

Web-Based Educational Resources for Learning and Online Teaching in Higher
Education: The MERLOT Project

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Abstract

MERLOT (Multimedia Educational Resource for Learning and Online Teaching) is a Web-based open resource designed primarily for faculty and students in higher education that aims to alleviate the difficulties in locating relevant materials of high quality. The resources in MERLOT include learning materials and support materials from a wide variety of disciplines that can be integrated within the context of a larger course. Support resources attached to materials include sample assignments and evaluations of the learning materials, and help faculty members identify learning materials that are high quality and pedagogically appropriate for their courses. Evaluation materials include discipline panel peer reviews and individual user reviews. The resources in the MERLOT repository currently include 8,500 free learning materials and support materials. The number of registered individual members who can add teaching-learning materials, comments, and assignments to the MERLOT collection has exceeded 13,600. The paper presents an overview of the MERLOT and its current state.

Keywords: Web-based learning, online teaching, peer review evaluation.

Introduction

The use of Web-based resources for teaching and learning is hindered by the difficulties in locating resources that are relevant, of high quality, and affordable. Locating resources with standard web search engines is usually inefficient. Search for relevant information on the web can benefit from the availability of portals, websites that are entry points to other websites. Educational portals such as MERLOT and World Lecture Hall provide systems of categorization and searching that allow users access to learning and teaching resources linked to the portal. Such portals may also offer services that support communication and collaboration among the educators and learners. For commercial resources, institutional sites such as WebCT and XanEdu provide tools for creating customizable print and digital course packs and allow access to the content by students. World Lecture Hall at the University of Texas publishes links to pages created by faculty worldwide who are using the Web to deliver course materials in any language. World Lecture Hall (2001) has 83 categories to browse, and search utilities to locate materials. WebCT (2002) offers over 1,250 publisher course content packs in more than 50 subject areas that have been specifically designed for use with WebCT. These packs provide instructors with fully customizable course materials around which to build their courses, including video animations, sample syllabi, lecture notes, quiz and test banks, and glossaries combined with the functionality of WebCT's course management software. Although these approaches address the problem of efficiently locating relevant materials, the quality issue is addressed in a limited way. World Lecture Hall materials are courses offered at accredited colleges and universities around the world, and WebCT packs adhere to the editorial standards of the publisher and author of the text. Affordability of the materials is also a concern in most situations. While all course materials reachable through World Lecture Hall are free and publicly available, students must purchase an access code to use WebCT materials.

MERLOT (Multimedia Educational Resource for Learning and Online Teaching) is a Web-based open resource designed primarily for faculty and students in higher education that addresses the issues of relevancy, quality and affordability. The resources in the MERLOT repository include approximately 8,500 free learning materials and support materials from a wide variety of disciplines that can be integrated within the context of a larger course ("MERLOT Tasting Room", 2002). Support resources attached to materials include sample assignments and evaluations of the learning materials and help faculty members identify learning materials that are high quality and pedagogically appropriate for their courses. Evaluation materials include discipline panel peer reviews and individual user reviews. MERLOT also aims at building "a community of people who strive to enrich the teaching and learning experience" by connecting "systems, consortiums, and institutions of higher education, professional organizations of academic disciplines, and individual members".

MERLOT was created by the California State University-Center for Distributed Learning in 1997 ("A Brief and Simplified History of MERLOT", 2002). Since then MERLOT has grown into an international cooperative project with 23 partner institutions serving over 1,400 campuses which serve over 350,000 faculty and about 8 million

students. The number of registered individual members who can add teaching-learning materials, comments, and assignments to the MERLOT collection has currently exceeded 13,600. The rest of the paper is an overview of the learning and teaching materials available in the MERLOT collection and the facilities provided for search, the peer review process, and the current state of the project.

Learning and Teaching Materials on MERLOT

The resources in the MERLOT repository include teaching-learning modules (called “learning objects”) that can be re-used in different contexts, and support materials, which include sample assignments, formal peer reviews and user comments. MERLOT’s advanced searching and sorting features allow faculty and students to search materials by title, description, author, subject category, material type, primary audience, technical format or language of material. Other search options include author’s email, author’s organization, source code availability, cost, copyright restrictions, content URL, availability of peer reviews, availability of member comments, availability of assignments, minimum panel rating and minimum user rating. The subject categories are loosely based on the Library of Congress classification system. The material types include Simulation, Animation, Tutorial, Drill and Practice, Quiz/Test, Lecture/Presentation, Case Study, Collection, and Reference Material. The search results can be sorted according to title, author, date entered, rating or material type. The users can also conduct searches for MERLOT members by name, organization, address, phone, email and associations.

