DEFINING THE NOTION OF CONCEPT MAPS 3.0

Jasper Jensen & Lars Johnsen, University of Southern Denmark, Denmark
Email: jkj@imi.sdu.dk, larsj@imi.sdu.dk

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 be exported to web 1.0 formats (e.g., HTML). Can be exported to images.
- Can be embedded in web pages.
- Can be exported to other resources to enhance their informational or learning value.
- Utilize social web (web 2.0) technology to facilitate sharing and collaboration.

Concept maps 2.0
- Can be created using dedicated web tools (e.g., CmapTools).
- Can be exported to other resources.
- Can be annotated by metadata using "well understood" vocabularies.
- Can be linked to external semantic web resources, as well as for alternative visualization of both internal and external data.

Concept maps 3.0
- Utilize semantic web (web 3.0) technology to make content dynamic.
- Can be created using dedicated online tools (e.g., Cmap Cloud).
- Are typically created using dedicated tools (e.g., CmapTools, VUE).
- Are represented in open standards such as SVG (Scalable Vector Graphics).
- Can be annotated by metadata using "well understood" vocabularies.
- Can be linked to external resources to enhance their informational or learning value.
- Utilize social web (web 2.0) technology to facilitate sharing and collaboration.

Defining Five Fundamental Requirements for Concept Maps 3.0

We have adopted the following Web Data Principles (Wilde, E., 2016, http://dire.github.io/webdata/), which outline five recommendations for exposing data on the Web of Data / Semantic Web.

These recommendations state that Web Data should:
- Be Linkable
- Be Publishable
- Be Uniformly Accessible
- Be Licensed
- Be Scalable

Based on the Web Data Principles above, we propose five requirements for concept maps 3.0 as data sets:

1. Concept maps should be Linkable, that is, accessible via persistent or 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 linked to specific entities or objects in the structure. (Jensen, L. & Jensen, J., 2016)

2. Concept maps should be Publishable, that is, accessible via a public, stable, or persistent identifier. This is needed for linking to the concept maps and their constituent parts. (Jensen, L. & Jensen, J., 2016)

3. Concept maps should be Uniformly Accessible, that is, accessible via a public, stable, or persistent identifier. This is needed for linking to the concept maps and their constituent parts. (Jensen, L. & Jensen, J., 2016)

4. Concept maps should be Licensed, that is, accessible via a public, stable, or persistent identifier. This is needed for linking to the concept maps and their constituent parts. (Jensen, L. & Jensen, J., 2016)

5. Concept maps should be Scalable, that is, accessible via a public, stable, or persistent identifier. This is needed for linking to the concept maps and their constituent parts. (Jensen, L. & Jensen, J., 2016)

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.