Becoming Connected

Stephen Downes

Warsaw, Poland, August 25, 2017

Objective

To present the core ideas of connectivism in both a learning and scientific context, in a sense unifying the ideas of discovery, interaction and education.

Overview

What is Science?

What is Connectivism?

How Do We Learn?

Implications for Practice

Science

Proposal: the core idea of education (into a science, broadly conceived), in which to learn a discipline is to become like a practitioner of that discipline.

Connectivism

Proposal: the core idea of connectivism, in which knowledge is literally the set of connections between entities, and learning is the growth and development of those connections.

Learning

Proposal: the idea that we learn and grow by becoming connected

- Distinguishing social knowledge and personal knowledge
- This is an additional goal of both science and education

Practice

Proposal: the 'how' of learning; what we need to do in order to 'become connected’:

- The ARRFF Process Model
- Success Criteria: Autonomy, Openness…
- Critical Literacies

What Is Science?

Domain

Science as a domain of discourse

- The set of objects we talk about: a,b,c,…
- The set of properties they share: P,Q,R,…

State Space

Rudolf Carnap: The Logical Foundations…

Pa Qa Ra Sa …
Pb Qb Rb Sb …
Pb Qb Rb Sb …
…

State Space

Rudolf Carnap: The Logical Foundations…

Pa Qa Ra Sa …
Pb Qb Rb Sb …
Pc Qc Rc Sc …
…

Detour:
- Bayes Theorem
- Data Analytics

Hypotheses

Hempel: The Deductive Nomological Model

if Pa then Rb (Observed)

(x,y) if Px then Ry (Hypothesis)

Pc, thus Rd (Prediction)

Positivism

Science as the generation of general principles based on inference from observations

Pa Qb Rb Sd (Observation Language)

if p then q, p, thus q (Analytical)

Pc causes Rd (General Principle)

Two Dogmas

The Failure of the Positivist Foundations…

- Reductionism is False
- No Analytic-Synthetic Distinction

(Quine, Two Dogmas of Empiricism)

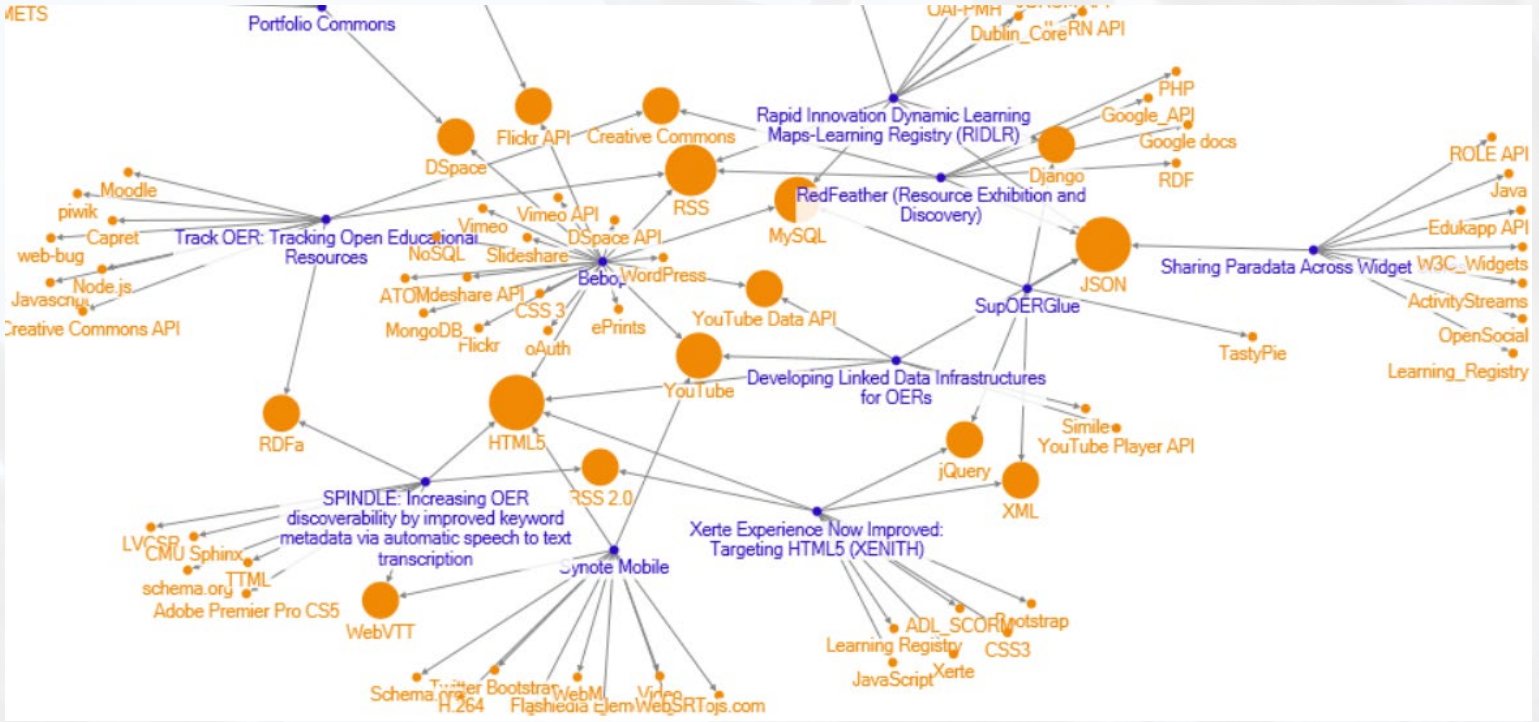
Paradigms

Data, Instrument and Theory

- Theory-Laden Data (Lauden)
- Scientific Paradigms (Kuhn)

Science as commonly accepted languages, practices, questions → Way of Life

Community


METS
Portfolio Commons
Dublin_Core
RN API
PHP
Google_API
Google docs
RDF
Flickr API
Creative Commons
Rapid Innovation Dynamic Learning Maps-Learning Registry (RIDLR)
DSpace
Django
ROLE API
Java
Edukapp API
W3C_Widgets
ActivityStreams
OpenSocial
Learning_Registry
Moodle
piwik
Capret
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NoSQL
Slideshare
RSS
MySQL
RedFeather (Resource Exhibition and Discovery)
JSON
Sharing Paradata Across Widget
Bebo
WordPress
ATOM
deshare API
CSS 3
MongoDB
Flickr
oAuth
ePrints
YouTube Data API
SupOERGlue
TastyPie
YouTube
Developing Linked Data Infrastructures for OERs
RDFa
HTML5
Simile
YouTube Player API
jQuery
XML
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SPINDLE: Increasing OER discoverability by improved keyword metadata via automatic speech to text transcription
Xerte Experience Now Improved: Targeting HTML5 (XENITH)
LVCSR
CMU Sphinx
TTML
schema.org
Adobe Premier Pro CS5
WebVTT
ynote Mobile
ADL_SCORM
Bootstrap
CSS3
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JavaScript
Xerte
Schema.org
H.264
WebM
WebSRT
js.com

