

COLLABORATIVE WEB-BASED WORKSPACES FOR AN ACADEMIC DEPARTMENT

Jacek M. Zurada^{*1}, Piotr A. Habas², Mehmet K. Muezzinoglu³

¹ Department of Electrical and Computer Engineering
University of Louisville, Louisville

² Biomedical Image Computing Group
University of California, San Francisco

³ Institute for Nonlinear Science
University of California, San Diego

Abstract

Continuous program improvement and expectations of productivity of academic departments necessitate the use of web-based information sharing. This paper outlines how simple-to-use web-based environments such as documents repositories and collaborative ABET workspaces can improve the workflow of an academic department. They can boost the departmental productivity and faculty involvement in many aspects of teaching and accreditation efforts, and assist with faculty, staff and students interaction. Such environments reduce email communications and can vary by their degree of interactivity. Document repositories can be read-only, while interactive workspaces will typically extend read-write privileges to all participants. Furthermore, collaborative workspaces offer a democratic and open environment that encourages faculty and staff interaction. Finally, such workspaces remain easily scalable for projects of any size, and offer simplicity of navigation and easy-to-organize table of contents. The discussion of web-based tools has been illustrated with several examples of departmental repositories and interactive workspaces. Implementation guidelines are also offered for those interested in custom design of such tools.

Key words: document repositories, collaborative workspaces, open source database MySQL, web-based information sharing, accreditation of engineering programs

* Corresponding author. Address: Lutz Hall 406, University of Louisville, Louisville, KY, 40292. Phone: +1-502-852-6314. Fax: +1-502-852-3940. Email: jacek.zurada@louisville.edu

1 Introduction

With increasing expectations of universities in many aspects, efficiency and productivity of academic departments has recently become of paramount importance. Faculty and staff need easy and immediate access to policies, procedures, and governance documents at several levels of university administration and of departmental instruction. Furthermore, compliance with accreditation criteria for academic programs and resulting reporting requirements often call for significant, interactive input and feedback from all parties involved. Such expectations can be met easier in collaborative and interactive environments that take advantage of the state-of-the-art information technology.

On one side, proliferation of bureaucracy in academia has created new pressures on faculty and administrators. On the other, however, many faculty and administrative tasks can be easily accomplished by the use of intuitive, easy-to-learn productivity tools such as documents repositories and collaborative virtual workspaces. It has been our experience that availability of such tools encourages active participation and involvement of faculty and staff. Furthermore, it induces numerous improvements, especially in facilitating the teamwork.

The purpose of this paper is to outline how a simple web-based interactive workspace can boost the departmental productivity and involvement at all aspects of teaching and accreditation efforts, and assist with faculty and staff interaction. Such environment practically eliminates email communications that are notoriously hard to save and sort, especially when many versions of documents need to be circulated and shared by various teams and committees.

In addition, many university documents are difficult to label, sort and archive due to their multi-thread content. For example, a single document can be attributed to an academic program, but also to mentoring, to new coursework development, and to accreditation requirement. Such a multi-thread document typically will be saved in a single folder named after its major component. Search and retrieval of such multi-thread documents when a minor component needs to be retrieved will thus meet with difficulties. Proposed repositories can efficiently alleviate this inherent ambiguity of the content.

Web-based reporting tools have been developed and demonstrated in the education literature as effective aids to fulfill other components of the ABET accreditation process. An interactive environment for the surveying component, which awaits contribution from a broad community related to the department, is proposed in [1]. A comprehensive, non-interactive repository compiled for an ABET review is presented in [2].

2 Motivation for Web-based Repositories and Interactive Workspaces

Academia is widely recognized by the public for its research and teaching contributions, and especially for research publications that enrich the stock of human knowledge. This published output has been well streamlined and organized into a myriad of textbooks, conference proceedings, journals and, recently, also electronic journals. On the inside, however, academia produces an inordinate amount of paperwork of less organized and less permanent nature. These are policies, procedures, governance documents, guidelines, reports, committee recommendations and alike. Such documents originate at various levels of university structure: university, school or college, department, program, project team, or laboratory. Groups that participate in creating such documents are usually variable and temporary, and so are users' groups that utilize the information. Due to the distributed network of contributors, considerable amount of such information is circulated by email. The email medium, however, is notoriously inconvenient for interactive work in which reports take many versions and are edited by various co-authors. Also, email is even less convenient for file sharing.

