

# Design Elements in a Personal Learning Environment

Stephen Downes  
March 5, 2015

Fourth International Conference e-Learning and Distance Education

2 - 5 March 2015

Innovative Learning ... Promising Future  
THE RITZ-CARLTON, RIYADH



المؤتمر الدولي الرابع للتعليم الإلكتروني و التعليم عن بعد

14 - 11 جمادى الأولى 1436 هـ | 2 - 5 مارس 2015 م

تعليم مبتكر .. لمستقبل واعد  
الريتز كارلتون - الرياض



National Research  
Council Canada

Conseil national  
de recherches Canada

Canada 

# The Problem: The Skills Shortage in Canadian Industry

- Canadian Oil and Gas (O&G) sector loses \$4 billion per year due to skills shortages.
- Skilled and professional unemployment rate less than 1%.
- Training current and prospective employees time-consuming and expensive.



August 26, 2013

## OTTAWA CITIZEN

Home News Opinion Business Sports Arts Life Technology Travel Health Jobs

### LABOUR AND SKILLS SHORTAGE ADDRESSING CURRENT AND FUTURE CHALLENGES

Report of the Standing Committee on Human Resources, Skills and Social Development and the Status of Persons with Disabilities

Ed Komarnicki, M.P.  
Chair

DECEMBER 2012  
41st PARLIAMENT, FIRST SESSION

#### An answer to Canada's mining skills shortage

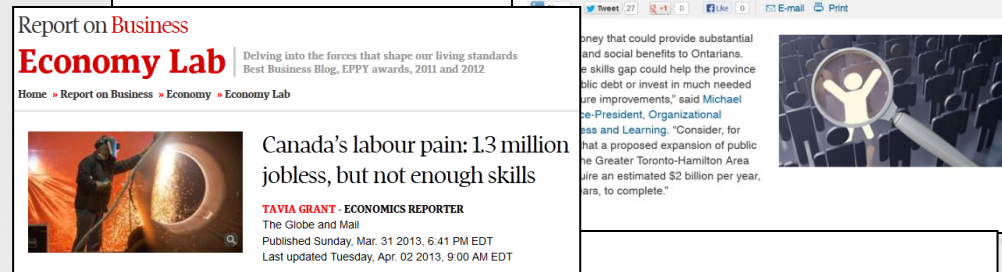
BY DANIEL BLAND, OTTAWA CITIZEN AUGUST 26, 2013

While economists and labour market researchers agree one of Canada's greatest challenges is the shortage of skilled workers, that.

The Conference Board of Canada

NEWS RELEASE 14-09

#### Skills Shortages Cost Ontario Economy Billions of Dollars Annually




Report on Business

## Economy Lab

Delving into the forces that shape our living standards  
Best Business Blog, EPPY awards, 2011 and 2012


Home » Report on Business » Economy » Economy Lab



### Canada's labour pain: 1.3 million jobless, but not enough skills

TAVIA GRANT · ECONOMICS REPORTER  
The Globe and Mail  
Published Sunday, Mar. 31 2013, 6:41 PM EDT  
Last updated Tuesday, Apr. 02 2013, 9:00 AM EDT

...ney that could provide substantial and social benefits to Ontarians. The skills gap could help the province reduce public debt or invest in much needed infrastructure improvements," said Michael ... President, Organizational Development and Learning. "Consider, for example, that a proposed expansion of public transit in the Greater Toronto-Hamilton Area would require an estimated \$2 billion per year, or more, to complete."



## itbusiness.ca

Syndicated Education Human Resources

### IT skills shortage still a problem in Canada

Published on: July 10th, 2013

## CANADIAN BUSINESS JOURNAL

Home | Features | March 09 | Advanced Skills Shortages in Canada – Getting to the Root of the Problem

### Advanced Skills Shortages in Canada – Getting to the Root of the Problem

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In November of last year, the Canadian Chamber of Commerce published a report on skills shortages in Canada, expressing a view felt by many: the skills shortage is a critical economic issue that impacts Canadian productivity, and ultimately, competitiveness in a global market. The Chamber commented in the report that skills shortages are not "just a 'made-in-Canada' problem", saying that the country is in a global fight for talent.



# The Solution: Personal Learning and Performance Support

Single point of access to all skills development and training needs

- Individual learning path
- Context-aware support
- Searchable and verifiable
- Tailored to industry needs
- Always available
- Point of need performance support



# Why NRC? Our Distinct Leverage

- NRC is a globally recognized leader in emerging learning technologies
  - Not core competencies for target clients
  - LPSS benefits from NRC's research in other fields
- NRC is deeply connected to the e-learning industry
  - University researchers not driven to spend the time with industry
  - NRC by contrast has collaboration and commercialization experience
  - Neutral broker reduces risk to technology development partners

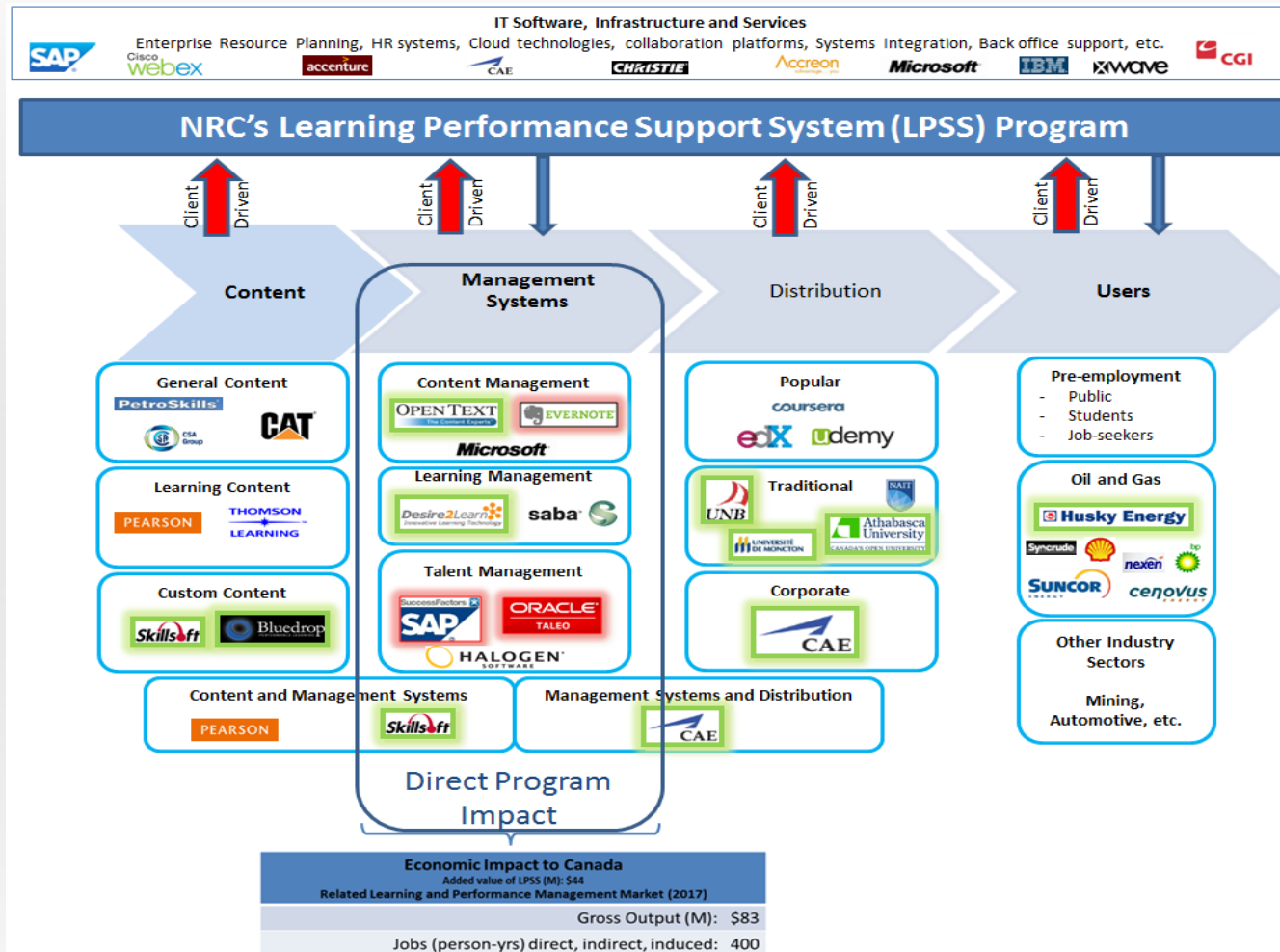


# NRC – Previous Work in eLearning

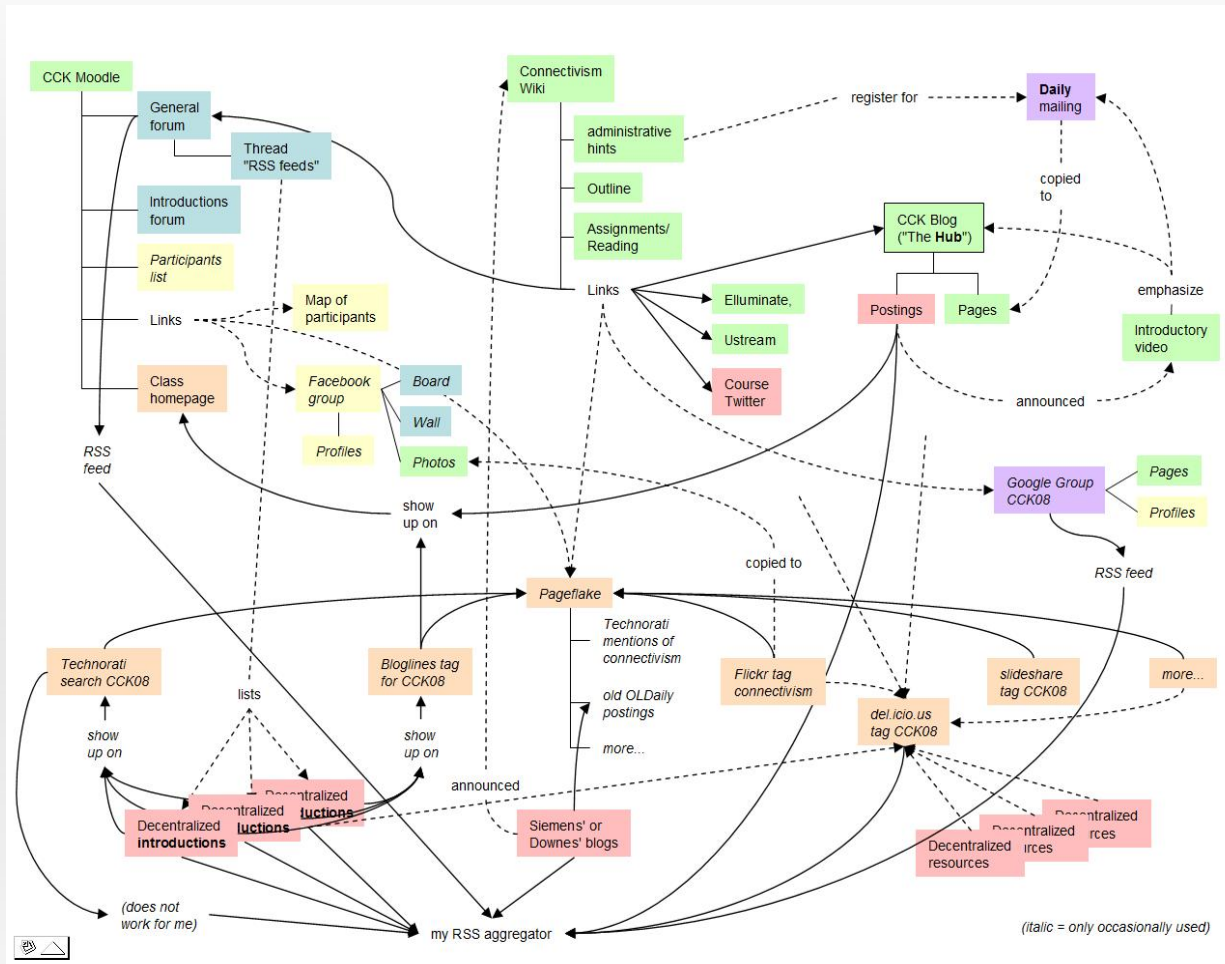


- eduSource Resource Repository Network (Canadian CANARIE Network)
- Sifter/Filter Content Recommender (commercialized as RACOFI)
- SHARE Sentiment Analysis
- Synergic3 Collaborative Workflow (commercialized with Desire2Learn)
- gRSShopper / MOOC / Connectivism
- 2Sim Haptic Simulations