Sciences

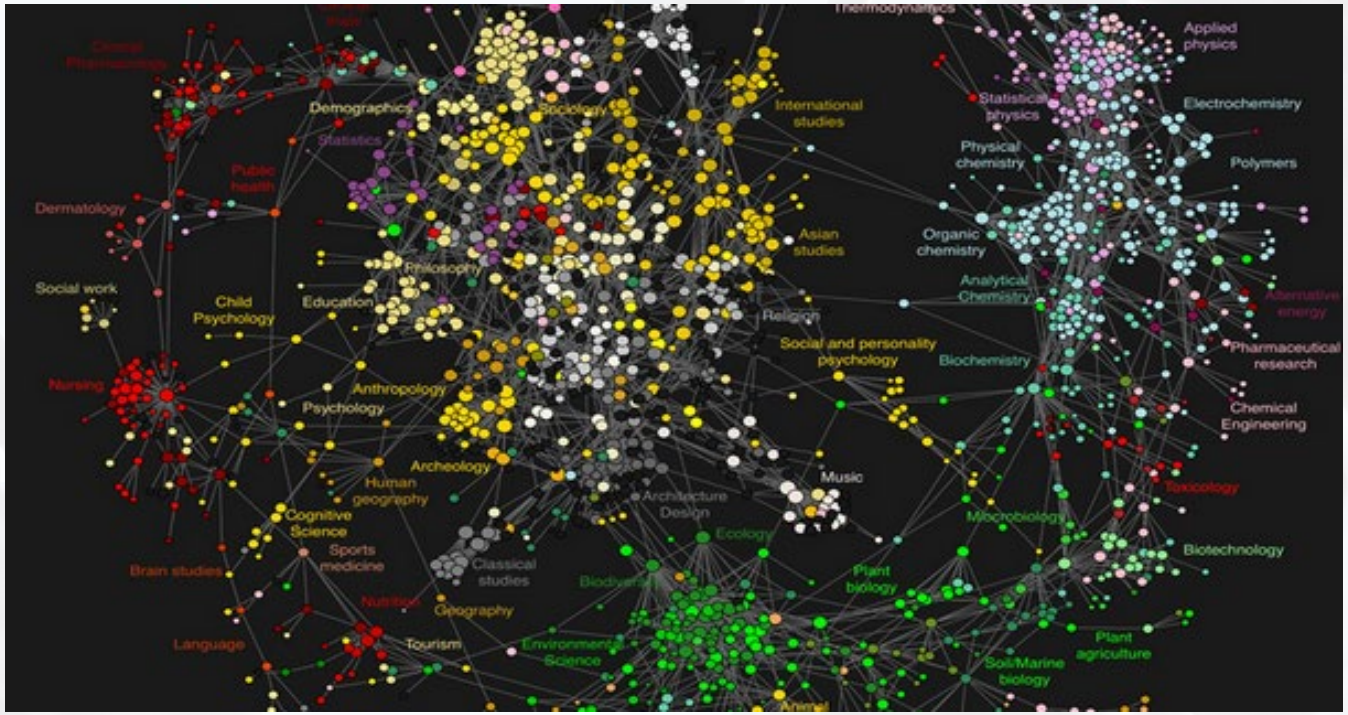


Image: http://blog.physicsworld.com/2009/03/12/the-atlas-of-science/

Construction

Science as Construction

- Constructive Empiricism (van Fraassen)
- Constructing the World (Chalmers)

(But are we back to Carnap again?)

Chalmers review: http://ndpr.nd.edu/news/constructing-the-world/

Point of Decision

Science

as construction?

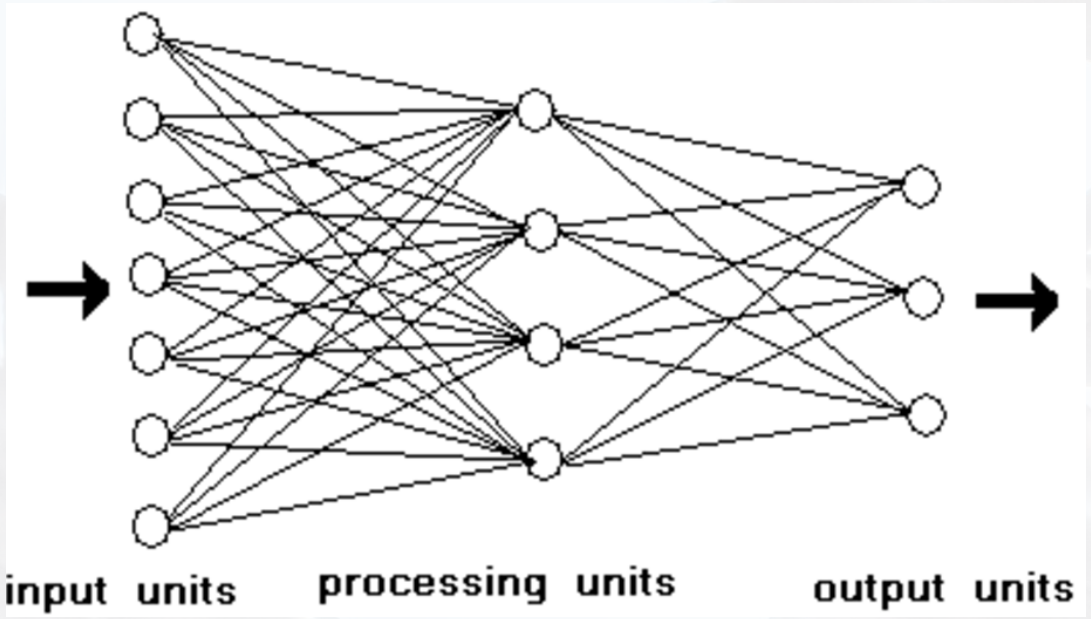
- Foundation in language, representation, models
- Something me *make*

as discovery?

- Foundation in experience, immersion, practice
- Something we *become*

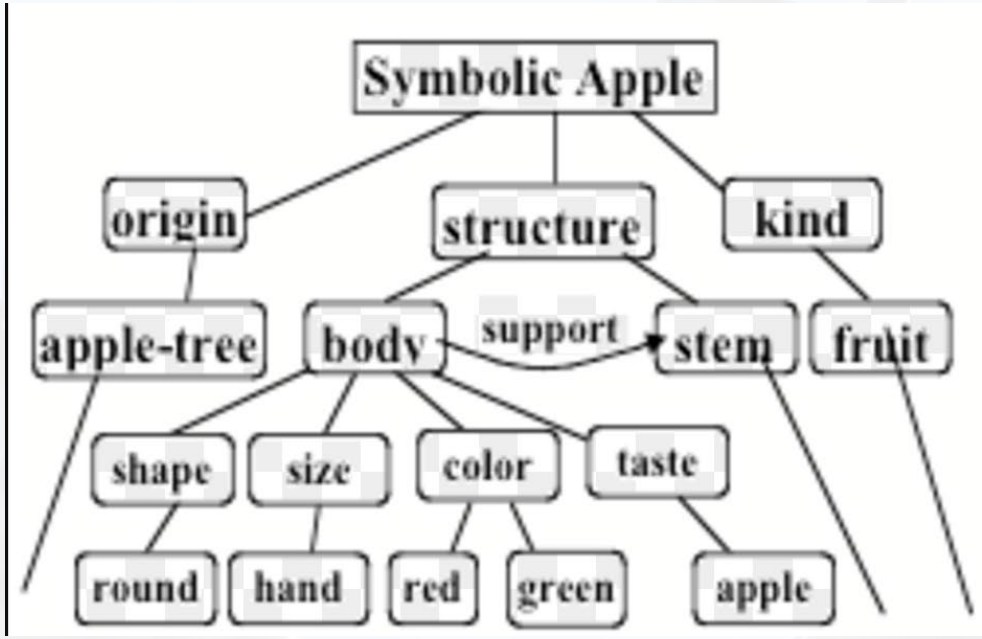
What Is Connectivism?

