Application for 2004 University of California Larry L. Sautter Award for Innovation in Information Technology

Ilios: UCSF School of Medicine's Curriculum Management Tool

http://medschool.ucsf.edu/ilios/

Table of Contents

Submitters iii
Ilios Team iii
Summary 1
Project Description 1
I. Introduction 1
II. Challenges, Solutions, and Other Features 2
III. Development Process 3
IV. Implementation 4
V. Impact 4
VI. Portability 4
VIII. Future Direction 5
Technology Utilized 5
I. Summary 5
II. Highlights 6
Benchmarking and Customer Satisfaction Data 8
I. Improved Processes 8
II. Presentations and Conferences 11
III. Use Statistics 11
IV. Recognition by Medical School Accrediting Body 11
APPENDICES 12
Appendix 1: Ilios System Architecture 12
Appendix 2: Ilios Data Flow 13
Appendix 3: Sample Help Documentation 16

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Summary

Ilios manages curriculum planning, delivery and oversight at UCSF's School of Medicine. In order to stimulate and support dramatic curricular change we created a powerful web-based tool to facilitate communication and collaboration; to serve as a development forum; to provide a database of curricular details; to manage digital learning materials; and to offer windows into our curriculum. Ilios's intuitive interface and wizard-driven navigation facilitate:

- Ownership and community among diverse faculty.
- Longitudinal curriculum monitoring and planning.
- Wide-ranging searching and reporting capabilities.
- Management and delivery of curricular information and learning materials.
- Seamless integration with *i*ROCKET, the School of Medicine's digital curriculum delivered through WebCT.

Project Description

I. Introduction

Beginning in 1999, School of Medicine students and faculty recognized the need for dramatic curricular reform in order to keep pace with vast changes in the field of medicine. Traditional paradigms for teaching and learning medicine seemed both inefficient and unrealistic. The School thus redefined elements of its core educational mission to emphasize the following: the development of knowledge, skills, and attitudes appropriate to leaders of 21st century medicine; the integration of basic, clinical, and social sciences; and the creation of instructional activities that promote active classroom and life-long learning.

The success of such broad-based curricular change required an extensive and unique collaboration among teaching faculty, curriculum committees, education administration, and education technologists. Ilios was first conceived as an accessible web-based tool to foster and facilitate these discussions, enabling curriculum design teams to determine the appropriateness and completeness of content without gaps, overlaps, or unintentional redundancy, as well as develop a rich set of learning objectives for each core course.

As planning moved into implementation, Ilios was enhanced to meet other objectives, such as automatic notification of faculty regarding their teaching obligations, management of digital learning materials, delivery of content to students through their online courses in WebCT, sharing of curricular data with all medical schools through the Association of American Medical Colleges (AAMC) curriculum database, CurrMIT,[1] and connectivity to course and teacher evaluation process. Ilios has thus become a true curriculum management tool, strengthening and reinforcing strong teamwork, promoting oversight, revision, and evaluation of the curriculum, and making critical contributions to faculty development and student learning. The School's faculty and educational leaders now say that it is inconceivable for the curriculum to operate without Ilios.

The application is also becoming recognized nationally as an extremely flexible and easy-to-use curriculum management tool for medical education. Medical schools from within the University of California system, as well as from around the country, have inquired about implementing Ilios to

[1] CurrMIT is managed by the Association of American Medical Colleges. [http://currmit.aamc.org]

promote their own educational innovations and teaching mission. We have responded by building a distribution package for other UC schools and have begun exploring methods to distribute Ilios beyond the UC system. The AAMC "laud(s) the effort by UCSF to collaborate with other medical schools." The vice president for the AAMC's Division of Medical Student School affairs stated, "that we (the AAMC) should do everything in our power to assist the dissemination of this (Ilios)." As Ilios has served to foster collaboration and teamwork within the UCSF School of Medicine's educational community, we are actively working with other educational institutions and communities to share our unique tool and experiences.

II. Challenges, Solutions, and Other Features

We believe we can best highlight the innovations Ilios offers by describing some of the challenges we face in developing, managing, and delivering a new integrated curriculum[2] for the School of Medicine and the solutions Ilios provides.

Challenge: Manage an ever-growing number of digital learning materials so they can be accessed, tracked and incorporated into any teaching session.

Solution: Ilios includes a management system for digital learning materials. Built on IMS/HEAL[3] standards for management of digital learning materials, the repository manages citations, files and URLs. The materials can be incorporated into any teaching session as a required or supplemental exercise along with instructions to the learner. Materials can be easily used across teaching sessions and even courses, minimizing the need to duplicate and recreate materials from course to course and year to year.

Challenge: Share curricular data with AAMC's CurrMIT database in a cost and time efficient method.

Solution: Ilios can export XML data, compliant with AAMC's CurrMIT schema, for upload into CurrMIT. This allows UCSF to share the details of its curriculum with every accredited medical school in the US for purposes of benchmarking, collaboration and reporting. Data, which had to be manually entered before is now transferred to CurrMIT in a matter of seconds.

Challenge: Provide access to learning objectives, curricular themes, course schedules and learning materials to more than 800 faculty and 560 medical students who are teaching and learning across disparate geographical locations.

Solution: Ilios is web-based and integrates with most any course management system (such as WebCT at UCSF or Angel at UCLA). Ilios can also stand alone to deliver course content, calendars and learning materials to instructors and students.

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[2] Overview of UCSF new curriculum: [http://medschool.ucsf.edu/curriculum/basics.asp]

[3] The IMS Global Learning Consortium develops and promotes the adoption of open technical specifications for interoperable learning technology [http://www.imsglobal.org/]. The Health Education Assets Library (HEAL) is a digital library of freely accessible, web-based multimedia teaching materials that meet the needs of today's health sciences educators and learners. [http://www.healcentral.org]

Challenge: Develop a complete and accurate picture of a complex four-year medical curriculum in order to identify gaps, reduce unintentional redundancy, improve integration, and satisfy important requirements for accreditation.

Solution: The best way to ensure accuracy and completeness of curricular details is to bring data entry down to faculty who develop, manage and teach the curriculum. Ilios's interface is designed for fast, accurate and convenient data entry directly by the teaching faculty and their support staff. Ilios has more than 148 registered users who can enter and edit data. Having accurate and complete curricular data, combined with Ilios's robust searching capabilities, enables curriculum planners to identify gaps and unnecessarily redundant curricular content.

Challenge: Index the curriculum using an international standard for fast, reliable retrieval of data and for comparison across other medical schools and the published medical literature.

Solution: Ilios indexes all courses, sessions, objectives, cases, learning materials and self-directed learning modules with the National Library of Medicine's Medical Subject Headings (MeSH).[4] Within the 2003-2004 academic year more than 3750 unique MeSH terms have been used over 12,000 times to index our curriculum.

Additional Ilios features include a publicly accessible search engine, course calendaring, ability to create curricular modules and teaching cases, a PDA calendar syncing function, and tools to facilitate room scheduling, faculty evaluations, and tracking of teaching hour efforts by faculty and departments.

III. Development Process

Ilios began as an idea by a few key faculty who were overseeing the development of the School of Medicine's new integrated curriculum in the spring of 2000. These faculty worked with the school's curriculum coordinator and director of educational technology to develop Mosaic, a prototype curriculum database built in Microsoft Access. The system was hosted by the school's Information Services Unit and distributed to Windows and Macintosh OS desktops through a Citrix client.

