Conceptual data model v04

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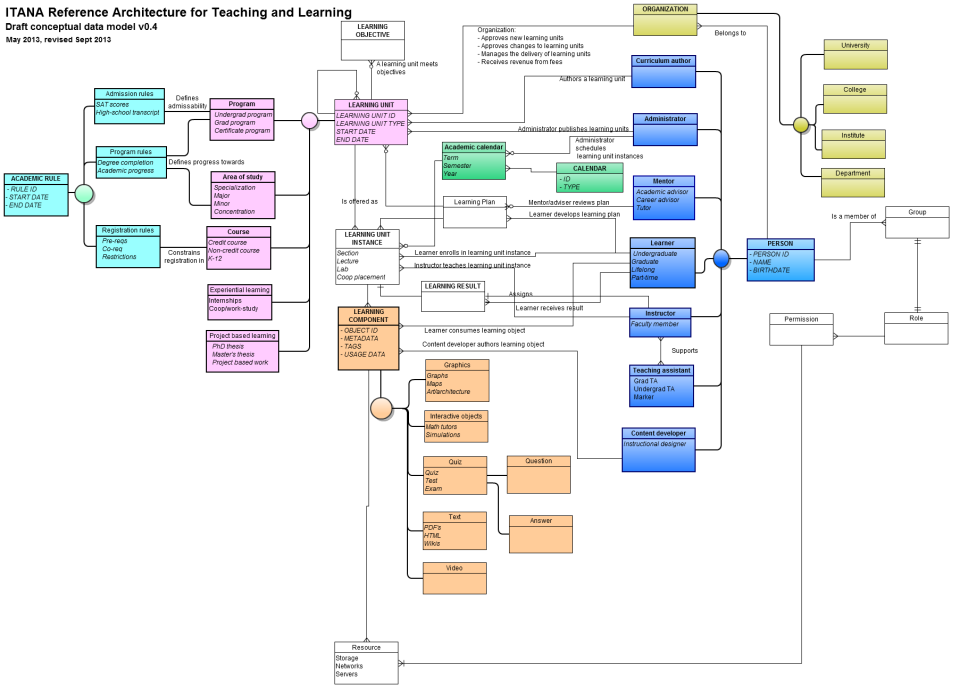
ER diagram



Index of definitions

Object	Definition	Example	Standards
ACADEMIC RULE	A rule that constrains enrollment.	Degree rules. admission rules	
Academic rule: Admission rules	Rules that cover admission to the institution (or a specific program of study). May refer to SAT scores, IB scores, High School grades and English proficiency tests (eg TOEFL)		
Academic rule: Program rules	Rules that specify courses or work that must be completed to fulfill promotional requirements or completion requirement. Degree Audit rules typically specify completion requirement.	Degree audit rules, academic progression rules	
Academic rule: Registration rules	Rules that constrain registration	Pre-requisites, co-requisites or any kind of restriction	
Academic calendar	For convenience the academic year can be divided into sub-units: semesters, terms etc. There can be multiple academic calendars	Fall semester, winter semester, summer terms	
Group	A collection of persons or groups (used in access management)		Grouper has become something of a de-facto standard in Higher Education (http://www.internet2.edu/products-services/trust-identity-middleware/grouper/)
LEARNING COMPONENT	An object of pedagogical value that is created and curated by the institution. May be re-used. Access (read,write, modify) may be controlled by permissions assigned to roles just like any other object in the learning ecosystem. Metadata, tags and usage data are associated with all Learning Objects.	Video, game, simulation, static content (PDF, HTML), quiz	If the Learning Component is a tool, then there is the IMS standard for Learning Tools Interoperability (LTI): [http://www.imsglobal.org/toolsinteroperability2.cfm] For the content of the component the is the IEEE Standard for Learning Object Metadata: http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=1032843