Connectionism

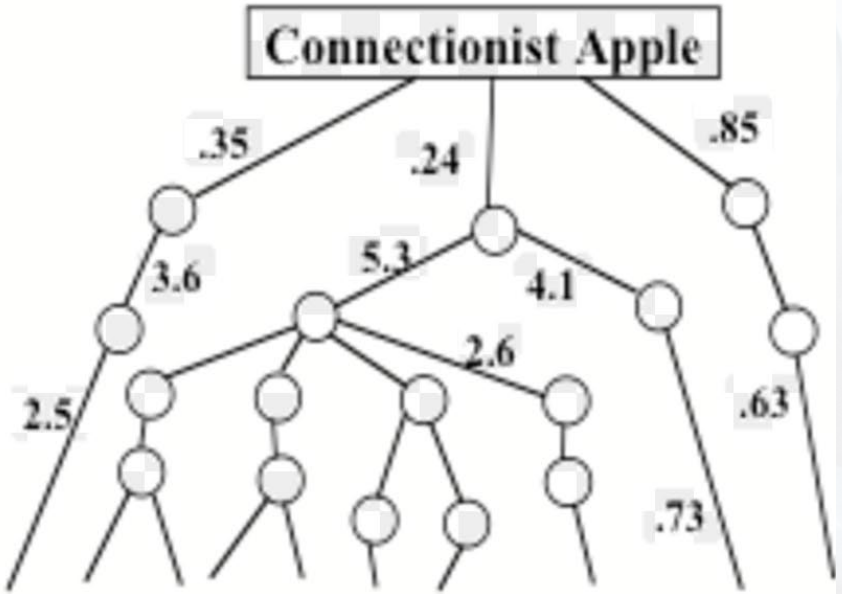


Network-based non-symbolic processing system

Representation



Symbols System – Model - Representation

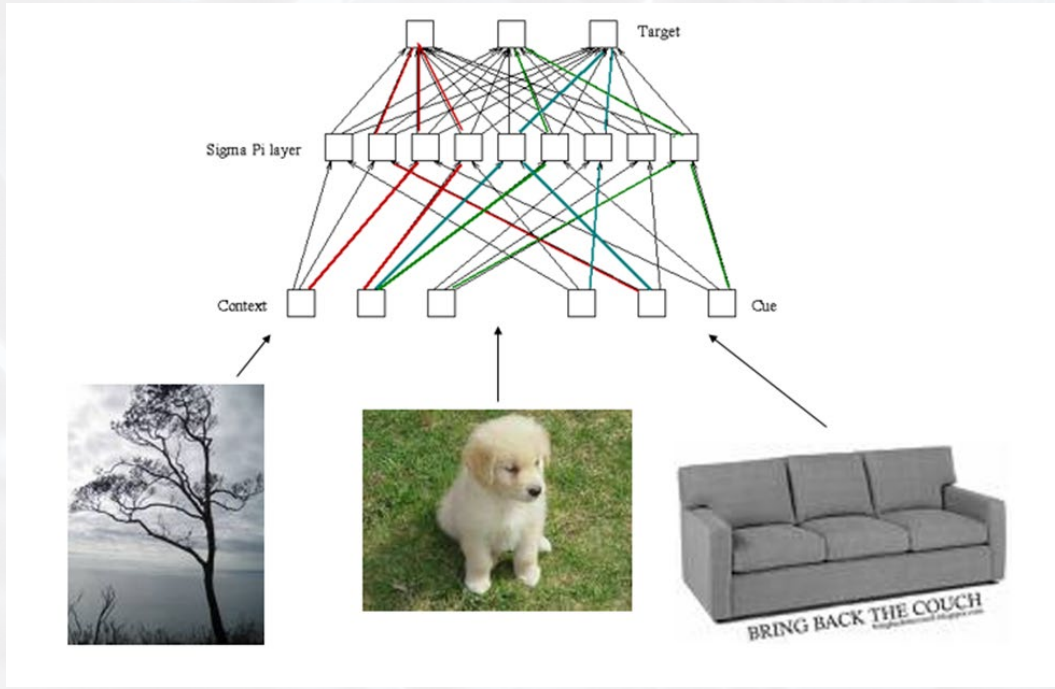


Analogy – Image – Neural Network

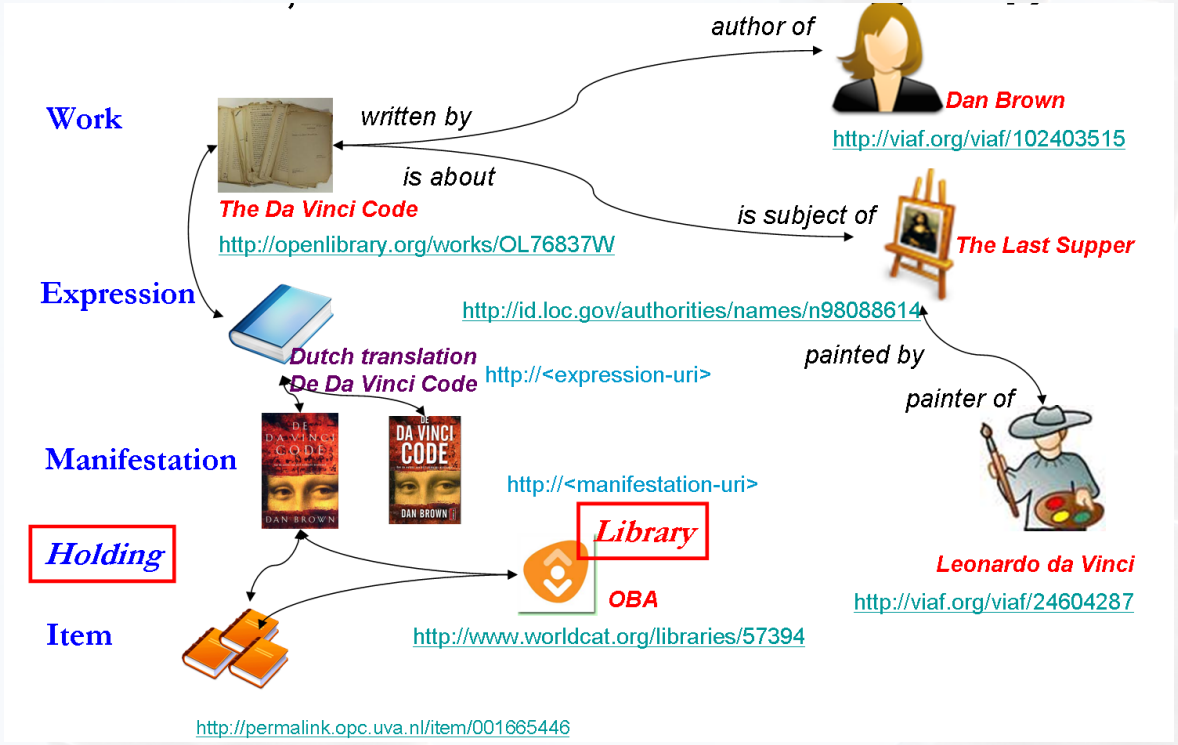
https://web.media.mit.edu/~minsky/papers/SymbolicVs.Connectionist.html

