The Center for African Studies, the Department of African, Middle Eastern, and South Asian Languages and Literatures, and the "Technologies Without Borders: Technologies Across Borders" School of Arts and Sciences International Programs Series present a talk by

Dr. Hamadou Saliah-Hassane

(Informatics and Computer Networks, TELUQ)

AFRICAN EDUCATION IN THE DIGITAL AGE

Thursday, March 22, 3:30pm

Graduate School of Education Building, Room 124

10 Seminary Place

College Avenue Campus

For Dr. Saliah-Hassane's bio visit http://www.teluq.uquebec.ca/siteweb/univ/saliah.html

Sponsor links:

Center for African Studies (http://ruafrica.rutgers.edu)

Department of African, Middle Eastern, and South Asian Languages and Literatures (http:amesall.rutgers.edu)

Technologies Without Borders: Technologies Across Borders (http://technologies.rutgers.edu)

RUTGERS
School of Arts and Sciences

Rutgers, The State University of New Jersey
Center for African Studies, March 22nd 2012

AFRICAN EDUCATION IN THE DIGITAL AGE

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www.licef.teluq.uquebec.ca

Centre de recherche LICEF
LICEF Research Center

TÉLUQ
L'université à distance de l'UQÀM

lab@der

Presentation outline

- TELUQ a Distance Education University
- LICEF Research Center
- Laboratory at Distance (Lab@DER)
- Education Infrastructure in Africa
- ICT : Education and Research Enabler in Africa
- Collaborative Research and Technical Assistance in Africa
- Conclusion

TELUQ a Distance Education University

LIFE CYCLE:

- Created in 1972 by decision of the Board of Governors of the University of Quebec
- With its letters of patent since 1992
- TELUQ became The Distance University of University of Quebec in Montreal in 2005
- TELUQ again became entirely at distance in 2012
- Member of the Quebec Network of

TELUQ: a Distance Education University

PROGRAMS:

- **Offered to three cycles: Certificates; Bachelor; Graduate degrees; Masters and PhD**
- **Continuously available throughout the year**
- **Under the responsibility of four Teaching Units: - Work, Economics and Management – Education - Science and technology - Humanities, Literature and Communication**

TELUQ: a Distance Education University

Disciplinary areas	Characteristics of Distance Education
Management Science Computing Communication Languages and Literature Psychology Science Social Sciences	•Continuous admission and registration •Individualized pathways in mixed mode (Synchronous and asynchronous) •Educational materials provided •Supervision of a tutor-corrector •Virtual Campus Library @ distance •Examinations under supervision in 200 sites in Quebec, Canada and abroad

Research @ TELUQ : Axis # 1

Distance Learning – Cognitive Informatics & TEL:

- The LICEF Centre of Research on Cognitive Informatics and Learning Environments (www.licef.ca)
- LORIT: a Distance Learning Engineering Research Observatory Laboratory
- GIREFAD (Interuniversity Research Group in Distance Education)
- Research Chair in Engineering Cognitive Distance Learning (CICE)
- Laboratory at Distance for Education and Research (Lab @ DER)

Research @ TELUQ : Axis # 2

Knowledge and New Economy:

- **Bell Chair in Technology and Work Organization**
- **Canada Research Chair in Human Resource Management**
- **LARCOPES: Research Laboratory on Collaboration, Communities of Practice and the Knowledge Economy**

Research @ TELUQ : Lab@DER

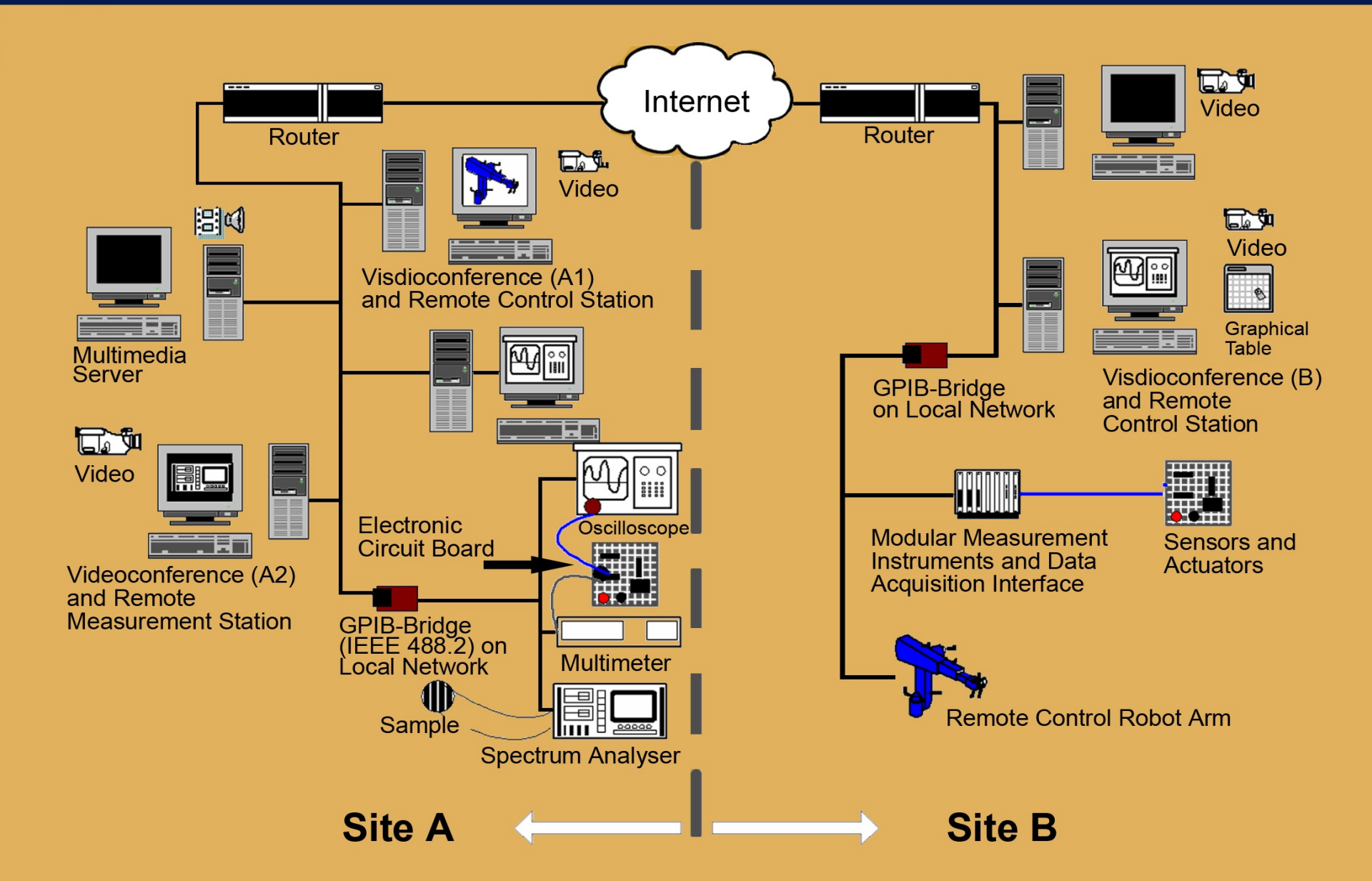
Laboratory at Distance for Education and Research

Lab@DER aims to set up an online laboratory brokerage system that offers:

- Scenario samples and tools to create distributed users' interfaces that meet the standards pertaining to learning objects and distributed hardware in the loop (HIL) systems;
- Mechanisms that allow interface storage and retrieval, interoperable resources;
- A management model that makes it possible for institutions to share remotely, in an optimal manner, human resources and various devices and apparatus;
- A synchronous computer environment (online) that supports communication for remote collaborators.

