A MULTIMODAL ENVIRONMENT FOR COOPERATIVE AND TRANSNATIONAL TRAINING ACTIVITIES

Mihai Polceanu [5], Ammar Assoum [3], Jean-Pierre Gerval [2], Dorin-Mircea Popovici [5], Bassem Fennani [1], Yann Le Ru [2], Hùng Ngô [6], Habib Hamam [1], Valeriu Dulgheru [4]

[1] Moncton University
165 av. Massey - Moncton (New-Brunswick)
E1A 3E9 – **CANADA**
E-mail: habib.hamam@umoncton.ca

[2] Institut Supérieur de l'Electronique et du Numérique – Brest
20 rue Cuirassé Bretagne – CS 42807 – 29228 BREST cedex 2 – **FRANCE**
E-mail: jean-pierre.gerval@isen.fr

[3] Lebanese University, Faculty of Science – Section 3 – Laboratory LaMA-Liban
P.O. Box 826, Tripoli – **LEBANON**
E-mail: a.assoum@ul.edu.lb

[4] Technical University of Moldova
168 Stefan cel Mare Blvd.
Chisinau – MD-2004 – **MOLDOVA**
E-mail: dulgheru@mail.utm.md

[5] OVIDIUS University of Constanta
124 Mamaia Bd. – 900527 – Constanta – **ROMANIA**
E-mail: dmpopovici@univ-ovidius.ro; polceanum@gmail.com

[6] Viettronics Technology College
No 118 Quartier de Catbi – Arrondissement de Hai An
Haiphong – **VIETNAM**
E-mail: hungngohn@gmail.com

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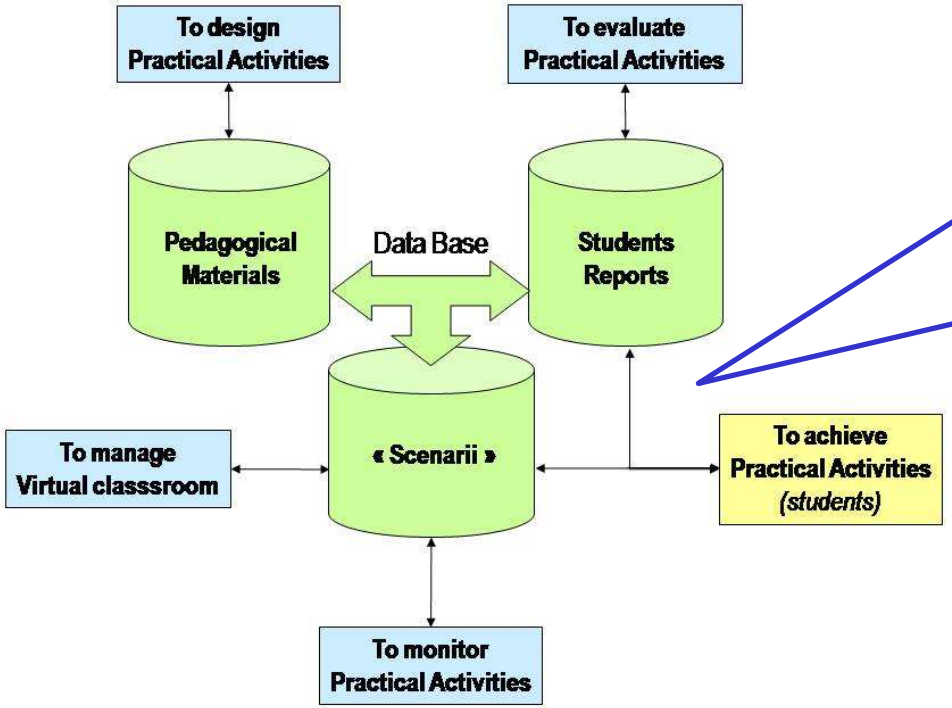
EMULACTION

(Multimodal Environment for Cooperative and Transnational Training Activities)

To develop a Digital Environment (Web-Based Portal) in order to enable distributed and cooperative practical activities

Electronics, Digital Image Processing, Numerical Analysis, Computer Science and Signal Processing

To improve students' practical skills through a distributed learning environment, with support for collaborative tasks and knowledge, which can be accessed by users from different countries



Virtual room:
Digital infrastructure that enables a cooperative learning process

To configure virtual rooms:

Define a teaching scenario

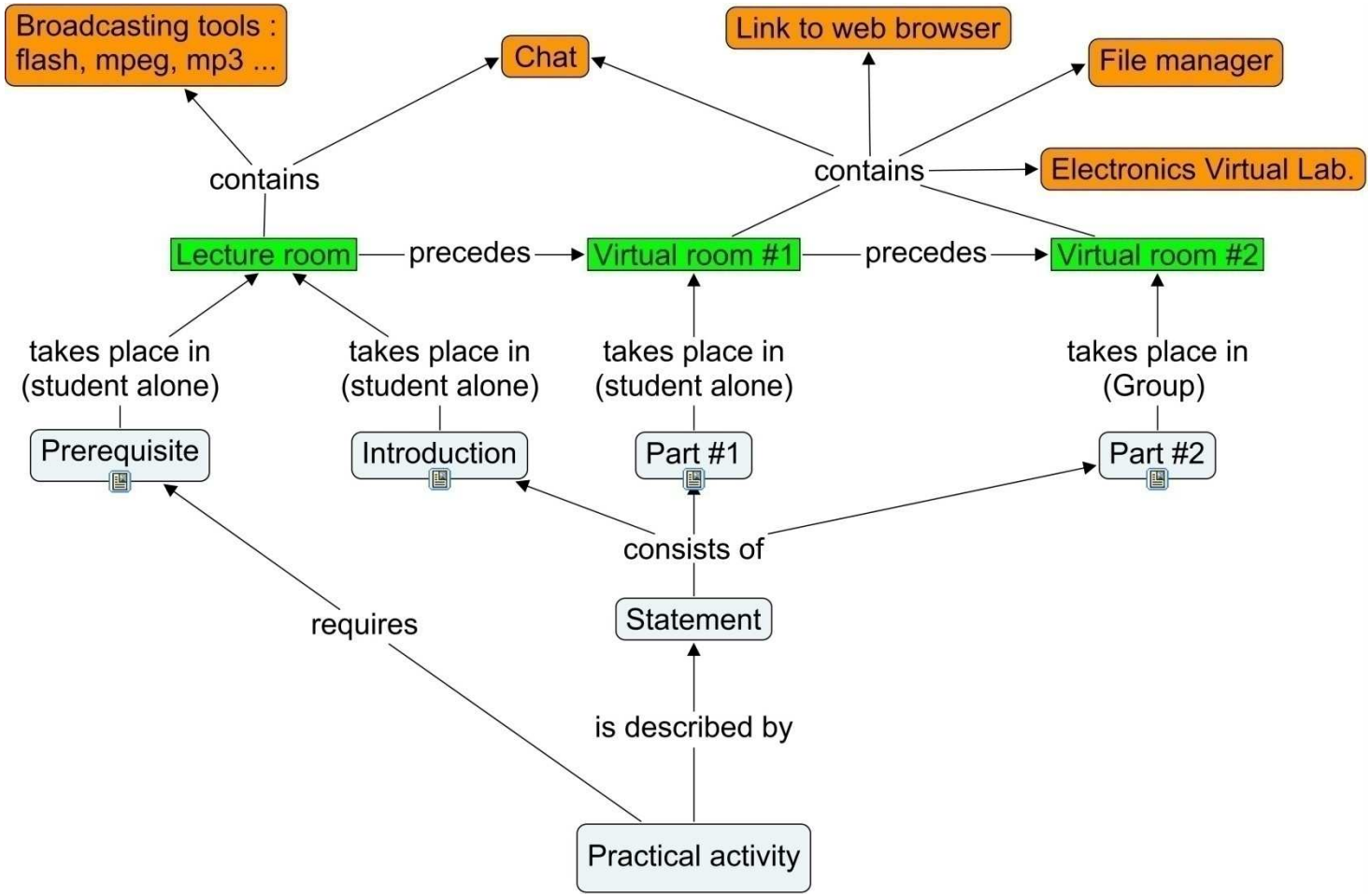
number of virtual rooms, assignment of activities to the rooms, order of the rooms according to activities, requirements to access the rooms

Select communication tools

chat, forum, blog, voice, video, whiteboard, etc.