3 Read-only Repositories

A number of documents that need to be dealt with in academia are of archival and read-only nature. Such documents could be posted on a department or unit directory. Convenient format of choice for shared documents is a non-editable, non-proprietary one such as PDF. The key feature of each repository posting is the intuitive yet structured grouping into subdirectories, and, in addition, chronological ordering of documents.

An example departmental repository shown in Fig. 1 has been organized into the following ordered sections: 00 – Department Directory, 01 – College Policies, 02 – College Scorecards, 04 – Departmental Policies, 05 – Departmental Program Policies, 11 – ABET-related Forms, 12 – ABET Samples of Reports, 14 – ABET Internal Guidelines and Explanations, 20* – ABET Self-Study Reports, 21* – ABET Yearly Reports, 25* – Non-ABET Accreditation Reports, 90 – Publication List Posting Formats, 92 – Departmental Committees, 95 – Departmental Meeting Minutes, and 98* – Departmental Board of Advisors Meetings Material (password-protected sections have been asterisked).

The subsections within each section are either arranged chronologically (such as minutes) or in topical groups. The repository is of maximal utility only when filenames are identical with descriptive titles of documents posted, and when dated. Such transparent, intuitive organization facilitates easy

access to the content by the user who, at any given time, is first only trying to find a document of interest without opening individual files. Furthermore, such organization eliminates the need for keyword searches that often return tedious results due to the ambiguity inherent in document indexing process.

The screenshot displays the 'ECE REPOSITORY' page for the University of Louisville's Electrical & Computer Engineering department. The page features a red header with the university's name and logo on the left, and the department name on the right. Below the header, the title 'ECE REPOSITORY' is centered. A list of categories and documents follows, including 'ECE Discussion Board', 'Syllabi and CARs posting', 'ABET Current Self-Study Workspace', and various policy documents under categories like '00-ECE-Directory', '01-SSoE-policies', '02-SSoE-scorecards', '04-ECE-policies', '05-ECE-programs-policies', '11-ABET-forms', '12-ABET-sample-archives', '13-ABET-final-samples', '14-ABET-explanations', '20-ABET-self-study-reports', '21-ABET-yearly-reports-ECE-only', '25-WKU+MSU-secure-repository', and '90-ECE-website-guidelines'. Each category lists specific document titles and file formats.

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ECE REPOSITORY

- **ECE Discussion Board**
- **Syllabi and CARs posting**
- **ABET Current Self-Study Workspace**

00-ECE-Directory

01-SSoE-policies

- 01-SSoE-Personnel-Policies-Procedures-Approved-Apr-22-2002.pdf
- 02-SSoE-Faculty-Appointments-Explanations-Approved-Mar2003.pdf
- 03-SSoE-Request-for-Permission-to-Consult-Approved-Apr-2002.pdf
- 04-SSoE-Procedures-for-payment-of-one-month-salary-for-B11s.pdf
- 05-SSoE-Faculty-Salary-Supplement-Approved-May-2003.pdf
- 06-Res-Sal-Charges-Info-Dec-2005.pdf
- 07-SSoE-Space-Assignment-Policy-April-2005.pdf

02-SSoE-scorecards

- 01-Scorecard-SSoE.pdf
- 02-Scorecard-SSoE-Definitions-2004-05-10.pdf

04-ECE-policies

- 01-ECE-BYLAWS-3-21-02.pdf
- 02-ECE-Policy-on-Teaching-Release.pdf
- 03-ECE-Policy-on-Faculty-Salary-Supplement-Aug-2003.pdf
- 04-ECE-Policy-on-Matching.pdf
- 05-ECE-Policy-on-Adjunct-Pay.pdf
- 06-ECE-Guidelines-on-Procurement-Cards-and-Reimbursements.pdf
- 07-ECE-Policy-on-Conference-Registration-Reimbursement.pdf
- 08-ECE-Policy-on-Student-Mentoring.pdf
- 09-ECE-Travel-and-Absence-Form.pdf
- 10-ECE-Faculty-Activity-Report-2004.doc
- 11-ECE-Policy-on-Travel-Reimbursement.pdf

