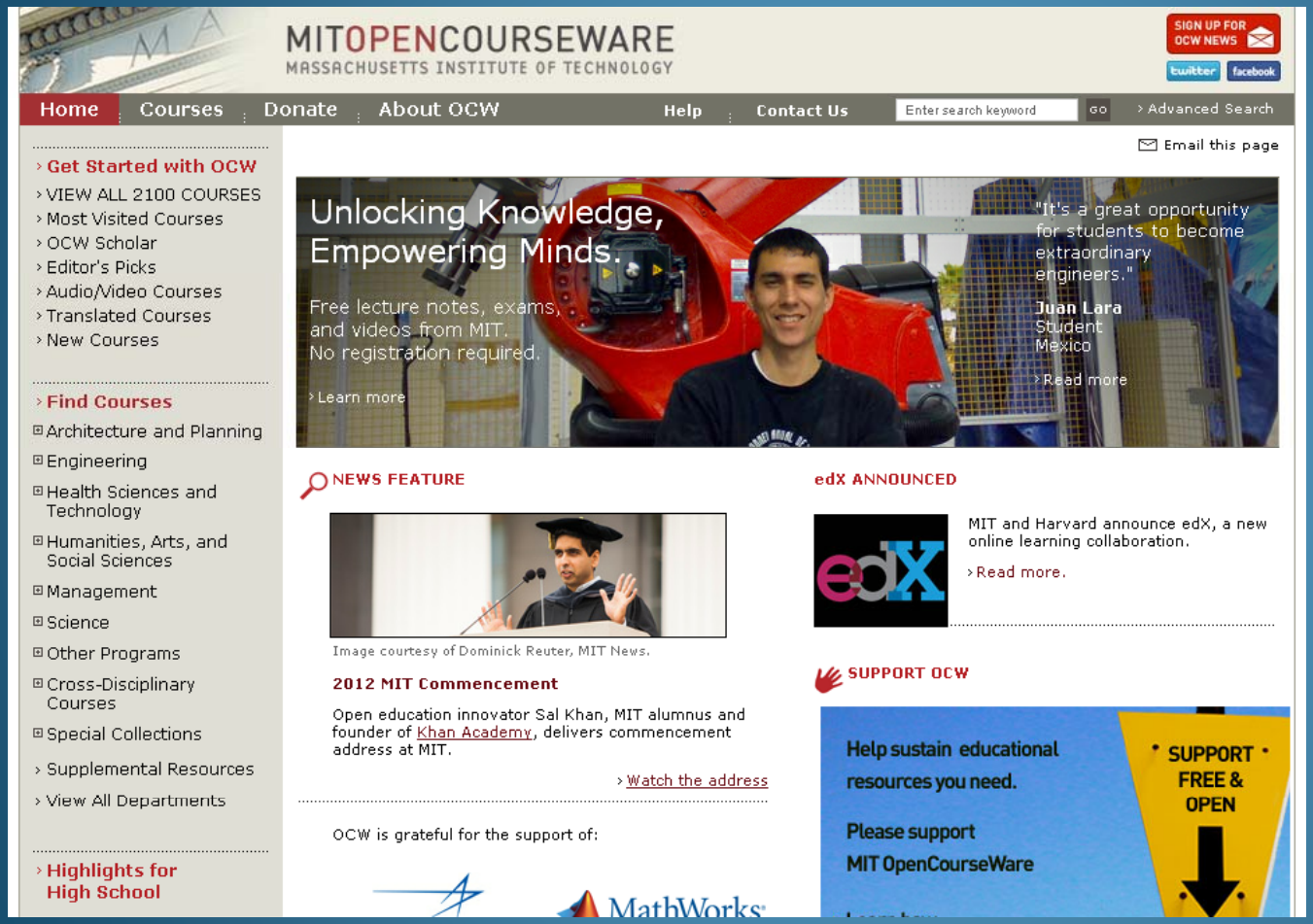
addictive

Disruptive

One Step Ahead in the Future of Labs: Widgets, Ubiquity and Mobility

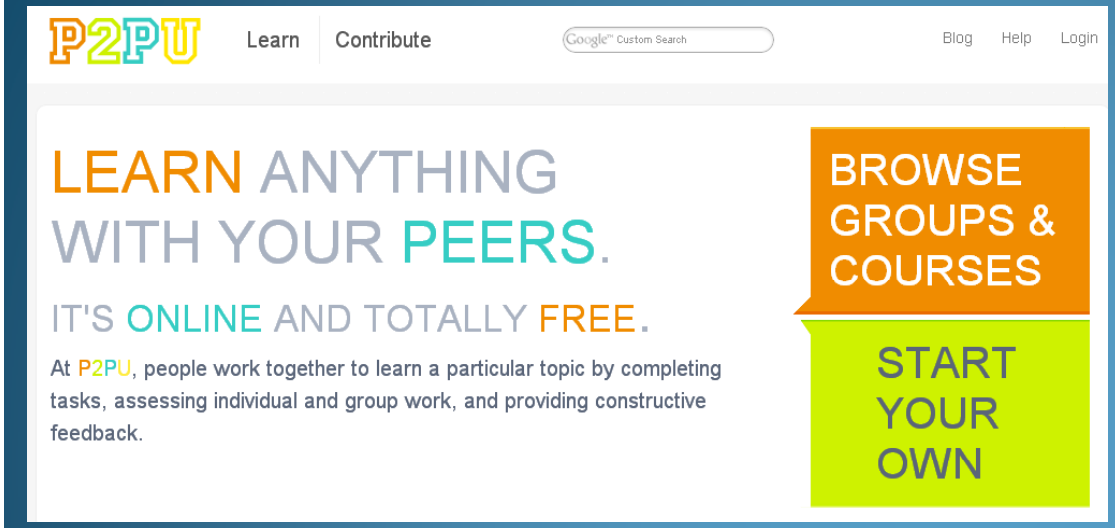
Open education new initiatives

OCW was Education Web 1.0



- CONTENT
- ¿INTERACTION?
- ASSESSMENT ¿SELF?
- ¿CERTIFICATION?

New Web 2.0 Education



- CONTENT
- INTERACTION
- ASSESSMENT
- ¿CERTIFICATION?

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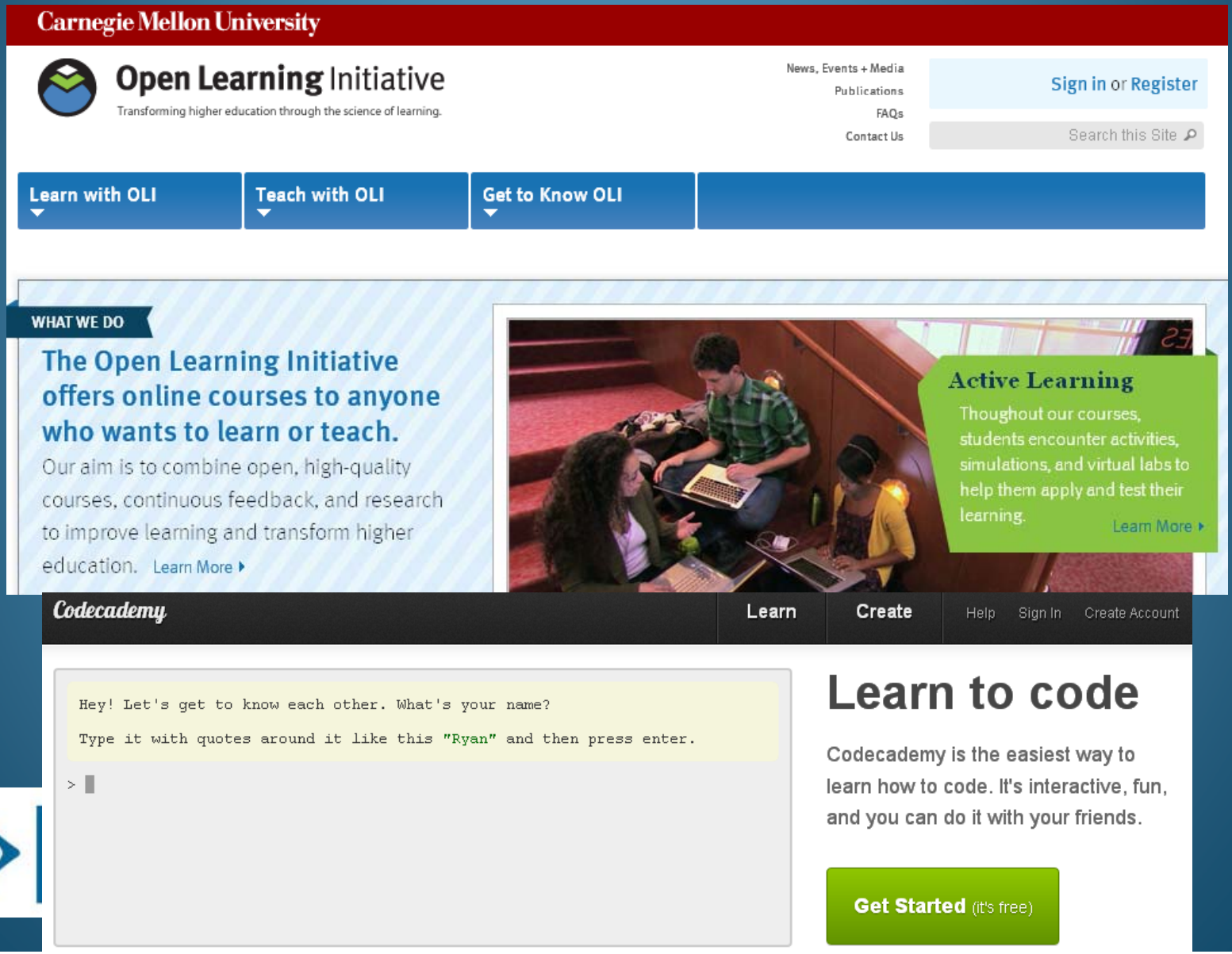
An Adaptive open learning



Massive On-line Open Courses

udacity

MITx MIT's new online learning initiative

Coursera

PRINCETON UNIVERSITY

STANFORD UNIVERSITY

UNIVERSITY OF MICHIGAN

Penn
University of Pennsylvania

IE

Massachusetts Institute of Technology

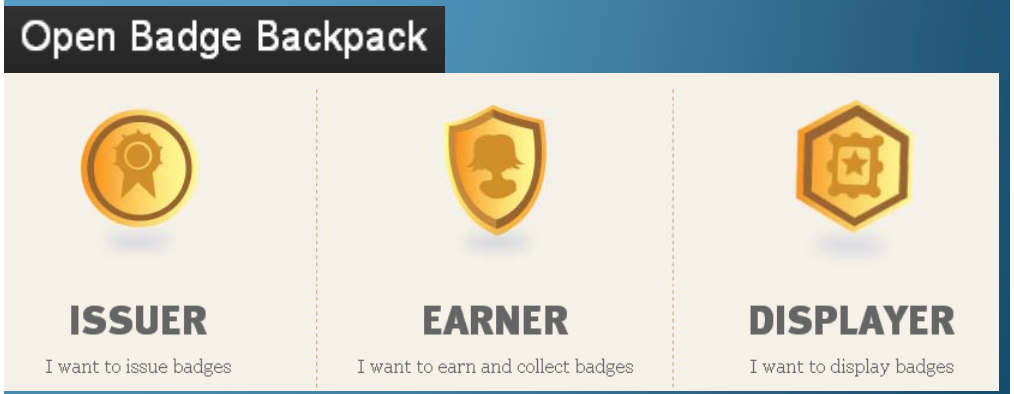
edX

HARVARD UNIVERSITY

How about Certification on those open environments?

mozilla
OPEN BADGES

Self-accreditation & identity ?

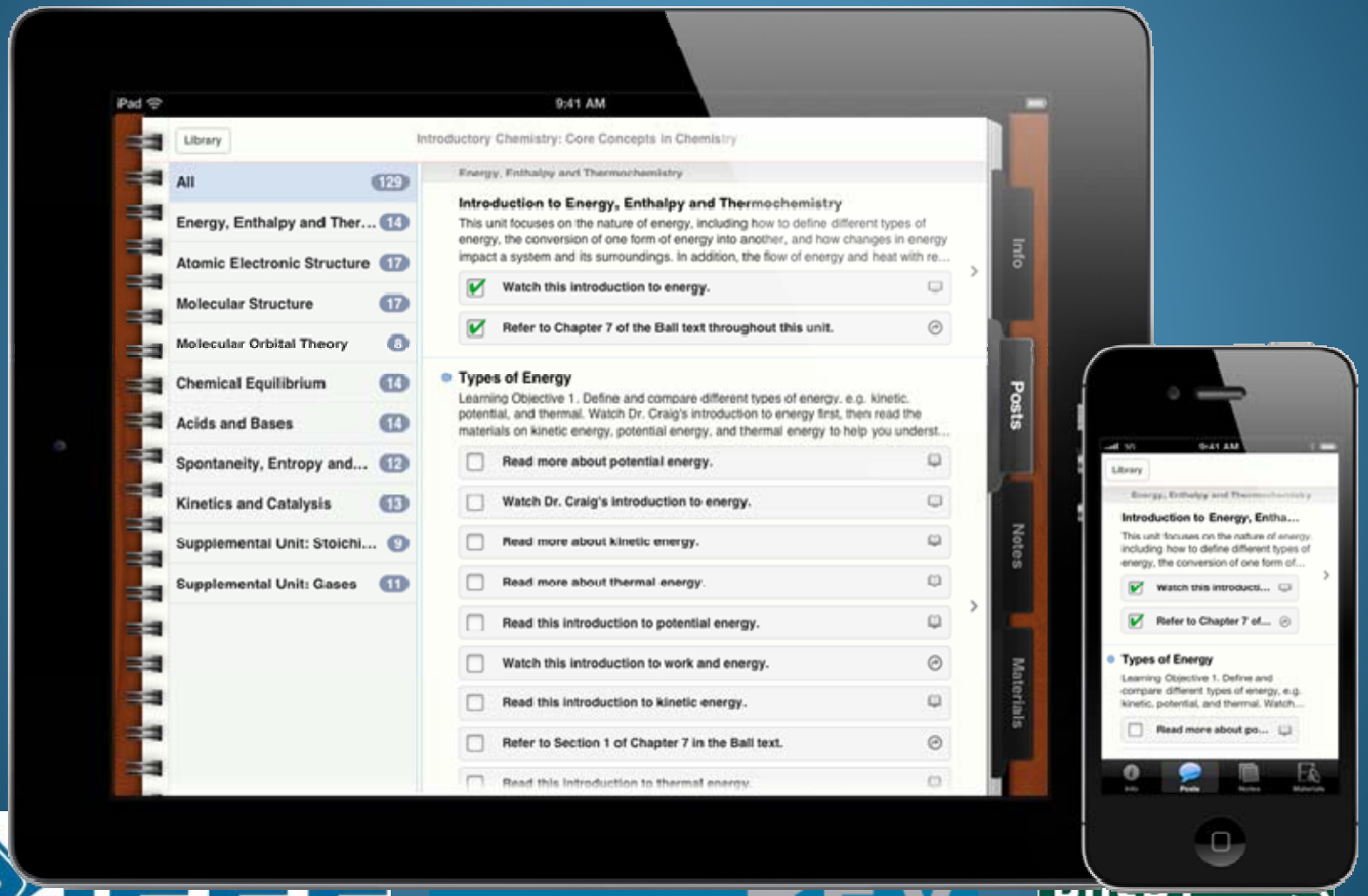


Mobile and augmented learning…


F My Life
Today I woke up to find that my car had been broken into. I was upset about not hearing my car alarm go off, until I realized that it *had* gone off in the middle of the night. I had woken up, cursed the idiot who had set off the alarm, put a pillow over my head, and fallen back to sleep. FML
Today my friends and I were drinking boba, a type of East Asian tea. On the side of the cup it said, "Please drink carefully to avoid choking on the boba." I started to laugh at the ridiculousness of the label and proceeded to choke on the boba in a coughing fit. FML
Today I went for a jog in my neighborhood. While I was running, I passed my girlfriend's parents, who were out for a walk. Trying to make a good impression, I stopped to talk. When I got home, I realized I was wearing a shirt that friends had given me as a joke. It said: "Blow me, bitch. It's my b-day." FML
136
You Shouldn't Have Even Bothered . . .
Today I babysat three-year-old twins. They have a huge dry-erase board hanging between their beds. After they fell asleep, I was bored and drew a very large, detailed penis on the board. When I went to erase it, I realized I had used a permanent marker. FML
Today my child said to me, "Mommy
goes up like a stick." I said, "Well, h
okay." Then I asked when it does th
times when I'm watching *Scooby-D*
out dressed in lady clothes." FML
Today I met a really nice couple
conversation eventually drift
commented that hooking up
pathetic. They had met on My
Today I was giving my boyfri
thing squirt into my mouth. I h
to my mouth. FML
1:28 AM

