Appendix A

Survey of Learning Resource Type Vocabularies (April 14, 2003)

This survey is intended to provide clarity for the interpretation of element 5.2:Educational.LearningResourceType. It lists vocabulary values chosen for this element in a number of LOM implementations and learning resource classification projects. Similar surveys have been undertaken by others; see, for example, http://nm.wu-wien.ac.at/e-learning/lr-types.htm.

Heal: http://www.healcentral.org/index.htm

Health Education Assets Library (HEAL) is creating a national repository of free, web-based multimedia teaching materials in the health sciences, as a component of the National Science Digital Library, an initiative of the National Science Foundation (USA).

- Multimedia/Item
- Case
- Quiz/Question

CLEO: http://www.adlnet.org/adldocs/Documents/P6D731T1130.doc

"The Customized Learning Experience Online (CLEO) Lab is a research collaboration between Cisco Systems, IBM, Microsoft, and Thomson-NETg. The the CLEO Lab goal is to conduct focused, applied research on technical and pedagogical issues related to the ADL Sharable Content Reference Model (SCORM), an important compilation of e-learning interoperability specifications."

- **Additional resources:** Information provided to the learner about additional resources or next steps in the learning process.
- **Analogy:** Presents an analogy for the topic.
- **Assessment**: Assesses learner performance.
- **Assessment item:** Single assessment item, typically intended for inclusion in an assessment, practice, or learning sequence as a check on learning.
- **Attractor:** Attracts the learner's attention. Typically has little or no instructional intent.
- **Community:** Unspecified collaboration or community resource, such as chat room, etc.

- **Content:** Any presentation or informative content that is not practice or assessment. Ideally used as a statement of fact.
- **Cycle charts:** Illustrates process cycles.
- **Decision path:** Illustrates decision paths.
- **Definition:** Provides a definition.
- **Demonstration**: Demonstrates (more engaging than presentation).
- **Example:** Provides an example.
- **Feedback:** Provides feedback (usually related to another resource such as a practice resource).
- **Glossary:** Resource is a glossary.
- **Guidance:** Provides learning guidance on the topic (e.g., roadmap, hints, etc.) Usually related to another resource such as a practice resource.
- **Guidelines:** Provides rules that require principle-based judgment.
- **Importance:** Impresses the importance of the topic.
- **Introduction:** Introductory information, smaller in scope than an Overview.
- **Non-example:** Counter-example of the topic.
- **Notes:** Notes and glosses (intended user MD element defines target user).
- **Objectives:** Informs learner of learning objectives.
- **Outline:** Provides an overview of content structure.
- **Overview:** Provides a comprehensive overview.
- **Practice:** Elicits learning through practice (generic).
- **Prerequisites:** Informs learner about prerequisites.
- **Presentation:** Presents information about the topic.
- **Principle statement:** Memorable statement of principle.
- **Recall prior:** Recalls prior knowledge on the same topic.
- **Reference:** Resource contains unspecified reference information (other than Glossary).
- **Reinforcement:** Enhances retention or transfer of learning.
- **Scenario:** Scenario illustrating instance of the topic.
- **Stage:** Sequential element of a process.
- **Step:** Sequential element of a procedure.
- **Summary:** Provides a comprehensive summary of a collection of objects.

DLESE: http://www.dlese.org/Metadata/

The Digital Library for Earth System Education (DLESE) is a grassroots, community-based effort involving teachers, students, and scientists working together to create a library of educational resources and services to support Earth system science education, at all levels, in both formal and informal settings. DLESE resources include electronic materials for both teachers and learners such as lesson plans, maps, images, data sets, visualizations, assessment activities, curriculum, online courses, and much more. Sponsored by

CanCore Guidelines for the Implementation of Learning Object Metadata (IEEE 1484.12.1-2002)
Written by Dr. Norm Friesen, Sue Fisher, and Anthony Roberts
Version 2.0 www.cancore.org

the National Science Foundation, DLESE is being designed, built, and governed by community members from around the country.

AUDIO: A resource whose content is primarily audio or intended to be realized in audio (use for recorded items that have no visual component).

