

1998

Design, development and delivery of Web-based instruction

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Design, development and delivery of Web-based instruction

Abstract

The World Wide Web is becoming an increasingly popular medium for instructional delivery of distance education. Many colleges and universities are offering courses and complete programs of study via the web.

This Graduate Project: "Design, Development and Delivery of Web-based Instruction" includes a brief review of the literature indicating the widespread use of the web in distance education in higher education. It reflects the current practice of web-based instruction in the UNI Educational Technology program. It documents the project including the process for establishing a new section of a currently developed course. It is the intention through this project report to present a model for future maintenance of web curricula in the Educational Technology program.

Design, Development and Delivery of Web-based Instruction

A Graduate Project

Submitted to

Division of Educational Technology

Department of Curriculum and Instruction

In Partial Fulfillment

of the Requirement for the Degree

Master of Arts

UNIVERSITY OF NORTHERN IOWA

by

Isabelle Cowden

May, 1998

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CHAPTER ONE

Introduction

The World Wide Web is becoming an increasingly popular medium for instructional delivery of distance education. Many colleges and universities are offering courses and complete programs of study via the web. The Educational Technology program of the Department of Curriculum at the University of Northern Iowa is keeping pace with the technological advances in distance education and is meeting the needs of its students by currently offering a masters degree in which many of the courses may be taken via distance education. Three courses currently are offered entirely over the web. The existence of these courses and the desire to continue to offer and develop distance education courses for the Educational Technology program at UNI has prompted the need to create this documentation and propose a model for continued support for this program.

This Graduate Project: Design, Development and Delivery of Web-based Instruction includes a brief review of the literature indicating the widespread use of the web in distance education in higher education. It reflects the current practice of web-based instruction in the Educational Technology program. It documents the project including the process for establishing a new section of a currently developed course. It is the intention through this project report to present a model for future maintenance of web curricula in the Educational Technology program.

Terms

1. asynchronous communication – communication that occurs between two or more parties independent of time and place.

2. CU-SeeMe – a desktop videoconferencing system designed for use on the Internet or other TCP/IP networks.

3. FTP – File transfer protocol – is the software used to retrieve and send files over the Internet.

4. Internet – A global network of networks connecting computer around the world that use the TCP/IP protocol.

5. NetForum – a Web based group communication and collaboration system provided by the University of Wisconsin Medical Informatics Group and the Biomedical Computing Group.

6. Listserv – a mailing list which operates on a server which distributes mail to the members of the list.

7. ListSTAR – is an email processor which runs exclusively on the Macintosh allowing users to create and maintain Internet mailing lists (listservs). It is developed by StarNine Technologies, the Macintosh division of Quarterdeck Corporation.

8. synchronous communication – communication that occurs between two or more parties simultaneously.

9. TCP/IP – Transmission Control Protocol/Internet Protocol; U.S. Government-established network data-packet exchange standard.

10. URL – Uniform Resource Locator; an address used to define the location of information on the Internet.

11. Videoconferencing – Software and hardware that allows users to see and hear each other.

12. WebSTAR – is a World-Wide server for the Macintosh operating system. It is developed by StarNine Technologies, the Macintosh division of Quarterdeck Corporation.

CHAPTER TWO

Literature Review

Distance education has two important aspects: education and communication. The assumption is that distance education, in terms of learning, equates to that in traditional education. In the last decade the emergence of advanced electronic technologies have provided new methods of communication for education at a distance. These powerful new technologies available for educating people worldwide may be viewed as the means for global reform of education. Others see these new technologies as a way of extending the traditional model of higher education by creating new choices and opportunities. This chapter reviews the history of distance education, examines the current state of distance education and the role it plays in distance learning.

The history of distance education in the United States originates with correspondence education. The University of Wisconsin offered its first correspondence course via coach and pony mail in 1891 (Phillips, 1996). Correspondence education classifies as a form of distance education because it involves the separation of learner and instructor and the presence of an educational institution (Steinberg, 1997). This form of distance education was the accepted norm until the early 1900's when instructional radio and television became popular. As consumers adopted radio and television, distance education incorporated them

as well. According to Jeffries (1997), technology based distance education links back to the introduction of audiovisual devices in schools. The major drawback of radio and instructional television was the lack of 2-way communications between teacher and student (Sherry, 1996). By the late 1960's and early 1970's interactive communications technologies became available as universities experimented with microwave networks to utilize Instructional Fixed Television Services (ITFS) (Jeffries, 1997). In the 1980's according to Phillips (1996), cable technology in tandem with the popularity of the VCR revived correspondence education.

The correspondence courses and early interactive communications technologies of the past played only a minor role in higher education, but the technologies of today suggest a greater role for distance education in higher education. Today distance education technologies are expanding at an extremely rapid rate. Distance education delivery systems now involve a high degree of interactivity between teacher and student. There are two categories of distance education delivery systems, synchronous and asynchronous. Synchronous instruction requires the simultaneous participation of all students and instructors and provides real time interaction. Examples of synchronous delivery include two-way interactive television (ITV) and desktop videoconferencing. Asynchronous instruction does not require simultaneous participation of all students and instructors. Students create virtual learning environments accommodating their

personal schedules. Examples of asynchronous delivery include correspondence courses, email, listservs, and most Internet based courses.

Pat Dixon (cited in Hamilton & Miller, 1997) author of "Virtual Colleges," states that there are about 300 colleges and universities now offering virtual degrees. Virtual-degree-based distance education programs have a wide range of approaches. Some use distributed education—a trend utilizing a mix of delivery modes for optimal instruction and learning (Steiner, 1997). As Phillips (1996) reported, among the institutions practicing distributed education are George Washington University and Pepperdine University. Doctorate students in the Graduate School of Education and Human Development at George Washington University meet one weekend each month for live instruction and mentoring. Between campus seminars' students use email and electronic conferencing to discuss group projects and problems. Doctorate students of educational technology at Pepperdine use a combination of mandatory face-to-face seminars, held on weekends three times each trimester, and Internet-assisted distance learning. At the University of Wisconsin in Madison, a professional certificate in distance education has an optional summer attendance at the Madison campus but may be completed entirely via the Internet (Phillips, 1996).

Other institutions are offering degrees entirely on the Internet. The University of Maryland is offering a virtual degree in their graduate school of

management and technology. According to Sanchez (1997), in 1997 at the University of Maryland, more than 70 students in the graduate school of management and technology entered a full-fledged Internet based master's degree program. Duke University, Ohio University and Purdue University have recently launched Internet-based M.B.A programs. Duke's nineteen-month \$75,000 program entitled the Global Executive M.B.A, will have their first class of 40 graduates in December 1997 (Hamilton & Miller, 1997). At New York University (NYU) BYTE magazine (BYTE, 1995) reported the School of Continuing Education offered a 16 course credit advanced professional certificate. With an additional 16 course credits at NYU one may earn a master's degree in performance and Information Systems auditing

Using the approach of distributed education the Educational Technology program in cooperation with the Continuing Education office at the University of Northern Iowa offers a masters degree in which a majority of the program may be completed via distance education. Utilizing the Iowa Communications Network (ICN) this program offers a number of its courses via interactive television. Utilizing the Internet it currently offers three courses of the program entirely using the web. Students come to campus for at least six credit hours in one semester to meet a residency requirement whereas most the rest of the degree may be earned from a distance.

CHAPTER THREE

Educational Technology program Web-based Courses

In the Educational Technology program the constructs for the virtual classroom utilize web pages, NetForum – a web-based electronic interactive discussion system, FTP (File Transfer Protocol), a listserv and CU-SeeMe – a videoconferencing program. One of greatest benefits of web-based instruction is that the instruction is independent of time and place, but at the same time may be interactive. Creating the virtual classroom community which encourages and supports the need for interactivity presents a challenge in designing, developing, and delivering web-based instruction. In order to design a course which engages the learners within a 'learner centered' environment, the course materials need to be easily navigable by the learners providing clear instruction for participation as well as generating a virtual sense of classroom community.