The collection can be browsed by subject area, which includes Arts, Business, Education, Humanities, Mathematics, Science and Technology, and Social Sciences. The subjects are organized in a three-level hierarchy. For example, the Science and Technology category currently has over three thousand entries which are organized in eleven sub-categories including Agriculture, Information Technology, etc. The Information Technology subcategory in turn has twelve sub/subcategories, which include E-commerce, Networking, Security and others. The “browse members” link on the Browse the MERLOT Library screen allows the user to browse the MERLOT members by subject area/skill or interest. Figure 1 shows the results of a search for peer-reviewed materials in the E-Commerce sub/subcategory under Information Technology. One tutorial and one Collection are displayed with the tutorial having also four user (“Member”) comments. The ratings are indicated by the number of stars on a scale of 1 to 5.

Peer Review Process

The quality of the learning materials in the MERLOT database is ensured by the peer review process, which is modeled on the peer review of scholarship. MERLOT is establishing discipline communities of reviewers to conduct peer reviews of learning materials within the discipline. Discipline communities have been established for the following thirteen subject areas: biology, business, chemistry, engineering, health sciences, history, information technology, mathematics, music, physics, psychology, teacher education, and world languages. “The core of each discipline community is a discipline team with the responsibility to develop evaluation standards, conduct peer

reviews of learning materials within the discipline, and make connections with their professional organizations” (Hanley and Thomas, 2000). Discipline teams (also called “MERLOT Editorial Boards”) are made up of faculty selected by the MERLOT partner organizations in accordance with the MERLOT guidelines.

Currently peer review is being conducted in twelve discipline-based communities. The peer review process involves each learning material being evaluated by at least two team members who have relevant expertise. The review process typically consists of two stages where a triage review to identify worthy candidates is followed by the review of worthy candidates. Reviewers write individual review reports by applying the discipline team’s evaluation standards and review procedure, and then prepare a "composite review" report that is posted to the MERLOT Web site by the discipline leader after sending the review to the authors for their feedback and permission to post the review on MERLOT (“Peer Review of MERLOT Materials”, 2002). The reports also include comments and recommendations only for the author. MERLOT provides password-protected internal worksites for the discipline teams and MERLOT administrative staff to work as "virtual communities" on the project. MERLOT uses the Blackboard platform for the discipline teams to share documents and communicate.

The resulting peer review report posted to MERLOT contains a description of the learning material and the evaluation. The description includes “learning goals, targeted student population(s), prerequisite knowledge/skills, type of learning material, summary of procedures for using the software and technical requirements” (Hanley and Thomas, 2000). The evaluation is divided into three dimensions: quality of content, potential effectiveness as a teaching tool, and ease of use. Each of these dimensions is evaluated separately (on a scale of 1-5 stars, 5 being the highest), and an overall rating is computed (“Peer Review of MERLOT Materials”, 2002). A review must average three stars in order to be posted to the site. Figure 2 shows how a review report is displayed on the MERLOT Web site.

Evaluation Standards

MERLOT Administration Team has provided the discipline teams with a framework of evaluation standards divided into the three dimensions mentioned above and conducted a workshop to facilitate the teams’ development of discipline-specific implementation of these standards. The evaluation standards for the three dimensions are summarized in this section. Further information on the evaluation standards can be reached from the MERLOT home page (“Peer Review process”, 2002).

- Quality of content: This dimension evaluates the validity (correctness) and educational significance of the concepts, models, and skills for the discipline. To evaluate the educational significance of the content, reviewers are guided to consider whether content is core curriculum within the discipline, whether it is difficult to teach and learn, and whether it is a pre-requisite for understanding more advanced material in the discipline.
- Potential effectiveness as a teaching-learning tool: This dimension evaluates the extend “the instructional software is likely to improve teaching and learning, given the ways the faculty and students could use the tool”. MERLOT Evaluation Standards

emphasize the contextualization of reviews by considering the following three questions (“Evaluation Standards for Learning Materials in MERLOT”, 2000):

1. What stage(s) in the learning process/cycle could the materials be used?
 2. What is (are) the learning objective(s)? What should students be able to do after successfully learning with the materials?
 3. What are the characteristics of the target learner(s)
- Ease of use: This dimension evaluates the usability of the learning materials by focusing on the ease of use. The evaluation standards consider factors such as interface consistency, feedback provided about the system status and the user's responses, flexibility in use, need for documentation, technical support, and/or instruction for most students to successfully use, presentation of information in ways that are familiar for students, attractiveness of presentations, and user getting trapped or lost in the software.