05-ECE-programs-policies

- 01-2004-09-07-MEng-Paper-Policy.pdf
- 02-2004-09-07-Ind-Proj-Study-Policy.pdf
- 03-2004-10-05-SACS-Procedures.pdf
- 04-2004-11-09-Targets-POs.pdf
- 05-2005-01-13-Thesis-Dissert-Committees.pdf
- 06-2005-05-05-Changes-in-MSEE.pdf
- 07-2005-12-06-MSEE-Policies.doc
- 08-2006-02-09-MEng-MSEE-Advising-Policy.pdf

11-ABET-forms

01-CAR-form-archive

- 02-Student-Self-Assessment-Form.doc
- 03-Course-Assessment-Form-beginning-Fall-2005.doc

12-ABET-sample-archives

13-ABET-final-samples

- 00-read-me-first.pdf
- 01-SampleCourseAssessRpt-ECE420-SP04.pdf
- 02-Sample-Student-CLO-Assessment-ECE420-SP04.pdf
- 03-Student-Self-Assessment-ECE420-SP04.pdf

14-ABET-explanations

- 01-Student-Work-Criteria.doc
- 02-Guidelines-for-Program-Outcomes-Selection-SP2004.doc
- 03-Mapping-of-Outcomes-to-Req-Courses-SP2006.xls
- 04-Student-Work-Criteria-in-use-beginning-Summer-2005.doc

20-ABET-self-study-reports (Password Protected)

- ABET Current Self-Study Workspace
- ABET 2006 Self-Study Report
- ABET 2006 Self-Study Workspace (read only)
- ABET 2000 Self-Study Workspace (read only)

21-ABET-yearly-reports-ECE-only (Password Protected)

- 01-2004-July-12-ECE-ABET-Report.pdf
- 02-2005-July-13-ECE-ABET-Report.pdf
- 03-2005-July-13-ECE-ABET-Subcommittees-Report.pdf

25-WKU+MSU-secure-repository (Password Protected)

90-ECE-website-guidelines

- 01-Reference-Formats-IEEE.pdf

Figure 1. Read-only Repository of the ECE Department at University of Louisville

A notable feature of such repositories is that they benefit from having a single owner who has both design as well as posting privileges. It could be typically an administrator of the unit, such as department chair. As noted, large sections of repositories are open-access, with limited parts of them restricted to the contributors and direct users of the content (faculty and staff). Although this discussion has been illustrated with a specific example of a departmental document repository, the design and structure of each repository will be highly customized and will depend on the users' needs.

4 Collaborative Course Assessment Repositories

In contrast with static document repositories described in the previous section, collaborative repositories provide an interactive environment in which contributors and users can work on and share files without sending, sorting, or searching through emails, and even without locating files on their own workstations. Especially program accreditation needs benefit from such repositories that facilitate interactive workspaces for file sharing. Such collaborative repositories aimed at ensuring collective and continuous participation and involvement of all interested parties, both contributors and users, but also clients (students) and evaluators (such as accreditation reviewers).

Under ABET Criterion 3, each accredited program must have a process that produces program outcomes and its educational objectives, and an associated assessment process [3]. The assessment process is supposed to measure the degree to which the objectives are achieved. Furthermore, interim results of such assessment process need to be reiterated to the further improvement or development of the program. The process of assessment is repeated yearly, with major assessment every six years.

The above requirements can be well met via a collaborative repository called ABET Course Assessment Workspace. The workspace contains a list of links to Syllabi and Course Learning Outcomes (S&CLO) files for all courses, arranged by semester. This part of the workspace is also open to the students. The second part of the workspace is open only to faculty and staff, and it contains links to Course Assessment Report (CAR) files. When a semester begins, S&CLOs are posted by instructors. A transient state of the workspace typically appears as shown for Fall 2006 in Fig. 2. After the semester ends, instructors complete their course assessments and upload completed CARs for their courses. The section of Fig. 2 for Summer 2006 shows the state of the site – a complete list of offerings with all CARs uploaded. This automated ABET Course Assessment Workspace not only helps the accreditation process by saving time and streamlining communication, but also serves as up-to-date bulletin board for consultation, including situations when

a course structure changes from instructor to instructor and/or the CLOs need to be reviewed or redefined.