The web pages are the mechanism for delivery of content and instruction. The courses are divided into modules of instruction; each module designed with a focus question to further the students' understanding of the course topic. Focus questions require students to post written responses to the class NetForum.

One measure to facilitate interactivity is the requirement of each class member to reflect and reply to their colleagues responses in NetForum. Requiring this form of interactivity may be considered one of the most valuable aspects of a

virtual class. Learners are forced to express themselves both on the tasks of the module as well as the reply to each others' work which adds diversity while opening eyes to different approaches.

FTP is used to post student visual responses. The visual responses in the form of a digital image, are submitted via FTP to the program's servers. FTP is also used by the students to acquire some of the course digital reading materials available on one the program's servers.

Another means of establishing classroom interactivity is with the use of the listserv. The students participate in asynchronous class discussion via the class listserv. Participation on the listserv is required to assure everyone with a voice and an opportunity to use it. Contrary to a traditional classroom in which some students may dominate classroom discussion in a virtual class everybody has an equal voice. In a virtual class the learner can not hide in the group as in a classroom situation where it may be easy to be a silent participant.

CU-SeeMe is a desktop videoconferencing system designed for use on the Internet or other TCP/IP networks. CU-SeeMe software enables users to send and receive video, audio and text in real-time with others, thus allowing the class to participate in synchronous class discussions.

CHAPTER FOUR

The Project

This chapter provides an explanation of the project. The initial goal driving this project was to restructure the course files to best utilize disk space on the server and to create a system for adding future sections of the courses. There are two main sections in this chapter: Server File Structure and Creating a New Course Section. Three courses in the Educational Technology program are described as examples in this discussion. These courses are: 240-131g – Technology in Education, 240-138g – Graphics Production and 240-130 – Communication Theory in Media.

Server File Structure

The main server for the Educational Technology programs web courses, (edtech1.coe.uni.edu), is a Macintosh 7300 running WebSTAR server software. This server is used primarily to house the course contents. On the edtech1 hard drive is a folder named AISS 3.0. Inside this folder is Server Software folder, Figure 1.

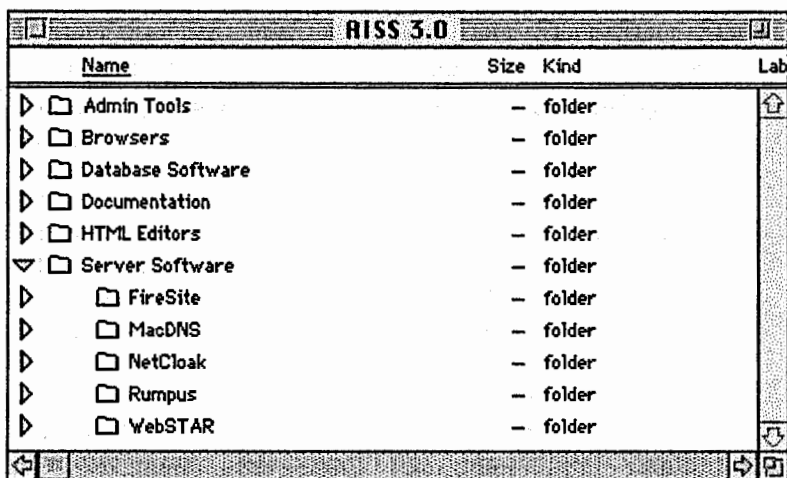


Figure 1

The Server software folder contains a WebSTAR folder, Figure 2.

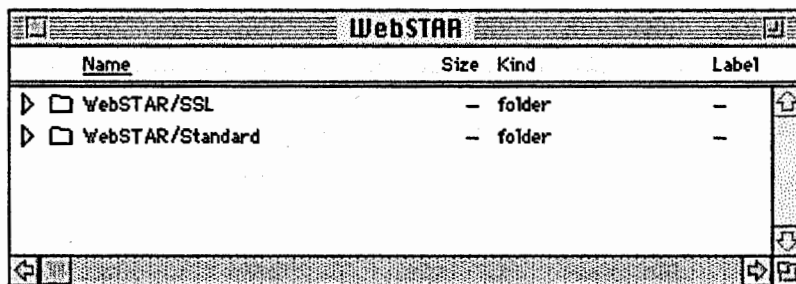


Figure 2

The WebSTAR folder contains two folders. The WebSTAR/Standard folder contains the application files for the server as well as all the files accessible from the web, Figure 3.

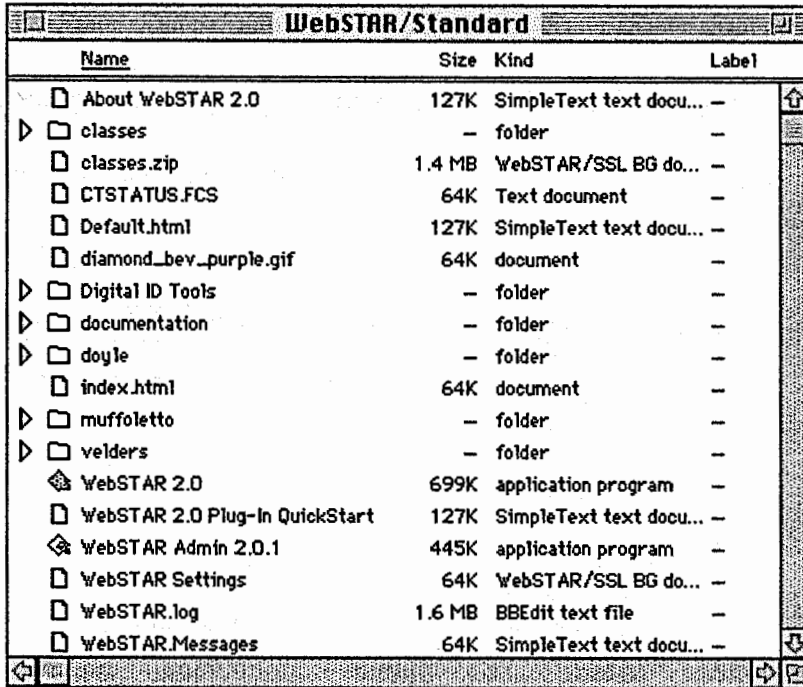


Figure 3

The structural design contains a main folder, 'classes', inside the WebSTAR/Standard folder. The classes folder contains a folder for each of the currently developed web courses (240:131g, 240:138g and 240:230), Figure 4.

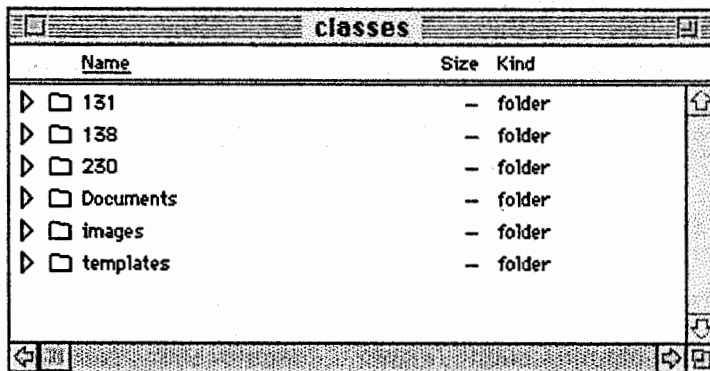


Figure 4

The classes folder also contains folders which hold documents, images and templates shared by all three courses. For example in Figure 5, shared files such as downloading.htm and internet-tools.html demonstrate skills and provide tools for learners in all the courses.