Enriched ebooks

iBooksU


iPad
9:41 AM
Library
Introductory Chemistry: Core Concepts in Chemistry
All 129
Energy, Enthalpy and Ther... 14
Atomic Electronic Structure 17
Molecular Structure 17
Molecular Orbital Theory 8
Chemical Equilibrium 14
Acids and Bases 14
Spontaneity, Entropy and... 12
Kinetics and Catalysis 13
Supplemental Unit: Stoichi... 9
Supplemental Unit: Gases 11
Introduction to Energy, Enthalpy and Thermochemistry
This unit focuses on the nature of energy, including how to define different types of energy, the conversion of one form of energy into another, and how changes in energy impact a system and its surroundings. In addition, the flow of energy and heat with re...
Watch this introduction to energy.
Refer to Chapter 7 of the Ball text throughout this unit.
Types of Energy
Learning Objective 1. Define and compare different types of energy, e.g. kinetic, potential, and thermal. Watch Dr. Craig's introduction to energy first, then read the materials on kinetic energy, potential energy, and thermal energy to help you underst...
Read more about potential energy.
Watch Dr. Craig's introduction to energy.
Read more about kinetic energy.
Read more about thermal energy.
Read this introduction to potential energy.
Watch this introduction to work and energy.
Read this introduction to kinetic energy.
Refer to Section 1 of Chapter 7 in the Ball text.
Read this introduction to thermal energy.
Info
Posts
Notes
Materials

Location-based AR

- ✓ Location of institution facilities: CSEV AR
- ✓ In-situ collaborative Learning: leARnengineering

Location-based AR to learn History

ENREDA MADRID

Vive una nueva realidad

Gamification

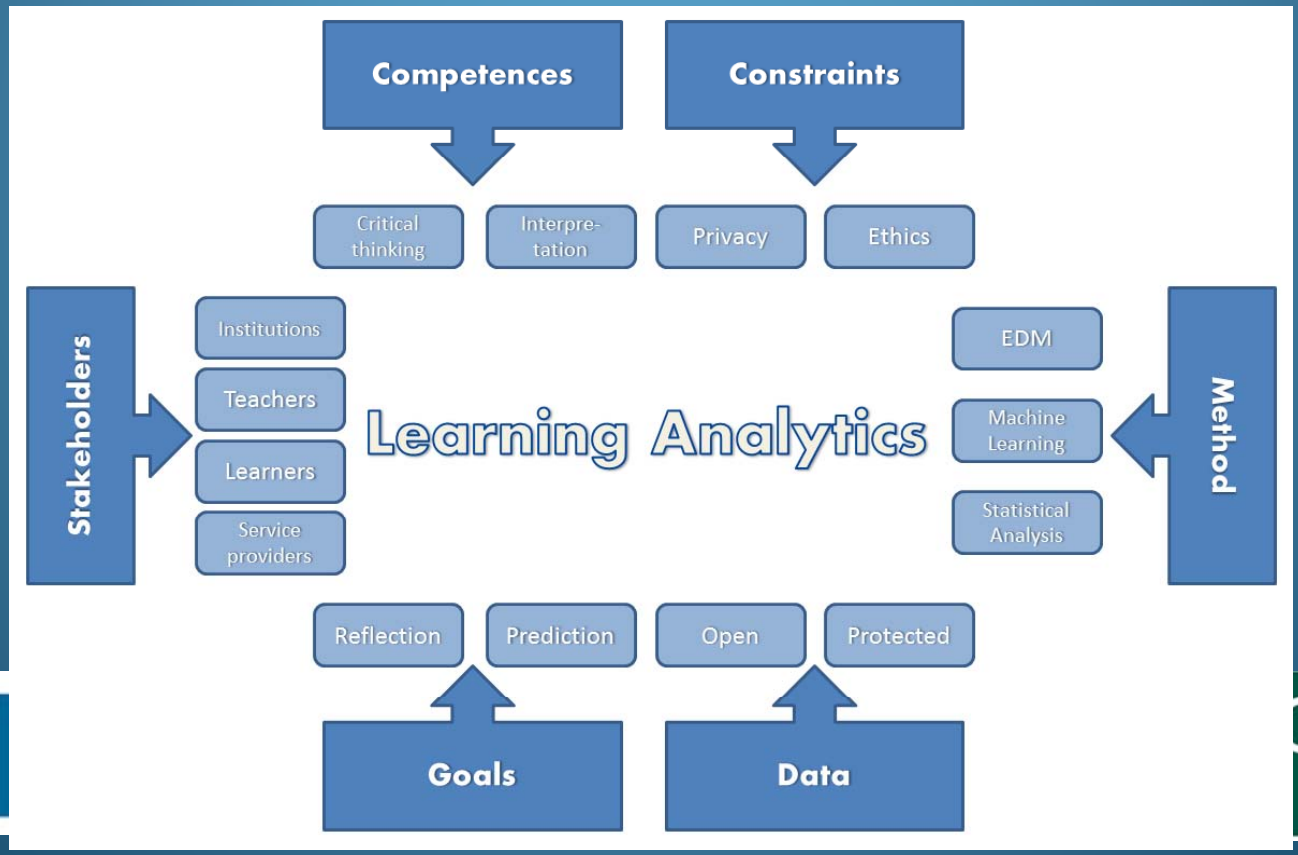
Education should not be fun, it should be addictive!

The importance of...

Learning analytics

Learning analytics

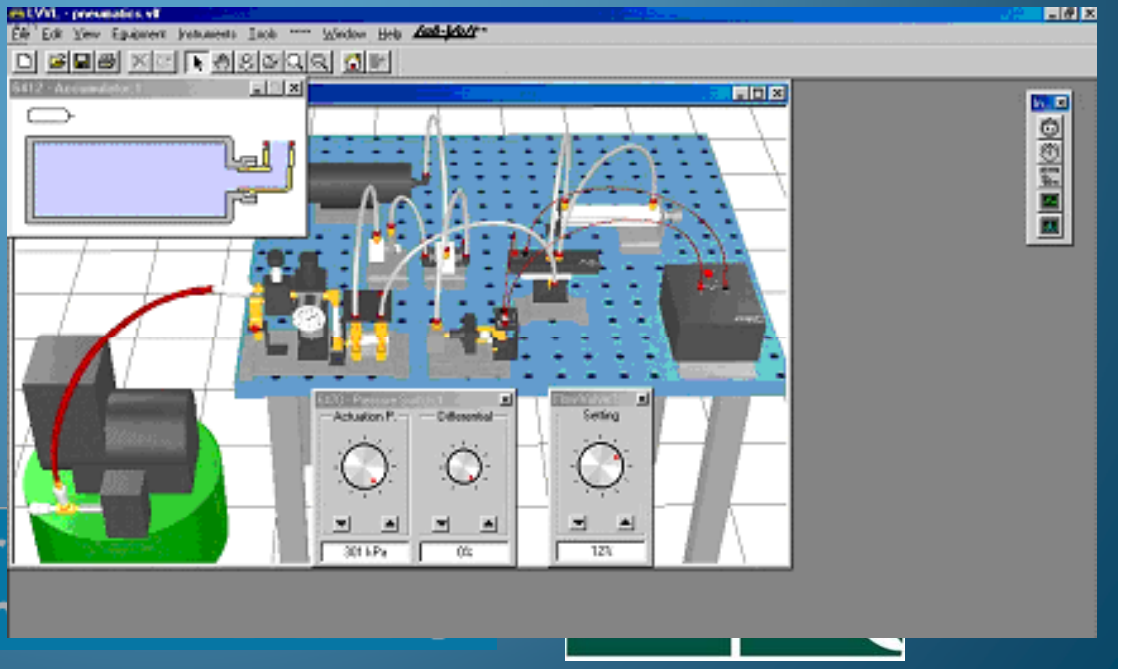
- Data mining students learning performance to adapt and personalized contents and services



How these new initiatives impact on engineering education?

What happen with our resources?

- Existing resources:
  - Virtual & Remote Labs
  - Simulations
  - Video-lectures
  - Assessment

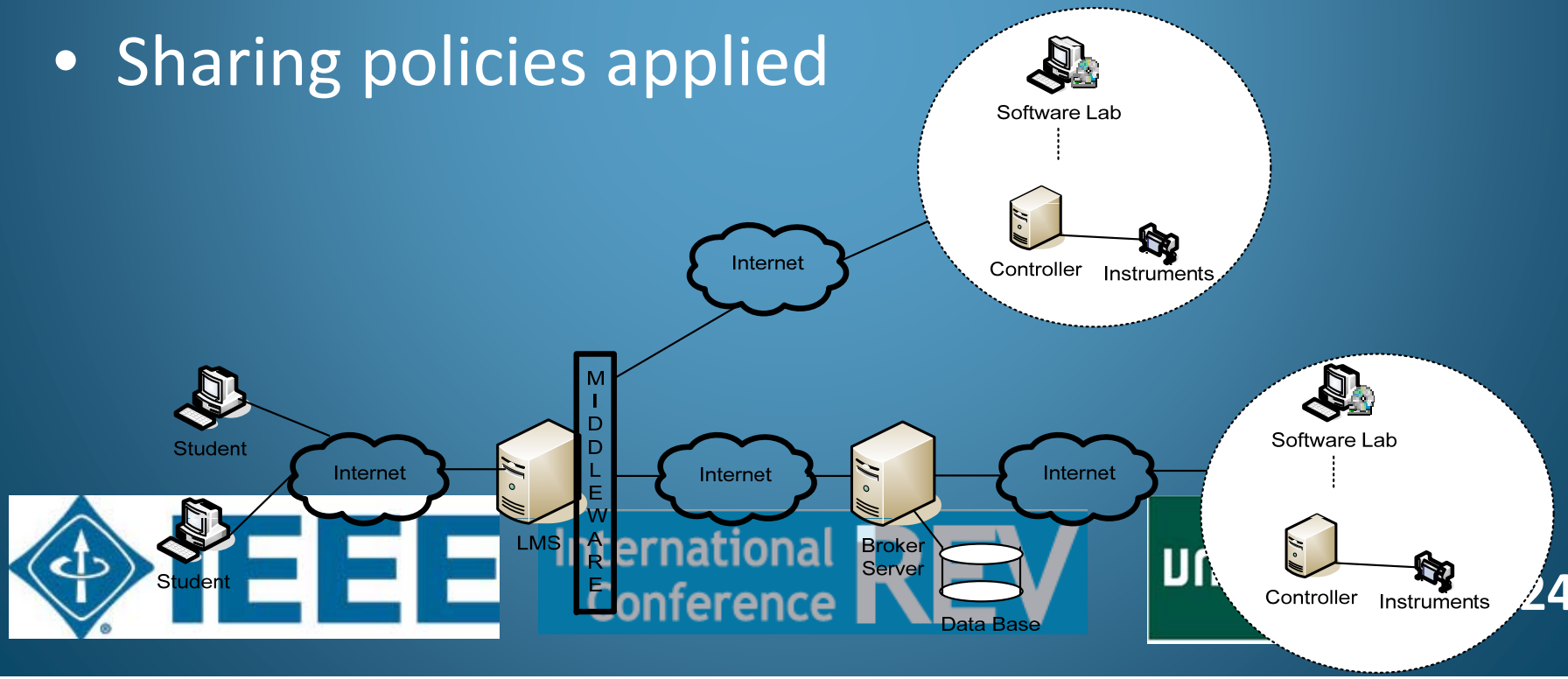


1) Should be easily reused into the new initiatives

- iBook
- Enriched eBook
- iTunesU
- Massive on-line courses
- P2P learning environments

2) Should be shared by other institutions

- A federation of resources is needed to orchestrate the resources sharing
- APIs offered to share learning analytics
- Sharing policies applied



3) Should work on any device

- Resources built or adapted using cross-platforms technologies such as HTML5
- Reduce reprogramming efforts

4) Should be more engaging

- Apply some game-like elements to our experiments
  - Karma
  - Levels
  - Badges
  - Points
  - Story-telling
  - Realistic cases
  - …
  - Confrontation
  - Collaboration & Fighting

5) Should be more secured

- With identification technologies
  - or along with traditional username & Password (identification)
- Such as,
  - Biometrics
    - Multi-biometrics
  - RFID
  - Combination
- Multiple identities ?
- Digital identities ?

But we have a long way to walk...

- Challenges -

Online Labs as Open E-learning Resources

- Traditional laboratories were the only possibility that allowed students to carry out experiments and get the needed skills for their future jobs

- The improvement in communication networks and programming languages were key factors in the evolution from traditional Laboratories to online Labs

Online Labs as Open E-learning Resources

- Currently, there are a great number of Virtual and Remote Labs on Web
  - Virtual Web Labs → Virtual web labs are applications installed in a web server and accessed over Internet
  - Remote Web Labs → are applications which allow student to manipulate hardware through a Web browser over Internet

Online Labs as Open E-learning Resources

Virtual and Remote Labs are not mutually exclusive. They can be combined in the learning process. For instance:

- A Virtual Web Lab can be used to teach students how to hand the instruments and carry out tasks that can damage these
- A Remote Web Lab can be used when students have learnt of management of instruments

- A new resource to consider inside **Blended Learning** !!!!

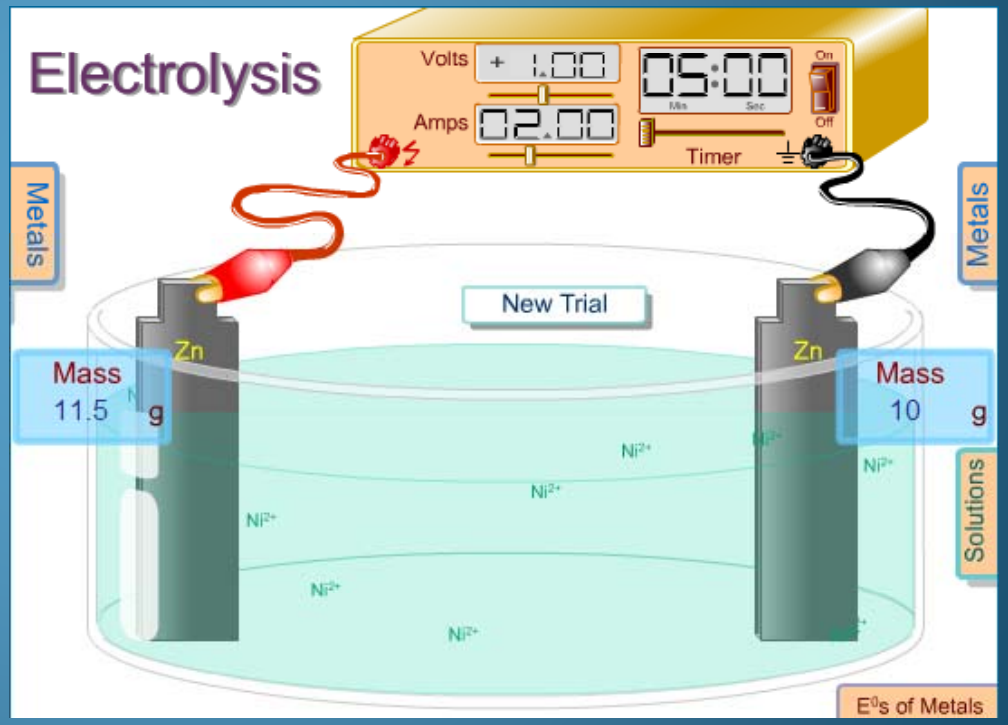
Online Labs as Open E-learning Resources

- Virtual and Remote Labs can be used in many educational fields, such as:
  - Electronic and Control
  - Electrical Engineering
  - Chemistry
  - Physics
  - Anatomy
  - Biology
  - Education
  - …

Examples of Virtual and Remote Web Labs

- Chemistry

The Iowa State University provides a set of Virtual web Labs in Flash where students can carry out experiments about electrochemistry, gas laws, stoichiometry, and acid-base equilibria