The main benefit of this workspace is that its postings are shared by groups, they are always up-to-date, and show properly-formatted and current input by instructors. The longevity of this workspace is one academic term, after which it becomes a reference (read-only) repository for continuous program improvement. Since S&CLO and CAR files are usually built on standard template files that sometime undergo modifications, the Read-Only Repository (see Section 3) should also highlight template files for downloading.

The screenshot shows a web page titled "ABET WORKSPACE: SYLLABI AND CARs" for the University of Louisville's Electrical & Computer Engineering department. The page includes a header with the university logo and the text "dare to be great". Below the header, there is a section for "ECE Discussion Board" with a link to review current postings by semester (Fall 2006, Summer 2006, Spring 2006, Fall 2005, Summer 2005, Spring 2005). A link to upload a new file is also present. The main content is organized by semester:

- Fall 2006**
 - ECE 210/211: Logic Design - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 220/221: Network Analysis I - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 252-01: Introduction to Electrical Engineering (Naber) - [Course Syllabus & CLOs](#)
 - ECE 252-02: Introduction to Electrical Engineering (Cox) - [Course Syllabus & CLOs](#)
 - ECE 320: Network Analysis II - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 322: Introduction to Computing Tools - [Course Syllabus & CLOs](#)
 - ECE 333/334: Electronics I - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 412: Computer Interfacing - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 420: Signals and Linear Systems - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 421/422: Active Network Design I - [Course Syllabus & CLOs](#)
 - ECE 473: Introduction to Electromagnetic Fields and Waves - [Course Syllabus & CLOs](#)
 - ECE 496: Professional Issues and Current Topics Seminar - [Course Syllabus & CLOs](#)
 - ECE 500-01: LabView for Electrical Engineers - [Course Syllabus & CLOs](#)
 - ECE 510/511: Computer Design - [Course Syllabus & CLOs](#)
 - ECE 514/515: Introduction to VLSI Systems - [Course Syllabus & CLOs](#)
 - ECE 516: Microcomputer Design - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 542: Physical Electronics - [Course Syllabus & CLOs](#)
 - ECE 543/544: Fundamentals of Microfabrication and MEMS - [Course Syllabus & CLOs](#)
 - ECE 569: Intermediate Electromagnetic Fields and Waves - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 582: Power System Analysis - [Course Syllabus & CLOs](#)
 - ECE 599: Capstone Design in ECE - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 618/635: Digital Image Processing - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 642: Fiber Optics and Integrated Optics Systems - [Course Syllabus & CLOs](#)
 - ECE 653: Digital Communications - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 662: Introduction to Optimum Control - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
- Summer 2006**
 - ECE 210/211: Logic Design - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 252: Introduction to Electrical Engineering - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 320: Network Analysis II - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 333/334: Electronics I - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 400: Introduction to Computing Tools - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 496: Professional Issues and Current Topics Seminar - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 540/541: Lasers and Electrooptical Systems - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 560/561: Control Systems Principles - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 620/655: Pattern Recognition and Machine Intelligence - [Course Syllabus & CLOs](#)
 - ECE 665: Theory of Nonlinear Systems - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
- Spring 2006**
 - ECE 210/211: Logic Design - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 220/221: Network Analysis I - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 252-02: Introduction to Electrical Engineering (Naber) - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 412: Computer Interfacing - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 420: Signals and Linear Systems - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 421/422: Active Network Design I - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 473: Introduction to Electromagnetic Fields and Waves - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 496: Professional Issues and Current Topics Seminar - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 500-01: Fundamentals of Autonomous Robots - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 510/511: Computer Design - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 516: Microcomputer Design - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 520/521: Digital Signal Processing - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 530/534: Integrated Circuit Design - [Course Syllabus & CLOs](#) - [Course Assessment Report](#)
 - ECE 535/536: Instrumentation Electronics - [Course Syllabus & CLOs](#)