This prototype, while limited in scope and accessibility, successfully showcased the power of a collaborative curriculum development tool and led to the creation of Ilios. The Ilios team was formed in the fall of 2001 as a joint venture of the School's Office of Educational Technology (OET) and the Information Services Unit (ISU). The team quickly began gathering requirements for a new more stable, extensible, and scalable solution.

In the three years since, the process has followed a five-step software development lifecycle of gathering requirements, creating specifications, coding applications, testing, and releasing to production. To facilitate the process, we have a three-tier server environment consisting of development, integration, and production environments. Ilios has undergone two complete lifecycles, leading to two major version releases in July 2002 and July 2003. The Ilios team is nearing completion of the third iteration and expects another major version release in July 2004.

[4] MeSH is the National Library of Medicine's controlled vocabulary thesaurus. It consists of sets of terms naming descriptors in a hierarchical structure that permits searching at various levels of specificity. [http://www.nlm.nih.gov/pubs/factsheets/mesh.html]

IV. Implementation

Milestone	Date
Development of application prototype in Microsoft Access "Mosaic"	January 2000
Requirements gathering and project planning for Ilios Version 1	September 2001
Implementation of Ilios version 1	July 2002
Requirements gathering and project planning for Ilios Version 2	December 2002
Implementation of Ilios version 2	July 2003
Requirements gathering and project planning for Ilios Version 3	December 2003
Implementation of Ilios version 3	July 2004

V. Impact

Ilios has had, and continues to have an enormous impact on the development, implementation, delivery and refinement of our curriculum. It is used throughout our required curriculum and is gaining momentum as a valuable tool for development and management of electives. At least eight curricular theme groups have used the data in Ilios to conduct thorough reviews of their particular themes in order to improve integration of that theme through the continuum of our curriculum. These groups include culture, behavior, ethics, health policy, epidemiology, genetics, informatics, and human sexuality.

Ilios dramatically reduces our dependence on WebCT, the increasingly expensive commercial courseware package licensed by our campus. Ilios also considerably strengthens our mission of education by creating a fabric of knowledge of the core objectives, competencies and educational methods we use to train the physicians of the 21st century. It is a fabric that stretches electronically across geographic locations and touches hundreds of teachers and learners, providing each one the opportunity to learn, refine, and interact with our curriculum.

VI. Portability

While Ilios is a complex amalgamation of processes and technologies, it is a fairly self-contained and portable application. We have built a distribution package that contains everything a school would need to implement Ilios on their own servers. The package includes the database and all of the source code as well as a list of system requirements and dependencies, an installation guide for system administrators, technical documentation for programmers, sample course and user data, and a user guide. Once Ilios is installed and configured, the only customization that is required is populating the Person table, which acts as a repository of everyone available to be used as instructors, students, and users.

Other schools can take advantage of useful features already built in to Ilios such as email notification of instructors and the XML data bridge with CurrMIT with little to no modification. AAMC staff have stated that they are "particularly impressed with the apparent portability of Ilios, and, taking advantage of the portability, they laud the effort by UCSF to collaborate with other medical schools, via dissemination of the Ilios code."

Ilios can be easily implemented within any organization that supports its technical environment. Within the UCSF community, the School of Pharmacy is exploring an implementation that would resolve the challenges they face in teaching at both the primary UCSF campus and the new Mission

Bay campus. Within the UC community of medical schools, Ilios has already been given to UCLA's David Geffen School of Medicine for implementation in September 2004. UCLA plans to integrate Ilios into their Angel course management system. There is also interest in Ilios from the medical schools at UC Irvine, UC Davis, and UC San Diego. Outside of the UC community, Loma Linda School of Medicine and the University of Colorado School of Medicine have made formal requests for Ilios. These requests have set into motion discussions on how to provide the code and support to non-UC schools for a nominal fee. All funds generated by distribution of Ilios will go to fund further development.

VIII. Future Direction

There is no end in sight for development and support of Ilios. From the encouragement of the Association of American Medical Colleges to disseminate the application, to the fervent interest in Ilios by other medical schools, and also to the unending challenges of supporting the innovative and evolving UCSF medical curriculum, we see enormous potential for the growth of Ilios. Ilios's third major release in the summer of 2004 will see the implementation of more robust small group management, a response to the intense small group learning methodologies that exist in our curriculum. It will also provide students with personalized calendaring information, further lessening our dependence on WebCT and other commercial courseware tools.

Technology Utilized

I. Summary

Ilios is a Classic ASP application with a SQL Server 2000 database backend. As such, it requires Windows 2000 Server, IIS Server 5.0, and SQL Server 2000 Enterprise. To maximize performance, security, maintainability and scalability, we are running Full Text indexes on the database and all data access is done through stored procedures. The database includes 95 tables, 64 views, and 260 stored procedures and functions.

In addition to the standard functions of a data-driven web application, Ilios users can upload teaching material files, such as Word documents, PDFs, and images. These documents can then be associated with teaching sessions and accessed, by students and registered users, through the web interface. Ilios uses ASPUpload, a third-party active-x control, to handle the document upload functionality.

Ilios also contains many peripheral functions that contribute to the overall success of the application. There are three custom Visual Basic 6 applications that facilitate the integration of data. For example, we use both SQLXML and SAXX to import (MeSH terms from National Institute of Health's National Library of Medicine website) and export XML (course data consistent with the CurrMIT schema from the AAMC). Ilios uses ASP.Net with Crystal.Net to generate reports of teaching hours by department. Finally, Ilios generates SMTP email, such as teaching reminders sent to instructors, via a customized version of a freeware Winsock active-x control and our Exchange 2000 email server.

II. Highlights

Security

Ilios contains both a public and a private web interface. Anyone can browse the Ilios website to view course calendars and search summaries of Ilios's vast catalog of published sessions, learning materials, self-directed learning modules, and publication citations. In order to see the details or to get access to the actual files, a person must log on.

Once logged on, access is controlled at a very granular level. Students may view materials relevant to their courses while faculty, course directors, and curriculum developers can view all published materials, but edit only information associated with their courses.

Database Structure

Ilios is composed of six types of components: Courses, Sessions, Cases, Independent Learning Modules, Learning Materials, and Publications. As all of the components share some common data, such as name, the basic information about all of these components are stored in a single table. However, each component has a separate table for details that are specific to that component. This structure mimics an object model with a group of objects inheriting a base class.

The relationships between components can be complex and there is rarely a clear parent-child relationship. For example, a case might be used in multiple teaching sessions, in multiple courses, and in multiple years. Therefore, each component is saved as an independent object and the relationships are stored in a separate, hierarchical table.

This design reduces complexity of the application, simplifies searches across various types of components, and allows any component to benefit from any new fields added to the base component table. As a result, the database is very flexible and extensible. New types of components can be added easily and automatically take advantage of much of the application's core functionality, such as the ability to attach keywords, objectives, and disciplines.

Data Availability

All components in Ilios are created in draft mode. While in draft mode, the component is only available course developers, course directors, and Ilios administrators. Draft components do not need to meet all data integrity rules to be saved, allowing a user to create, edit, and prepare a component over multiple sessions. Once a component is complete, the user can mark it as "Published". Published components are available to all Ilios users and summaries of published components are available to the public.

Another method users have to control data availability is release dates. Components can have release dates for each course and session to which they are attached. This allows course directors and developers to keep even published components hidden from students until the release date has passed. Since a single component can have multiple release dates, students from one course might have access to a case that students in another course cannot yet see.