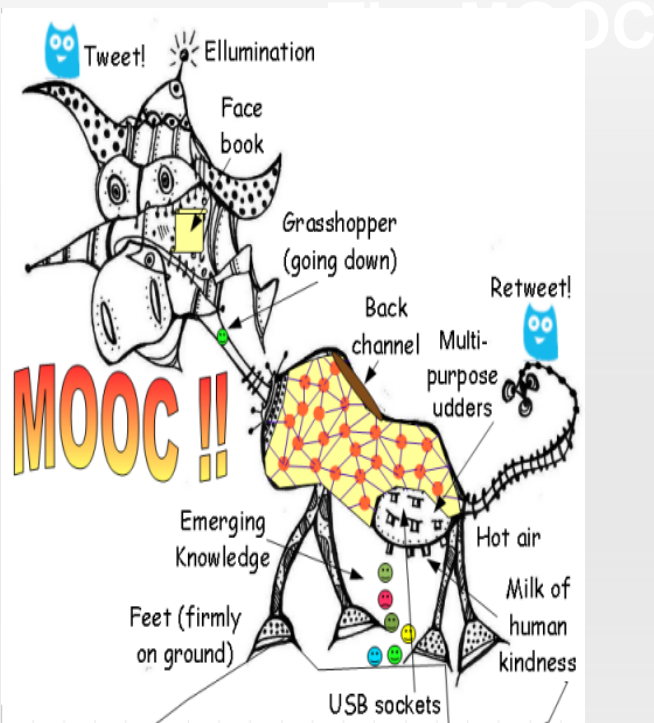
# LPSS in Canada's Learning Technology Marketplace



# The Connected Application



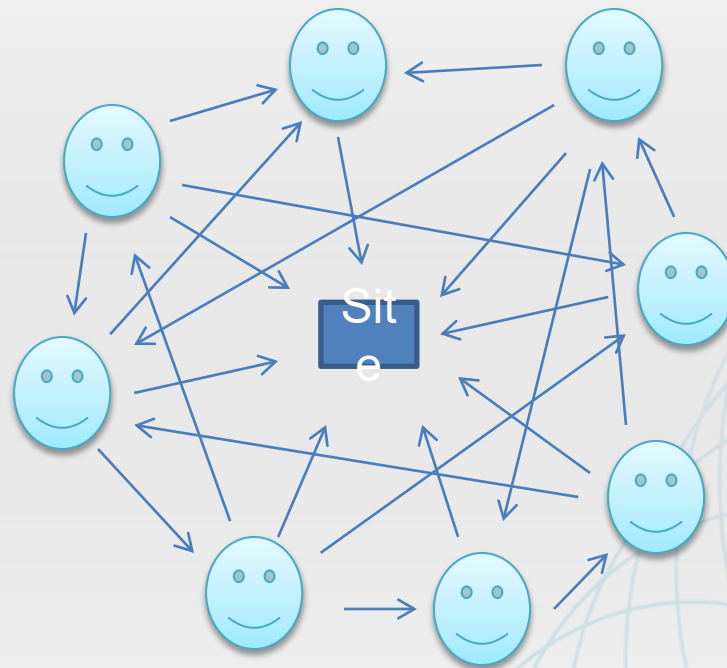
<http://x28newblog.blog.uni-heidelberg.de/2008/09/06/cck08-first-impressions/>



Massive – by design  
Open – gratis and libre  
Online – not blended, not wrapped  
Courses – not communities, websites, video collections, etc



# Massive Open Online Course



A MOOC is a Web, not a Website

# Design Principles

## Autonomy

- Choice of contents
- Personal learning
- No curriculum

## Openness

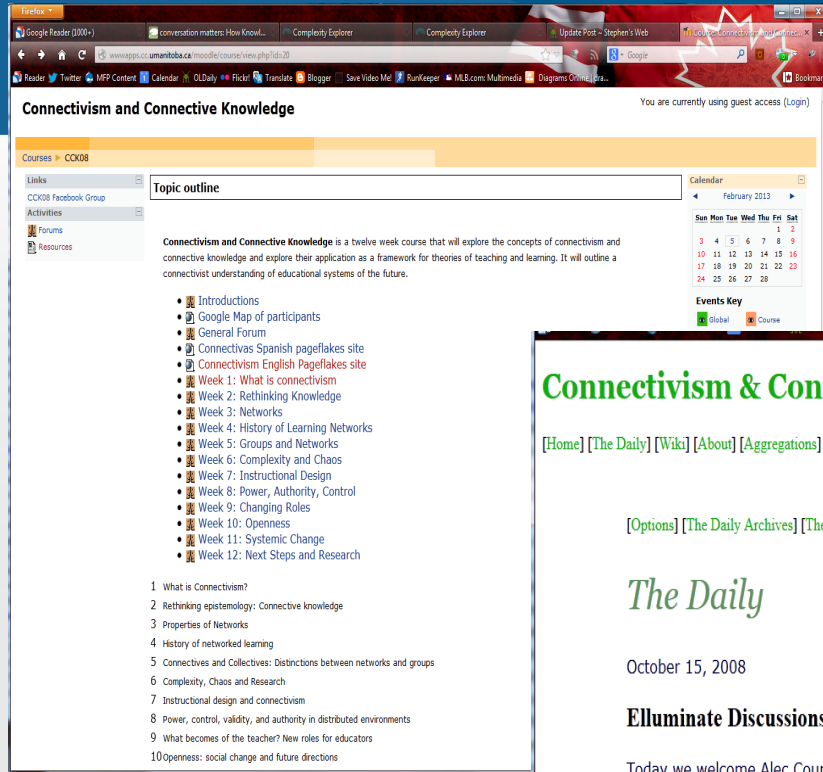
- Open access
- Open content
- Open activities
- Open assessment

## Diversity

- Multiple tools
- Individual perspective
- Varied content

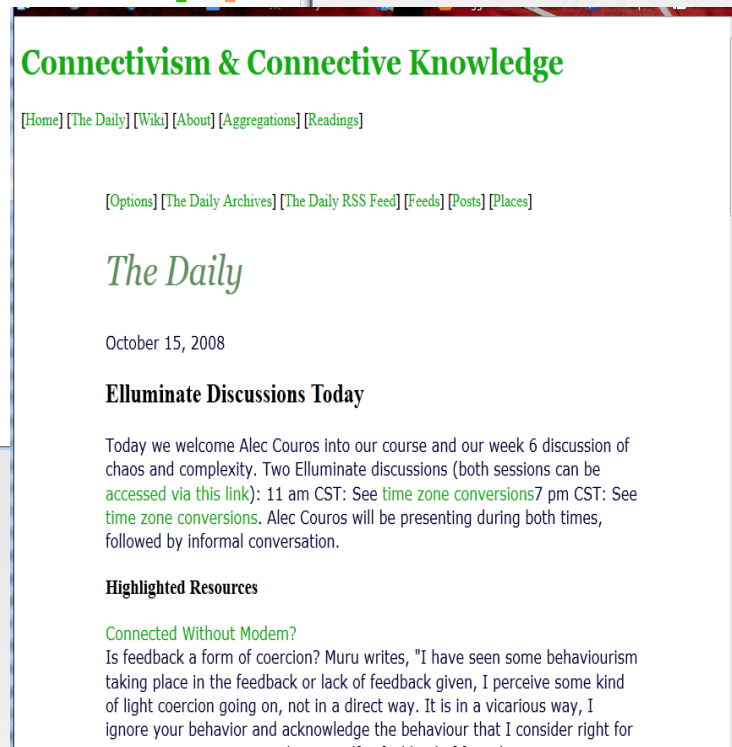
## Interactivity

- Encourage communication
- Cooperative learning
- Emergent knowledge



<http://wwwapps.cc.umanitoba.ca/moodle/course/view.php?id=20>

2300 students



<http://connect.downes.ca/cgi-bin/archive.cgi?page=thedaily.htm>

# Other Courses

1800 students

<http://connect.downes.ca/>

3000 students

<http://edfuture.net/>

2800 students

<http://change.mooc.ca/>

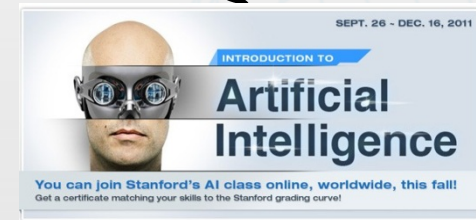
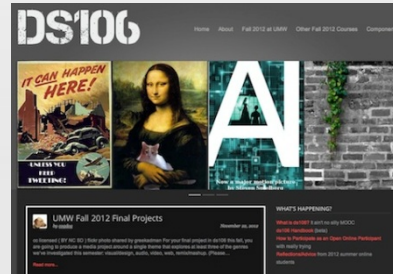
# cMOOC vs xMOOC