Figure 2. Course Assessment Workspace of the ECE Department at University of Louisville. Faculty view, Course Assessment Report (CAR) files available for Summer 2006

The most essential features of each interactive, collaborative repository are its simplicity and functionality. Obviously, once a file has been uploaded, it can be downloaded, printed out, and shared. The workspace repository reported here has been extremely easy to navigate, with clearly labeled pull-down menus and simple instruction how to upload files by contributors themselves, and it has no administrative overhead that often tends to plague many virtual community websites.

5 Collaborative ABET Self-Study Repositories

An ABET Self-Study Report is a major collaborative task that requires involvement of all program faculty. The Report requires individual contributions as well as committee reports. For an average engineering program to be accredited, a collection of some 200-300 documents needs to be contributed by some 10-30 authors. In addition, contributors are themselves also committee members that assess various program outcomes and need an access to many parts of the Report that consists of individual documents.

The environment that meets such requirements for a typical electrical engineering program is shown in Fig. 3. It contains several pull-down menus to upload files as course descriptions; special topics course descriptions; descriptions of projects, studies, theses, and papers; laboratory descriptions; and faculty vitae. Figure 3 shows the state of the self assessment process in early January 2006.

Figure 3 shows each section A1 through C as partially completed with respective files present. Uploads are made by individual contributors using easy-to-use pull-down menus. The menus need to be customized in advance for each section. Similarly as for course assessment files, each section A1 through C should feature desired current templates for each document. For uniformity and later re-use, all files on the Self-Study Repository are formatted in DOC, but other editable formats can be equally useful. It is worth noting that concatenating the individual files from this repository to compile a Table of Contents for the final Report volume is straightforward.

6 Departmental Discussion Board

An easy and convenient way to allow, if not encourage, interaction of faculty and staff outside of the meetings can be a Discussion Board. Unlike in commonly used chat rooms, the Discussion Board does not require real-time participation, but it is almost equally interactive. Furthermore, Discussion Board contributions are not interspersed and not interfered with by spam as is regular email exchange.

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CURRENT ABET SELF-STUDY WORKSPACE

This workspace opens on August 1, 2006 and can be updated by:
 (1) modifications through replacement of existing files, or
 (2) uploads of new files using placeholders from the pull-down menus.

A1. Regular Course Descriptions (template)

che253.doc	ece210.doc	ece211.doc	ece220.doc
ece221.doc	ece252.doc	ece260.doc	ece288.doc
ece289.doc	ece320.doc	ece322.doc	ece333.doc
ece334.doc	ece389.doc	ece395.doc	ece412.doc
ece420.doc	ece421.doc	ece422.doc	ece473.doc
ece489.doc	ece493.doc	ece496.doc	ece505.doc
ece510.doc	ece511.doc	ece512.doc	ece513.doc
ece514.doc	ece515.doc	ece516.doc	ece520.doc
ece521.doc	ece530.doc	ece531.doc	ece533.doc
ece534.doc	ece535.doc	ece536.doc	ece540.doc
ece541.doc	ece542.doc	ece543.doc	ece544.doc
ece545.doc	ece550.doc	ece551.doc	ece560.doc
ece561.doc	ece562.doc	ece564.doc	ece565.doc
ece569.doc	ece570.doc	ece571.doc	ece572.doc
ece581.doc	ece582.doc	ece593.doc	ece599.doc
ece605.doc	ece611.doc	ece614.doc	ece616.doc
ece618.doc	ece619.doc	ece620.doc	ece621.doc
ece622.doc	ece623.doc	ece630.doc	ece631.doc
ece635.doc	ece640.doc	ece641.doc	ece642.doc
ece643.doc	ece645.doc	ece646.doc	ece647.doc
ece650.doc	ece651.doc	ece652.doc	ece653.doc
ece655.doc	ece661.doc	ece662.doc	ece664.doc
ece665.doc	ece667.doc	ece670.doc	ece682.doc
ece693.doc	ece695.doc	ece697.doc	ece698.doc
ece699.doc	ie360.doc	ie579.doc	