Choose software tools to be used by the students

1. INTRODUCTION / 1.2 Digital Environment Architecture



2. VIRTUAL CLASSROOM METAPHOR

A location where students and teachers can communicate and collaborate on the basis of a “room metaphor” [6]

Organizing the learners in teams may reduce most of the gaps between the individual knowledge by increasing communication and competition [7]

2. VIRTUAL CLASSROOM METAPHOR

Students can share the virtual environment in the same way they share the real one

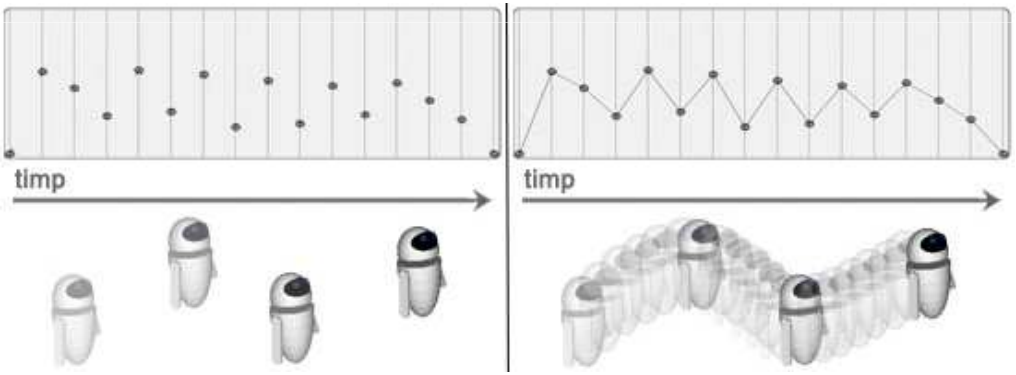
Space to explore

Determine goals