Distributed

A ‘concept’ is a *pattern of connectivist* in a network

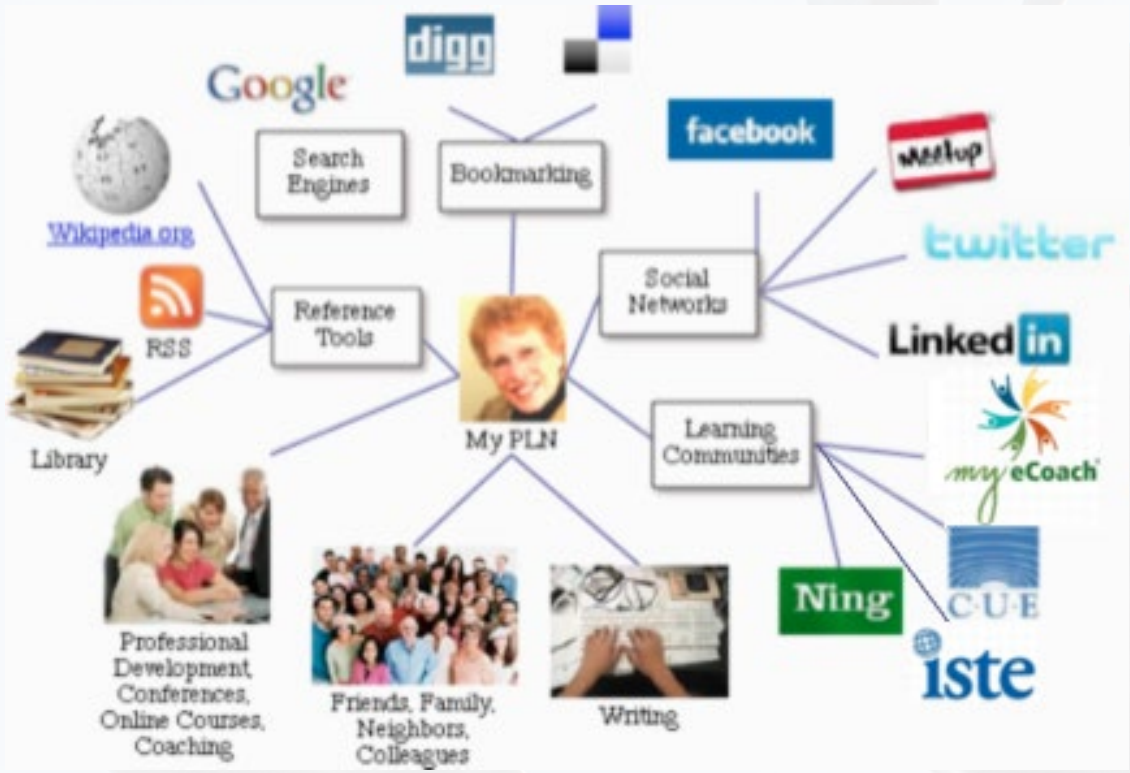


Linked Data



Though still employing symbols and language, steps away from *inference* and toward *association*