networks

tasks

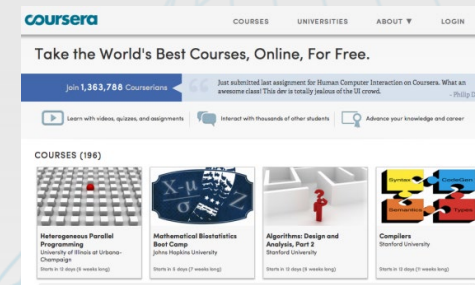
content



<https://www.ai-class.com/>



<http://ds106.us/history/>



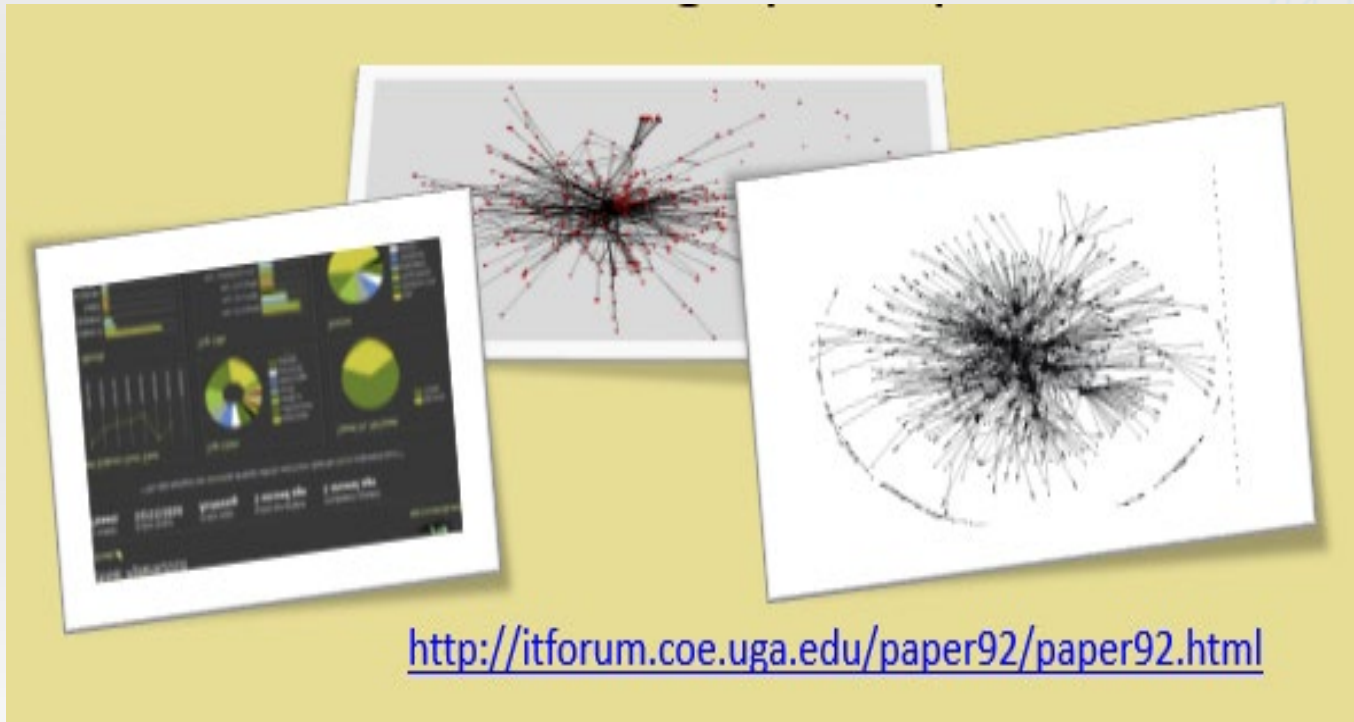
<https://www.coursera.org/>

<http://lisahistory.net/wordpress/2012/08/three-kinds-of-moocs/>



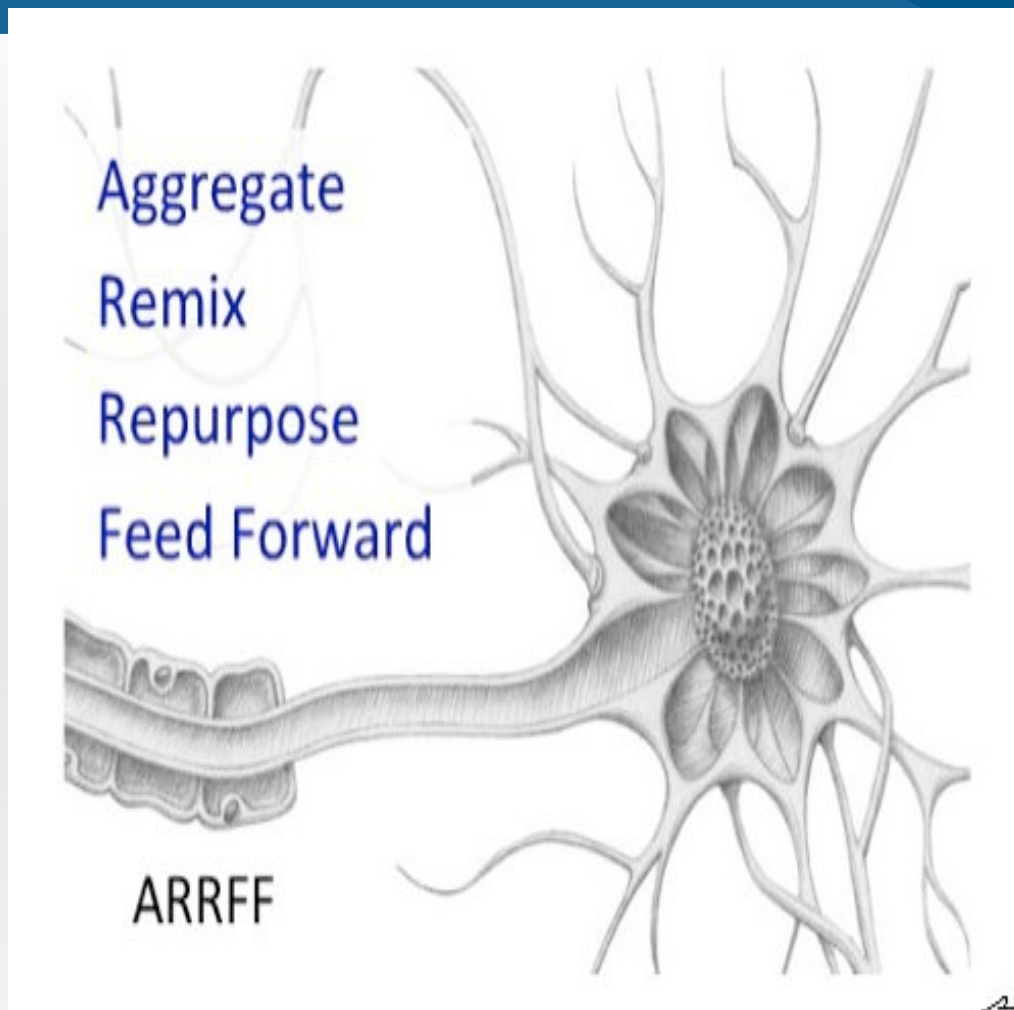
# Design principles of the cMOOC

Autonomy, diversity, openness, interactivity



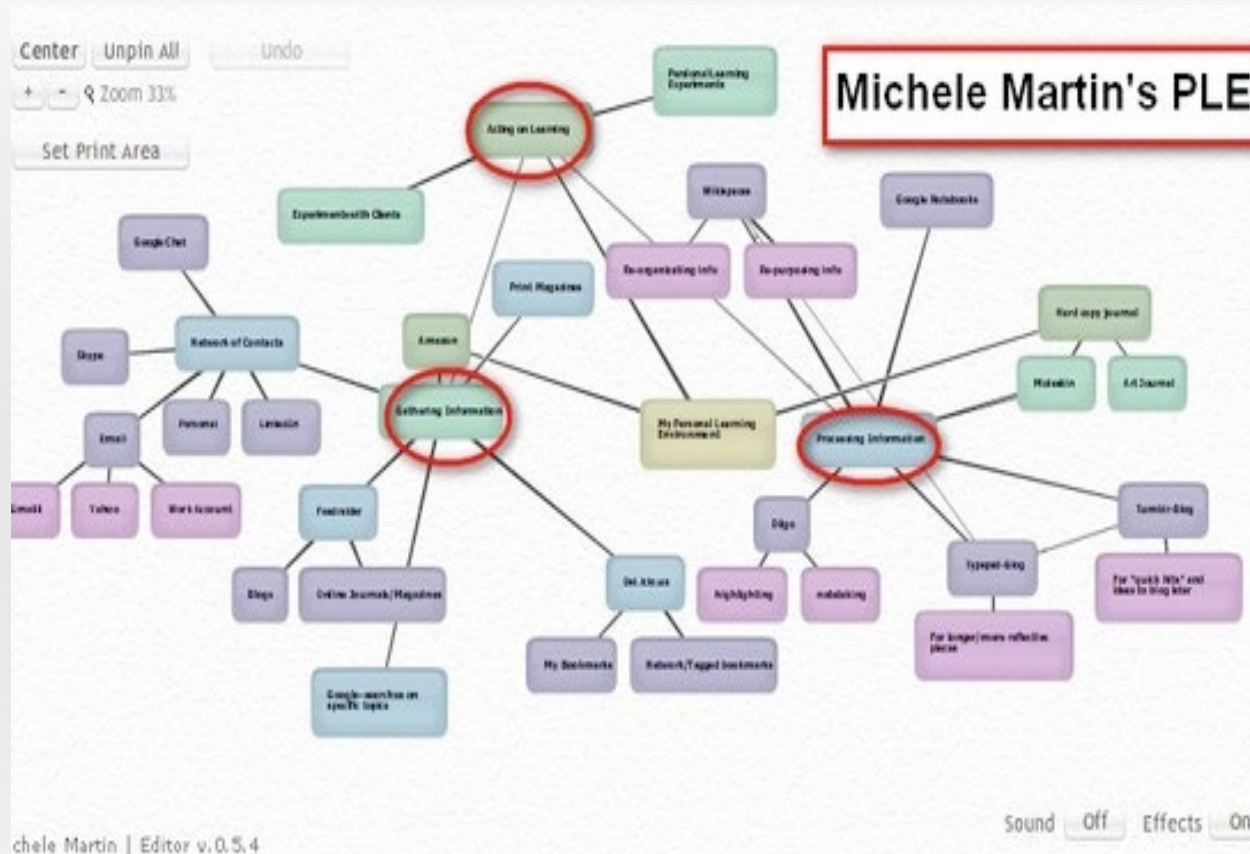
<http://itforum.coe.uga.edu/paper92/paper92.html>

# Pedagogy of the cMOOC



<http://cogdogblog.com/2009/06/29/arrff/>

# Personal Learning



<http://dmlcentral.net/blog/howard-rheingold/diy-u-interview-anyakamenetz> <http://www.downes.ca/post/58150>