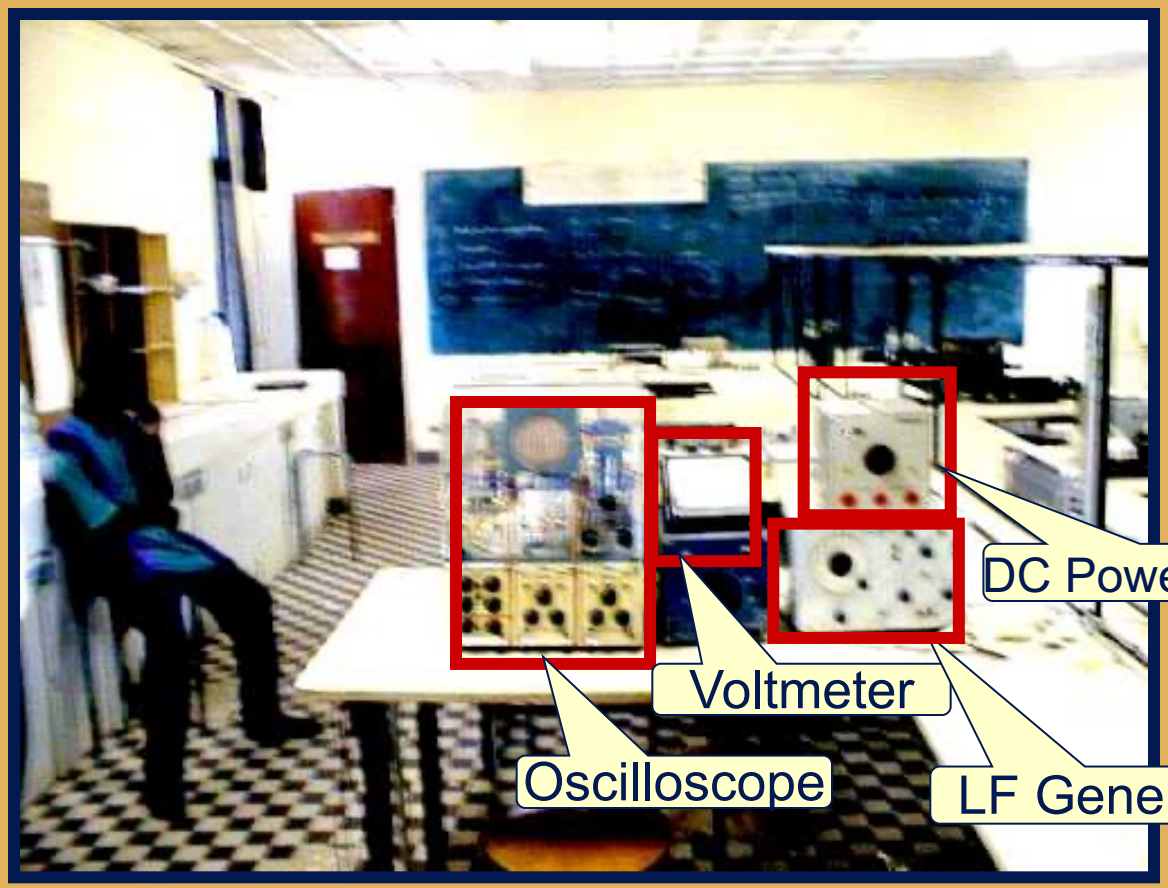
Lab@DER aims to gather industrial and financial partners, as well as international organizations in order to establish a viable and lasting research and training laboratory federation.

Concept of Online Laboratory Brokerage System



Motivation – Simulating Old or Rare Equipment

A First Year Physics Laboratory at Université Abdou Moumouni of Niamey (Niger) 1970-1999

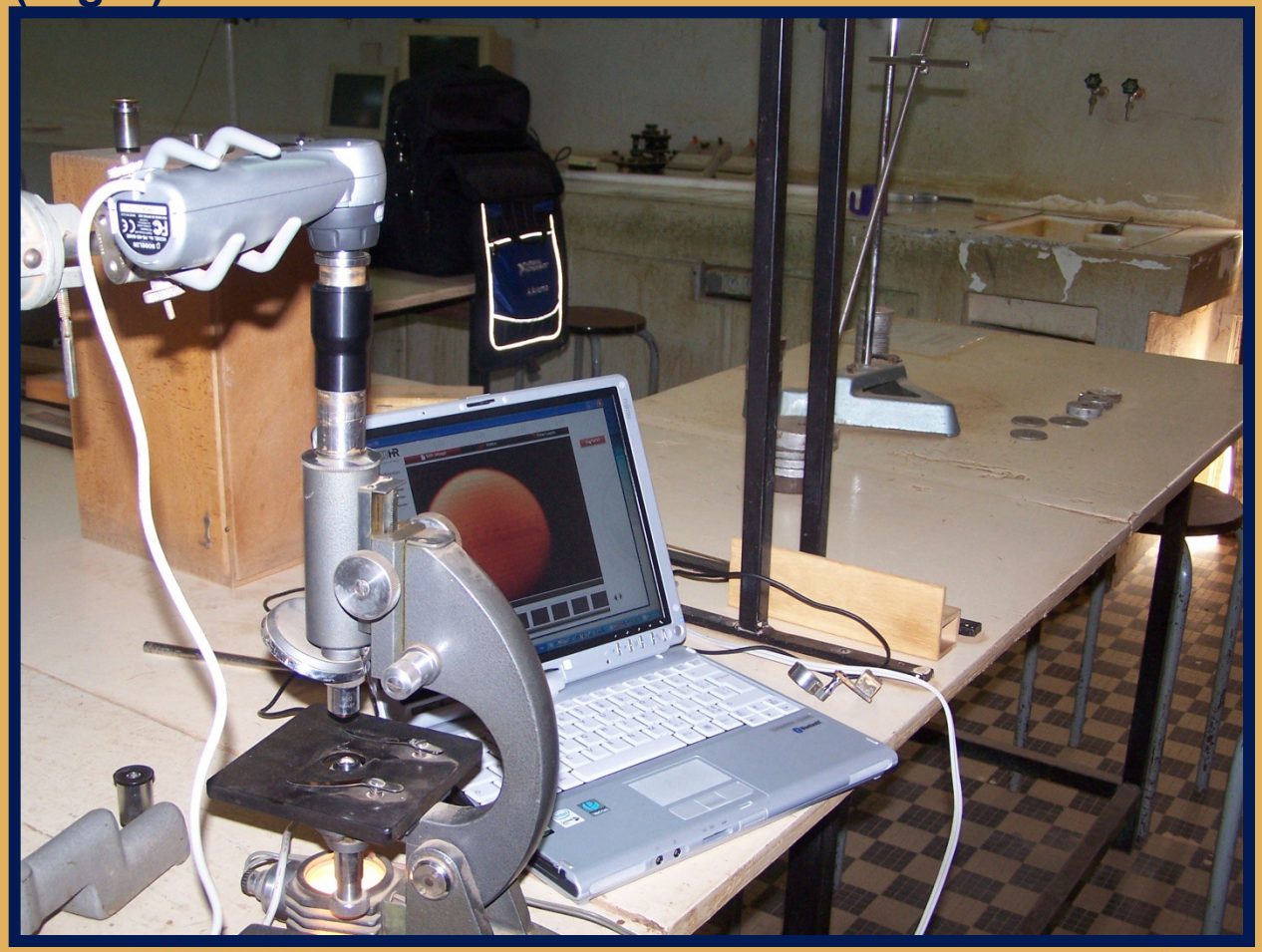


Motivation - Simulating Old or Rare Equipment

A First Year Physics Laboratory at Université Abdou Moumouni of Niamey (Niger) January 2003