Learning activities as attractive concepts

2. VIRTUAL CLASSROOM METAPHOR

Avatars
(with dead-reckoning technique)



"Why are you using 3D for education instead of classical or multimedia approaches?"

If we simplify and pack instruction for consumption, the fullness of the subject can be bleached away, and so learning outside the context of its natural setting can also have the same affect [4]

3D Virtual Environments (VEs)

=

Attractive approach in education process

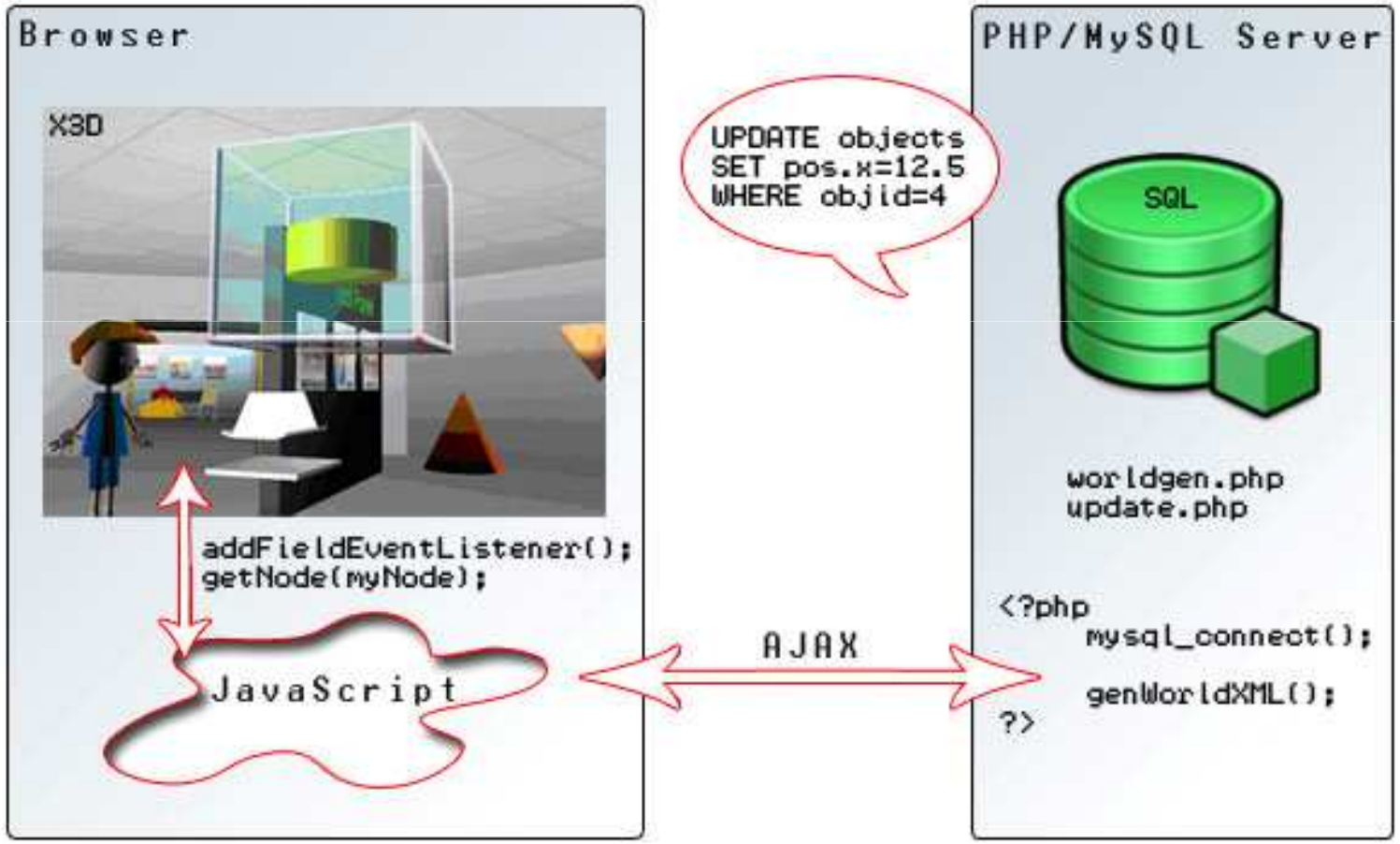
by reconstructing, as much as possible,
the real environment and context of traditional education