Ad-Hoc Querying and Reporting

Although Ilios contains numerous reports, it proved impossible to anticipate and create every report that users may want. Therefore, we built an ad-hoc query interface to the SQL Server database. As the database is designed for maintainability, extensibility, and speed, and not for simplicity, it can be daunting for novice query writers to find the data they may need. While users of the ad-hoc interface may query any table in the database, we built a number of views specifically designed to simplify the database structure, particularly to help traverse the complex hierarchical relationships of the various Ilios components.

Course Rollover

As courses and course schedules, content, and instructors are fairly consistent from year to year, Ilios contains a mechanism to copy a course into the next academic year. This rollover greatly simplifies the process of preparing a course. Instead of recreating the course from scratch, all the users have to do is delete old, unnecessary content and enter any new data.

The rollover copies all user security settings, sessions, and learning materials for the course. The new course is marked as "draft" so that it will not appear to the public until it is ready to be published. Also, the rollover includes an algorithm that preserves the day of the week for sessions. A version-history is maintained for everything that is copied which allows users to track the creation and modification of objects and also allows administrators to rollback a rollover if there are issues.

Data Classification

As we anticipated that Ilios would generate vast amounts of data, we needed a very precise way to classify that data. By incorporating the MeSH terms from the National Library of Medicine, Ilios users have as much precision as possible. Users can attach MeSH terms to any Ilios component and subsequently search for components by MeSH term. As we preserved the hierarchy when we imported the terms from the NLM website, Ilios is able to search for exact terms and also for any terms that appear in the same branch of the MeSH term hierarchy tree.

While MeSH terms have proved very useful and very successful, Ilios contains the functionality to implement a second, separate set of keywords should the need arise.

Data Integration

Ilios data is already compatible and integrated with AAMC's online CurrMIT database, but Ilios is also designed for future integration with other data systems. The database is consistent with both the IMS/Dublin Core Metadata Guidelines and the IMS LOM (Learning Objects Metadata) schema. As the HEAL database is also based on LOM, Ilios data is compatible with the HEAL.

Custom Processors

In two instances, we coded custom processors to send emails and to process XML. The MeSH XML file downloaded from NIH was too big for Microsoft's DOM-based XML; therefore we developed a custom XML processor based on the SAXX XML APIs that could handle large files.

Also, no available tools met the needs for Ilios's emailing requirements; therefore we coded a custom email component, based on a freeware Winsock component, which uses the SQL Server and Exchange Server to send mail. This component has proved very successful and ISU has reused the component in several other applications.

Benchmarking and Customer Satisfaction Data

We believe that Ilios has set the standard for curriculum management in medical education because of the tremendous collaboration that went into developing its functionality and because of our attention in focusing on the challenges that were best addressed by technological solutions. Ilios was specifically designed to provide multiple benefits from single actions. The following list describes several areas of curriculum management, how they were conducted before Ilios, and how Ilios has improved the process.

I. Improved Processes

Curriculum Development

Then: Curriculum developers used text-based documents sent by email for collaboration, review, and approval. Once completed, the files would be compiled by the course directors, printed and redistributed to teaching faculty

Now: Ilios allows for faculty to develop curriculum in a web-based environment without the need for file sharing. Ilios provides space for planning notes and all materials are developed in a "Draft" mode. Once the content is finalized, course directors can approve the content by "Publishing" it. Once published, the content is immediately available to other faculty and students.

Online Course Content

Then: An educational technology developer would spend approximately 30 hours per week converting content from the paper syllabus into online course content, which includes session information, objectives and learning materials. Changes to online courses were confined to Monday through Friday, 8 a.m. to 5 p.m.

Now: Ilios provides the faculty direct control over the content in their online courses so that the educational technology developer no longer needs to manually covert content. This greatly improves the reliability and timeliness of curricular information. Faculty and their support staff can now make changes 24 hours a day, 7 days a week. The 30 hours per week are now devoted to instructional design and multimedia development and not to simple content conversion. Faculty stated in a recent focus group:

> "The changes get made right away and you know they are done, you don't have to go through someone else and then go back to see if it got done."
>
> "Being able to attach PowerPoints and link URLs is wonderful. It is a great way of sharing information with other courses too."

Room Scheduling

Then: UCSF does not have automated room-scheduling procedures in place. Our course administrators still have to complete forms in longhand that specified each teaching session, the session format and number of students attending. This form would then be faxed to room scheduling.

Now: Ilios allows course administrators to print a room scheduling request form, generated directly from the curricular data they have already entered.

Teaching Hours Data

The School of Medicine monitors department contribution to teaching in an integrated multi-disciplinary curriculum for use in mission-based management and faculty reporting of teaching in tenure and promotion.

Then: It would take administrative analyst an average of 13 hours a week to conduct paper-based surveys of all course directors to determine number of hours faculty taught in our curriculum. These data were hand entered into a database and reports for teaching hours were compiled and distributed.

Now: Ilios provides comprehensive reports on teaching hours across educational methods at the department, course, and individual faculty member level. The data is accurate and up-to-date because faculty performance evaluations are directly tied to their entry in Ilios.

Faculty Evaluation Rosters

Then: In order for faculty to be evaluated by students, course directors were required to compile a list of all teaching faculty in a course, organized by how much and what type of teaching they did. Each core course in the School has approximately 135-150 faculty and the compilations of these lists were very time consuming. Substitute faculty often fell through the cracks and were not evaluated.

Now: Ilios's ability to track every instructor in our core curriculum and the type and quantity of teaching enabled us to develop an evaluation roster to replace the previous manual process. Now course directors simply need to approve the roster in Ilios and the list of faculty is electronically uploaded into our evaluation system. Any substitutions of faculty during a course's duration are automatically sent to our evaluation office. Ilios has increased the accuracy of our teaching evaluation process by providing authoritative and timely data on who is teaching when. The incidence of faculty members receiving inappropriate or incorrect evaluations has been greatly reduced.

Learning Materials Management

Then: In order for faculty to post any learning materials on *i*ROCKET, our online course system, they had to forward the material to the Office of Educational Technology who would then post the materials. This service was only available during normal business hours.

Now: Faculty can upload their materials to Ilios and designate if the material is a required or supplemental part of the course. They are also able to write instructions on how to use the

material or provide deadlines for completion. This process can take place anytime, from anywhere, and the material is instantly available to students.

Data Entry into CurrMIT – A national Curriculum Management Information Tool

Then: All US accredited medical schools are encouraged to enter the details about their curriculum into CurrMIT, which is managed by the Association of American Medical Colleges. It took an administrative analyst 8-10 hours to enter data for just one course into CurrMIT.

Now: Courses are transferred to CurrMIT in seconds, with far greater depth and detail than before and just as the faculty entered the data. This is accomplished through an XML data bridge that we built between CurrMIT and Ilios.

Collaboration, Planning & Educational Research

Ilios allows novice and experienced faculty alike to quickly become acquainted with our new curriculum and to collaborate in unforeseen ways, across departmental and even geographic boundaries. Faculty stated in a recent focus group:

> "If you look at Ilios you can get a feeling for what the students have learned so far and what they will be learning."
>
> "It has been helpful in terms of longitudinal planning. You can check where things will be coming up in the curriculum."
>
> "It's helpful that we know what's coming down the road and we can make use of that to make the students feel more secure."

Then: Prior to Ilios, in order to answer questions about quantity and quality of any topic that was taught in our curriculum, the School's curriculum coordinator would have to survey all course directors to find out if the topic was taught and if so, how much time was devoted to and in what format.

