

Elements of Connectivism



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What Connectivism Is

- The theory that knowledge consists of the connections between entities in a network, and
- The theory that learning consists of developing and traversing these networks

Principles of Connectivism

- Learning is a process of connecting entities
- Nurturing and maintaining connections is needed to facilitate continual learning.
- Ability to see connections between fields, ideas, and concepts is a core skill.
- Capacity to know more is more critical than what is currently known
- Decision-making is itself a learning process

VLE vs PLE

We are in a process of migrating from:

- Virtual Learning Environment (a.k.a. Learning Management System (LMS))

To:

- Personal Learning Environment (PLE)

This is not only a shift in technology, but also a shift in how we view learning itself.

Traditional Online Learning

– Institution Based

- Online courses, learning management system
- Content 'federations' – closed network

– Product Based

- Content packaging and CD-ROM delivery
- Digital rights and authentication

– Content Based

- The idea of courseware, course packs
- Learning design and sequencing

Learning Networks

- Not Institution Based
 - Resource based, learning integration
 - Open access, content networks
- Not Product Based
 - Web based, content not packaged but aggregated
 - Identity used to enable access, not restrict it
- Not Content Based
 - E-learning as engagement, conversation
 - Focus on services and interaction

The VLE – Managing Learning

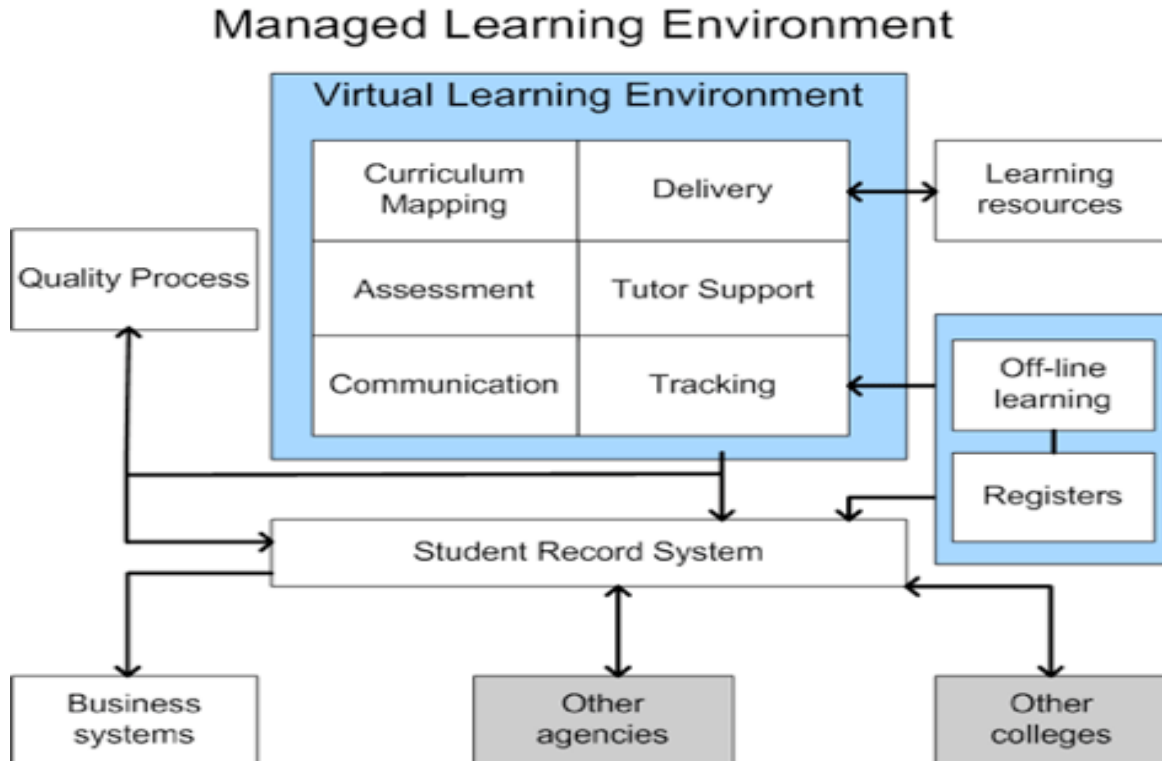


Image: <http://doughelshaw.com/blog/tag/information-technology/>

The central purpose of the VLE is to manage learning (whatever that means)

