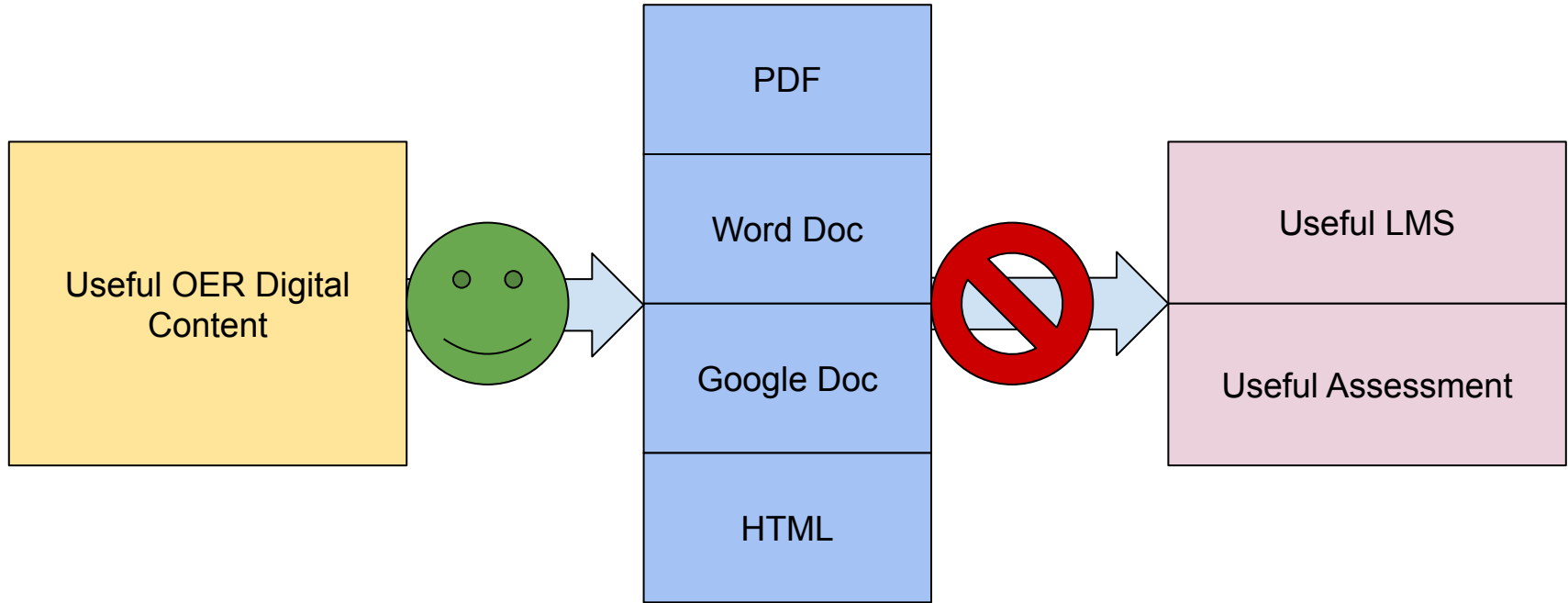# K12 OCX: Open Content Exchange

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Why?

Why OCX?

Why OCX?

- The information about learning that LMS's need isn't present in the documents they import.

- The original authors know this information and then it is thrown away in the document export process.

- OCX seeks to preserve this information so it can be used by downstream content systems such as LMS, assessment, and re-authoring platforms.

- This is particularly true for OER because generally the authors of this type of content want their stuff to be reused widely and easily.

A little more background on OCX...

- OCX came about to fill a need for describing and sharing content between learning content authors and learning content systems.
- Prior to OCX content could be described in general terms: hierarchical structures of chapters and lessons; classification of topic for an entire book; etc.
- The goal of OCX is to enable a fine-grained description of the structure and content of learning content, especially large scale (e.g., "textbook-equivalent") digital content.
- R&D funding was provided by the Bill and Melinda Gates Foundation and the Chan Zuckerberg Initiative to produce an draft specification, and develop open-source technical integrations and capabilities around the specification.

The parts of a solution

- Common Cartridge and LTI (or SCORM) are useful for moving content around.

- But they don't tell you enough about what is inside the content.

- OCX is designed to bridge that gap - providing metadata about structure, layout, purpose, and intent within content.

- If we want to integrate learning content more deeply into learning systems, we need something like OCX.