Now: Ilios is serving as a tool for educational research by our faculty, students and staff. Discipline task forces, for disciplines such as dermatology, culture, behavior, ethics, health policy, epidemiology, genetics, informatics, and human sexuality have used Ilios to perform systematic reviews of their discipline's role in our curriculum. Other groups have used Ilios to help compare our medical school with others in the teaching of a certain topic or area. Satterfield et al.[5] wrote:

> Each major department is given "ownership" of a block, with all blocks reporting to an Essential Core steering committee that oversees coordination, facilitates collaboration, and drives quality improvement. Coordination among faculty within and between blocks has been promoted with the use of Ilios… All teaching materials are first posted in the Ilios database and then made directly available to students through the electronic curriculum.

[5] Jason M. Satterfield, Linda S. Mitteness, Melanie Tervalon, and Nancy Adler. Integrating the Social and Behavioral Sciences in an Undergraduate Medical Curriculum: The UCSF Essential Core. Acad Med 2004 79: 6-15.

Ilios allows us to share our curriculum like never before. We have granted access to a wide array of users from outside our school, enabling them to see our curriculum at work. Users have included:

- Association of American Medical Colleges
- American Psychiatric Association
- Community physicians
- UCSF Schools of Dentistry, Nursing, and Pharmacy
- UC San Diego, Davis, Irvine, Los Angeles.
- University of Colorado, Stanford, Harvard, Loma Linda

II. Presentations and Conferences

Ilios has been presented at more than a dozen conferences including the 13th International WWW Conference in New York, May 17-20, 2004. It is also presented in *Rx for Learning: From eCurricula to Interactive Case Studies, Technology Serves as an Invaluable Instructional Tool in the Health Sciences* from the March 2003 edition of UCTLTC's (University of California's Teaching, Learning and Technology Center) website, [http://www.uctltc.org/news/2003/03/feature_2.html].

III. Use Statistics

We provide the following statistics from the 2003-2004 academic year as evidence of Ilios's use by our community of educators. Ilios manages:

- 20 courses (141 students per course)
  - 16 core courses
  - 4 elective courses
- 1295 teaching sessions, such as lectures, small-groups and labs
- 61 self-paced learning modules
- 5670 unique learning objectives
- 2750 unique learning materials, including
  - 2085 files
  - 460 journal and book citations
  - 205 web sites (URLs)
- 73 clinical teaching cases used for self-directed and small-group learning

IV. Recognition by Medical School Accrediting Body

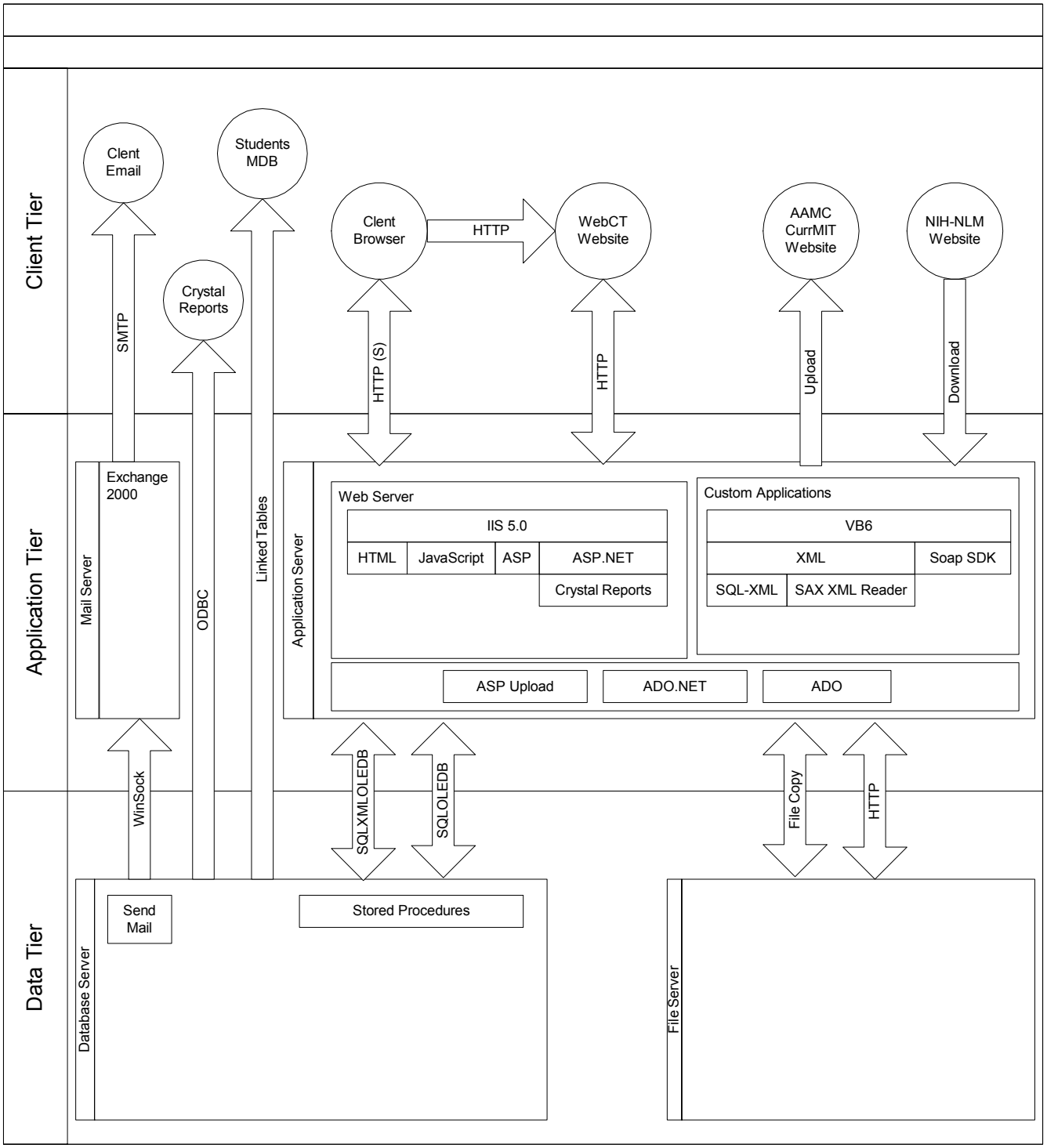
The Liaison Committee on Medical Education (LCME)[6] awarded Ilios a commendation during the school's 2003 accreditation review. The LCME site visit report dated July 2, 2003, stated that:

> …the LCME concurred with the survey team that the following items represent institutional strengths...
>
> Student learning is being effectively broadened through creative use of a wide spectrum of educational technology and information resources, such as Ilios, *i*ROCKET, and the various computer resources available through the school's library.