The PLE – Manage Connections

Personal Learning Landscape

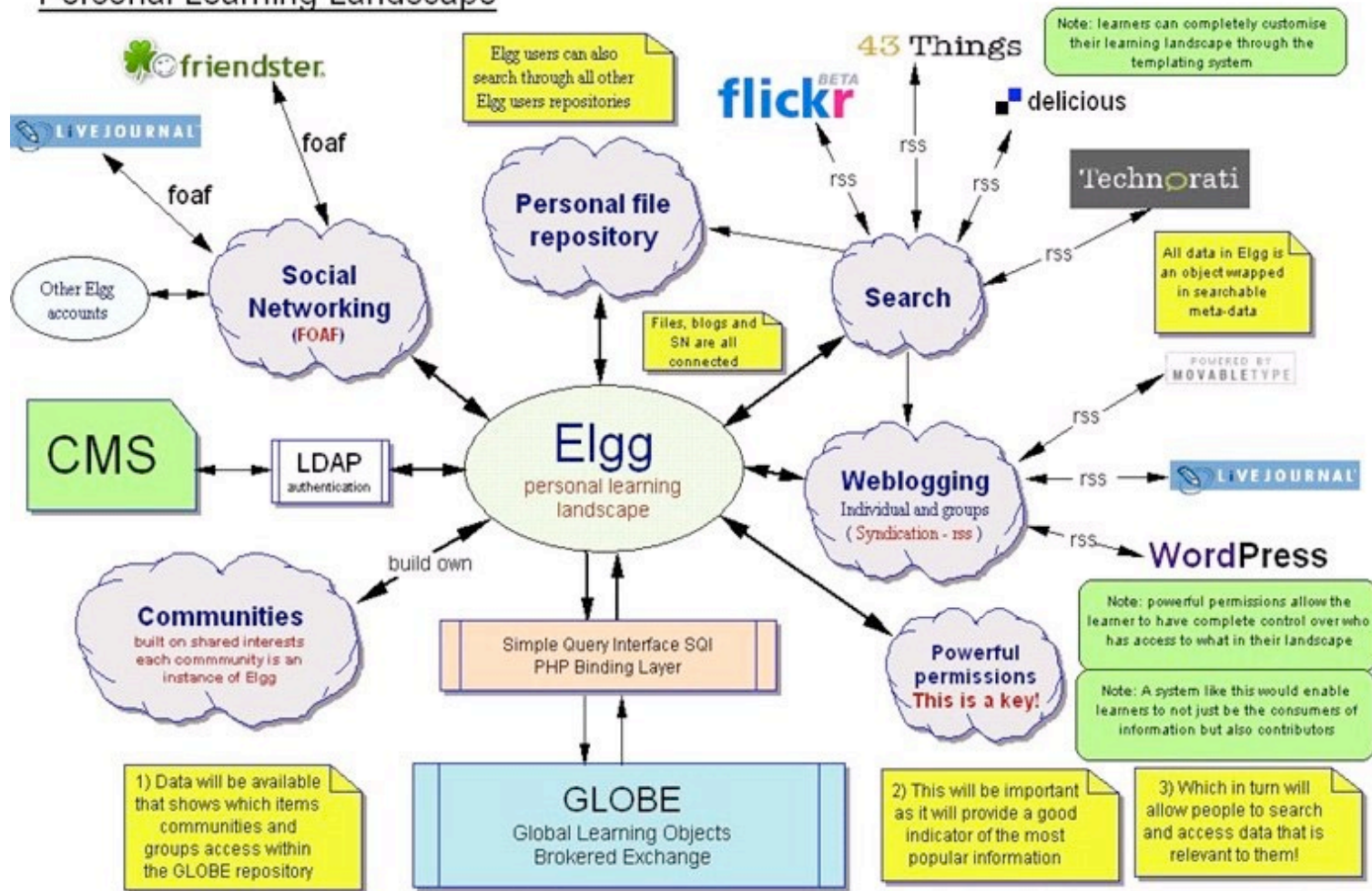


image developed by the Elgg development team - contact d.tosh@ed.ac.uk

Two Kinds of Knowledge

Knowledge in the VLE (Typically):

- Static
- Declarative
- Authority-based

Knowledge in the PLE (Typically):

- Dynamic
- Tacit / Non-Declarative
- Constructed

Social Networks

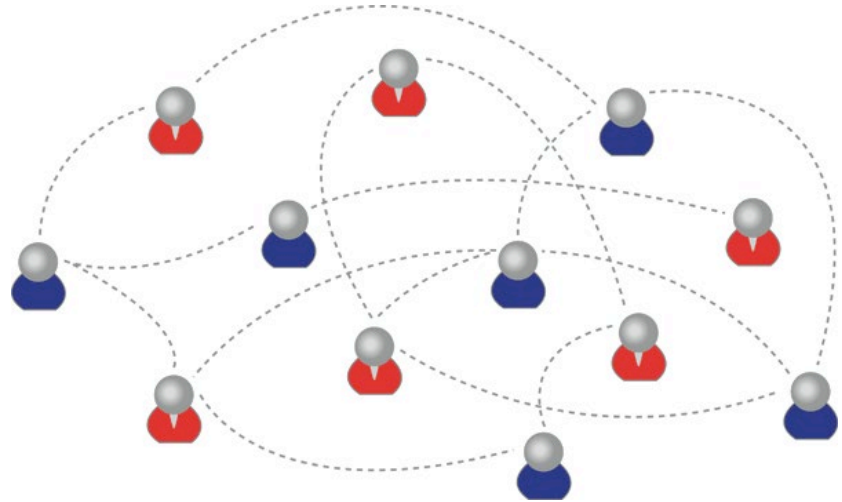
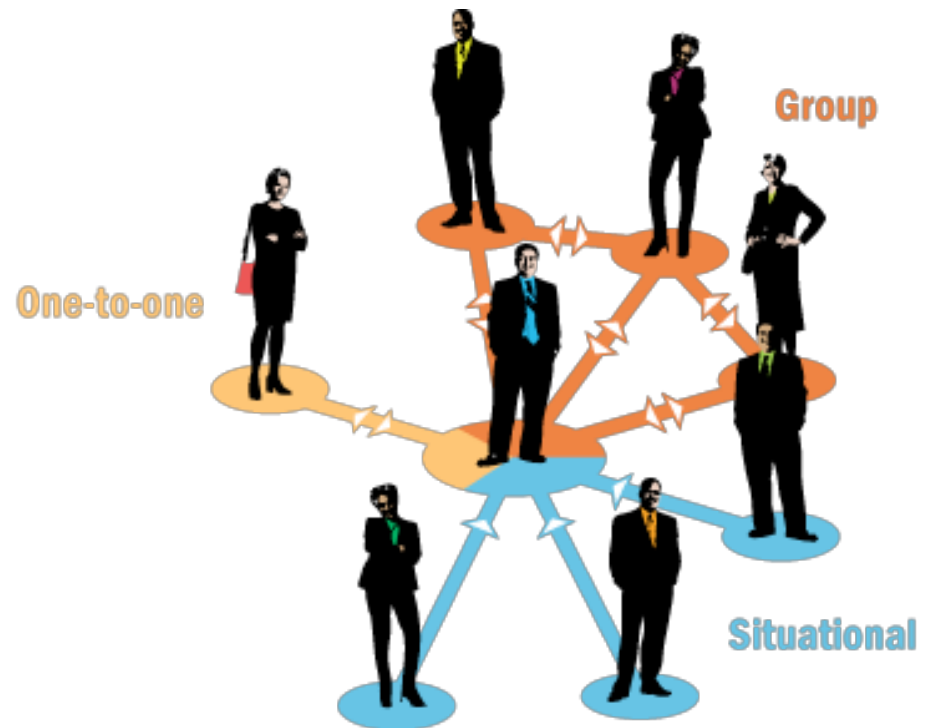


