

# **Quality Standards: It's All About Teaching and Learning?**

Presented at NUTN, Kennebunkport, June 4, 2004

Stephen Downes

Senior Researcher, National Research Council Canada

<http://www.downes.ca>

## ***What would make this a good talk?***

- *The process answer*: if I stated objectives, used multiple media, facilitated interaction...
- *The outcomes answer*: if you stayed to the end, if you got improved test scores...

## ***Quality Paradoxes...***

- Doing the right thing does not ensure success...  
(The operation was a success, but the patient died)
- Assessing for outcomes comes too late...  
(Well, I'll never see *that* brain surgeon again...)
- Even if *I* think it's good, you may not...  
(Especially when I want a knee operation!)

## ***Asking the Right Questions:***

- Are we evaluating the right thing?  
Courses and classes? Vs people and resources...
- Is it being done at the right time?  
Before? After? A paradox here...
- Did we take the right point of view?  
Completion rates? Grades? Vs performance, ROI, life success...

## *How do you know this will be a good talk?*

Because, in the past:

- People like you...
- ... expressed satisfaction...
- ... with things like this

Three dimensions of quality assessment: **the item, the user, the rating** (the product, the customer, the` satisfaction)

## ***Our Proposal***

- Describe learning resources using metadata
- Harvest metadata from various repositories
- Develop LO evaluation metadata format
- Employ evaluation results in search process

## *Previous Work*

- Multimedia Educational Resource for Learning and Online Teaching (MERLOT) <http://www.merlot.org>
- Learning Object Review Instrument (LORI)  
<http://www.eler.net/eLera/Home/About%20%20LORI/>
- Various definitions of evaluation criteria
  - eg. DESIRE <http://www.desire.org/handbook/2-1.html>
  - Nesbit, et.al. [http://www.cjlt.ca/content/vol28.3/nesbit\\_etal.html](http://www.cjlt.ca/content/vol28.3/nesbit_etal.html)



## ***MERLOT***

- Peer review process
- Materials ‘triaged’ to presort for quality
- 14 editorial boards post reviews publicly
- Criteria (five star system):
  - Quality of Content
  - Potential Effectiveness as a Teaching-Learning Tool
  - Ease of Use



## LORI

- Members browse collection of learning objects
- Review form presented, five star system, 9 criteria
- Object review is an aggregate of member reviews

The Human digestive system

Learning Object Review Instrument

	Low	1	2	3	4	5	High	N/A	Comments:
1. Content Quality					*	*	*		
Veracity, accuracy, balanced presentation of ideas, and appropriate level of detail >> more >>					*	*	*		
2. Learning Goal Alignment					*	*	*		
Alignment among learning goals, activities, assessments, and learner characteristics >> more >>					*	*	*		
3. Feedback and Adaption					*	*	*		
Adaptive content or feedback driven by differential learner input or learner modeling >> more >>					*	*	*		

## *Issues (1)*

- The peer review process in MERLOT is too slow, creating a bottleneck
- Both MERLOT and LORI are centralized, so review information is not widely available
- Both MERLOT and LORI employ a single set of criteria – but different media require different criteria

## ***Issues (2)***

- Results are a single aggregation, but different types of user have different criteria
- In order to use the system for content retrieval, the object must be evaluated

## ***What we wanted...***

- a method for determining how a learning resource will be appropriate for a certain use when it has never been seen or reviewed
- a system that collects and distributes learning resource evaluation metadata that associates quality with known properties of the resource (e.g., author, publisher, format, educational level)

## Recommender Systems

- *“Collaborative filtering or recommender systems use a database about user preferences to predict additional topics or products a new user might like.”* (Breese, et.al., <http://www.research.microsoft.com/users/breese/cfalgs.html>)

- The idea is that associations are mapped between:

- User profile – properties of given users
- Resource profile – properties of the resource
- Previous evaluations of other resources

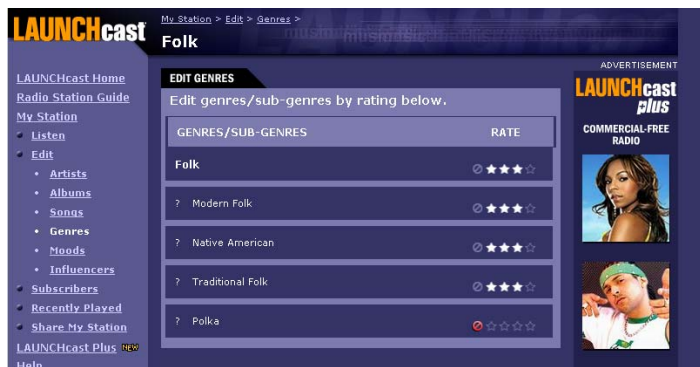
(See also <http://www.cs.umbc.edu/~ian/sigir99-rec/> and <http://www.iota.org/Winter99/recommend.html> )