Member Contributions to MERLOT

Individual members can submit learning materials, assignments and user comments to MERLOT.

Member Comments

The formal peer reviews of MERLOT are complemented by user comments. Any individual member of MERLOT can contribute user comments (called Member Comments). The entries in the MERLOT database are listed with the numbers and average ratings for Peer Reviews and Member Comments as shown in Figure 1. A sample user comment is given in Figure 3.

Assignments

An Assignment is an example that explains how an instructor has used a particular learning material in a specific context. Assignments “help create understanding of how particular learning materials might be used in a course” (“MERLOT Introduction: Assignments”, 2002).

Search for learning materials indicate whether any assignments exist for the materials listed, as Figure 1 illustrates. Search options for assignments include: Subject Category, Sub-Category, Assignment Title, Description, Author's Name, Topics, Course, Education Level, Learning Objectives, Technical Notes, and Assessment. Search results are listed with Category, Title, Date, Course, By, and Education Level.

The assignment form is composed of Title, Description, Topics, Course, Pre-Requisite Skills, Learning Objectives, Type of Task (Supervised, Team Task, Student-Centered, or Supplemental Activity), Technical Notes, Assessment, Assessment URL, Time Required, and Text of Assignment.

Current state of MERLOT

MERLOT aspires to be not only a repository of web learning materials, but also evaluations and “guidance for use” (Hanley & Thomas, 2000). This ambitious project is steadily growing as indicated in Table 1 and gradually overcoming its weaknesses discussed by Knauff (2001). As of April 25, 2003, MERLOT indexes 8580 learning materials of which 2457 have been added during the last 365 days, representing a 40.1% increase. However, only 881 (10.3%) of the materials have been peer reviewed. The labor

intensive peer review process carried out by 150 discipline team members is obviously still too slow. The number of materials with member comments has reached 1,831, representing 21.3% of the materials, and assignments have totaled 352, representing 4.1%. The number of registered members has almost reached 13,700, representing an increase of 72.8% during the last year.

In summary, the MERLOT project has made significant progress towards its goal of providing a free and open collection of high quality Web-based learning materials to improve learning and teaching within higher education. It is expected that further addition of new discipline communities and substantial increases in the number of peer reviews, learning assignments, and user reviews will help the MERLOT community achieve what they have aspired. Successful integration of learning materials into teaching may require additional initiatives, such as MERLOT TWO (“ABOUT MERLOT-Teaching Well Online”, 2001), which focuses on successful integration of online resources in teaching and learning.

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Table 1 Growth of MERLOT materials, members and peer reviews

	Total	Added during last 365 days
Materials	8580	2457
Members	13688	5766
Peer Reviews	881	113
Member Comments	1831	296
Assignments	352	74

The screenshot shows the MERLOT website interface. At the top, there is a search bar with the text 'Search Materials:' and a 'go' button. Below the search bar are links for 'advanced search' and 'search tips'. The MERLOT logo is on the left, with the text 'Multimedia Educational Resource for Learning and Online Teaching'. A navigation menu includes 'Home', 'Communities', 'Browse Materials', 'Contribute Material', 'Member Directory', and 'Help'. Below the menu, it says 'MERLOT Search Results: Materials'. The search results section indicates 'Your search found 2 materials' and lists the category as 'All/Science and Technology/Information Technology/E-commerce'. It also shows 'Peer Reviews: are available' and 'Items 1 - 2 shown'. There are sorting options: 'Default sort order by rating.' with a dropdown menu set to 'Title' and a 'Go' button, and 'Resort by:' with a 'Sub-Search:' input field and a 'go' button. A link for 'Advanced Sub-Search' is also present. The results are displayed in a table with columns: 'Title', 'Author', 'Date Entered', 'Rating', and 'Item Type'. Two items are listed: 'Electronic Commerce Tutorial (Tutorial)' and 'The Electronic & Distributed Commerce Page (Collection)'. Each item includes a brief description, a location URL, and the date added. To the right of each item, there are statistics for 'Peer Reviews', 'Member Comments', 'Assignments', and 'Collections'.