Technology Enhanced Laboratories

A First Year Physics Laboratory at Université Abdou Moumouni of Niamey (Niger) November 2007



Technology Enhanced Laboratories

A First Year Physics Laboratory at Université Abdou Moumouni of Niamey (Niger) November 2007

Challenges: Education and Research Infrastructure in Africa

Needs: Building Education & Research Capacity in Africa Using Information and Communication Technologies

- **Research and Higher Education**
- **Africa Diaspora and their "Friends"**
- **Collaboration & Cooperation / Sharing Human Expertise and Material resources**
- **Participative Action Research**
- **Virtual Organisation & Computer Networks**

Challenges: Education and Research Infrastructure in Africa

In primary schools there are still classes in hut and the blackboard and chalk are the main tools of the teacher

Challenges: Education and Research Infrastructure in Africa

Changes and solutions are noticeable, with the desire of communities to support themselves and the wishes of the young for another way to learn

Collaborative Environments & Remote Laboratories

- Example: SYNCHROMEDIA; ECHO, ENJEUX, ECLATE, Lab@DER
  - Partipative Action Research
    - Domain Experts; Multidisciplinarity; Diversity in Needs (Networks, Users, interfaces & Online Laboratories)
    - Flexible and Evolutive Environments
    - Costly Software Licences Acquisition & Security Issues; Sustainable;
    - To take into account interoperability (Compatibilty with what we have & What we are going to acquire)
    - Synchronous Student Supervision Fonctions; Remote Access to Real Devices & Data Sha… Network Computing…

Virtual Organisation

« A place where scientists, Educators and researchers work together to solve complex interdisciplinary problems despite geographic and organizational boundaries »

Virtual Organisation

Why*: Resource* Sharing

- Cost
- Knowledge Management
- Few Experts in each Education Institution
- Research Equipment Maintenance
- Rapid Technology Change
- Virtual Organisation: Researchers; Industries; National and International Organisations; Managers /or Funding Agencies;
- Platform: Evolutive, Adaptable, Accessible, Secured;
- Memory of Understanding

Collaborative Work Scenarios

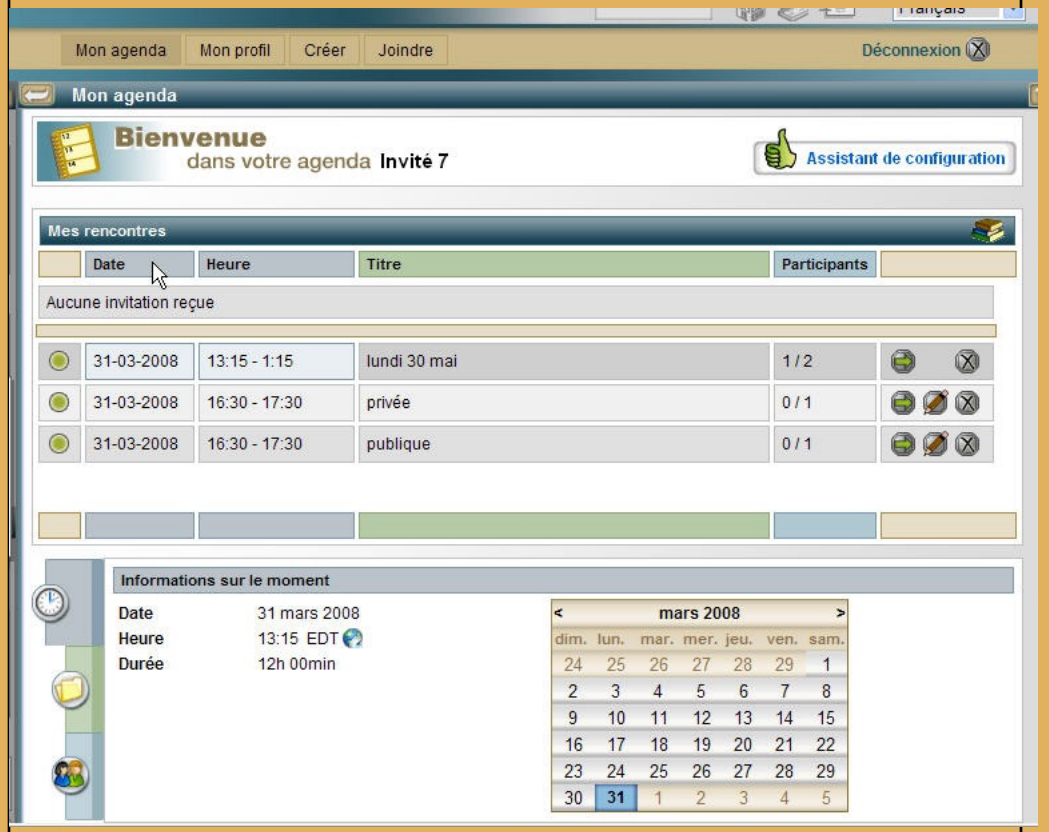
- Investigation
  - Search Tools, Acces to Libraries, Note Taking…
- Experimentation
  - Remote computing or interactive simulations and/or Access to Real Devices Using Specific User Interfaces
- Presentation
  - Video Streaming, Visioconference, White Boards…
- Assistance
  - Forums, Video Chat…
- Management Tools
  - Planning Meetings

Collaborative Work: Virtual Colloquium

Planning & Management of Synchronous Meetings

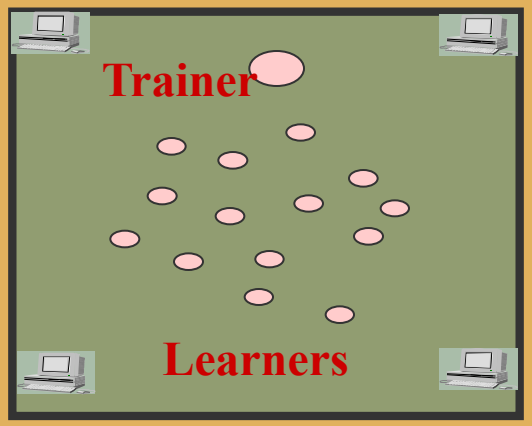
ENJEUX's Management Space

- Planning Meetings ;
- Invitations;
- Self Management of Personnal Information ;
- Meeting Preparation

