DEFINING THE NOTION OF CONCEPT MAPS 3.0

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Web based concept maps can be viewed as reflections of generations of web technology. Thus we define the following generations of concept maps:

Concept maps 1.0

- Can contain static content, which must be manually updated either directly in the source code or through an interface.
- Are typically created using desktop tools (like CmapTools, VUE).
- Can be exported to other formats (GIF, HTML) or as XML, Strict (XML).
- Can be annotated by metadata using certain defined metadata types and properties.

Concept maps 2.0

- Can be created using web based tools (like CmapCloud).
- Utilize web 2.0 technology for collaboration and sharing.
- Are represented in open standards such as SVG (Scalable Vector Graphics).

Concept maps 3.0

- Can be viewed as reflections of generations of web technology. Thus we define the following generations of concept maps:
- Utilize semantic web / web of data (web 3.0) technology to make content dynamic.
- Can make use of semantic metadata for meaningful integration of data from external resources.
- Can be annotated by metadata using well known and/or standard vocabularies.
- Can be linked to other resources to enhance their informational or learning value.
- Links should be typed if possible to signal their communicative purpose.

Based on the Web Atlas Data Principles, we propose five requirements for Concept Maps 3.0 as data sets:

1. "Concept maps should be linkable, that is accessible via persistent stable identifiers. This obviously applies to the concept map as a whole but preferably also to its constituent parts, in this way external resources can be made to specific entities or objects in the structure." (Johnsen, L. & Jensen, J., 2016.)

2. "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." (Johnsen, L. & Jensen, J., 2016.)

3. "Concept maps should be annotatable by metadata using well known or well documented vocabularies." (Johnsen, L. & Jensen, J., 2016.)

4. "Concept maps should be represented in open formats that do not require proprietary software for processing and whose source code is open to inspection." (Johnsen, L. & Jensen, J., 2016.)

5. "Concept maps should be exportable to other resources to enhance their informational or learning value." (Johnsen, L. & Jensen, J., 2016.)

These recommendations state that Web Data should be:

- Usable
- Usable
- Parseable
- Linkable
- Linkable

A simple example of how a concept map 3.0 can be annotated and exposed as web data using the schema.org vocabulary and the format JSON-LD.

This particular example includes a snippet of code specifying metadata for a history concept map about the American general George Armstrong Custer.