

A Great Egret with long, wispy white feathers and a long, sharp yellow beak is perched on a thick, moss-covered tree branch. The bird is facing right, and its body is angled slightly away from the viewer. The background is a dense, out-of-focus green forest. The title text is overlaid on the right side of the image.

The Third Wave: the Next Generation of Distributed Learning Technology

Stephen Downes
CNIE, Vancouver, B.C.
May 22, 2019



E-Learning 3.0

Distributed Learning Technology

<https://el30.mooc.ca>

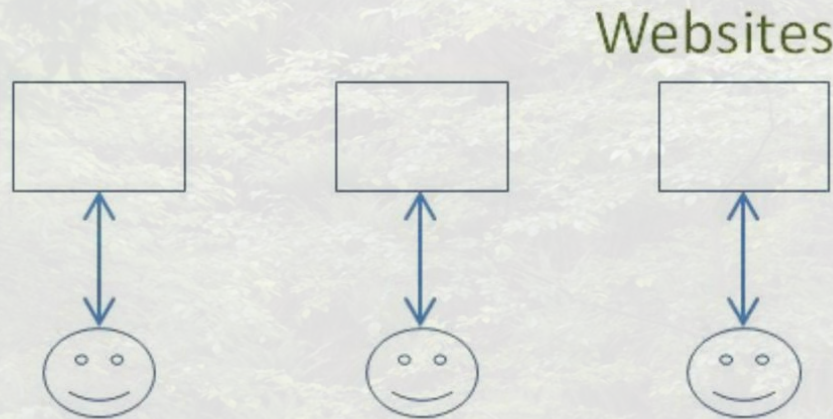
Starting October 15

[View the Course Outline and Synopsis](#)

[Subscribe to the Course Newsletter](#)

The First Wave

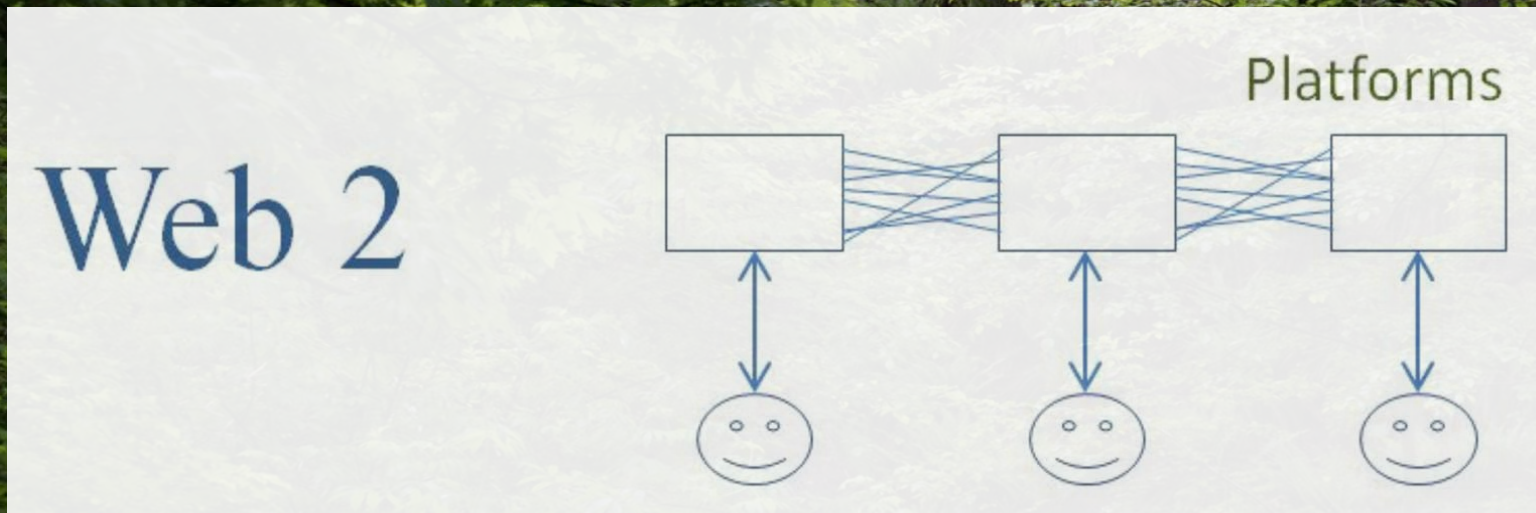
Web 1



- Websites
- CMS / LMS
- Learning Objects
- Client-Server
- Content Delivery
- Sequencing
- Learning Design
- SCORM
- Repositories
- E-learning

The Client-Server Model

The Second Wave



- Web Services
- Learning Platform
- API / REST
- Server-Server
- Social Networks
- IMS-LTI
- Learning Design
- Recognition Net
- Curation
- E-learning 2.0

The Platform Model

The Third Wave

Web 3



Distributed

CC-by Downes

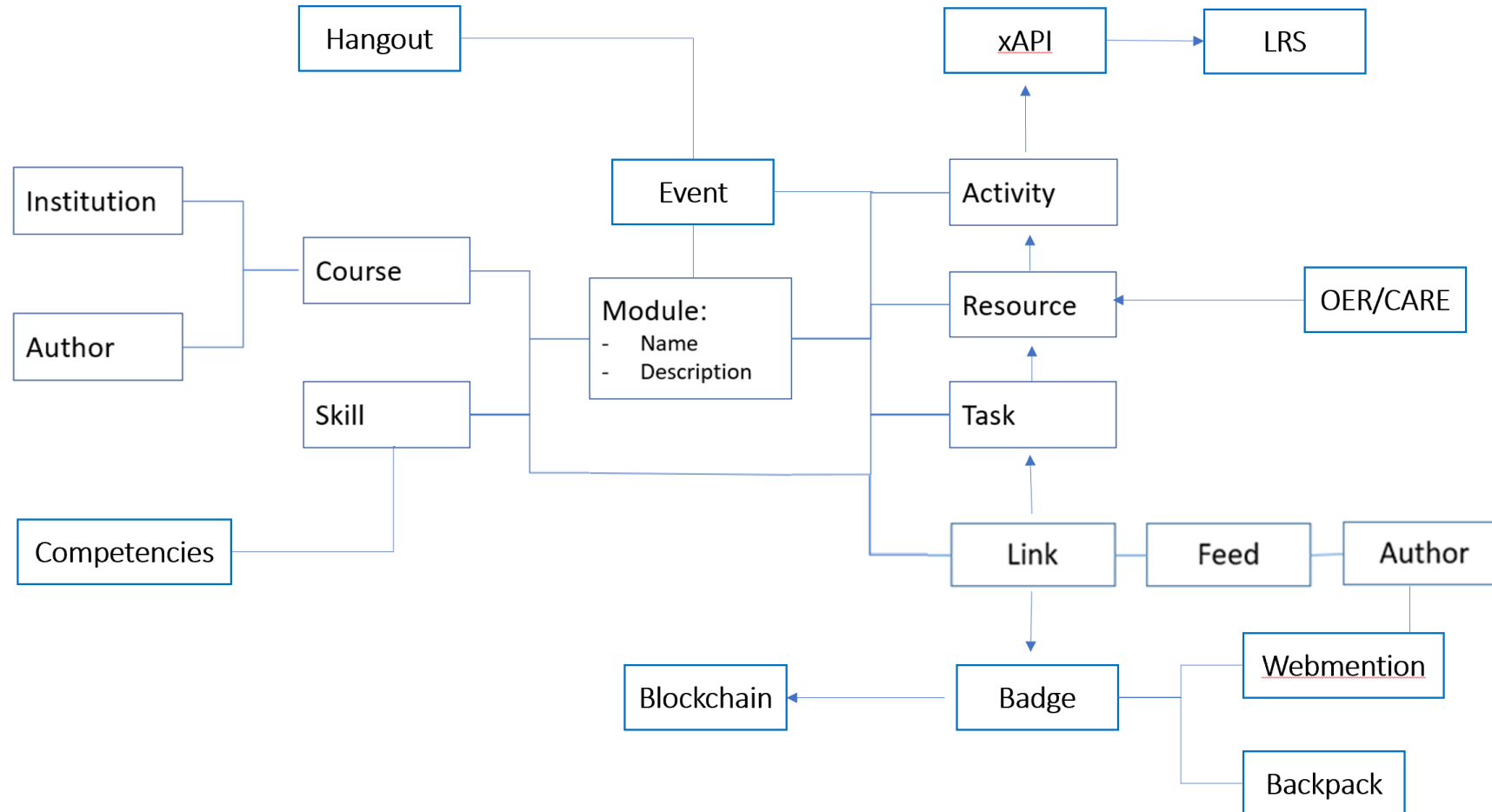
- Open Data
- Cloud Services
- Graph Tech
- Sovereign Identity
- Sharing Network
- Recognition
- Consensus
- Experience
- Agency
- E-learning 3.0