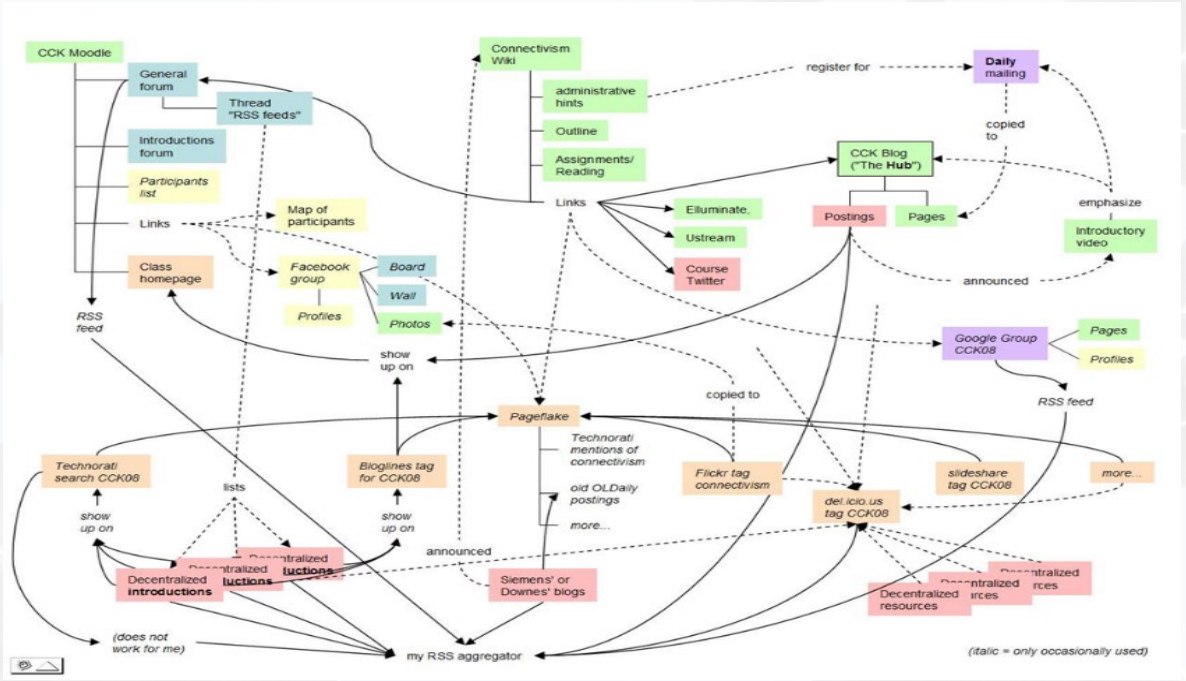
PLENK



Personal Learning Network & Environment

- Your friends
- Your concepts
- Your learning

MOOC



https://sites.google.com/site/themoocguide/home

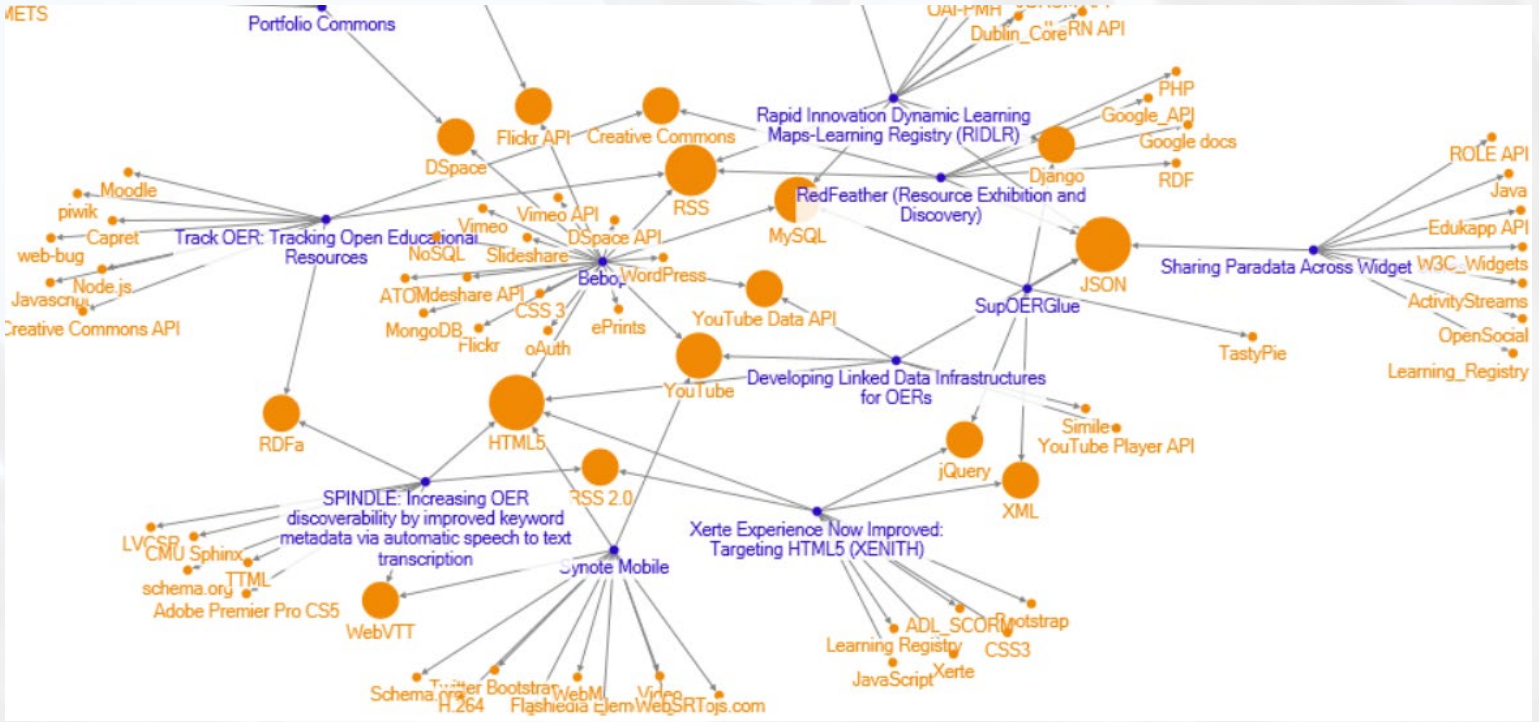
MOOC

Instead of seeing a course as a series of contents to be presented, envisions a course as a network of participants who find and exchange resources with each other (2008)

MOOC

- An initial structure is developed and ‘seeded’ with custom-built or (preferably) existing OERs
- Participants are encouraged to use their own sites to create or share resources
- A mechanism (such as gRSShopper or BuddyPress) is employed to connect them

Community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ROLE API
Java
Edukapp API
W3C_Widgets
ActivityStreams
OpenSocial
Learning_Registry
Moodle
piwik
Capret
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CSS 3
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TTML
schema.org
Adobe Premier Pro CS5
WebVTT
ynote Mobile
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Bootstrap
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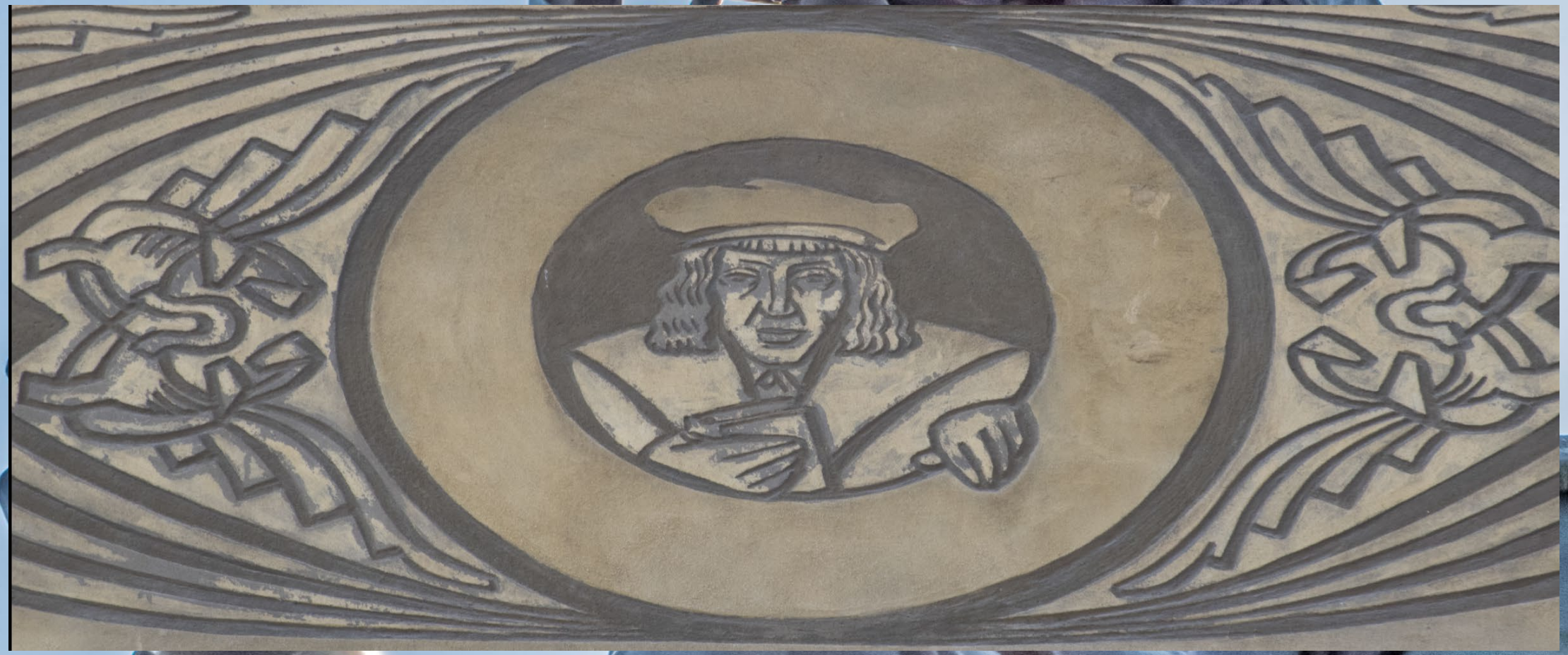
JavaScript
Xerte
Schema.org
H.264
WebM
WebSRT
js.com

What Is Learning?