Image: <http://www.mguhlin.org/2009/12/rethinking-blogging-social.html>

Image: <http://www.relenet.com/>

Social Learning

- The next step in such a discussion is usually to describe a theory of social learning, depicting learning as an external process (or set of processes)



Some Forms of Social Learning

- Behaviourism / Instructivism
- Interaction & Interaction Theory (Moore)
- Social Constructivism (Vygotsky)
- Problem-Based Learning (Johnasson)



Image: <http://ibis.tau.ac.il/twiki/bin/view/Zoology/Lotem/MyResearch>

Aspects of Social Learning

- Externally-Based Definitions
 - Learning objectives, Body of Knowledge
- Externally-Based Processes
 - Learning activities, Processes and conversations
 - Interaction and communication
- External Systems
 - Classes, networks, groups, collaboration
- External Evaluation

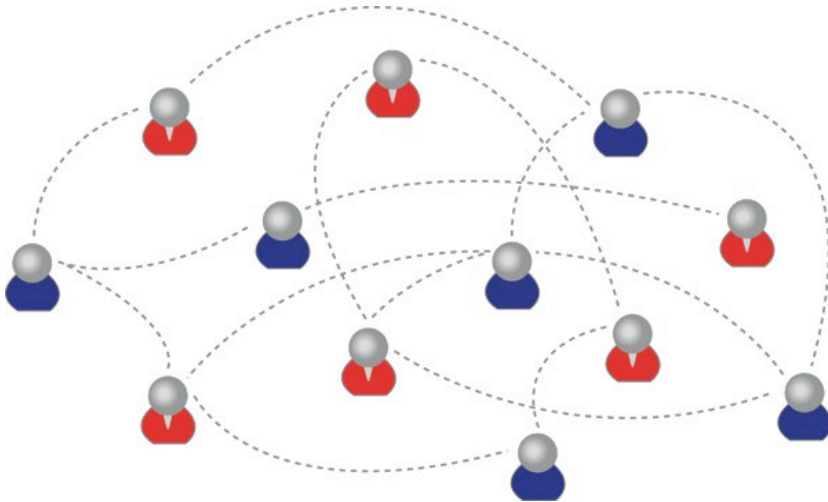
Personal vs Social

Social knowledge is *not* personal knowledge

- Personal Knowledge management = Learning
- Social Knowledge Management = Research

The product of the educational system is not a *social* outcome (knowledge, skill, problem, community) but a *personal* outcome