The Distributed Model

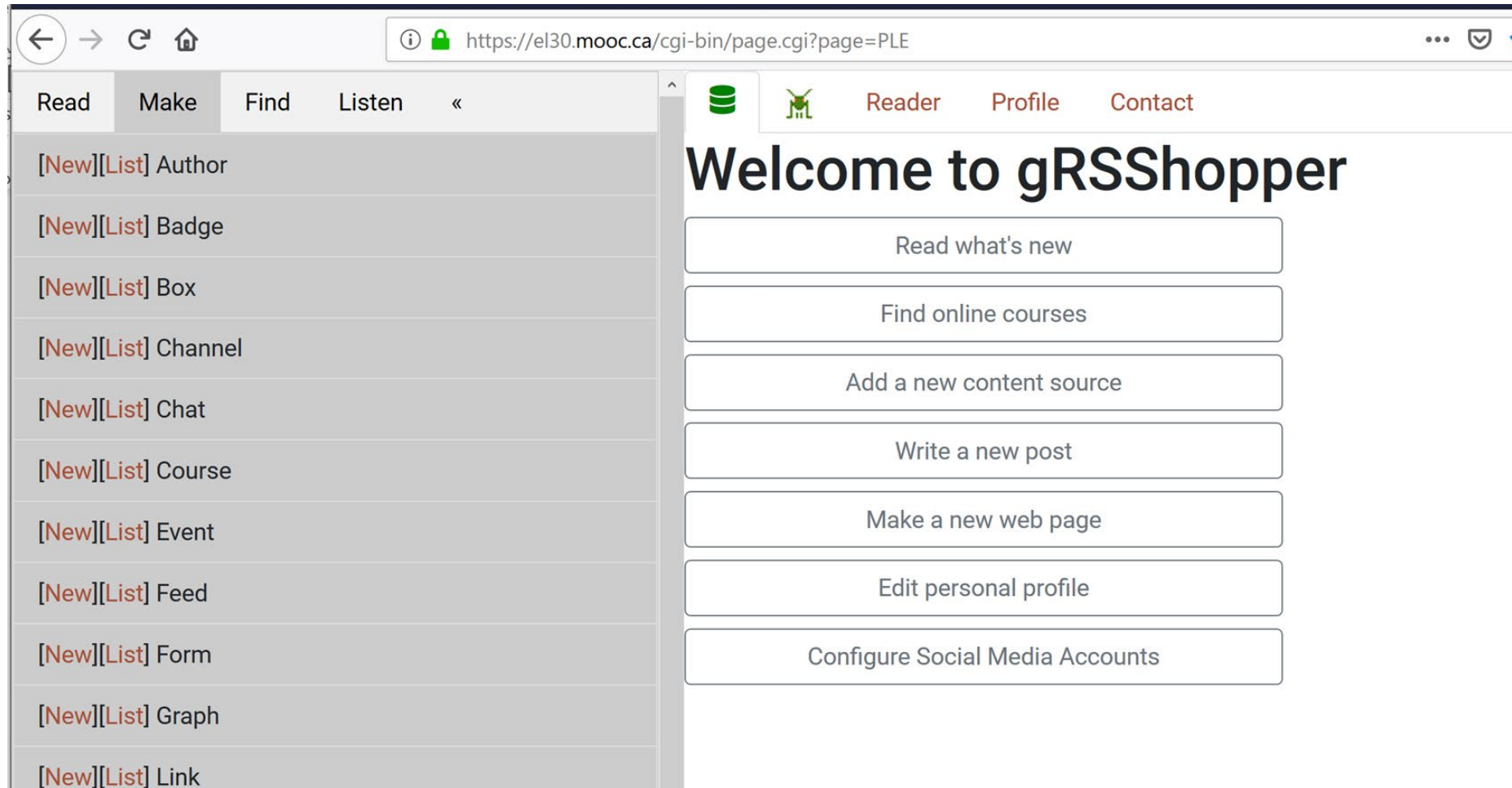
Part One: Technology



Big Idea 1: Course(?) as Open Data

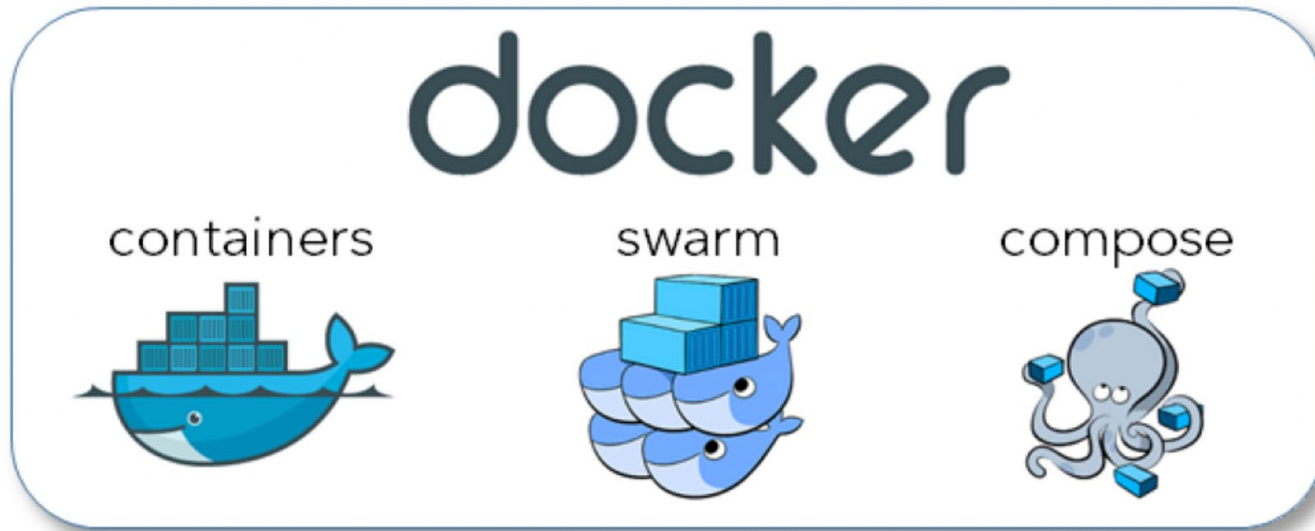


Course as Open Data in gRSShopper



<https://el30.mooc.ca/cgi-bin/page.cgi?page=PLE> (requires admin login)

Big Idea 2: Course(?) in Containers



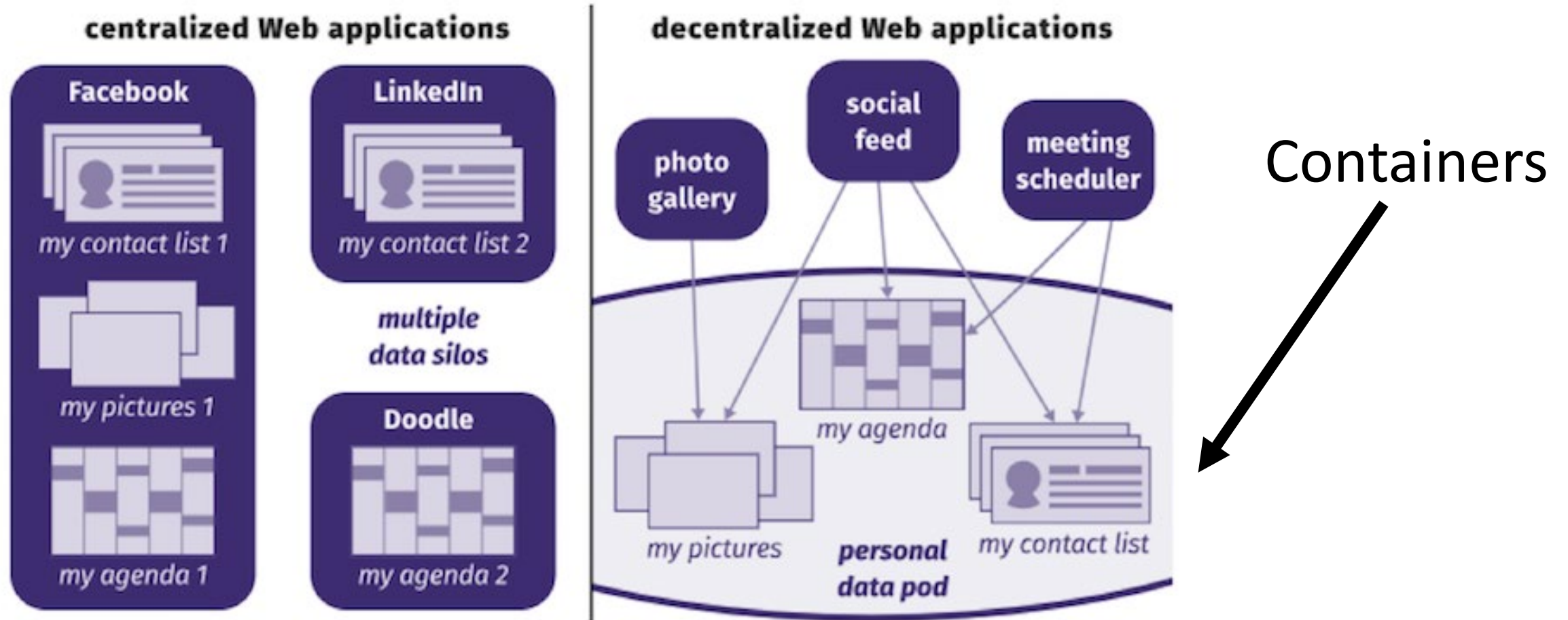
Tools that enable cloud-on-demand applications and services