Using three dimensional graphics
Interacting with another human being
Involving more senses in the acquisition process
Using collaborative VEs
Using virtual teachers, animated pedagogical agents
... [10]

Open-source technology to create
a viable distributed learning environment

JavaScript (with AJAX) and X3D/VRML world
PHP and MySQL backbone for user and interface management
JQuery for interface enhancement
FluxPlayer for X3D rendering

3. DISTRIBUTING VIRTUAL WORLDS
/ 3.2 Software architecture of EMULACTION



Why ?

An environment good for learning cannot be fully pre-packaged and defined! [6]

→ Provide a flexible framework for classroom creation

Enables the teacher to use new educational entities such as sonar scanners, electronic circuit boards, graph simulators, etc.

Object package for EMULACTION:

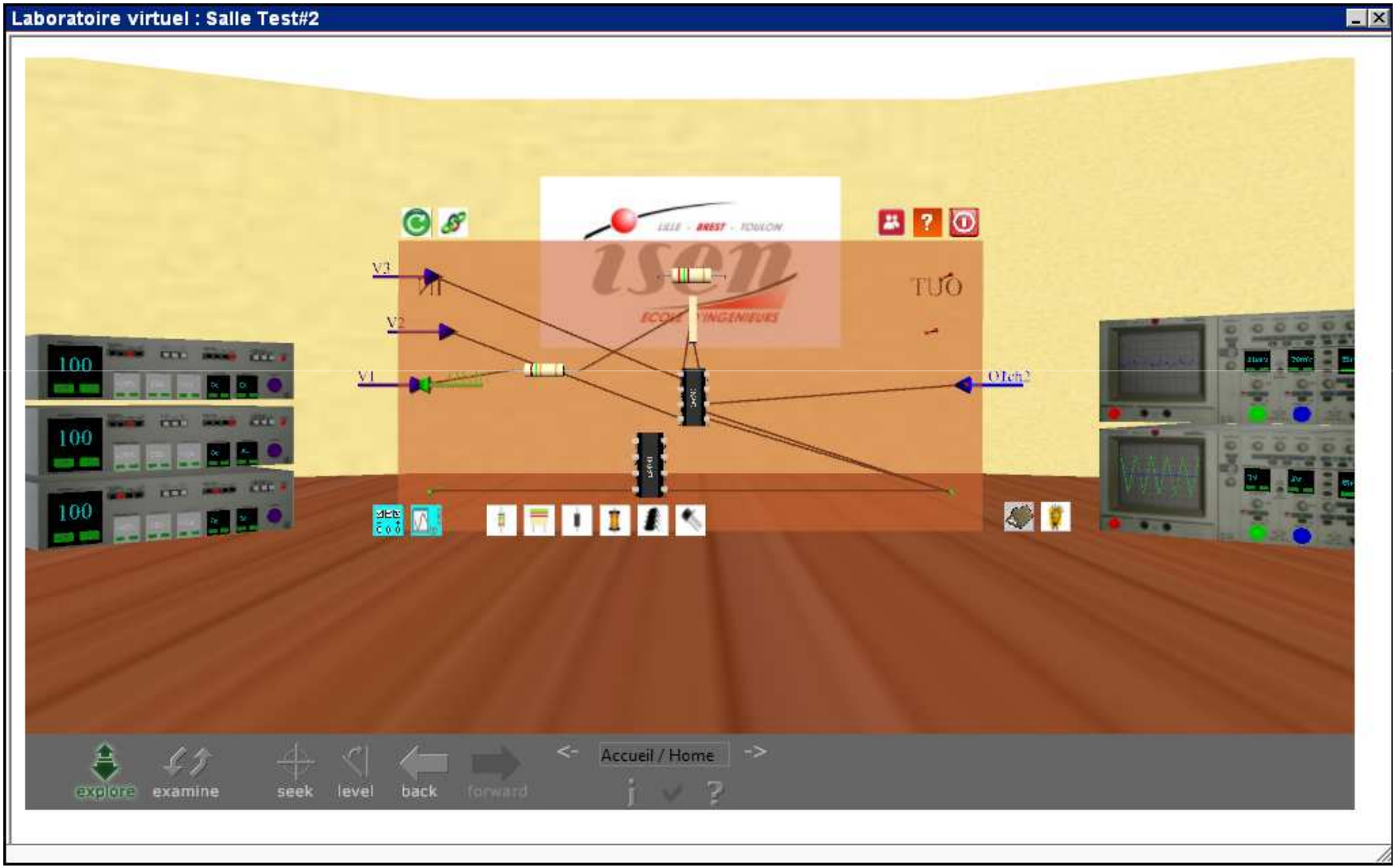
Set of VRML files inside an archive

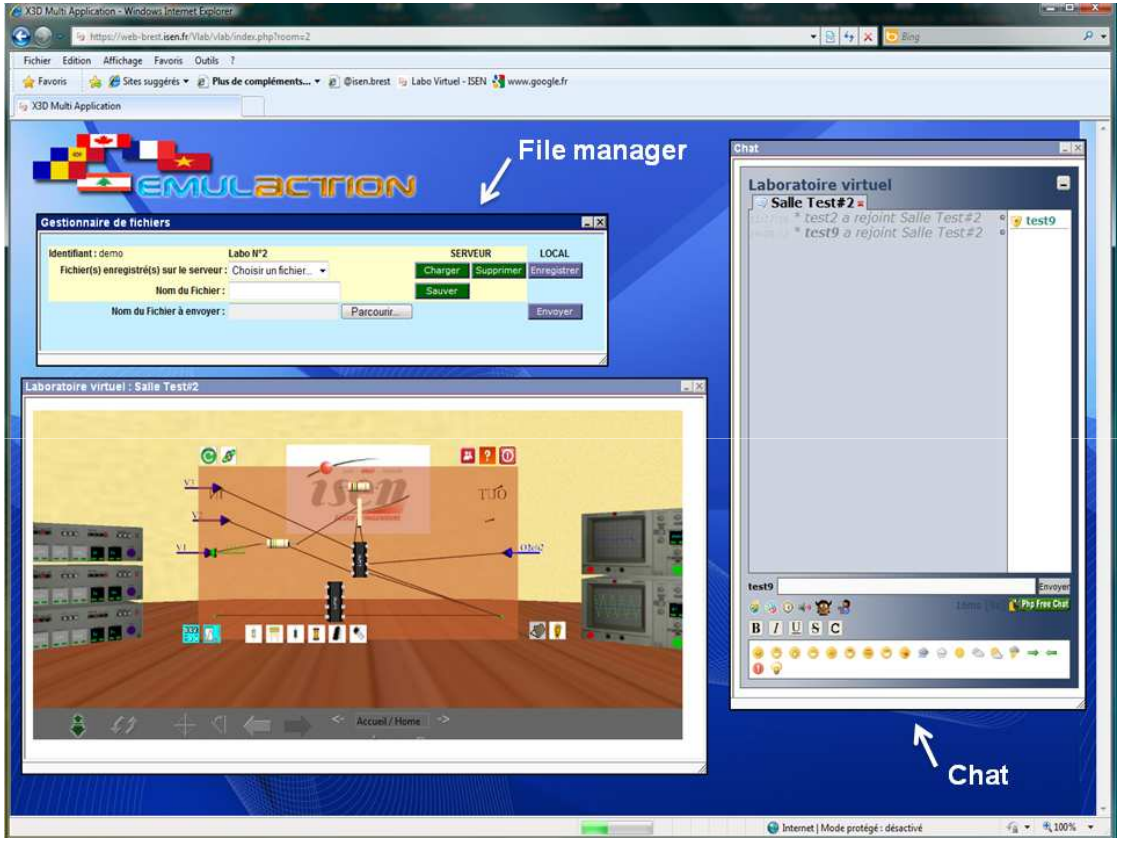
+

XML file (set of properties)

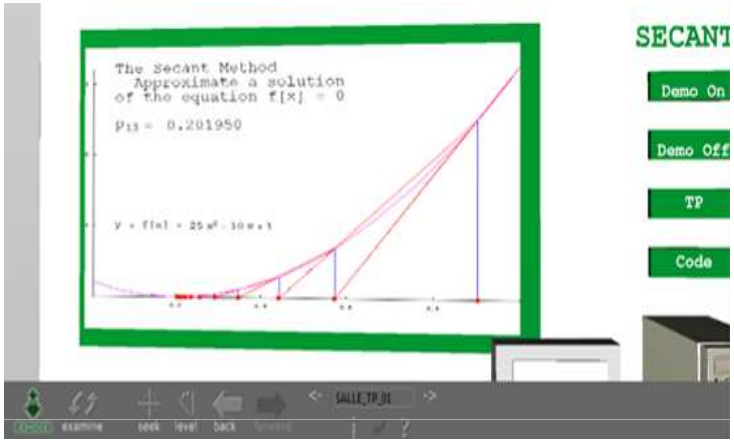
Purpose: to enable the JavaScript engine to tap into the virtual world and dynamically generate the scene with every stored aspect of it


Instantiate ChessGame
Object properties:
Tag
ChessGame_48
objtranslation
-20.074 1.262 -12.095
objrotation
1 0 0 0
wpawma
-0.218 0 -0.157
wpawmb
-0.157 0 -0.157
wpawmc
-0.095 0 -0.157
Classrooms
Objects
ChessGame
Author: Mihai
Created at: 22-03-2010
Version: 1.0
Create Instance
SimpleTable
TehCube
chat
console
Apply
Cancel