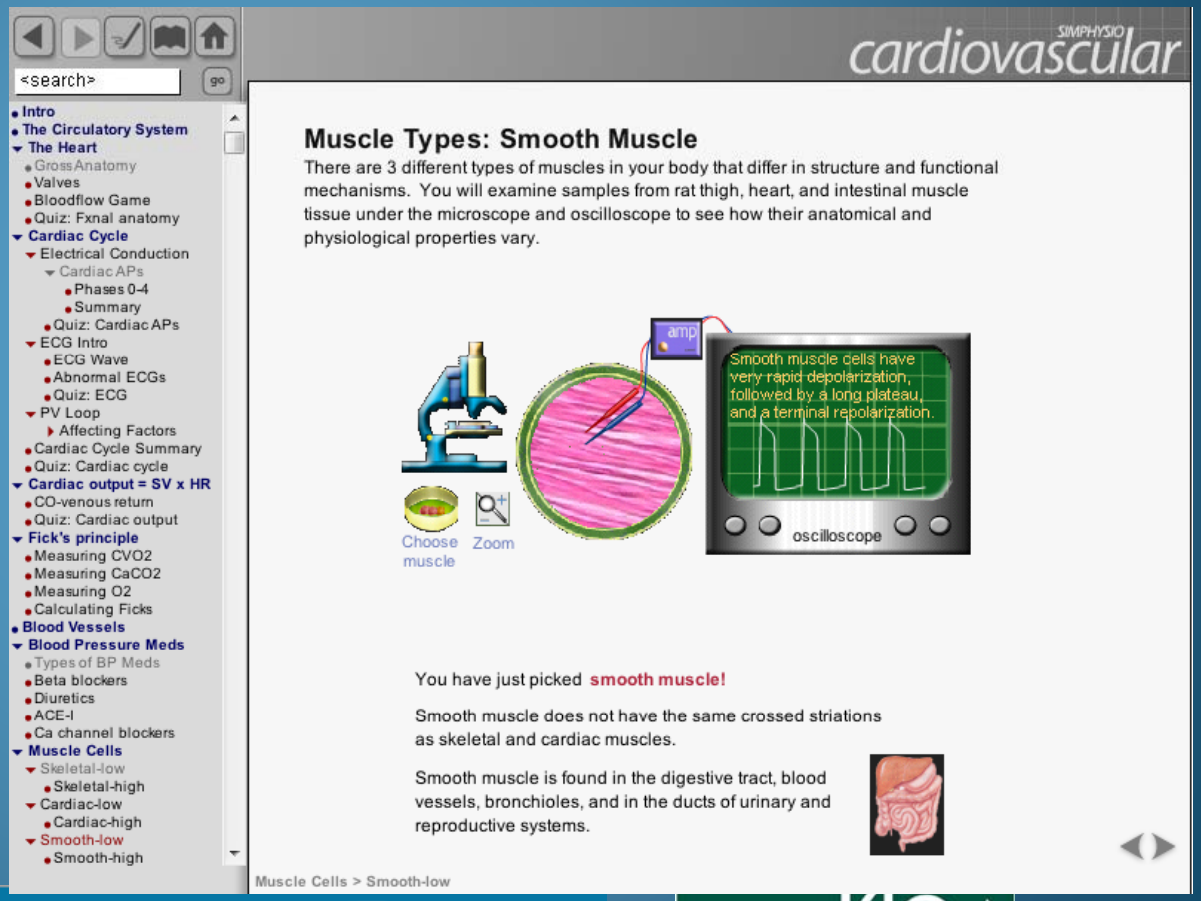


Examples of Virtual and Remote Web Labs

- Anatomy

The Stanford University provides a set of online interactive media to teach human biology

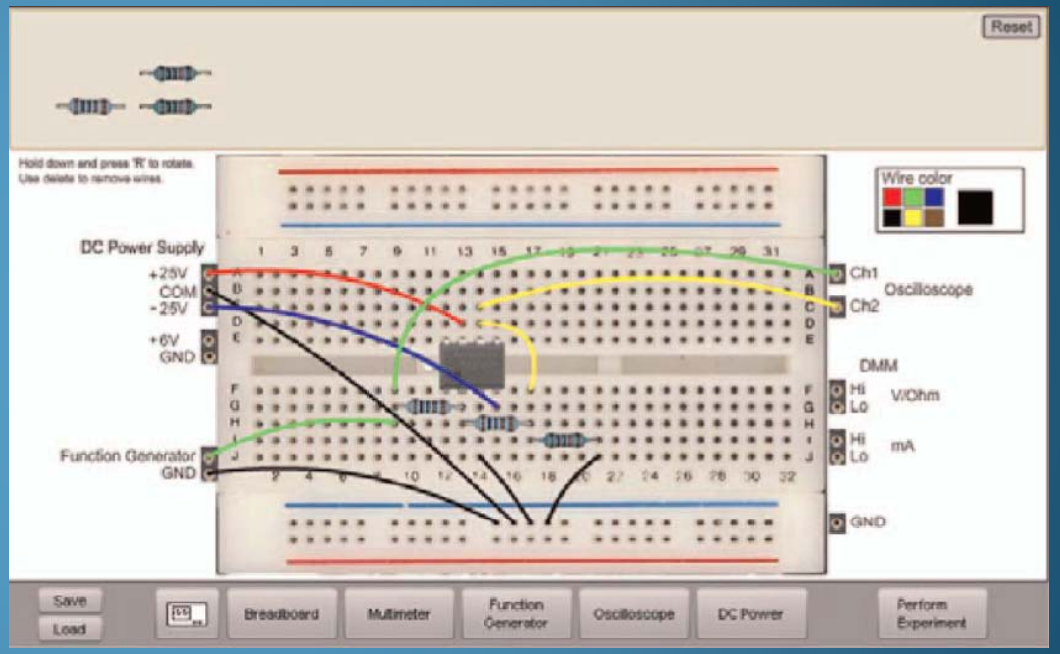
http://virtuallabs.stanford.edu/



Examples of Virtual and Remote Web Labs

- Circuit analysis and electronics

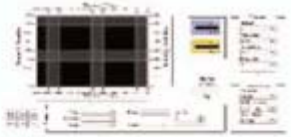
Visir project developed by Blekinge Institute of Technology (BTH) in Sweden that has created a lab workbench equipped with a unique remote control interface, enabling students to perform physical experiments at home or elsewhere




breadboard


multimeter


functiongenerator

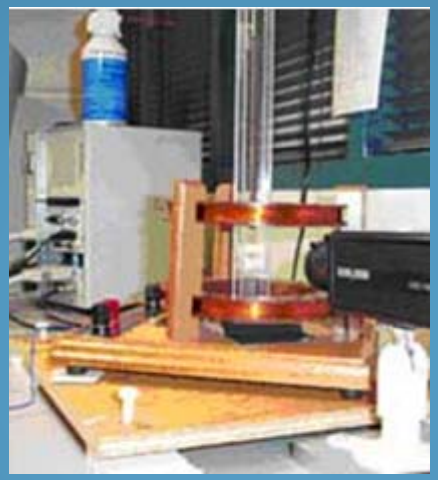

oscilloscope


dcpower

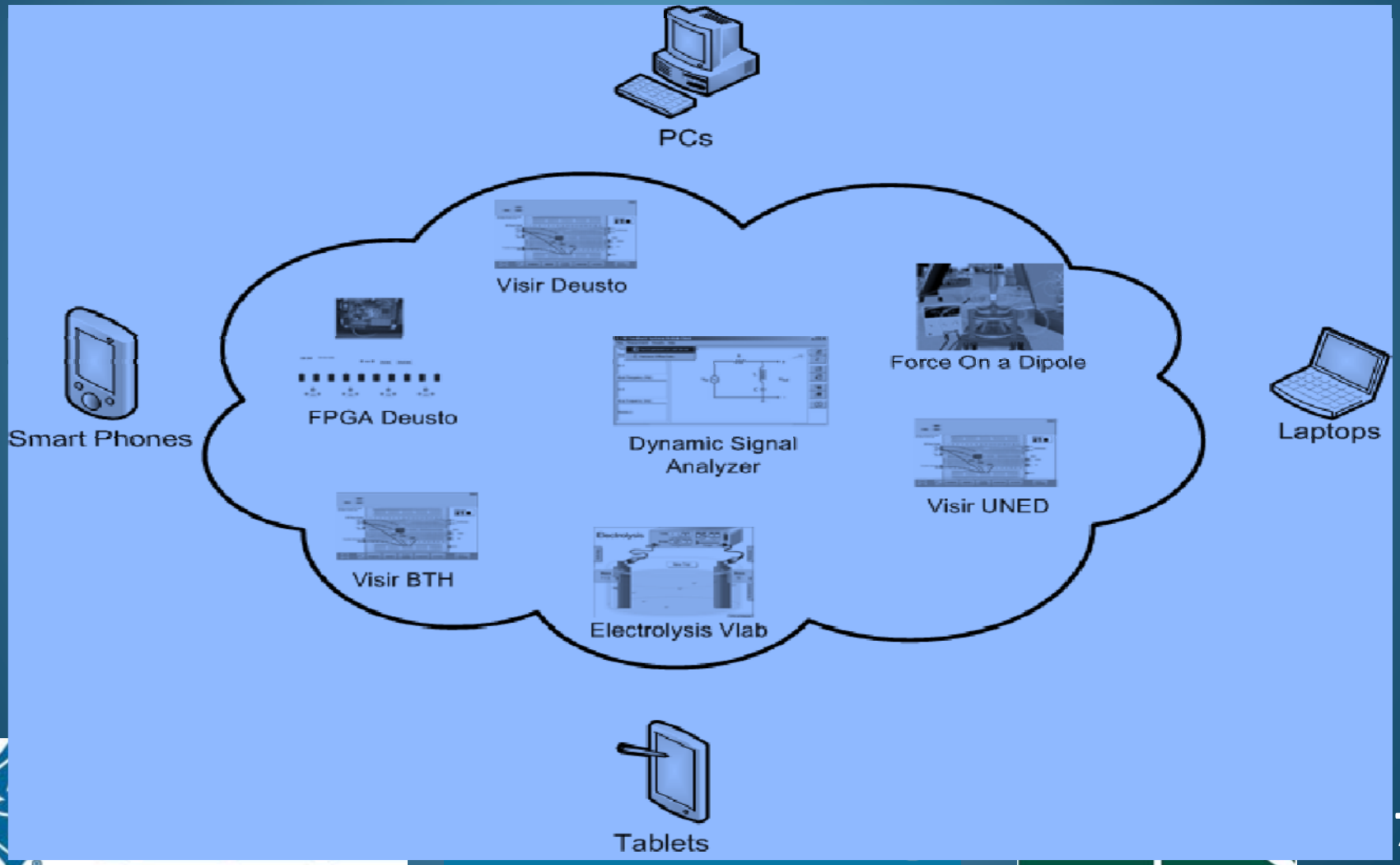
Examples of Virtual and Remote Web Labs

- Physics

Force On a Dipole Experiment from MIT. This Remote Lab consists of a small magnet suspended vertically by a spring in the center of two horizontally mounted coils



Virtual and Remote Web Labs In INTERNET



Sharing Virtual and Remote Web Labs

Currently, there are two main solutions:

- Shared architectures
  - iLab Shared Architecture (ISA)
  - WebLab-Deusto Architecture
  - SAHARA
- E-learning standards
  - W3C´s Resource Description Framework (RDF) & Dublin Core (Lab2go)
  - SCORM (LILA)

IEEE Education Society Working Group on "Standard for Networked Smart Learning for Online Laboratories" (PAR No. P.1876)

Sharing Virtual and Remote Web Labs

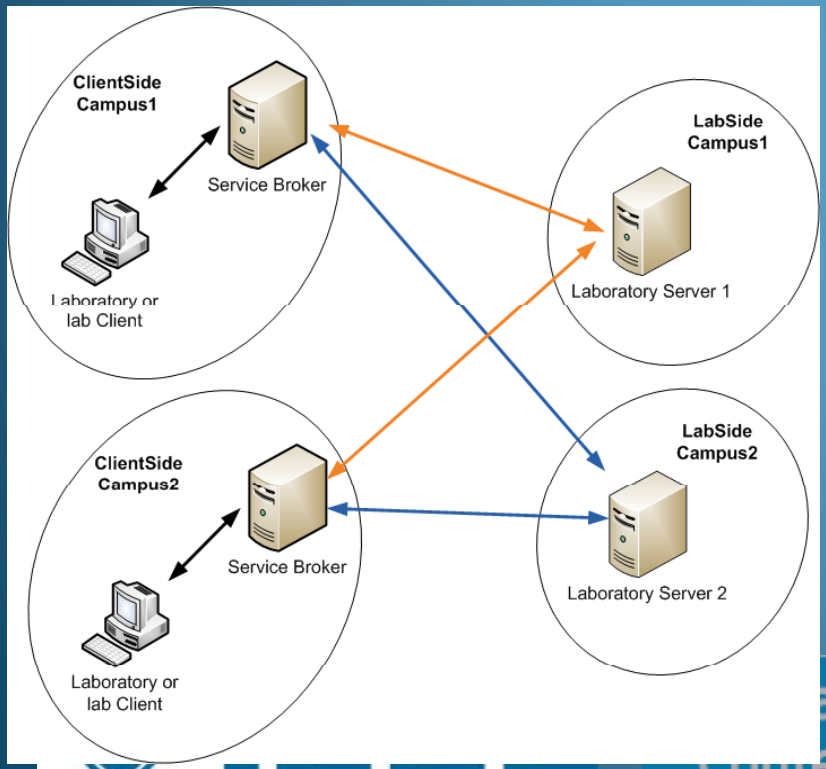
Shared architectures provide a unifying software framework that can support access to a wide variety of online laboratories. Users and the online laboratories can be globally distributed across an arbitrary number of locations linked only by the Internet

- iLab Shared Architecture (ISA)
- WebLab-Deusto Architecture
- SAHARA

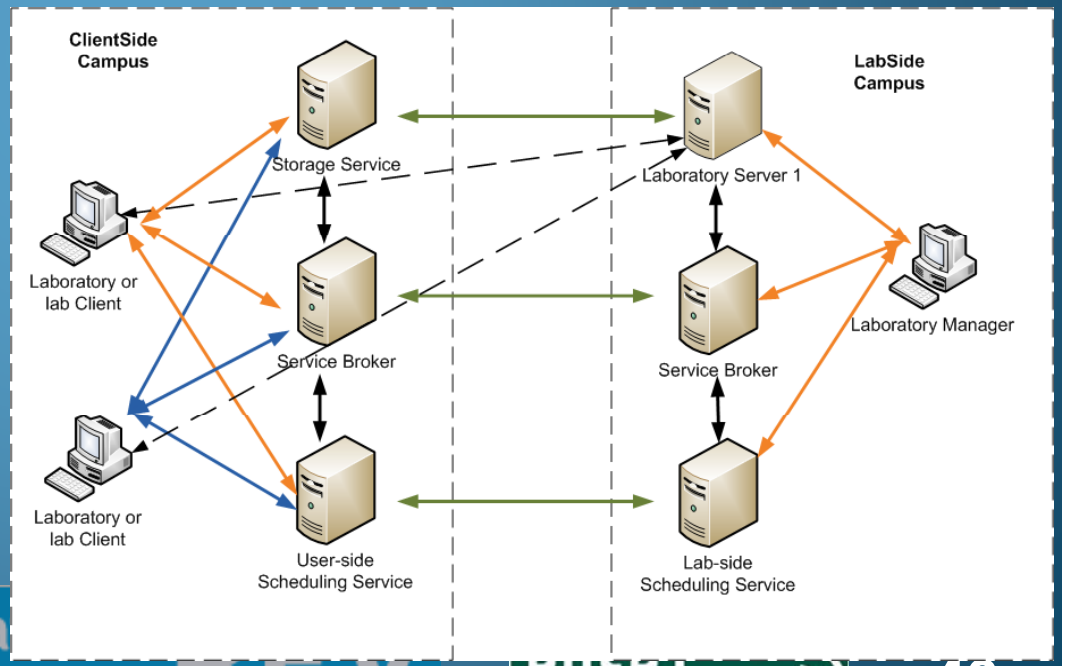
Examples of Shared Architectures

iLab Shared Architecture (ISA)