<https://www.techradar.com/news/what-is-container-technology>

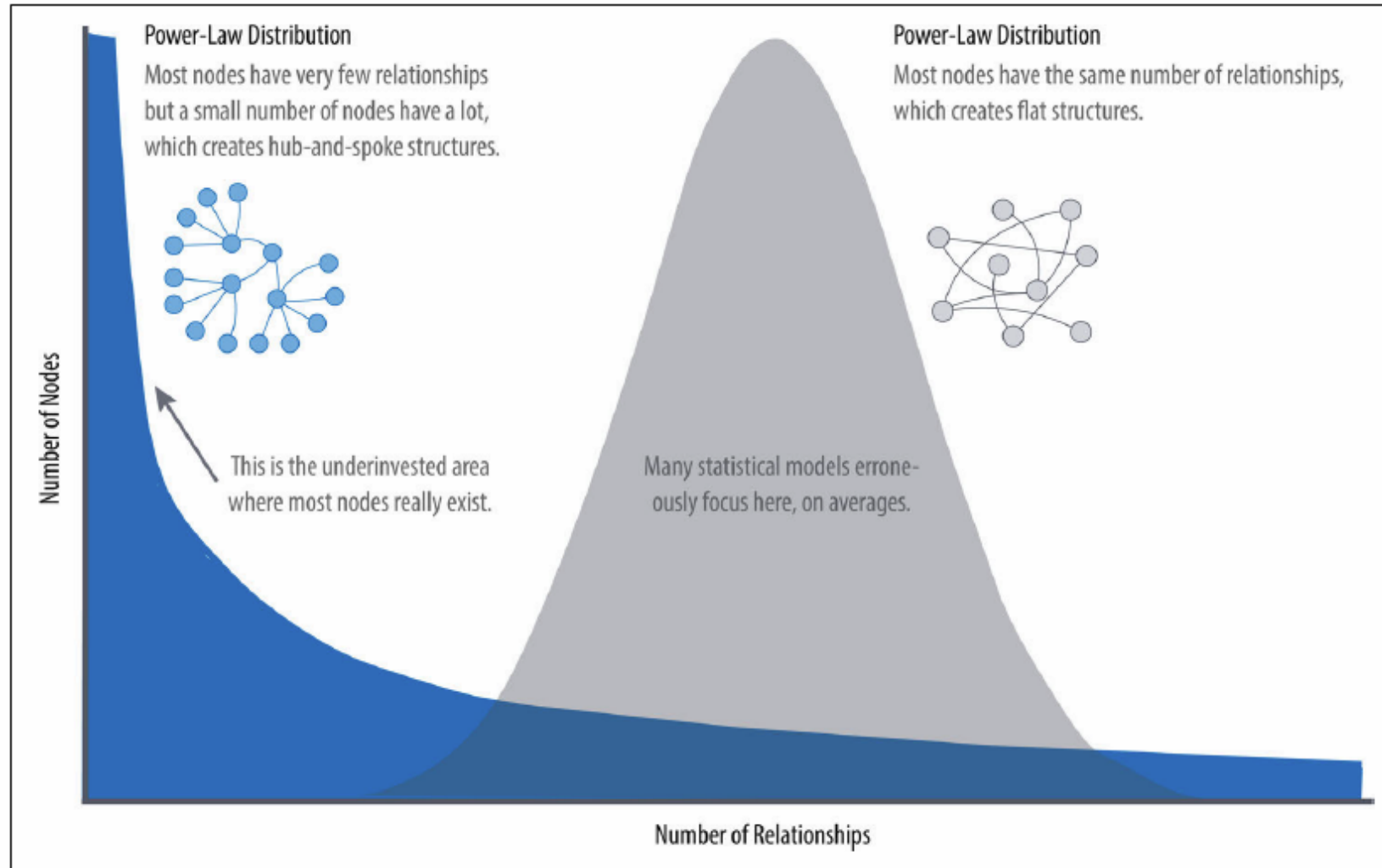
gRSShopper in a Box

<https://www.downes.ca/presentation/482>

Re-Decentralizing the Web



Big Idea 3: Graph, Not Story

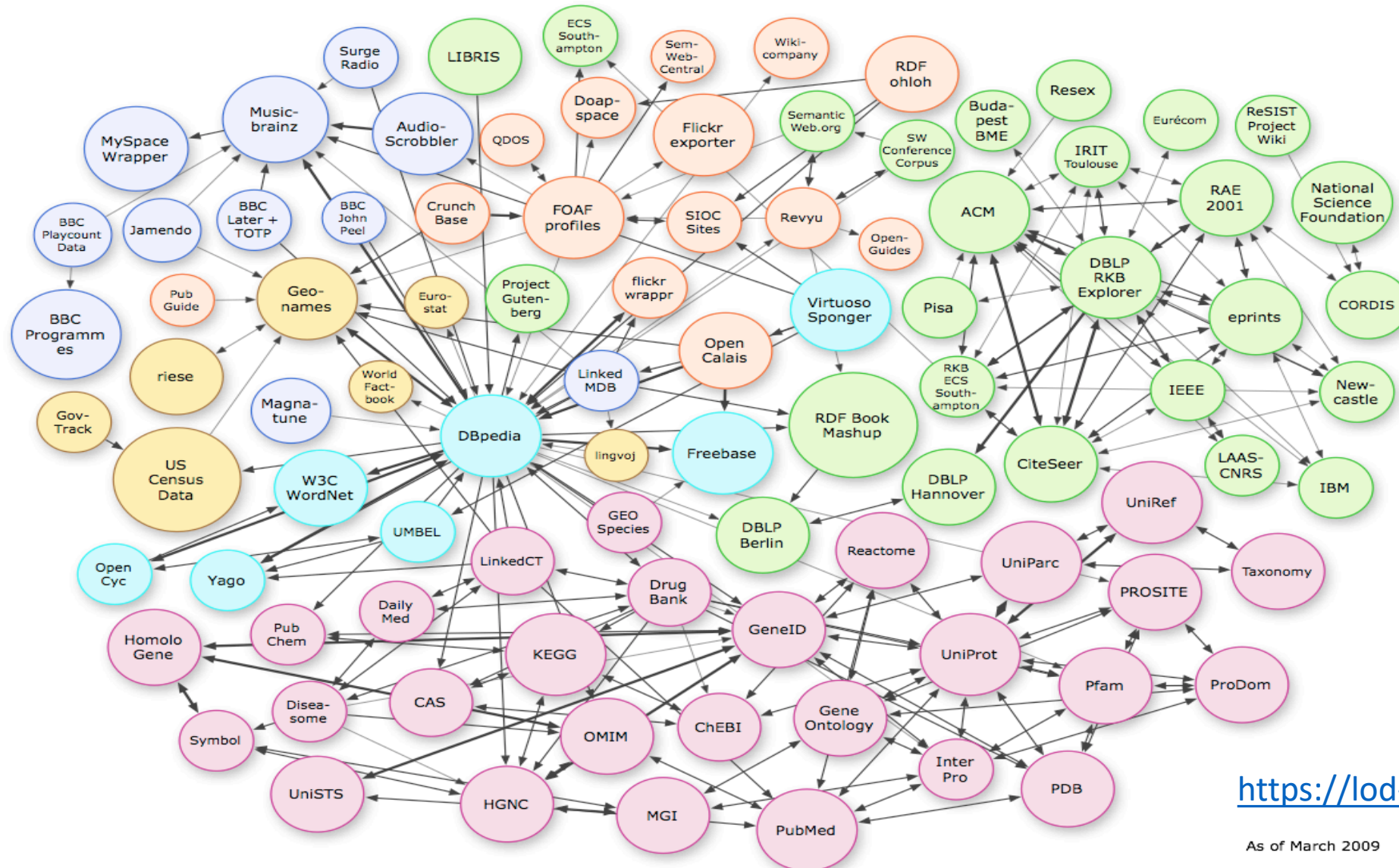


Narrations and models focus on common or 'best' practices

Graphs capture patterns, outliers, and the unexpected.