Learning Object: Graphics			.png, .jpeg and .svg have become the standards for the Internet. Standard Vector Graphics (SVG) have the enormous advantage of scaling without loss of clarity (as well as the fact that annotations can be embedded in the xml)
Learning Object: Interactive object	Interactive objects ranging from Calculus tutors to Second Life	Maple Calculus Tutor, Second Life, Chemistry Dry Labs	
Learning Object: Text			PDF has become a ubiquitous standard for lecture notes and other course materials
Learning Object: Video			
Learning Objective	Cognitive, psychomotor or affective objectives		Bloom's taxonomy is the most often quoted. The Common Core (http://www.corestandards.org/the-standards) defines objectives for K-12. Without clearly articulated objectives, measurement is problematical. However, there are no universal standards for objectives.
Learning Plan	Learners intended course of study		
Learning Result	Result assigned to a learner upon completion of a Learning Unit	Grade, standing, degree	The IMS CALIPER project provides a finely grained approach to measuring the learning process: http://www.imsglobal.org/IMSLearningAnalyticsWP.pdf\\ For learning results captures by a student transcript: the PESC College Transcript (http://www.pesc.org/interior.php?page_id=164)
LEARNING UNIT	Any ***definition*** of a learning activity. The abstraction used to isolate core attributes and relationships: learning objectives, organizational relationships, rules. Learning Objects, by contrast, are the actual objects of pedagogical value that are used to accomplish the Learning Objectives of the Learning Unit.	Program, course, specialization	
Learning Unit: Program	Any program of study that is composed of multiple units. There may be rules constraining the manner in which these units are assembled.	Bachelor of Science. Major Biology. First Aid Certificate	
Learning Unit: Area of Study	Usually an area of specialization within a program. Again, rules define how this is completed	Major in History. Minor in Philosophy	
Learning Unit: Course			
Learning Unit: Experiential Learning	Coop or work study. Credit may be given	3 month internship at IBM	
Learning Unit: Project Based Learning	Usually research based. May be new research (as in a post-graduate thesis) or an opportunity to learn research methods (as in an undergraduate research project)	PhD thesis, Masters thesis	
Learning Unit Instance	Any scheduled offering of a Learning Unit	Course offering, scheduled lecture	
ORGANIZATION	A group with some formal Terms of Reference within an institution. Could also be an external organization	University, College, High-school, Department, Faculty, US Department of Education, Max Planck Institute	
Permission	A permission defines access to a resource	Access to lab equipment, access to library resources	
PERSON	Person lies at the heart of the Learning Ecosystem. A person may have multiple concurrent roles.	Learner, instructor, administrator	There is the Internet2 schema for eduPerson: http://www.internet2.edu/media/medialibrary/2013/09/04/internet2-mace-dir-eduperson-201203.html
Person: Administrator	Anyone administering registration, scheduling, facilities		
Person: Content Developer	Anyone connected with creating learning units	Subject matter expert (Faculty), librarian, web-developer, pedagogical expert	
Person: Instructor	Person with primary responsibility for delivering content	Lecturer	
Person: Learner	Any "consumer" in the learning process	Degree, student, non-degree student, life-long learner	

Person: Mentor	A person with an ancillary role in the learning process	Adviser, tutor, auditor	
Person: Teaching Assistant			
Resource	Any resource used in the learning process	Room, server, projector, file, books, articles, videos	

Detailed definitions

Academic Rule: Program
Examples:

1. Degree Audit rules. These define the courses and credits that are required in order to complete a program.
2. Promotional rules.
3. Program admission or transfer rules.

These rules are often very similar in structure. Eg: "You need to complete course xxx and course yyy and 10 credits of electives of type x"

Academic Rule: Registration
Rules that constrain registration can be of two kinds:

1. Rules that are intended to ensure that students have the necessary academic background to succeed (you need to have completed differential calculus before you can register in integral calculus)
2. Rules that are intended to ensure that certain cohorts get the courses they need (this section is reserved for electrical engineering students)

An institution may support multiple academic calendars. For example, undergraduate degree program courses may be offered on one calendar, while non-degree continuing eduction courses may be offered on another calendar. Some professional programs may be on yet another calendar. It is important that there is a level of indirection between learning unit instances and calendars.

A **Learning Component**:

1. Has pedagogical value for the consumer
2. Is re-usable
3. Is searchable (across the Web)

Examples of Learning Objects include:

1. Videos. A learning tool video platform allows parts to videos to be tagged, supports viewer analytics, supports access controls
2. Static content: PDF, html, wikis
3. Games
4. Simulations
5. Quizzes

Learning Objective
Learning Objectives can be attached to any learning unit.

1. A course can meet certain learning objectives.
2. Learning objectives can b e specified for an individual lecture
3. An entire degree program may have to meet certain learning objectives. This is especially important in the context of the certification of professional programs

Learning objectives are typically divided into:

1. Cognitive
2. Psychomotor
3. Affective

Learning Plan
The Learning Plan can be short-term as in a timetable for the following term's courses. It can be long term as in the case of someone who want to become a medical doctor: stretching from Biology prerequisites all the way to residency requirements.

Learning Result
The term Learning Result covers 3 different concepts:

1. A measure of success in meeting the learning objectives of the learning unit. This can be a grade (78%, 3.5, A+) or a standing (PASS, FAIL)
2. A unit measure of the "amount learned" - "3 credits", "2 units"
3. Recognition on a transcript of completion of a learning unit: BA major in History, CHEM 123

Learning Unit
The concept of a "Learning Unit" comes from Kuali Student. Canonical Learning Units are prescriptive in nature: MATH100 consists of differential calculus. HIST200 covers the ante-bellum South. Learning Units can be courses, programs, majors....indeed, anything to which the word "learning" can be applied. A Learning Unit ID is like a SKU. This allows for the creation of an inventory of Learning Units (a curriculum) without having to worry about the exact nature of the items.

Person

Person lies at the center of the Learning Ecosystem data model. Often there are two possible relationships between a person and any other object in the model:

1. Learner - Instructor
2. "Advisee" - adviser
3. Instructional designer - instructional consumer (learner)