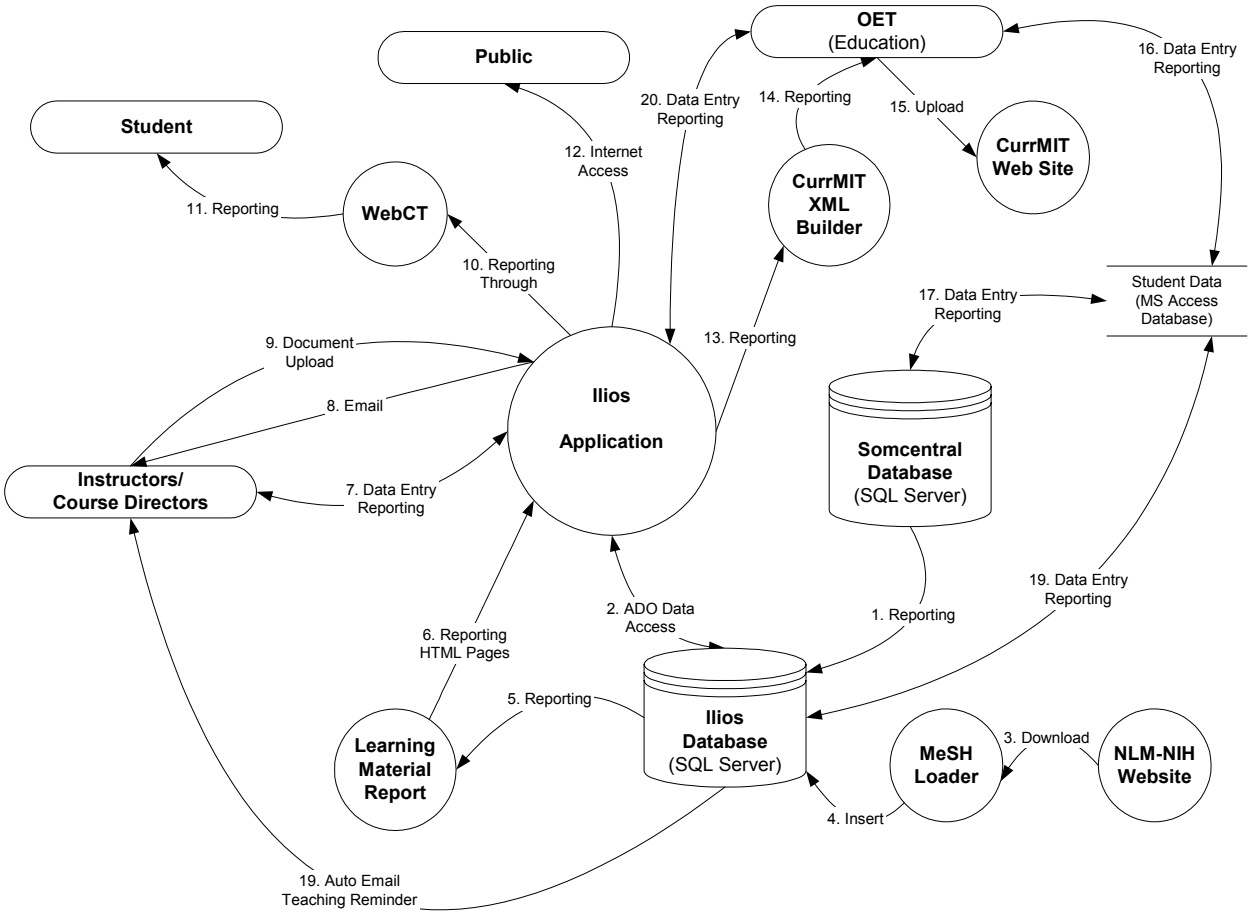
[6] The Liaison Committee on Medical Education (LCME) is the nationally recognized accrediting authority for medical education programs leading to the M.D. degree in U.S. and Canadian medical schools. The LCME is sponsored by the Association of American Medical Colleges and the American Medical Association.

APPENDICES

Appendix 1: Ilios System Architecture



Appendix 2: Ilios Data Flow



Dataflow Definitions

1. SomCentral database to Ilios database reporting
   Meaning: Personnel data stored in SomCentral is used for reporting purposes by the Ilios database
   Data: Personnel data: Name, Position, and Contact data

2. Ilios Database to Ilios Application
   Meaning: Database access for the Ilios website
   Data: Various: All data required for website

3. NLM-NIH Website to MeSH Loader
   Meaning: Mesh terms manually downloaded from the NIH website for processing by the VB app
   Data: MeSH Terms and descriptions

4. MeSH Loader to Ilios Database
   Meaning: MeSH data downloaded from NIH is processed by a custom VB6 app and inserted into the Ilios Database

Data: MeSH Terms and descriptions

5. Ilios Database to Learning Materials Report
   Meaning: A custom VB6 application processes data from the Ilios database and outputs HTML files of Learning Materials
   Data: Learning Materials, Course, Session data

6. Learning Materials Report to Ilios Application
   Meaning: Data processed by the LMReport VB6 application is output as HTML files in the Ilios application's webspace
   Data: Learning Materials, Course, and Session data

7. Ilios Application to Instructors (Data Entry/Reporting)
   Meaning: Instructors/Directors use the Ilios website to view, create, and edit course content
   Data: Various

8. Ilios Application to Instructors (Email)
   Meaning: Ilios Administrators can send email from the website to the users
   Data: Various

9. Instructors/Directors to Ilios Application (Document Upload)
   Meaning: Instructors/Directors can upload documents to Ilios as Learning Materials
   Data: One file at a time

10. Ilios Application to WebCT
    Meaning: WebCT has various links to Ilios content including views of the calendar, courses, sessions, learning materials, and learning material reports
    Data: Various

11. WebCT to Student
    Meaning: Student log on to the WebCT website and follow links to Ilios content.
    Data: Various

12. Ilios Application to Public
    Meaning: Ilios is a public website and anyone can use it to view basic data about the UCSF curriculum
    Data: Various

13. Ilios Database to CurrMIT XML Builder
    Meaning: A custom VB6 app processes Ilios course and session data and outputs XML files.
    Data: Course, session, curriculum, scheduling

14. CurrMIT XML Builder to OET
    Meaning: The XML files generated by the VB6 app are transferred to OET
    Data: Course, Session, curriculum, scheduling

15. OET to CurrMIT Website
    Meaning: OET logs onto the AAMC's website and uploads data generated by the Builder
    Data: Course, session, curriculum, scheduling

16. OET to Students.MDB
    Meaning: OET uses the Students database to track student data not available in Ilios.
    Data: Student data, contact, enrollment

17. Students.mdb to SomCentral database
    Meaning: The Students Access database uses attached tables from SomCentral
    Data: Various

18. Students.mdb to Ilios database
    Meaning: The Students Access database uses attached tables from Ilios for ad-hoc reporting and data entry
    Data: Various

19. Ilios Database to Instructors
    Meaning: Automatic emails sent by the database to instructors reminding them when and where they teach
    Data: Location, date time, session title

20. OET to Ilios Application
    Meaning: OET uses the Ilios web interface to create and edit curricular content, run reports, and perform administrative tasks
    Data: Various: all Ilios details are available to OET staff

Appendix 3: Sample Help Documentation

Ilios Help: Adding Learning Materials

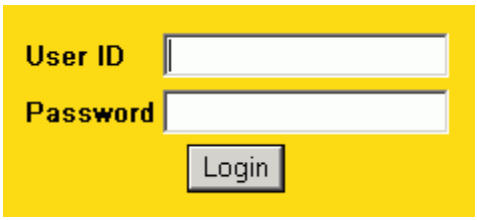
Table of Contents

Log On
Learning Material Type
Add Learning Materials Wizard
    Step 1: Details
    Step 2: Owners
    Step 3: MeSH Terms
    Step 4: Attach to Session
Learning Material Summary

Log On

- In your Web browser, go to the Ilios home page, then click the Log On button.

- Enter your user ID and password, then click the Login button.



Top

Learning Material Type

- Once you are logged in to Ilios, click on Learning Materials in the lefthand menu.