# Underlying MOOC Support

1. First student creates resource and sends info to course



Site

2. Second student sees resource info in newsletter and RSS feed

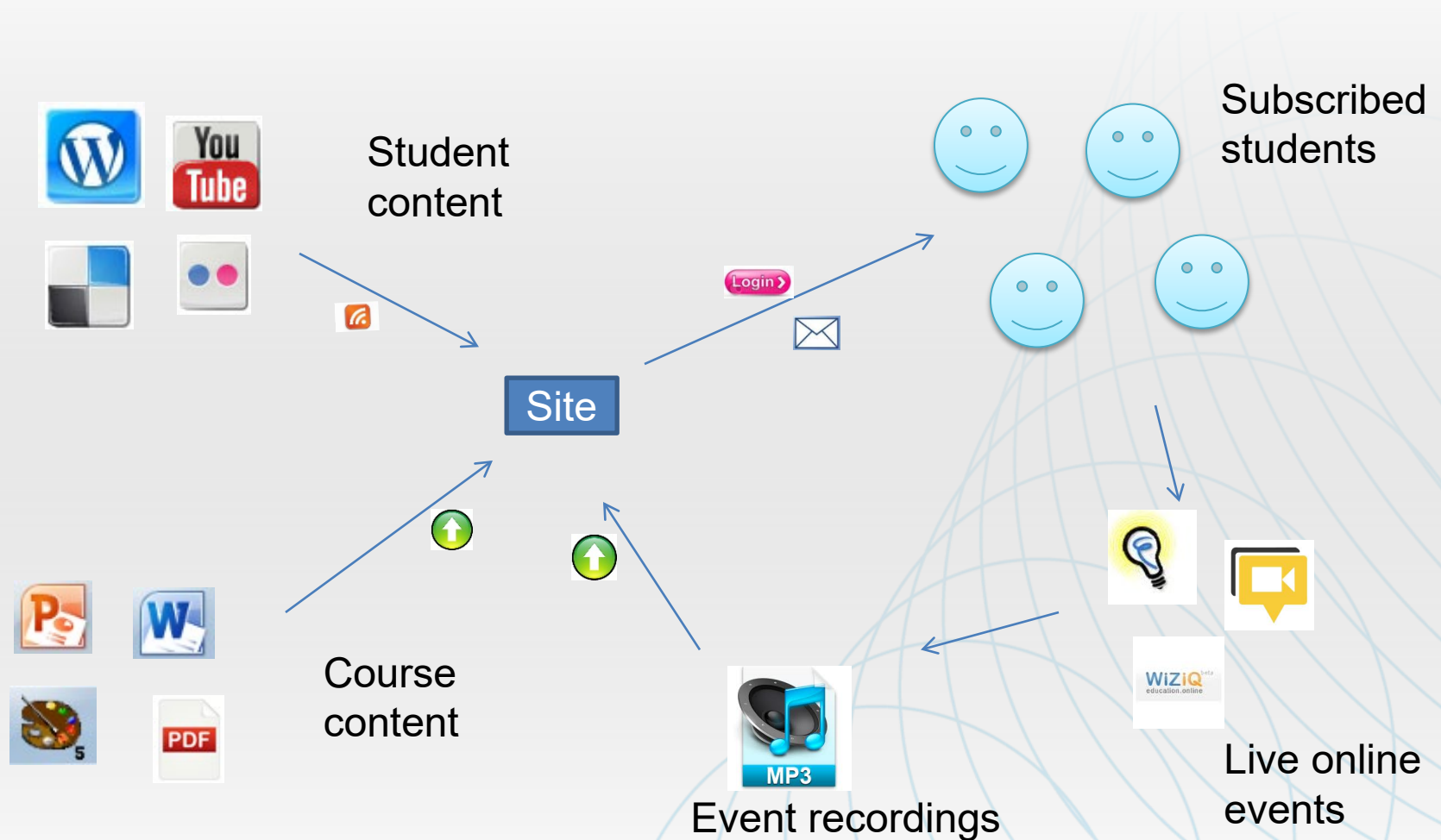


3. Second student accesses the resource directly

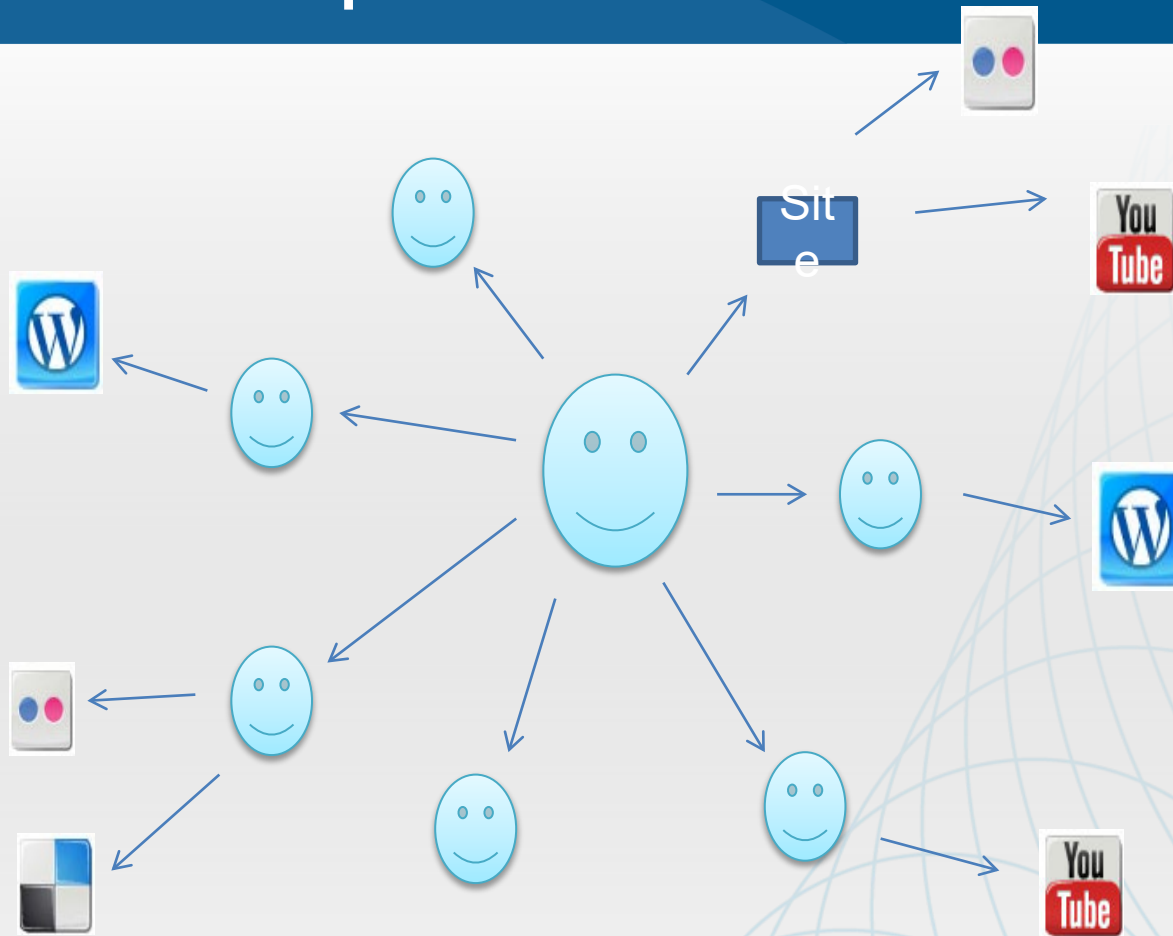


4. Second student finds link to third student's resource

# Course Provider Perspective

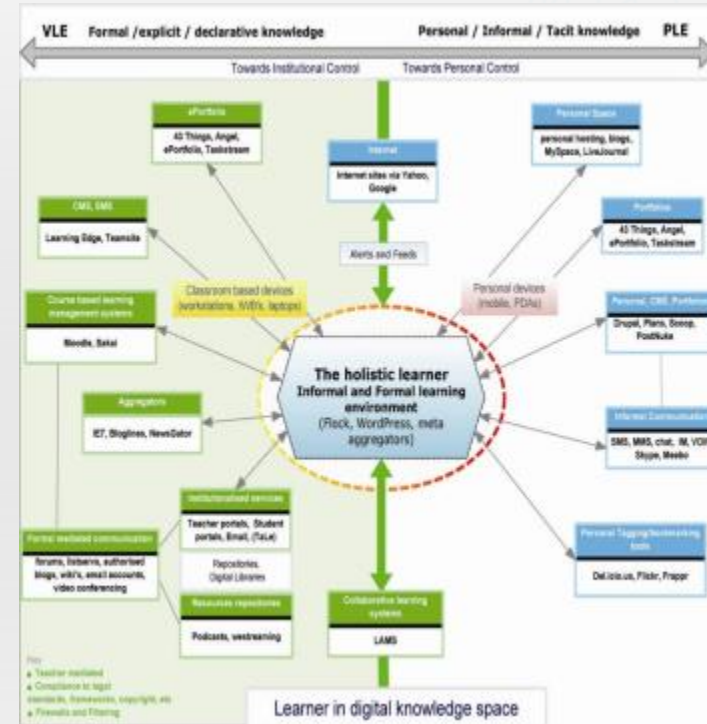
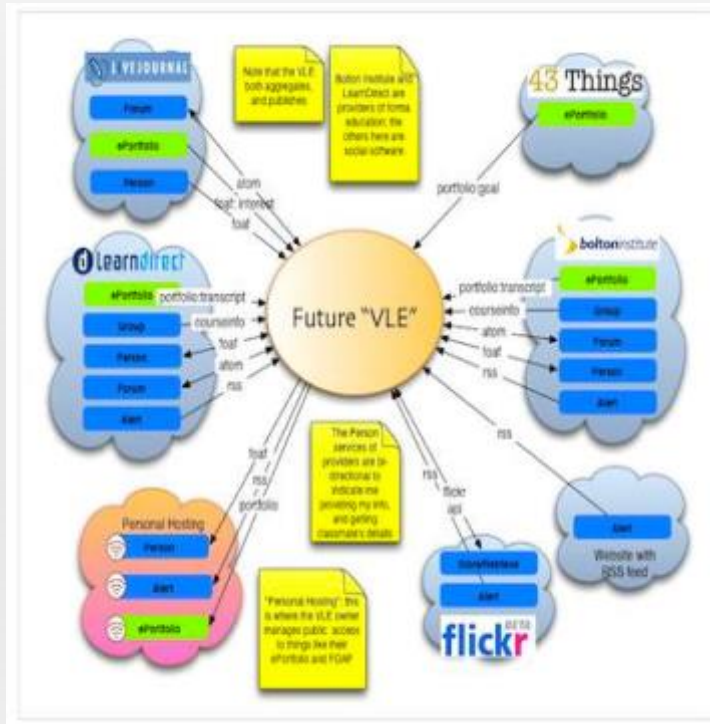


# The Student's Perspective



A range of different resources and services

# The design is based on putting the learner at the centre

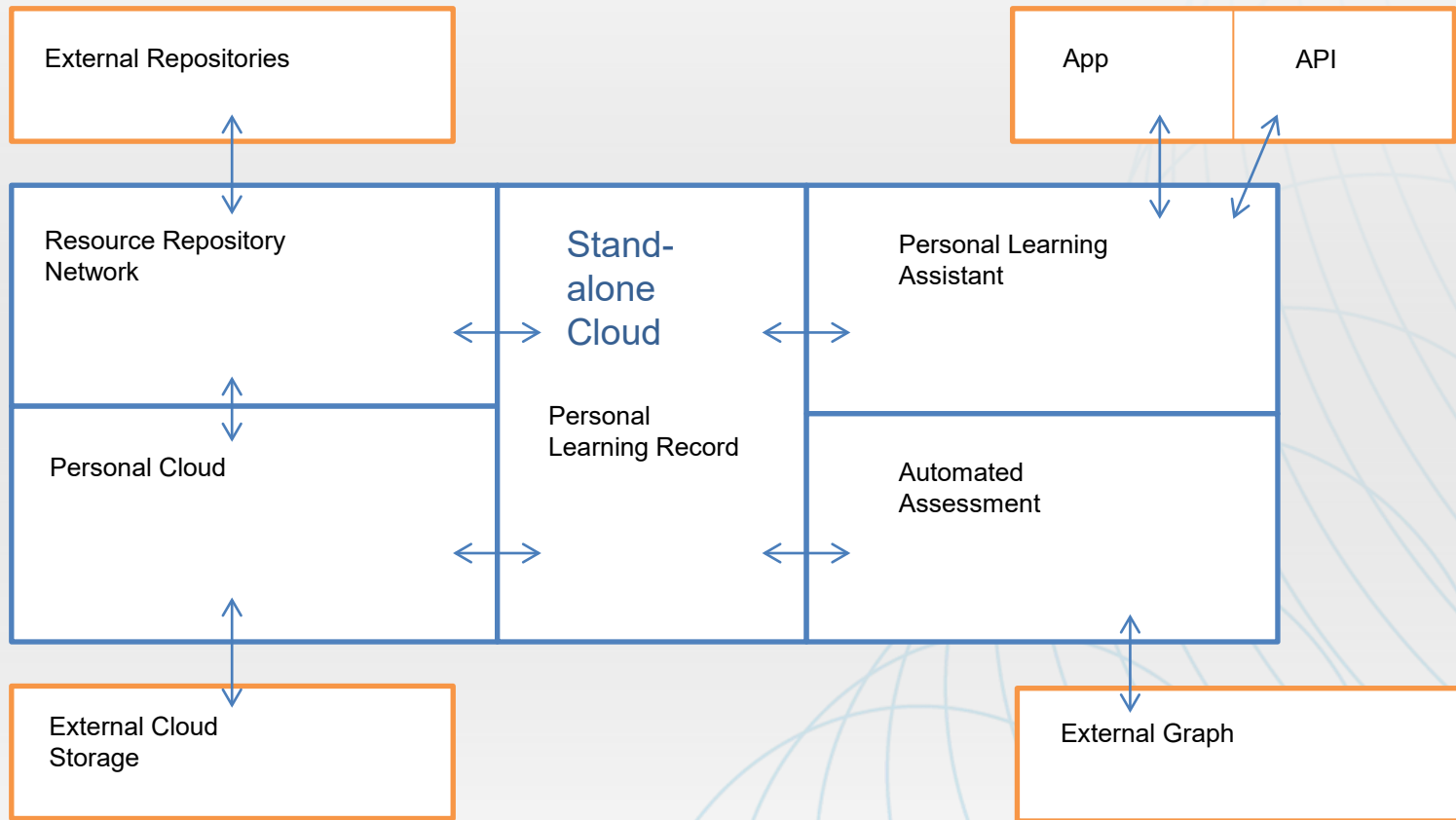


Scott Wilson (left), Tim Hand (right)