Knowledge is *recognition*, not *remembering*

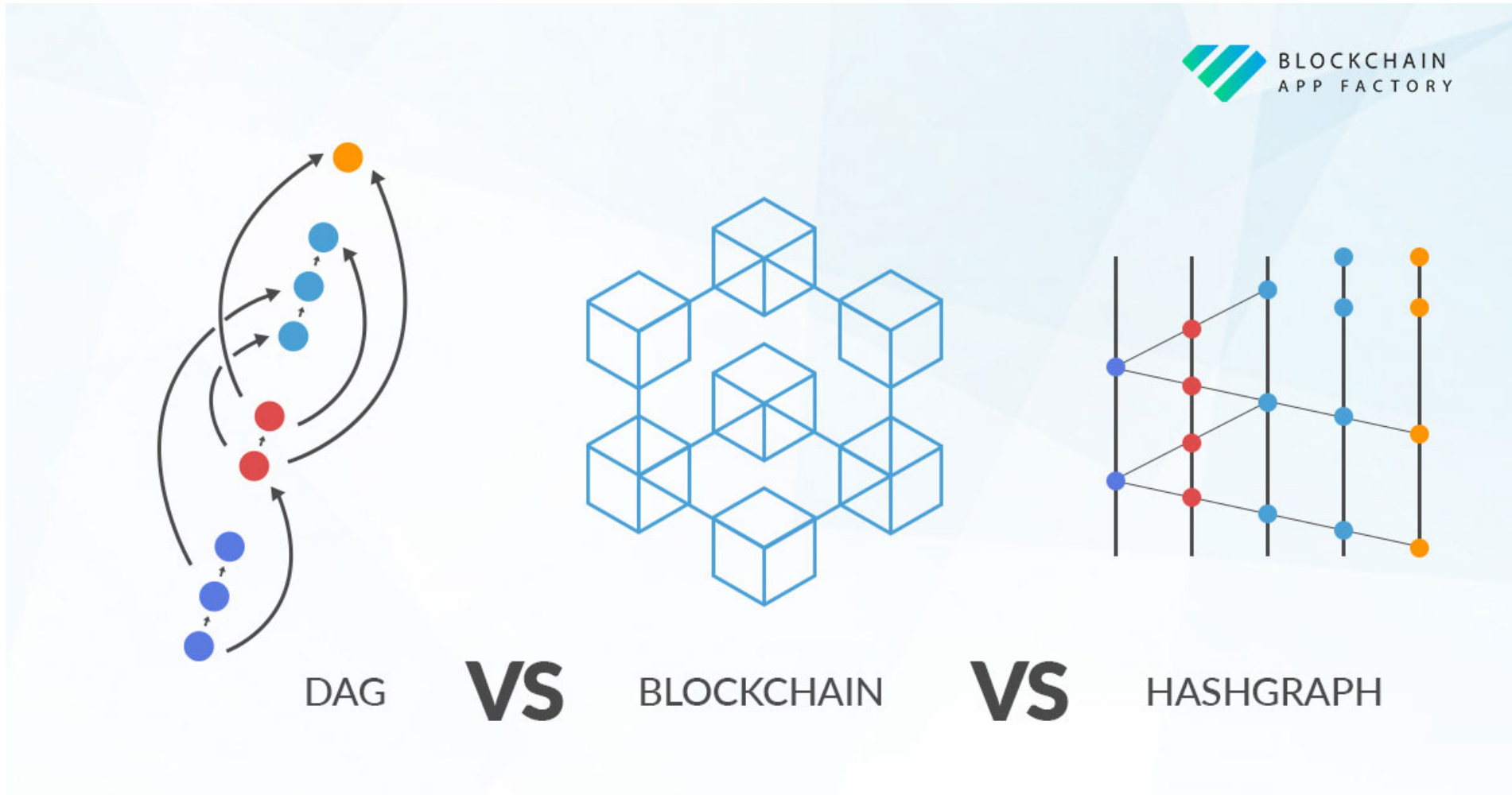
Linked Open Data



<https://lod-cloud.net/>

As of March 2009

Hashgraphs and Merkle Chains

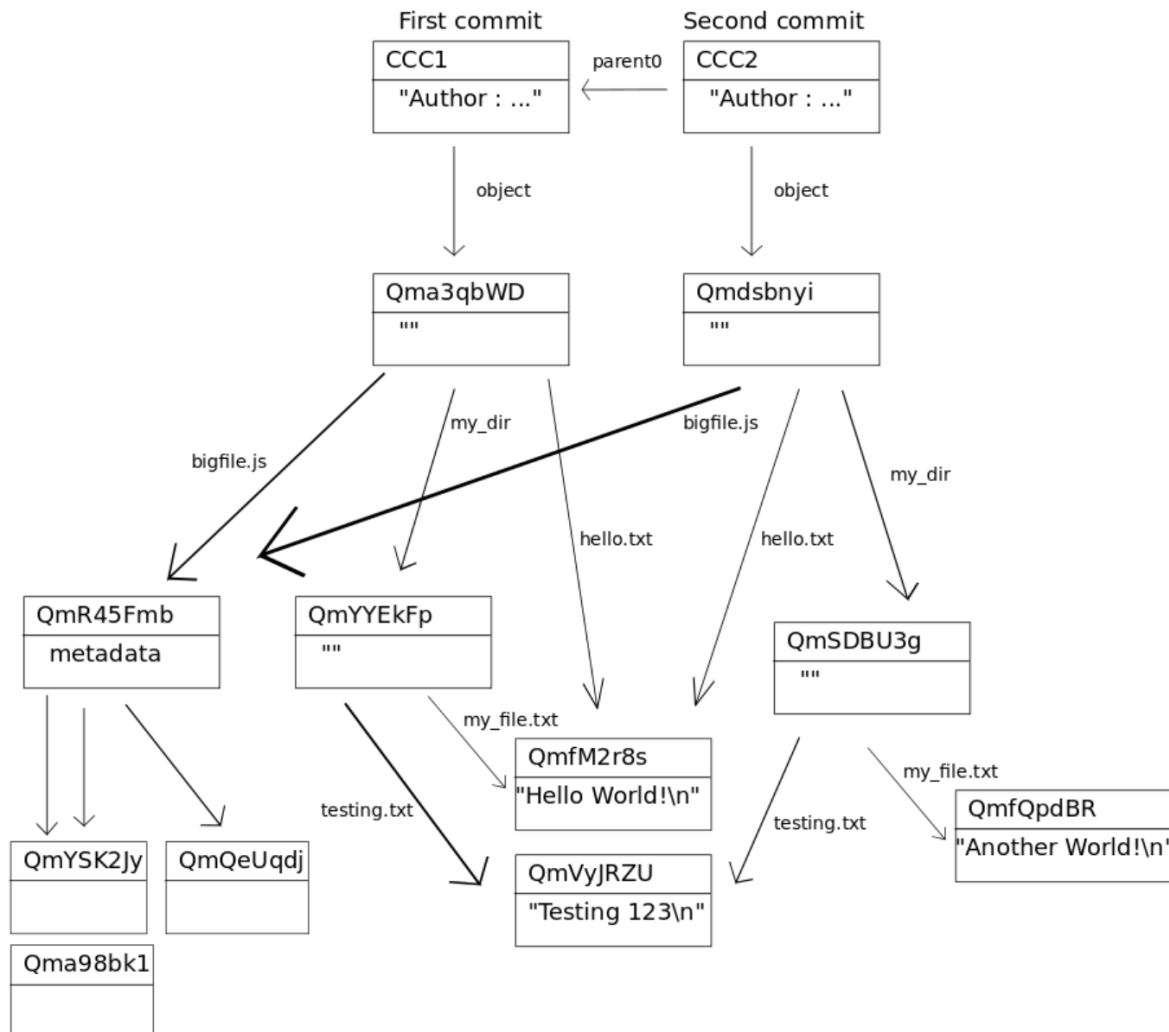


<https://www.blockchainappfactory.com/blog/dag-vs-blockchain-vs-hashgraph/>

Part Two: Pedagogy



Big Idea 4: CARE



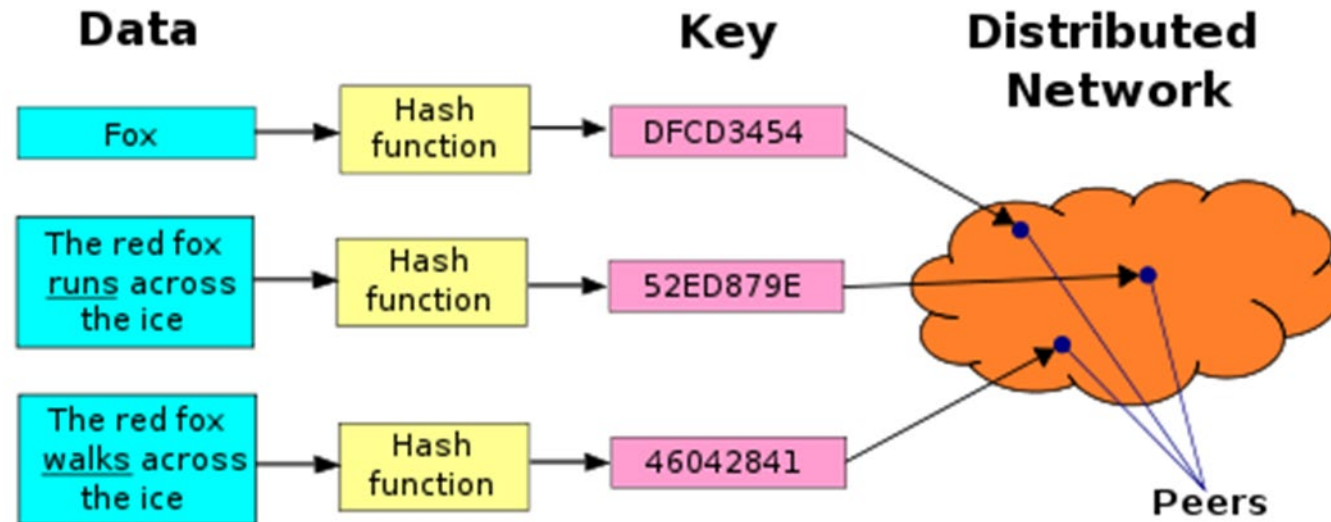
CARE is based on the idea of distributed hashgraph networks

A lot like Git

<http://www.github.com>

https://www.youtube.com/watch?v=QNKpK_InQHQ

Hash Addresses



Distributed Hash Table

Each piece of content has a unique address, which is a hash of its content

https://ipfs.io/ipfs/QmXoypizjW3WknFiJnKLwHCnL72vedxjQkDDP1mXWo6uco/wiki/Distributed_hash_table.html

CARE

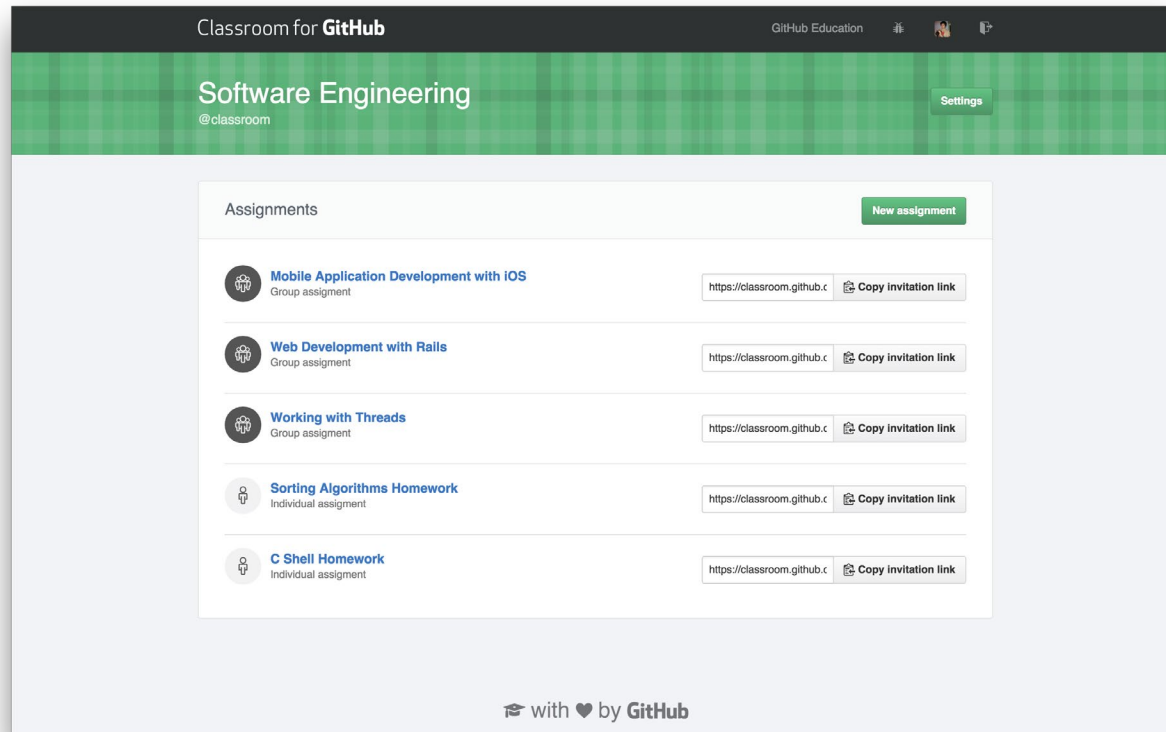


Content
Addressable
Resources for
Education

The new OER

<https://ipfs.io/>

A Distributed GitHub for Learning Resources



Creativity happens in a context, in a community, where building on each other's work and sharing is the norm

<https://github.com/topics/educational-materials>

<https://github.blog/2015-09-22-teachers-manage-your-courses-with-classroom-for-github/>

Creating With OpenAI

Completion

**A poem, constrained,
by words and context;
Not even the poet knows
what happens next ...** I can just imagine how that story looks:
The wind whistling against the sky ... the ocean glitters ... a distant land
Crawling on the sea floor, growing thicker and darker
The trees have been robbed and gone
It's been so long since someone used to love me,
When I was so scared, I forgot

My old mother would hold me
So tight her fingers hurt as he
Lifted them out while she whispered
To me as if she was still alive ...
She whispered the same words every night, she said I'd never love her
But I did. She wanted everything, so she gave it to me.

I am what I am when I'm no longer
Something that mustn't be forgotten...
... a person so beautiful.



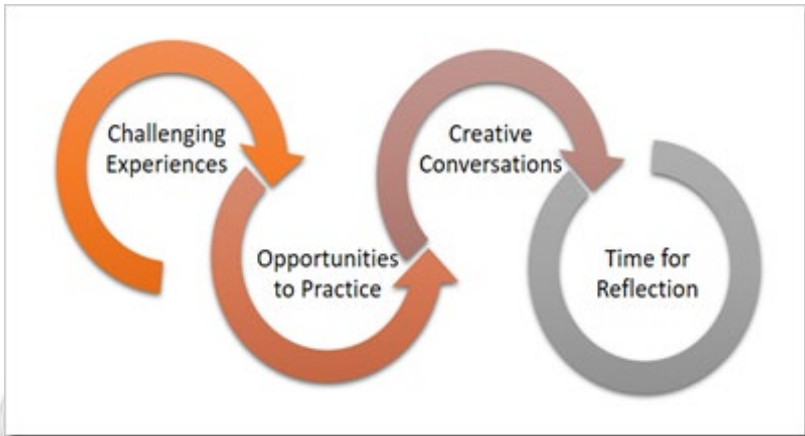
<http://dogtrax.edublogs.org/2019/05/18/writing-collaboration-with-openai-context-and-constraints/>

Big Idea 5: Content and Creation Combined



<https://www.mediavillage.com/article/how-banksys-disruptive-approach-informs-the-best-creative-campaigns/>

Practice and Reflection



We learn from experience...
And reflecting on experience.
We are beginning to *combine*
the experience and reflection

<https://charles-jennings.blogspot.com/2016/07/the-power-of-reflection-in-ever.html>

<https://www.epicgames.com/fortnite/en-US/home>



Content and Creation

Creation of the content is becoming a part of the content itself.



Livecaster

<https://intrsection.com/2017/04/8396/>

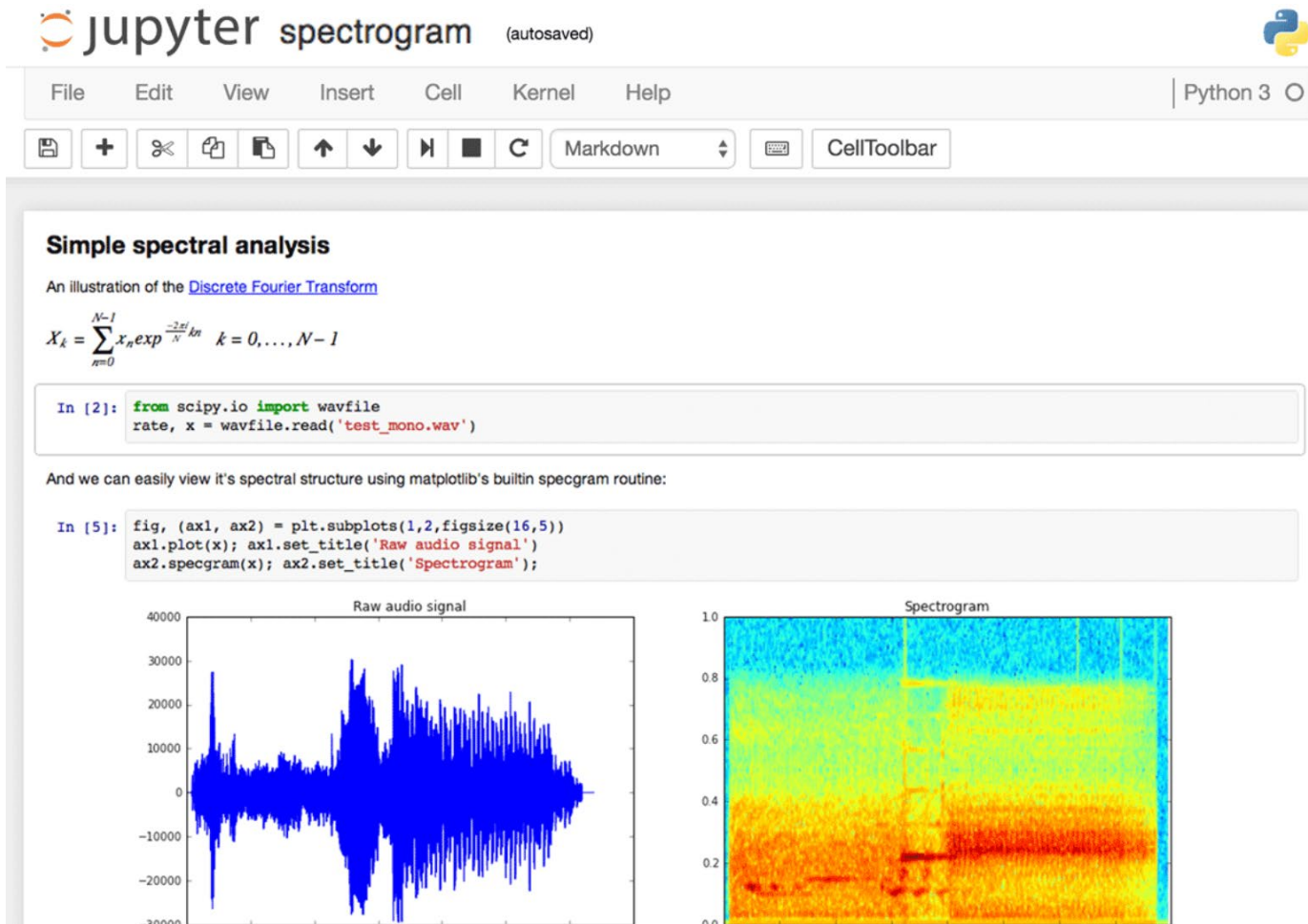
Twitch

<https://www.twitch.tv/>

Open Broadcaster

<https://obsproject.com/>

Notebooks



Jupyter Notebook
combines data and code
in a document

JupyterLab Environment
- work with code, data,
and the Jupyter
notebook format.