Upload a new/updated file for

A2. Special Topics Course Descriptions (template)

ece500-02-sp-02.doc	ece500-02-sp-05.doc	ece500-01-fa-05.doc	ece500-75-fa-05.doc
ece500-77-fa-05.doc	ece500-79-fa-05.doc	ece500-01-sp-06.doc	ece500-02-sp-06.doc
ece600-01-sp-02.doc	ece600-02-sp-02.doc	ece600-01-fa-03.doc	ece600-01-sp-04.doc
ece600-02-su-05.doc	ece600-01-sp-06.doc	ece600-02-sp-06.doc	

Upload a new/updated file for

A3. Projects, Studies, Theses, Papers (template)

ece690-cohn-nabha-fa-05.doc	ece690-cohn-olajeye-su-05.doc	ece693-inanc-rodas-sp-06.doc	ece693-cohn-nharas-fa-05.doc
ece693-naber-nellore-fa-05.doc	ece693-inanc-nasirzadeh-su-05.doc	ece698-naber-turner-su-05.doc	ece699-mcnamara-zegarra-sp-06.doc
ece699-naber-thaman-fa-05.doc	ece699-cohn-iones-sp-05.doc	ece699-cox-elbasvuni-sp-05.doc	

Upload a new/updated file for

Semester:

Faculty: Student (lastname): File:

B. Laboratory Descriptions (template)

ece-auton-rob.doc	ece-cad.doc	ece-capst-des-rob.doc	ece-cl.doc
ece-comm.doc	ece-comp-int.doc	ece-comb-svs.doc	ece-comb-time-cir.doc
ece-cv.doc	ece-dig-syst-elec.doc	ece-elec-pst.doc	ece-ana-pst.doc
ece-mic-des.doc	ece-mic-fab.doc	ece-mic-wav.doc	ece-net-instr.doc
ece-vlsi.doc	ece-wire-ic-des.doc	ece-3d-nano.doc	

Upload a new/updated file for

C. Faculty Vita (template)

alphenaar.doc	amini.doc	aronhime.doc	chenoweth.doc
cleaver.doc	cohn.doc	cole.doc	cox.doc
farsa.doc	faul.doc	harrett.doc	horowitz.doc
jinhc.doc	lihu.doc	liu.doc	mcnamara.doc
muezzinoglu.doc	naber_l.doc	walsh.doc	zurada.doc
ahmed.doc	durbin.doc	jessee.doc	kamel.doc
miller.doc	naber_c.doc	stottmann.doc	

Upload a new/updated file for

Figure 3. ABET Self-Study Workspace of the ECE Department at University of Louisville

Although typically behind the password because issues discussed are not of interest to the public, the Discussion Board remains in complete control of the departmental faculty and staff. Anyone is free to initiate a thread and/or participate by posting a comment or an attachment in any format. Files can be shared for reviews, comments, or questions asked in preparation for discus-

sion-making. A sample Discussion Board that can be easily programmed is shown in Fig. 4. For additional transparency, discussion threads that have remained inactive for a predetermined length of time can be archived and stored in the background.

The screenshot shows a web interface for the University of Louisville's Electrical & Computer Engineering department. At the top, there is a red header with the university's name and logo on the left, and the department name 'ELECTRICAL & COMPUTER ENGINEERING' on the right. Below the header, the page is titled 'ECE Discussion Board' and includes a 'Create new thread' button. The main content area is divided into two columns. The left column contains a list of discussion threads, including 'Increasing ECE enrollment - part 2: my contribution' and 'Ways to increase ECE enrollment - part 1: my advice'. The right column displays the details of the selected thread, 'Increasing ECE enrollment - part 2: my contribution', which was opened by John Smith on September 10. It includes an 'Opening message' and several 'Comments' from users like Michael Doe, Stacy Jones, and Jim Taylor. The thread also features a link to a news article and a 'Post &!' button at the bottom.