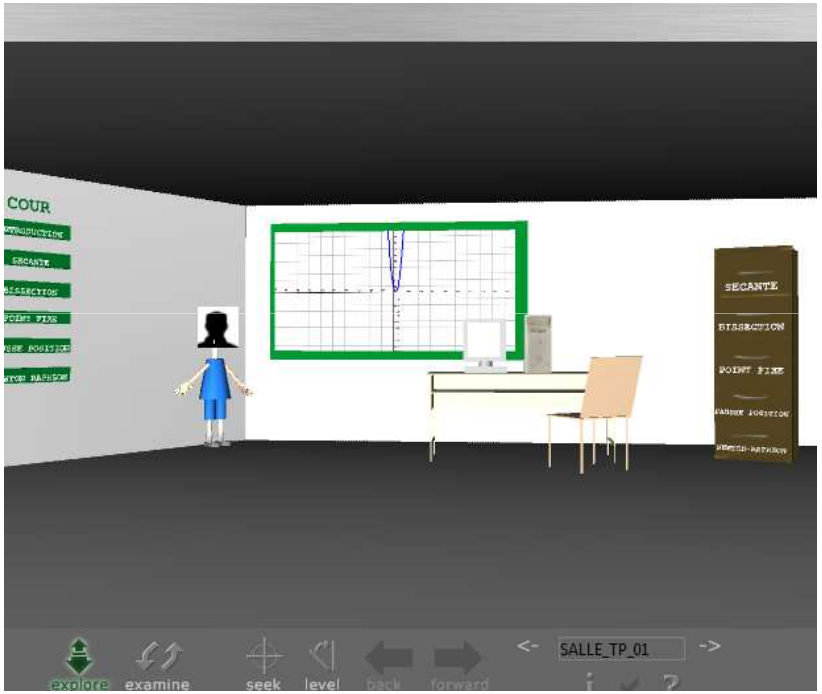

Laboratoire virtuel : Salle Test#2
V3
V2
V1
100
100
100
explore
examine
seek
level
back
forward
<-
Accueil / Home
->
i
?


File manager
Chat
Gestionnaire de fichiers
Laboratoire virtuel
Salle Test#2
Laboratoire virtuel : Salle Test#2


Phone icon
Audio conférence : Salle Test#2
Pour quitter l'audio conférence, fermer la fenêtre !

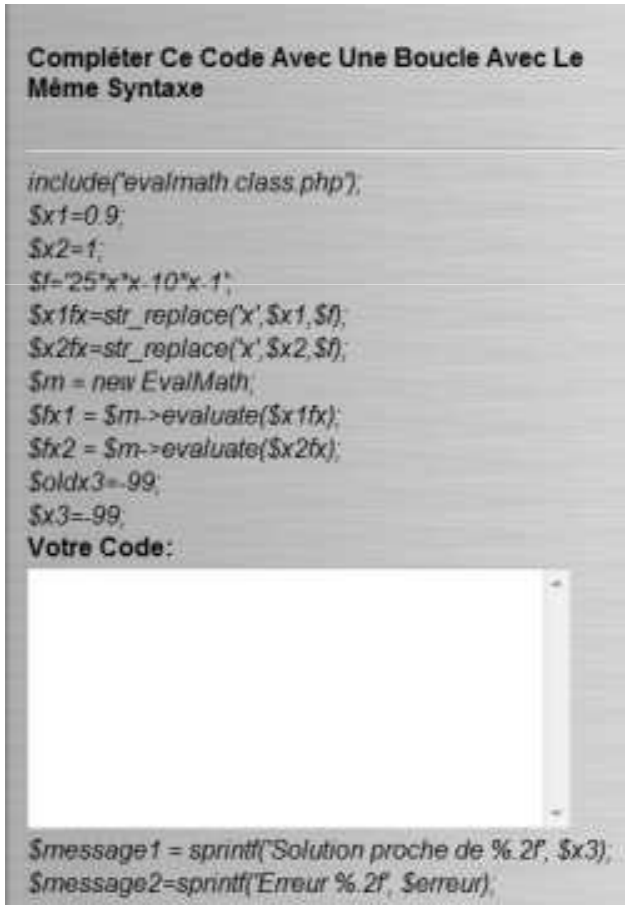


Graphical demo



Testing

Adding code to the skeleton



Individually
or in
a collaborative way

Five lab sessions as follow:

1. Installing the environment and developing the tool frame with load (from file, web camera or print screen) and save images

2. Basic operations : like inverting the image, adding, multiplying two images ...

3. Qualities processing by applying basic filters like Pyramid, Uniform and Gauss filters and getting the Histogram

4. Characteristic extraction from the image (Prewitt, Sobel and Canny filters)

5. Application: face recognition using cross-correlation based on FFT transformation

Collaborative architecture: test with three students, lab. 2

Student #1:
Developing the code to calculate the negative of an image.

Student #2:
Providing the JAVA classes and codes for the “Simple operation” window with the button functions such as opening and displaying files.

Student #3:
The JAVA class for the three operations:

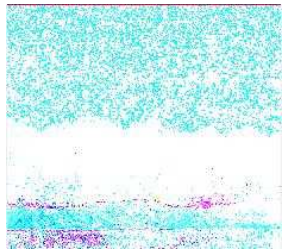
- Adding two images
- Subtracting two images
- Multiplying two images

Image 1

Image 2

Addition

Subtraction



Multiplication

4. CONCLUSIONS AND FUTURE WORK

Preserving the richness and the complexity
of the learning environment

Providing tools and support
for students to “learn their way around”

Work + Tests => Still on progress!!!

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Thanks for your attention…

Any Questions?