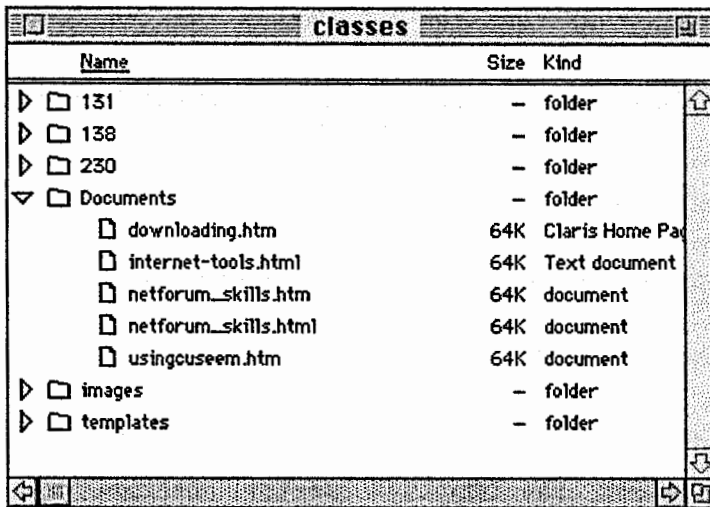


Figure 5

The images folder in the classes folder contains image files which support the files in the Documents folder. The templates folder contains files which are used when creating a new course section and will be discussed later in this chapter.

The structure contained in each of the course folders is identical and is illustrated using figures from the 240:230 course. A similar structure as is in the classes folder is used in each of the course folders; i.e. a documents folder, an images folder and a templates folder, Figure 6.

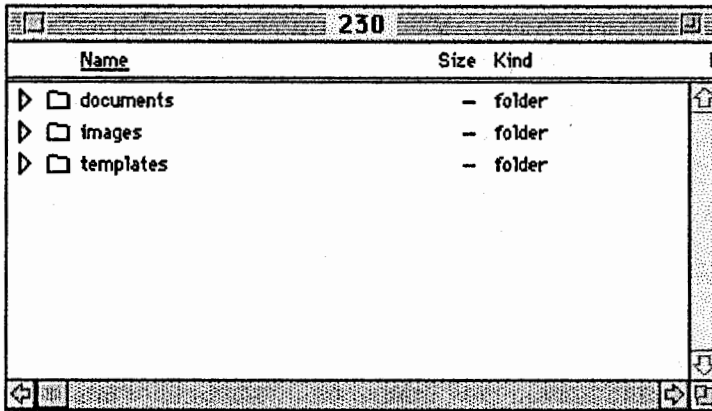


Figure 6

As shown in Figure 7 and Figure 8, the documents folder contains all the files that support the modules for the course and the images folder contains image files which support the document and template files. Similar to the classes folder the templates folder contains files which are used when creating a new course section and will be discussed later in this chapter.

230		
Name	Size	Kind
▼ documents	-	folder
□ boy.html	64K	document
□ commtheory-reading.html	64K	Text document
□ mod5-image.html	64K	document
□ module-1.html	64K	document
□ module-2.html	64K	document
□ module-3.html	64K	document
□ module-4.html	64K	document
□ module-5.html	64K	Claris Home Page
□ module-6.html	64K	document
□ module-7.html	64K	document
□ photo1.html	64K	document
▶ images	-	folder
▶ templates	-	folder

Figure 7

230		
Name	Size	Kind
▶ documents	-	folder
▼ images	-	folder
□ boy.jpeg	64K	document
□ calendar.jpeg	127K	Photoshop® JPEG
□ delt10s1.gif	64K	document
□ good.jpeg	64K	document
□ kmart.jpeg	127K	Photoshop® JPEG
□ NAVBUTT.GIF	64K	document
□ skyedge.gif	64K	document
□ women.jpeg	64K	document
▶ templates	-	folder

Figure 8

Creating a New Course Section

At the beginning of a new semester there are several steps involved to prepare the web-based materials for offering a new section of a course. Preparing a folder on the server is the first action to creating a new class. Within this folder other folders are created and the appropriate template files are copied. The next step of the process is to create a listserv and an administrative listserv for the class. Once the class listserv is created the students are added as members of the list. The administrative listserv is created to allow subscribing and unsubscribing to the class listserv from other accounts by the members once the class has started. The listserv server for the Educational Technology program's web courses, (edtech.coe.uni.edu), is a Macintosh 6100 running ListSTAR server software.

Establishing a NetForum is the next step. NetForum is housed on the University of Northern Iowa server hence, establishing the contents requires collaboration with the Information Technology Services department. The GraphicForum is actually a web page that is modified throughout the semester to accommodate the image files submitted by the students. This file starts as a template file and utilizes the edtech2 server to house the files. The final step in the process of creating a new course section is modifying the template files to reflect all the appropriate files and links for the class.

The information that follows has been outlined as a step by step process using figures to further explain details when necessary.

Preparing new section folders

Step 1: Create a folder in the WebSTAR/Standard folder for the new section. The name of the folder may be the last name of the instructor or some other name that may be easily accessed by the students. A name that is in some way descriptive of the course section, one that is not excessively long or uses punctuation characters is suggested. The name of this folder becomes part of the URL the learners use to access the course web pages. In Figure 9, there are three folders (doyle, muffoletto and velders) containing active course sections.

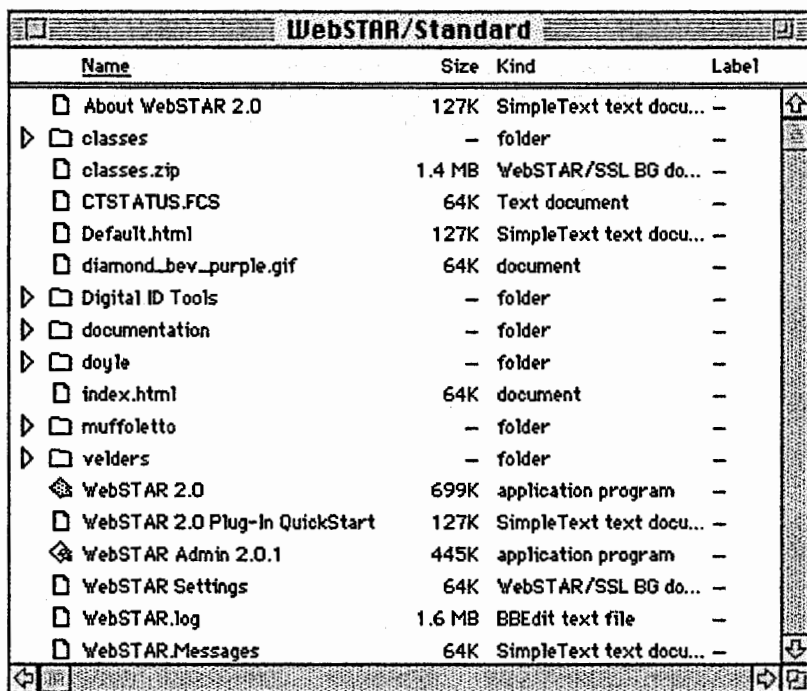


Figure 9

Step 2: Create two folders with the new folder name one - documents and the other images.

Step 3: Copy the three template files `graphicforum.temp.htm`, `listserve_template.htm`, and `netforum_template.htm` from the `classes/templates` folder into the `documents` folder (from step 2).

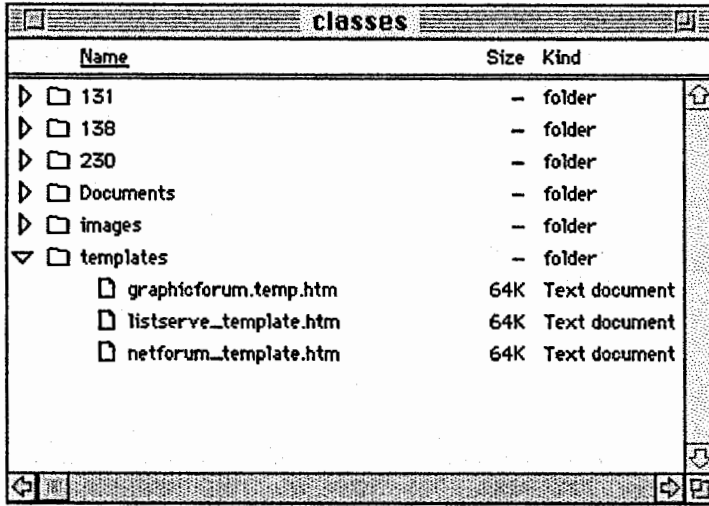


Figure 10

Step 4: Rename the three files by removing template references from the names.