- **Audio book:** An audio recording of a book in print.
- **Audio Webcast:** The audio component (only) of a broadcast that was captured digitally from the Web (e.g., newscast, speech, interviews).
- **Lecture:** An audio recording of a speech or classroom instruction.
- **Music:** A recording of vocal, instrumental, or mechanical sounds having rhythm, melody, or harmony.
- **Oral history:** Tape-recorded historical information obtained in interviews concerning personal experiences and recollections.
- **Radio broadcast:** A recording of a newscast, talk show, or other oral presentation originally generated via the radio.
- **Sound:** Recorded auditory material (e.g., natural world, mechanical, noise, tones).

DATA: Structured information encoded in lists, tables, databases, etc., which will normally be in a format available for direct machine processing.

- **In situ dataset:** Data measurements generated when the measuring instrument and the medium to be measured are in direct contact.
- **Modeled dataset:** Data generated by equations, computer models, and numerical simulations.
- **Remotely sensed dataset:** Data measurements generated when the measuring instrument and the medium to be measured are not in direct contact.

LEARNING MATERIALS: Materials prepared for use by students or teachers in the classroom, field, or other learning environment. Some of the following fit in a hierarchy with implied scope, specificity, and length (e.g., from curriculum, to course, to module/unit, to lesson plan, to activity).

- **Assessment:** Materials that are designed to measure student learning (exams, questionnaires, quizzes) or to support teacher design or development of such materials (rubrics). Materials that support existing assessments (answer keys). Materials that relate to the philosophy of assessment (articles about performance and authentic assessment, for example).
- **Case study:** An intensive analysis of an individual unit (as a person or community) stressing developmental factors in relation to environment or a scientific study of a specific location or region.
- **Classroom activity:** Defined as a classroom-based task or exercise that students are asked to do, often as part of a lesson plan or other larger unit

CanCore Guidelines for the Implementation of Learning Object Metadata (IEEE 1484.12.1-2002)
Written by Dr. Norm Friesen, Sue Fisher, and Anthony Roberts
Version 2.0 www.cancore.org

of instruction--to help them develop particular skills, knowledge, or habits of mind. Usually, the goals and outcomes are broad.

- **Computer activity:** Defined as a computer-based task or exercise that students are asked to do, often as part of a lesson plan or other larger unit of instruction--to help them develop particular skills, knowledge, or habits of mind. Usually, the goals and outcomes are broad. (For example, see Mountain Simulation: Assignment.)
- **Course:** Defined as a sequence of instructional units, often a semester long, designed by a teacher (or a faculty or other group of teachers) to significantly advance student skills, knowledge, and habits of mind in a particular discipline and to help students meet specified requirements (as set forth in a curricula or district or state policy). (For example, see Air Quality Meteorology.)
- **Curriculum:** Defined as a program of study. Examples include academic standards (the knowledge, skills, and habits of mind students are expected to acquire in particular grade levels or clusters of grade levels) and the units of instruction, often with sample lesson plans, illustrative student activities, and essential and supplementary resources that can help students reach standards. Curriculums are often designed at the state or school district level, but can also apply to a program of study required for a particular university or college-issued degree.
- **Field activity:** Defined as a field-based task or exercise that students are asked to do, often as part of a lesson plan or other larger unit of instruction--to help them develop particular or habits of mind. Usually, the goals and outcomes are broad.
- **Field trip guide:** Directions or suggestions for learning experiences outside of the classroom, usually off-site, either in general or specific to a particular location.
- **Instructor guide:** Supporting material for teachers regarding the use of learning materials with respect to learning objectives, classroom management, materials, assessment, and additional reference material.
- **Lab activity:** Defined as a laboratory-based task or exercise that students are asked to do, often as part of a lesson plan or other larger unit of instruction--to help them develop particular skills, knowledge, or habits of mind. Usually, the goals and outcomes are broad.
- **Lesson plan:** Defined as a plan for helping students learn a particular set of skills, knowledge, or habits of mind. Often includes student activities as well as teaching ideas, instructional materials, and other resources. Is shorter in duration than and often a part of a unit or module.
- **Module or unit:** Defined as a sequence of lesson plans designed to teach a set of skills, knowledge, and habits of mind (e.g., Oceanography).
- **Presentation or demonstration:** A formal representation of ideas to others. Includes, but is not limited to, links to PowerPoint slides.
- **Problem set:** A series of tasks or questions posed to the student, as in a homework or other assignment.