- Fits well with projects like SkoHub and OERSI: this project describes internal content structure and features.
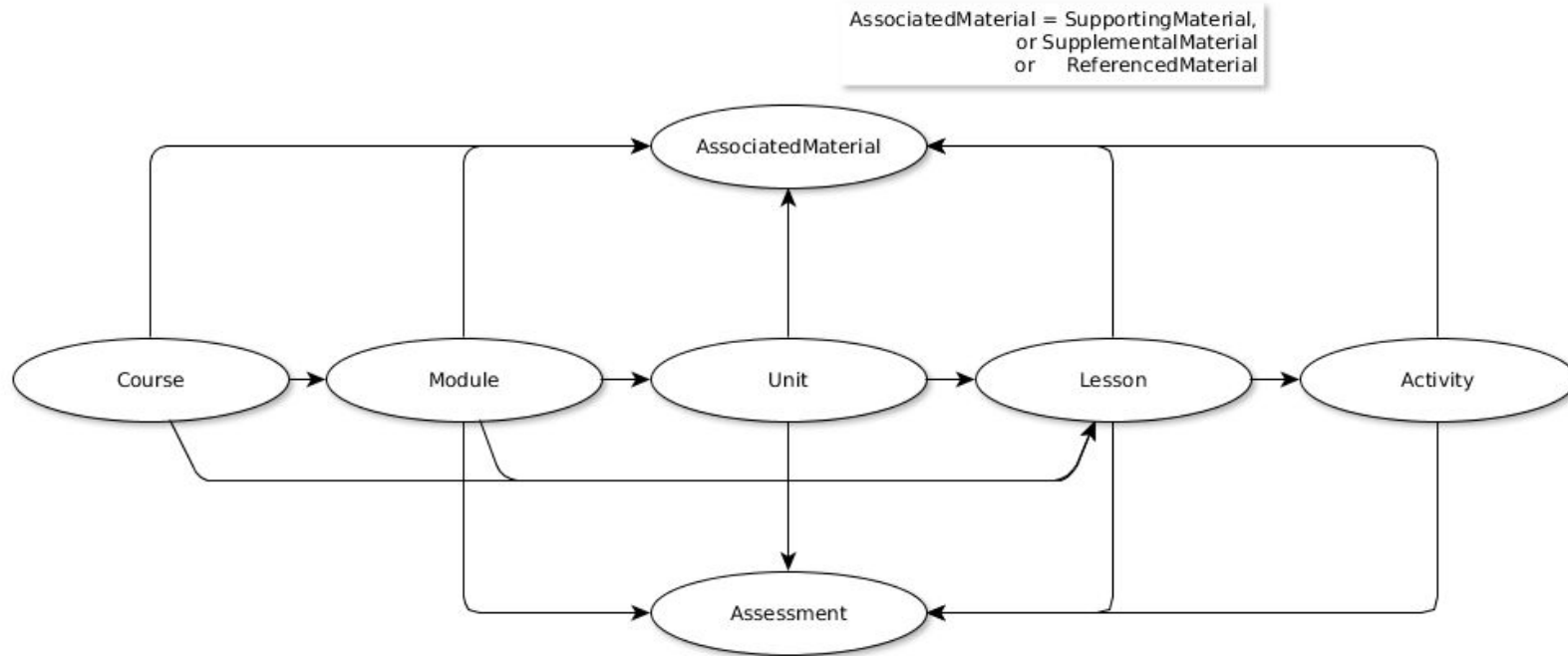
OCX: Metadata Approach

We created:

- A content model
- Structural metadata
- Descriptive metadata

Using existing standards and specifications

- HTML + JSON-LD
- Schema.org / LRMI
- OERSchema
- (also influences from SCORM, ePub, Sitemap, OAI ORE, ResourceSync and others)

See https://k12ocx.github.io/k12ocx-specs/ for full details

Content Model

AssociatedMaterial = SupportingMaterial,
or SupplementalMaterial
or ReferencedMaterial
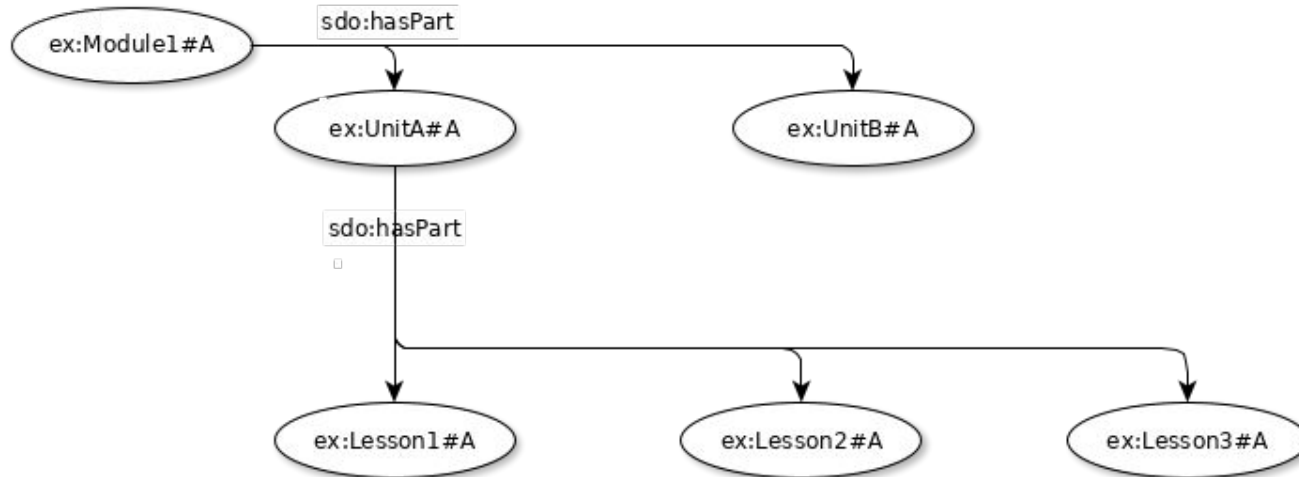