Batch Experiments



Interactive Experiments



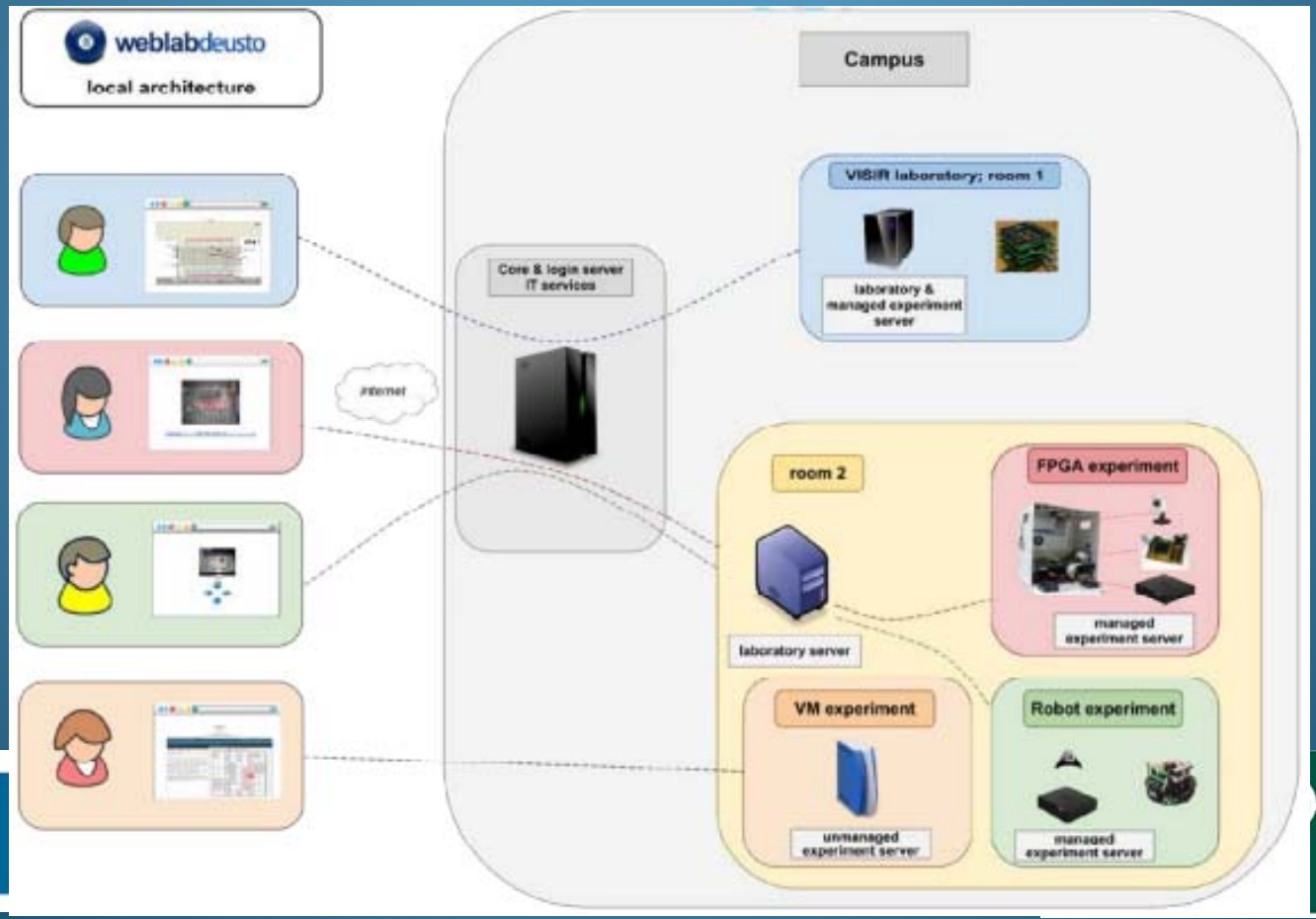
Examples of Shared Architectures

iLab Shared Architecture (ISA). At this moment is implemented in:

- Africa (Uganda, Nigeria, Tanzania)
- Asia (China)
- Europe (Austria, Stuttgart, Brasov, …)
- Australia (Queensland, Melbourne)
- USA (Massachusetts)

Examples of Shared Architectures

WebLab-Deusto Architecture



Examples of Shared Architectures

WebLab-Deusto Architecture is implemented in:

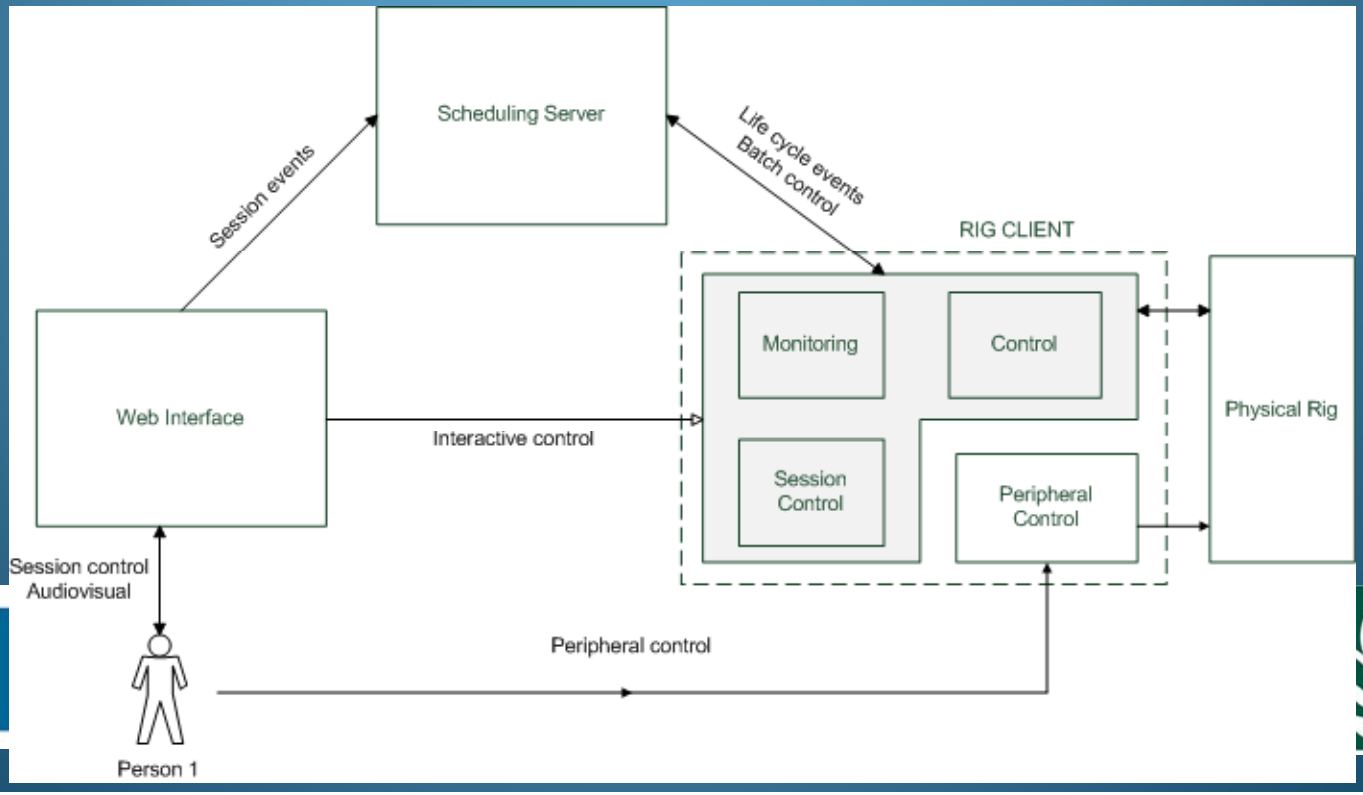
- Deusto
- DIEEC (UNED)

Some of the laboratories are:

  - FPGA
  - Visir
  - Managing a Robot

Examples of Shared Architectures

SAHARA provides a network of remote laboratory that could be used by all Australian Universities



Examples of Shared Architectures

SAHARA is being used by:

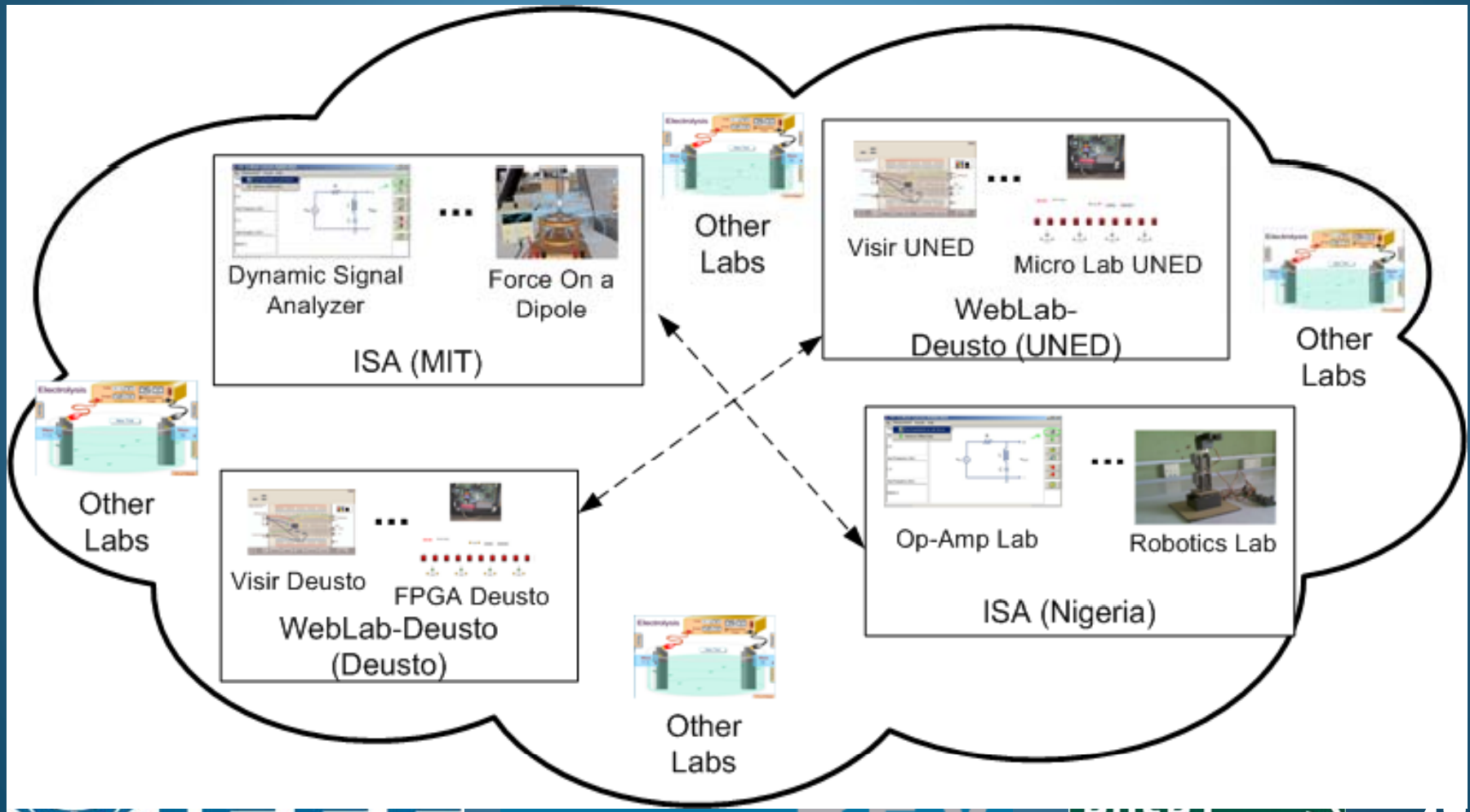
- Curtin University of Technology
- Queensland University of Technology
- RMIT University, University of South Australia
- The University of Technology, Sydney

Virtual, Remote Web Labs and Shared Architectures in INTERNET

Therefore:

- Students of universities that have implemented some of the shared architecture are able to reuse Virtual and Remote Labs of other universities

Virtual, Remote Web Labs and Shared Architectures in INTERNET



Challenges of Shared Architectures

- Currently these architectures are not able to speak (too much) each other. It is necessary to:
  - sponsor the design of an efficient mechanism for sharing, exchanging and trading access to online labs by creation of a global network of shareable experiments
  - lead the evolution of an architecture that enables the sharing of online labs by unified standards

Challenges of Shared Architectures

- These challenges are being undertaken by

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Challenges of Shared Architectures

- The Global Online Laboratory Consortium is composed by a great number of members, such as:

- University of Technology, Sydney
- Massachusetts Institute of Technology
- University of Deusto
- University of Stuttgart
- Carinthia University of Applied Sciences
- UNED
- Makerere University
- Technische Universität Graz
- The University of Queensland
- TU Dortmund University
- School of Engineering - Polytechnic of Porto
- Universidad EAFIT
- College of the North Atlantic Qatar
- Obafemi Awolowo University
- Nanyang Technological University
- RMIT
- Bleckinge Institut of Technology

Using E-Learning Standards

The use of E-learning Standards make easier:

- Interoperability → offer e-learning resources on different platforms
- Migration among different versions of e-learning platform s
- Search and Reuse of E-learning Resources

Using E-Learning Standards

Some of well-known e-learning standards are:

- Dublin Core & LOM IEEE. Both define a set of metadata which allow describing e-learning resources
- IMS Content packaging & SCORM. Both define how to pack e-learning resources to create more complex e-learning objects

Using E-Learning Standards

- IMS Learning Design supports the use of a wide range of pedagogies in online learning
- IMS Question and Test Interoperability describes a data model for the representation of question (assessmentItem) and test (assessmentTest) data and their corresponding results reports

E-Learning Standards & Online Labs

Virtual and Remote Web Labs are enriched e-learning resources and therefore can be used with e-learning standards

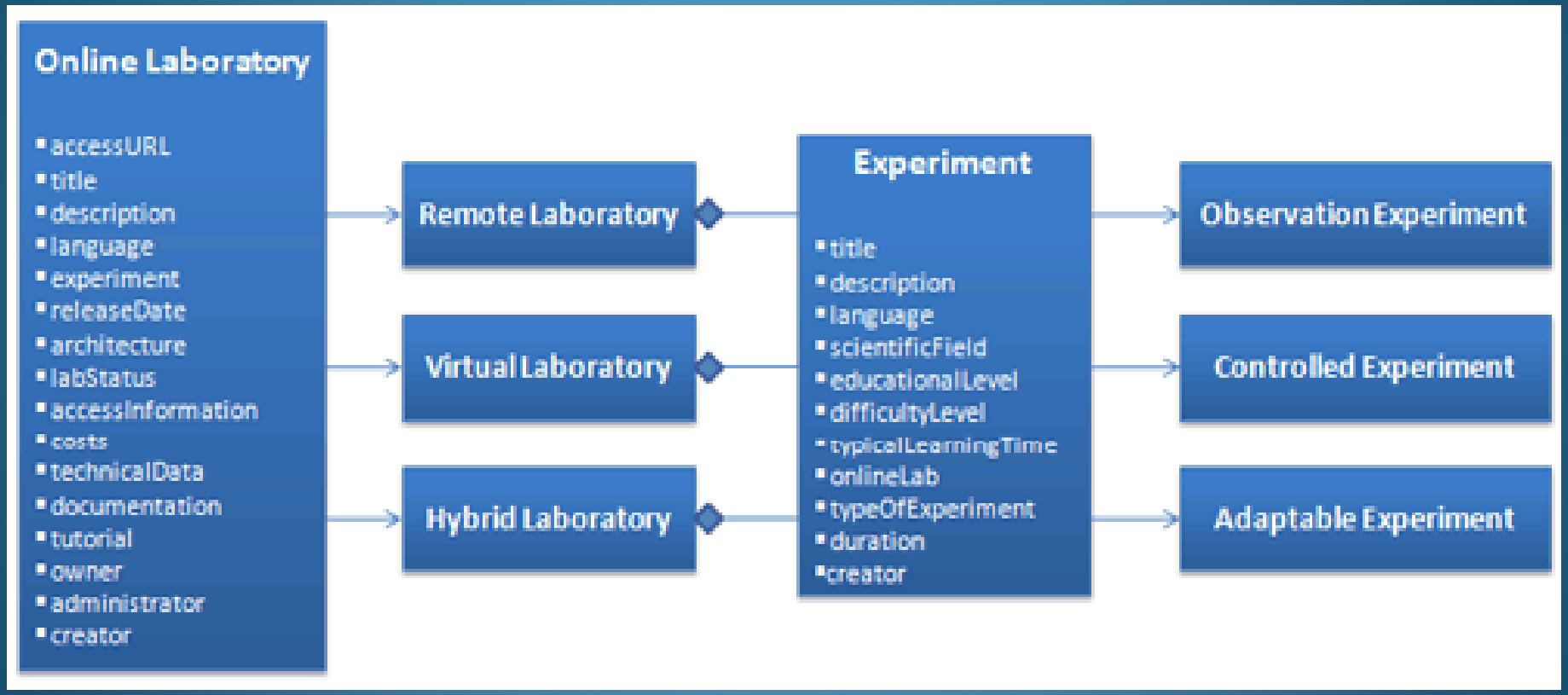
E-Learning Standards & Online Labs

- Some example of the use of e-learning standards and Online Labs are:
  - Lab2go Project
  - LILA Project