Step 5: Copy the image files `skyedge.gif` and `delta10sl.gif` from the `classes/images` folder into the `images` folder (from step 2).

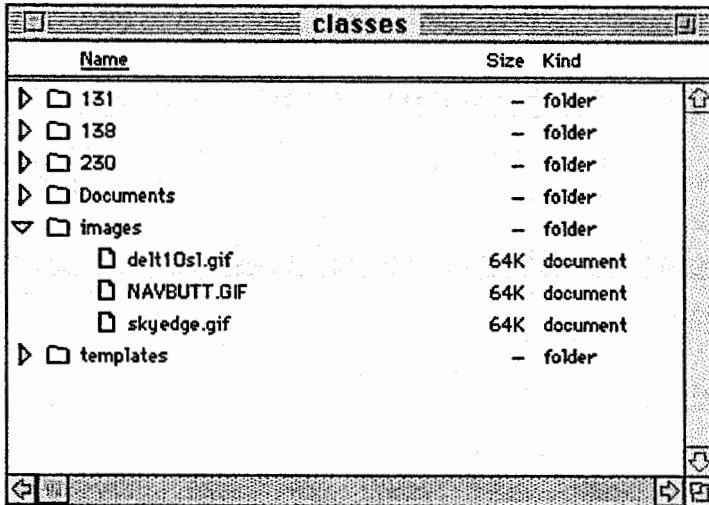


Figure 11

Step 6: Copy the template file `timeline_template.html` from the proper course section into the `documents` folder (from step 2). Copy the template file `index_template.html` from the proper course section into the new section folder (from step 1).

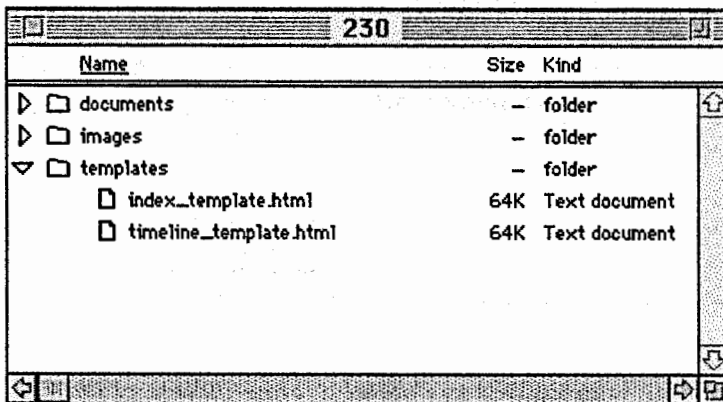


Figure 12

Step 7: Rename these two files by removing `template` from the names.

Creating a course listserv

Step 1: Select Services from the Window menu. Click on *Creating Lists* to select, then click on Duplicate...

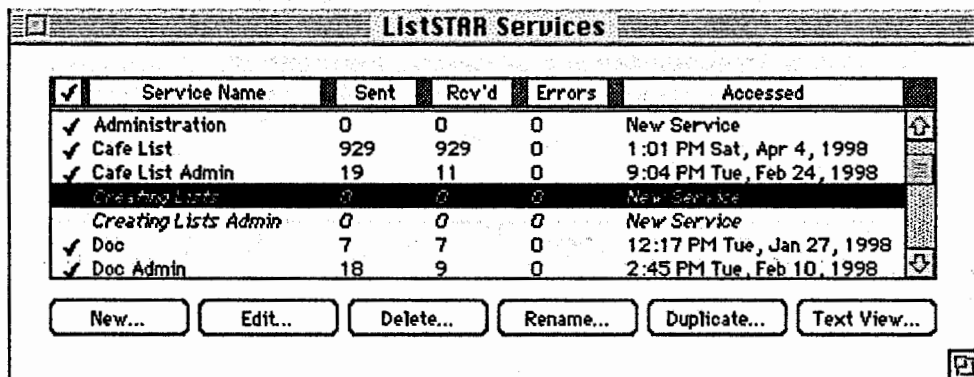


Figure 13

Step 2: In the Create new ListSTAR service window text box key in the "New Name Listserv" for the service then click on Create.

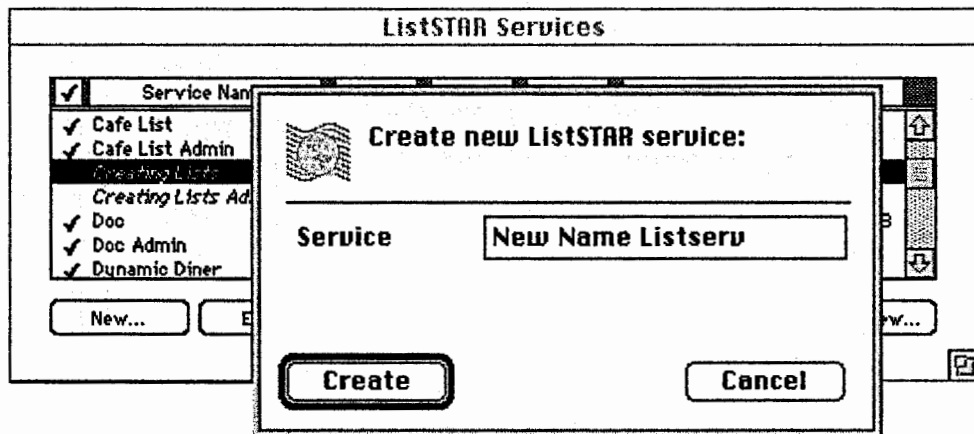


Figure 14

Step 3: In the ListSTAR Services window click on “New Name Listserv” to select, then click on Edit...

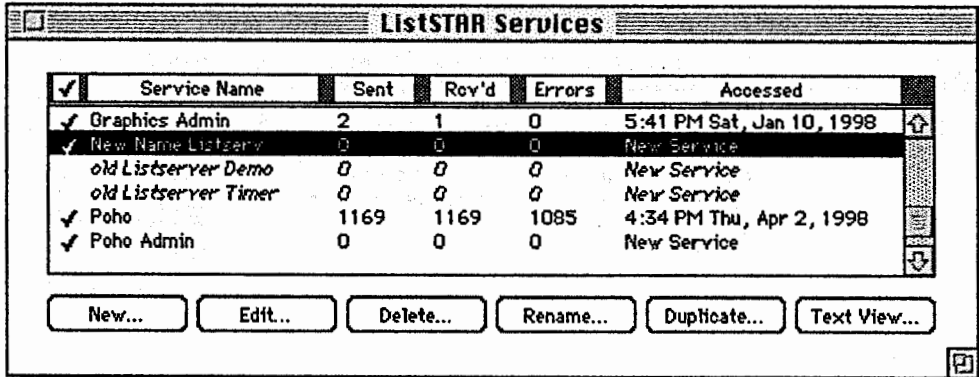


Figure 15

Step 4: In the text boxes “New Name Listserv” Service Preferences window, key a Friendly name and a username for the listserv email address. Click on the Rules icon.