<https://www.google.com/search?q=ple+diagrams>

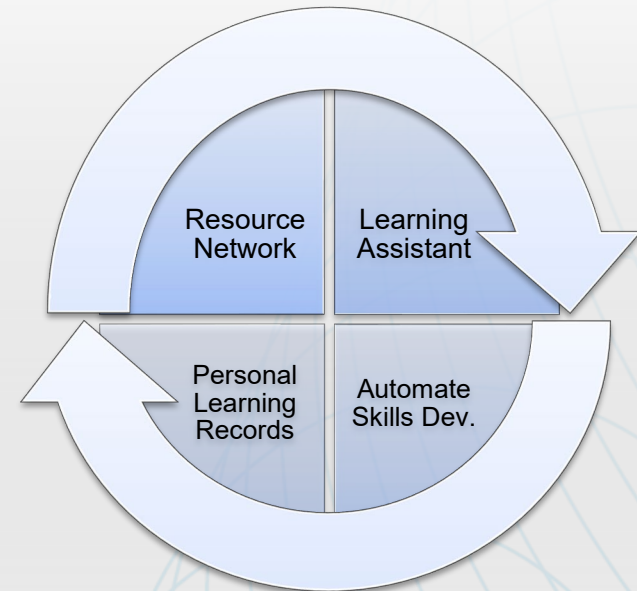
[http://www.edtechpost.ca/ple\\_diagrams/index.php/mind-map-3](http://www.edtechpost.ca/ple_diagrams/index.php/mind-map-3)

# Simplified Design



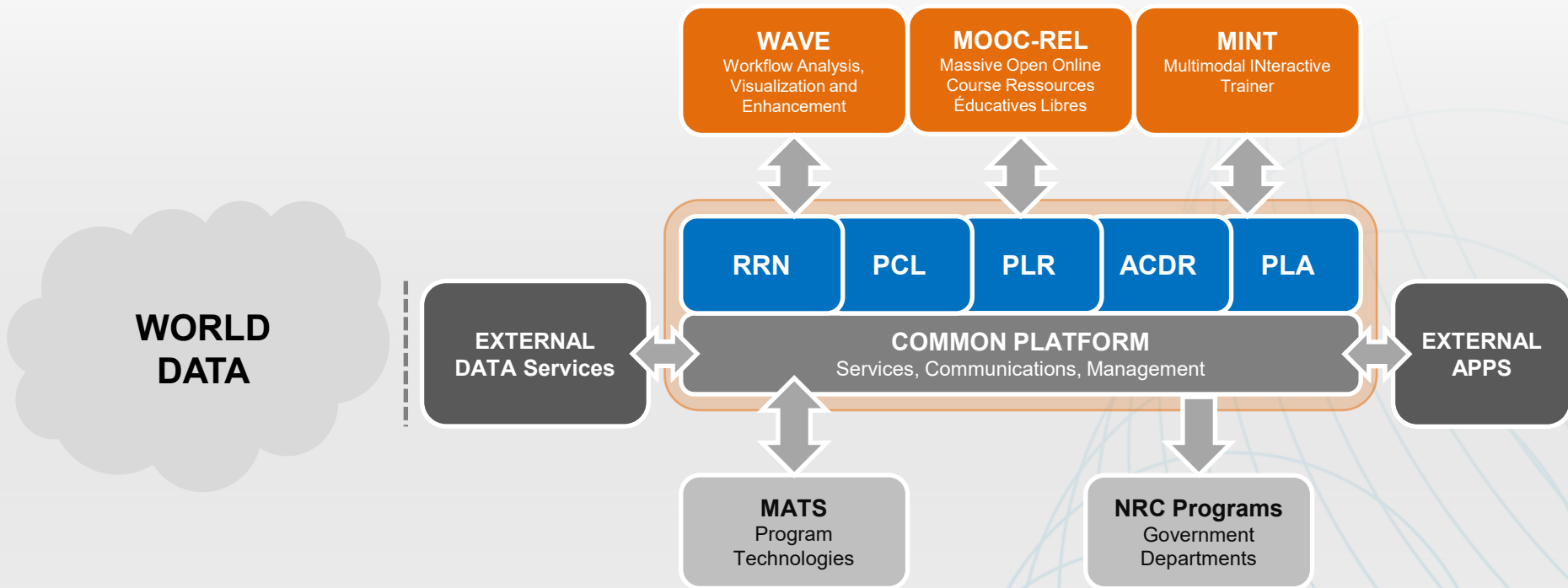
# Learning and Performance Support System: Core Technology Development Projects

- Learning services network and marketplace
- Automated skills development and recognition
- Lifetime management of learning and training records and credentials
- Personal learning assistant to view, update and access training



- Learning as a cloud service and deep integration with external systems

# Program Design and Scope

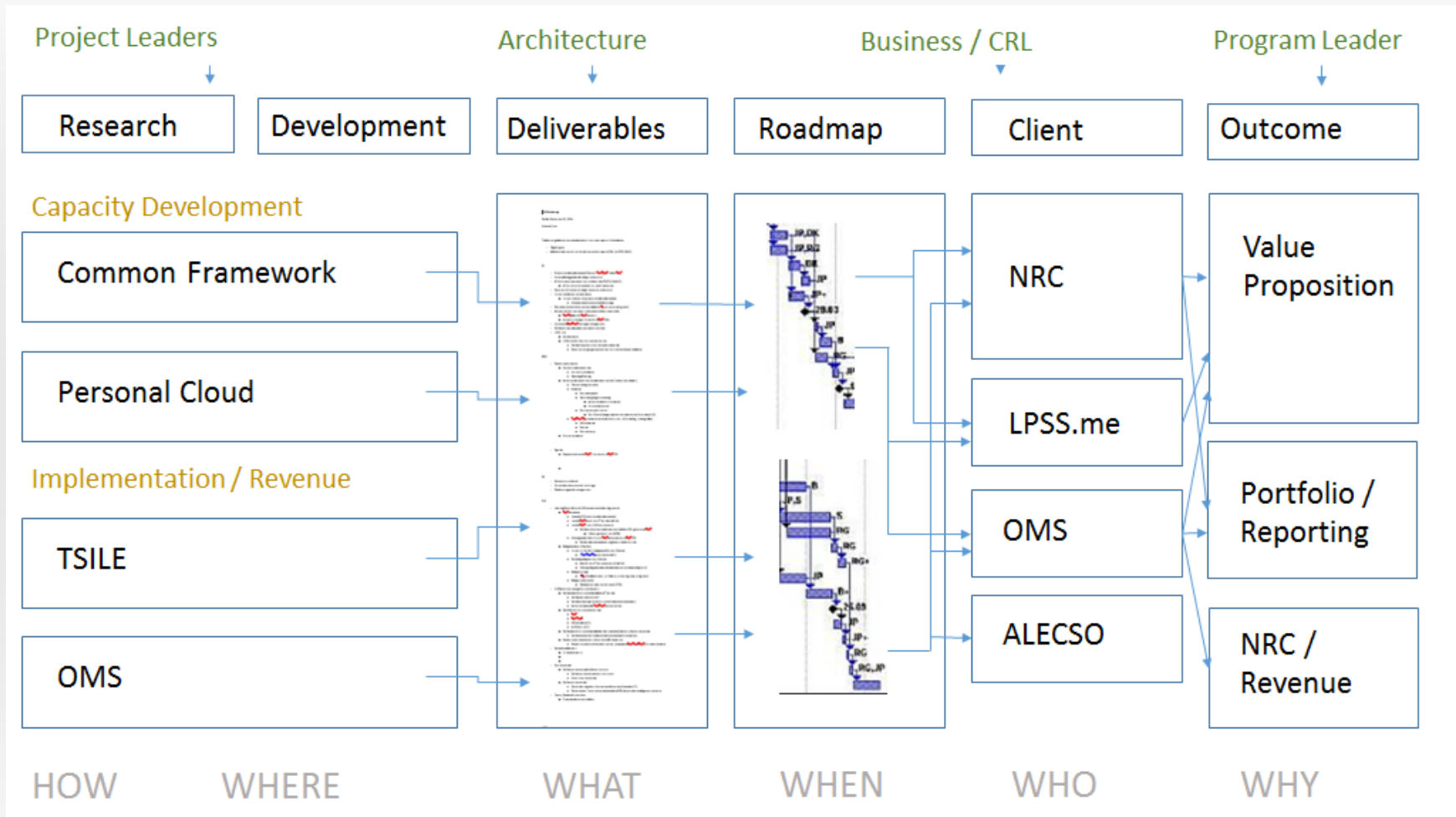


**Blue:** Core technology projects

**Orange:** Implementation projects with commercial clients

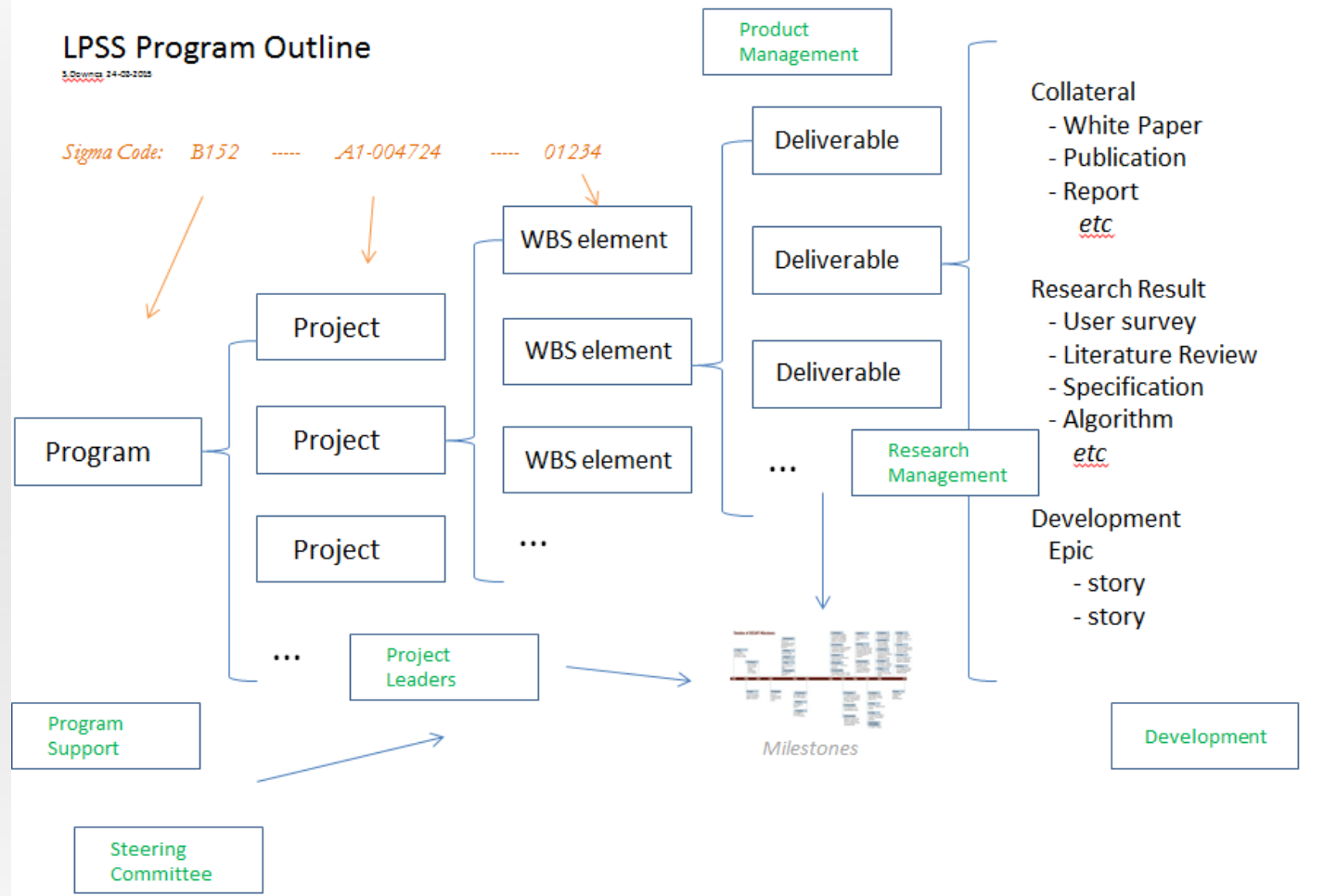
**Grey:** Infrastructure, other NRC programs, external services