Search Materials:

[advanced search](#) | [search tips](#)

[join now](#) | [log in](#)

[Home](#) | [Communities](#) | [Browse Materials](#) | [Contribute Material](#) | [Member Directory](#) | [Help](#)

MERLOT Search Results: Materials

Your search found 2 materials
 Category: All/Science and Technology/Information Technology/E-commerce , **Peer Reviews:** are available
 Items 1 - 2 shown.

Default sort order by rating.
 Resort by:
[Advanced Sub-Search](#)

Title	Author	Date Entered	Rating	Item Type
Electronic Commerce Tutorial (Tutorial)	Author: This tutorial provides an overview of how electronic commerce works, the challenges of hosting...	Location: http://www.iec.org/tutorials/e-commerce/index.html Added: Apr 15, 2001	Peer Reviews (1) avg: ★★★ Member Comments (4) avg: ★★★ Assignments (none) Collections (none)	
The Electronic & Distributed Commerce Page (Collection)	Author: This page presents an overview of distributed e-commerce, focusing in particular on business models...	Location: http://oneoutbox.com/eib/ Added: Oct 16, 2002	Peer Reviews (1) avg: ★★ Member Comments (none) Assignments (none) Collections (none)	

1

page 1 of 1 | jump to page

Figure 1 Result of a search for peer-reviewed materials in the Systems Analysis sub/subcategory of Information Technology subcategory

Peer Review Detail View

Detail View | Peer Reviews (1) | Member Comments (4) | Add | Assignments (0) | Add

Peer Review of [Electronic Commerce Tutorial](#)

Reviewed: Jan 3, 2002 by the [MERLOT InfoTech Review Panel](#)

Overall Rating: 3.33

Category Ratings: [Content Quality](#) : 4.0
[Potential Effectiveness as a Teaching Tool](#) : 3.0
[Ease of Use for Students and Faculty](#) : 3.0

[About the Evaluation Process, Criteria, and Ratings](#)

Description

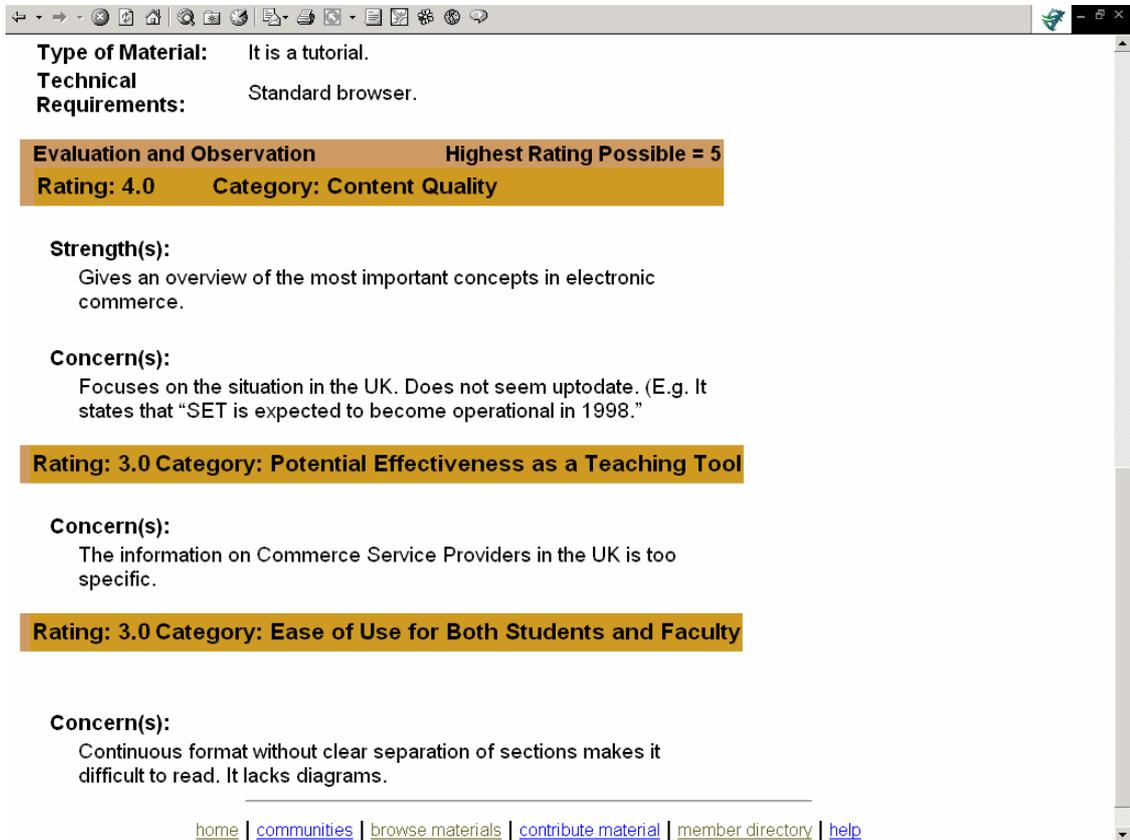
Overview: Electronic Commerce Primer is the first section of a three-section tutorial. It is provided by Webmasters Ltd., a London Internet consultancy that specializes in electronic commerce. The sections cover: 1. Electronic Commerce Primer 2. Planning for Electronic Commerce: Business Issues 3. Selecting an Electronic Commerce Solution Electronic Commerce Primer is a paper that summarises the basics of electronic commerce, covering on-line catalogues and on-line purchasing. The sections of the paper cover: The Market, Its Size and Characteristics Selling vs. Marketing on the Internet The Basic On-line Catalogue Mechanism Payment Processing