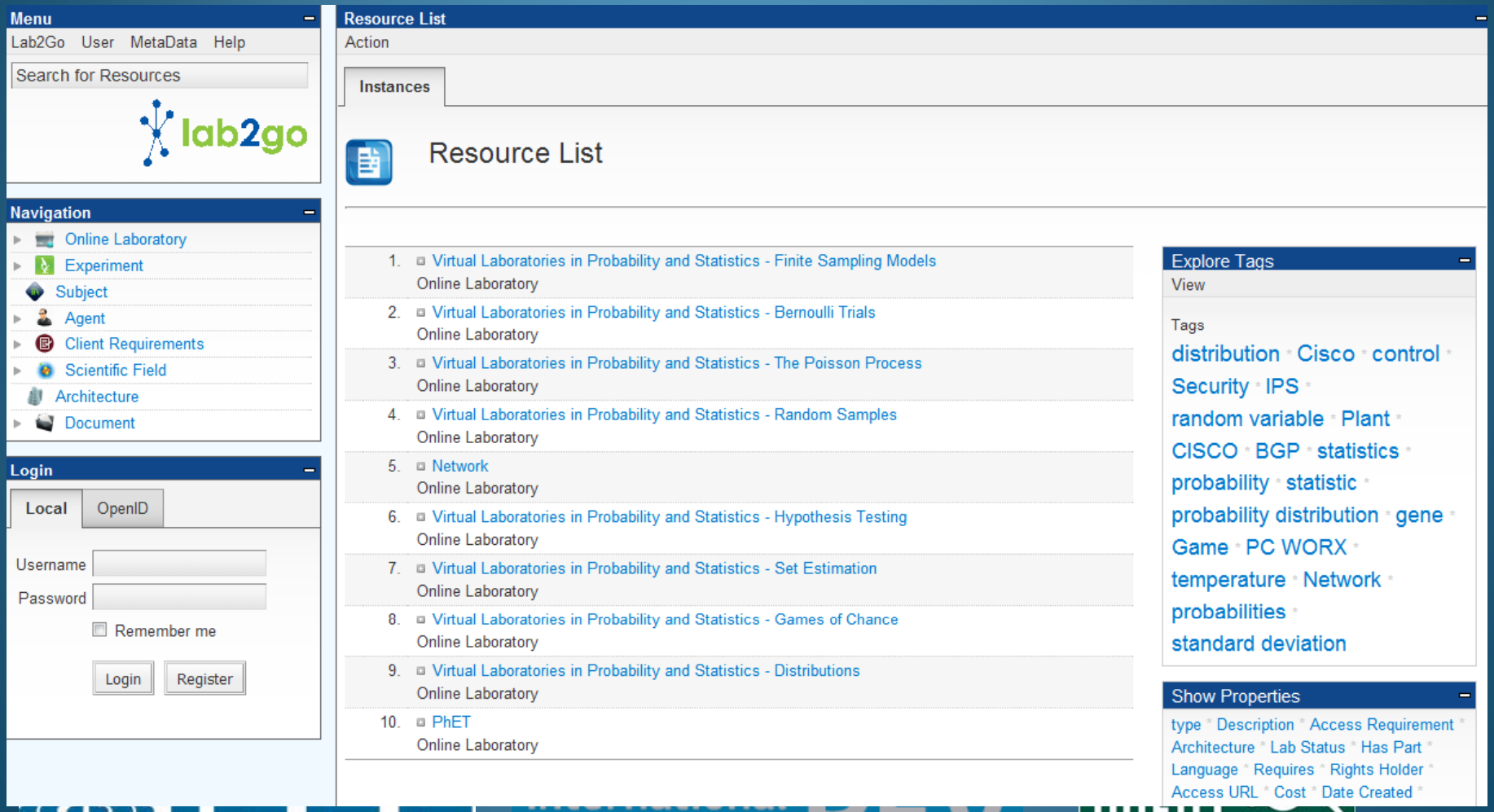
E-Learning Standards & Online Labs

- Lab2go project has created a generic model ontology consisting of various properties to add laboratories such as remote laboratories, virtual laboratories, experiments, access URL, status, cost, release date, languages, description, administrator, etc.
  - This project adopts basic terminology and data types from Dublin Core

E-Learning Standards & Online Labs



E-Learning Standards & Online Labs



E-Learning Standards & Online Labs

- LILA project. Consists of a web server running the LiLa portal and a database for keeping the experiments, and a second database for the booking and reservation time slots and the corresponding booking and reservation codes. Experiments are, as already described earlier, represented by SCORM packages

E-Learning Standards & Online Labs

Library of Labs

Home | About | LiLa Content | Resources | Contact

You are here: Home » LiLa Content

co-funded by the Community Programme eContentplus

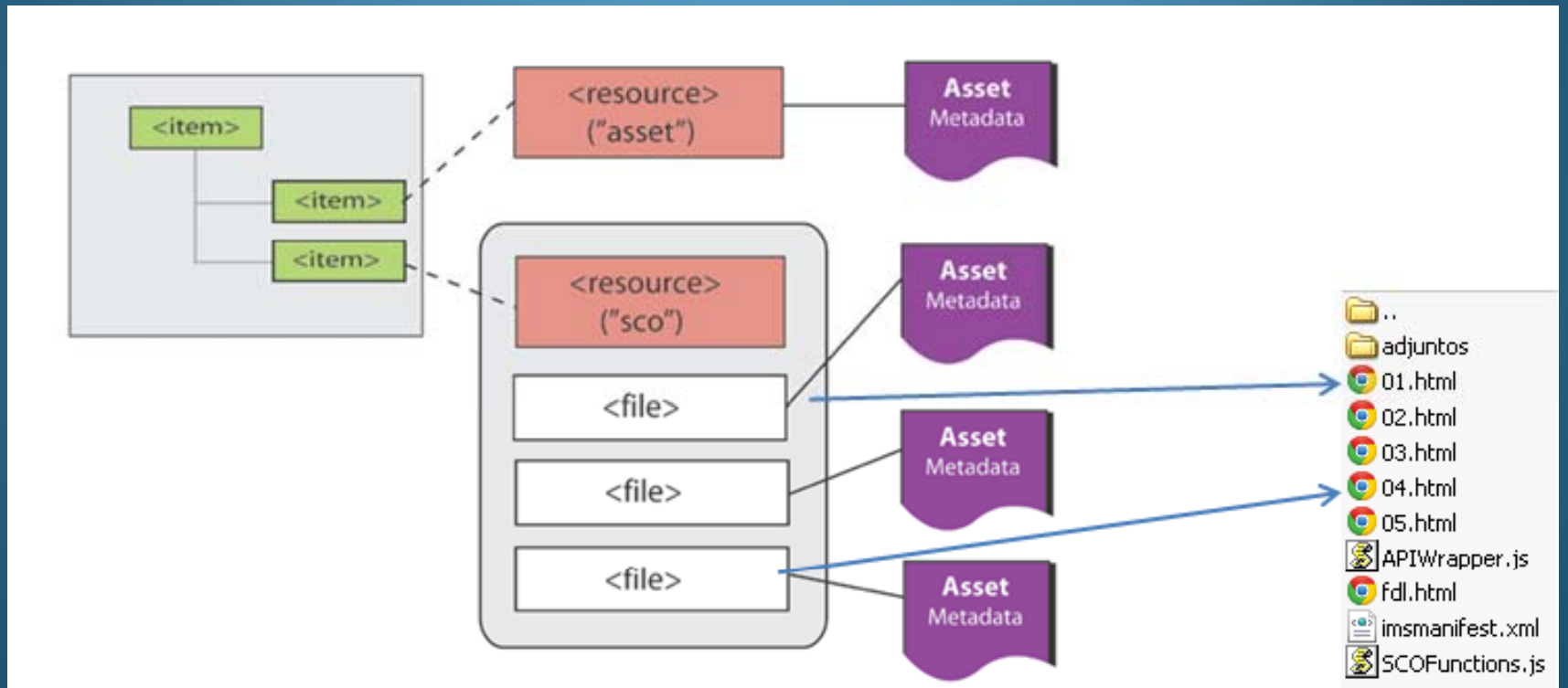
LiLa Content

The following list represents the initial content to be integrated into the LiLa environment. The project is open for additional content providers.

Content	Description	Type	Content Provider
VideoEasel	Laboratory for statistical mechanics, about 90 experiments (magnetism, lattice gas, population dynamics, oscillating reactions...)	Virtual Lab	Rechenzentrum Universität Stuttgart
Remote Farm	16 experiments (magnetism, electrical oscillator, Raman-Spectroscopy...)	Remote Experiments	Technische Universität Berlin
Cambridge Weblabs	Two setups: combustion flame experiment & reactor web-lab	Remote Experiments	University of Cambridge
SRM web-suite	Combustion engine simulations	Simulations	Computational Modelling Cambridge Ltd.
LTFN	Optical properties of thin films, Nanomechanical properties of thin films, Nanotopography	Remote Experiments	Aristotle University Thessaloniki
NanoWorld	Six setups: Virtual pharmacy experiments, electro chemistry, fluorescent dipoles, atomic flat silicon surfaces...	Virtual Experiments	Universität Basel
NanoWorld	Nine setups: Remote atomic force microscope, data acquisition of sensors, harmonic oscillator,...	Remote Experiments	Universität Basel
OMNotebook	An electronic notebook based on the programming language Modelica, suitable for Multi-domain acausal simulations, e.g any type of system that can be described by coupled differential equations (flight simulation, racing car, robots, automatic gearbox and many more)	Simulations	Linköpings Universitet

Challenges of E-Learning Standards & Online Labs

Structure of SCORM Package

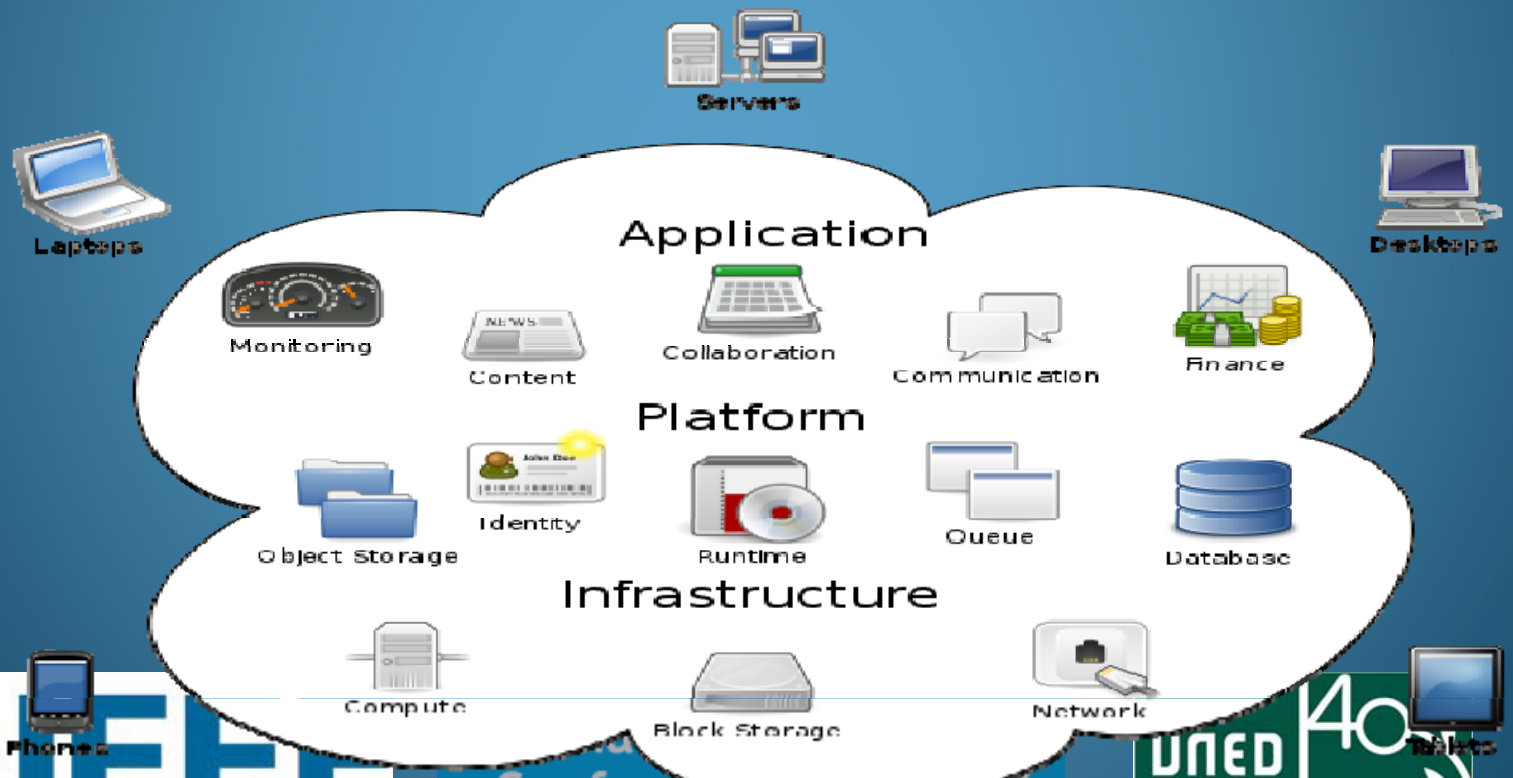


Challenges of E-Learning Standards & Online Labs

- Although SCORM is used to pack e-learning resources. Several issues must be considered:
  - The packaging of rich multimedia and interactive e-learning content is restricted by current online learning environment that uses SCORM
  - SCORM should have an authentication mechanism, particularly to Protect Assessment Data
  - SCORM should use current programming standards. It is recommended that SCORM use a RESTful API to decentralize the architecture

Challenges of E-Learning Standards & Online Labs

- To mash-up, nowadays Internet is a set of services, applications and infrastructures



E-Learning Standards & Online Labs

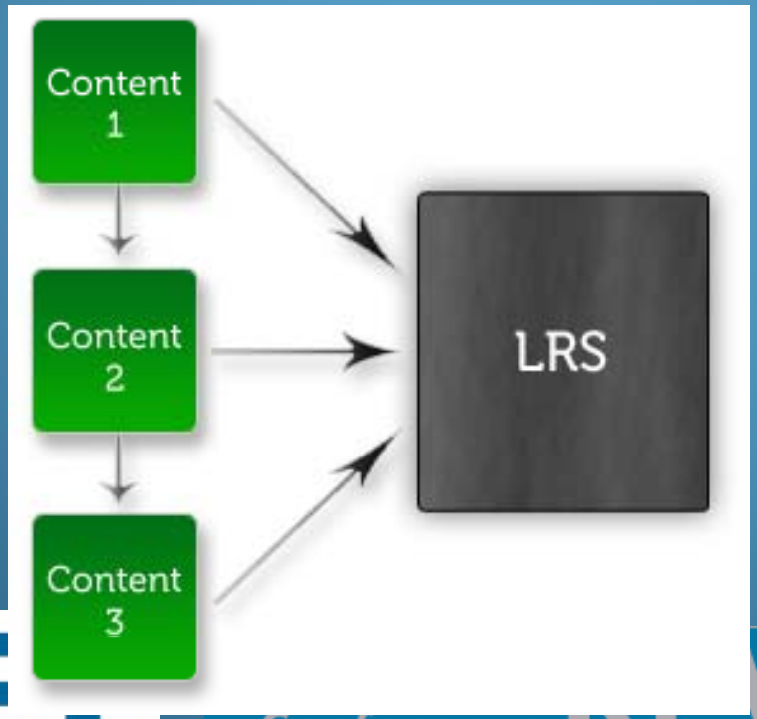
- Therefore new e-learning standards are being developed such as Next Generation SCORM focus on:
  - Tracking of detailed learner interactions and learner performance characteristics that are richer in scope and depth than assessments involving score thresholds
  - Tracking of out-of-browser content to include games, simulations, virtual worlds and mobile apps

