

A large, detailed mural in a semi-circular dome. The scene is filled with numerous figures, many of whom are shirtless or wearing simple, draped clothing. Some figures have their arms raised in a gesture of protest or triumph. The background is a dramatic, fiery orange and red, suggesting a scene of intense conflict or a significant historical event. The overall style is reminiscent of Mexican muralism, with strong contrasts and a focus on human figures.

Design Elements in a Personal Learning Environment

Stephen Downes
Guadalajara, Mexico
August 17, 2015

Challenges and Opportunities



Technology surrounds us with new opportunities, yet we face historical challenges

... For Institutions



- Changing business models are challenging established institutions
 - Music Industry
 - Publishing Industry
 - Uber, AirBNB
- Centralized design model making it difficult to adapt to changing needs
 - Curricula
 - Standardized Tests
 - Robot Instructors

... For Government and Society

- Skills shortages and productivity gaps
- 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 SHORTAGES 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 worker shortages is in the mining sector, that.

NEWS RELEASE 14-09
The Conference Board of Canada

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 jobs, 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

money that could provide substantial and social benefits to Ontarians. The skills gap could help the province pay down public debt or invest in much needed infrastructure improvements," said Michael S. Lee, 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."



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

Font size: A A A

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.



... For Individual Learners



- Access to learning opportunities remain elusive
- The cost of tuition and textbooks is too high
- Learning and development needs continue after graduation
- Difficulties exist in finding employment and matching skills to opportunities

Our Approach: Personal Learning and Performance Support Systems

Single point of access to all skills development and training needs

- It's personal and you carry it with you
- It's a network – we don't put everything in one package
- Different types of things, not just courses:
 - Access to learning resources
 - Calling cards and communications
 - Credentials, permits and licenses



Why NRC? Our Distinct Leverage

- NRC is a globally recognized leader in emerging learning technologies
 - LPSS benefits from NRC's research in other fields
- NRC is deeply connected to the e-learning industry
 - NRC by contrast has collaboration and commercialization experience
 - Neutral broker reduces risk to technology development partners

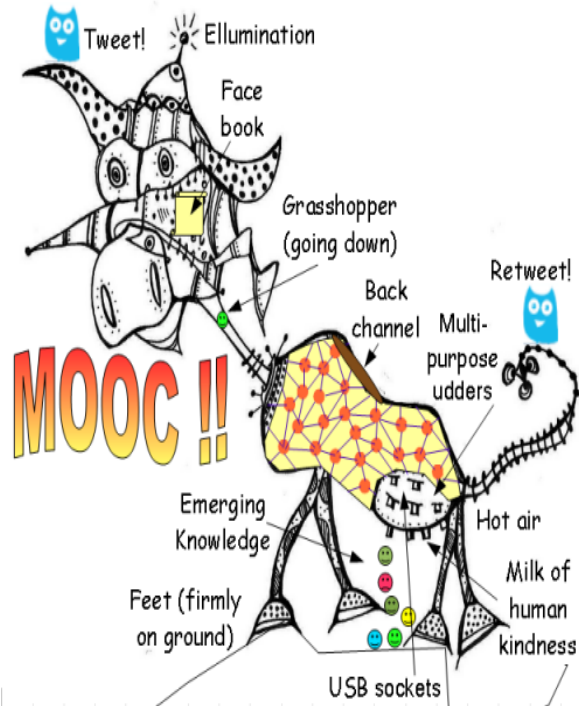


NRC – Previous Work in eLearning



- 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

The MOOC



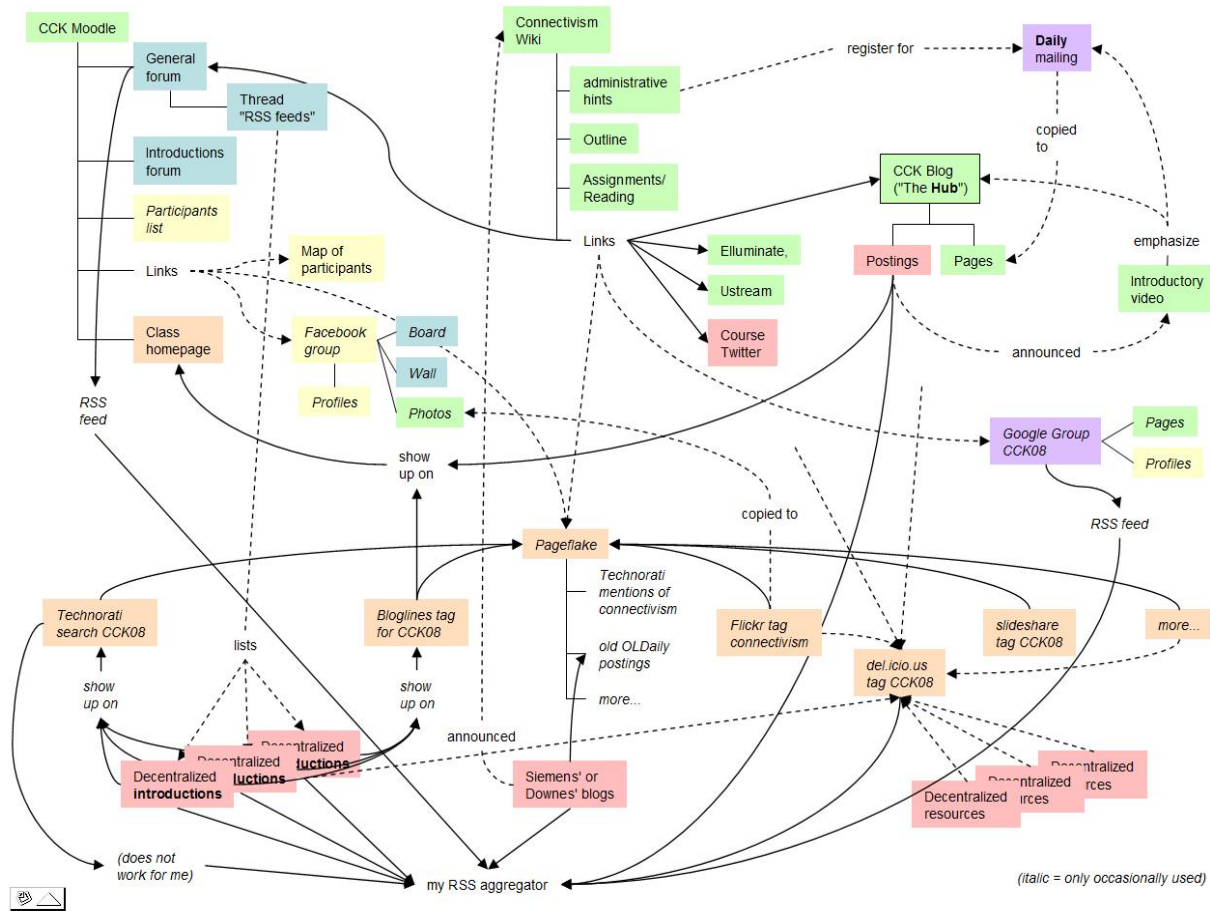
Massive – by design

Open – gratis and libre

Online – not blended, not wrapped

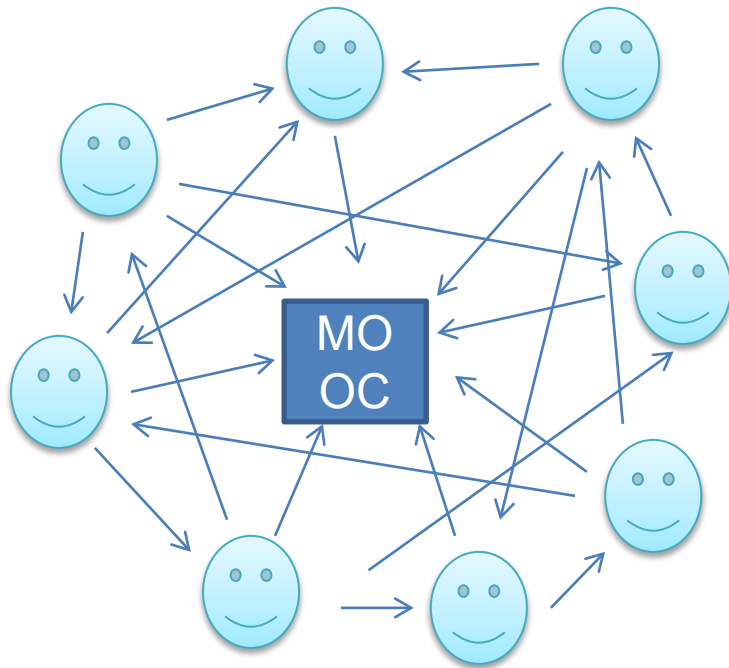
Courses – not communities, websites, video collections, etc

MOOC as Connected Applications



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

MOOC as One Part of a Wider Network



To us, a MOOC was not a single website or application, but instead, a way of connecting people to *each other* in order to share and learn cooperatively

CCK08

The screenshot shows a Moodle course page titled "Connectivism and Connective Knowledge". The page includes a "Topic outline" section with a list of weeks and topics. A calendar on the right shows the course dates for February 2013. The course description states it is a twelve-week course exploring connectivism and connective knowledge.

Topic outline

- Introductions
- Google Map of participants
- General Forum
- Connectivias Spanish pagellakes site
- Connectivism English Pageflakes site
- Week 1: What is connectivism
- Week 2: Rethinking Knowledge
- Week 3: Networks
- Week 4: History of Learning Networks
- Week 5: Groups and Networks
- Week 6: Complexity and Chaos
- Week 7: Instructional Design
- Week 8: Power, Authority, Control
- Week 9: Changing Roles
- Week 10: Openness
- Week 11: Systemic Change
- Week 12: Next Steps and Research

1 What is Connectivism?
2 Rethinking epistemology: Connective knowledge
3 Properties of Networks
4 History of networked learning
5 Connectives and Collectives: Distinctions between networks and groups
6 Complexity, Chaos and Research
7 Instructional design and connectivism
8 Power, control, validity, and authority in distributed environments
9 What becomes of the teacher? New roles for educators
10 Openness: social change and future directions

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

2300 students

The screenshot shows the "The Daily" page from the course. It features a green header "Connectivism & Connective Knowledge" and navigation links for [Home], [The Daily], [Wiki], [About], [Aggregations], and [Readings]. Below are links for [Options], [The Daily Archives], [The Daily RSS Feed], [Feeds], [Posts], and [Places]. The main content includes the title "The Daily" and the date "October 15, 2008". The section "Elluminate Discussions Today" welcomes Alec Couros and mentions two sessions accessible via a link. The "Highlighted Resources" section includes "Connected Without Modem?" and a quote from Muru about feedback and coercion.