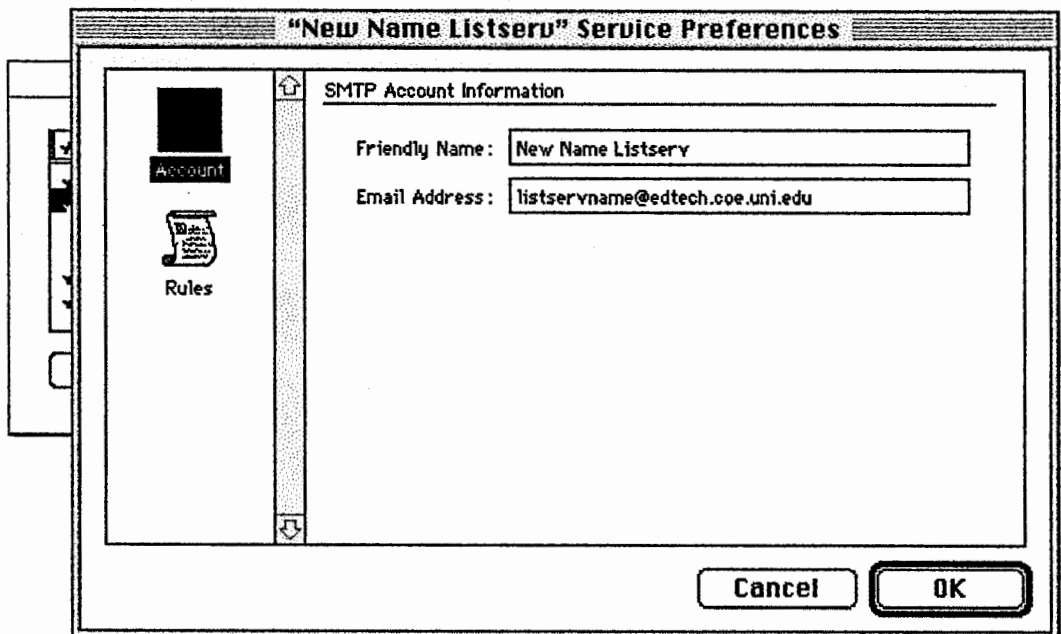


Figure 16

Step 5: Select Reflect and File then click on Edit...

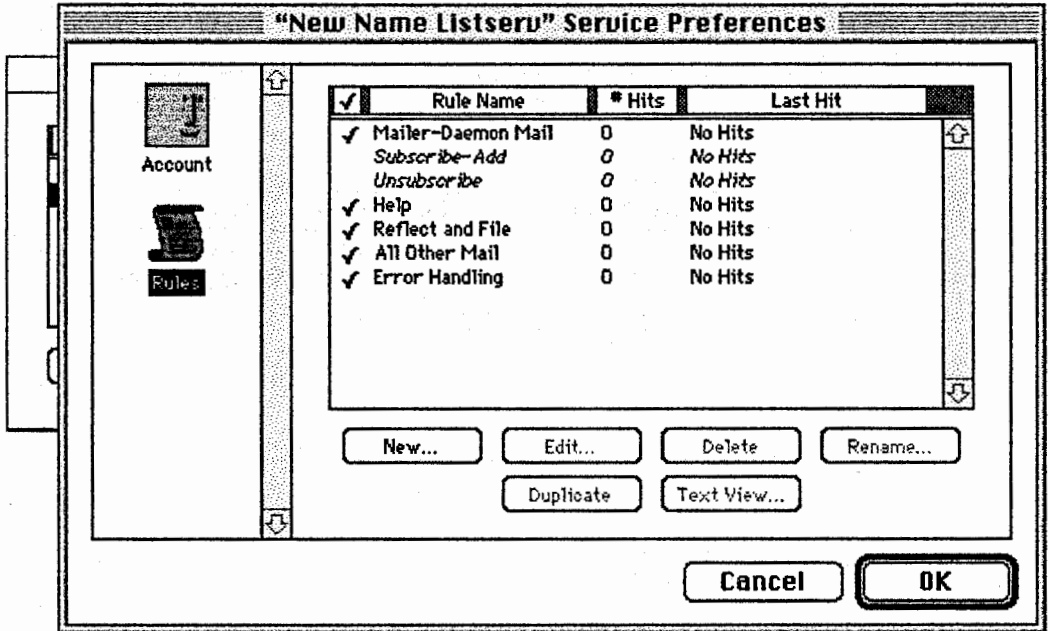


Figure 17

Step 6: In the “Reflect and File” rule definition window, click on the Mailing-list icon. Below the Mailing-list Actions click on ”Creating Listserves List” button to the right of the Forward Check box. This action allows the opportunity to select the appropriate list to reflect and file the listserv messages.

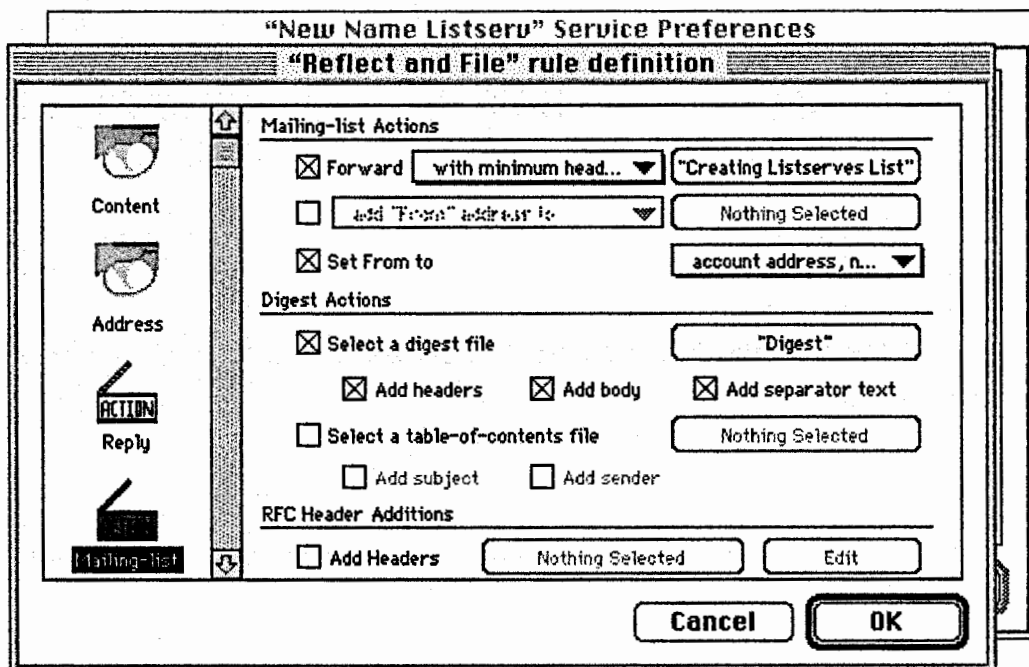


Figure 18

Step 7: The Address List Maintenance window appears. In this window scroll down if necessary and locate in Services column the “New Name Listserv”. Click on this service to select then click on Rename...

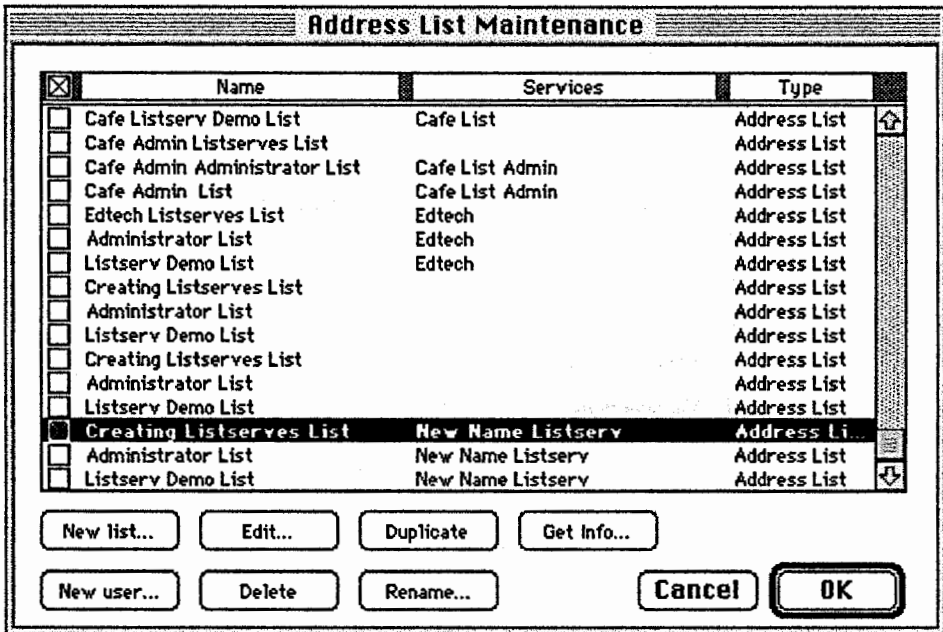


Figure 19

Step 8: In the Rename text box, key in "New Name Listserv" for the service then click on OK. Click on OK in the Address List Maintenance window and then click OK in the "Reflect and File" rule definition window.

