Design Elements in a Personal Learning Environment

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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.
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)
• gRSSShopper / 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
A MOOC is a Web, not a Website
Design Principles

**Autonomy**
- Choice of contents
- Personal learning
- No curriculum

**Diversity**
- Multiple tools
- Individual perspective
- Varied content

**Openness**
- Open access
- Open content
- Open activities
- Open assessment

**Interactivity**
- Encourage communication
- Cooperative learning
- Emergent knowledge
Connectivism and Connective Knowledge is a twelve week course that explores the concepts of connectivism and connective knowledge and explores their application as a framework for theories of teaching and learning. It will outline a connectivist understanding of educational systems of the future.

[Course] [Daily] [Wiki] [About] [Aggregations] [Readings]

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..."
Other Courses

1800 students
http://connect.downes.ca/

3000 students
http://edfuture.net/

2800 students
http://change.mooc.ca/
cMOOC vs xMOOC

networks

- CCK08

- DS106
  - [http://ds106.us/history/](http://ds106.us/history/)

- Autres cours
  - [https://www.ai-class.com/](https://www.ai-class.com/)

- [https://www.coursera.org/](https://www.coursera.org/)

- [https://www.udacity.com/](https://www.udacity.com/)

- [https://www.edx.org/](https://www.edx.org/)

- [https://www.khanacademy.org/](https://www.khanacademy.org/)

tasks

- [https://www.khanacademy.org/](https://www.khanacademy.org/)

content

- [https://www.ai-class.com/](https://www.ai-class.com/)

- [https://www.coursera.org/](https://www.coursera.org/)

- [https://www.udacity.com/](https://www.udacity.com/)

- [https://www.edx.org/](https://www.edx.org/)
Design principles of the cMOOC

Autonomy, diversity, openness, interactivity

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

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

- Site
  - Student content
  - Course content
  - Event recordings
- Subscribed students
- Live online events
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
Simplified Design

External Repositories

Resource Repository Network

Personal Cloud

External Cloud Storage

Stand-alone Cloud

Personal Learning Record

Personal Learning Assistant

Automated Assessment

External Graph

App

API
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
LPSS in Context

$6-12M / year
- Formal
- Courses:
  - Coaching
  - Mentoring
  - Communities of Practice
  - Bodies of Knowledge

$15M / year
- Data Host
- Situational Awareness
- Decision Support
- Expert Systems

$20M / year
- Simulation
- Engine
- Models
  - Math
  - Visual
- Activities

$15M / year
- Mobility
- Point-of-Need Learning

Human Performance Outcomes

$300M in direct value to the business
100,000 person-days of productivity into the business
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

Data, Information Retrieval
Cleansing/Filtering/Profiling/Processing
Data Representation
Prototype Repository

Standards/Communication protocols
Security Protocols
Distributed Architecture

Data synchronization
Personal Access to Network Storage
Cloud Storage and Management

Data Capture
Security Protocols
Personal Learning Record

TROI (Training Return on Investment) analytics
Performance Trends Algorithm
Competence Development
Automated Assessment

Management Layer
Search/Recommendation Layer
Learning activity sequencing/modeling
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
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

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

http://integralleadershipmanifesto.com/manifesto/making-subject-object/
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
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 sommes entrain 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
Program Implementation Timeline

Business Model

Development

Hosted projects

First projects initiated

Targets for project partnerships met

Transfer of technology

2013
2014
2015
2016
2017
2018

Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
Q10
Q11
Q12
Q13
Q14
Q15
Q16
Q17
Q18
Q19
Q20

MOOC
WAVE

Additional Hosted Implementation Projects

Common Platform
CP Enhancements and Maintenance
LPSSTransfer

Basic LCS
Learning as a Cloud Service
LCS Transfer

Basic RRN
Resource Repository Network
RRN Transfer

Basic PLR
Personal Learning Record
PLR Transfer

Basic ACDR
Auto. Competency Dev. & Rec.
ACDR Transfer

Basic PLA
Personal Learning Assistant
PLA Transfer
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