Connectivism & Connective Knowledge

[Home] [The Daily] [Wiki] [About] [Aggregations] [Readings]

[Options] [The Daily Archives] [The Daily RSS Feed] [Feeds] [Posts] [Places]

The Daily

October 15, 2008

Elluminate Discussions Today

Today we welcome Alec Couros into our course and our week 6 discussion of chaos and complexity. Two Elluminate discussions (both sessions can be [accessed via this link](#)): 11 am CST: See [time zone conversions](#) 7 pm CST: See [time zone conversions](#). Alec Couros will be presenting during both times, followed by informal conversation.

Highlighted Resources

[Connected Without Modem?](#)
Is feedback a form of coercion? Muru writes, "I have seen some behaviourism taking place in the feedback or lack of feedback given, I perceive some kind of light coercion going on, not in a direct way. It is in a vicarious way, I ignore your behavior and acknowledge the behaviour that I consider right for

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

Other Courses

PLENK2010
Personal Learning Environments
Networks and Knowledge 2010

home discussion wiki the daily blog live sessions recordings about

Schedule

WEEK OF...
12TH SEPTEMBER 2010
[A TOUR OF PLEs AND PLNs](#)

19TH SEPTEMBER 2010
[CONTRASTING PLEs WITH LMSS](#)

26TH SEPTEMBER 2010
[THE NEXT/EXTENDED WEB](#)

3RD OCTOBER 2010
[PLE/PLN AND LEARNING THEORIES](#)

10TH OCTOBER 2010
[EVALUATING LEARNING IN PLE/NS](#)

17TH OCTOBER 2010
[USING PLEs SUCCESSFULLY](#)

24TH OCTOBER 2010
[PLE/N TOOLS](#)

31ST OCTOBER 2010
PERSONAL KNOWLEDGE

Welcome to the Course

YOU ARE LOGGED IN AS [NAME]

SEE I CAN PLENK, YOO!

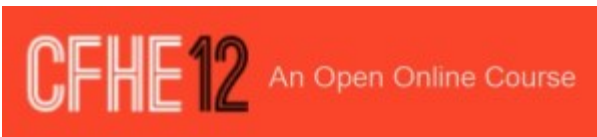
PLENK 2010

If you would like to register for PLENK2010 there's still time!
[Click here to Register](#)

If you have subscribed to The Daily, then you will receive the course materials.

1800 students

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



3000 students

<http://edfuture.net/>

CHANGE.MOOC.CA

home about contact

YOU ARE LOGGED IN AS DOWNES [OPTIONS] [LOGOUT]

Week 35: Terry Anderson
Change in formal education systems

Announcements

Terry Anderson Session Recording

Terry Anderson's week35 session recordings:

- [MP3 Audio](#)
- [Elluminate Recording](#)
- [Slides](#)

Week 35: Terry Anderson

Live Session Today

This is the last week of the Change11 course and we are pleased to welcome Terry Anderson. Our live session is **TODAY**.

Contents

Calendar

This Course

- [Home Page](#)
- [About This Course](#)
- [Course Outline](#)
- [How It Works](#)
- [Course Facilitators](#)
- [Your Privacy](#)
- [Contact Us](#)

Your Account

- [Register](#)
- [Login](#)
- [Manage Account](#)

2800 students

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

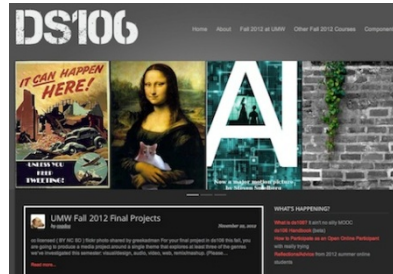
cMOOC vs xMOOC



networks

tasks

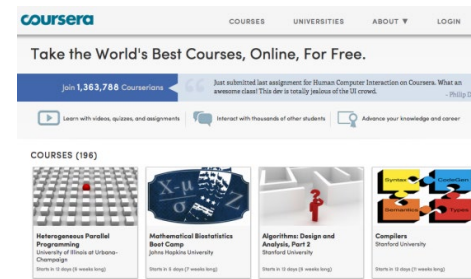
content



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



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



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

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



Design Principles

Autonomy

- Choice of contents
- Personal learning
- No curriculum

Openness

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

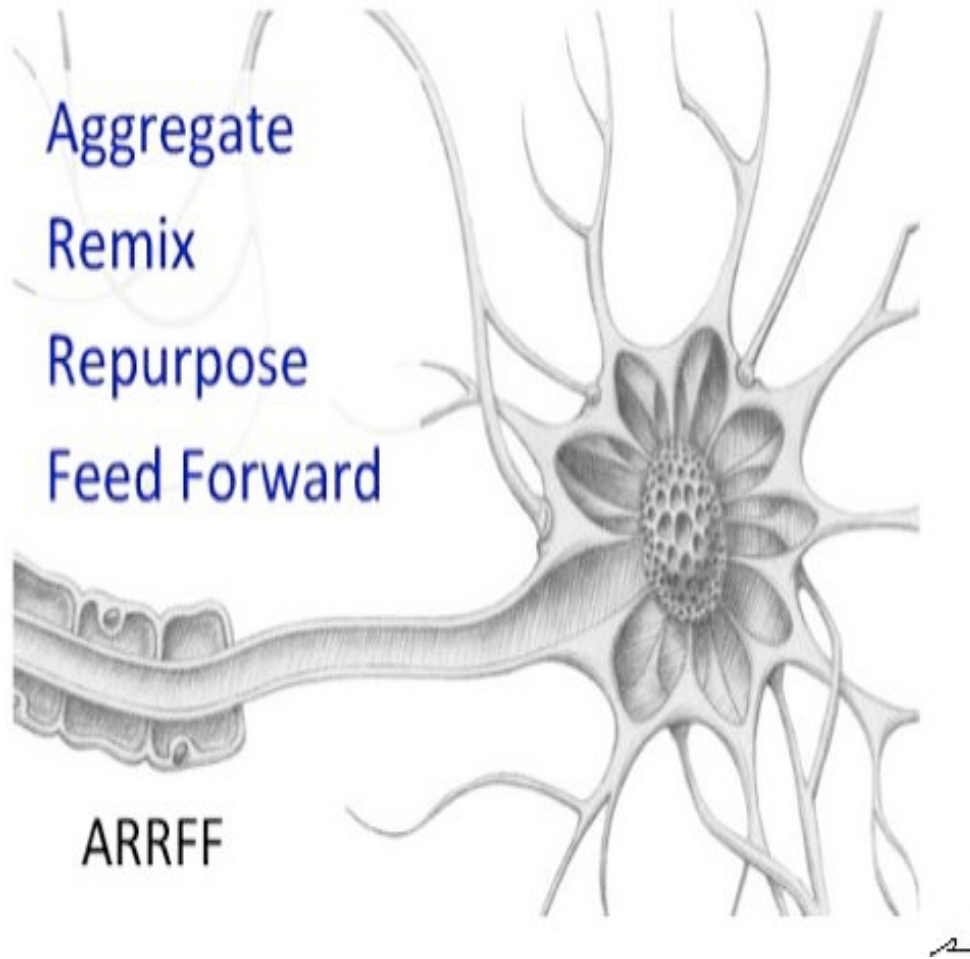
Diversity

- Multiple tools
- Individual perspective
- Varied content

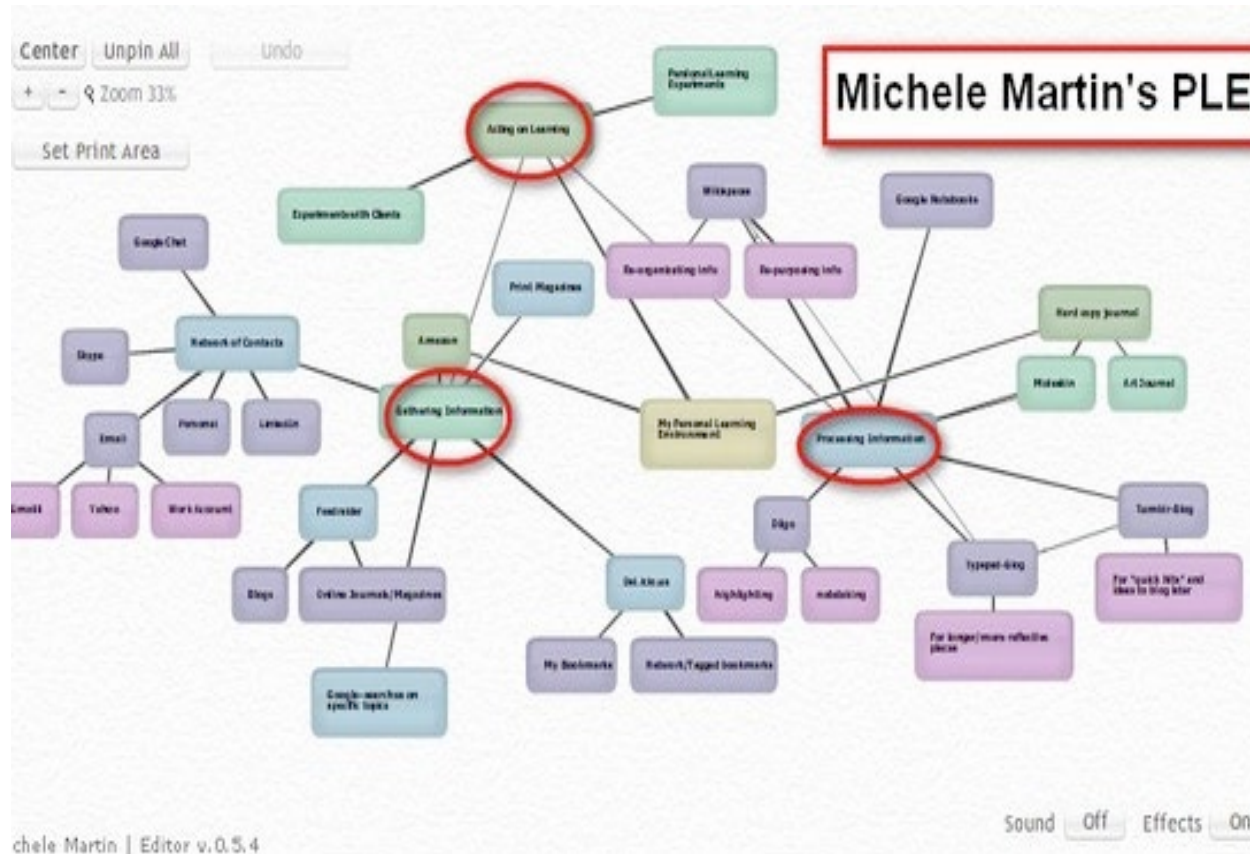
Interactivity

- Encourage communication
- Cooperative learning
- Emergent knowledge

Pedagogy of the cMOOC



Personal Learning



<http://dmlcentral.net/blog/howard-rheingold/diy-u-interview-anya-kamenetz> <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