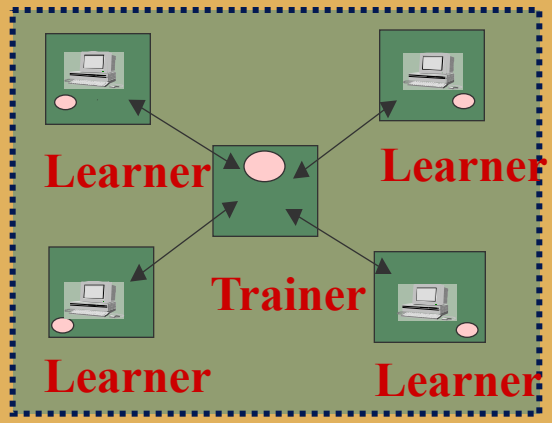


Distributed Learning Models

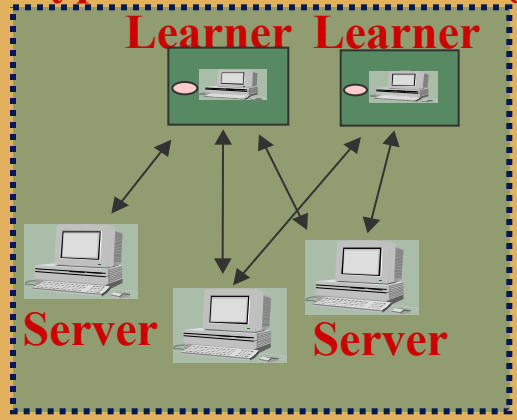
High-tech classroom



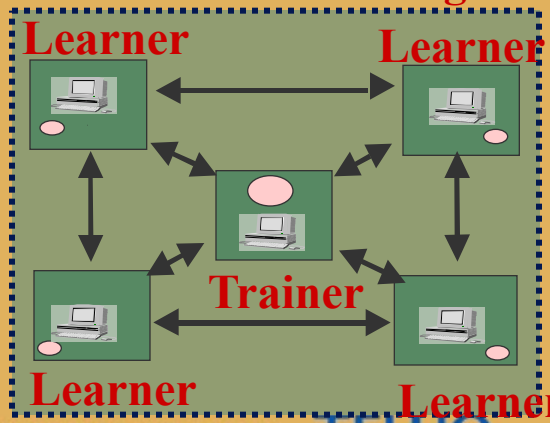
Distributed classroom



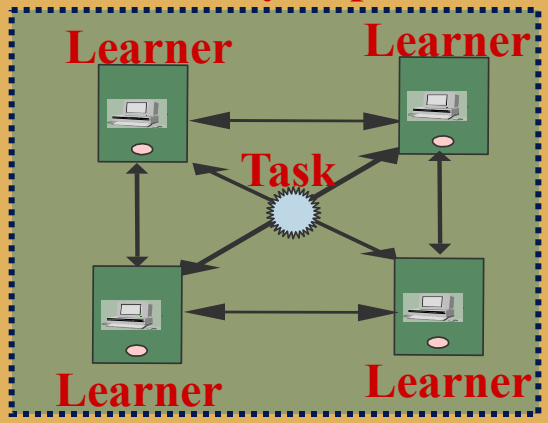
Hypermedia self-training



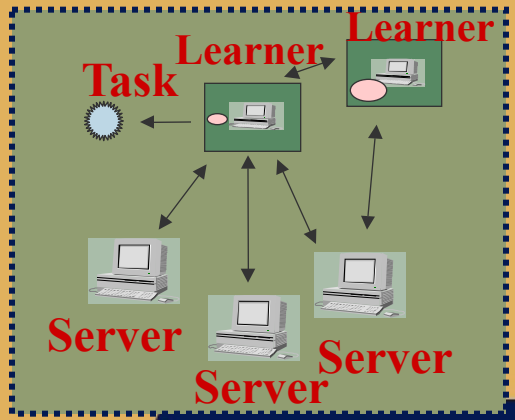
On-line teaching



Community of practice



Performance support



Concept of Online Laboratory Brokerage System

- Networked Infrastructure with Tools, Devices, Apparatus and Communication Software
- Normalized Scenarios & Tools;
- Normalized Repository
- Management Models / Inter- Institution Policy.