Personal Knowledge



We are using one of these

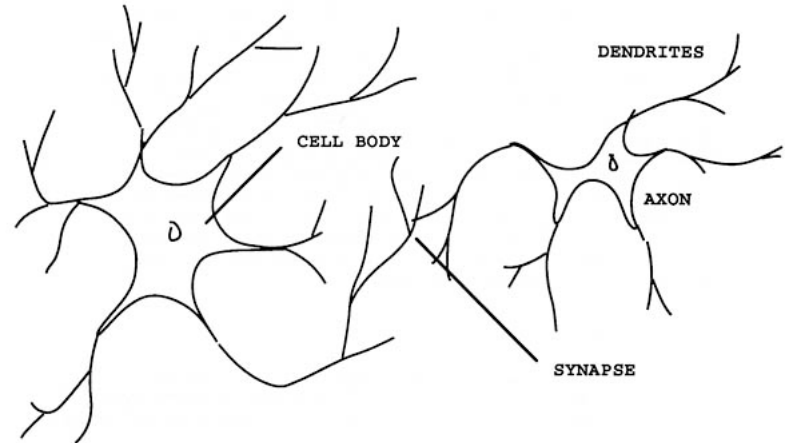


Figure 1. Biological Neuron

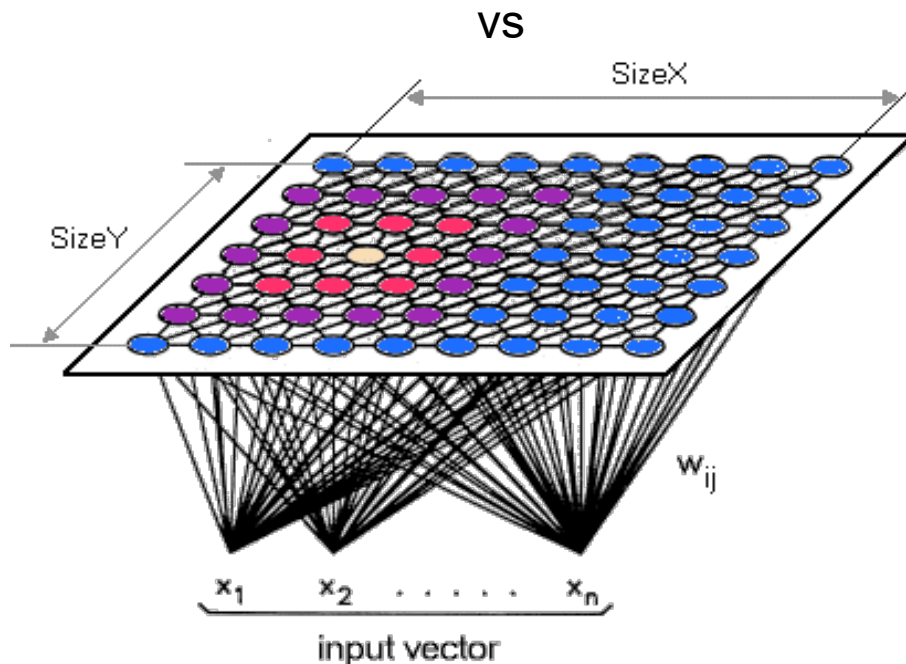
To create one of these

Personal knowledge consists of *neural* connections, not social connections

Learning Outcomes

Simple vs complex – text vs network

“Paris is the capital of France”



Learning Outcomes (2)

It's the difference between:

- 'Knowing' that 'Paris is the capital of France' or even some sort of 'knowing how' (these are *external* definitions of this knowledge) and
- What it *feels like* to have geographical knowledge; what it *feels like* to be a speaker of a language

Learning a discipline is a *total state* and not a collection of specific states

Learning Outcomes (3)

- Learning a discipline is a *total state* and not a collection of specific states
- It is obtained through *immersion* in an environment rather than acquisition of particular entities
- It is expressed functionally (can you perform 'as a geographer'?) rather than cognitively (can you state 'geography facts' or do 'geography tasks'?)

Learning Outcomes (4)

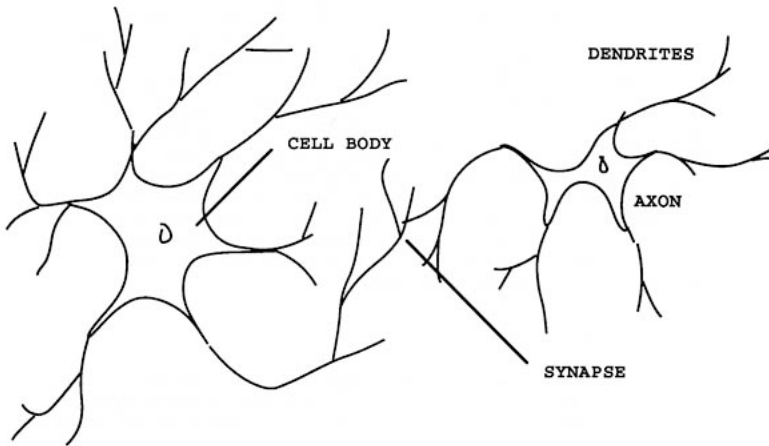
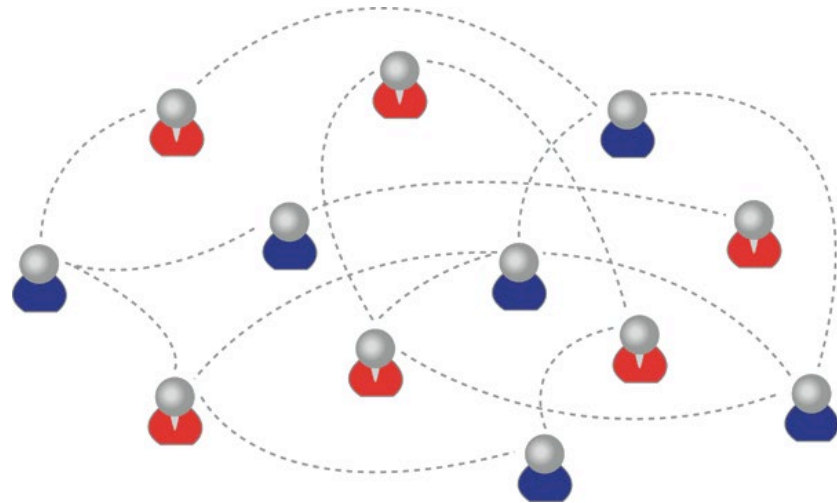


Figure 1. Biological Neuron

We recognize this

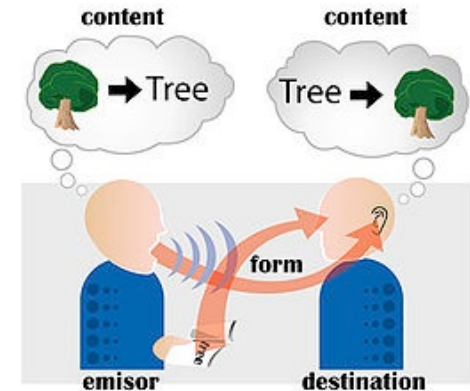
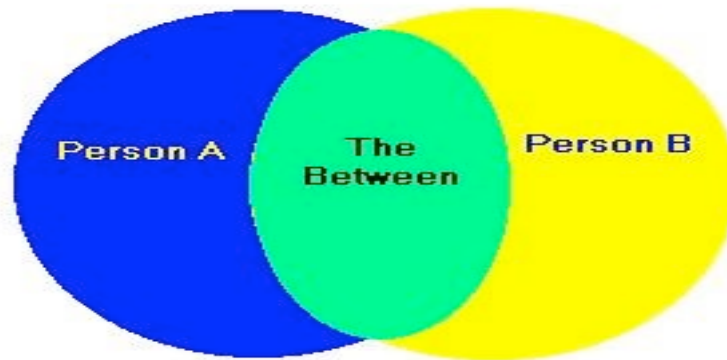