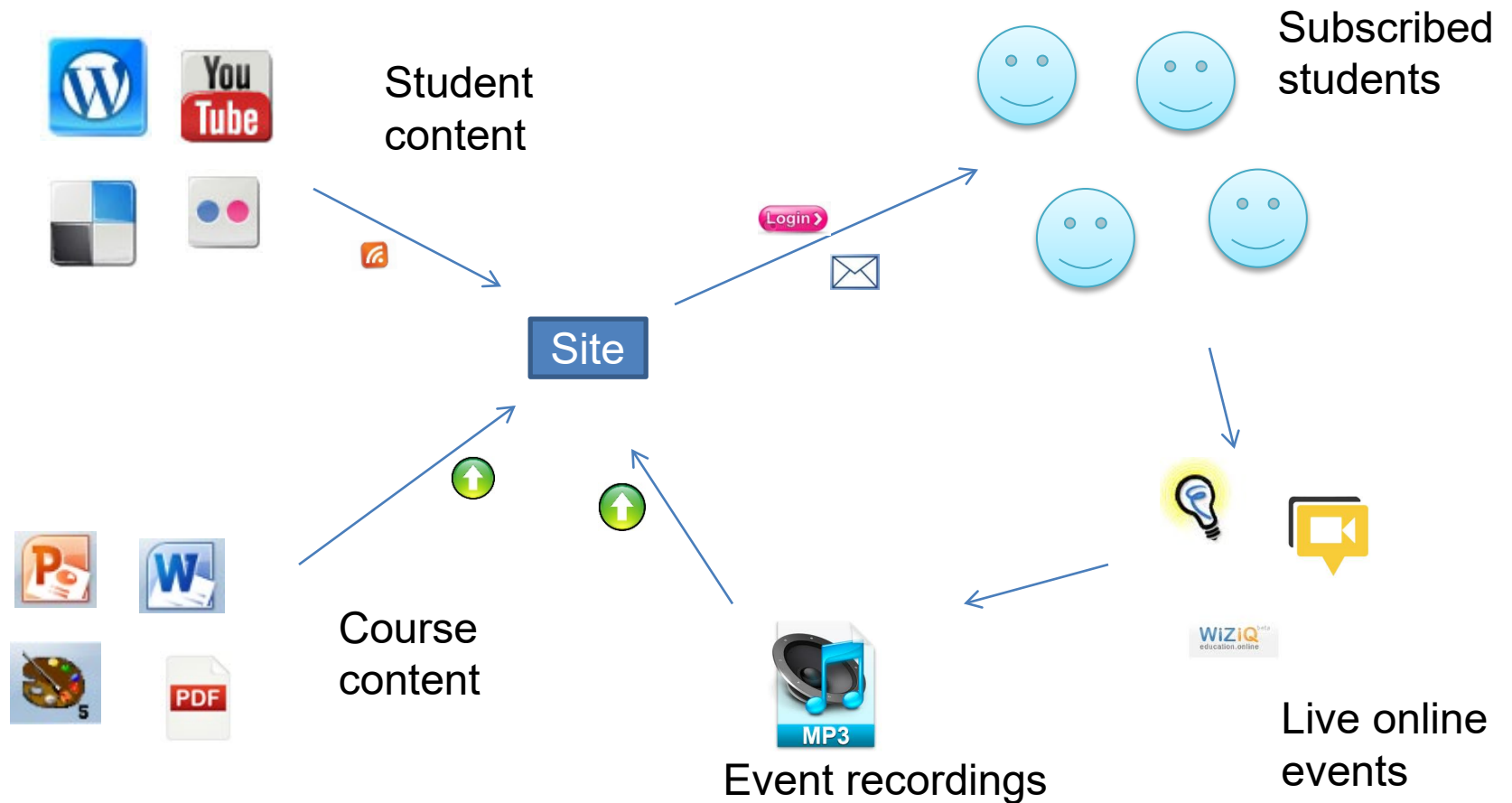


3. Second student accesses the resource directly

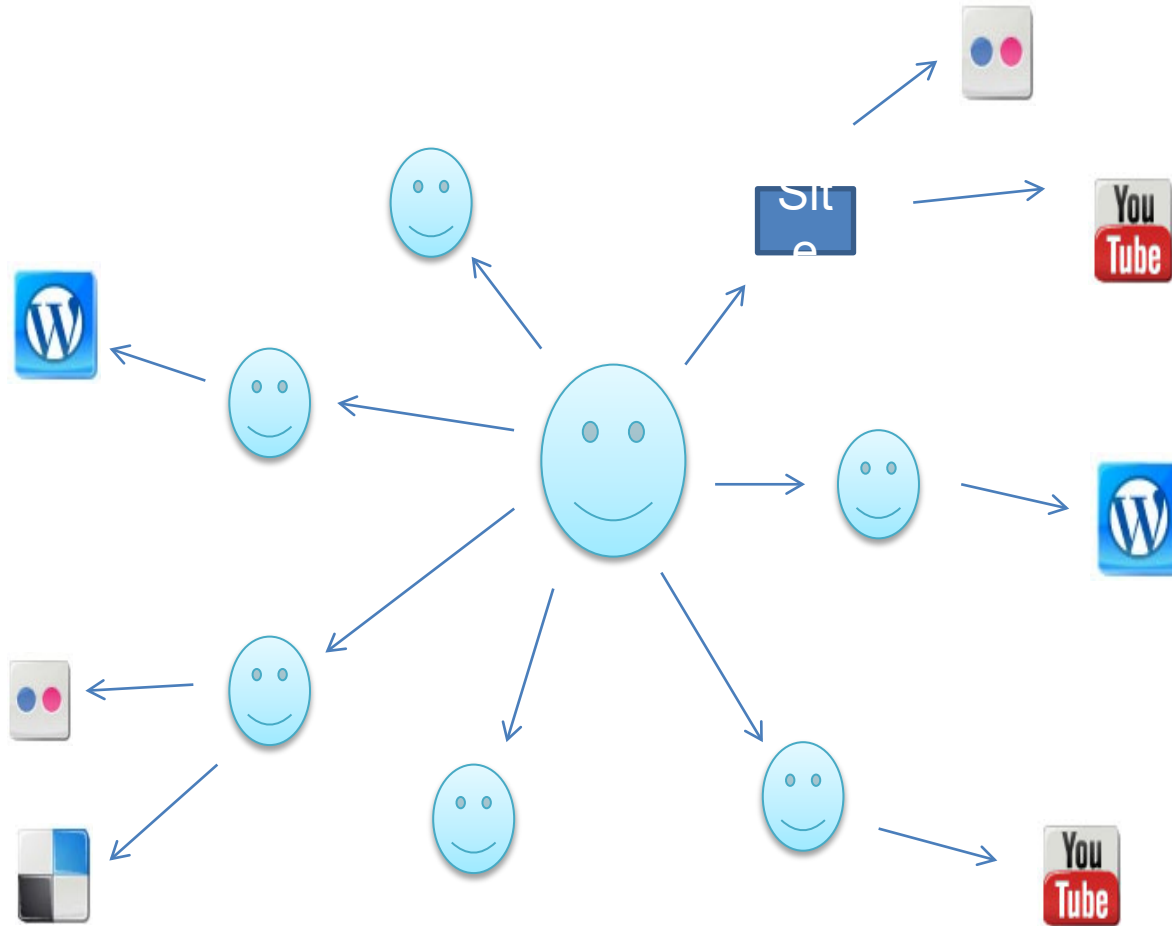


4. Second student finds link to third student's resource

Course Provider Perspective

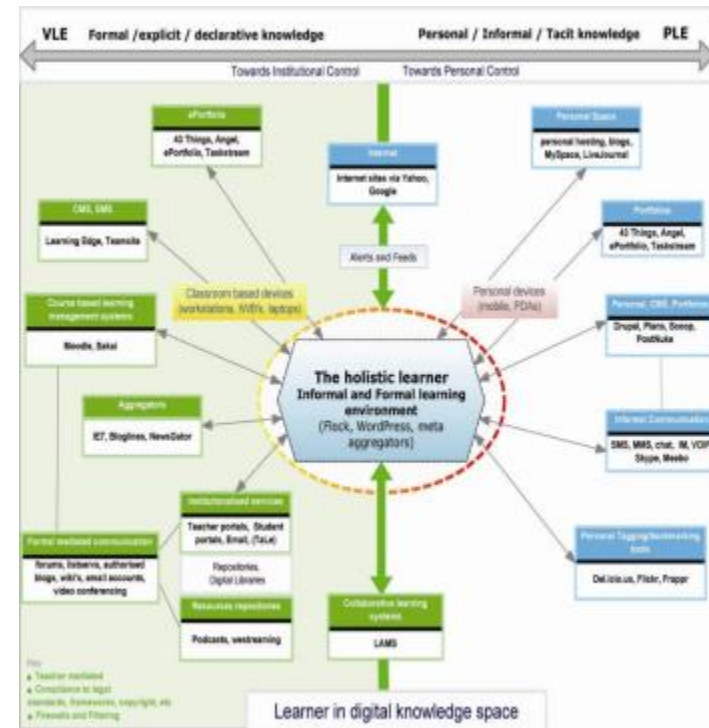
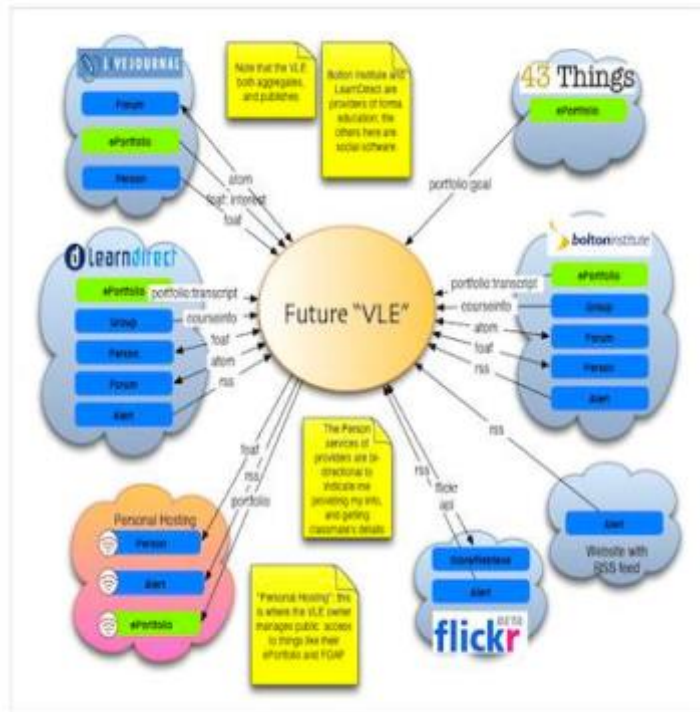


The Student's Perspective



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

LPSS is Built Around the Personal Learning Record

This is a *new* type of data – we call it the *personal graph*.