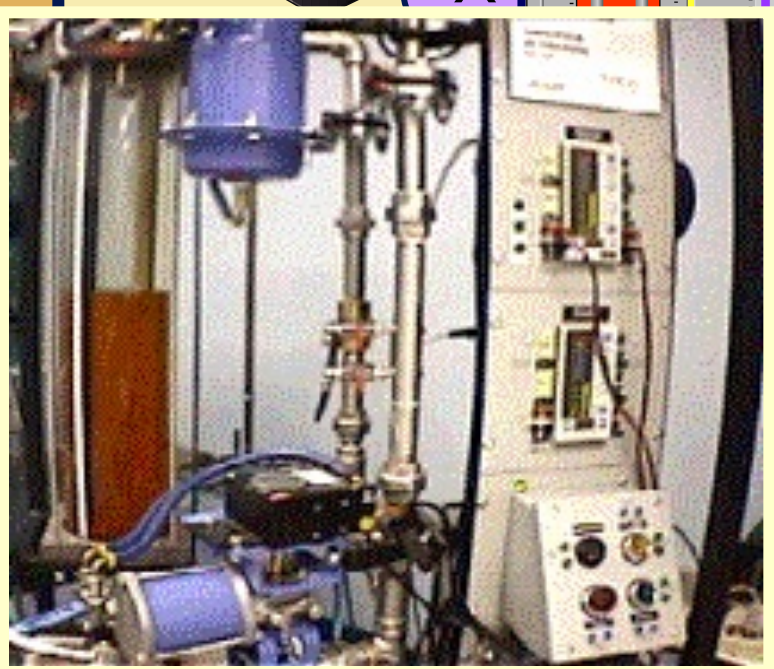
Industrial Process Command Laboratory

Teams

Controler

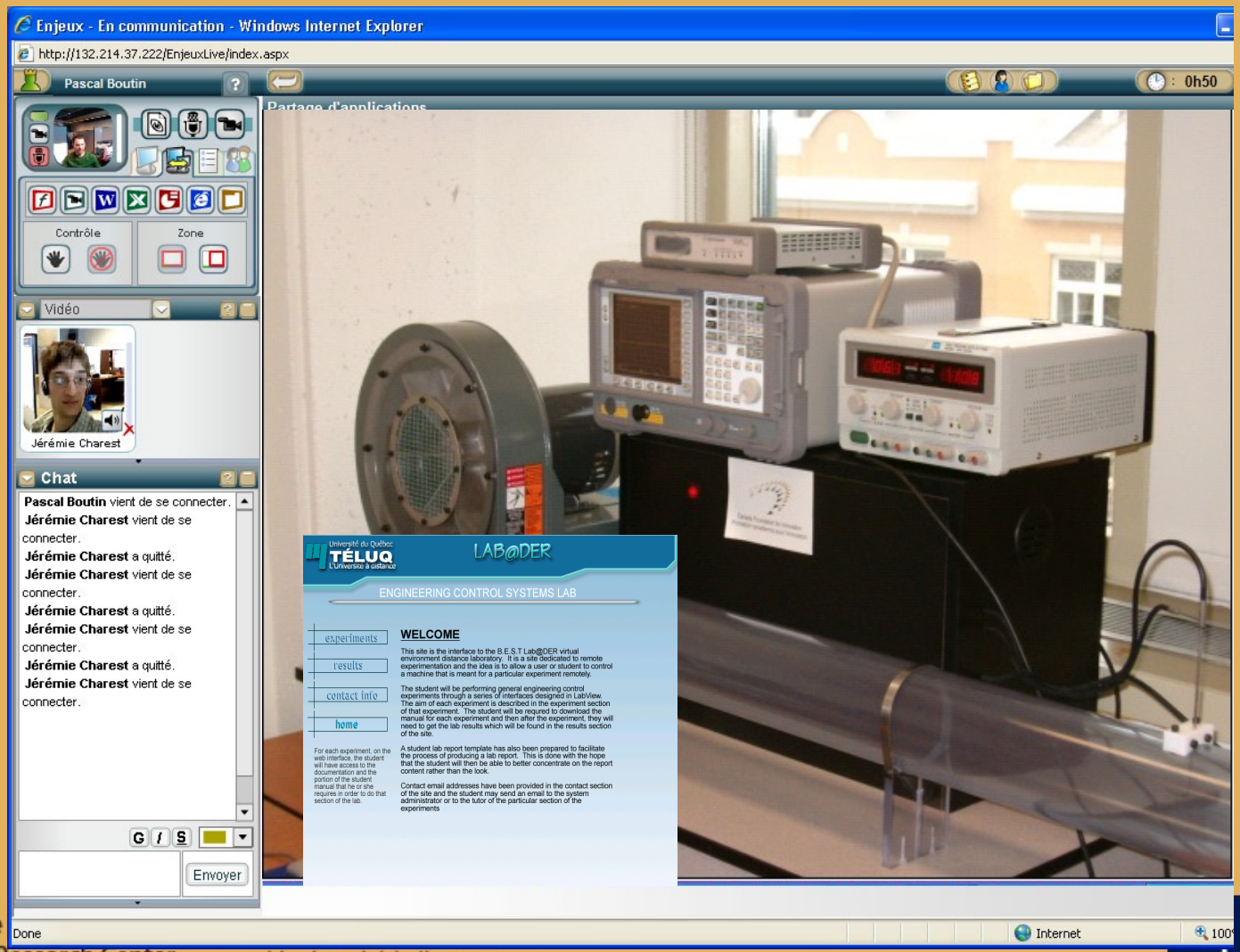
Observers

TP #1.1



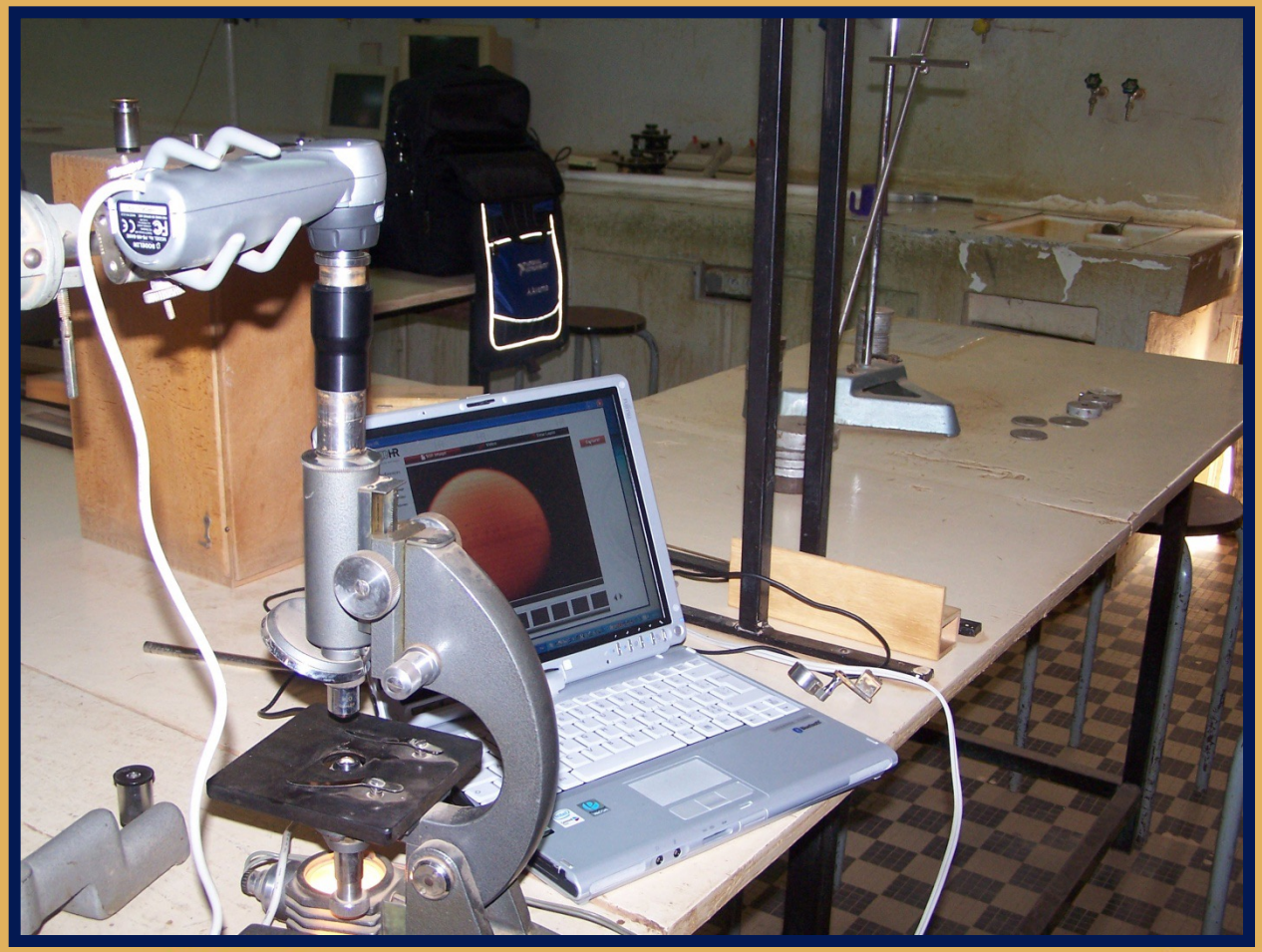
lab@der

Remote Access to Scientific Instruments & Wind Tunnel



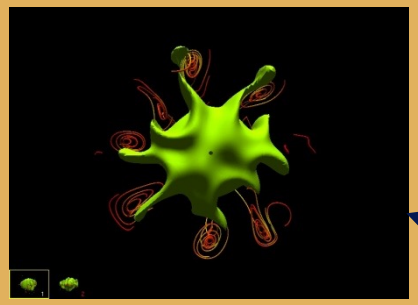
Online Laboratories: « du neuf avec du vieux »: « Teaching Old Dog New Tricks »

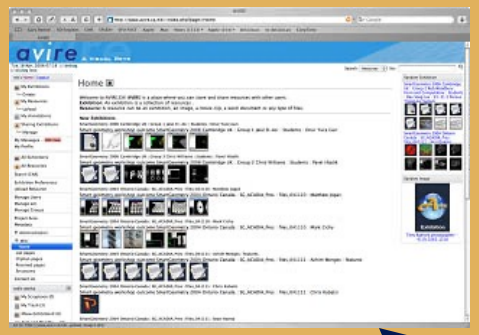
1rst Year Physics Laboratory of Université Abdou Moumouni of Niamey (Niger) November 2007