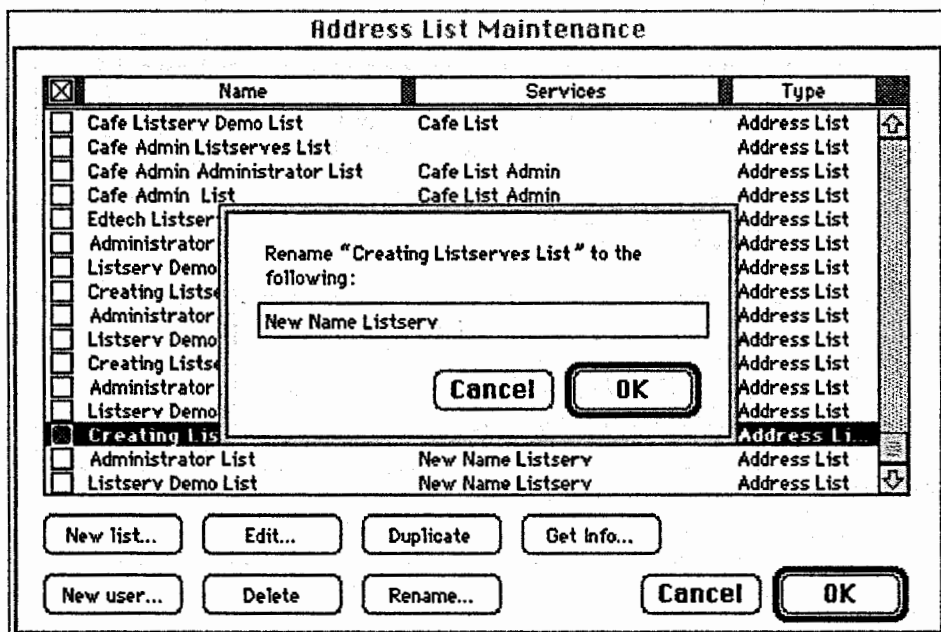


Figure 20

Step 9: Click OK to Enable rule without “triggers” set.

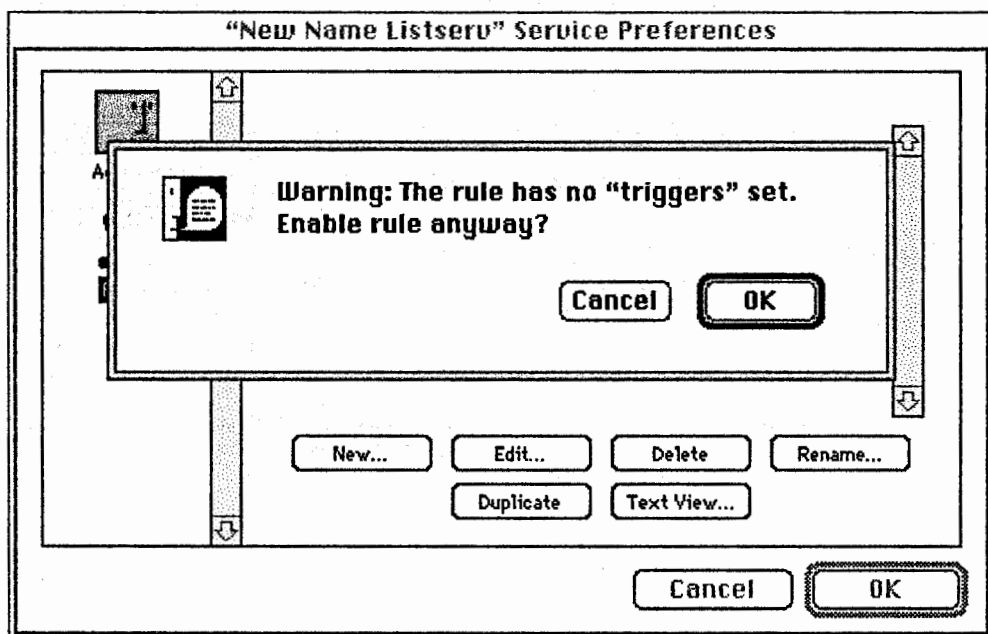


Figure 21

Creating a course administrative listserv

Step 1: Select Services from the Window menu. Click on *Creating Lists* to select, then click on Duplicate...

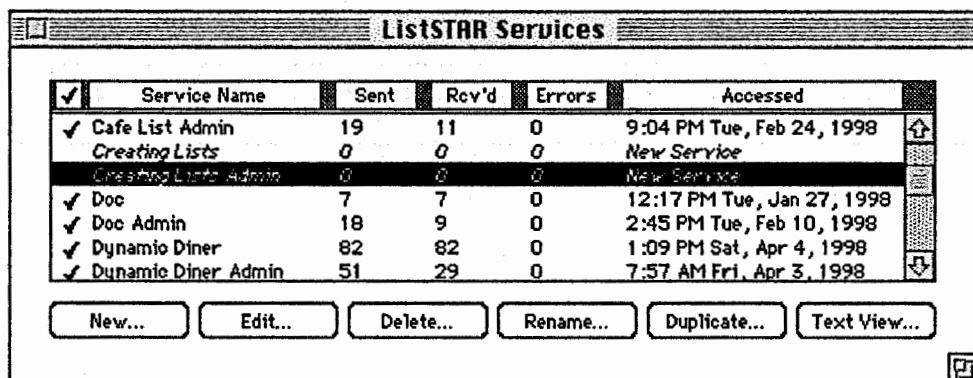


Figure 22

Step 2: In the Create new ListSTAR service window text box key in the "New Name Listserv Admin" for the admin service then click on Create.

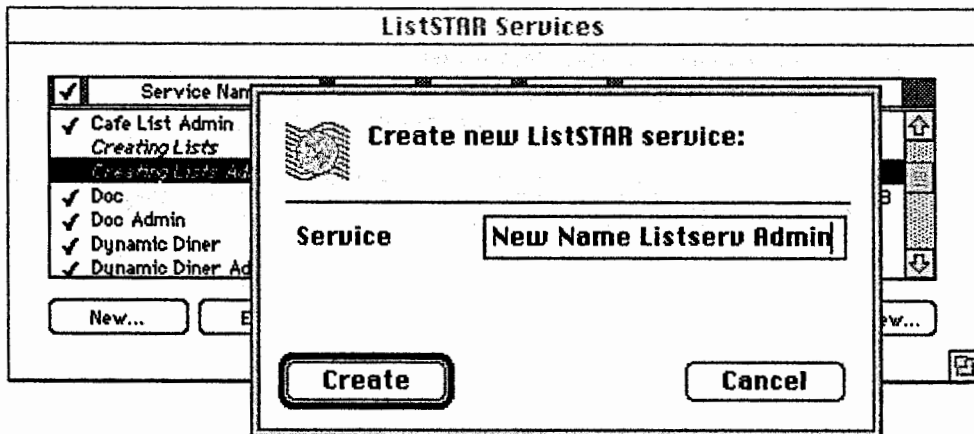


Figure 23

Step 3: In the ListSTAR Services window click on "New Name Listserv Ad..." to select, then click on Edit...