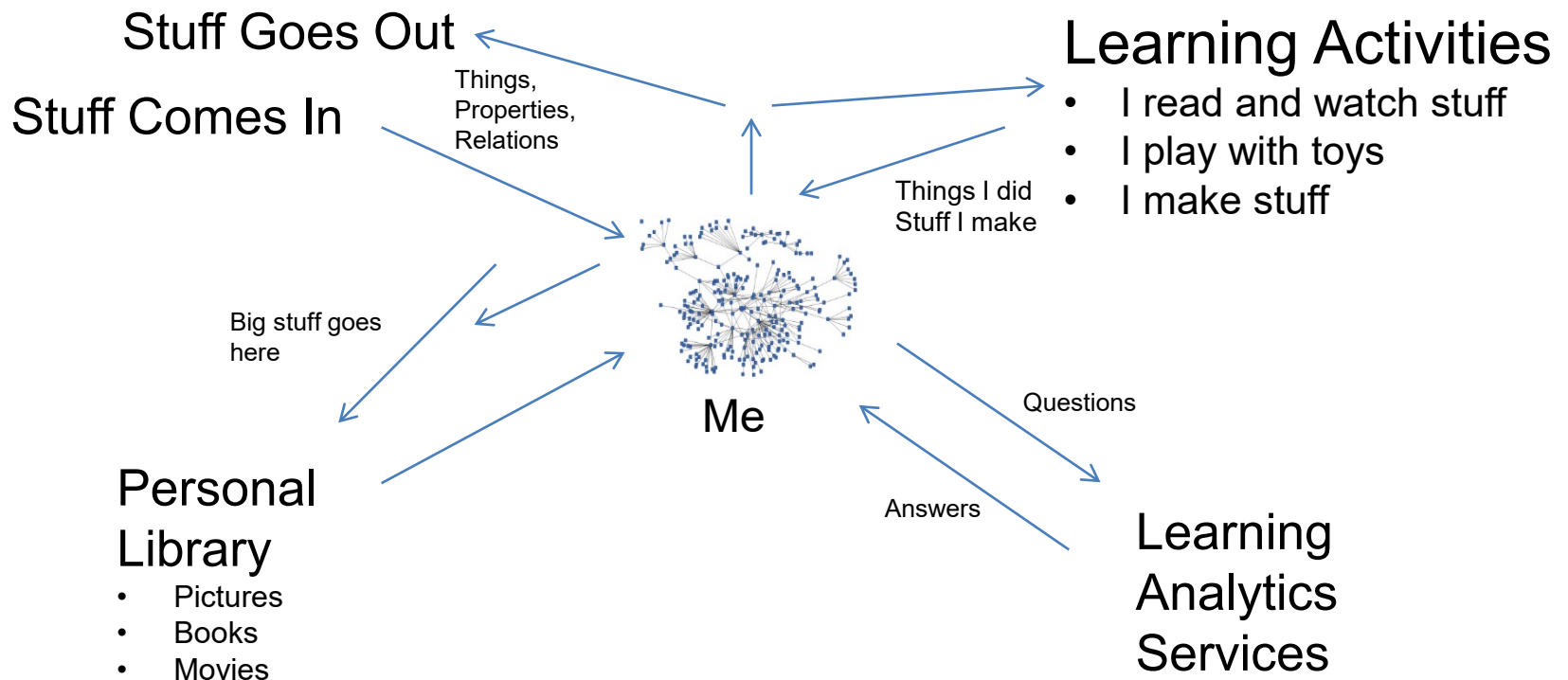
Me

Each person has their own *private* personal graph.

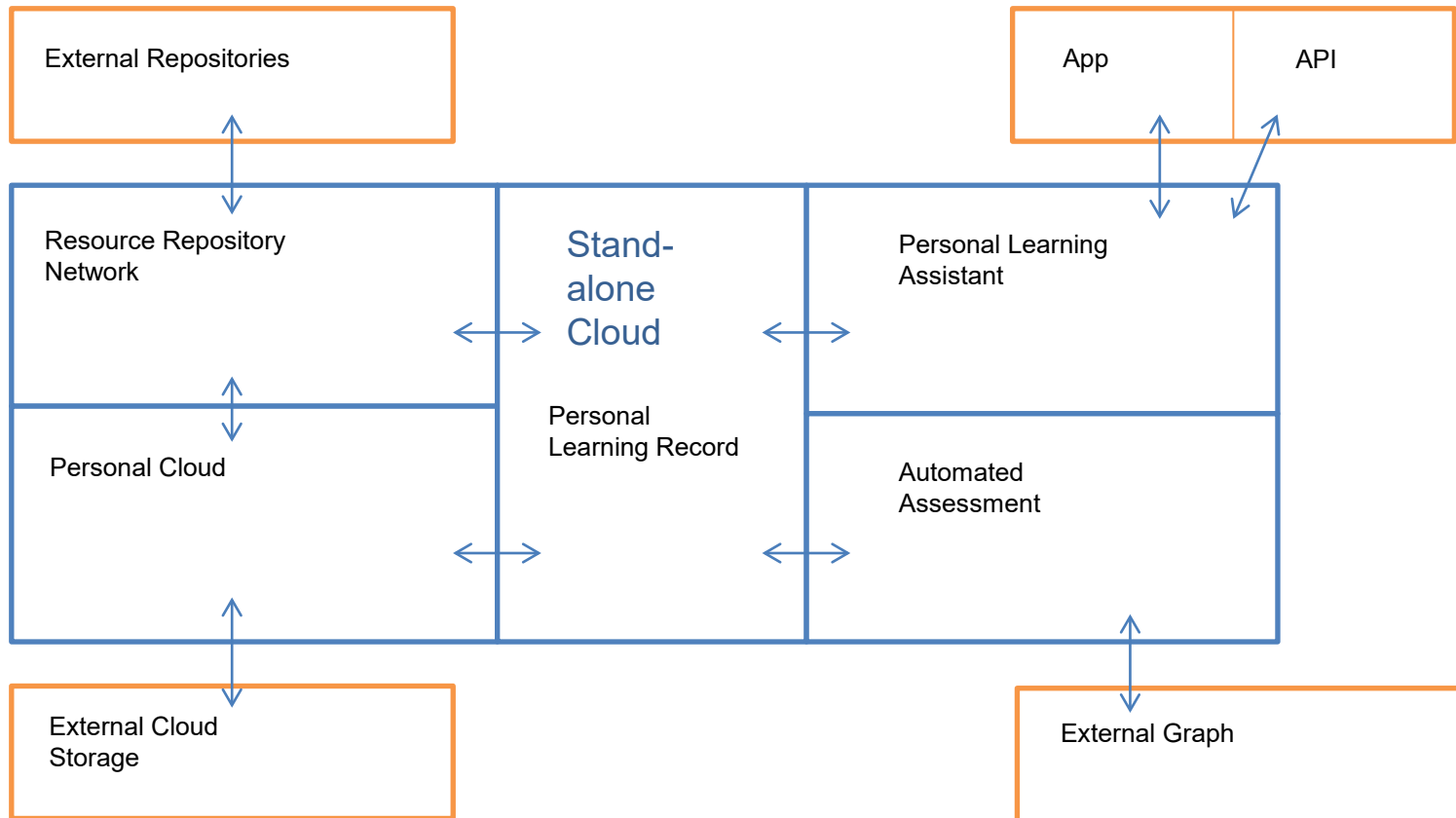
The PLR contains all a person's learning records, including:

- certificates, badges and credentials
- activity records, test results, scores
- Assignments, papers, drawings, things they create

