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The New Game of Tag

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Introduction

Suppose you decide you want to advance some specific aspect of your knowledge of Health Informatics (HI), but you don't want to go back to school and don't want to go through what someone else has decided is the pathway to enlightenment - a preset group of courses. What are your options?

Well, you can just read. But in getting ready, you find that what you want to learn is spread over many books, articles, and websites, and pulling it all together is a major undertaking. You try, but eventually abandon the effort. You can also try to contact people, but everybody is busy and that gets nowhere. And then the next crisis occurs and learning takes the back seat.

Fortunately, there is a new option under development that someday may give you exactly the learning tool that you need.

The Health Informatics Collaboratory led by Francis Lau at the University of Victoria and involving most HI centers across Canada (see list), is defining and developing technology that promises the future will be better for life-long learners. This project combines the forces of many academic centers and private industry to create the learning tools of the future.

There are many parts to this project:

- The development of on-line, asynchronous (anytime, anywhere) educational modules on key topics in HI.
- Tools for developing and preparing course materials.
- The creation of voice communications capabilities (Voice over Internet Protocol - VoIP) to allow inexpensive Internet-based communications among geographically dispersed students and with their teachers to support synchronous interactions in virtual classrooms.
- The creation of mechanisms to automatically gather relevant content via the Internet.
- The development of a searchable repository of learning objects, such as educational modules, complete courses, supporting materials within a course, and the like.
- Methods for tagging each of these learning objects as to their authors, content, the competencies they are intended to imbue, etc.

It is this latter are that this paper will explore: the competency tagging of learning objects.

Defining Health Informatics Competencies

Several years ago, a collaboration of about 100 individuals produced a document that spells out the competencies required of health informaticians [1, 2]. The products of this work included the definition of hundreds of detailed competencies that were collected

into high-level groups of competencies, called competency categories. Examples of detailed competencies are: Professional Presentation Skills, Professional Writing Skills, Listening Skills, and many others. These were then grouped together with other like skills into the Personal Competencies competency category. In addition the levels of competency needed for various roles were also identified.

These were developed for the various types of professional: the Applied Health Informatician (AHI - the deployer of technology) and the Research and Development Informatician (RDHI - the researcher, teacher, and developer of technology), and the clinician requiring Health Informatics capabilities to perform optimally is his or her clinical role.

Uses of the Competency Information

There are several ways in which this competency information may be used in relation to educational objects:

- Use 1: Defining an Educational Program: In this case, a course developer or student will access a repository of educational objects with the objective of navigating through it to address teaching or learning need, concatenating the objects into a program that imbues the necessary competencies the student or course developer targets.
- Use 2: Filling Gaps in a Program: In this case, a student or course developer needs to find an atomic object, component, section, module, or course to insert into or complement other materials in a planned or existing educational program.

In order to address either of these uses, it is necessary to tag educational objects with competency information.

Levels of Competency

In addition to the types of competency, it is also desirable to specify the required levels of competency that professionals need to fill specific roles. They include:

- Basic: General knowledge of the topical area (e.g., strategic planning), understanding of definitions and fundamental concepts, and the ability to analyze the topic into components. Familiarity with the skills required, and perhaps the experience with applying them in a class situation, e.g., a class project.
- Intermediate: Specific knowledge of components of the topic and ability to apply some or all of the components under direction; skills of a similar nature; experience in being a member of a real team, e.g., in a co-op situation.

- Advanced: Deep knowledge and understanding of the topical area and the ability to apply it independently; proficiency in the skills; experience with having actually led a project in a real setting.

It is clear that using the decomposed triple will generally involve multiple tags per object even at the component level, as it will likely be the case that multiple skills, knowledge elements, and or experience types will be addressed in any section, module, or course object.

Defining “Tags” for Educational Objects

Using the above, it is relatively simple to define tags (in, for example, XML) that can be associated with each educational object. In particular, the creator or integrator of educational materials can label each object with the competency category that it addresses, or can go deeper and label it with the detailed competencies that it is intended to transmit to the student, and if desired, can even indicate the level of competency that the object is intended to impart.

Once the object is tagged, the object can be put in a repository and made retrievable by its tag.

Putting it All Together

Once each learning object is tagged, then the magic is possible. All we need is a system that asks the student what he or she wants to be, determines the needed competencies, and then takes the student through the repository in a systematic way. “All” did I say. Well, there are a few more complexities and it is here that the work continues.

So we’re not there yet, but a lot of dedicated people are working to make our learning in the future an easier, more flexible, and more self-determined effort.

Acknowledgements

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References:

- [1] Cowey, H.D., Zitner, D., Bernstein, R., MacNeill, J.E., The Development of Model Curricula for Health Informatics, Proceedings of Medinfo 2001, September 2001.
- [2] MacNeill, J.E., Cowey, H.D., The Development of a Model Curriculum for applied Health Informatics, Proceeding of the AMIA Conference, November 2000.



Table 1: Educational Objects

Atomic Level: Analogy = Character, word.

Potentially reusable in any component of any course on any subject. The smallest units of useful information. Examples: image, video clip, paragraph, table, diagram, test question /answer, a simulation model.

Component Level: Analogy = Message.

Potentially reusable in selected modules addressing selected topics, e.g., in a module on HR management. A concatenation of atomic units comprising a standalone component of a lesson, i.e. transfers a unit of knowledge, skill, attitude, or experience (competency). Examples: A set containing text paragraphs, diagrams, and images that teaches the use of de Bono’s six thinking hats technique; a set containing a simulation model, text paragraphs, and diagrams explaining membrane transfer.

Section Level: Analogy = Section of a Chapter.

Potentially reusable in selected modules addressing selected topics by teachers accepting the teaching style of the module creator, e.g., a team-focused HR professor. The “Piece-of-a-Lesson-in-Box” model. A collection of messages that fulfills an educational objective, i.e., transfers a set of competencies that enable the student to execute something. Examples: a set containing components that teach de Bono’s basic thinking techniques that gives managers in order to impart to students the ability to do structured thinking (assumed for illustration to be an educational objective for a management leadership course).

Module Level: Analogy = Chapter.

Potentially reusable in selected courses by teachers accepting an entire module to serve or substitute for a module in one of their courses. The “Lesson-in-a-Box” model”. Examples: A collection of sub-modules that fulfills a set of related educational objectives; A set containing sub-modules that teach a variety of techniques for structured decision-making (e.g., problem definition techniques, thinking techniques, analysis techniques, etc.).

Course: Analogy = Book.

Potentially reusable by teachers wishing to adopt another teacher’s entire course. The “Course-in-a-Box” model. A compilation of modules that fulfills the comprehensive educational objectives that impart the set of required competencies in a subject area.

Involved Schools:

British Columbia Institute of Technology, Health Information Technology Program
 University of Calgary, Health Telematics Unit
 Dalhousie University, Health Informatics Program
 George Brown College, Faculty of Health Sciences
 Memorial University, Division of Medical Education
 University of Sherbrooke, Centre for Research Evaluation and Diagnostics
 University of Victoria, Health Information Science
 Waterloo Institute for Health Informatics Research, University of Waterloo
 University of Western Ontario, Faculty of Health Sciences and Faculty of Medicine & Dentistry

Involved Companies:

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