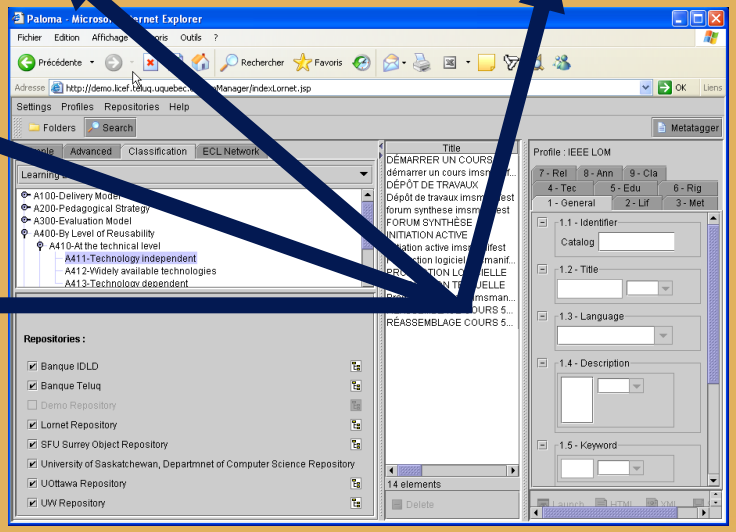


Normalized Repositories

Learning Object Repositories with PALOMA







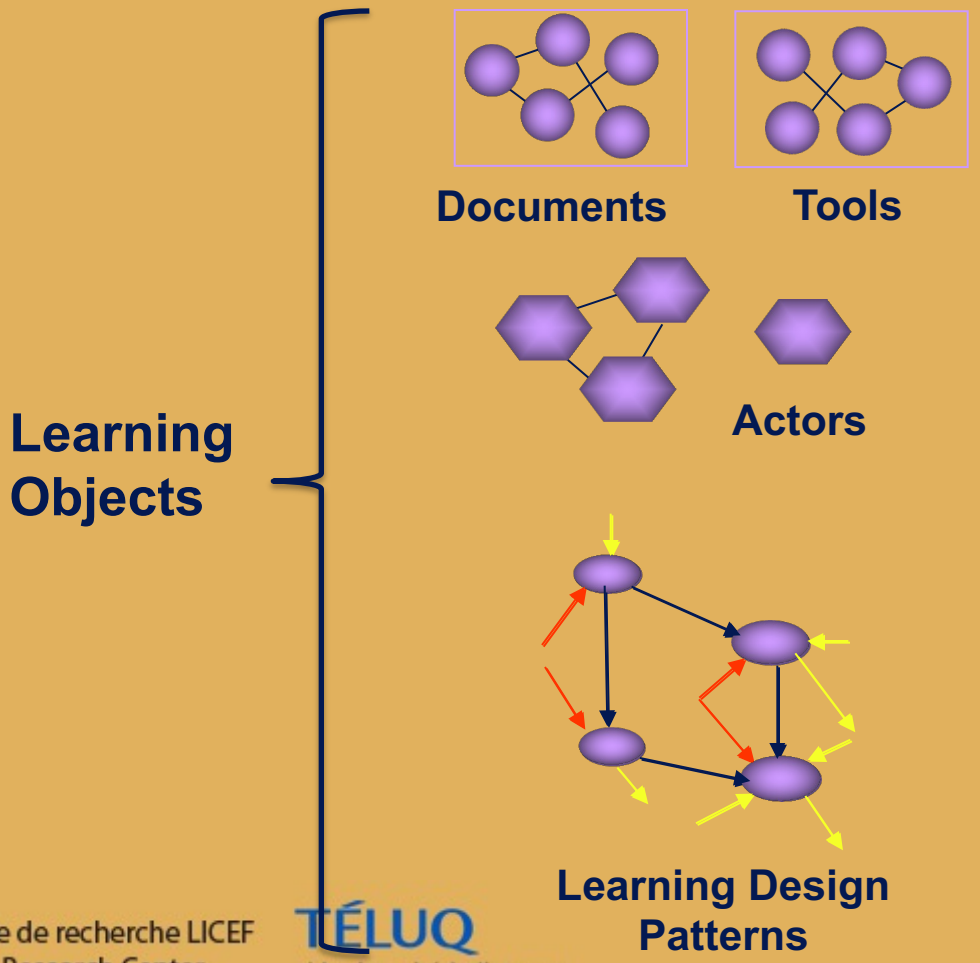
WHY LEARNING OBJECT REPOSITORIES ?

REF GILBERT PAQUETTE : HTTP://WWW2.LICEF.CA/ACCUEIL/TABID/1504/LANGUAGE/FR-FR/DEFAULT.ASPX

1. Resources maintained by educational institutions and professors guarantee their quality.
2. Resources are peer-reviewed to ensure their quality and identify their actual use and their reusability.
3. Metadata give precious information about authors, knowledge, educational use, language and technical requirements.
4. Metadata serve to make focused queries based on the properties instead of vague keywords that lead to thousands of references that you need to open.
5. The vast majority of these learning objects can be reused free of charge and adapted or aggregated to extend the availability of good learning material.

USING REPOSITORIES IN PALOMA FOR RESOURCE AGGREGATION

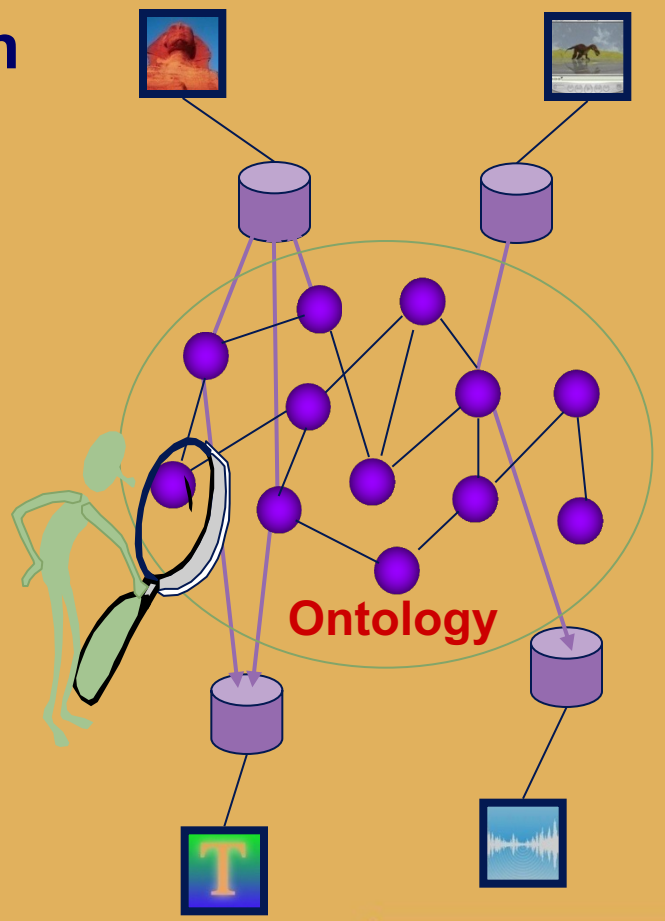
REF GILBERT PAQUETTE : HTTP://WWW2.LICEF.CA/ACCUEIL/TABID/1504/LANGUAGE/FR-FR/DEFAULT.ASPX