LPSS is Built Around the Personal Learning Record

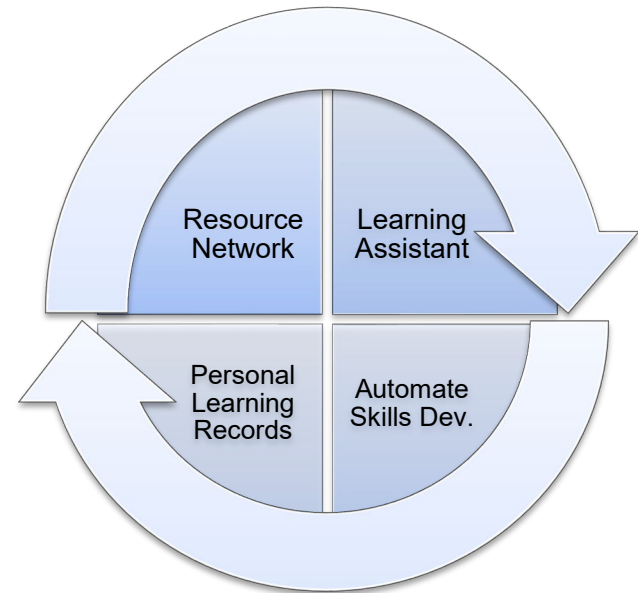


Simplified Design of the LPSS Personal Learning Architecture

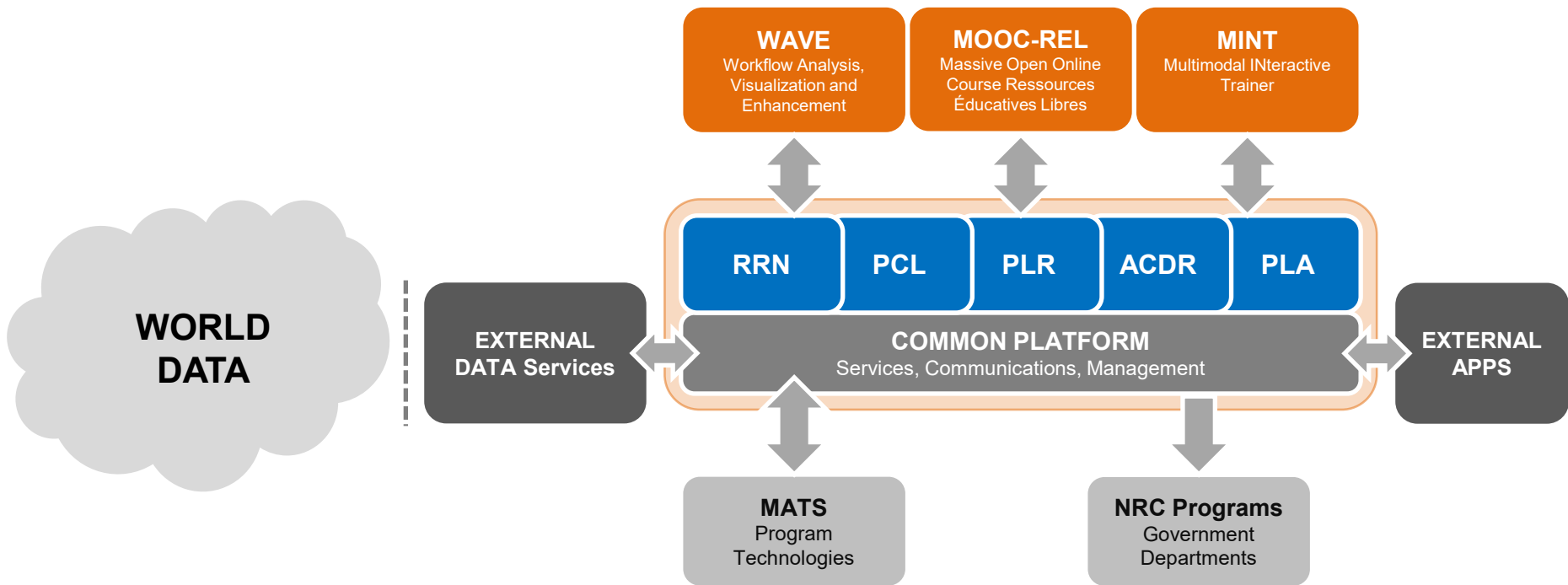


Learning and Performance Support System: Core Technology Development Projects

- 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
- Simulations and Tools



Program Design and Scope

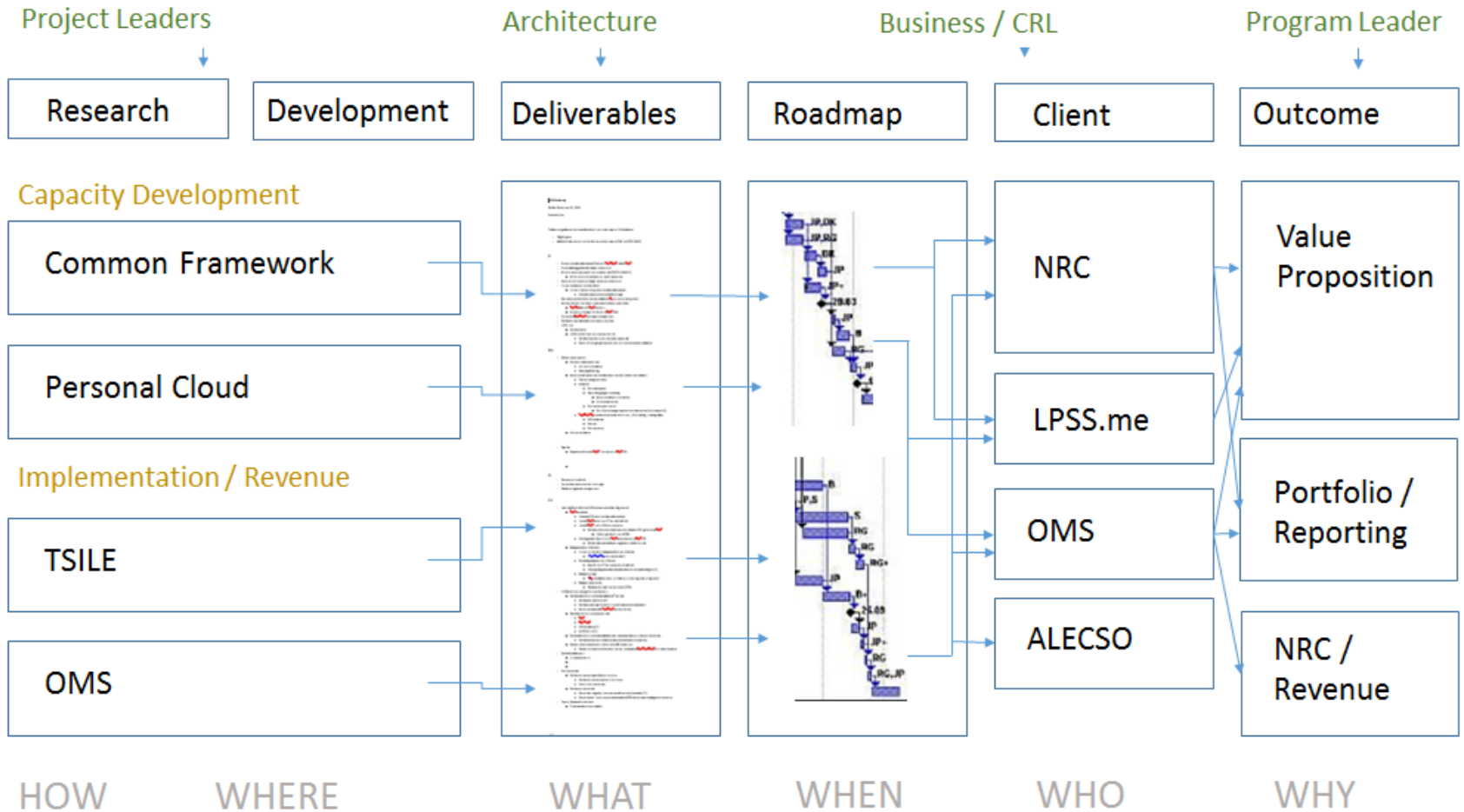


Blue: Core technology projects

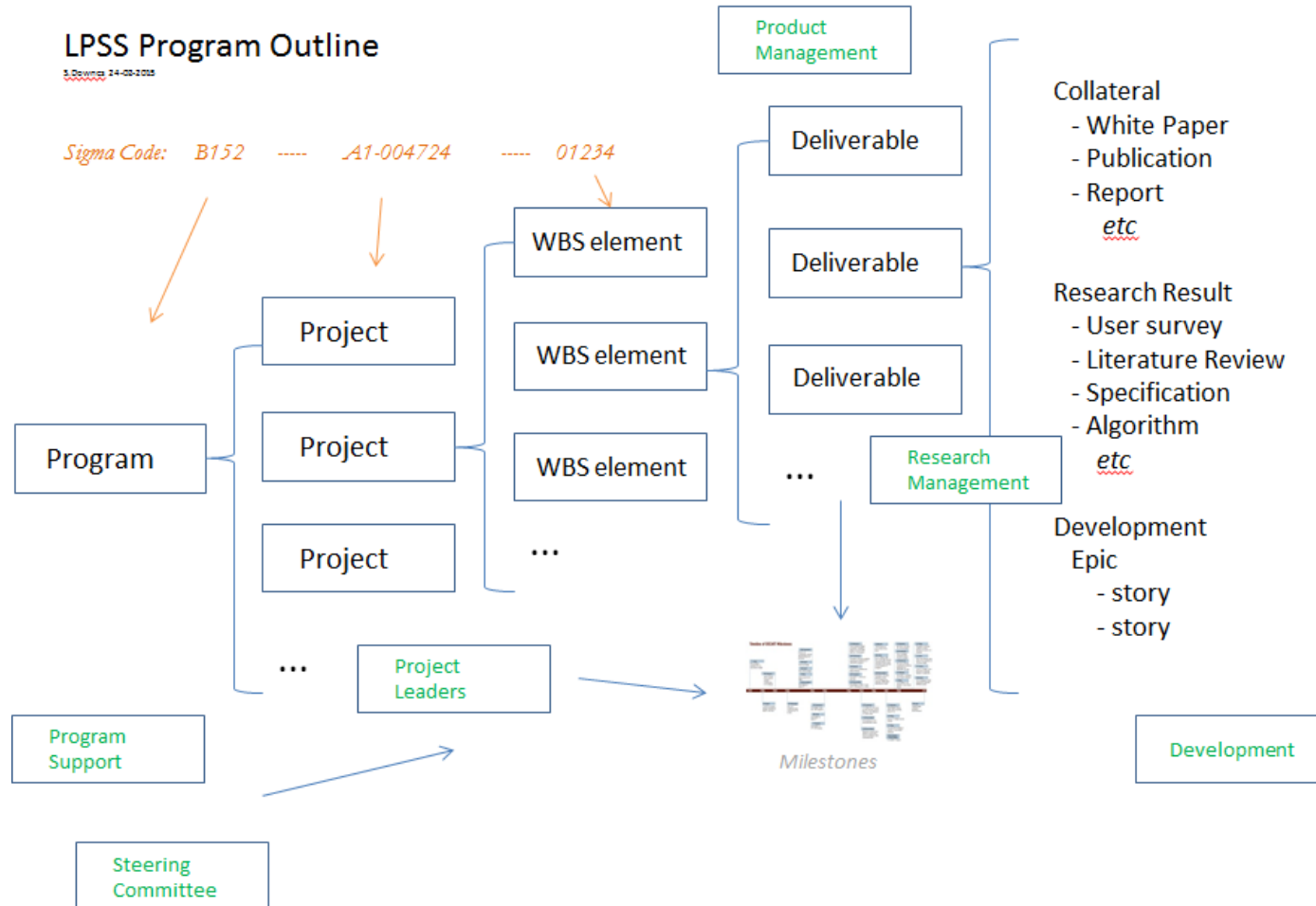
Orange: Implementation projects with commercial clients