- On the **Learning Materials** page, under **Add a Learning Material**, select the type of learning material you would like to upload from the *Type* menu. The choices include the following:

Individual Files

- HTML File (a single HTML page)
- Word Processing Document (a Microsoft Word document)
- Portable Document (pdf) (a PDF document, typically created with Adobe Acrobat)
- PowerPoint Presentation (a Microsoft PowerPoint document)
- Image (an image in GIF or JPG format)
- Video (File) (a video file)
- Text File (a plain text file)
- Spreadsheet (a Microsoft Excel spreadsheet)
- Audio (an audio file)
- Animation (an animated image)

URLs

- Web site (URL) (a link to an external Web site)
- Video (URL) (a link to an external video file)

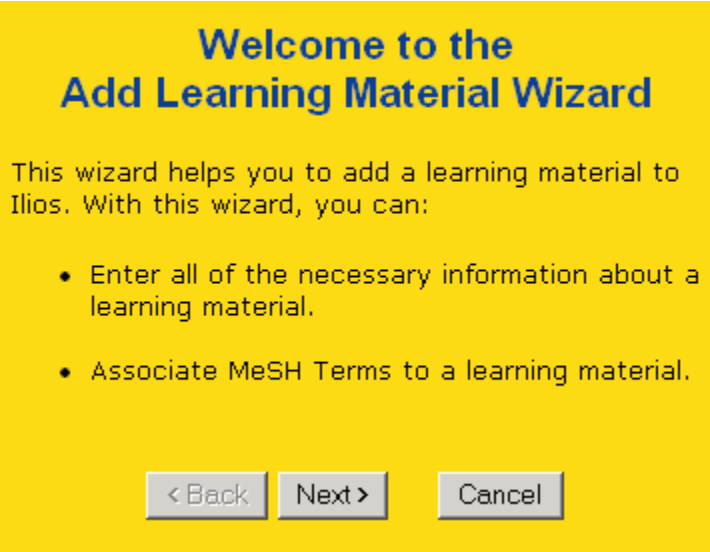
Book Citation (a citation entry for a book)

Periodical Article Citation (a citation entry for a journal article)

Top

Add Learning Material Wizard

You will then enter the **Add Learning Material Wizard**, which will guide you through the process of specifying the details, contributors, and MeSH terms associated with your learning material. Click the Next button.



(Note that after a learning material has been added, it can be attached to ILMs and Cases through the Add ILM Wizard and the Add Case Wizard, respectively.)

Top

Step 1: Details

Next, you complete the **Details** page, the contents of which will vary according to the type of learning material you are uploading.

If you select the learning material type...	Then you can enter... (* = required)
• HTML File • Word Processing Document • Portable Document (pdf) • PowerPoint Presentation • Image • Video (File) • Text File • Spreadsheet • Audio • Animation ([Individual file Details page])	• * Title • * File • File Extensions • Master File • * Description • Notes • Organs • Magnification • Orient. • Disease Process • Disease Diagnosis • MRI Type

	• Radiograph Type • Duration: Minutes, Seconds
• Web site (URL) • Video (URL) (URL Details page)	• * Title • * URL • * Description • Notes
• Periodical Article Citation (Periodical Article Citation Details page)	• * Article Title • * Description • * Journal Title • * Journal Date • Volume # • Issue # • Pages • Web Address • Notes
• Book Citation (Book Citation Details page)	• * Title • * Edition • * Year Published • * Description • Web Address • ISBN • Notes

If modifications need to be made to the file or URL of a learning material, they can be implemented on the Details page. (Note that users can make changes only to learning materials they have added and not others' added materials.)

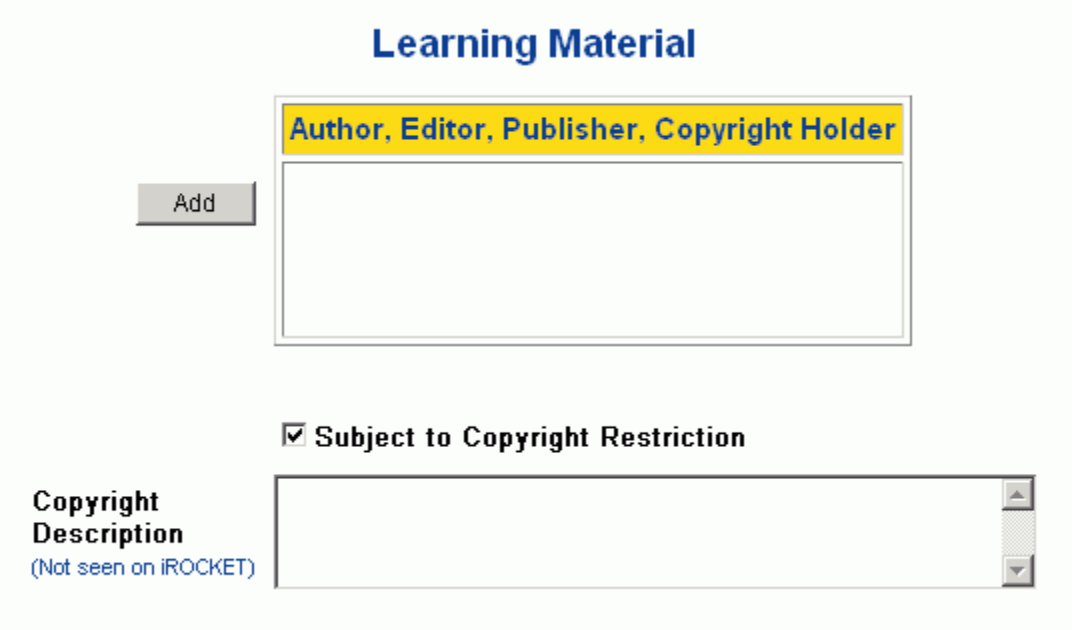
- A modified file can be uploaded in place of the old file by clicking on the Browse button next to the *File* field to locate and select the new file on your computer. Note that Ilios captures and displays the date on which an existing file was uploaded.

- A URL can simply be modified in the *URL* field.

Top

Step 2: Owners

After you complete the **Details** page associated with your learning material, you will need to enter contributor information on the **Owners** page.



- Click on the Add button; the Contributors Search page will open in a popup window. Enter search information in the *Last Name*, *First Name*, and/or *Organization* fields; select Starts With, Contains, or Exact Match; then click the Search button.

- On the **Search Results** page, check the box next to the contributor you want to select.

If there are no search results, or if your contributor is not listed in the search results, click the Add Contributor button. Complete as many fields as possible (at least the *First Name* and *Last Name* fields), select the person's role for this particular learning material, then click the Save button.

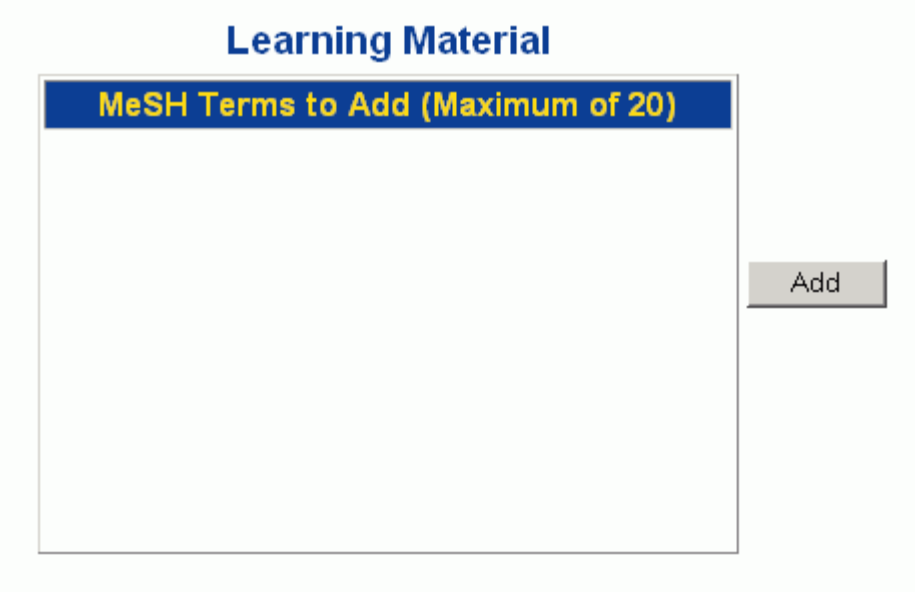
- On the **Contributor Roles** page, select one or more roles for the contributor (Author, Copyright Holder, Editor, or Publisher) in the *Roles* menu. (Hold down the Ctrl key on the PC or the Command key on the Mac to select more than one option.) The *First Name*, *M.I.*, *Last Name*, *Degree*, *Organization*, and *E-mail* fields should already be populated with at least minimal information. Click the Save button.