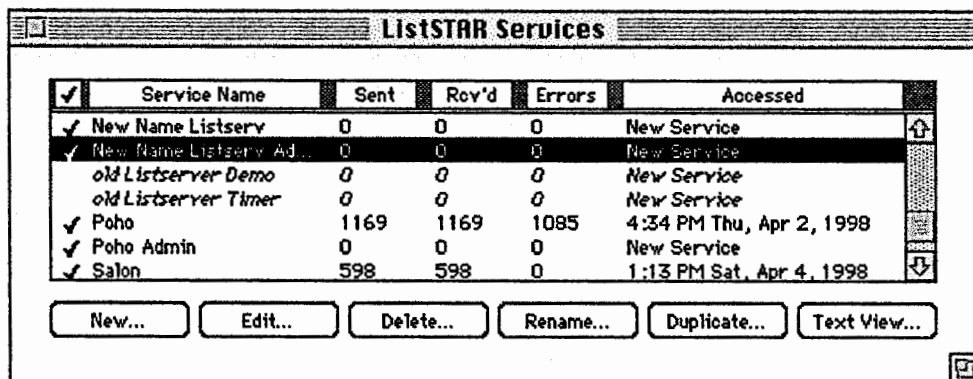


Figure 24

Step 4: In the text boxes “New Name Listserv Admin” Service Preferences window, key a Friendly name and a username for the admin listserv email address. Click on the Rules icon.

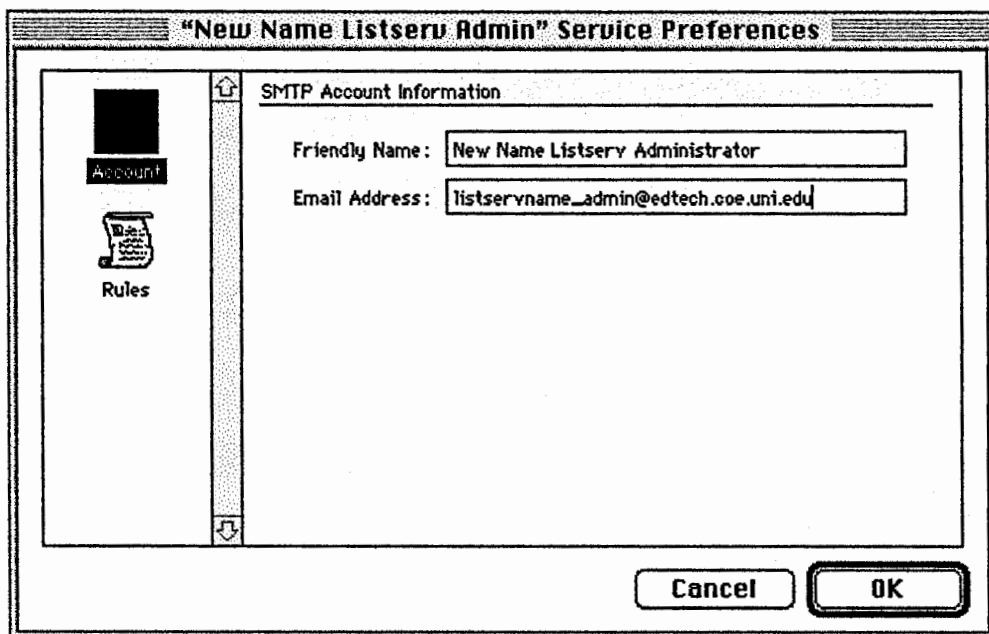


Figure 25

Step 5: Select Subscribe-Add then click on Edit...

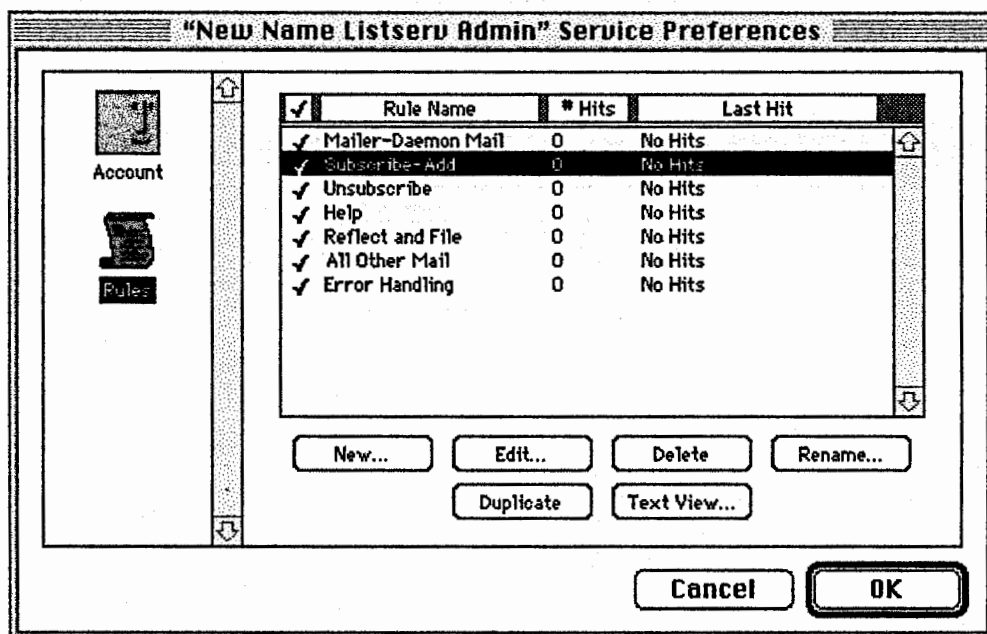


Figure 26

Step 6: In the “Subscribe-Add” rule definition window, click on the Mailing-list icon. Below the Mailing-list Actions click on the ”Creating Listserves List” button to the right of the pop down menu containing add “From” address to.

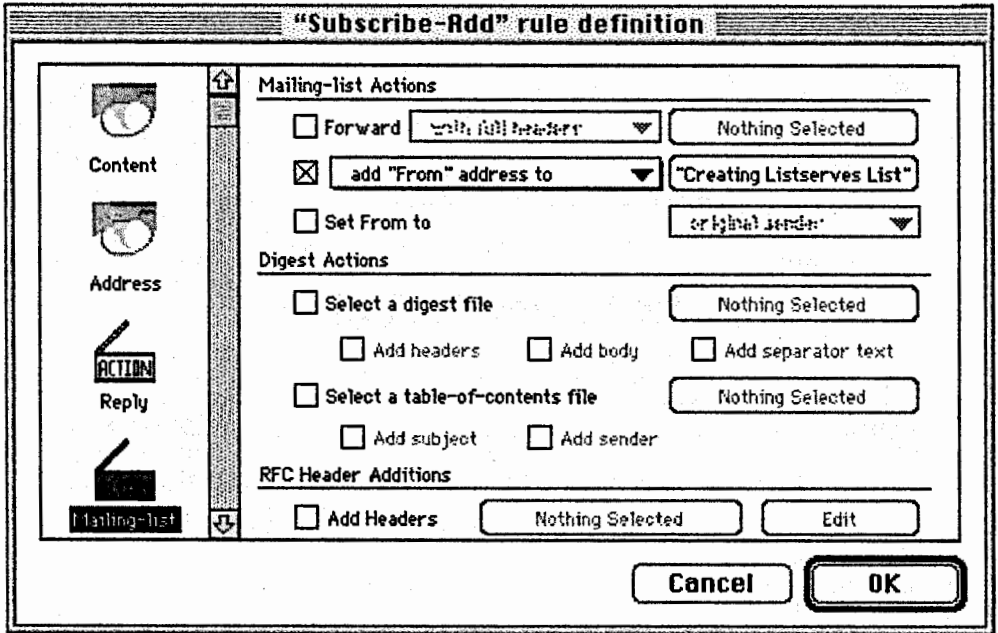


Figure 27

Step 7: The Address List Maintenance window appears. In this window scroll down if necessary and locate in the list the name Creating Listserves List with the “New Name Listserv Admin” as its service. Click on this service to select then click on Rename...