Grey: Infrastructure, other NRC programs, external services

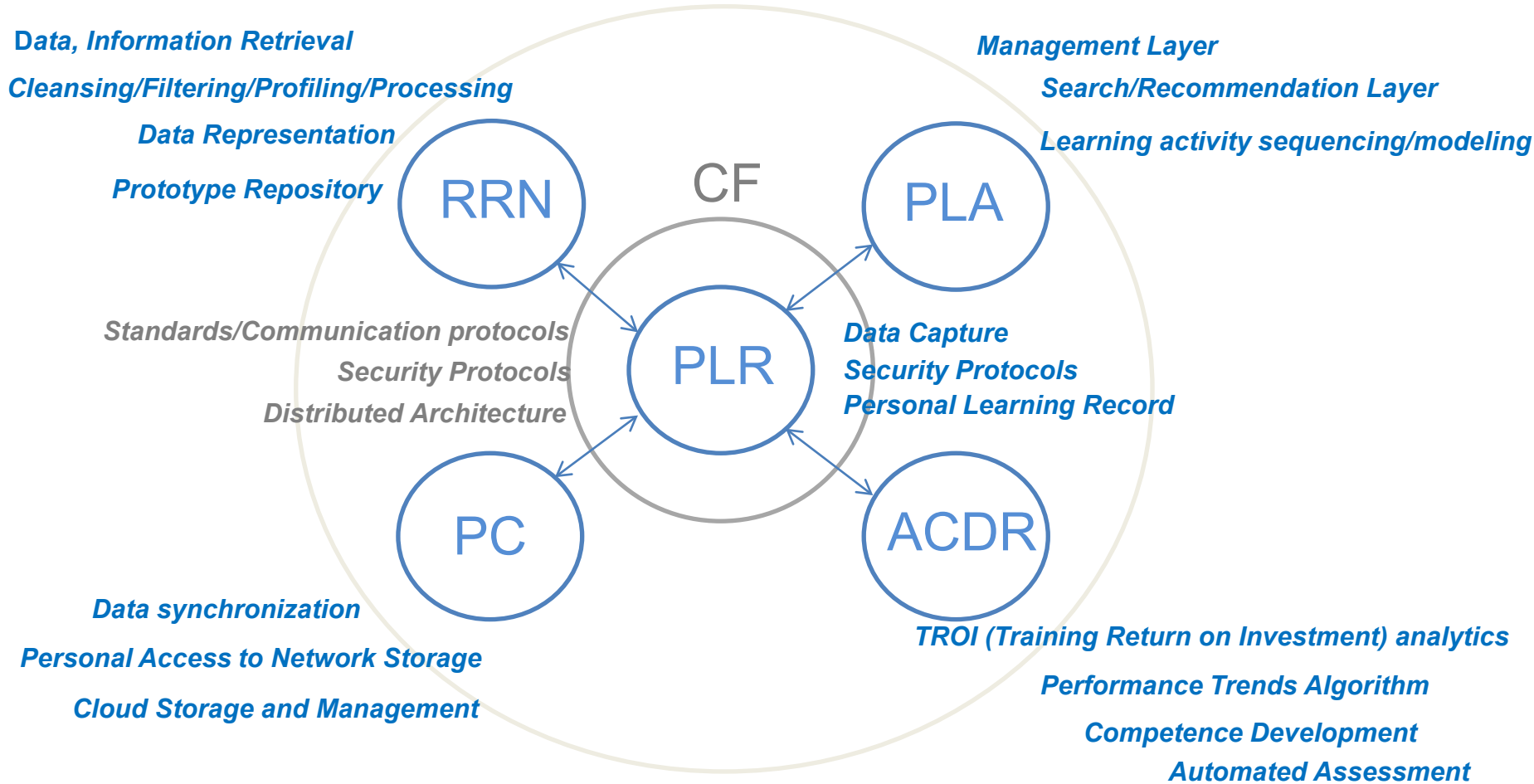
Program Organization



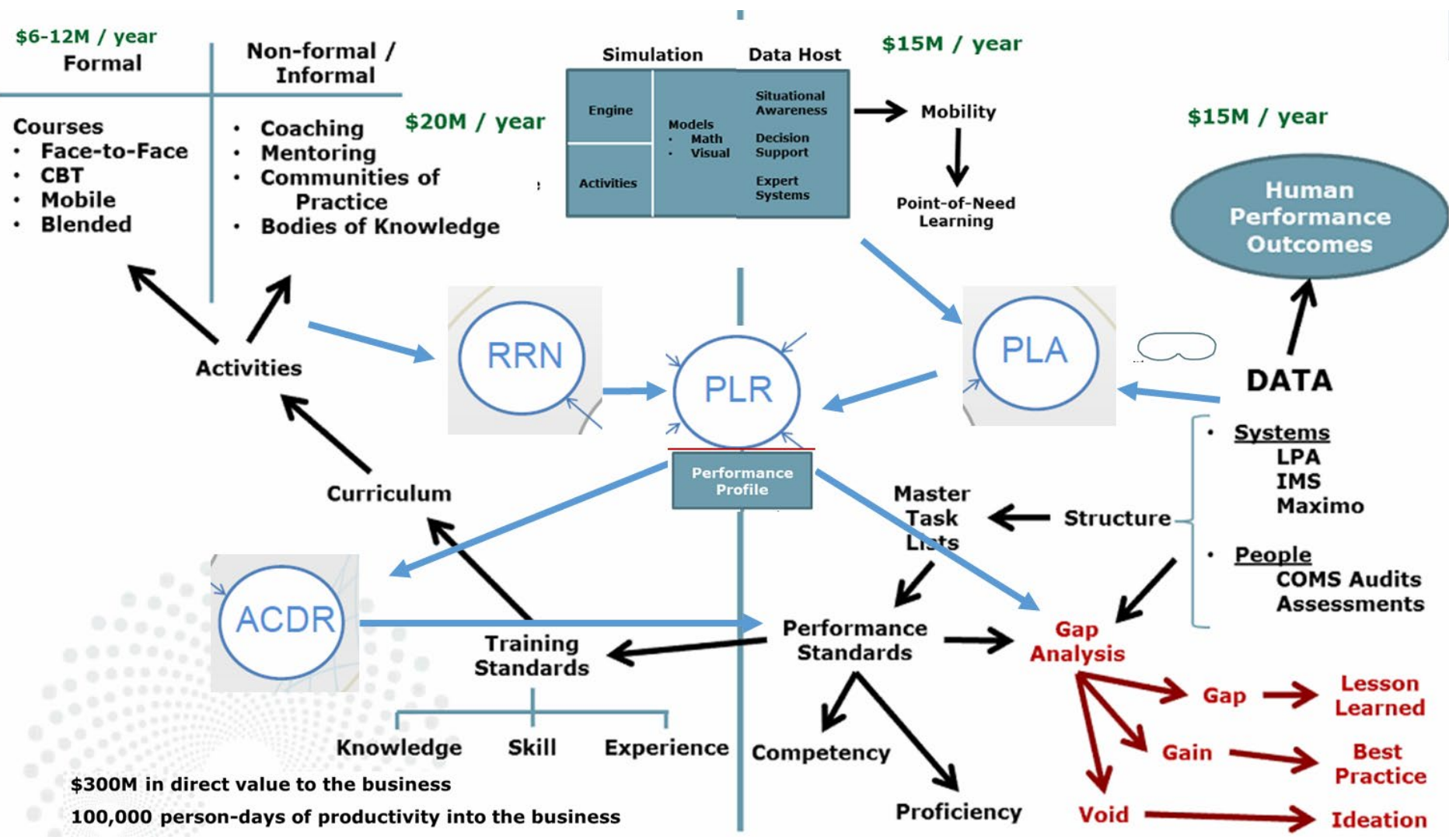
Program Outline



Project Details



LPSS in Context



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

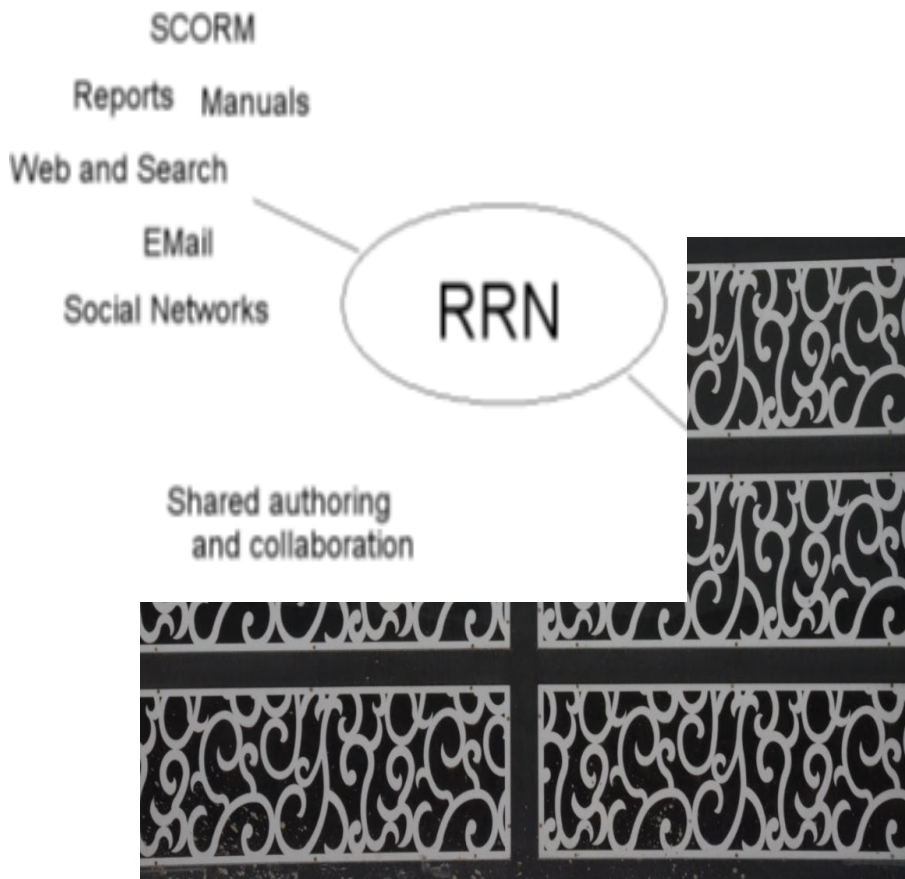
... become that much more difficult

Resource Repository Network



Assemble resources from multiple locations

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

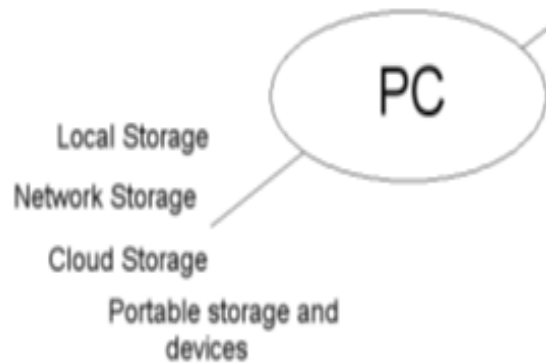
Personal Cloud



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



Personal Cloud

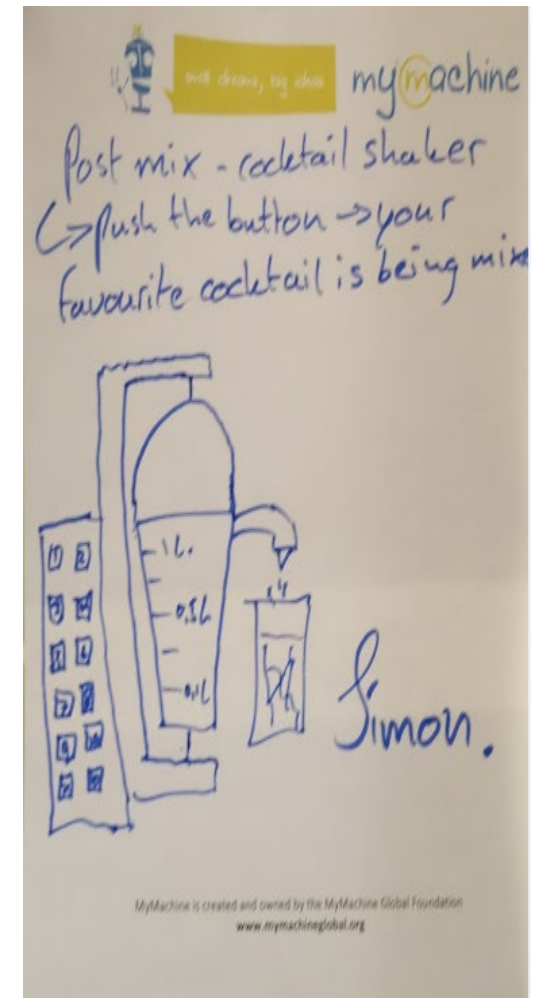


- * Manage list of local and remote storage systems
- * Maintain security, encryption, authentication and credentials
- * Include local or personal device storage
- * Manage and synchronize resource sets and data



