TOWARDS CONCEPT MAPS 3.0: VISUAL LEARNING DESIGNS AS WEB DATA

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CONCEPT MAPS

• Visual representation of knowledge of a topic.

• Focus question.

• Concepts & linking phrases.

• No restrictions on words, phrases, visual signals (shapes, color, etc.).

• Some software facilitates multimodality.

Is often used

• As teaching material.

• For evaluation of student understanding of a specific topic.

• For supporting collaborative learning.
CONCEP MAPS 3.0

CM 1.0 – 3.0 as generations of concept maps corresponding to generations of web technology (web 1.0, 2.0 & 3.0)

CM 3.0

• Metadata
• Discoverable
• Dynamic
• Data integration
• Visualization
5 WEB DATA PRINCIPLES AS A BASIS FOR DEFINING CM 3.0


The Web Data Principles are defined as "a simple set of guidelines about how to make structured information more useful on the web".

Consist of five recommendations of what should characterize data sets on the web and their distributions:

- Linkable
- Parseable
- Understandable
- Linked
- Usable
Linkable concept maps require:

- Accessibility via persistent or stable identifiers.
  - Concept map as a whole
  - Constituent parts

Linkable concept maps will allow external resources to point to specific entities or objects in the structure.

- SVG (Scalable Vector Graphics)

```xml
<svg width="100" height="100">
  <g id="globalwarming">
    <desc>Concept</desc>
    <circle cx="50" cy="50" r="40" stroke-width="4" fill="gray" />
    <text fill="white" x="25" y="50">Global warming</text>
  </g>
</svg>
```
MAKING CM 3.0 PARSEABLE

Concept map distributions should be:

- represented in open formats
  - That do not require proprietary software for processing
  - Whose source code is open to inspection.

SVG is an open format, endorsed by W3C (World Wide Web Consortium)

- SVG is supported by browsers
- SVG can be directly embedded in HTML
MAKING CM 3.0 UNDERSTANDABLE

Understandable → discoverable

Concept maps should be:
• Described and annotated using a "well-documented" vocabulary.

Making concept maps understandable by using a mix of:
• CXL – for specifying CM structure.
  • Not “well-known” 😞.
    • Not supported by non-CM software
• Schema.org – a general vocabulary for labeling things search engines care about.
  • Persons, places, products, events, creative works…
  • Allows inclusion of references to externally defined types.
MAKING CM 3.0 UNDERSTANDBALE

Adding schema.org/CXL metadata to SVG concept maps:

1. RDFa (Resource Description Framework in Attributes)
   • Annotations directly embedded in the SVG code.
   • Semantic metadata travel with the concept map.

```xml
<svg id="conceptmap" width="5000" height="5000" viewBox="0 0 5000 5000" vocab="http://schema.org/" typeof="CreativeWork">
  <desc property="name">General Custer.vue</desc>
  <desc property="genre">concept map</desc>
</svg>
```
2. JSON-LD (JavaScript Object Notation for Linked Data)

- Detaching metadata from the concept map.
- Annotation via reference rather than embedding.
- Advantages:
  - SVG is kept clean and easier to read.
  - Metadata can be added without writing rights.
  - Metadata can be stored in a separate file or as an integral part of an HTML document.
MAKING CM 3.0 LINKED

Linked CM → Tantamount to:

- Enhancing the informational or learning value of concept maps (explorative learning / deeper learning)
  - through integration and visualization of external semantic web data.

Therefore, individual concepts should be linked to external resources to better determine their identity

- Wikidata.org
- [https://www.wikidata.org/wiki/Q703620](https://www.wikidata.org/wiki/Q703620) = Copenhagen Business School

Links should also be typed:

- To signal their communicational purpose and/or the nature of their target
- To enable automatic processing.
MAKING CM 3.0 LINKED

George Armstrong Custer

United States Army cavalry commander in the American Civil War and the Indian Wars

Web3map

General George Armstrong Custer

The Battle of Wounded Knee

The Battle of the Little Bighorn

The Battle of the Greasy Grass

Custer's Last Stand

The American Indian Wars
Concept maps should be:
• Labeled with a license to signify
  • when, where, how and by whom they may be put to use and under what circumstances.

<desc
property="license">https://creativecommons.org/licenses/by/2.0/
</desc>
ANOTHER SIMPLE CM 3.0 EXAMPLE

Semantic search

• Using schema.org types on SVG groups
  • `<g typeof="Person">`
  • `<g typeof="Place">`
  • `<g typeof="Event">`

• Google custom search engine

• Knowledge Graph API – Demo (Jason A. Clark)

Example: CusterSearch.html
THANK YOU FOR LISTENING!

QUESTIONS?