By performance in this

There are not specific bits of knowledge or competencies, but rather, personal capacities
(more on this later)

Shared Understandings

- Interactivity vs commonality
- Communication is not this:



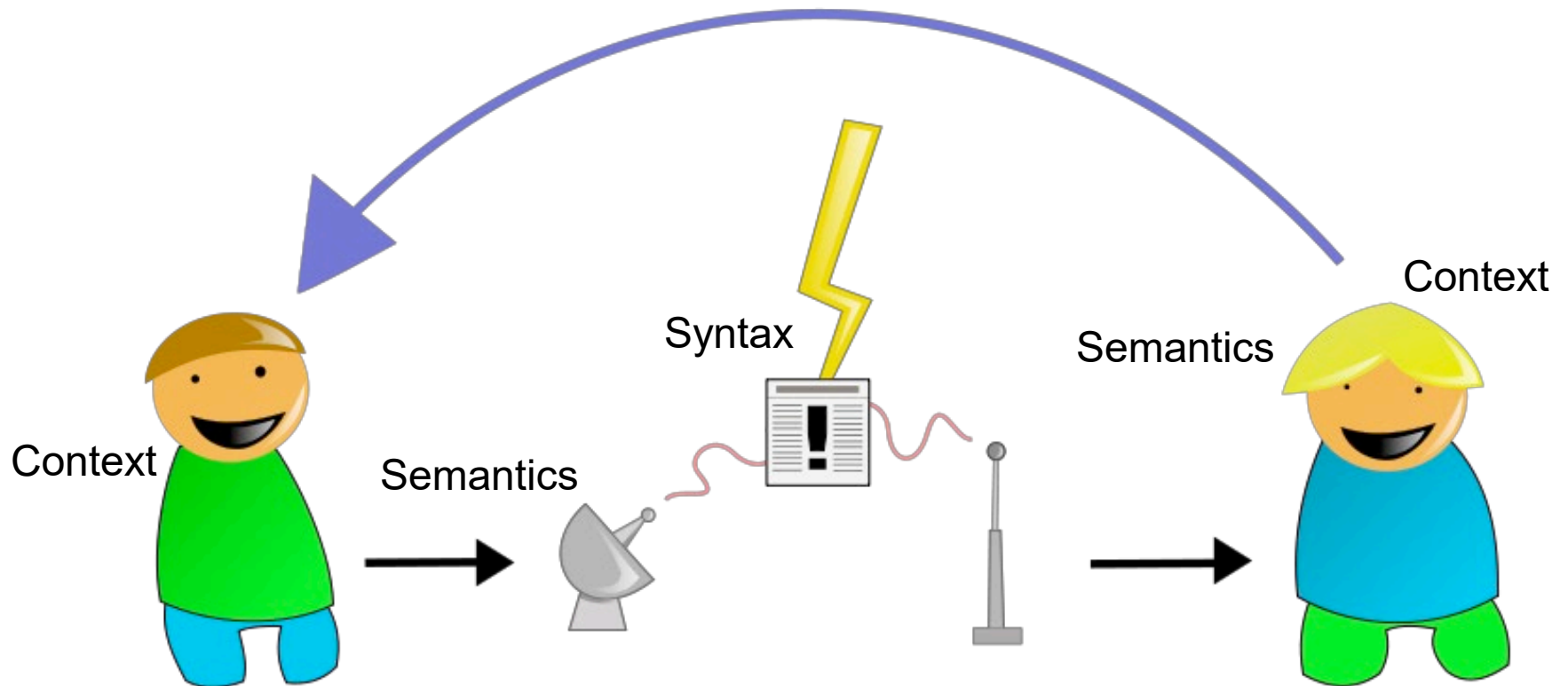
This is not biologically or physically possible!

Image: <http://faculty.evansville.edu/dt4/301/Dialogue.html>

Image: <http://www.answers.com/topic/communication>

Communication

- Communication is more like this:

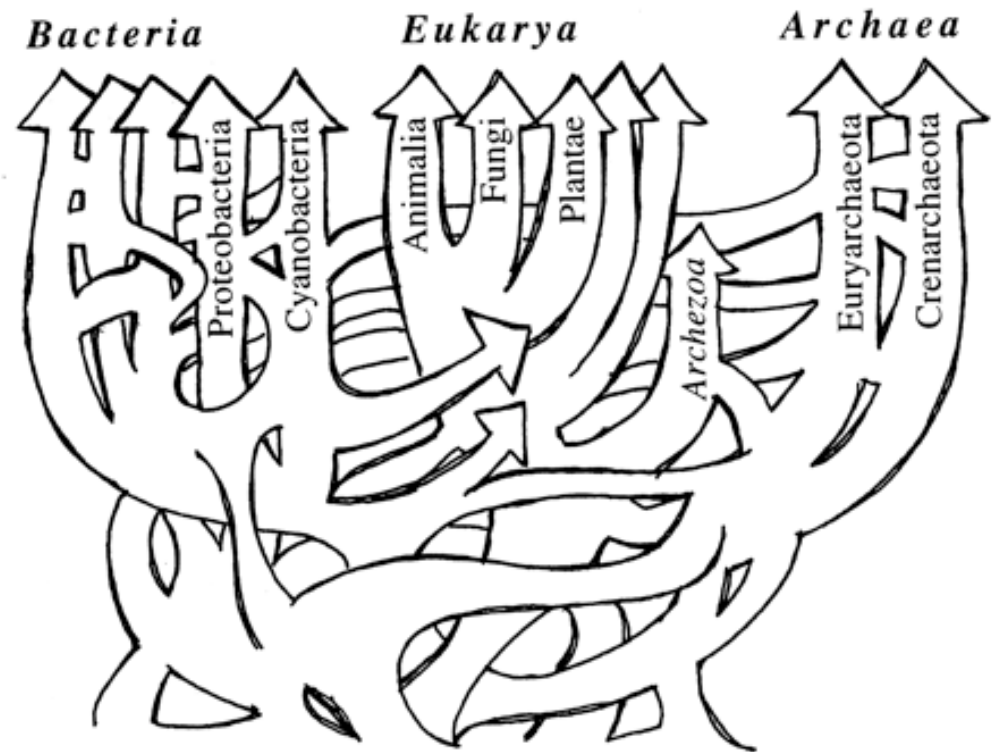


Cooperation vs Collaboration

- Groups vs Networks
- Collaboration assumes (the fiction) that we share goals, objectives, methods, etc.
- But these are *semantic* properties, and hence irreducibly individual and complex
- Cooperation assumes only the interaction at the point of interactivity – a *syntax* of words, objects, artifacts, but *personal* goals, objectives, methods, etc

Social Construction

- Social construction is *at best* the collaborative creation of social artifacts (such as naming conventions)
- It can be:
 - Process driven
 - Results oriented
 - Consensus-based
 - Deliberative
 - Mechanical



Personal Knowledge

- Is not 'constructed'
- You do not 'make meaning' for yourself
- It is a matter of organic growth



(Totally *not* what personal knowledge is)

This is important because it means that developing personal knowledge is more like *exercising* than like inputting, absorbing or remembering

(How do I know this? Research on how neural networks grow, develop)

PLE as Exercise Machine

- A PLE is a tool intended to *immerse yourself* into the workings of a community
- Once immersed, you then *practice* being one of the people characteristic of the community
 - For example, you would learn philosophy by practicing ‘being a philosopher’ in a philosophical community
- Your personal growth develops as a consequence of the interactions with that community

Connectivist Learning Design

- Based on the principles of network semantics
 - i.e., the principles that define effective networks
- In practice, amount to the design principles for the creation of massive open online courses

PLE (From a Knowledge Perspective)

- The PLE is an environment for a *person* to manage *connections* (whatever that means)
- *Knowledge* (conceived as dynamic, tacit, grown or constructed) consists of a set of connections.

Thus

- The PLE is an environment for a *person* to manage *knowledge* (whatever that means)