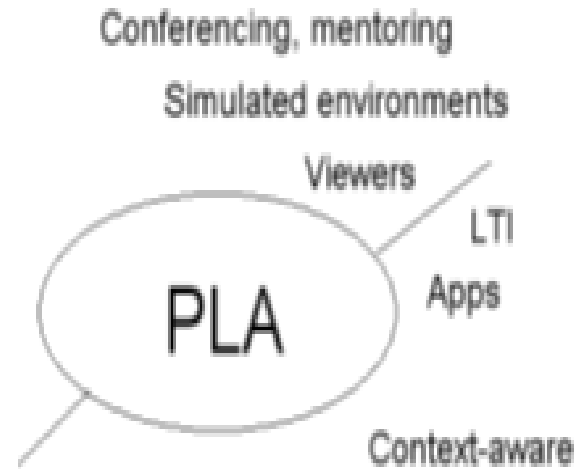
Personal Learning Assistant

Projection of learning services into multiple platforms

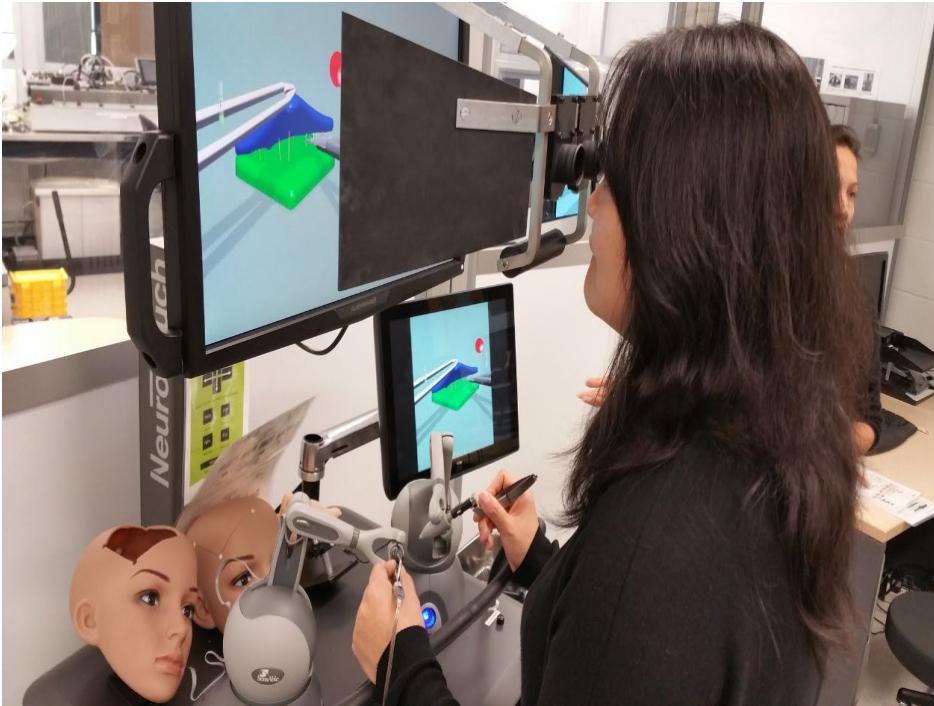


Personal Learning Assistant

- * 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



PLA Simulations Project

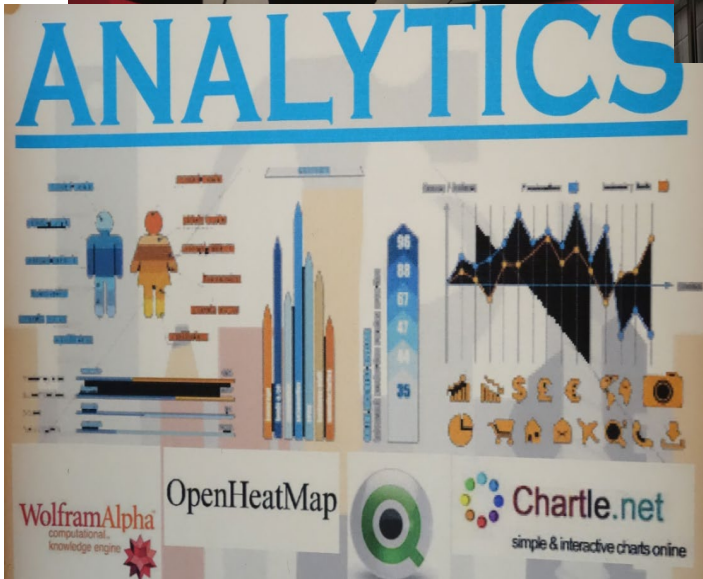


Connecting to real learning and workplace environments

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

Automated Competency Recognition and Development

Analytics as a service – analogy with web translation



Automated 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

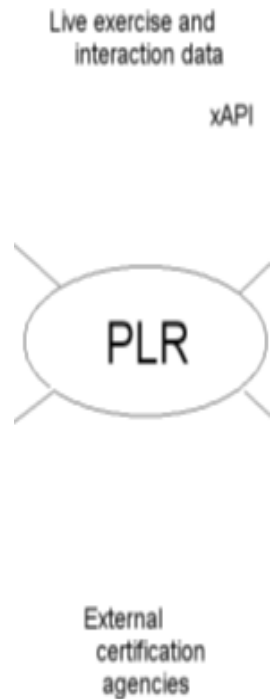


Personal Learning Record

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



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 3rd party certification

Relevant PLR Projects

Manchester PLE Project
Responsive Open Learning Environments (ROLE)