- The contributor you selected will then be listed on the **Owners** page. You can specify additional contributors (a minimum of one contributor must be specified) using the Add button and remove existing contributors using the Delete button. You can also optionally uncheck the box next to *Subject to Copyright Restriction* (checked by default) and fill in the the *Copyright Description* field. When you have finished filling in information on the **Owners** page, click the Next button at the bottom of the lefthand menu.

Top

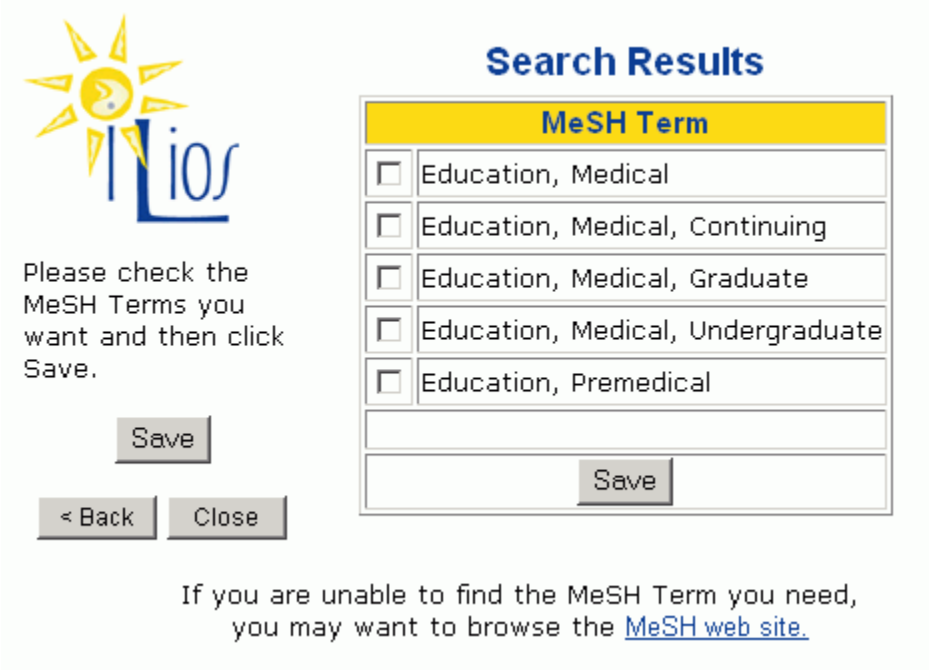
Step 3: MeSH Terms

You will then reach the **MeSH Terms** page, where you will need to associate at least one MeSH (Medical Subject Heading) term with your learning material.

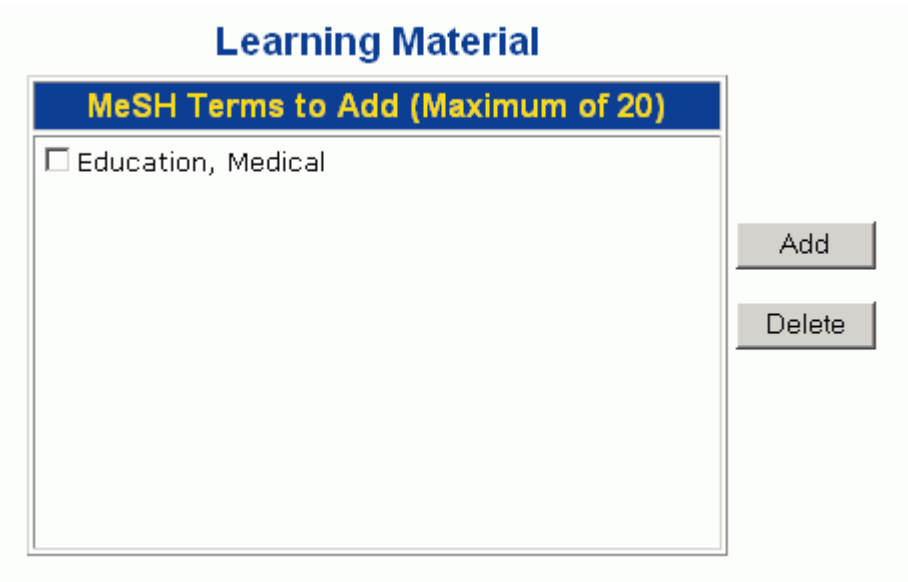


- Click on the Add button; the MeSH Terms Search page will open in a popup window. Enter search information in the text field; select All MeSH Terms (default) or MeSH Headings Only; then select Contains (default), Starts With, or Exact Term. Finally, click the Search button.

- On the **Search Results** page, check the boxes next to the terms you want to select, then click the Save button.



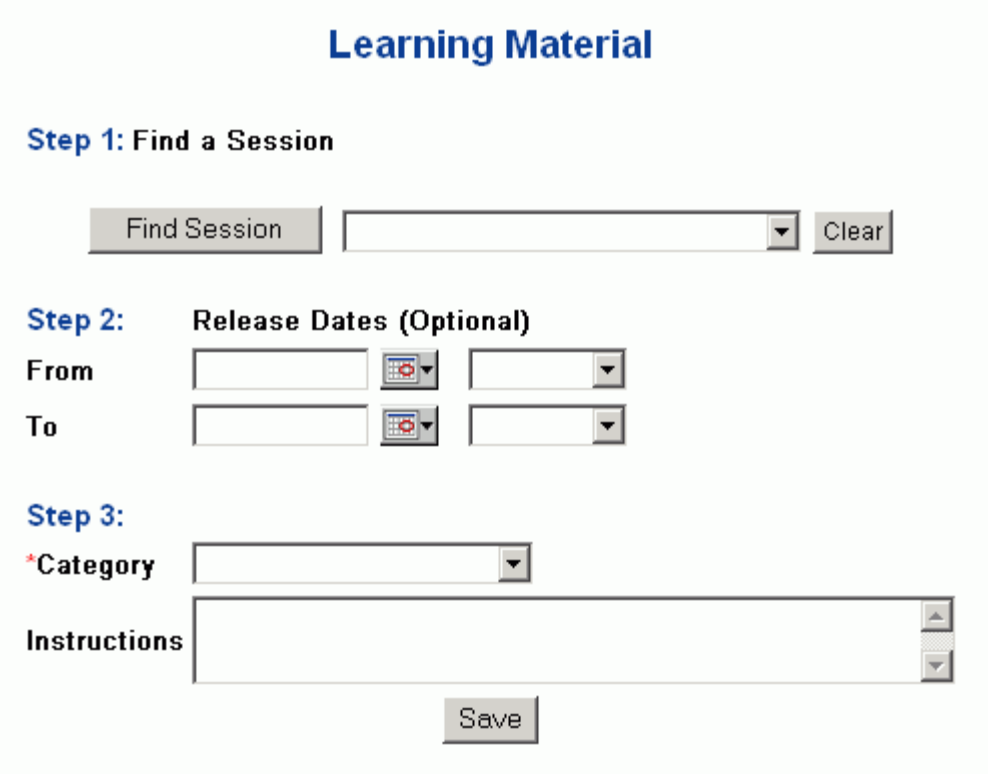
- The MeSH terms you selected will then be listed on the **MeSH Terms** page. You can specify additional terms (a minimum of one MeSH term must be specified) using the Add button and remove existing terms using the Delete button. When you have finished filling in information on the **MeSH Terms** page, click the Next button at the bottom of the lefthand menu.



