MIT Core Concept Catalog (MC3)

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Trend Toward Concept Modeling

Much attention over the past decade has been focused on developing and publishing open content.

We now see a growing trend in developing and cataloging conceptual models and pathways within and across the subjects and disciplines.

Examples...
An MIT Engineering Curriculum Map

Students will be able to describe the nature and behavior of engineering, physical, information, and social systems in order to design, modify, and adapt them.

<table>
<thead>
<tr>
<th>Governing Rules</th>
<th>Conservation</th>
<th>Linear Systems</th>
<th>Communication</th>
<th>Modeling</th>
<th>Problem Solving</th>
<th>Teamwork</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will be able to describe and predict physical interactions between objects using a small number of governing rules.</td>
<td>Students will be able to predict system behavior by identifying conserved properties.</td>
<td>Students will be able to identify and apply the properties of linear systems to simplify and describe engineering systems.</td>
<td>Students will be able to write, present, and communicate interpersonally in a professional setting based on communication strategies they develop.</td>
<td>Through modeling, students will create representations of real processes, systems, or objects.</td>
<td>Students will devise solutions to open-ended problems with technical and non-technical components.</td>
<td>Students will be able to work in teams.</td>
</tr>
</tbody>
</table>

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<tr>
<th>Representations</th>
<th>Derivatives &amp; Integrals</th>
<th>Differential Equations</th>
<th>Equilibrium</th>
<th>Information Systems</th>
</tr>
</thead>
<tbody>
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<td>Students will be able to utilize representations to understand a system's structure, properties, and function.</td>
<td>Students will be able to understand and apply derivatives and integrals to solve engineering problems.</td>
<td>Students will be able to explain how differential equations model changing properties.</td>
<td>Students will be able to determine properties of a system at equilibrium.</td>
<td>Students will be able to describe how a system is shaped and changed by the nature and flow of information into, within, and out of the system.</td>
</tr>
</tbody>
</table>

Developed by the MIT Teaching and Learning Lab for the Singapore University of Technology and Design
Kahn Academy Knowledge Map

Visit Page http://www.khanacademy.org/exercisedashboard
Another Example of trend toward concept mapping of curriculum – India Institute for Human Settlements curricular development. Faculty have developed a number of concept maps like this to define curriculum.
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MIT Core Concept Catalog

Allows teachers and students to author and publish concept inventories and topic maps within and across subjects

Exposes relationships between concepts and with on-line content and assessments.

Enhances use and re-use of Open Educational Resources from the perspective of educational topics and goals.
Features

• Allows educators to organize materials based on conceptual models
• Supports collaborative authoring of concept models and related content
• Map concepts within a course, program or across disciplines
• Provides access control for authoring and viewing (coming soon)
Benefits

• Ability to search, browse and/or otherwise navigate educational resources based on educational objectives and their relationships for a particular class, discipline or field of study

• For teachers, MC3 facilitates the re-use of cross-disciplinary content in the preparation of course materials

• For students, MC3 is designed to allow for efficient navigation of the vast and growing collection of OER content to help augment and deepen understanding based on learning objectives.
Demonstrations
Try it out

• CMAP
  – http://cmat.herokuapp.com

• Browser Extension
  – http://mc3.mit.edu/be.html
Application Areas

• Student discovery and sharing of resources
• Goals-based educational games
• Self-guided “learning pathway” tools
• Embedded concept review (Crosslook)
• Integration with LMS/VLE educational resources
• Concept-based course authoring
• Etc.
More Demonstrations
Try it out

• Knowledge Hub
  – http://staging.pragyasystems.com

• Crosslook
  – http://mc3-demo.mit.edu/crosslook2/
Course / Curriculum
Create a Concept Map
Link Concepts and Learning Materials
Link Concepts and Assessments
Add Concept-Linked Items into a Course Website
Export Course

CMAT Tool
Browser Extension
No Tool Yet
Pragya Tool
LMS (Moodle)

Crosslook Tool
Embed Links to Concepts in Webpages