E-Learning Standards & Online Labs

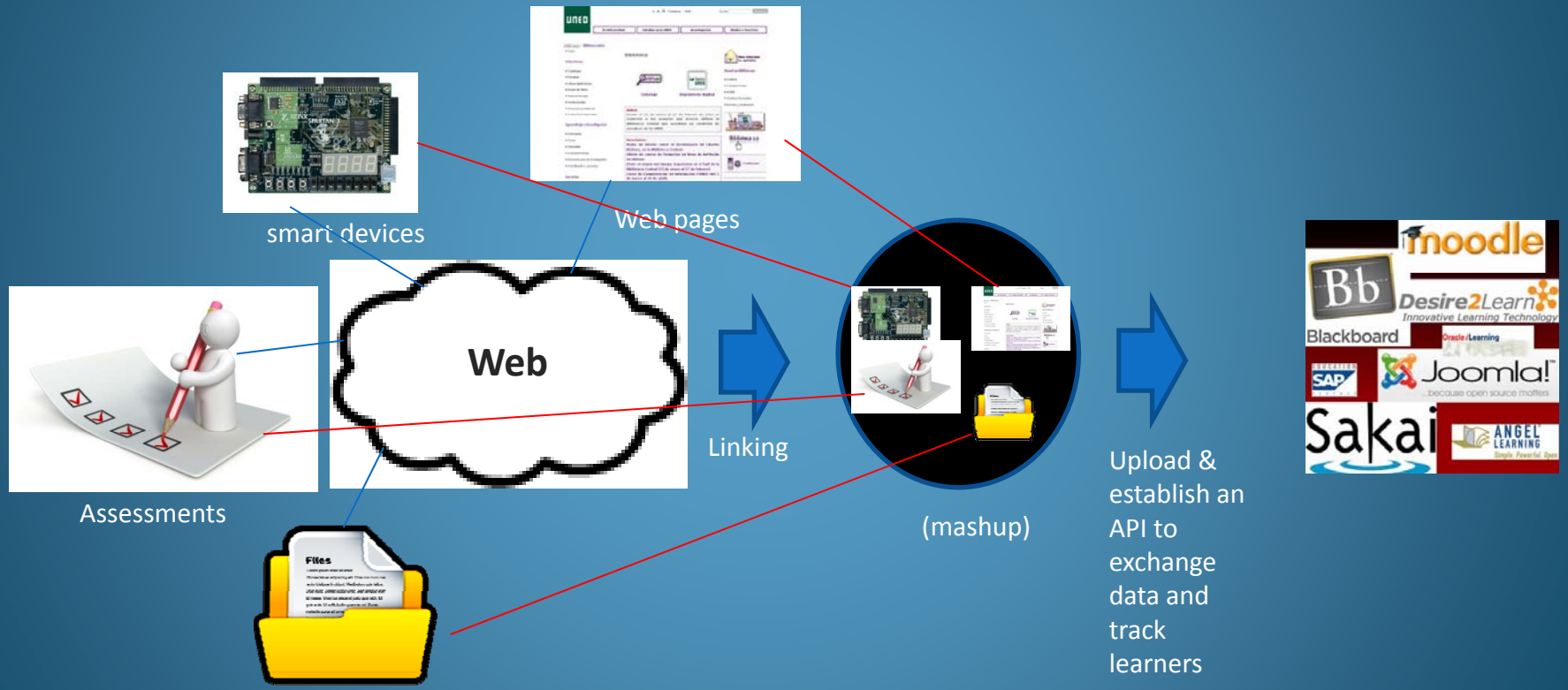
- Launching and tracking of multi-modal content that renders intelligently based on device (ex. tablet, smart phone, laptop) not only in LMS
- Accessing to learner data during or after the learner experiences the content
- Hosted content via a content as a service (CaaS) model

E-Learning Standards & Online Labs

The e-learning resources such as assessments, files, applications are in Learning repositiories



E-Learning Standards & Online Labs



Online Labs & Education

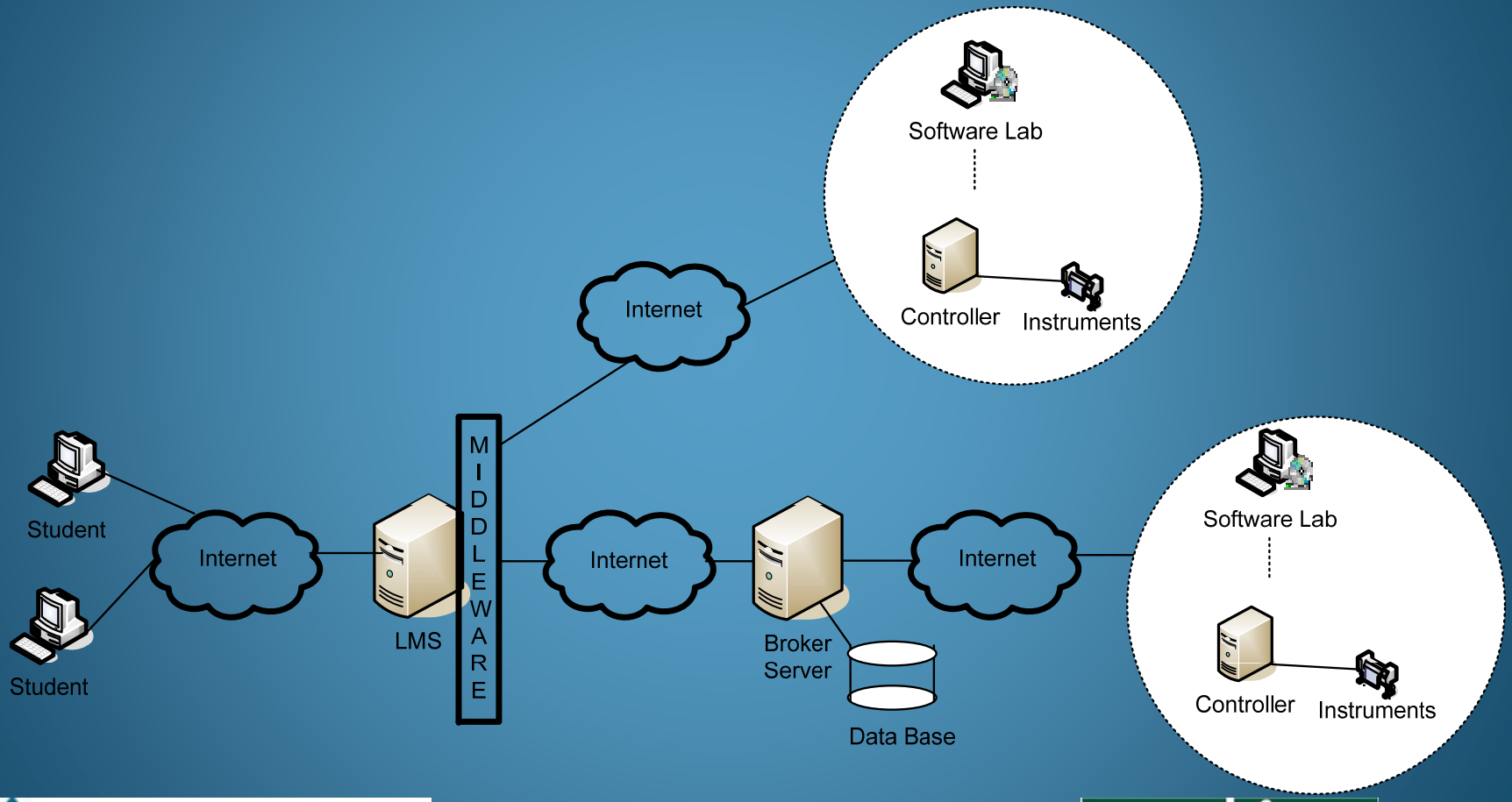
Virtual and Remote Web Labs are e-learning resources, and they must be used along with other e-learning resources & services, such as:

- Assessments
- Forums
- User tracking
- Tutorials (Web, PDF, etc.)

Online Labs & Education

- As it has been SCORM can be used In LMS SCORM Complaint
- Other possibility is that Virtual, Remote Web Labs and Shared architecture provide a set of APIs and these can be used by e-learning systems

Online Labs & Education

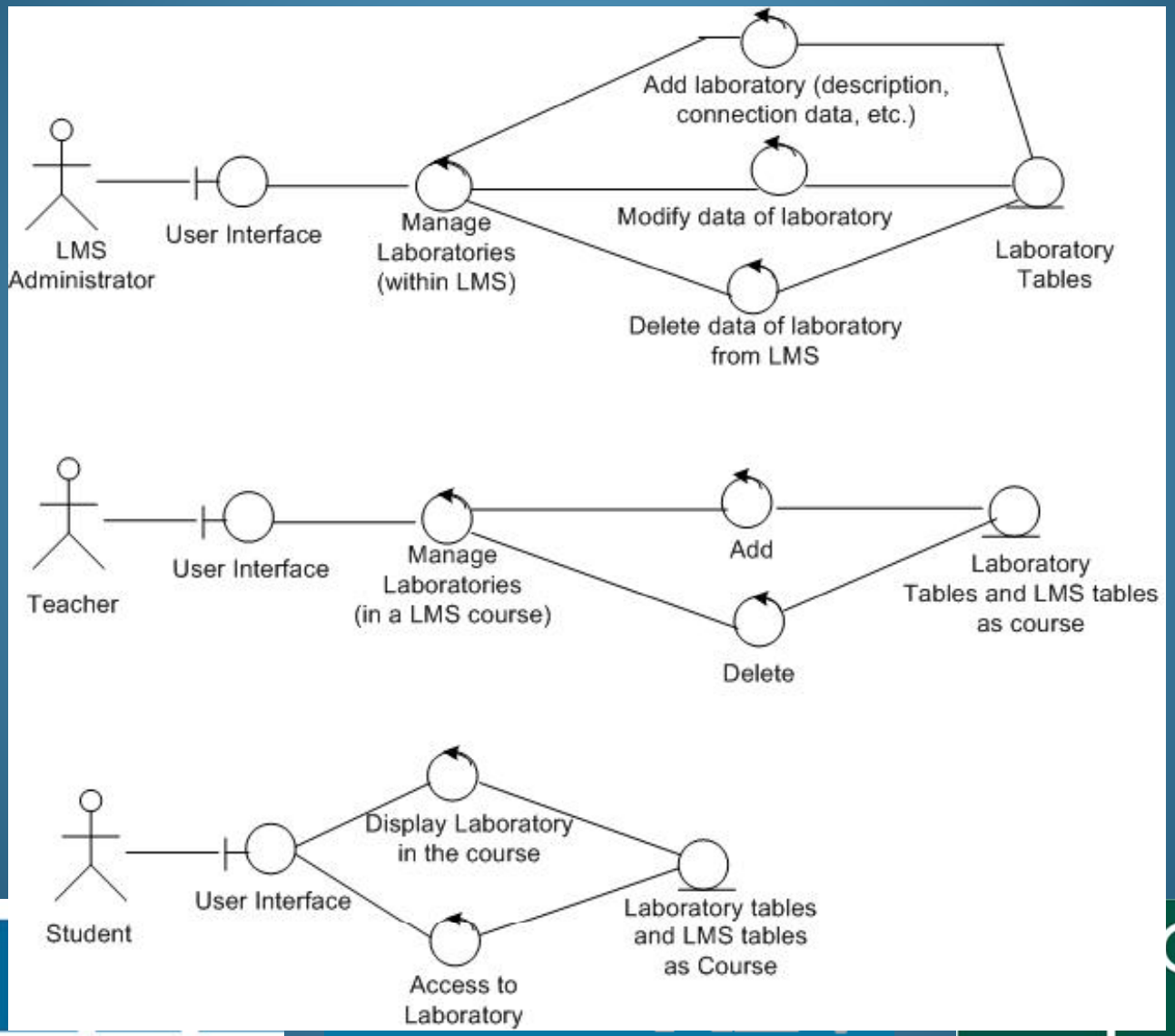


Online Labs & Education

- To do this, the main idea is to create an activity or module in a LMS (the less code possible to allow being translate a some LMS)

- And the main goal is to split the creation of learning scenarios in different roles

Online Labs & Education



Online Labs & Education

- This idea has been developed for DIEEC from UNED

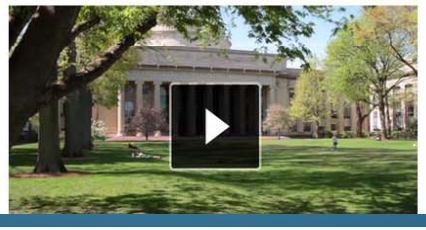
- This idea is evolving a new concepts and issue such as:
  - Use of new e-learning standards
  - There are institutions which use other e-learning system and free courses and communities

Online Labs & Education

- **Massive** open online **course** (MOOC) and free learning communities
  - MITx will offer a portfolio of MIT courses for free to a virtual community of learners around the world

MITx will offer a portfolio of MIT courses for free to a virtual community of learners around the world. It will also enhance the educational experience of its on-campus students, offering them online tools that supplement and enrich their classroom and laboratory experiences.

The first *MITx* course, 6.002x (Circuits and Electronics), was launched in an experimental prototype form. Watch



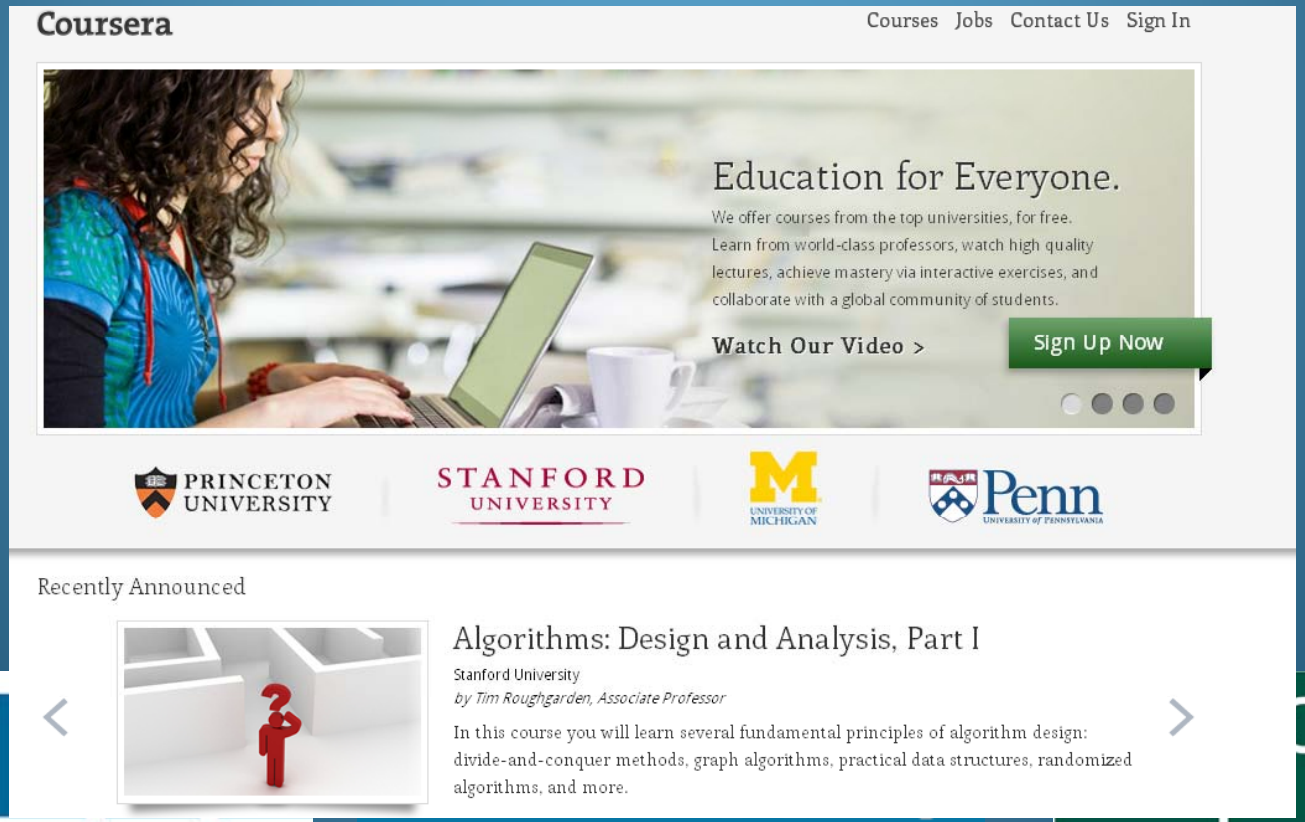
ANNOUNCEMENT

edX

On May 2, it was announced that Harvard University will

Online Labs & Education

- COURSERA provides courses from universities such as, Princeton or Stanford , for free