Learning Goal(s): To introduce the basics of electronic commerce

Target Student Population(s): College/professional studies in e-commerce.

Prerequisite Knowledge or Skills: Basic internet concepts and terminology (e.g. browser).

Figure 2 (a) Peer Review of Electronic Commerce Tutorial (Part a)



Type of Material: It is a tutorial.
Technical Requirements: Standard browser.

Evaluation and Observation **Highest Rating Possible = 5**
Rating: 4.0 **Category: Content Quality**

Strength(s):
Gives an overview of the most important concepts in electronic commerce.

Concern(s):
Focuses on the situation in the UK. Does not seem up to date. (E.g. It states that "SET is expected to become operational in 1998.")

Rating: 3.0 **Category: Potential Effectiveness as a Teaching Tool**

Concern(s):
The information on Commerce Service Providers in the UK is too specific.

Rating: 3.0 **Category: Ease of Use for Both Students and Faculty**

Concern(s):
Continuous format without clear separation of sections makes it difficult to read. It lacks diagrams.

[home](#) | [communities](#) | [browse materials](#) | [contribute material](#) | [member directory](#) | [help](#)

Figure 2 (b) Peer Review of Electronic Commerce Tutorial (Part b)

The screenshot shows a web browser window displaying the MERLOT website. The navigation menu at the top includes 'Home', 'Communities', 'Browse Materials', 'Contribute Material', and 'Member Directory'. The current page is titled 'MERLOT: Member Comments' and shows 'Member Comments (4) | Add'. The main heading is 'Member Comments on Electronic Commerce Tutorial by unknown'. Below this, there is a link to 'Add Member Comment' and a table of comments.

Commenter	Personal Evaluation	Classroom Use?	Remarks
Robinson	★★★★	Not specified	<p>General Remarks: This is a very informative website. I really liked all the other links on this site and it has plenty information on many subjects!! I browsed through a few topics and checked out all the information. It is very easy to use and you can learn alot on each subject.</p> <p>Technical Remarks: There are many topics discussed on this website. It is very informative and i really like it!</p>
Kathie Scarbrough	Comment Only	Not specified	<p>General Remarks: I spent about 15 or 20 minutes on this site. It was easy reading. I noticed that Leslie and Paul had both looked at it as well.</p> <p>Technical Remarks: It has a lot of information and is written in HTML.</p>
Paul Hughes	★★★★	Not specified	<p>General Remarks: I spent about 15 minutes at this site. It was a little easier than the first site because I was somewhat familiar with the layout. I also noticed that Leslie had also chosen this site. I agree with all her comments. The site is very staticy, with good pictures. Easy to read and understand.</p> <p>Technical Remarks:</p>

Figure 3 Member Comments for Electronic Commerce Tutorial