- **Project:** Activities organized around a particular academic topic. Goals and outcomes may be broad, and interaction with other classrooms via the Internet may be a component.
- **Syllabus:** Outlines of courses and modules and their contents. General material describing a course or unit of study.
- **Tutorial:** A resource that provides guided, practical information about a specific subject.
- **Virtual field trip:** A series of online visual and text-based resources that mimic the field trip experience in an electronic setting.

PORTAL: The homepage that is the entrance to a large, complex Website holding a variety related resources, hosted by a single or group of related organizations. For example, http://www.nasa.gov. A portal also encompasses other resource types.

- **Commercial portal:** For example, .com or .biz.
- **Educational portal:** For example, .edu or .museum; University of California, Berkeley: Museum of Paleontology.
- **Government portal:** For example, .gov; National Climatic Data Center.
- **Nonprofit portal:** For example, .org or .museum.

SERVICE: A system that provides one or more functions of value to the end user.
- **Ask an expert:** A site where one can submit questions for personal response to either an individual or a group of people who have specific expertise in the area of interest.
- **Clearinghouse:** A site that offers links to other sites organized around a topic or topics. The linked sites are hosted by unrelated organizations (e.g., teachearth.com).
- **Forum or discussion:** An interface where a group of individuals can engage in text-based talk about a particular subject. May or may not be synchronous.
- **Listserv:** E-mail-based communications that are distributed to a member-based group of individuals via a single e-mail address. Usually topic-focused.
- **Message board:** Interface whereby individuals can post information, requests, or ideas for view by others.
- **Search engine:** Mechanism by which the WWW or some sub-component is searched based on a specific query entered by the user. Use when the search function offered is more extensive than simply, "Search this site."

TEXT: A resource whose content is primarily words for reading.

- **Abstract or summary:** A condensed version of a larger piece of work, outlining the major points and conclusions.
- **Annotation:** Amazon.com-type reviews or short instructor comments about a resource.

CanCore Guidelines for the Implementation of Learning Object Metadata (IEEE 1484.12.1-2002)
Written by Dr. Norm Friesen, Sue Fisher, and Anthony Roberts
Version 2.0 www.cancore.org

- **Book:** A long, written composition (includes literature, technical documentation, and guides, excluding field and instructor's guides).
- **Glossary:** A collection of specialized terms and their meanings.
- **Index or bibliography:** A list (as of bibliographical information or citations to a body of literature) arranged usually in alphabetical order of some specified datum (as author, subject, or keyword); a list often with descriptive or critical notes of writings relating to a particular subject, period, or author; a list of works written by an author or printed by a publishing house; the works or a list of the works referred to in a text or consulted by the author in its production.
- **Journal article:** Writings that appear in a periodical publication, often peer-reviewed and of an academic nature, sharing ideas or research results.
- **Periodical:** A publication that is produced on some predictable schedule, such as weekly, monthly, or annually.
- **Policy or procedure:** A document containing statements or a series of steps for particular way of accomplishing things.
- **Proceedings:** A collection or papers or abstracts presented at a specific meeting or event.
- **Proposal:** A formal document that outlines a specific project, recommendation, plan, or idea.
- **Reference:** A work containing useful facts or information (e.g., user's guides, technical manuals). A student might consult this during independent research. It does not have a guided component. It may comprise hyperlinked pages but a specific path through it is not designated.
- **Report:** Detailed account or statement, often outlining the results or events of a meeting, endeavor, activity, or study (e.g., review, evaluation).
- **Thesis:** Scholarly work as for an academic degree.

TOOL: Aids in accomplishing a task.

- **Calculation or conversion tool:** For example, metric to English, satellite tracker.
- **Code:** Allows for the enhancement of the resource; it generally does not stand alone (e.g., numerical models, applets, computer code).
- **Software:** Allows access, interactions with, or the ability to execute resources; it does not enhance another piece of software; rather, it stands alone (e.g., tools to look at and analyze data or create learning materials).

VISUAL: Actual and symbolic visual representations other than text.