Point of Decision

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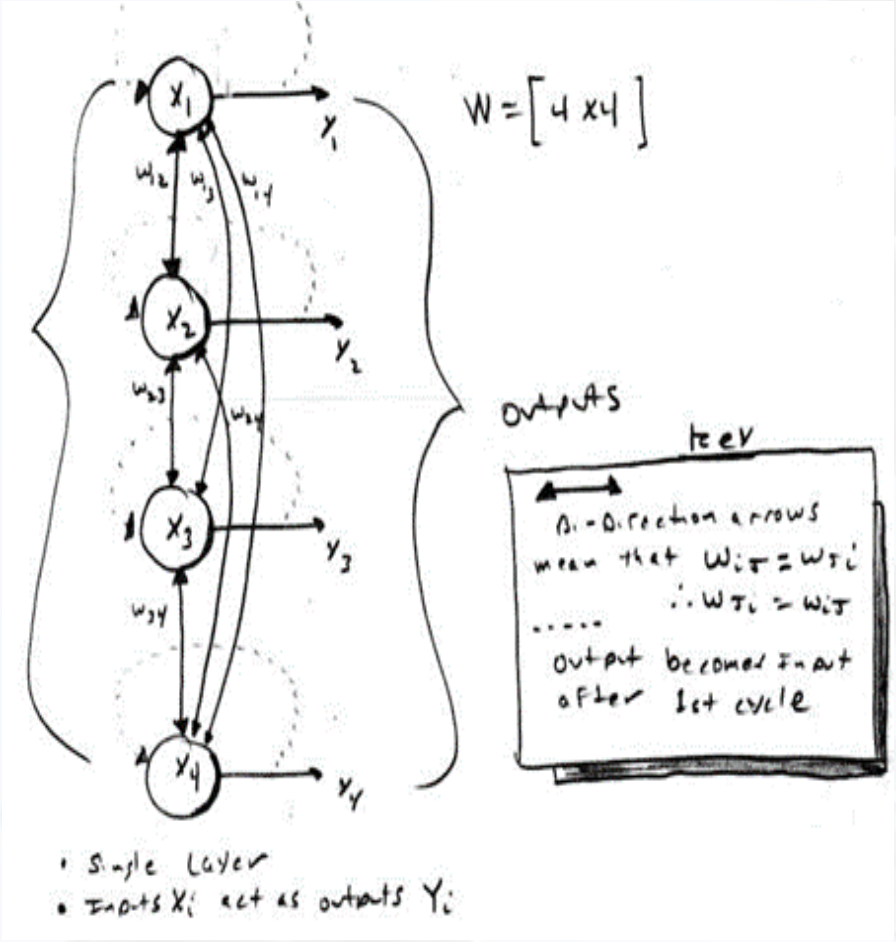


Network Learning

…is the creation and growing of connections

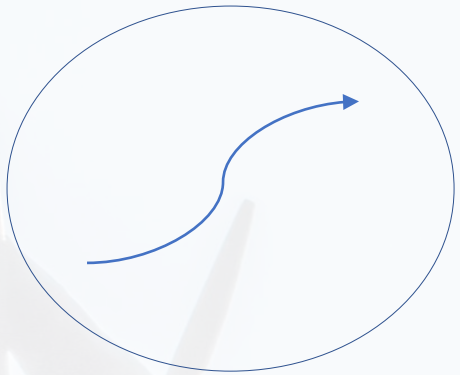
- Hebbian associationism
- Back propagation
- Boltzmann ‘settling’, annealing

Network Learning

…is the development of these networks

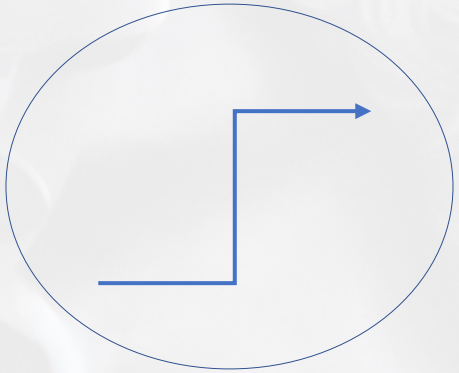
- A focus on both personal experience and social networks
- Learning is a matter of practice and reflection
- To know is to recognize