<https://www.dataquest.io/blog/jupyter-notebook-tips-tricks-shortcuts/>

Workbench

The screenshot displays the Workbench interface with a pink header bar containing the text "Introduction to Data Journalism" and "Per capita crime rates". Below the header, the source is identified as "U.S. Federal Bureau of Investigation". The interface is divided into a left sidebar with numbered steps (1, 2, 3, 4) and a main data table.

Step 1: "Add from URL" - A button labeled "Add from URL" is visible.

Step 2: "Concatenate workflow" - A dropdown menu shows "http://...". Below it, the "Include" section has a dropdown set to "Only this workflow's columns" and a checked checkbox for "Include source column". An "Update Manual" button and a version dropdown are also present.

Step 3: "Concatenate tabs" - A dropdown menu shows "Select tabs to append". Below it, there is an unchecked checkbox for "Add source column" and a blue arrow button.

Step 4: "Google Drive" - A "Connect account" button is visible. Below it, there is a checked checkbox for "Has header row", an "Update Manual" button, and a version dropdown.

At the bottom of the sidebar is a large blue button labeled "+ ADD STEP".

The main data table has 50 rows and 4 columns. The columns are labeled A, B, C, and D. The data is as follows:

	A	B	C	D
	State text	Population number	Violent crime number	Property crime number
1	ALABAMA	4,874,747	25,551	144,160
2	ALASKA	739,795	6,133	26,204
3	ARIZONA	7,016,270	35,644	204,515
4	ARKANSAS	3,004,279	16,671	92,489
5	CALIFORNIA	39,536,653	177,627	987,114
6	COLORADO	5,607,154	20,638	151,483
7	CONNECTICUT	3,588,184	8,180	63,509
8	DELAWARE	961,939	4,361	23,477
9	FLORIDA	20,984,400	85,625	527,220
10	GEORGIA	10,429,379	37,258	298,298
11	HAWAII	1,427,538	3,577	40,392
12	IDAHO	1,716,943	3,888	28,079
13	ILLINOIS	12,802,023	56,180	257,497
14	INDIANA	6,666,818	26,598	161,132
15	IOWA	3,145,711	9,230	66,855
16	KANSAS	2,913,123	12,030	81,593
17	KENTUCKY	4,454,189	10,056	94,833
18	LOUISIANA	4,684,333	26,092	157,712
19	MAINE	1,335,907	1,617	20,133

Workbench is a free and open source data journalism platform "that enables all stages of data journalism: getting data (including scraping), then cleaning, analyzing, visualizing, and sharing it.

<https://www.dataquest.io/blog/jupyter-notebook-tips-tricks-shortcuts/>

Big Idea 6: *We are the Content*



McLuhan: The
Content is the
Audience

https://www.youtube.com/watch?v=QNKpK_InQHQ

Identity Graph



<https://twitter.com/merkle/status/938123229335613440>

Self-Sovereign Identity

Symmetric Encryption

One key Session



Asymmetric Encryption

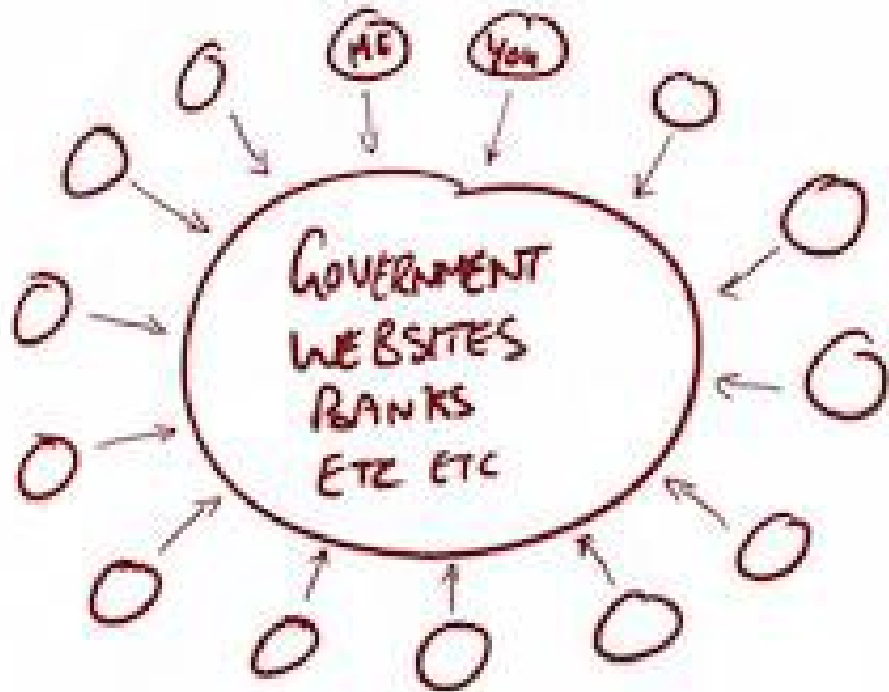
Private



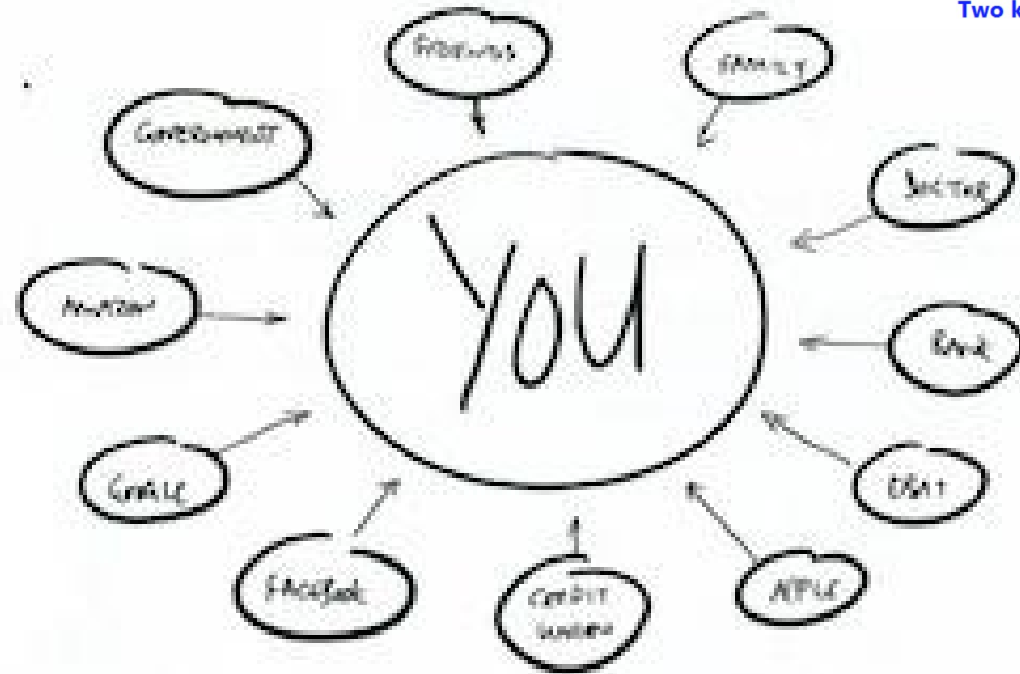
Public



Two keys

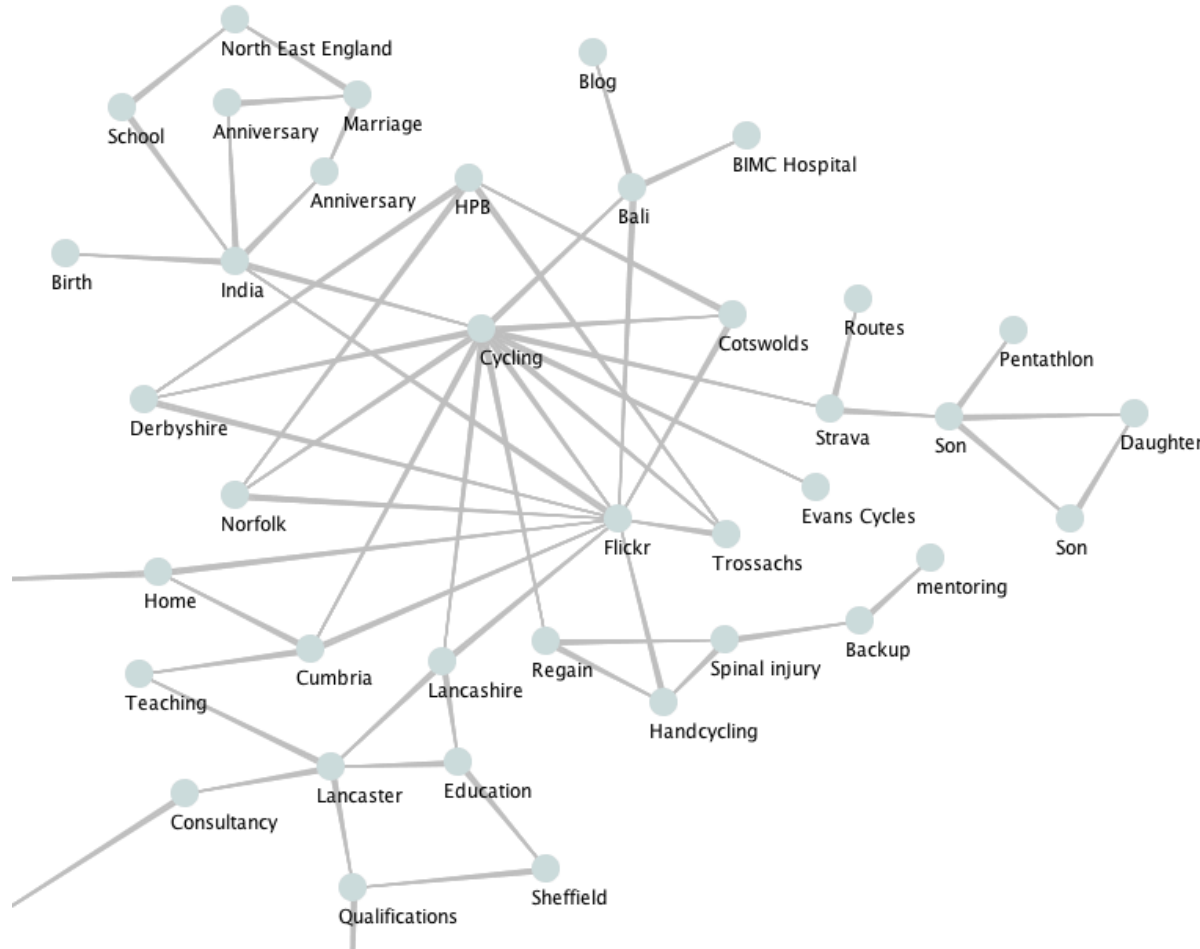


CURRENT MODEL OF IDENTITY



SELF-SOVEREIGN IDENTITY

The Qualified Self



Will the 'connected self' be more reflective? Will 'the connective self' more honestly reflect our hopes, aspirations and dreams?