- **Artistic illustration:** Visuals not generated from data and not meant to illustrate a scientific concept or process (e.g., artistic drawing, animations, clip art, virtual tours).

- **Map:** 2-D representations of a single point in time or space that illustrate fairly static physical features (e.g., topos, soil, road, bedrock maps). For weather or forecast maps, use scientific visualization.
- **Photograph:**
- **Remotely sensed imagery:** Imagery generated from measuring devices that are not in direct contact with the medium they are measuring (e.g., radar or satellite imagery).
- **Scientific illustration:** Still or animated images not based on data but meant to illustrate scientific concepts or processes (e.g., diagram, graph, figure, virtual reality; The Wilson Cycle).
- **Scientific visualization:** Visuals generated from data or model output (e.g., graphed or modeled, dynamic or static, physical or numerical, data, simulations, animations, weather forecast or streamflow maps; Idealized ENSO Simulation).
- **Video:** (e.g., clips, interviews, lectures movies).
- **Visual Webcast:** A broadcast that was captured digitally from the Web (may include audio portions as well).

iLumina: http://aa.uncwil.edu/dl/documents/ilumina-vocabs060701.htm
http://turing.bear.uncw.edu/iLumina/index.asp

"iLumina is a digital library of sharable undergraduate teaching materials for chemistry, biology, physics, mathematics, and computer science. It is designed to quickly and accurately connect users with the educational resources they need. These resources range in type from highly granular objects such as individual images and video clips to entire courses."

- Course
- Lesson, Book
- Presentation
- Example
- Demonstration
- Simulation
- Lab
- Exercise
- Assessment
- Project
- Dataset
- Syllabus
- Lesson plan
- Teacher tool
- Learner tool
- Manager tool

CanCore Guidelines for the Implementation of Learning Object Metadata (IEEE 1484.12.1-2002)
Written by Dr. Norm Friesen, Sue Fisher, and Anthony Roberts
Version 2.0 www.cancore.org

EUC: http://www.lub.lu.se/EUC/T1/111.html
http://www.medianet.org/euc/

"EUC is an open access, Internet based platform offering services which demonstrate the usefulness and added European value of using multimedia and ICT in education. The target groups addressed by EUC are teachers and pupils in European schools. EUC is closely linked to the European Schoolnet."

- Text
- Image
- Sound
- Software
- Data
- Interactive

FAILTE: http://failte.lboro.ac.uk/guidelines.pdf
http://failte.ac.uk/

"FAILTE [Facilitating Access and Information to Learning and Teaching resources in Engineering] aims to provide a unified approach to the description and cataloguing of electronic learning resources for engineering. We are building an internet resource catalogue and other services which we hope will help lecturers select and access suitable computer- and web-based learning materials for their courses."

- **Tutorial/Explanation:** For example, lecture notes, textbook, handout, presentation slides, worked examples.
- **Assessment/Test:** For example, examination style, questionnaire (IMS and SeSDL), formative assessment.
- **Assignment/Task:** For example, problem statement, exercise, experiment, worksheet.
- **Activity (incl. simulation):** For example, modelling, simulation.
- **Images/Movie**: For example, diagram, graph, table, illustration, animation, video.
- **Resource pack**: A complete package for a module including learning and teaching material of all types, and with tutors' instructions and learning objectives specified.

The Le@rning Federation:
http://www.thelearningfederation.edu.au/repo/cms2/tlf/published/3859/docs/Metadata_Application_Profile_1_2.pdf
http://www.thelearningfederation.edu.au/tlf/

CanCore Guidelines for the Implementation of Learning Object Metadata (IEEE 1484.12.1-2002)
Written by Dr. Norm Friesen, Sue Fisher, and Anthony Roberts
Version 2.0 www.cancore.org

"The Le@rning Federation is an initiative of State and Federal governments of Australia and New Zealand. Over the period 2001-2006 the Initiative aims to develop online interactive curriculum content specifically for Australian and New Zealand schools. The Initiative will support teachers in enhancing student learning[,]" thereby greatly improving educational outcomes for students.