Top

Step 4: Attach to Session

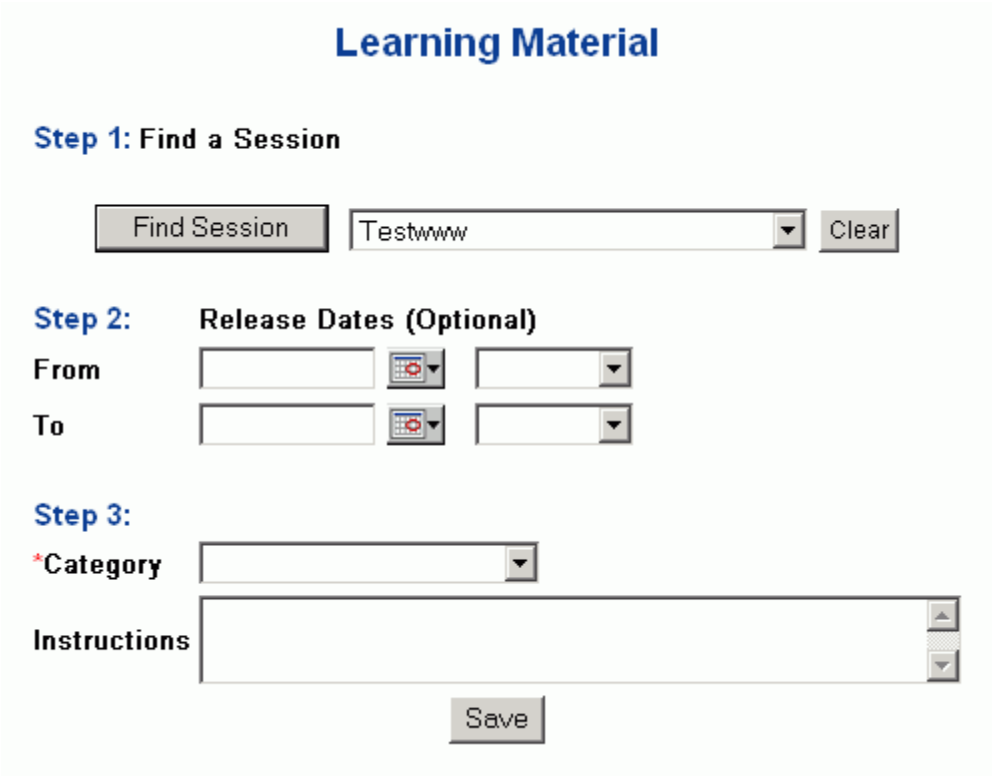
On the **Attach to Session** page, you can attach your learning material to a particular course session in Ilios and provide session-specific information for the material. (Note that a learning material can be attached to a particular session only once and that users can attach learning materials only to sessions in non-locked/-archived courses to which they have at least developer access.)



- Under **Step 1, Find a Session**, click on the Find Session button; the **Session Search** page will open in a popup window. You can search by entering session search information in the *Title* field and selecting the appropriate *Academic Year* (the current academic year is the default), then the appropriate *Course*, from the pulldown menus. (If you choose to search by course only, you will get a list of all of the sessions in the course, sorted chronologically.) Click the Search button.

- On the **Search Results** page, check the box next to the session you want to select.

The session you selected will then be listed on the **Attach to Session** page.



- Under **Step 2, Release Dates**, you can optionally specify beginning and ending dates and times for the period during which your learning material will be available via its attached session. (When the learning material is not available, it is as if it is unpublished -- it won't show up the student session pages.) To the right of From and To, click on the small calendar icons; the **Calendar** page will open in a popup window.

Use the <Y, Y>, <M, and M> buttons to move back and forth between years and months, and click on a date to select it. Back on the **Attach to Session** page, use the pulldown menus to select times.

- Under **Step 3**, select the **Category** for the learning material in the session from the pulldown menu; the choices are the following:

    - Session Material (a learning material that was used during a particular session [e.g., a PowerPoint presentation used as part of a lecture])
    - Required Material (a learning material that is required reading/viewing for a particular session)
    - Recommended Material (a learning material that is optional, or recommended, viewing for a particular session)

    Note: Your selection of a category is very important in relation to how your learning materials will appear to students in their online course.

If you select...	Then...
Session Material	Your learning material will appear on the session summary page located through the calendar view. It will be listed under the header **Session Material**.
Required Material	Your learning material will appear on the session summary page located through the calendar view. It will be listed under the header **Required Material**. In addition, your learning material will appear on the **Assignments and Readings** page in online courses and will be noted as a Required Assignment.
Recommended Material	Your learning material will appear on the session summary page located through the calendar view. It will be listed under the header **Recommended Material**.

- Finally, click the Save button. The session you attached will be listed at the bottom of the page, under **Associated Sessions**; you can attach more sessions, if you like. When you have finished attaching sessions, click the Finish button at the bottom of the lefthand menu.

Top

Learning Material Summary

The **Learning Material Summary** page displays all of the learning material information on a single page. You can easily go back and change the information in the **Details**, **Owners**, **MeSH Terms**, and **Attached to Sessions** sections by clicking their Edit buttons. (Note that users can make changes only to learning materials they have added and not others' added materials.)

Learning Material Summary

Delete | Printer Friendly Version

This learning material has been published. Click Unpublish to change the status of this learning material back to Draft. Unpublish **or click Reviewed to change the status of this learning material to Reviewed.** Reviewed

Details		Edit
ID	8161	
Title	Ilios Word Processing Document	
Type	WordProcessingDoc	
File Name	test.doc	
Description	Test Word Processing Document for Ilios	
Notes		
File Height		
File Width		
Magnification		
Orientation		
Disease Process		
Disease Diagnosis		
MRI Type		
Radiograph Type		
Duration (sec)		
Last Modified Date	5/29/2003	
Last Modified By	Visitor, iROCKET	

Owners		Edit
Marchand, Tara marchand@medsch.ucsf.edu	Author	
Copyright Restriction	Yes	
Copyright Description		

MeSH Terms	Edit
Documentation	

Attached To			Edit
Type	Title	Course	Acad Yr
Session	Testwww	Test	2006-2007

- When you are ready to make the learning material available, click the Publish button. (Unpublished materials are hidden from students on session pages as well as from public searching.)

- Once a learning material has been published, you can click the Unpublish button to return it to draft status, or you can click the Reviewed button to mark it as reviewed. (It is still possible to make changes to a learning material once it has been published.)

- To see how a learning material appears to students in the context of a session, click on the title of the attached session. Then, from the **Session Summary** page, click on Student View (the first item in the menu at the top of the page). The material should be listed near the bottom of the page.

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