Figure 4. Discussion Board of the ECE Department at University of Louisville

7 Implementation Guidelines

The presented collection of web-based repositories and interactive workspaces was developed from scratch for customized needs of the Department of Electrical and Computer Engineering at University of Louisville. While refraining from use of proprietary solutions and components, these interactive environments were designed and implemented using only free and well-established web technologies, namely the generic HyperText Markup Language (HTML) [4], the most widely-used open source scripting language PHP [5]: Hypertext Preprocessor, and the most popular open source database MySQL [6]. As a result, these collaborative systems can be easily accessed from any computer with a standard web browser.

The Read-only Repository (Section 3) is simply a collection of documents organized into folders according to their subject area. The index page (shown in Fig. 1) is created dynamically each time a user requests access to the repository. A PHP script detects the current structure of folders, checks if they are password protected, and lists files in open-access (no password) directories according to a predefined display scheme. Such approach provides automatic indexing of the departmental repository without a tedious need for updating the index page every time a file is added, deleted, or modified.

The Course Assessment Repository (Section 4) allows instructors for uploading two types of documents: Syllabus and Course Learning Outcomes (S&CLOs) and Course Assessment Reports (CARs). These files, organized by academic semester, are stored in separate folders with different access policies – while the course syllabi can be downloaded by current and prospective students, the CAR files are password-protected and available only for the departmental faculty and staff.

Since the files to be uploaded by individual instructors may originally be assigned unpredictable names, they need to be standardized using a predefined naming scheme that, however, preserves the original file extension (such as .doc or .html) that indicates the type of the file and the application that should be used to open it. The Course Assessment Repository uses the same automatic indexing as the Read-only Repository, thus eliminating the need for updating the index page (shown in Fig. 2) after every content modification that may occur frequently at the beginning of each semester. This repository features also a backup script that is automatically executed every week – a zipped archive (containing all files contributed by instructors) is emailed to selected users and copied to a backup server for additional security.

The ABET Self-Study Repository (Section 5) can be divided into two logical layers. A business logic layer consists of a set of configuration files (storing lists of different types of courses offered by the department, departmental labs, and faculty names) and scripts for handling files uploaded by contributing users of the workspace. A separate presentation layer is responsible for

delivering information to the user and providing an interface for further file uploads. To eliminate ambiguity, reduce potential mistakes by the users and to provide maximum consistency and clarity of the collected information, the user interface consists mainly of pull-down menus that allow only for selection from a predefined list of choices (course number, faculty name, etc.). Only where not applicable due to unlimited number of options, information from a contributor is gathered through open text fields. An example of such situation can be a name of a student taking a project/thesis class. As the content of the ABET Self-Study Workspace is a subject to frequent modifications, it is regularly archived by a backup script similar to the one for the Course Assessment Repository.

The Departmental Discussion Board (Section 6) is the only presented collaborative tool that runs a database in the background. The database stores information about all discussion threads including the creation date, the name of the initializing user, the opening message and keeps track of all further posts related to a given thread. Individual post entries (stored in a separate table), apart from a standard timestamp, a contributor's name and message text, may also contain a pointer to a file (attachment) if there is one associated with a particular post. For easy and uncluttered navigation, the discussion board, by default, displays only threads from the last 90 days. Older contributions are automatically moved to an archive that is also fully available for the users.

8 Conclusions

Continuous program improvement and expectations of high productivity of academic departments necessitate the use of web-based information sharing. This can be achieved through web-based repositories. Such repositories can vary by their degree of interactivity. Document repositories can be read-only, while interactive workspaces will typically extend read-write privileges to all participants. Such interactive web spaces enable easy sharing and dissemination of files. They can serve as a great medium for effective program accreditation reporting that originally consists of many disjoint documents but allows for integrating them to form a seamless report – if directories are properly designed. Furthermore, collaborative workspaces offer a democratic and open environment that encourages faculty and staff interaction and ensures the openness of the process. Finally, such workspaces remain easily scalable for projects of any size, and offer simplicity of navigation and easy-to-organize table of contents. Also, they not only are reusable, but encourage their continuous use and serve as excellent, easy-to-access archives.

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