- Auditory learning
- Collaborative learning
- Demonstrations
- Experiential learning
- Independent learning
- Inquiry learning
- Mentoring
- Peer tutoring
- Problem solving
- Resource based learning
- Tactile/Kinaesthetic learning
- Visual learning
- Team teaching
- Testing

Final Report of Industry Canada/University of Waterloo IMS Pilot Project (Tom Carey): http://www.cjlt.ca/content/vol28.3/carey_etal.html

"This project was intended to determine the feasibility of providing process-oriented information about instructional approach, though a set of Educational Rationale [ER] tags, which would allow creators of learning objects to describe the critical elements in their design intent."

- **Anchor:** Anchor new knowledge in authentic contexts.
- **Goals:** Set a goal to solve a non-trivial case or problem.
- **Motivate:** Develop motivation to perform tasks and understand knowledge.
- **Apply:** Apply theory in practice.
- **Styles:** Employ multiple styles of learning.

- **Customize:** Customize the learning agenda.
- **Monitor:** Monitor comprehension and adjust learning strategies.
- **Adapt:** Adapt task difficulty to match needs and capabilities.
- **Teach:** Engage in expository or teaching activities.
- **Discover:** Use trial and error to discover something new.

- **Collaborate:** Collaborate to accomplish part of the learning task.
- **Evaluate:** Engage in self-evaluation.
- **Reflect:** Reflect on the learning process.

CanCore Guidelines for the Implementation of Learning Object Metadata (IEEE 1484.12.1-2002)
Written by Dr. Norm Friesen, Sue Fisher, and Anthony Roberts
Version 2.0 www.cancore.org

- **Misconceptions:** Confront and resolve misconceptions.
- **Extrapolate:** Extrapolate beyond the information provided.
- **Relate:** Relate new knowledge to prior knowledge.
- **Perspectives:** Examine new knowledge from different perspectives.
- **Differentiate:** Differentiate knowledge types *e.g., heuristics, context-dependent*.
- **Integrate:** Integrate new knowledge.
- **Elaborate**: Elaborate new knowledge.
- **Critique:** Think critically about new knowledge.

Curriculum Online:

http://www.curriculumonline.gov.uk/NR/rdonlyres/e3oma44kllx22ww4n72j7xdxl5p
sr4xozniagapdjvqzuhzupjiod43lwkwmqu6biihugttfutukkc/TaggingforCurriculumOn
line1.doc
http://www.curriculumonline.gov.uk/Curriculum%20OnLine/default.htm

The vision for Curriculum Online is to give teachers easy online access to a wide range of digital learning materials, which they can use to support their teaching across the curriculum. The programme consists of ring fenced funds (eLearning Credits) and a web portal, www.curriculumonline.gov.uk, launched by the Secretary of State for Education and Skills on 9th January 2003.

- Assessment
- Collection
- Dataset
- Evaluation
- Event
- Exam
- Exemplification
- Factual literature
- Fictional literature
- Forum
- Guidance
- Image
- Interactive resource
- Lesson plan
- Review
- Revision aid
- Scheme
- Service
- Simulation
- Software
- Sound
- Task
- Test

CanCore Guidelines for the Implementation of Learning Object Metadata (IEEE 1484.12.1-2002)
Written by Dr. Norm Friesen, Sue Fisher, and Anthony Roberts
Version 2.0 www.cancore.org

- Text
- Textbook
- Training

GEM: http://www.geminfo.org/Workbench/Metadata/Vocab_Type.html
http://www.geminfo.org/

"A U.S. Department of Education initiative, the Gateway to Educational Materials SM (GEM) expands educators' capability to access Internet-based lesson plans, curriculum units, and other educational materials. GEM's goal is to improve the organization and accessibility of the substantial, but uncataloged, collections of materials that are already available on various federal, state, university, non-profit, and commercial Internet sites."

