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UBLIS 571 Soergel

**Lecture 4.2b. In-lecture exercise. Developing a conceptual data schema  
Two extensive worked-out examples**

<b>Content</b>	
<b>Example 1. Information system for a computer users group</b>	2
Step 1: From anticipated questions to conceptual data schema raw material collection_(read)	2
Step 2: Refining the raw list of entity types and relationship types into a conceptual data schema (follow along with the audio)	7
<b>Student-submitted questions with entity-relationship analysis What to do and what not to do</b> (read)	10
<b>Not LMS: You can stop here.      LMS: Example 2 is for you</b>	
<b>Example 2. A totally integrated information system for a school</b>	13
Step 1: From anticipated questions to conceptual data schema raw material collection_(read)	13
Step 2: Refining the raw list of entity types and relationship types into a conceptual data schema. No audio, follow along with the notes	16

Note: In neither example did I go into how the entity values would be identified. For most entity types this is fairly obvious.

### Example 1. Computer users group. **Step 2: Refining the conceptual data schema**

This step starts from the raw entity types and relationship types that were distilled from the original questions; there is no need to look at the many original questions any more.

In this step, I first arranged the draft relationship types into groups that address similar types of data. The groups are indicated by color in the draft **Relationship types, raw** column. In the **Scratchpad** column, relationship types are rearranged to show all relationship types in a group together. Now one can see relationship types that are the same or almost the same and can be consolidated. One also sees patterns that suggest how the conceptual data schema can be simplified (see the notes after the table). There are many other types of editing. The results are seen in the column **Relationship types, close to final**. I first extracted the purple group and dealt with it, then the red group, etc. The audio gives more explanation..

The **Scratchpad** column and the **Relationship types, final** are arranged in correspondence. Relationship types marked with strike through have been consolidated; they are encompassed in a one of the final relationship types. A final relationship type is next to an empty line in the scratchpad column has been added to make the schema more complete.

HardwareMake&Model is an entity type for such values as Lenovo (Make) W510 (Model). When necessary, it is abbreviated as HardwareM&M. Same for SoftwareMake&Model and ProductMake&Model

## Example 2. Integrated information system for a school. **Step 2: Refining the conceptual data schema**

This step starts from the raw entity types and relationship types that were distilled from the original questions; there is no need to look at the many original questions any more.

In this step, I first arranged the draft relationship types into groups that address similar types of data. The groups are indicated by color in the draft **Relationship types, raw** column. In the **Scratchpad** column, relationship types are rearranged to show all relationship types in a group together. Now one can see relationship types that are the same or almost the same and can be consolidated. One also sees patterns that suggest how the conceptual data schema can be simplified (see the notes after the table). There are many other types of editing. The results are seen in the column **Relationship types, close to final**. I first extracted the purple group and dealt with it, then the red group, etc. The notes give more explanation.

The **Scratchpad** column and the **Relationship types, close to final** are arranged in correspondence. Relationship types marked with strike through have been consolidated; they are encompassed in a one of the final relationship types. A final relationship type is next to an empty line in the scratchpad column has been added to make the schema more complete.

I have added many relationship types from the University Database (Soergel, Organizing Information), but the conceptual data schema given here still covers only a small part of what is needed for a Totally Integrated Information System for a School.

**Notes** (print these so you can look at them as you look at the table)

**Note #1 on Document and on Subject**

Looking at the entity types and relationships, we can see right away that EducationObject and LearningObject are the same thing, with LearningObject the preferred term, so I listed its group of relationships first. Furthermore, we can see that the relationship types for Document and for LearningObject are partially the same; in any event, all relationship types listed for either could be used with both, so I made LearningObject a narrower term of Document and consolidated all relationship types under Document. Likewise I made LearningObjectType a narrower term of DocumentGenre so that statements about the type of a LearningObject can now be made as

Document <belongsTo> DocumentGenre

To further consolidate relationship types, we can recognize that Subject and LearningOutcome, while not the same, relate to Document and LearningActivity in similar ways, so LearningOutcome can be a narrower term of Subject. Furthermore, a CurriculumStandard is a LearningOutcome within a particular scheme promulgated by a state or a school district. All of this simplifies the conceptual data schema without limiting the information that can be stored in the database in any way. For example,

Document <dealsWithSubject> Subject

can now be defined broadly to encompass

LearningObject <dealsWithSubject> Subject

LearningObject <supports> LearningOutcome

LearningObject <dealsWithStandard> CurriculumStandard

**Note #2. On Document <usefulFor> Condition**

Documents, esp. books, may be helpful to a person who is bullied or is overly shy or has some behavioral disorder. Reading a book in which a major character successfully deals with such issues may help the reader deal with his or her problem. Such use of books is called bibliotherapy; bibliotherapy can be used in conjunction with (adjunct to) other measures or therapies

**Note #3. On Age, AgeLevel, GradeLevel, and ReadingLevel**

These are interrelated but different entity types: Age (applied to people and other objects), AgeLevel (applied to objects that are suitable / appropriate for people of a certain age, values are usually age intervals), GradeLevel, and ReadingLevel (for which there are several measurement scales, such as grade level, Lexiles, etc.) The last three are often confused.

**Note #4. Entity types related to LearningActivity**

A LearningActivity is a process, a LearningObject is an object. A LearningActivityType is the general type of a learning activity, such as GroupActivity, Exploration, ShowingVideo, FieldTrip.

LearningActivityIntellectual is the abstract idea of a learning activity, such as may be described in a LearningObject. A learning activity may be supported by one or more LearningObjects. A LearningActivity could be designed to take a whole semester, a class period, or part of a class period. A LearningActivityInstance is an actual activity happening in a specific time and place, it may be scheduled for several time intervals (given as beginning Date&Time and ending Date&Time at different places (for example, a field trip)

**Note #5 Assignment**

All assignments from all courses in the school have their own ID