PLE as Knowledge Management

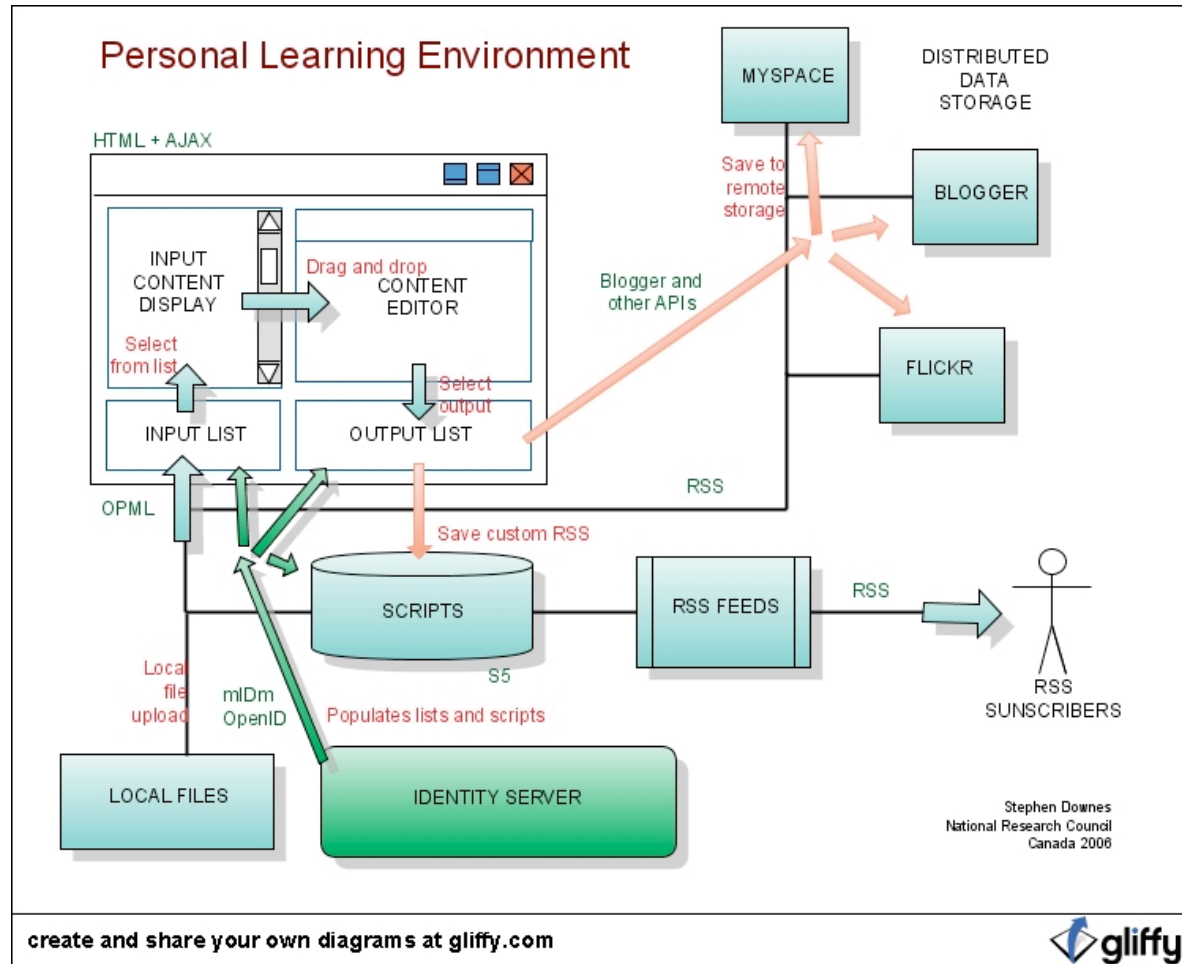
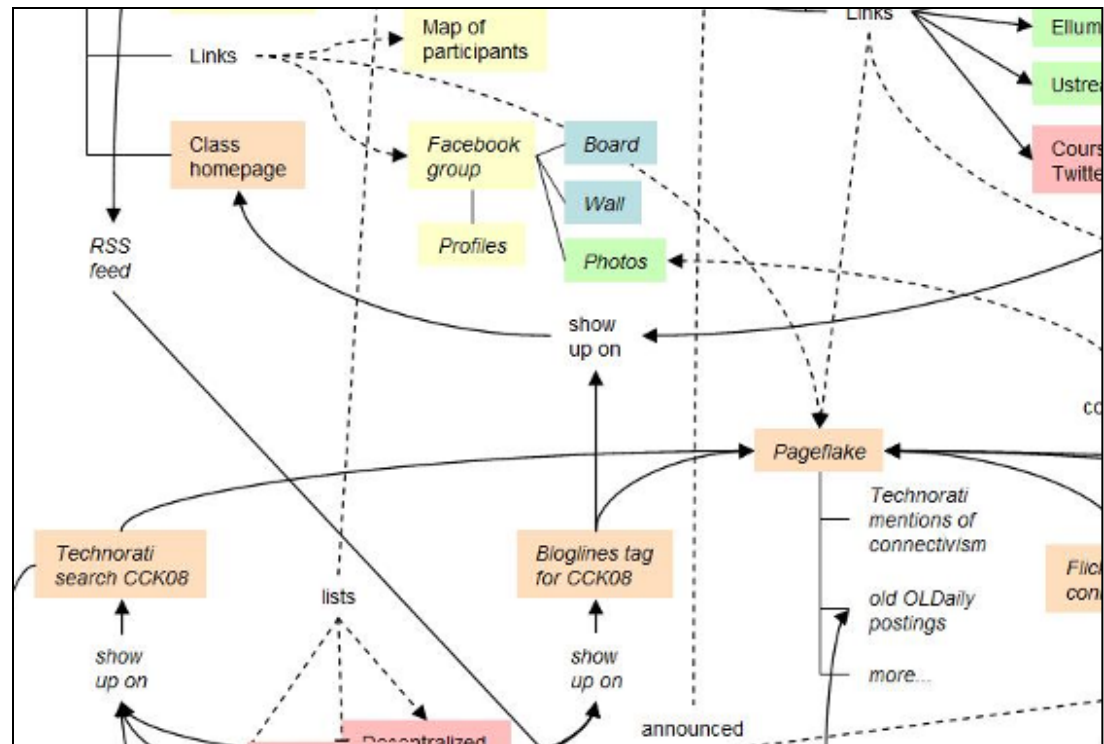


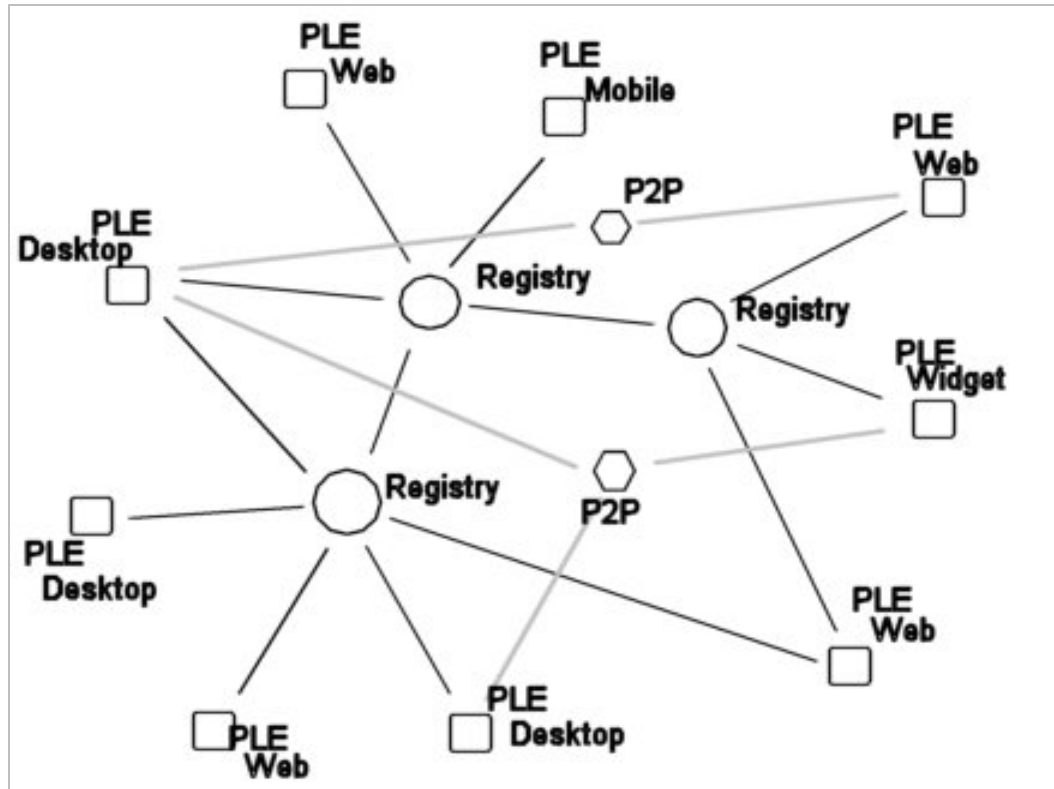
Image: <http://halfanhour.blogspot.com/2006/10/ple-diagram.html>