- **Activity:** A task or exercise that students are asked to do–often as part of a lesson plan or other larger unit of instruction–to help them develop particular skills, knowledge, or habits of mind. Usually, the goals and outcomes are broad.
- **Artifact:** Objects produced by humans with a view to substantial use. For example, art, cultural, or historic objects such as an image of Picasso's *Guernica* or of a Pueblo Indian pottery bowl.
- **Best practice:** The processes, practices, or systems identified in public and private organizations that performed exceptionally well and are widely recognized as improving an organization's performance and efficiency in specific areas.
- **Catalog record:** Another metadata record with deeper, more complex cataloging of the resource it describes than the GEM record provides.
- **Collection:** A collection of resources or links to other Web sites.
- **Community:** Education listservs and other online communities–forums for exchanging ideas around particular education topics or challenges.
- **Course:** A sequence of instructional units, often a semester long, designed by a teacher (or a faculty or other group of teachers) to advance student skills, knowledge, and habits of mind significantly in a particular discipline and to help students meet specified requirements (as set forth in curricula or district or state policy).
- **Curriculum:** Academic standards–the knowledge, skills, and habits of mind students are expected to acquire in particular grade levels (or clusters of grade levels)–and the units of instruction, often with sample lesson plans, illustrative student activities, and essential and supplementary resources that can help students reach those standards. Is often designed at the state or school district level by a team of teachers, curriculum specialists, and other experts.
- **Curriculum support:** The equipment, facilities, tools, materials, and personnel available for the teaching of the curriculum.

CanCore Guidelines for the Implementation of Learning Object Metadata (IEEE 1484.12.1-2002)
Written by Dr. Norm Friesen, Sue Fisher, and Anthony Roberts
Version 2.0 www.cancore.org

- **Data set:** A resource containing *only* numeric, spatial, spectral, or statistical data. A report of research *containing* a data set should be assigned the resource type "Research Study."
- **Educator's guide:** A guide intended for use by educators as a supplement to a lesson or unit plan.
- **Environment:** Any network-based environment intended for simultaneous interaction with one or more participants such as multimedia, games, chat rooms, and virtual reality.
- **Event:** A non-persistent, time-based occurrence.
- **Form:** An online document with blank spaces for filling in information before execution.
- **Image set:** A set of images and photographs of physical objects, paintings, prints, drawings, other images and graphics, animations and moving pictures, film, diagrams, maps, and musical notation.
- **Lesson plan:** A plan for helping students learn a particular set of skills, knowledge, or habits of mind. Often includes student activities as well as teaching ideas, instructional materials, and other resources. Is shorter (in duration) than, and often part of, a unit of instruction. Goals and outcomes are focused.
- **Literature:** Writings in prose or verse.
- **Primary source:** Person, place, or thing that provides firsthand information about something. Examples include oral histories, letters, and other original documents.
- **Project:** Activities organized around a particular academic topic or challenge in which students from various parts of the country (or world) participate, using the Internet. Goals and outcomes are broad. (Example: A semester-long effort to observe, gather, and analyze data on water quality.)
- **Realia:** All physical objects or encodings of physical phenomenon *not* produced by humans. In a sense, the universe of physical objects can be divided into realia (naturally occurring objects and phenomena) and artifacts (human-made objects and phenomena). Examples might include images of a rock from Mars or trees or the sound of ocean waves.
- **Reference:** A comprehensive, systematically organized collection of information such as a dictionary, encyclopedia, or almanac.
- **Research study:** A resource that reports the results of research. A resource containing *only* a data set resulting from research should be assigned the resource type "Data Set."
- **Secondary source:** Secondary sources are written in response to a primary source. Secondary sources are usually criticism, reviews, or are based on another book or journal.
- **Serial:** Publications in any medium issued in successive parts bearing numerical or chronological designations and intended to be continued indefinitely. Serials include periodicals; newspapers; annuals (reports, yearbooks, etc.); the journals, memoirs, proceedings, transactions, etc. of societies; and numbered monographic series. (AACR2)

- **Service:** Any online service and/or assistance that functions either as an intermediary between the user and online data and information (e.g., an online question-and-answer service such as AskERIC) or as a non-intermediary service (e.g., an online service that monitors and reports on some aspect of education or other activities having an impact on education).
- **Story:** A fictional narrative which is shorter than a novel.
- **Study guide:** A guide created to provide students with hints, techniques, or management ideas in a particular area.
- **Tool:** The resource being described is some kind of instrument or tool that may, or may not, be directly accessible over the Internet. In a sense, this category is a special instance of the "Services" resource type.
- **Unit of instruction:** A sequence of lesson plans designed to teach a set of skills, knowledge, and habits of mind.