Online Labs & Education

- Udacity → provides courses where students learn solving challenging problems and pursuing projects with world-renowned university instructors

Online Labs & Education

- Harvard University and the Massachusetts Institute of Technology (MIT) have developed edX. The two institutions will collaborate to enhance campus-based teaching and learning and build a global community of online learners

Online Labs & Education

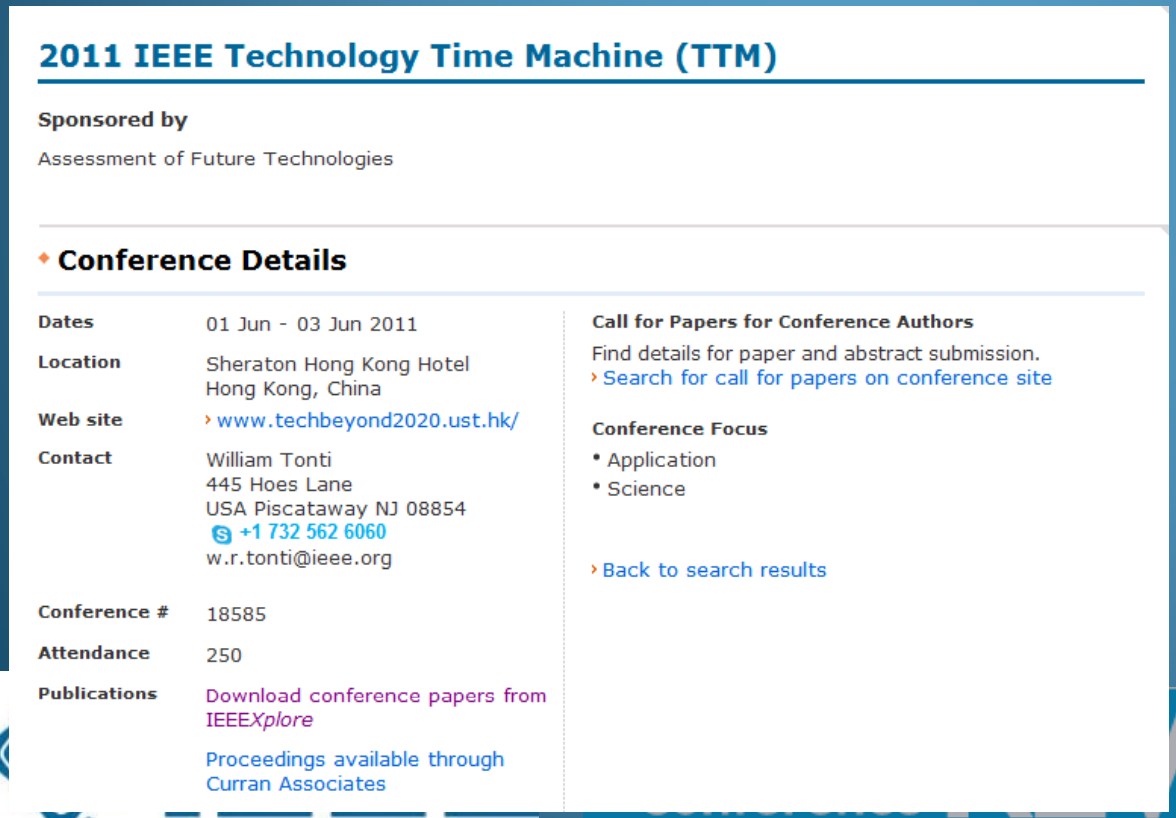
- UNED, Massachusetts Institute of Technology, CSEV, Telefonica and Banco Santander are collaborating on a project of higher education on line for Spanish- and Portuguese-speaking countries to simplify and have easy Industry-related activities and collaborative environment in economics activities

Online Labs & Education

- Virtual and Remote labs must be able to be elements of these courses and communities
  - Challenges, such as:
    - Open access
    - Security
    - Ubiquity
    - E-learning Services
- Must be reconsidered with new ideas, Standards and architectures

New Ideas to Create Online Labs

According to IEEE Technology Time Machine several ideas and concepts must be considered



2011 IEEE Technology Time Machine (TTM)

Sponsored by

Assessment of Future Technologies

Conference Details

Dates	01 Jun - 03 Jun 2011
Location	Sheraton Hong Kong Hotel Hong Kong, China
Web site	› www.techbeyond2020.ust.hk/
Contact	William Tonti 445 Hoes Lane USA Piscataway NJ 08854 +1 732 562 6060 w.r.tonti@ieee.org
Conference #	18585
Attendance	250
Publications	Download conference papers from IEEE*Xplore* Proceedings available through Curran Associates

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Conference Focus

- Application
- Science

› Back to search results

- **IoT**
- **Cloud (Service) Computing**
- **Mobile and ubiquous systems**
- **Security**
- Smart Grids
- Healt & Biosystems

New Ideas to Create Online Labs

"Internet of Things (IoT) refers to the vision that in the next 20 years, a revolution in device-to-device communication will take place that will be comparable to the revolution in person-to-person communication that erupted in the last two decades with the Internet and World Wide Web"

New Ideas to Create Online Labs

We will be able to browse I or “things” just as today we search for information. We will be able to create environments out of things, just as today we can mash up services and information

This “things” have embedded intelligence, an embodiment of the IoT can function quite autonomously, making decisions and taking actions that would normally require human activity

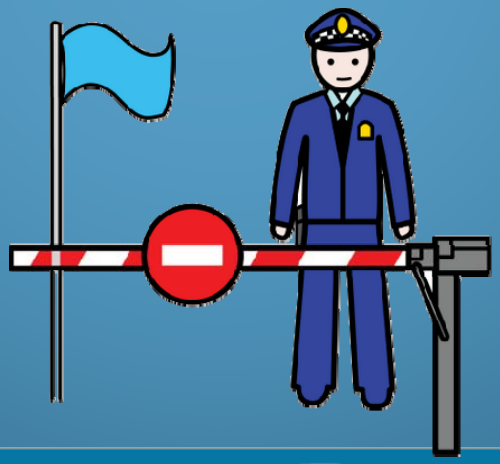
New Ideas to Create Online Labs

Security in e-leaning systems

Biometric & Fingerprint

Biometric Technology

- According to “Biometric Market Forecast to 2014”, biometric technologies:
  - Widely accepted
  - Adopted in POS, ATM, border security and so on



Biometric Technology

Fingerprint recognition dominates

the world market of biometric technology

Biometric Technology

- Companies search for application with a fast integration

- The biometric authentication security architecture multilayer would be the future of network security

Biometric at Labs

- Combination of Labs and technology emergent
- Exams by Internet – NEED an automatically control module

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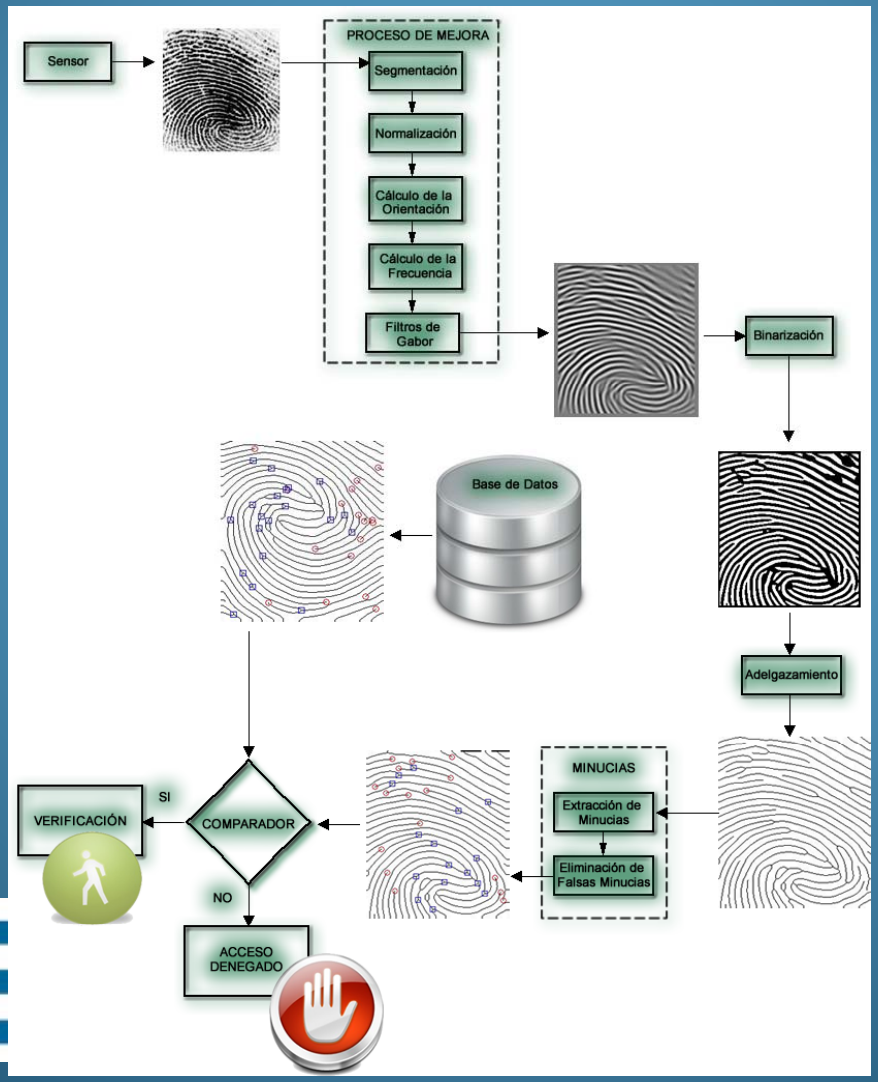
Biometric at Labs

- BUT, practical activities with **real instrumentation** by Internet – NEED a biometric system
  - For his own benefit
  - For the institutions'

Generic Diagram of Biometric for example uses of Fingerprint



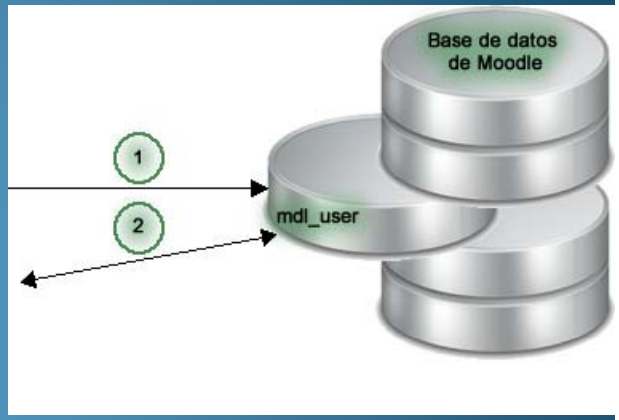
Biometric at Labs

- Traditional authentication (IDN, password, …) + Biometric
- LMS to connect us with Labs – such as Moodle

- Case of study
  - Moodle (user name + password) & Biometric

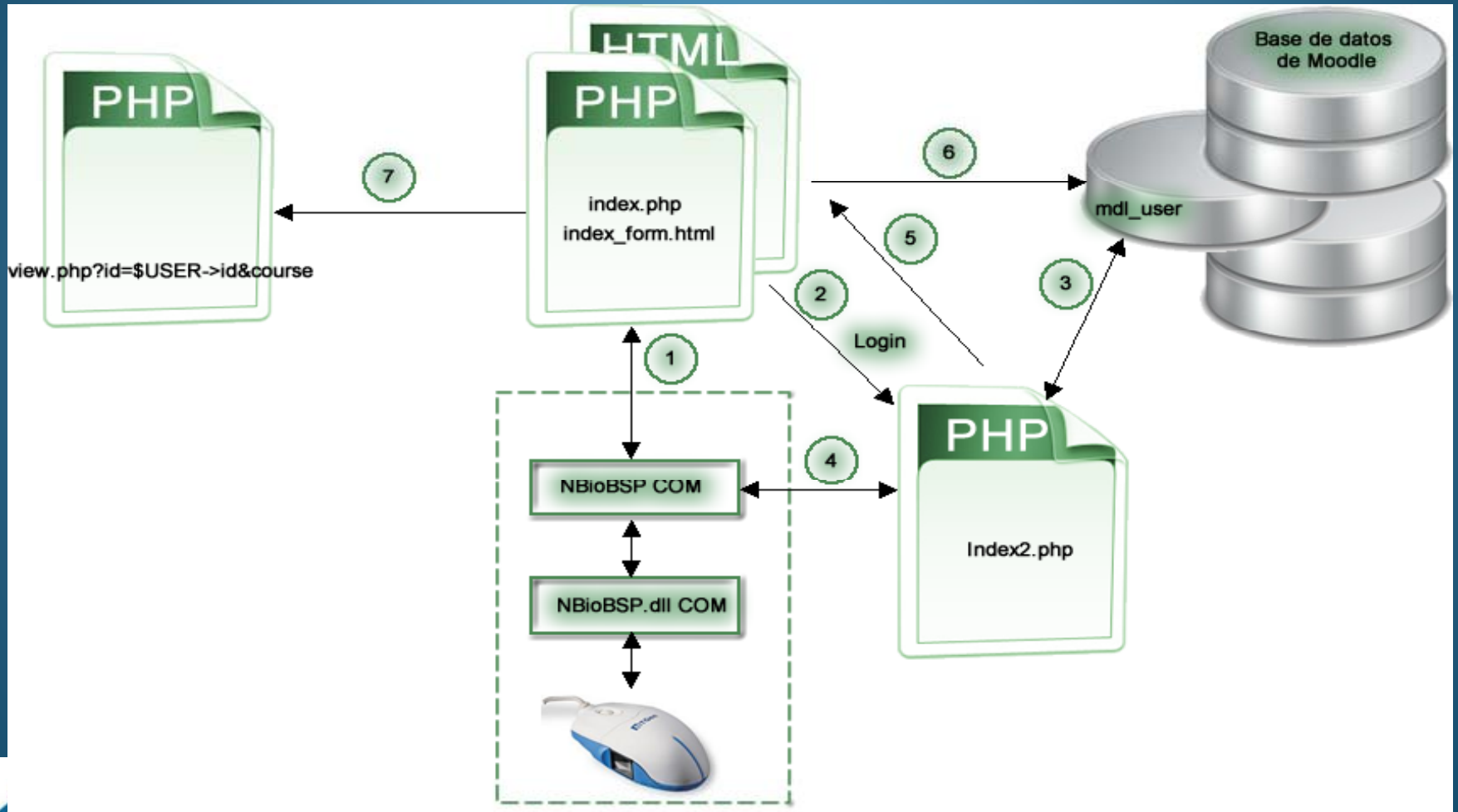
Biometric at Labs

- New login
  - – Biometric sample stored in Moodle DB
    - At enrolment – it is stored
    - Login – match it in every access



- New files and changes in *login/* folder
- A new field (Biometric sample) in *mdl_user* table of DB Moodle

Biometric at Labs – How?