gRSShopper



- A tool for managing connections
- Used in Connectivism course

PLEs in a Network



PLEs are envisioned as working as a network

Network Design Principles

- Specify how networks differ from traditional learning
- The idea is that each principle confers an *advantage* over non-network systems
- Can be used as a means of evaluating new technology

Principles of Effective Design (1)

- Syntactic (structural) principles :
 - Decentralize – mesh, not star
 - Distribute – across different locations
 - Disintermediate – direct connections
 - Disaggregate – unbundle content
 - Disintegrate – stand-alone components
 - Dynamize – activity, plasticity
 - Desegregate – one big mesh

Elements of Network Semantics

– Context

- Localization of entities in a network
- Each context is unique – entities see the network differently, experience the world differently
- Context is required in order to *interpret* signals

– Salience

- The relevance or importance of a message = the similarity between one pattern of connectivity and another
- Meaning is created from context and messages via salience
- In other words: knowledge is *shared understanding* (and not *copied* understanding)

Elements of Network Semantics (2)

- Emergence
 - The development of patterns in the network
 - A process of resonance, synchronicity, not creation
 - Example: commonalities in patterns of perception
 - Requires an *interpretation* to be *recognized*
- Memory
 - Persistence of patterns of connectivity
- Other elements: stability, weighting...

Principles of Effective Design (2)

- Semantic (intentional) principles:
 - Autonomy
 - Diversity
 - Openness
 - Interactivity

Autonomy

- Factors affecting mental states
 - Empirical, cognitive, psychological
- Capacity to act on mental states
 - Physical, social, structural, resources
- Scope and range of autonomous behaviour
 - Expression, association, selection, method...
- Effects of autonomous behaviour
 - Impact, improvement

<http://halfanhour.blogspot.com/2010/11/model-of-autonomy.html>

Diversity

- Composition
 - Many types of entities
- Intention
 - Different goals, desires (Mill)
- Perspective
 - Uniqueness of point of view, language
- Mathematics of diversity
 - Multiple inputs produce mesh networks

<http://lemire.me/fr/abstracts/DIVERSITY2008.html>

http://www.huffingtonpost.com/stephen-downes/democratizing-education_b_794925.html

Diversity (2)

- Putnam, Florida, and the rest of it
- Homophily and associationism

<http://www.downes.ca/post/53544>

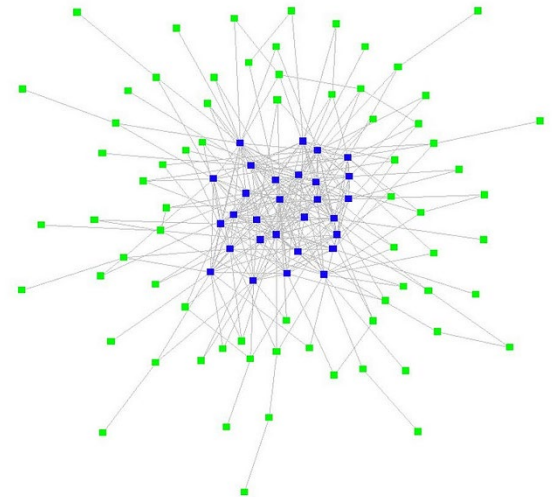
<http://profesorbaker.wordpress.com/2011/01/30/homophily-and-heterophily-what-fires-together-wires-together-cck11/>

- Teaching what we have in common instead of our differences? No

<http://secondlanguagewriting.com/explorations/Archives/2007/August/TheDownsideofDiversity.html>

Openness

- Open education
 - Open content, teaching, assessment
 - Stages of openness and terminal path
- Open networks
 - Clustering instead of grouping
- Flow
 - Input, output, feedback
 - plasticity



Interactivity

- Influence vs emergence
 - Thought-bubbles – “we perceive wholes where there are only holes”

<http://www.downes.ca/post/55001>

- ‘Scope’ vs ‘Level’

– <http://www.downes.ca/post/42066>



- Ontology of emergence
 - Ontological (real) vs perceptual (recognized)
- Connection to complexity & chaos

<http://connect.downes.ca/post/44222>

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<http://www.downes.ca>