E- REFERENCING RESOURCES ON THE SEMANTIC WEB (WEB 3.0)

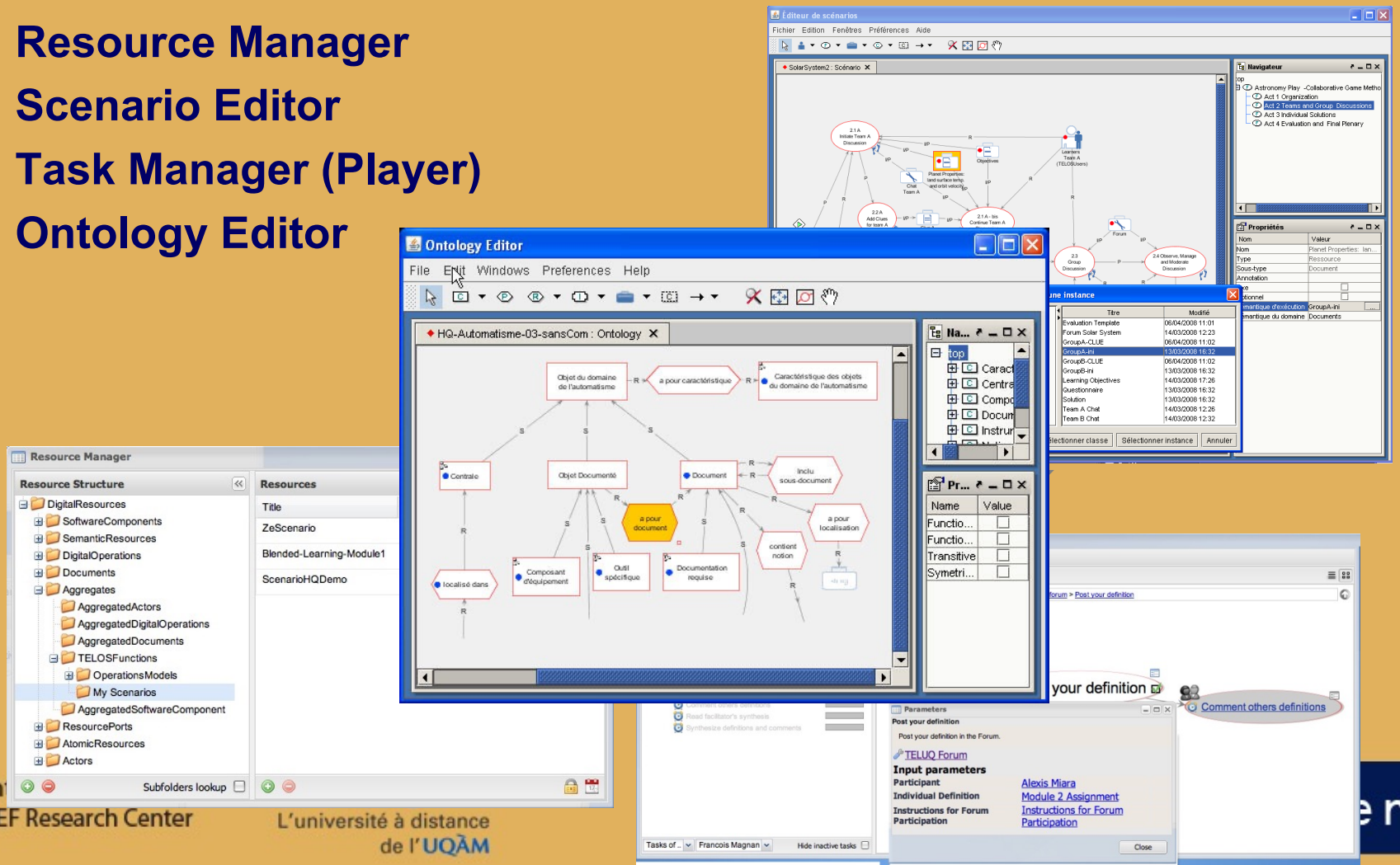
Ref Gilbert Paquette : http://www2.licef.ca/Accueil/tabid/1504/language/fr-FR/Default.aspx

- Exponential Growth of Information and Resources on the Internet
- Metadata Describe the Resources (including persons)
- Knowledge Metadata: LO as Instances in Ontologies
- Ontologies allow agents (and LMSs) to Handle Resources Based on their Knowledge and Competency gaps



TELOS: TELE-LEARNING OPERATING SYSTEM; AN ONTOLOGY DRIVEN SYSTEM

- Resource Manager
- Scenario Editor
- Task Manager (Player)
- Ontology Editor



Projects & Collaborations in Africa

Mainstreaming Engineers in Africa & Motivating Students

IEEE Foundation: $20.000 (2006-2008)

- Visio-conferences (Attending our Research Labs Presentations)
- Assisting African students to attend Conferences
- Team Teaching With African Colleagues in Canada & USA
- Free Software Adaptation and Use
- Funding Paper Translations & Submissions
- Introduce Young Students to Science, Technology & Engineering
- Giving away to the next

Projects & Collaborations in Africa

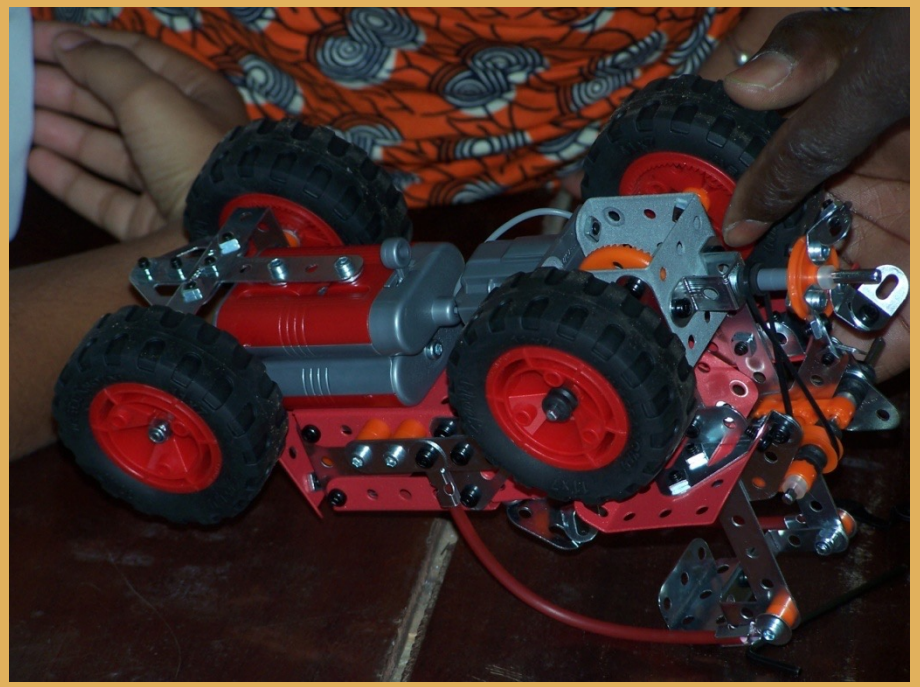
Bridging Learning Technologies and Research on Next Generation Networks in Africa and Middle East