Biometric at Labs – Real case

- Date – June, 2010
- Seek – receptivity of the users
  - The use of biometric control as a method of verification

- Sample size – 23 students
- In the segment from 26 to 35 years old
- With a college degree

Biometric at Labs – Real case

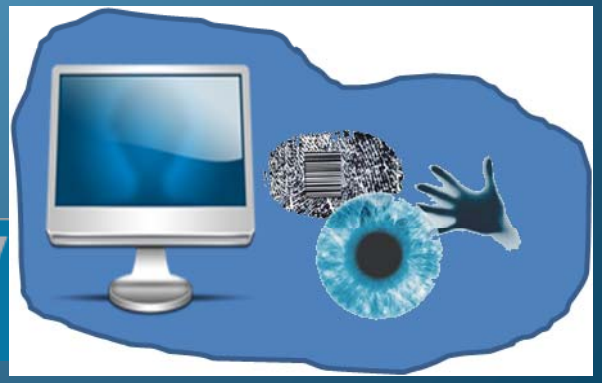
Most important Q/R in the Survey about E-learning activities

Questions	Rate
How do you consider the register via fingerprint to access to the courses in Moodle?	47,8% students consider it is convenient or very convenient
If you had to choose one biometric technology to access Moodle courses, which one you would choose?	52,2% Fingerprint
Do you consider that it was easy to access the course in Moodle using fingerprint verification?	78,3% easy or very easy
How would you consider your knowledge of biometrics?	60,9% without knowledge level
Have you ever used the biometric access control?	73,9 % Never

Biometric at Labs – Real case

- Results – a positive trend of the use of biometric control as a way of access to e-learning activities

- Safer, easier and faster
- Some biometric technologies are integrated in our laptops – best-known



Biometric in High Education – Future project

- **Challenge:**

Convert the distance into an advantage

Biometric in High Education – Future project

- Future project – Face recognition
  - Key – Biometric systems, more than a control system
  - Intelligent control of emotions (angry, worried, happy, etc.)

Biometric in High Education – Future project

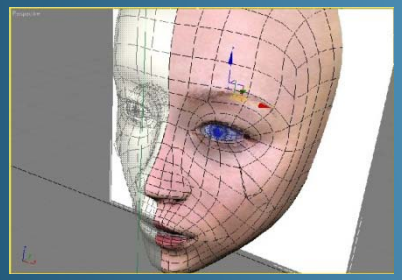
- DIEEC website as a tool for students
- Interactive display at information point at Industrial Engineering School

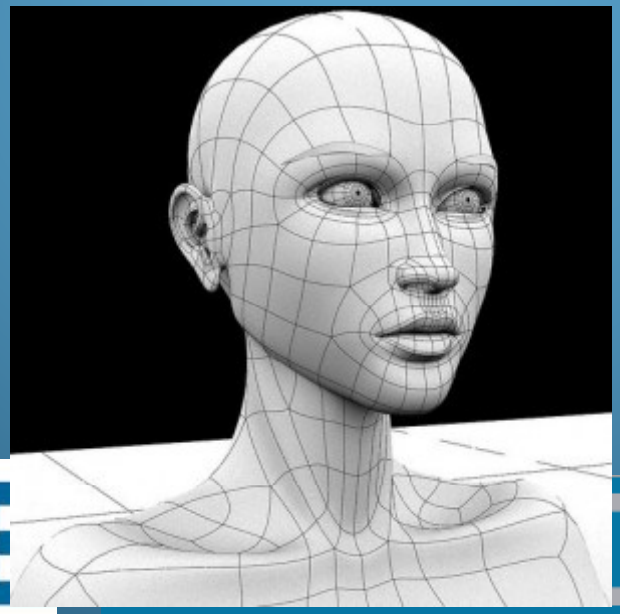
Biometric in High Education – Future project

- Robots to interact with children with disabilities

Biometric in High Education – Future project

- Serious Games
- 3D Animation for educational purposes

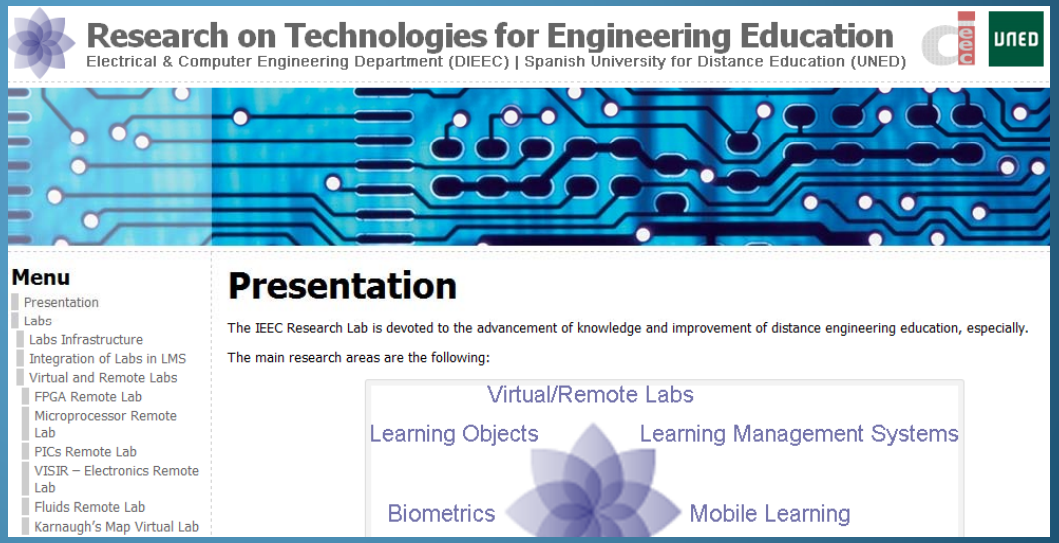




Ubiquity in e-learning systems

Future Technologies for Engineering Education

Mobile devices



http://ohm.ieec.uned.es/portal/

Mobile devices

- Some experiments are made with technologies not supported by mobile devices:
  - Flash on iOS devices
  - Microsoft Silverlight

Mobile devices

- Some experiments do not make sense to use them in a mobile device:
  - Because you have to program or compile something (a file) previously with a computer-based tool
    - e.g., microprocessor remote lab
  - Because screen is too small
    - Tablets could help

Mobile devices

- Ways of using experiments on mobile devices:
  - Native app (iOS or Android) for the experiment
    - Provides more control over the device capabilities
    - Expensive to create and maintain
    - Specific development for each platform

Mobile devices

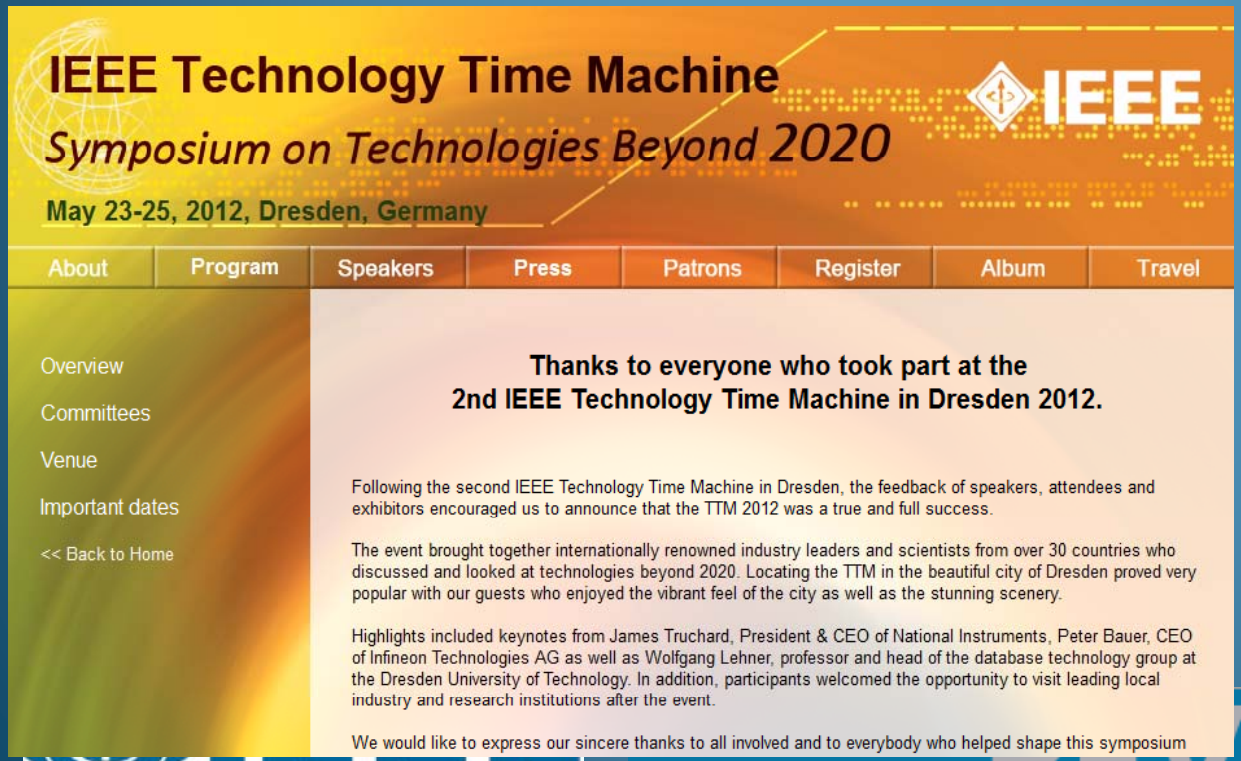
- Ways of using experiments on mobile devices:
  - Integrated on an enriched ebook
    - It allows its use together with the theory and assessment
  - Web-based experiment adapted to mobile device
    - Reduces development efforts

Mobile Web adaptations

- Provide a proper layout. Developers should think what is actually going to be used from a mobile device, and how may the user see it in a small screen
- Provide the required contents. Developers should think what contents are going to be migrated to the mobile version
- Avoid plug-ins. Some plug-ins are not available in all devices, such as Flash or Microsoft Silverlight

What will the future bring?

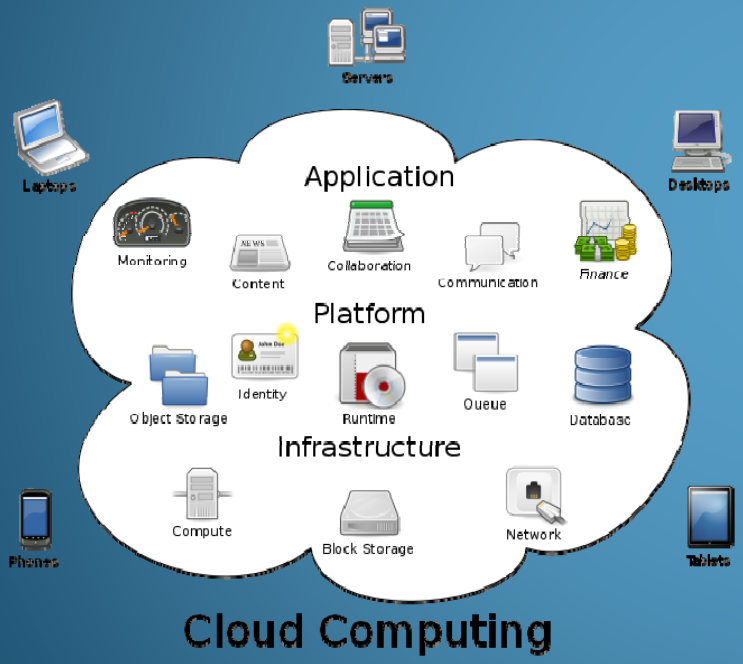
According to IEEE Technology Time Machine several ideas and concepts must be considered



- **Network (Service) & Cloud Computing**
- **Collective Intelligence**
- **Media & Inmersive**
- Smart Power
- Transportations
- Healt & Biosystems

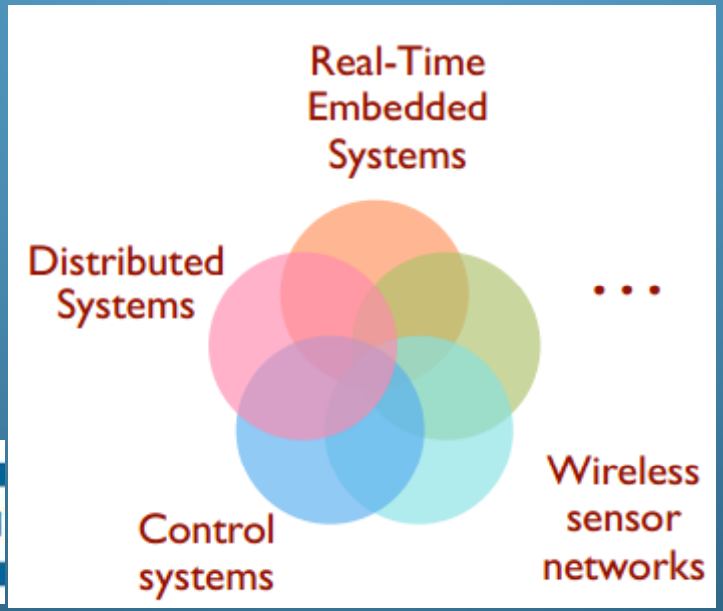
What will the future bring?

- Cloud computing & Internet of Things



What will the future bring?

Cyber Physical Systems. Complex systems can be characterized as composed of heterogeneous components and in particular electromechanical, thermal, computing, and communication elements



What will the future bring?

- Collective Intelligence emerges from collaboration and competition of multiple individuals

> "In a changing and dynamic world, high-resolution and timely geospatial information with global access and coverage becomes increasingly important"

What will the future bring?

Future Connectivity and networks →

- we will have faster connectivity, both wireless and wireline, we will be using cell phones and other devices, we will be living in a world
- seamless ubiquitous access to information and services

What will the future bring?

- Future of Media→

• How will information be acquired, paid, and distributed in the future

• What is the impact of ubiquitous connectivity and connected users on future developments

IEEE EDUCATION SOCIETY

- IEEE Education society is interested in:
  - Educational methods
  - Educational technology
  - Instructional materials
  - Accreditation
  - History of science and technology
  - And educational and professional development programs within Electrical Engineering, Computer Engineering, and allied disciplines

IEEE Education Society

IEEE EDUCATION SOCIETY

- To do this, IEEE education society organize and support several conferences:

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TAEE 2012

TAEE 2012 13-15 June Vigo, SPAIN

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ITHET 2012 21-23 June Istanbul, TURKEY

International Conference ICL

ICL 2012

21-23 September Villach, AUSTRIA

International Conference REV

9th International Conference on Remote Engineering and Virtual Instrumentation

University of Deusto, Bilbao, Spain

July 4 - July 6, 2012

ICELIE 2012 25-28 October ÉTS, Montréal, CANADA

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IEEE EDUCATION SOCIETY

- IEEE education society provides a set of publications, such as:
  - IEEE Transactions on Education

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– IEEE Learning Technologies

– IEEE-RITA Revista Iberoamericana de Tecnologías del Aprendizaje

IEEE EDUCATION SOCIETY

– The Interface—joint publication with ASEE

– IEEE Technology and Engineering Education (ITEE)

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IEEE EDUCATION SOCIETY

- BUT IEEE as Conferences and Publications and Services provider must be changing as the time is changing:
  - Virtual worlds and virtual conferences
  - Immersive conferences
  - Open content publication
  - Enriched and immersive publications

IEEE Education Society

allowing INTERACTIVITY and OPEN ACCESSIBILITY

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Conclusions

Mashup of acronyms, letters, technologies …

Some initiatives has been developed to SHARE laboratories and be used in learning management system

- iLab, Labshare, WebLab-Deusto
- LILA, UNED (DIEEC) Project

our PhDs will be the future with our help

Conclusions

But new issues must be considered to:

- Should work on any device, such as (e-books, smart phones, tablets, PCs, etc.)
- Should be used along with other e-learning services and different platforms (LMS, Massive online Courses, etc)
- Should be shared by other institutions. Ideas such as Cloud computing, new e-learning and Internet of things must be considered
- Should be more secured (biometric methods) and certified

ACKNOWLEDGMENT

- European Funded projects RIPLECS “Remote-labs access in Internet-based Performance-centred Learning Environment for Curriculum Support” 517836-LLP-1-2011-1-ES-ERASMUS-ESMO
- PAC PAC - Performance-centered Adaptive Curriculum for Employment Needs - 517742-LLP-1-2011-1-BG-ERASMUS-ECUE
- e-Madrid Project, S2009/TIC-1650, “Investigación y Desarrollo de tecnologías para el e-Learning en la Comunidad de Madrid”
- DIEEC/UNED team: **Elio / Mohamed / Alberto / Gabi / Sergio / Maria Jose / Clara / Charo**

One Step Ahead in the Future of Labs: Widgets, Ubiquity and Mobility

Thank for your attention
Comments ? Questions ?

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