# Program Organization

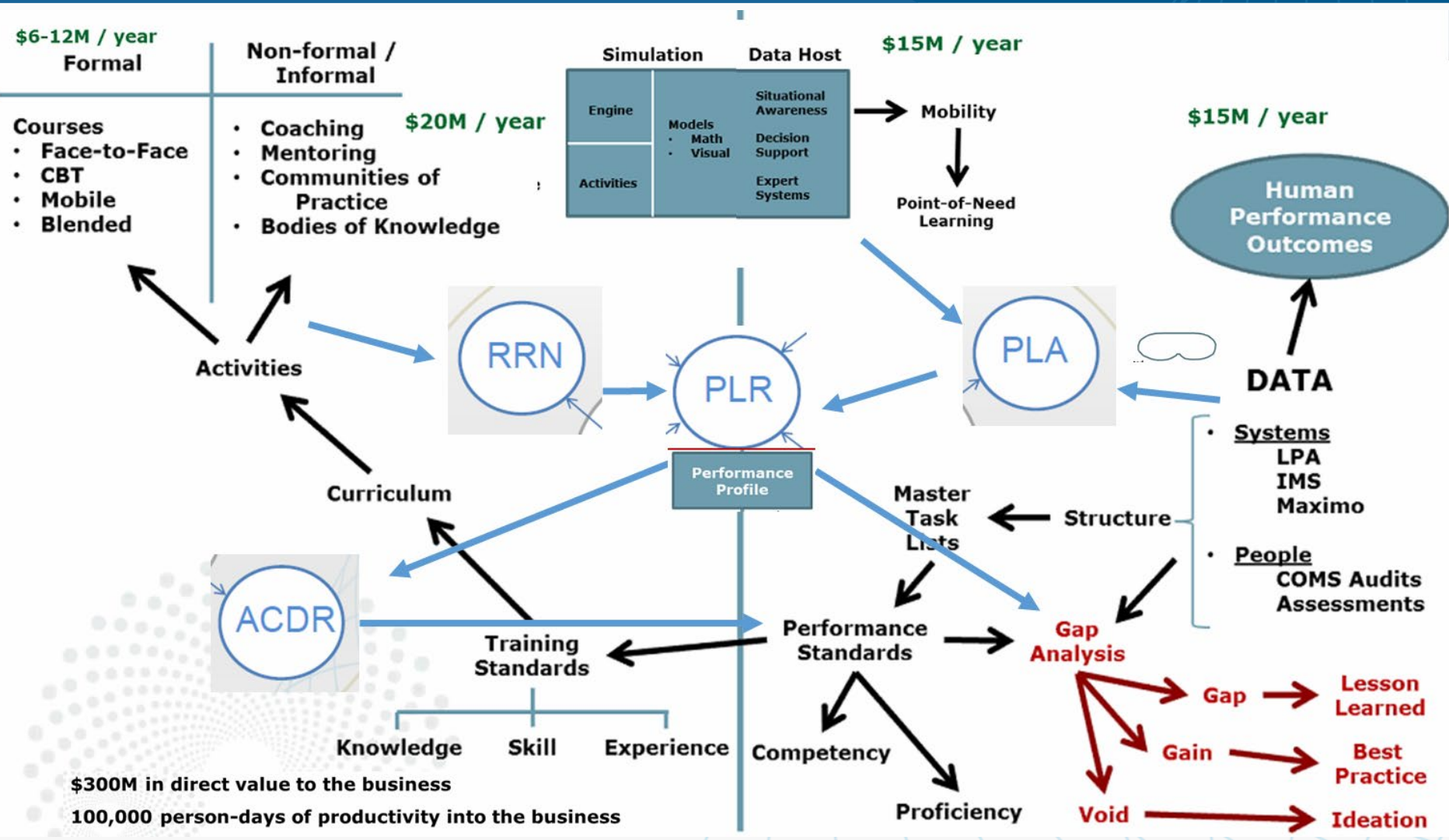




# Program Outline

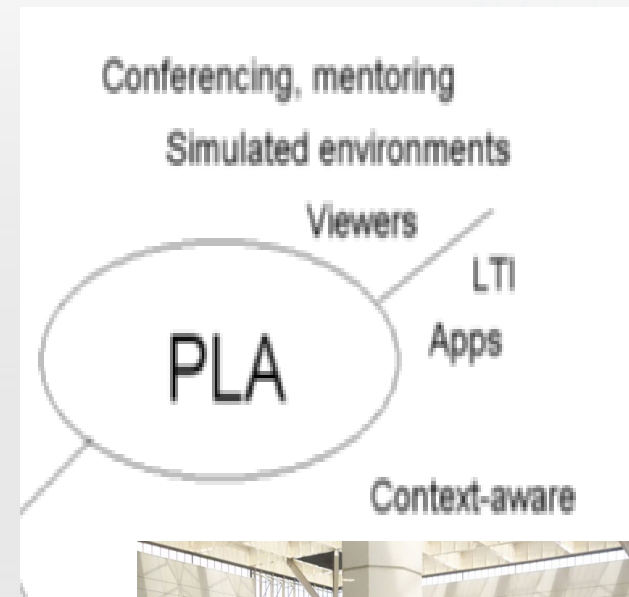


# LPSS in Context

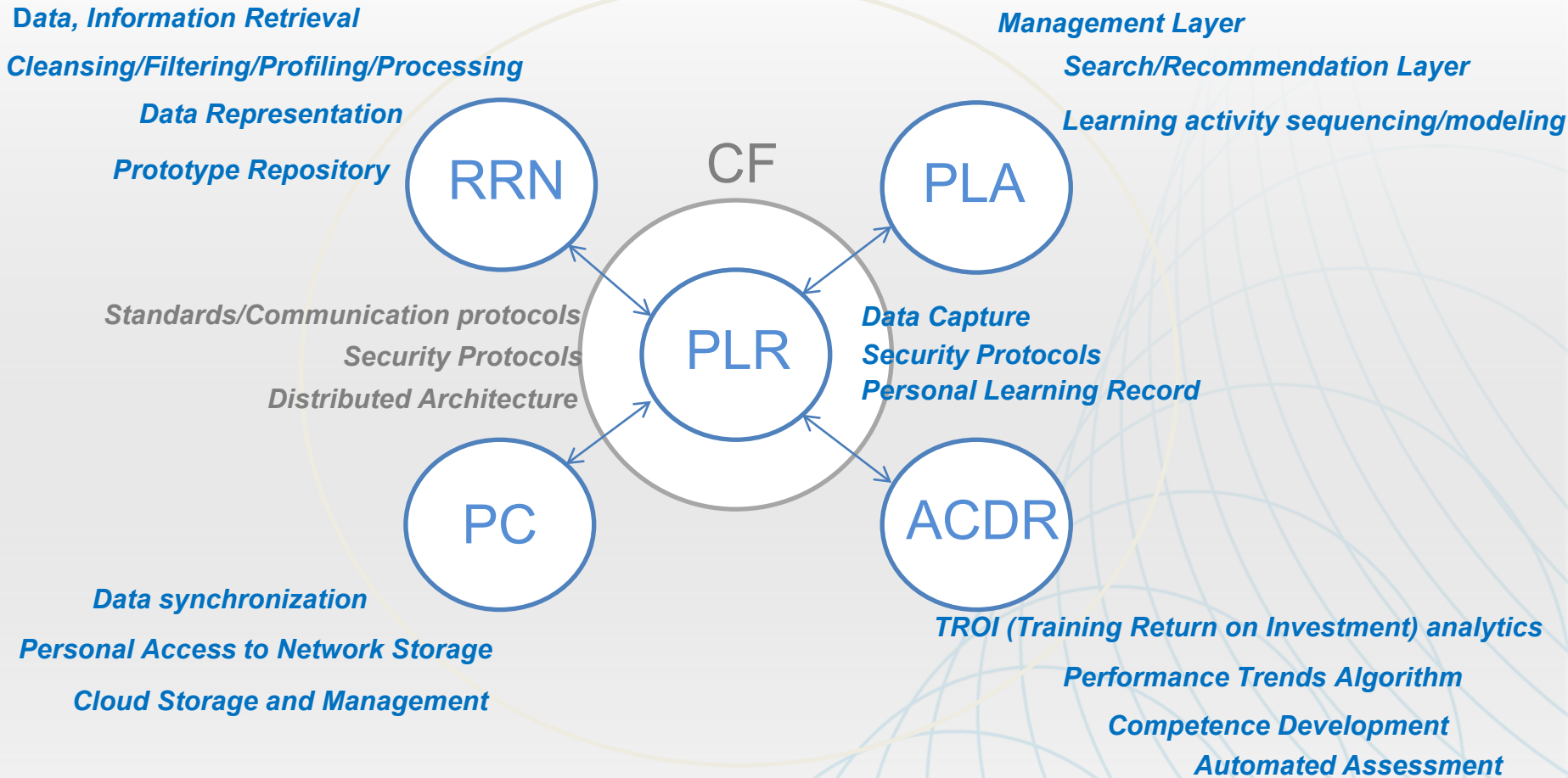


# Personal Learning Assistant

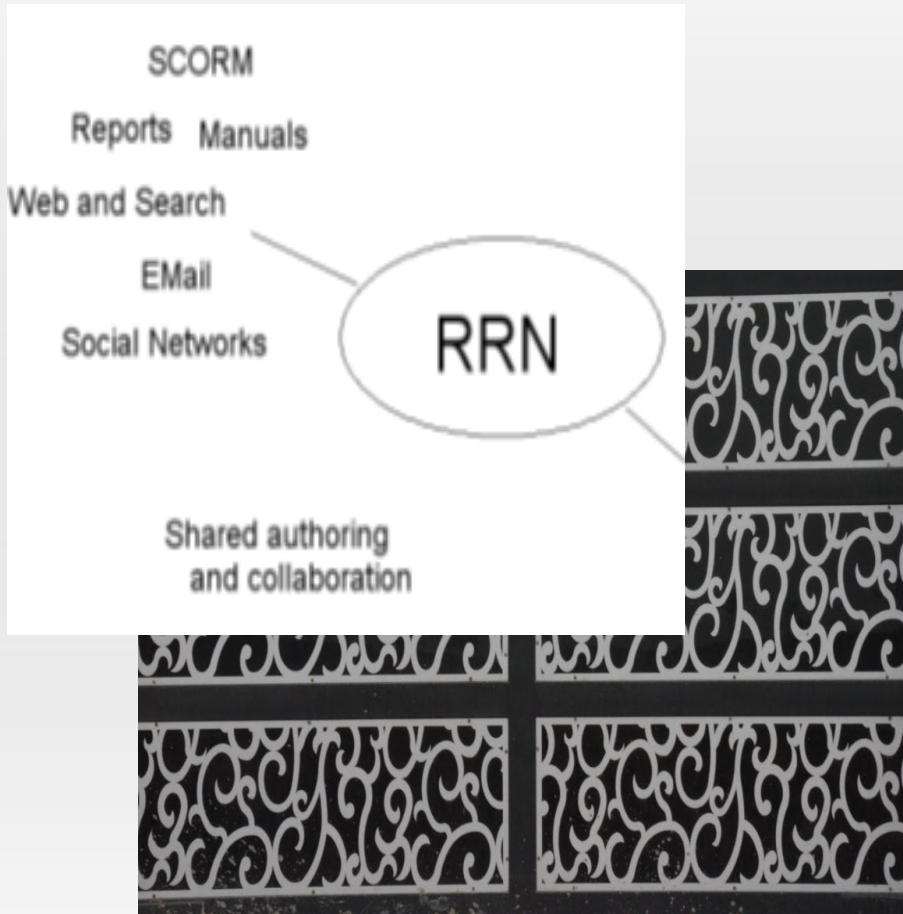
- Collect contextual information for system
- Display resources of various formats, including SCORM, LTI, etc.
- Support (scaffolded) authoring environments
- Project LPSS capacity into external software and devices



# Project Details



# Resource Repository Network



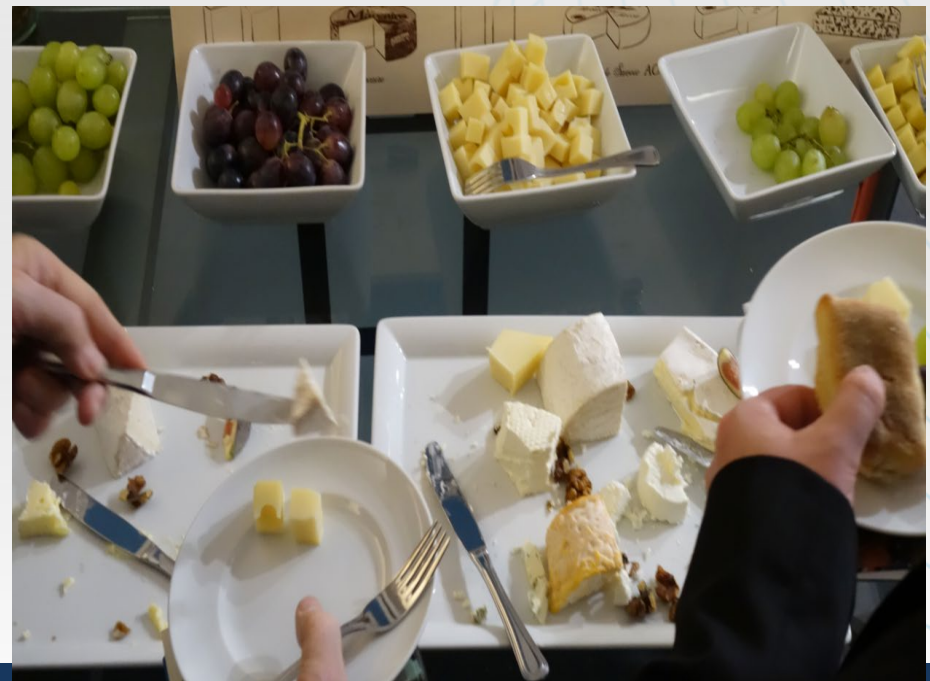
Manage and discover list of sources and resources

Maintain authentication and credentials

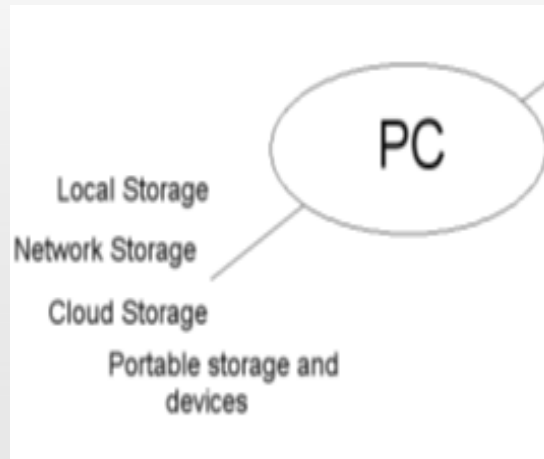
Support APIs and metadata standards

Gather, analyze and sort resources and/or metadata

Synchronized cloud data services (including Owncloud) to support data portability



# Personal Cloud



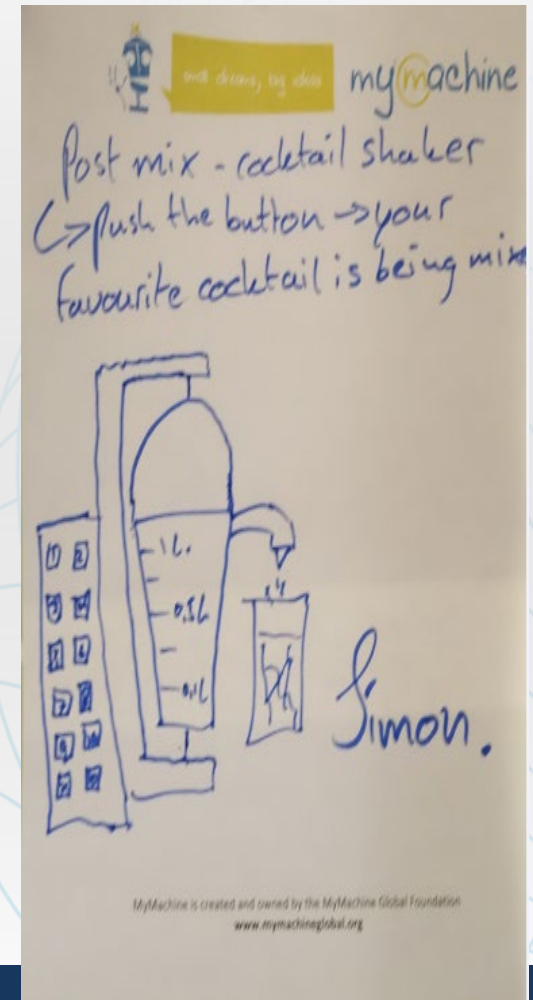
Manage list of local and remote storage systems  
Maintain security, encryption, authentication and credentials

Include local or personal device storage

Manage and synchronize resource sets and data



# Projection of learning services into multiple platforms





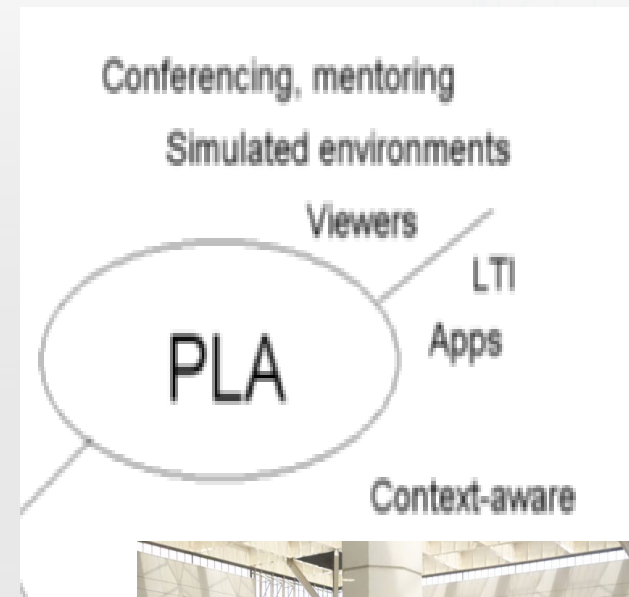