IEEE Education: $20.000 (2008-2009)

- Facilitate the mobility of the team members as well as young researchers to attend meetings held in their region
- Propose tools and methods to develop course materials suited to mobile and smart phones and personnal digital assistants
- Reducing the barrier of the English language with funding for translation of papers into English

Mainstreaming Engineering Education in Africa

Introduce Young Students to Science, Technology & Engineering (High School Students: Lycée d'excellence à l'ÉMIG au Niger) (2007)

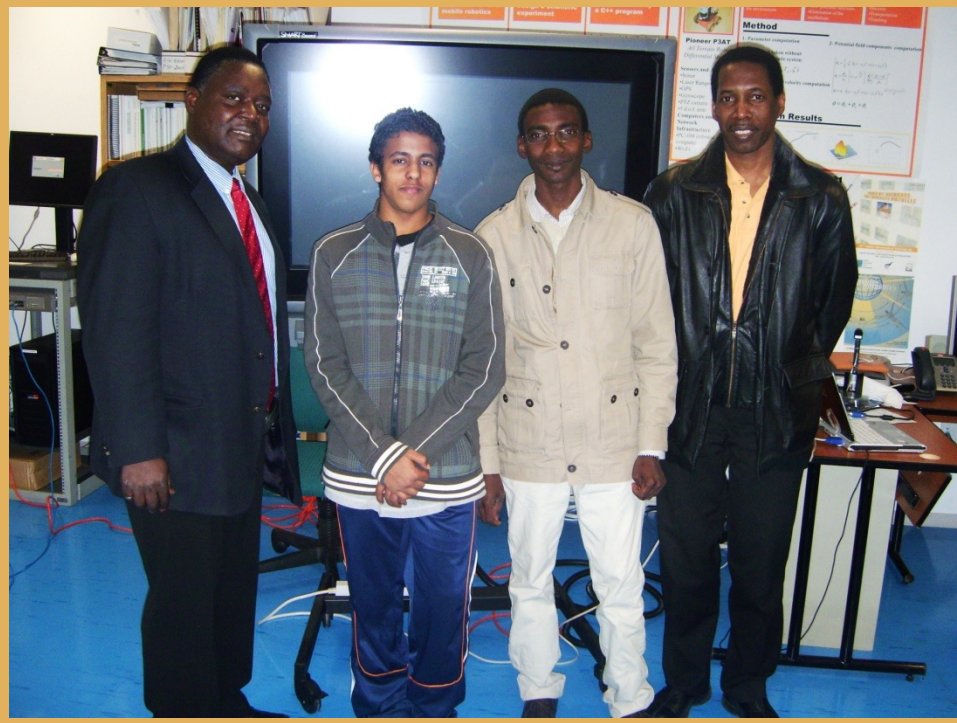


Mainstreaming Engineering Education in Africa

Introduce Young Students to Science, Technology & Engineering (Activities integrated in Science and Technology in Secondary Schools in Canada)

Mainstreaming Engineering Education in Africa

Introduce Young Students to Science, Technology & Engineering (Other ways in Quebec : Young Explorer for a Day)

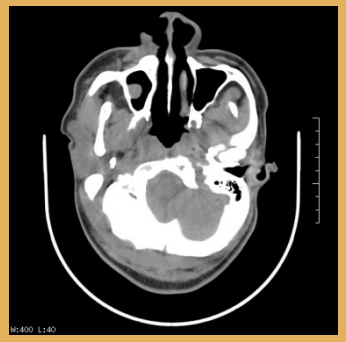
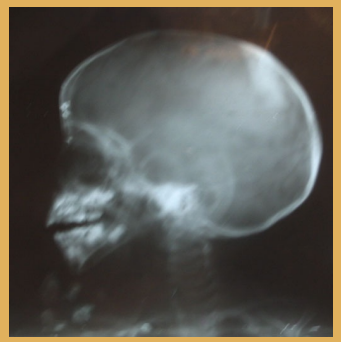


Mainstreaming Engineering Education in Africa

Educating African Educators: Seminar inTunisia: Online Engineering Education using Laboratories at Distance and an Educator giving back to the Next in Niger

Graduate Student Supervision with ICT: Telemedecine

LA TELEMEDECINE AU NIGER :
EXPERIMENTATION DE LA TELERADIOLOGIE

Thèse de Doctorat d'État en médecine, soutenue par
Marianne LAURENT KOUAWO
Sous la direction du Pr. Hamadou SALIAH-HASSANE et du Dr Herbert DEGBEY
FSS, le 28 avril 2007

Student Feedback: “First Telemedecine Thesis in Niger”

… Our defense was the first of its kind to be done remotely in Niger, that is to say with a supervisor who is outside Niger. This defense, we wanted to be in the same dynamic of ICT use in medical practice. Indeed, given the distances in Niger, it is important to show that through a collaborative platform, experts can come together to discuss around a case …

Dr Mariame Kouawo (2007)

Graduate Student Supervision with ICT & Mobile Labs: Environmental Studies Thanks to “Vernier” Software and Hardware

Graduate Student Supervision with ICT & Mobile Labs: Environmental Studies; Student Feedback

With the equipment that I have been loaned temporarily, I freely collected my data and analyze them without resorting to an outside laboratory or measurement devices also absent in the laboratory of the university.

The comparative cost analysis of services offered by laboratories

Samples	Lanspex (prix unitaire)	Icrisat (prix unitaire)
pH	8.500	215
Calcium	8.500	540
Phosphore	8.500	290
Magnésium	8.500	540
Ammonium	8.500	865
Nitrate	8.500	865
Chlorure	8.500	540
Conductivité	8.500	360
Salinité	8.500	685
Turbidité	8.500	360
DBO	10.500	10.500
DCO	10.500	10.500
Pour une station	106.000	26.260
Pour les 8 stations	848.000	210.080
Nombre total d'échantillonnage (12)	10.176.000	2.520.960
TOTAL COST	$23.500	$6000

Collaboration industry-university

Examples:

- Canadian Innovation Fund (Industrial participation)
- LORNET Network : Demands of Industry partners
- NRC: Marketing of Research Results
- Telecommunication Networks and Value-added Services
- Agreements / Conventions International de collaborations.

Collaboration industry-university

Examples: Potential Industrial and Educational Partners

- IEEE: EdSoc / Foundation / EAB(Initiatives, TISP, eScience)
- HP: HP Social Innovation education programs
- Vernier: (http://www.vernier.com/grants/)
- National Instruments: (India Example: http://planetni.in/home.html)
- Association for the Development of Education in Africa (ADEA): The New Africa – Corea Partnership in Education & UNESCO
- Local Non Governmental Organizations
- University In Service and Outreach Programs

Conclusions

- We can contribute to the creation of a Virtual Organization for education in Africa
- A Virtual Organization, an extension of educational and research institutions may enrich its infrastructure and expertise sharing
- We must share our network and contribute, each in his/her way, to training the next generation through teaching and research in presence or over computer networks
- With industries and organizations based in Africa or not, we can contribute to research development in Africa in a number of areas
- We still have to follow an approach adapted to the context of each country for the integration of technology in education
- We can expose our student to the realities of Africa Education in multiple ways

Questions?

Thank you!