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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 be embedded in webpages.
  - Can be exported to web 1.0 formats (GIF, HTML) or XML formats (CXL).

- Concept maps 2.0
  - Can be created using dedicated online / web based tools (Cmap Cloud).
  - Utilize web 2.0 technologies for facilitation sharing and collaboration.
  - Are represented in open standards such as SVG (Scalable Vector Graphics).

- Concept maps 3.0
  - Can be exported to web 1.0 formats or through an interface.
  - Are represented in open standards such as SVG (Scalable Vector Graphics).

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

1. Concept maps should be usable, that is, accessible via a persistent or stable identifier. This obviously applies to the concept map as a whole but preferably also to its constituent parts. To this end, external resources should be specific entities or subjects in the structure (Johnsen, L., & Jensen, J., 2016).

2. Concept map distributions should be represented in open formats that do not require proprietary software for processing and whose source code is open to inspection (Johnson, L., & Jensen, J., 2016).

3. Concept maps should be annotated by metadata using a "well known" and/or "well documented" vocabulary. We propose to use schema.org as the main vocabulary to mark up concept maps because it is both well known, well documented, and supported by major search engines. This allows concept maps to be re-Discoverable and conducts autonomous processing. Furthermore, we propose that this schema.org metadata be added to links concept maps by using formats such as JSON-LD (JavaScript Object Notation for Linked Data) or RDFa (Resource Description Framework).

4. Concept maps should be linked to other resources to enhance their informational or learning value. Links should be typed if possible to signal their communicational purpose and/or the nature of their target and to make automatic processing, individual concepts should be linked to external resources to better determine their identity (Johnsen, L. & Jensen, J., 2016).

5. 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. This can be achieved by linking to a Creative Commons license, which will allow the concept maps in question to signal how their license is documented (Johnson, L. & Jensen, J., 2016).

References:

A simple example of how aconcept 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

```json
{
  "@context": {"schema": "https://schema.org"
  },
  "@type": "CreativeWork",
  "mainEntity": {
    "@type": "Event",
    "about": "http://cmap.ihmc.us/xml/cmap-22371RZ-217298-0-1PXQ8ZZHR",
    "name": "The Battle of The Little Bighorn",
    "description": "http://g.co/kg/m/0pzgm",
    "image": "https://cmapscloud.ihmc.us/viewer/22371RZ-217298-0-1PXQ8ZZHR",
    "license": "https://creativecommons.org/licenses/by/2.0",
    "alternateName": "Custer’s Last Stand",
    "mainEntity": ["https://cmapscloud.ihmc.us/viewer/22371RZ-217298-0-1PXQ8ZZHR"],
    "@type": "Role",
    "roleName": "Google's Knowledge Graph",
    "focusQuestion": "What was General George Armstrong Custer and The Battle of The Little Bighorn?"
  }
}
```