OERSchema gave us the components of a course, and the means to describe the logical and pedagogic relationships between them. See http://oerschema.org/
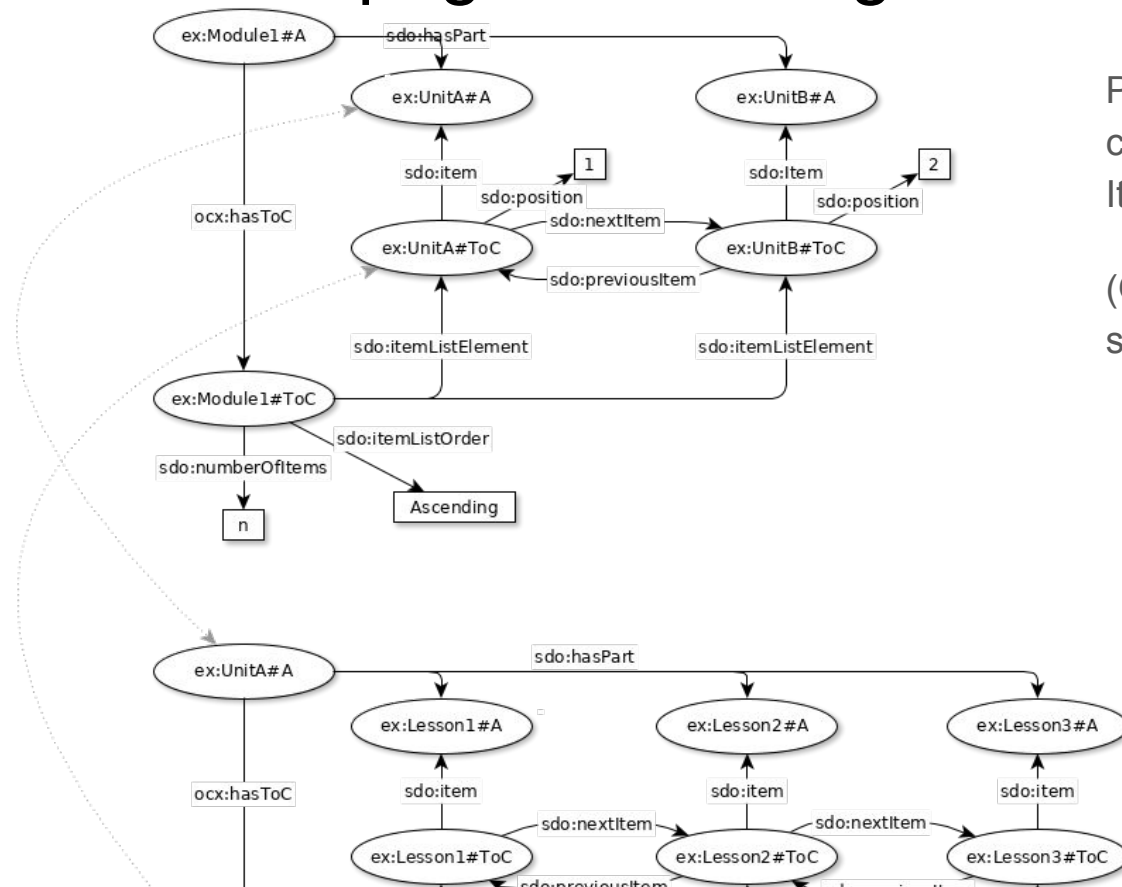
Between page structuring

Content is presented as web pages

Typically there would be a page for of the major components e.g. a page representing the Course, a page representing the module.

Between page structuring

Putting content into order can be complicated (the union of schema.org ItemLists, OERSchema and OAI ORE)

(Or as simple as a "defaultOrder" list--not shown.)