<https://jennymackness.wordpress.com/tag/digital-identity/>

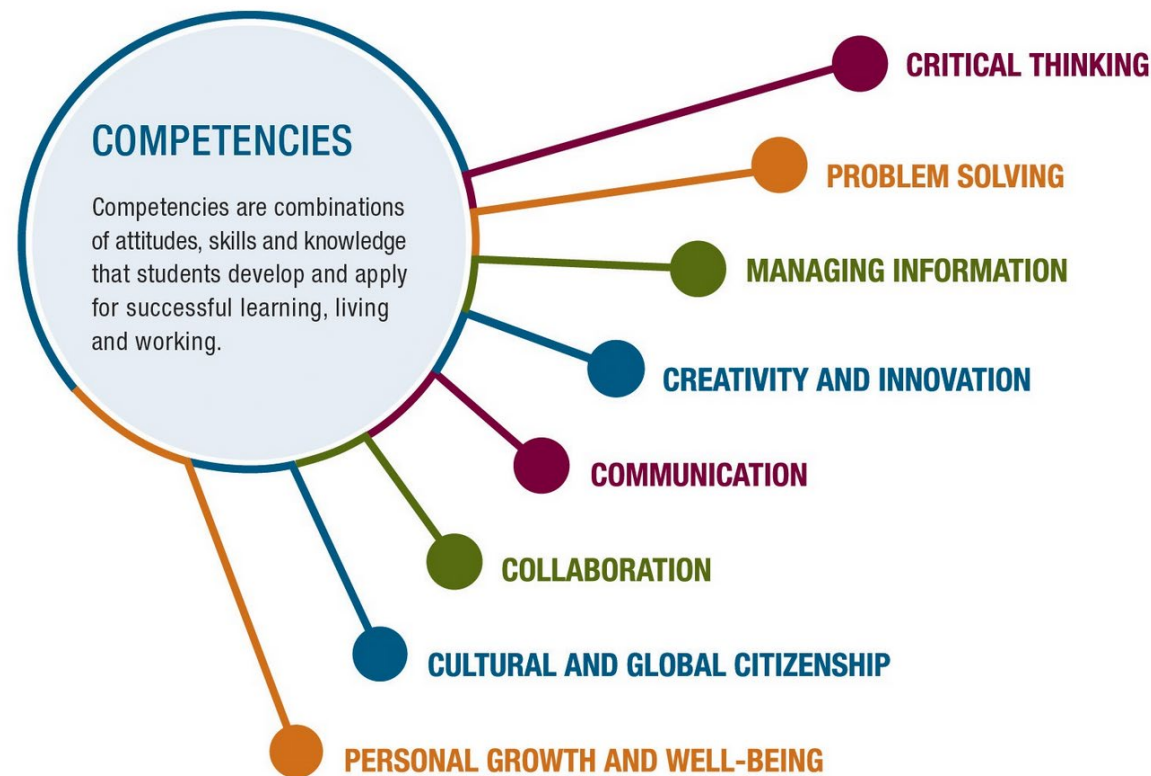
<https://mitpress.mit.edu/books/qualified-self>

<https://markcarrigan.net/2014/07/23/qualitative-self-tracking-and-the-qualified-self/>

Part Three: Outcomes



Big Idea 7: AI-Based Learning Recognition

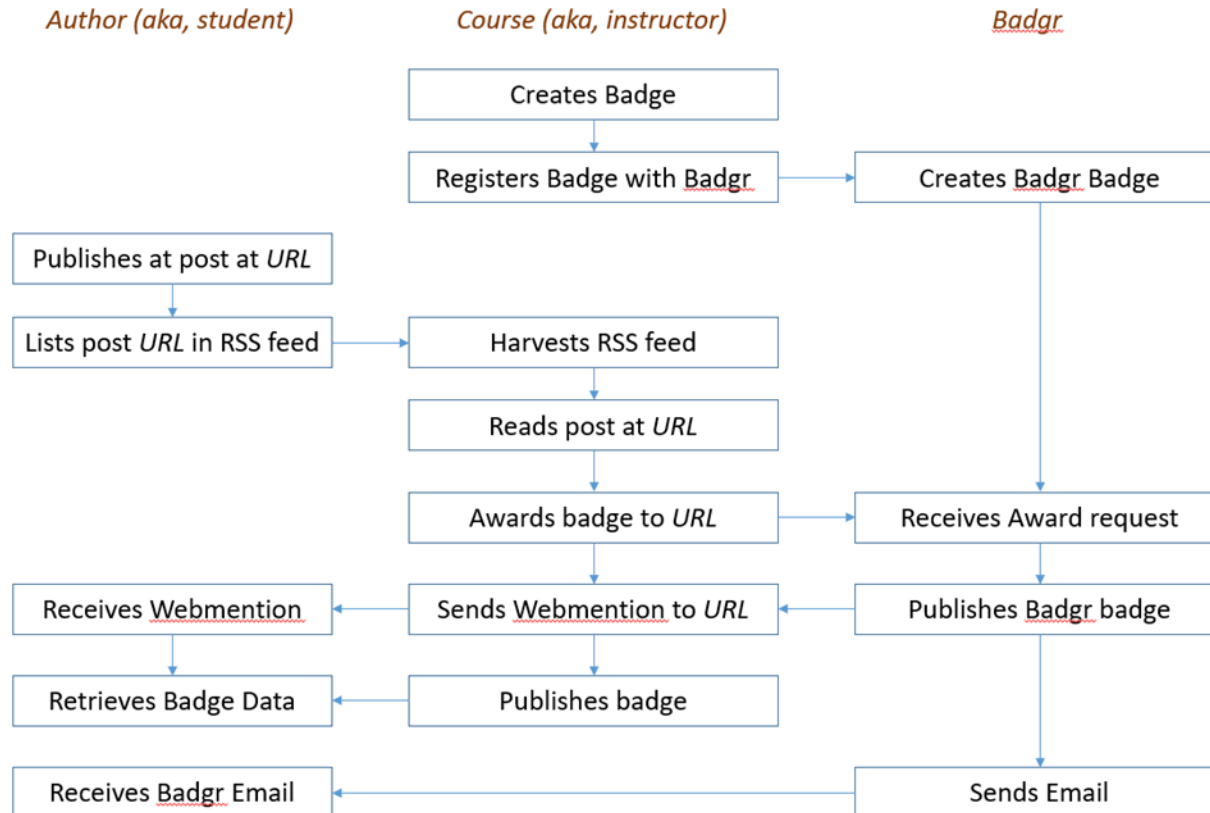


What happens when we recognize skills and competencies rather than content knowledge?

We no longer need to depend on tests and exams and can instead rely on a body of work.

Badges, Microcredentials...

Open Badges are the global standard for verifiable digital credentials.



<https://openbadges.org/>
<https://www.openbadges.me/>

<https://openbadgefactory.com/>
<https://badgr.com/>

Activity Records, xAPI...

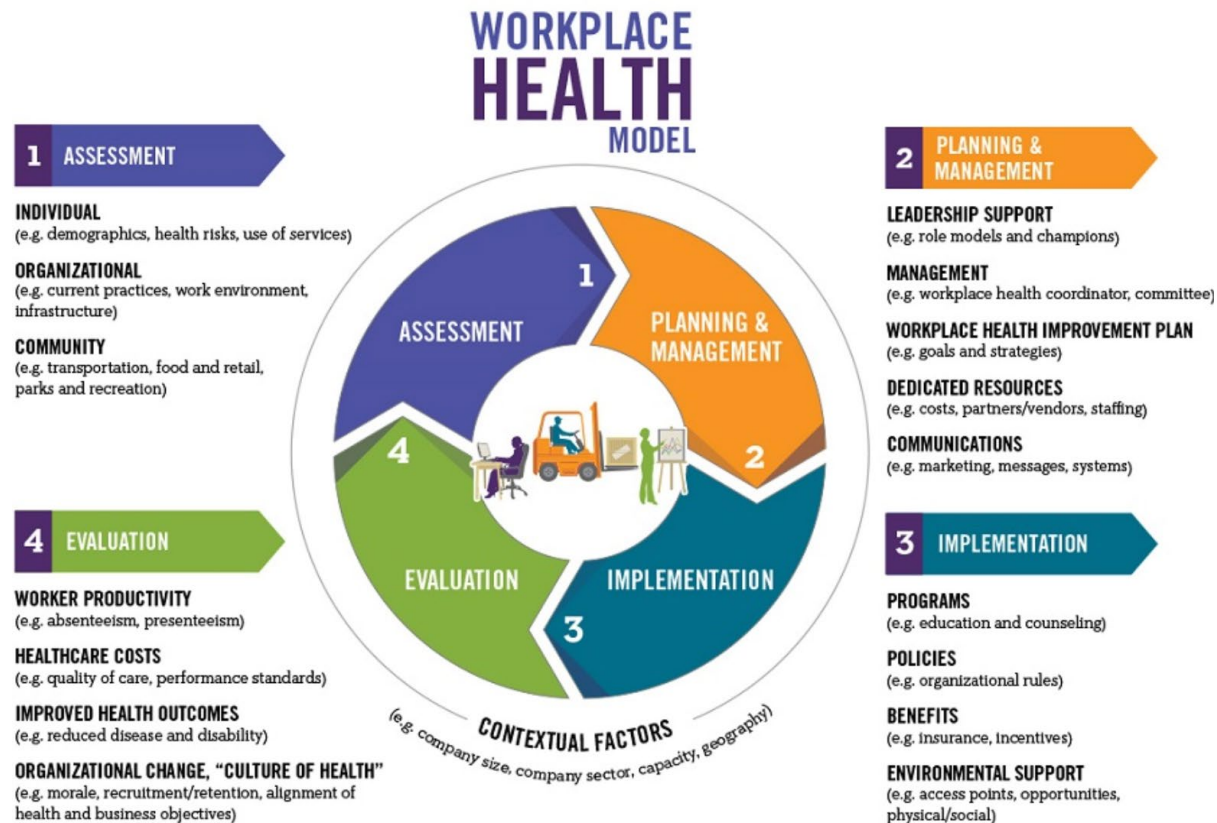


xAPI lets you capture (big) data on human performance, along with associated instructional content or performance context information...