# Personal Learning Assistant

Collect contextual information for system

Display resources of various formats, including SCORM, LTI, etc.

Support (scaffolded) authoring environments

Project LPSS capacity into external software and devices





## Connecting to real learning and workplace environments

<http://www.nrc-cnrc.gc.ca/eng/rd/medical/>

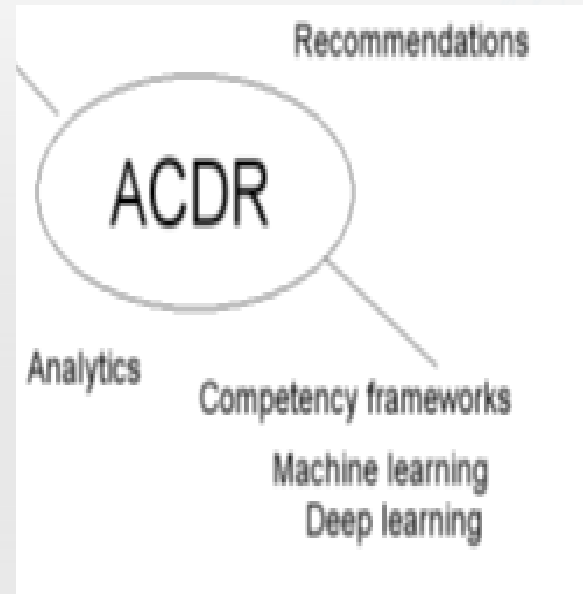
# Competency Recognition and Development

Import or create competency definitions

Analyze interactions for skills and learning gaps

Support development of learning plans

Provide resource and service recommendations



# Analytics as a service – analogy with web translation

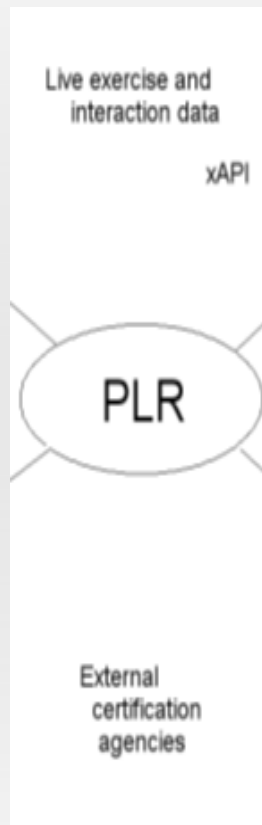




The Personal Learning Record – data owned by the individual, shared only with permissions

<http://halfanhour.blogspot.de/2014/12/eportfolios-and-badges-workshop-oeb14.html>

# Personal Learning Record



Collect full record of interactions with all resources, external systems

Support learning activity data exchange formats (eg. xAPI)

Collect and present a person's personal portfolio

Display certifications and credentials (eg. badges)

Maintain 3<sup>rd</sup> party certification

# Relevant PLR Projects

Manchester PLE  
Project  
Responsive Open  
Learning  
Environments (ROLE)