Parameters



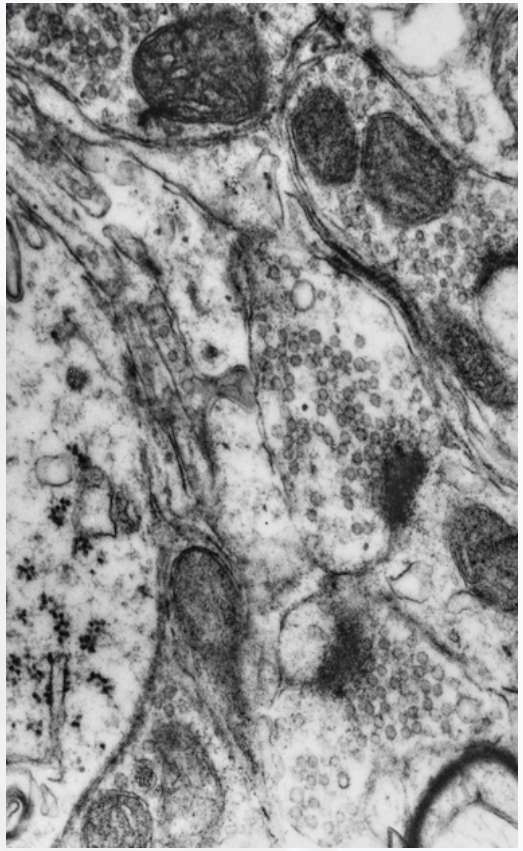
- Current state
- Activation function

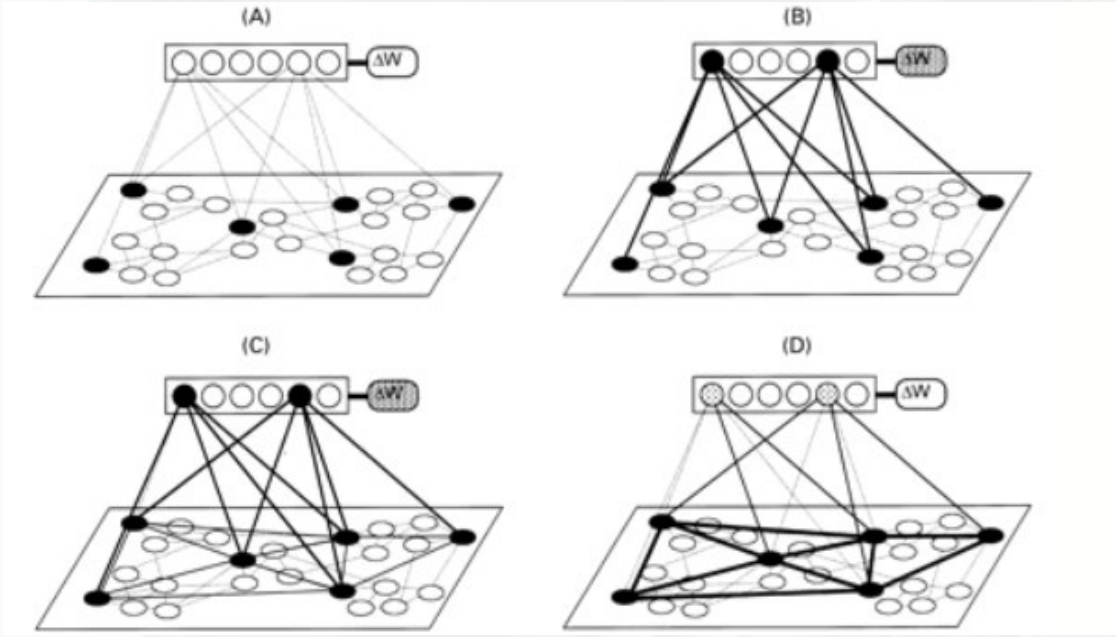
- Bandwidth (weight)
- Signal / Noise



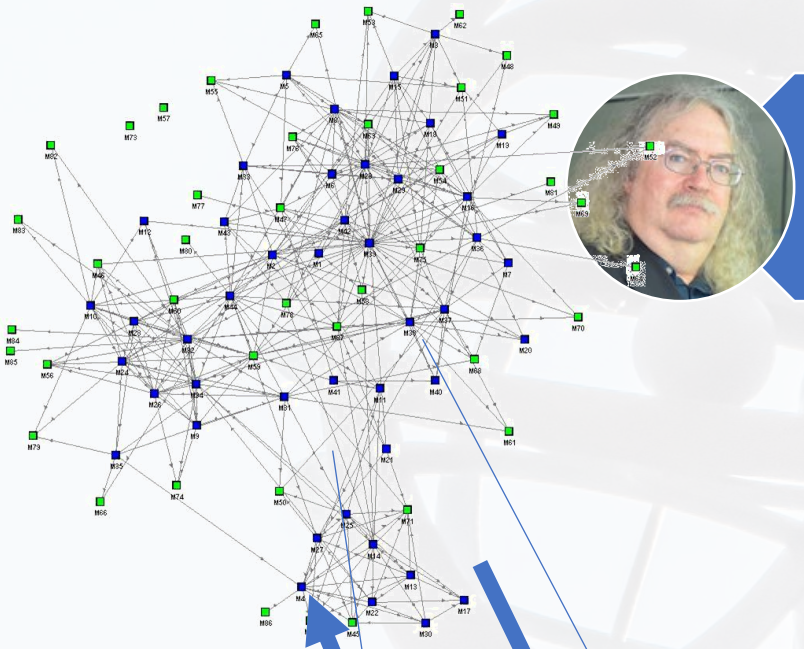
- Threshold value
- Increments

Synapses



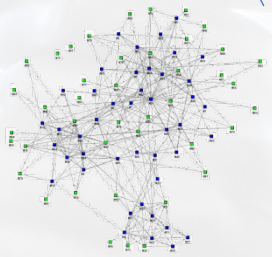


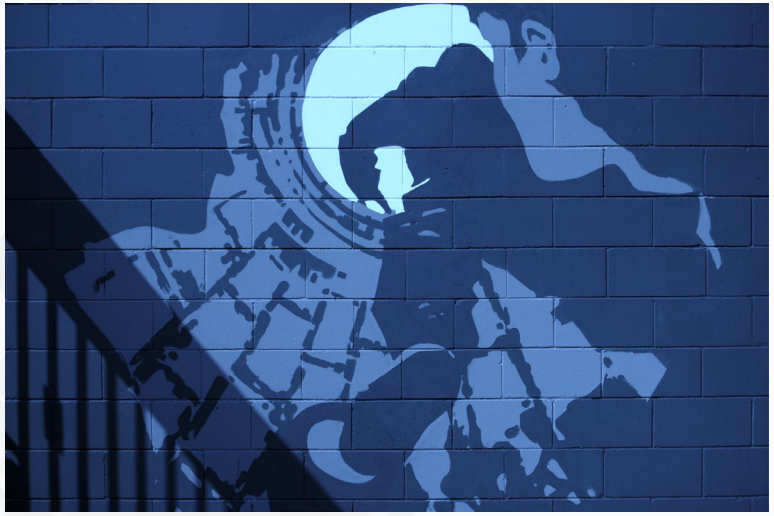
Core Concepts



Emergence

Recognition

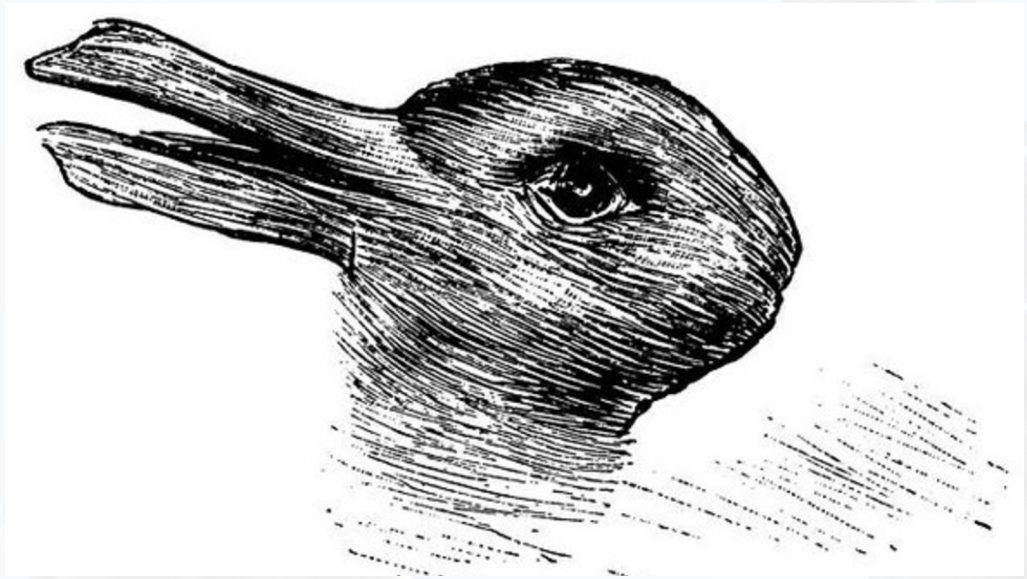




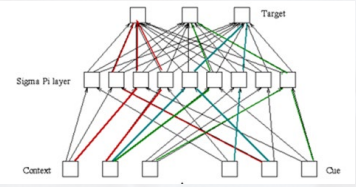
Emergence

- The creation of apparent order out of patterns
- Depends on perception, culture, way of seeing
- Self-Organization

Recognition



Gestalt
Duck-Rabbit
Pattern Activation



Implications for Practice

Objective

To present the core ideas of connectivism in both a learning and scientific context, in a sense unifying the ideas of discovery, interaction and education.

Method

Method as Discovery:

- To discover something is to be immersed in it, to speak it and listen to people speaking in it
- To immerse oneself in the world is to try listening and to try speaking

Principles

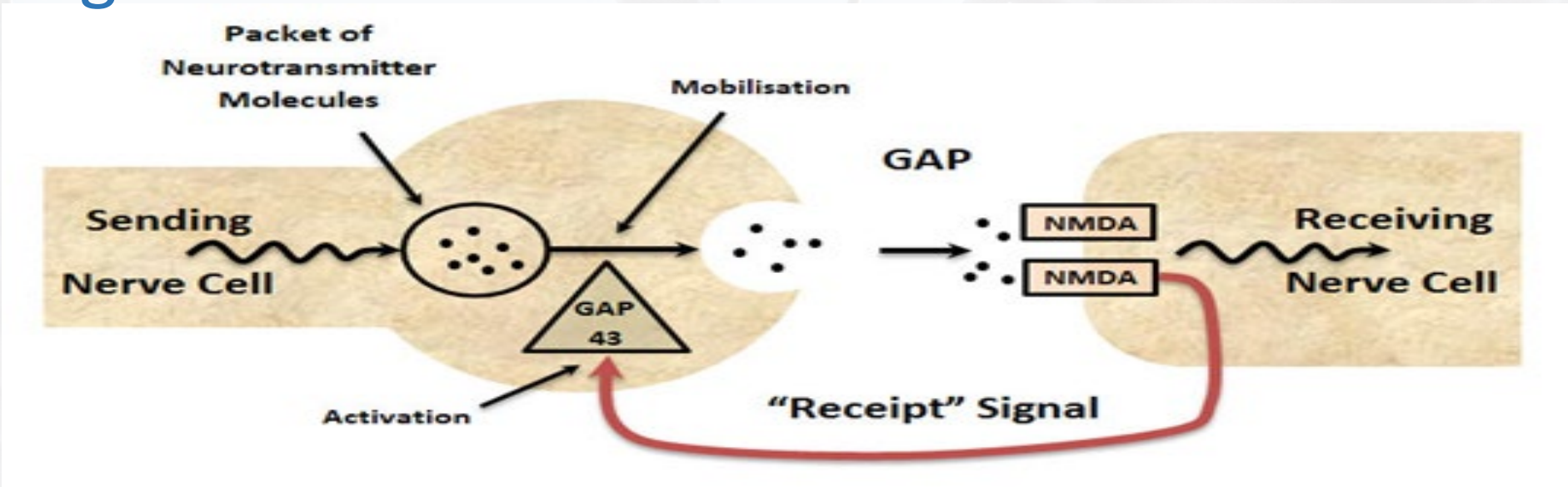
- Autonomy – each entity has its own values and objectives and decides for itself
- Diversity – each entity in a network is unique in role, function and perspective