<https://adlnet.gov/research/performance-tracking-analysis/experience-api/>
<https://www.yetanalytics.com/xapi-lrs>

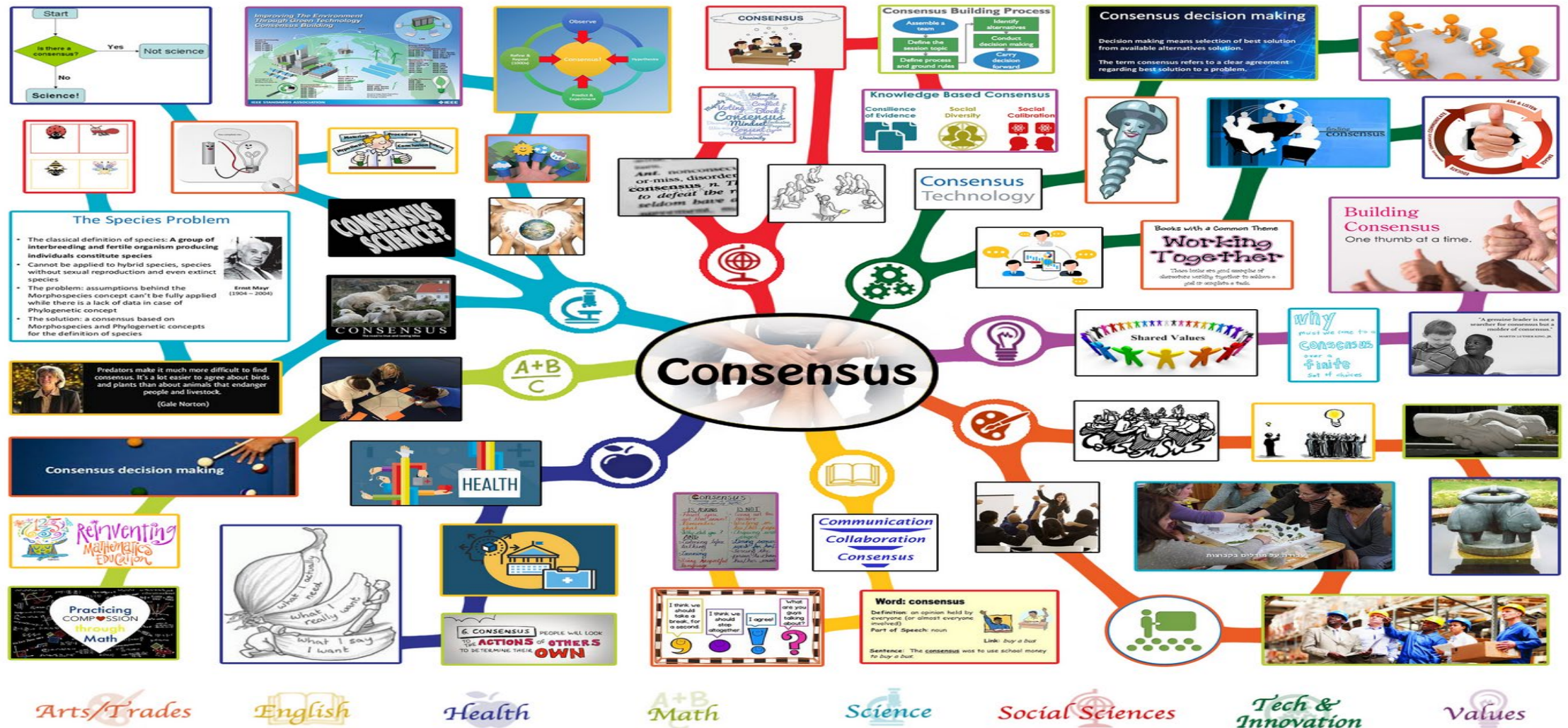
Recognizing Learning as a Totality of Achievement

We can also gather data *outside* the school or program, looking at actual results and feedback from the workplace.

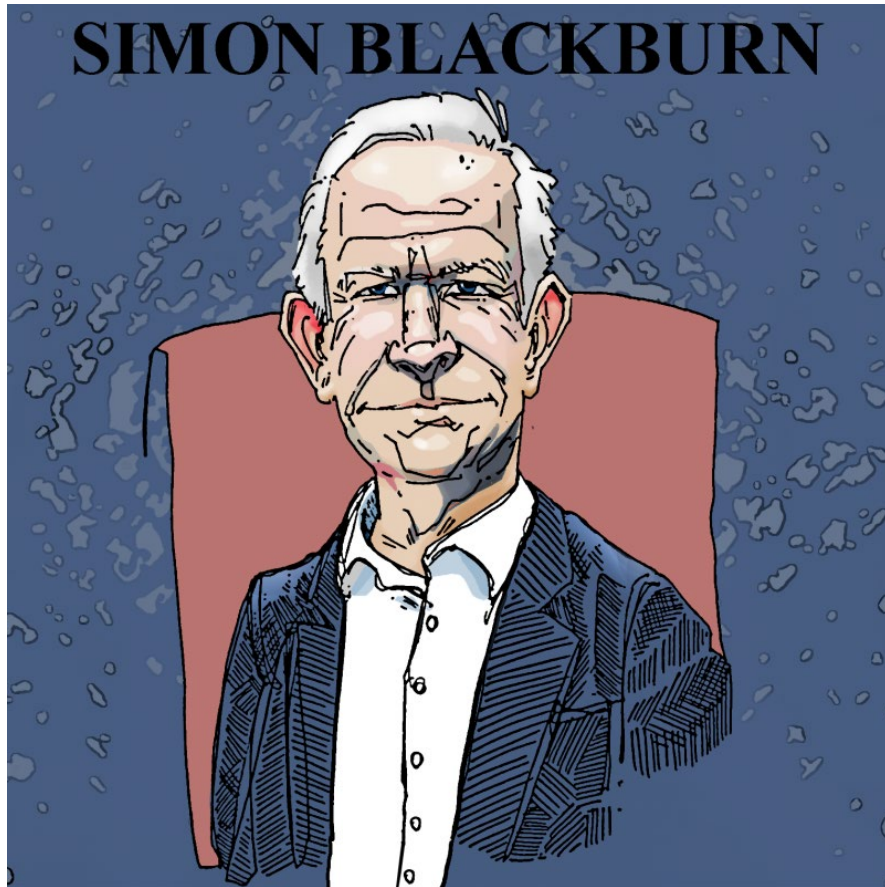


<https://www.cdc.gov/chronicdisease/resources/publications/aag/workplace-health.htm>

Big Idea 8: Community as Consensus



A Basis in Personal Experience



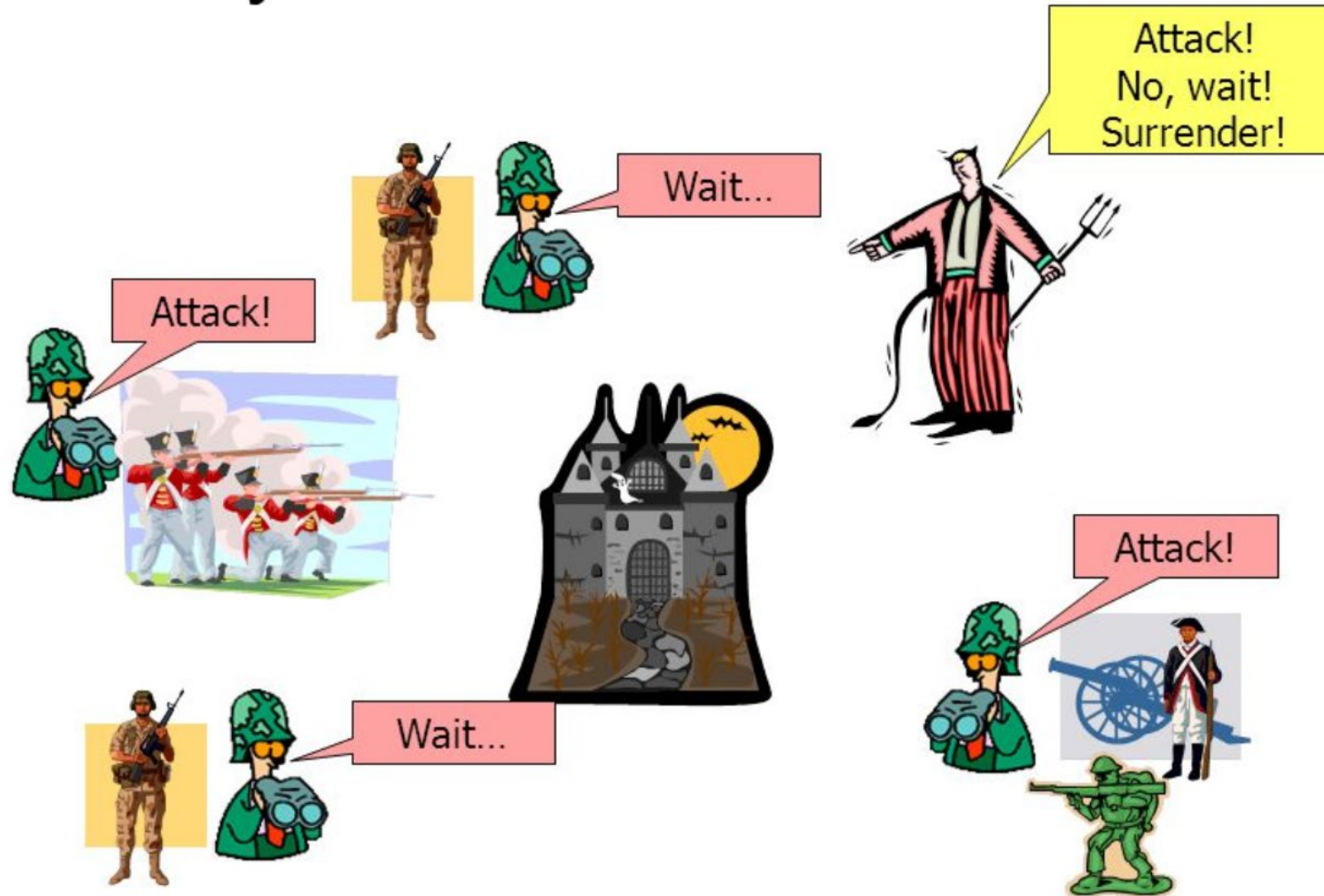
Truth begins with personal knowledge...

We can describe how it works in a specific domain

<https://partiallyexaminedlife.com/2018/08/06/ep196-1-simon-blackburn/>

<https://halfanhour.blogspot.com/2016/12/detecting-fake-news.html>

The Byzantine Generals Problem



Trust no one...