<http://www.role-project.eu/>

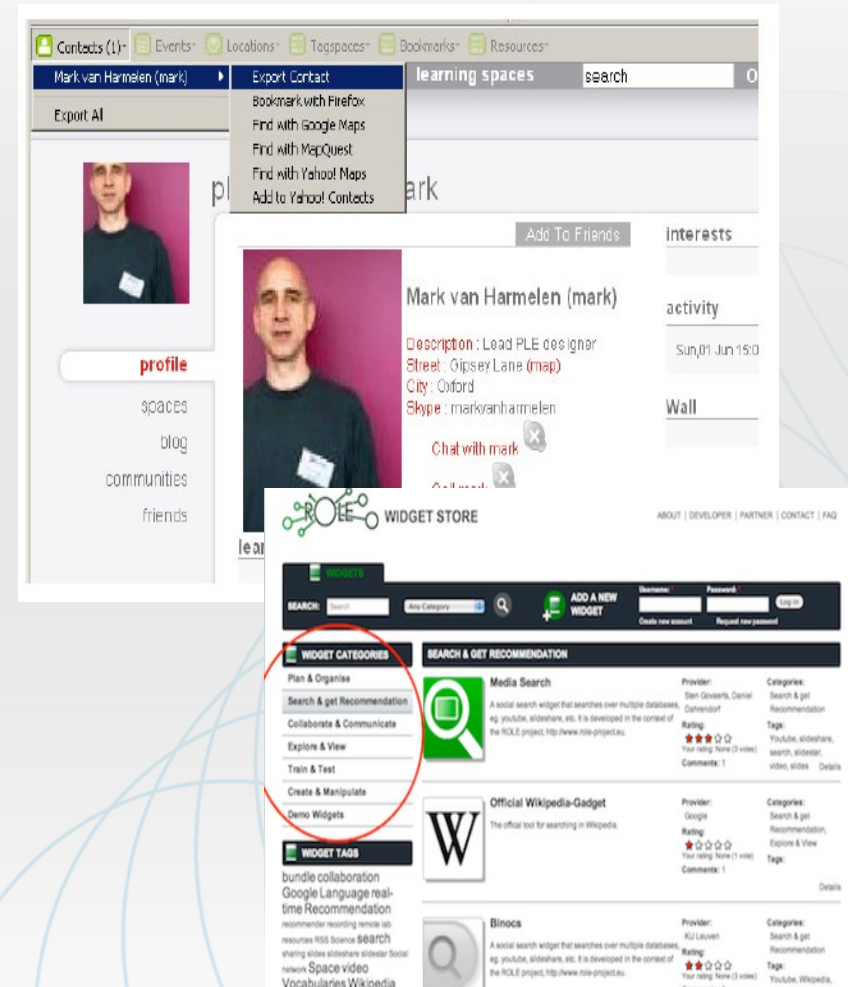
Known <http://withknown.com/>

Learning Locker

<http://learninglocker.net/>

Mahara <https://mahara.org/>

<http://personalis.wikispaces.com/PLE+Projects>



## Implementation – from MOOC to Personal Learning

MOOC-REL (OIF)

ALECSO

MINT

PCO Badges

TSILE xAPI

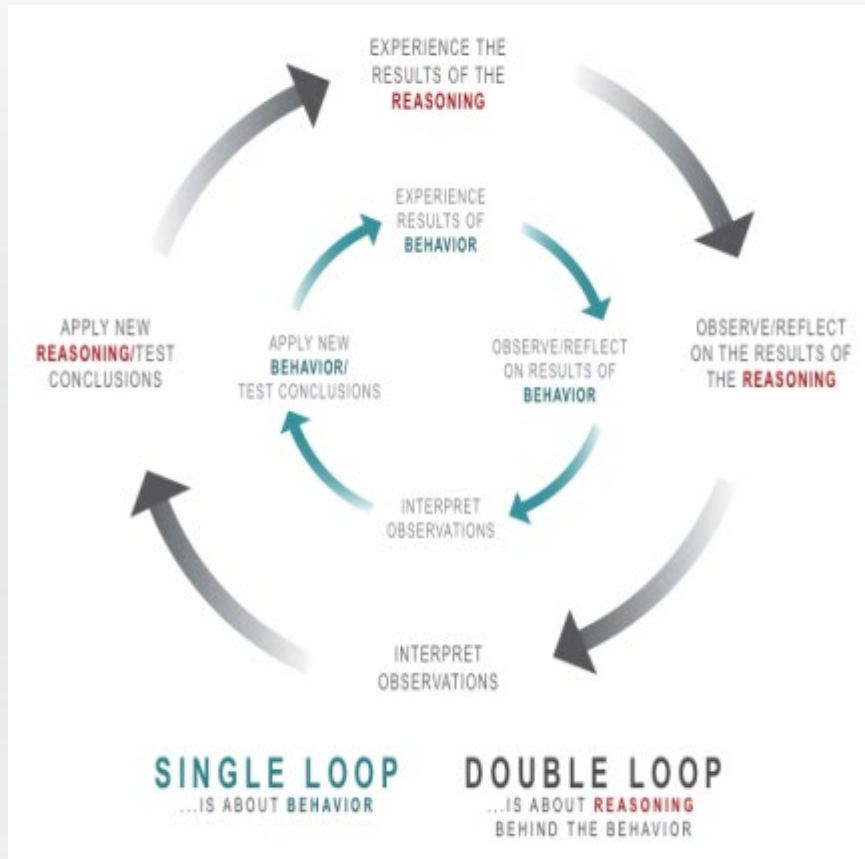
2Sim Simulator xAPI

Workplace T&D





# Implementation Projects



Ultimately, the objective is to support individual learning in a network

<http://integralleadershipmanifesto.com/manifesto/making-subject-object/>

## Why is this Difficult?

It's not one big thing...

... but a set of many small things

Tasks that are simple in an enterprise system...

- Like data storage
- Like content distribution
- Like authentication
- Like analytics

... become that much more difficult

# Launch Day



About

Log in

Forgot password

## Welcome to LPSS! - Bienvenue à SAAR!

The NRC Learning and Performance Support Systems (LPSS) will enable you to develop your own learning program from the ground up. Working with a range of industry, technology and academic partners, we are researching and developing a dynamic personal learning environment with enhanced access to resources, activities and credentials from multiple providers around the world.

*Your learning, your time, your way.*

### Thank you for your interest in the pre-release of LPSS.

Les systèmes d'aide à l'apprentissage et au rendement du CNRC ( SAAR ) vous permettra de développer votre propre programme d'apprentissage. En travaillant avec l'industrie et des partenaires académiques, nous étudions et somme entrein de développer un environnement d'apprentissage personnel dynamique avec un meilleur accès aux ressources, aux activités, et aux attestations d'études à partir de plusieurs fournisseurs à travers le monde.

*Votre apprentissage, votre temps, votre chemin.*

### Merci de votre intérêt pour la version prédiffusion de SAAR.

[Sign-up for the pre-release! »](#)

[Inscription à la prédiffusion »](#)

# http://lpss.me – prototype PLE

**LPSS** Resources Competencies Learning record About Help Settings Logout

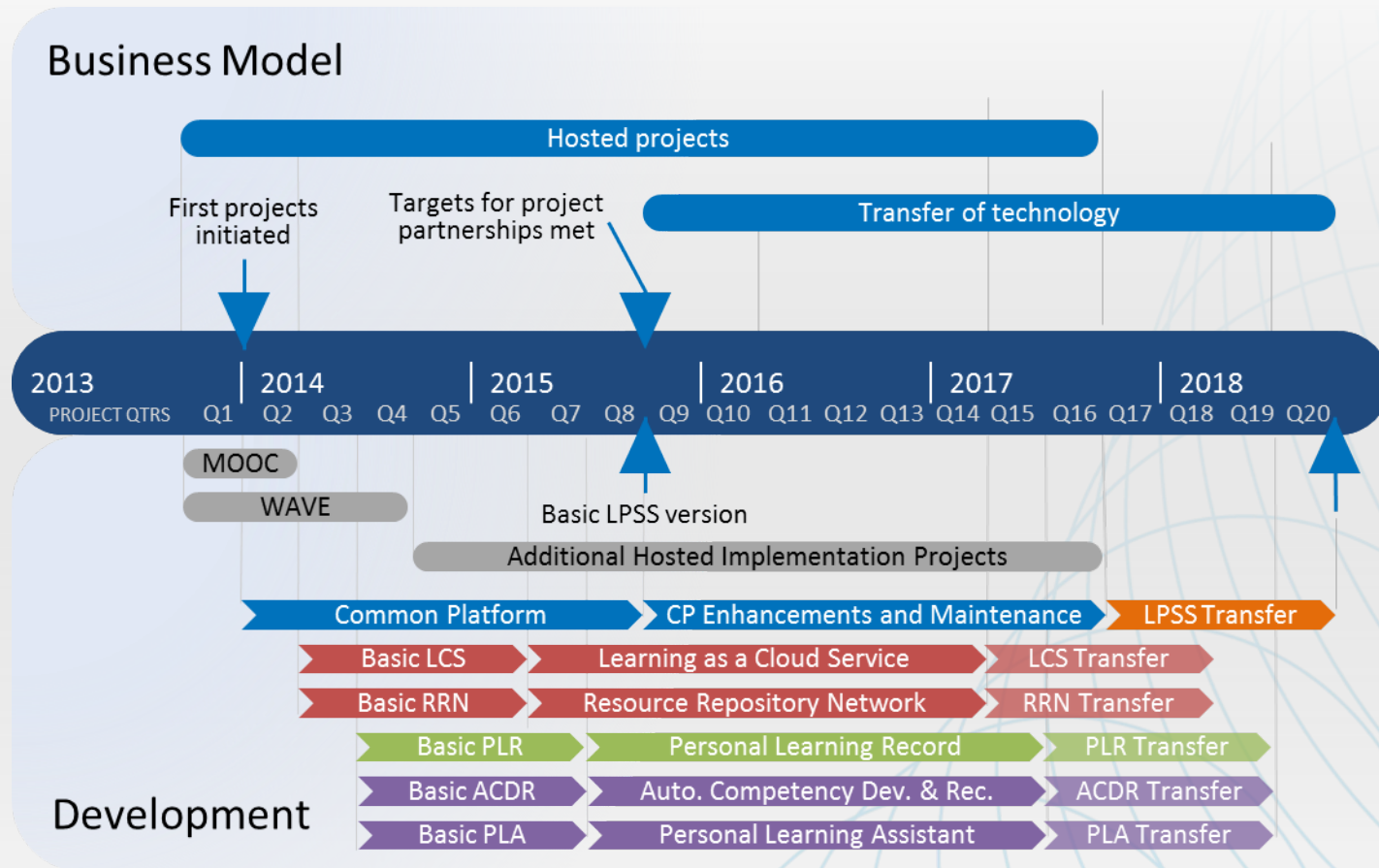
## Browse competencies [help]

Search for what interests you Search 1 2 3 ... 7 > >>

Competency  Import  Competency hierarchies  Only my competencies  Competencies

Acknowledges the practical limits of a system for problem solving [1] <input type="checkbox"/> Add to my profile resources: 69	Analyze a situation in a systematic manner. [2] <input type="checkbox"/> Add to my profile resources: 19	Applies different software development methodologies [1] <input type="checkbox"/> Add to my profile resources: 59	Be familiar with adult learning techniques such as mentoring, coaching, and the sharing of expertise and best practices. [2] <input type="checkbox"/> Add to my profile resources: 72	Communicate to clients those activities that can and cannot be done. [2] <input type="checkbox"/> Add to my profile resources: 15
Acts with fairness, courtesy and good faith towards clients, colleagues and others [1] <input type="checkbox"/> Add to my profile	Analyze issues to separate the cause from the symptoms. [2] <input type="checkbox"/> Add to my profile resources: 16	Applies the correct statistical methods to analyze and investigate data [1] <input type="checkbox"/> Add to my profile	Build mutual trust by being reliable, consistent and credible. [2]	Communication [2] <input type="checkbox"/> Add to my profile resources: 10

# Program Implementation Timeline



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