Principles

- Openness – membership in the network is fluid; content (signals, messages) enter and exit network
- Interactivity – knowledge in the network is created by the interactive process (as opposed to the content of signals propagated through the network)

Process

Being a neuron in the network



Process

- Aggregate – seek out connections and obtain resources through those connections
- Remix – join the resources from multiple links together
- Repurpose – adapt the remixed resources
- Feed Forward – send the newly created resources on to the next nodes in the network

Model

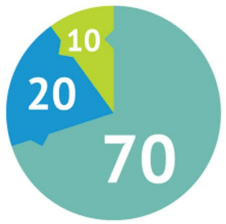
70-20-10 Model of Learning & Development

Experience

Social

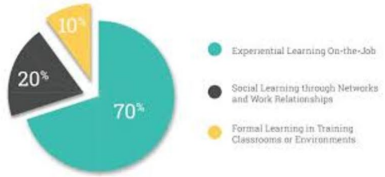
Classroom

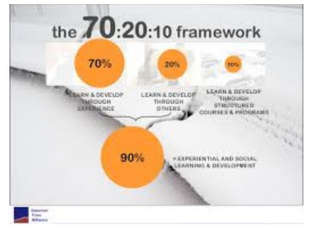
Method


10
20
70


70% ON the job
Learning by experience:
Assignments - directly related to role
Assignments - outside usual work responsibilities
Increased responsibilities in current role
20% - NEAR the job
Learning from others:
Feedback
Networking / conferences
Informal learning communities
Web based research
Internal / external
Coaching / mentoring from experts
10% - OFF the job
Formal training courses or certifications
10%
20%
70%


Performance Support &
The 70:20:10 Model
70%
On-the-job
Learning
(Experience)
20%
Informal
Learning
(Exposure)
10%
Formal
Learning
(Education)

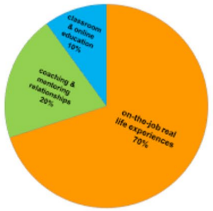

10%
20%
70%
Experential Learning On-the-Job
Social Learning through Networks and Work Relationships
Formal Learning in Training Classrooms or Environments


the 70:20:10 framework
70%
20%
10%
90%


EXPERIENTIAL LEARNING
70
Experience
Practice
SOCIAL LEARNING
20
Exposure
People
FORMAL LEARNING
10
Education
Programs


70:20:10

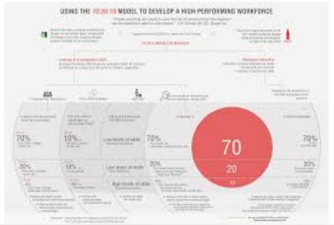

70:20:10 Forum's 10 Point Approach to Implementation
www.702010forum.com


on-the-job real life experiences 70%
coaching & mentoring relationships 20%
classroom & online education 10%

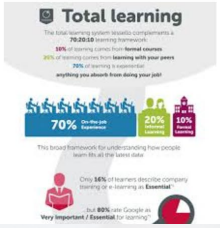

10%
Formal
Training
20%
Coaching and
Support
70%
On-the-job
Application


70/20/10


10%
Formal
training
20%
Feedback
& Coaching
70%
Experience


70
20


WLH
Is 70-20-10 Really Working For Operations?
70%
20%
10%


Total learning
70%
20%
10%

Model

70-20-10 Model of Cognition

Recognition

Reasoning

Remembering

Model

70-20-10 Model of Cognition

Recognition

Experience, practice, reflection, creation, sharing

Reasoning

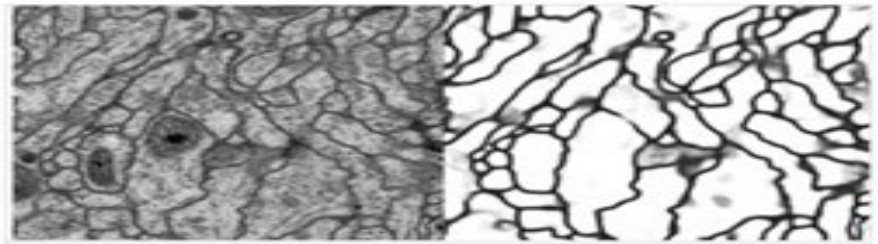
Models, inference, representation, theorizing

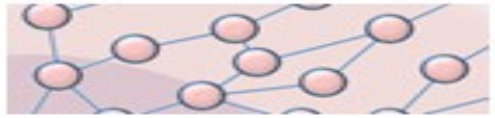
Remembering

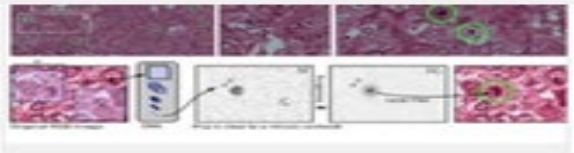
Facts, data, names, content

Reading the World

I don’t see the world as neat and ordered, like logic and mathematics – I see it as messy and complex

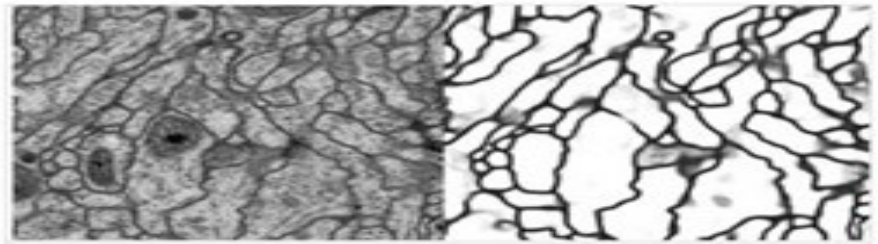


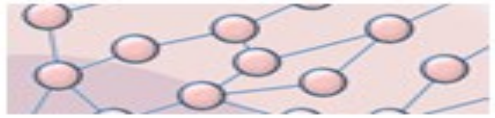


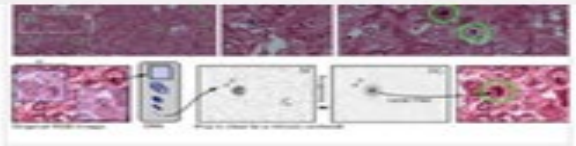


Reading the World

It’s not one language, but many languages; not one way of seeing, but many ways of seeing, not one way of being, but many ways







Thank You

Stephen Downes
http://www.downes.ca