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

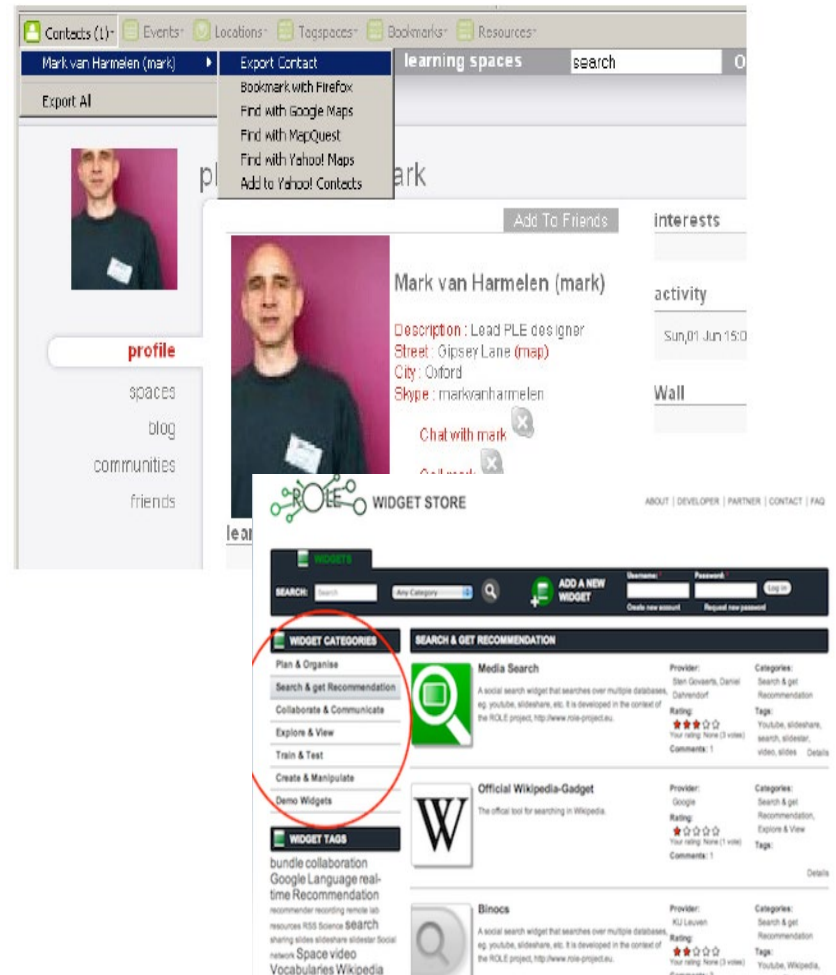
Known <http://withknown.com/>

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

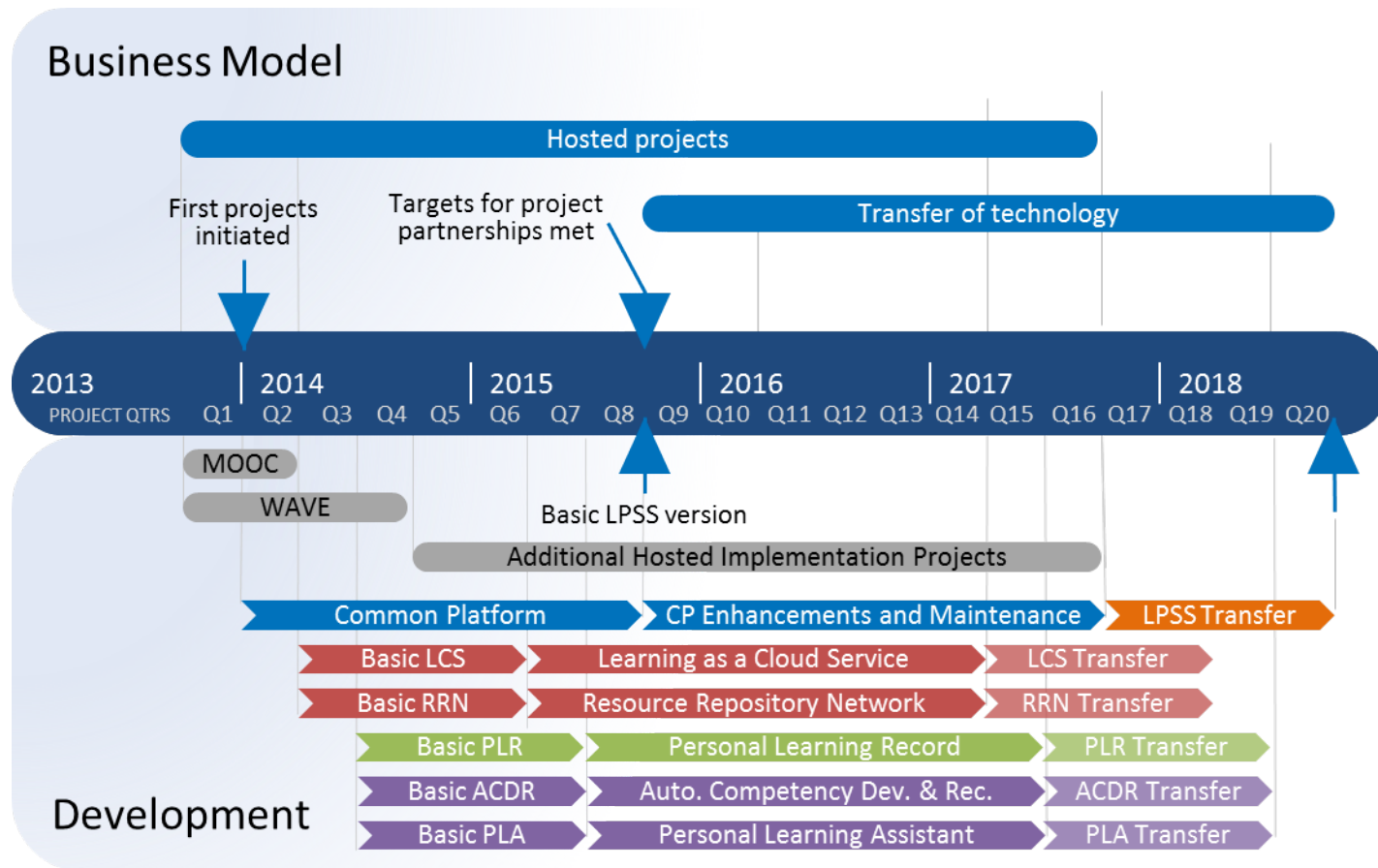
TSILE xAPI

2Sim Simulator xAPI

Workplace T&D



Program Implementation Timeline



http://lpss.me – prototype PLE

LPSS Resources Competencies Learning record About Help Settings Logout

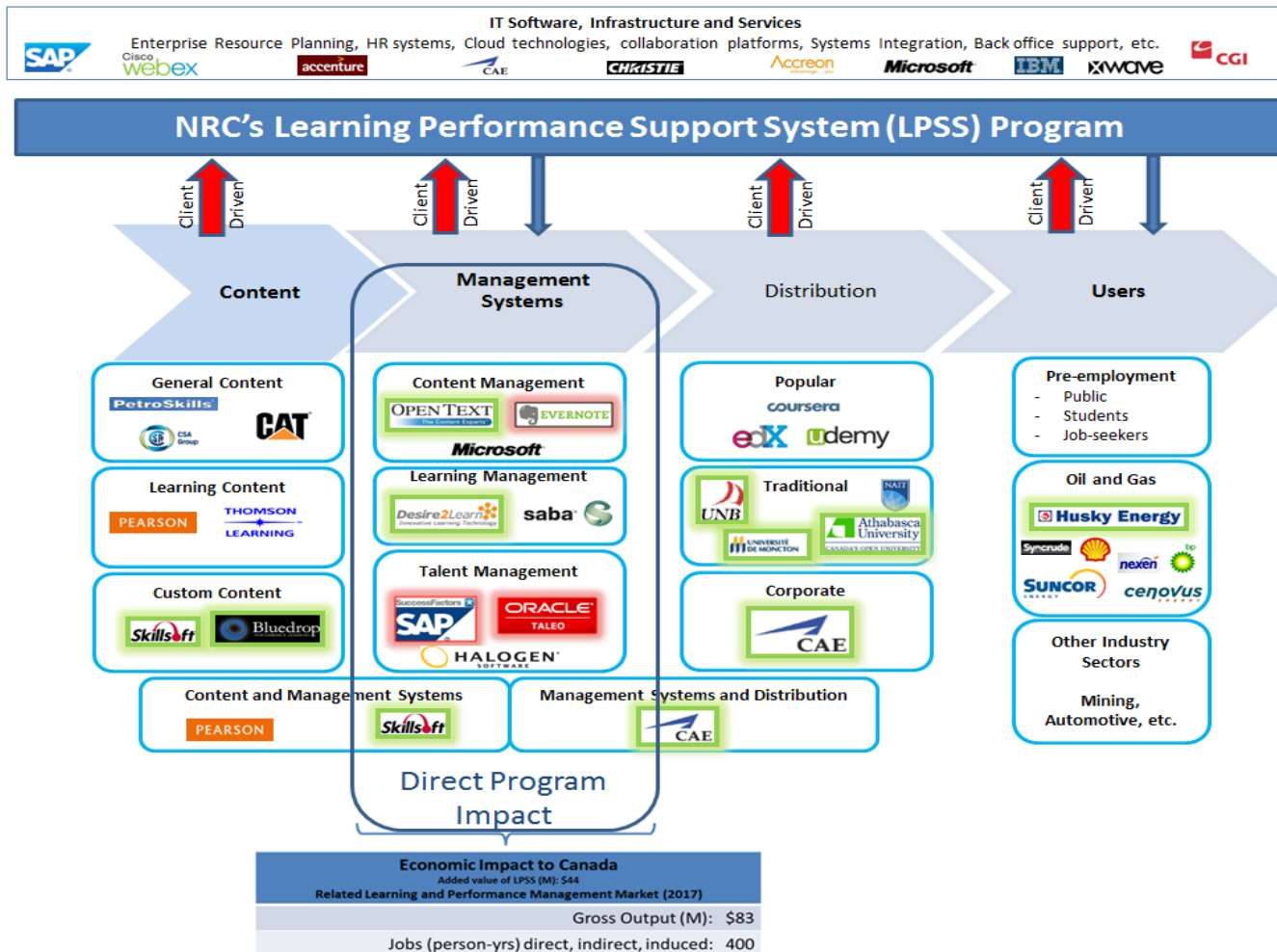
Browse competencies [\[help \]](#)

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

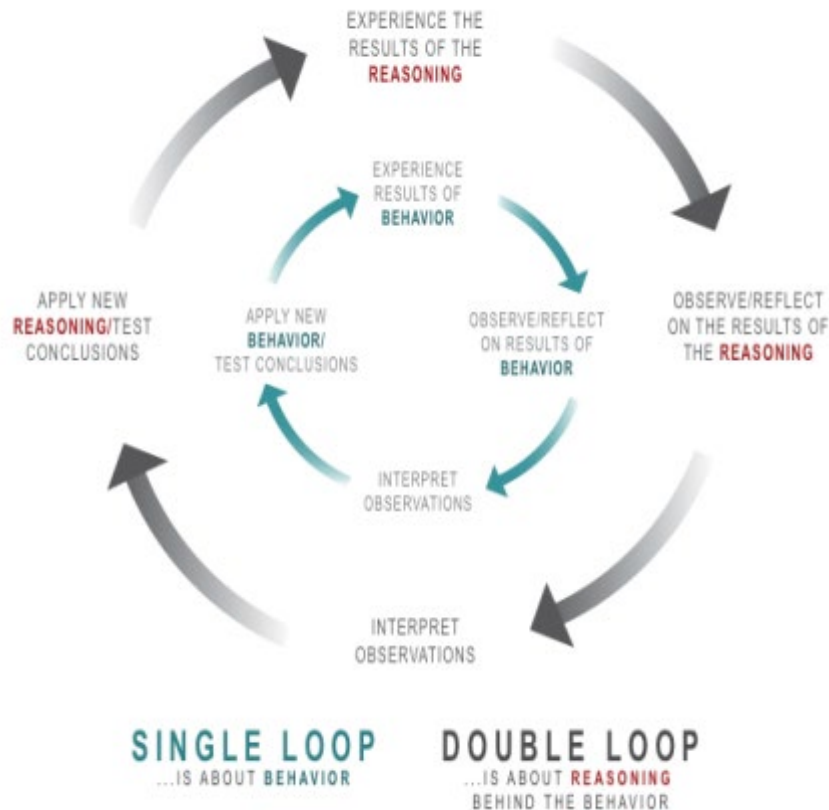
Competency Import Competency hierarchies Only my competencies Competencies

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] <input type="checkbox"/> Add to my profile	Communication ^[2] <input type="checkbox"/> Add to my profile resources: 10

LPSS in Canada's Learning Technology Marketplace



Implementation Projects

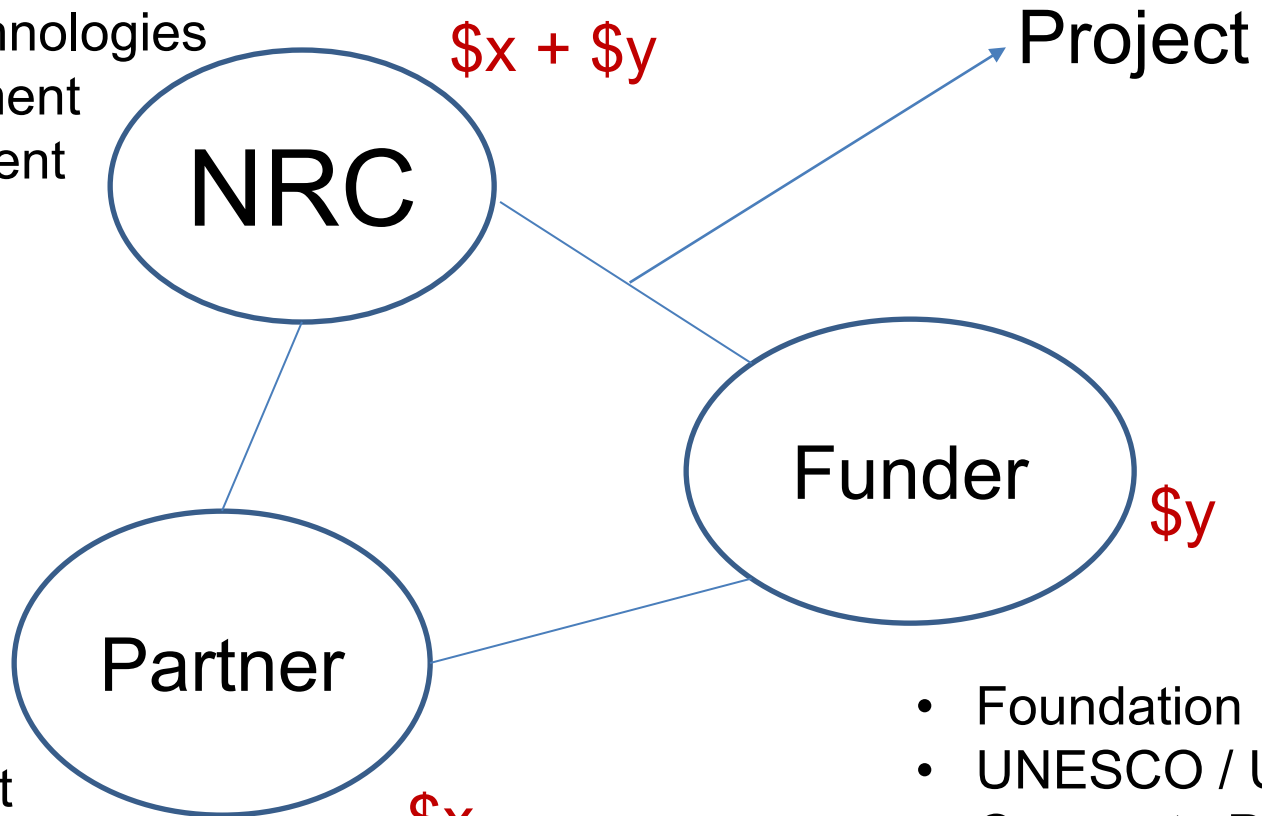


Ultimately, the objective is to support individual learning in a network

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

Expanding LPSS

- \$20 Million Investment
- NRC Technologies
- Development Environment



- University
- Government
- Development Agency

- Foundation
- UNESCO / UN
- Corporate Partner

Possible Projects...

OERs, Repositories, Marketplaces

- eg. OIF MOOC, ALECSO

Badges, Credentials, Recognition

- eg. PCO Badge Project, TSILEE xAPI

Simulations & Workplace Support

- eg. MINT, 2Sim

Matching People to Opportunities

- eg. Concierge, Micromissions



Thank you



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