## ***Firefly***

- One of the earliest recommender systems on the web
- Allowed users to create a personal profile
- In addition to community features (discuss, chat) it allowed users to evaluate music
- User profile was stored in a 'Passport'
- Bought by Microsoft, which kept 'Passport' and shut down Firefly (see <http://www.nytimes.com/library/cyber/week/062997firefly-side.html> and <http://www.nytimes.com/library/cyber/week/062997firefly.html> )

## Launch.Com

- Launched by Yahoo!, allows users to listen to music and then rate selections
- Detailed personal profiling available
- Commercials make service unusable, significant product placement taints selections <http://www.launch.com>






## Match.com

- Dating site
- User creates personal profile, selection criteria
- Adds 'personality tests' to profile

### The Match.com Profile

Basics Photos **Personality** Physical



How social is she?  
mostly shy & introverted | your ideal | mostly outgoing

Next Step →

How creative are you? Are you shy or outgoing, whimsical or pragmatic? find out in **only 5 minutes!**

Explore your personality traits and quirks and find out what type of personality is right for you using Match.com's Ph.D.-designed Personality Test.

When you're finished, we'll send your FREE Personality Report and allow you to include highlights from it in your

#### Your Match.com Profile

✓ Basics	
Photos	
Personality	25% completed
Physical	

## ***Our Methodology***

- Perform a multidimensional quality evaluation of LOs (multi criteria rating)
- Build a quality evaluation model for LOs based on their metadata or ratings
- Use model to assign a quality value to unrated LOs
- Update object's profile according to its history of use
- Identify most salient user profile parameters

## ***Rethinking Learning Object Metadata***

- Existing conceptions of metadata inadequate for our needs
  - Getting the description right
  - The problem of trust
  - Multiple descriptions
  - New types of metadata
- The concept of *resource profiles* developed to allow the use of evaluation metadata

## ***Resource Profiles***

- Multiple vocabularies (eg., for different types of object)
- Multiple authors (eg., content author, publisher, classifier, evaluator)
- Distributed metadata (i.e., files describing the same resource may be located in numerous repositories)
- Metadata models
- Analogy: personal profile

See [http://www.downes.ca/files/resource\\_profiles.htm](http://www.downes.ca/files/resource_profiles.htm)

## Types of Metadata

First Person	Second Person	Third Person
<ul style="list-style-type: none"><li>- Bibliographic</li><li>- Technical</li><li>- Rights</li></ul>	<ul style="list-style-type: none"><li>- Educational</li><li>- Sequence and Relational</li><li>- Interaction</li></ul>	<ul style="list-style-type: none"><li>- Evaluation</li><li>- Classification</li></ul>
<i>Created by the content author or publisher</i>	<i>Created by the content user (in the process of use)</i>	<i>Created by disinterested third parties</i>

## *Evaluation Approach...*

- Development and definition of evaluative metadata
- Expanding evaluation schema to include user types with a set of relevant ratings at different levels of detail
- Quality evaluator for the assessment of perceived subjective quality of a learning object based on criteria specific to each type of object

## ***Our Approach***

- Quality evaluator using LO type-specific evaluation criteria with rating summary or ‘report card’
  - information according to eight groups of LO users
  - weighted global rating
  - user-tailored weighting; user preferences of the evaluation quality criteria
- Combination of subjective quality values that are purposefully fuzzy



## ***Representing Evaluation Data***

- Using the schemas defined, evaluation data is stored as XML files
- These XML files are aggregated alongside learning object metadata
- Evaluation data may then be aggregated or interpreted

## *The User Profile*

- user description data: required or available for the user to enter via sign-in forms for example:
  - user information: age, gender, occupation, education level...
  - user preferences: language, topics of interest, choice of media...
- automatically collected user data (user platform: OS, connection bandwidth ...)

## ***LO Filtering***

- Content filtering: based on content similarities (metadata-based) with other LOs (data scenario 2)
- Collaborative filtering: used when only ratings of LOs are available, no metadata (data scenario 3). It is carried out in two steps:
  - finding other users that exhibit similar rating patterns as the target user (called user neighborhood) by means of clustering algorithms
  - recommending LOs that have not been rated by target user according to their ratings by his neighborhood users

## LO Quality Prediction

- Calculating object's similarity with other rated LOs based on their content metadata
- Calculating user similarity
  - clustering of the users based on their profiles (users with same preferences, competence and interests)
  - co-rated LOs (rating patterns)
- Predict quality value of the unrated LO by the target user using target user neighborhood rating of similar LOs