Between page structuring

```
"@graph": [
  {
    "@id": "ex:Module1#A",
    "@type": ["sdo:CreativeWork", "oer:Module"],
    "sdo:hasPart": ["ex:UnitA#A", "ex:UnitB#A" ]
  },
  {
    "@id": "ex:UnitA#A",
    "@type": ["sdo:CreativeWork", "oer:Unit"],
    "sdo:hasPart": [
      "ex:Lesson1#A",
      "ex:Lesson2#A",
      "ex:Lesson3#A"
    ]
  },
  {
    "@id": "ex:UnitB#A",
    "@type": ["sdo:CreativeWork", "oer:Unit"]
  },
...
```

Metadata in JSON-LD encodes the logical and pedagogical structure of the course.

Logical structure from schema.org (hasPart)

Pedagogical structure from oerschema (relating to types in the content model)

Between page structuring

```
"@graph": [
  {
    "@id": "ex:Module1#A",
    "@type": ["sdo:CreativeWork", "oer:Module"],
    "sdo:hasPart": ["ex:UnitA#A", "ex:UnitB#A"]
  },
  {
    "@id": "ex:UnitA#A",
    "@type": ["sdo:CreativeWork", "oer:Unit"],
    "sdo:hasPart": [
      "ex:Lesson1#A",
      "ex:Lesson2#A",
      "ex:Lesson3#A"
    ]
  },
  {
    "@id": "ex:UnitB#A",
    "@type": ["sdo:CreativeWork", "oer:Unit"]
  },
...
```

Metadata in JSON-LD encodes the logical and pedagogical structure of the course.

Logical structure from schema.org (hasPart)

Pedagogical structure from OERSchema (relating to types in the content model)

In-page structure

```
<body>
  <header>
    <nav><-- links to other pages --></nav>
    <div>non-ocx content</div>
  </header>
  <main id="LessonPlan">
    <header>
      <h1>OCX Example</h1>
      <p>Some general information about the resource</p>
    </header>
    <section id="Intro">
      <h2>Introduction to example subject</h2>
      <div>content for introduction</div>
    </section>
    <section id="Activity">
      <h2>My example activity</h2>
      <div>content for the learning activity</div>
    </section>
  </main>
  <footer>non-ocx content</footer>
</body>
```

Where several components are in one HTML page, we used HTML5 sectioning content elements.

The OCX content is in the `main` element.

Each component of it is in a `section` element.

Each OCX element has an id

In-page structural metadata

```
<body>
  <header>
    <nav><-- links to other pages --></nav>
    <div>non-ocx content</div>
  </header>
  <main id="LessonPlan">
   <script type="application/ld+json">
       { "@context": [
           "http://schema.org",
           {"oer": "http://oerschema.org/"}
         ],
         "@id": "#LessonPlan",
         "@type": ["LearningResource", "oer:Lesson"],
         "hasPart": [
           {"@id": "#Activity"},
           {"@id": "#Intro"}
         ]
       }
   </script>
   <header>
     <h1>OCX Example</h1>
     <p>Some general information about the resource</p>
   </header>
```

Structural metadata can be added to describe the relationship between the parts of the page.

Descriptive metadata

```json
{
  "@context": [...],
  "@id": "http://example.org/documents/227#A",
  "@type": ["oer:Assessment","Quiz"],
  "educationalUse": "formative assessment",
  "name": "Mid-Unit Assessment: Structure and Theme",
  "description": "This assessment asks ...",
  "keywords": "historical fiction,novel,poem",
  "timeRequired": "PT90M",
  "sameAs": "http://example.org/resources/8666",
  "url": "http://example.org/documents/227",
  "identifier": {
    "@type": "PropertyValue",
    "propertyID": "Example resource identifier",
    "value": "8666"
  },
  "dateCreated": "2017-06-14T17:26:37.919Z",
  "dateModified": "2017-08-14T22:44:01.334Z",
  "author": {
    "@type": "Person",
    "name": "Anne X Ample"
  },
  "inLanguage": "en-US",
```

```json
  "assesses": [{
    "@type": "DefinedTerm",
    "sameAs": "http://www.corestandards.org/ELA-Literacy/RL/6/5",
    "termCode": "RL.6.5",
    "inDefinedTermSet": "Common Core State Standards"
  },
```

We have what amounts to an application profile of schema.org / LRMI and OERSchema for each of the major entity types in the content model

The JSON-LD is in the HTML page, so it travels with the content

We hope it supports discovery of alternative, more contextually appropriate content

How to get involved

- Open OCX community on Slack
- Open community on Github
  - Open an issue or send us a PR for improvements
- DC LRMI community is part of schema.org and is foundational to OCX

- If you want to markup your content with OCX, or...
- If you want to find OCX content to load into your learning system...

Please Contact Us!
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steve@learningtapestry.com