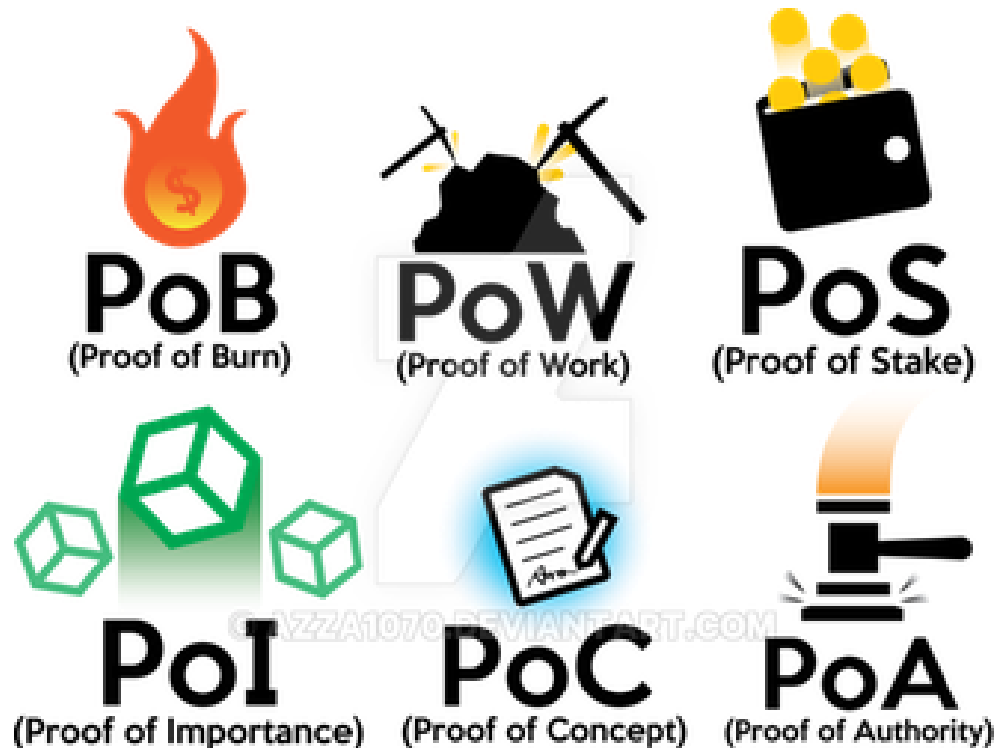
From cs4410 fall 08 lecture

<https://slideplayer.com/slide/5163640/>

Distributed Consensus

The mechanisms we use to interact and reach consensus are what define us as a community...

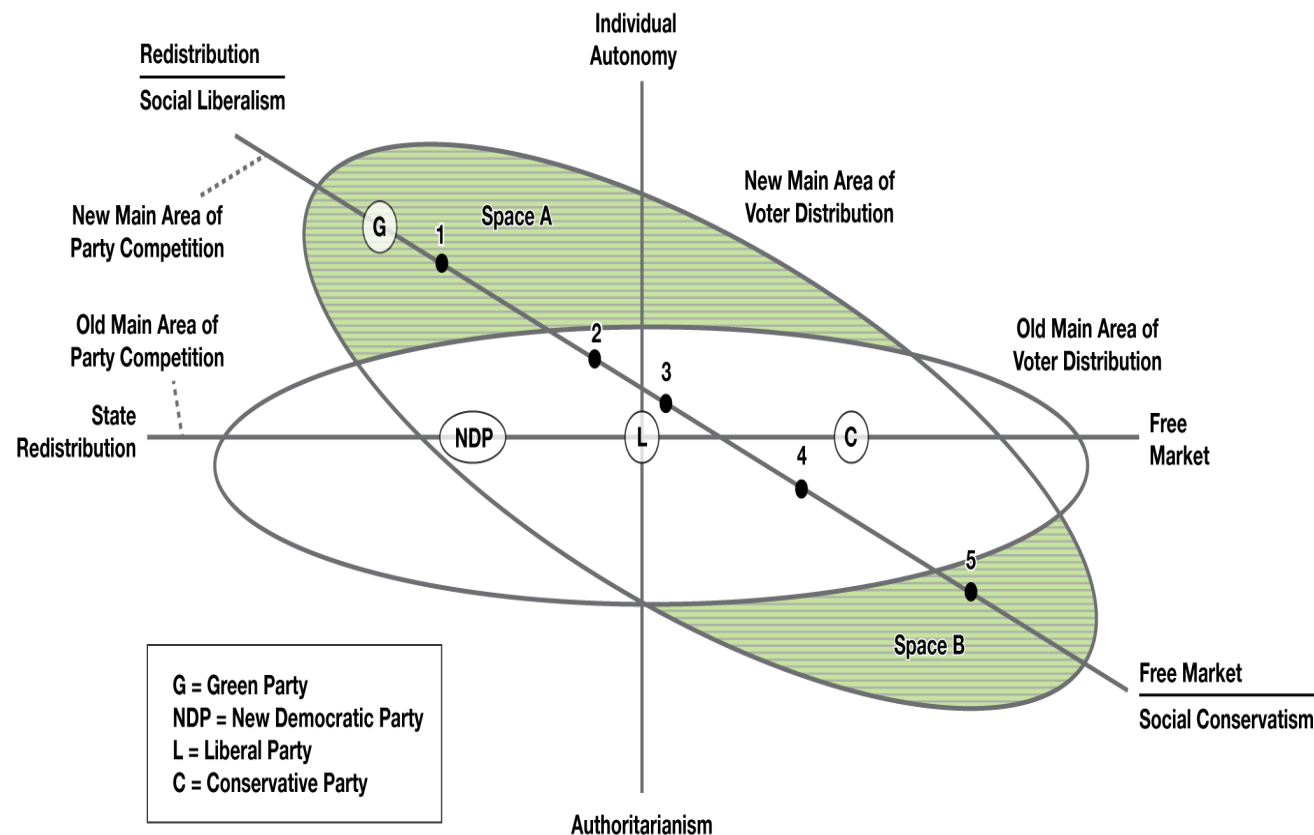
Is consensus based in work, stake, importance, authority...? What are the *conditions* for consensus?



<https://www.deviantart.com/azza1070/art/Blockchain-Protocols-PoB-PoW-PoS-PoI-PoC-PoA-734159319>

Paxos [https://en.wikipedia.org/wiki/Paxos_\(computer_science\)](https://en.wikipedia.org/wiki/Paxos_(computer_science))

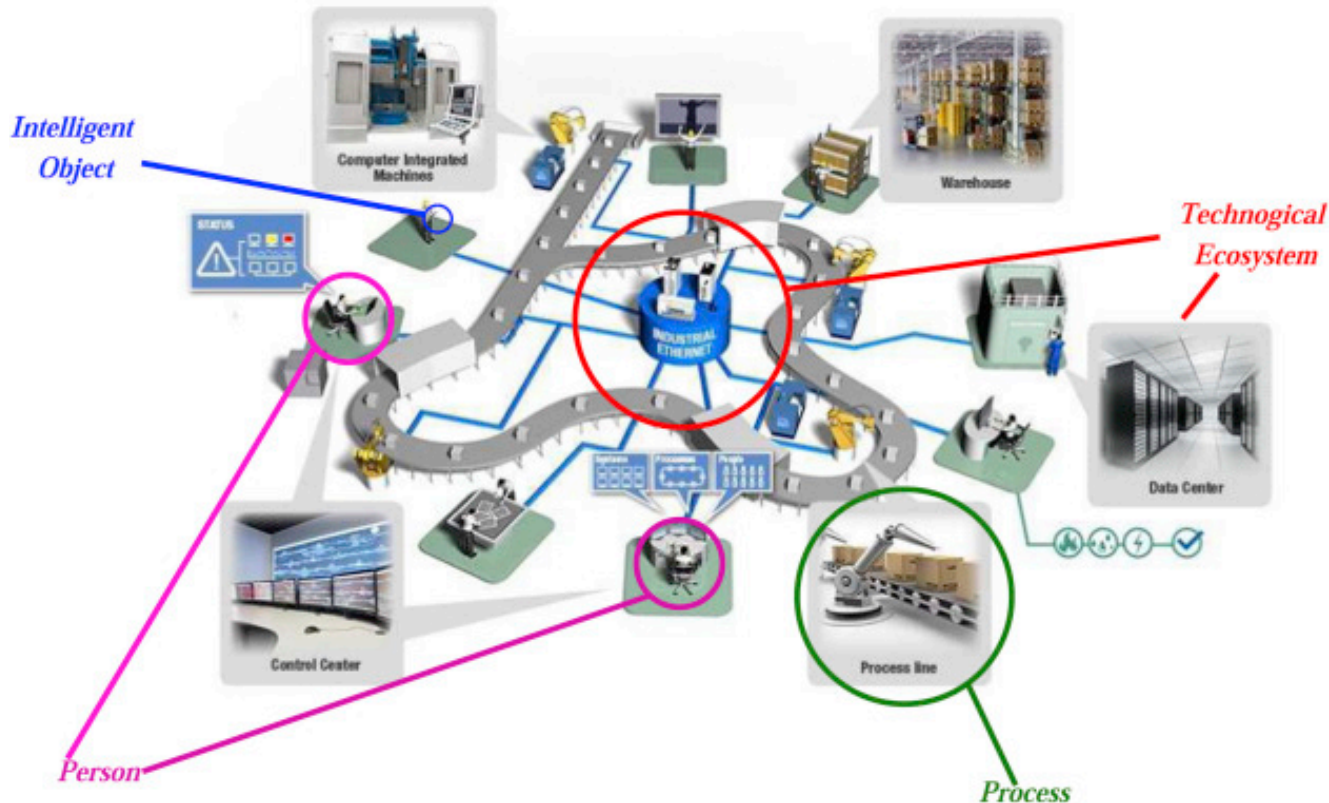
Big Idea 9: Redefining Success



Agency: The relative standing of the individual with respect to community, institutions, and governments

<https://opentextbc.ca/introductionto sociology/chapter/chapter17-government-and-politics/>

Agency



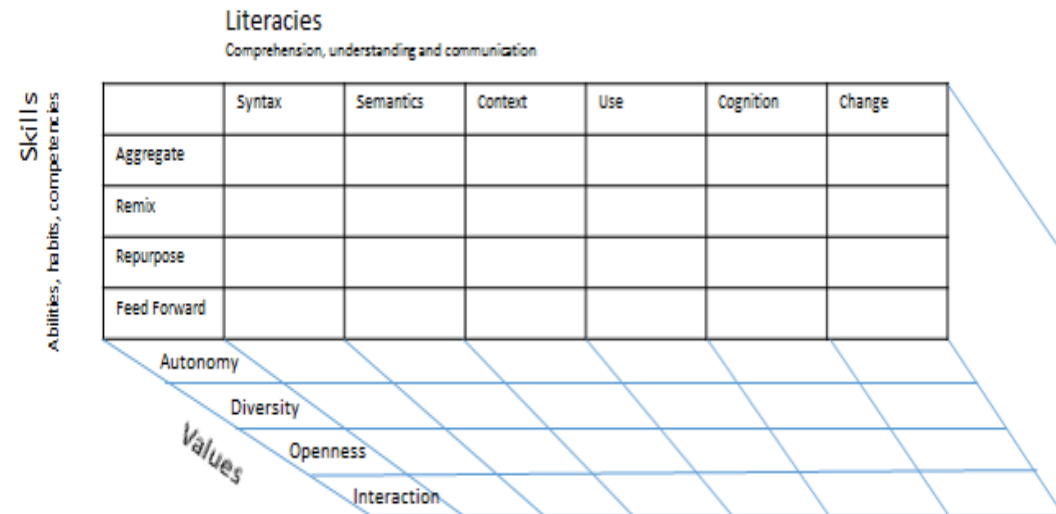
Four key outcomes for a modern distributed learning environment: security, identity, voice and opportunity.

<https://www.downes.ca/post/68088>

Agency



Education must focus on the tools and capacities for agency



<https://www.globalpartnership.org/blog/building-peace-through-education>

<https://science.sciencemag.org/content/364/6441/702>

<http://www.downes.ca>