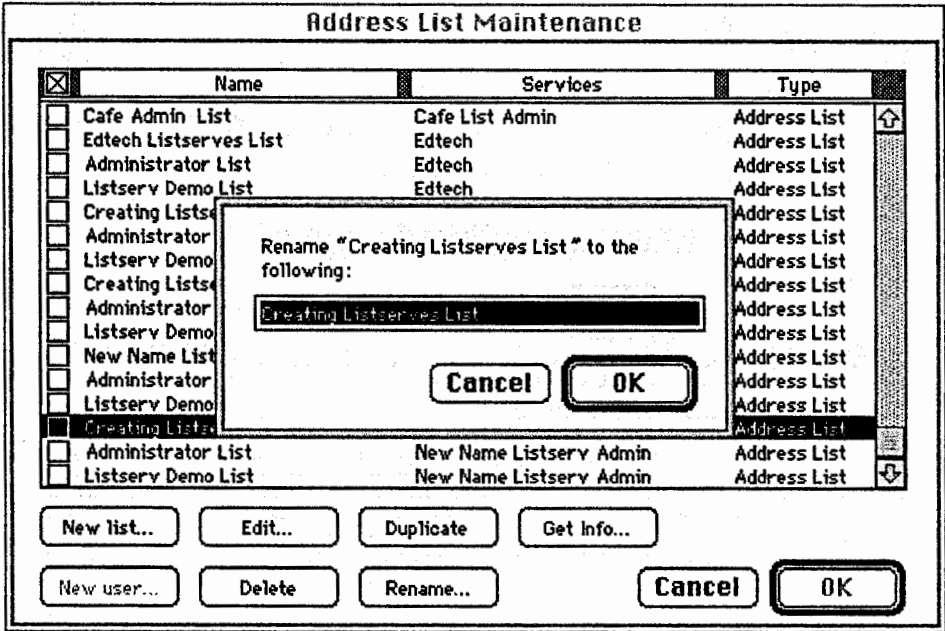


Figure 28

Step 8: In the Rename text box, key in “New Name Listserv Admin” for the service then click on OK.

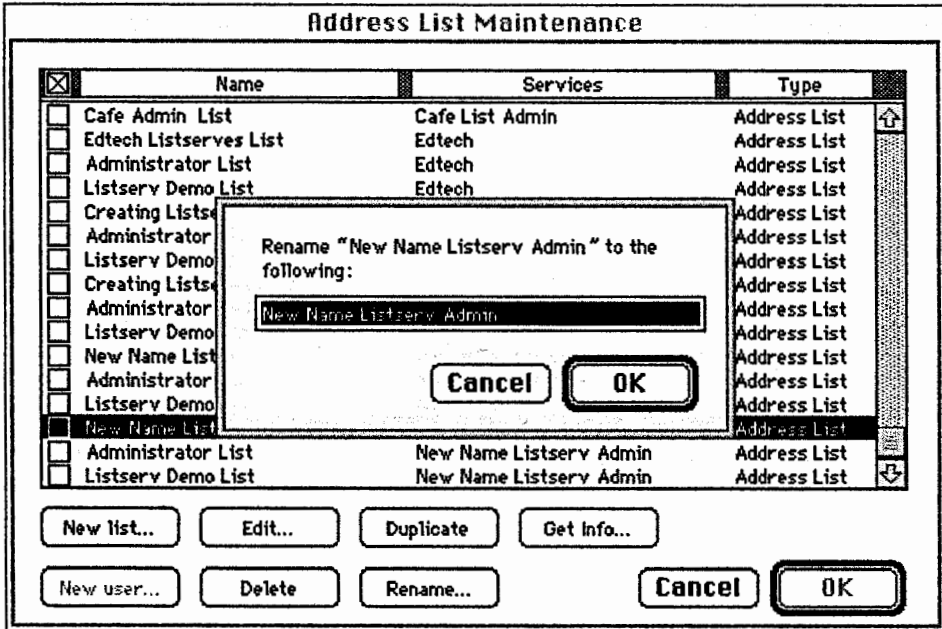


Figure 29

Step 9: Make sure the Check box to the left of “New Name Listserv Admin” is empty.

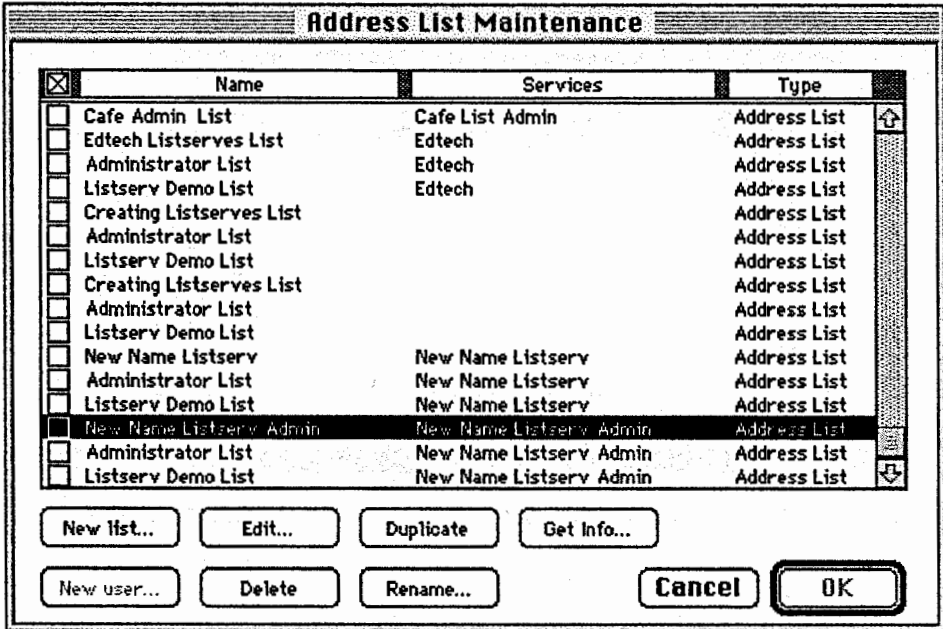


Figure 30

Step 10: Click in Check box to the left of service name “New Name Listserv” with “New Name Listserv” as service to create an X. Click on OK.

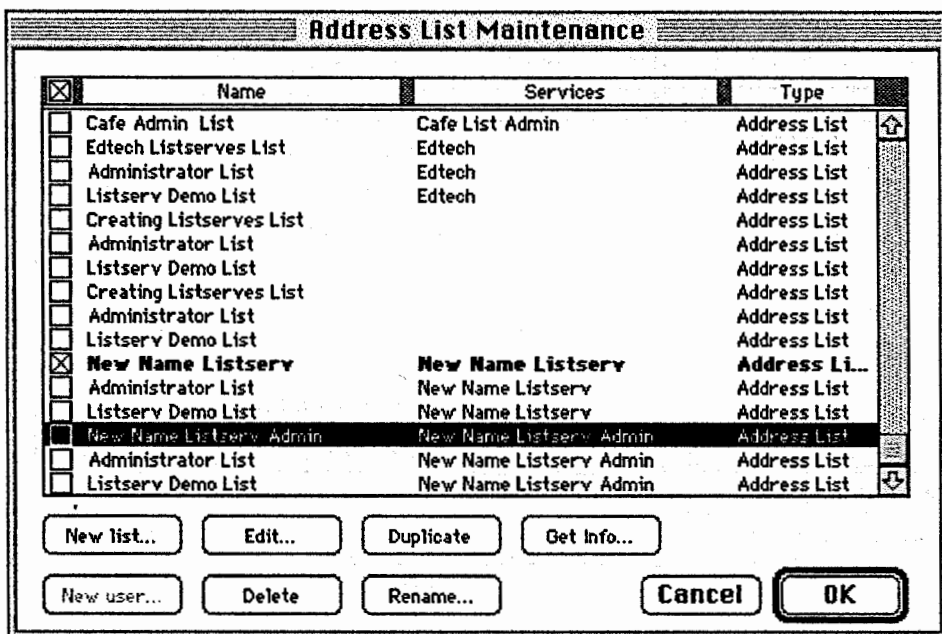


Figure 31

Step 11: Click OK in “Subscribe-Add” rule definition window.

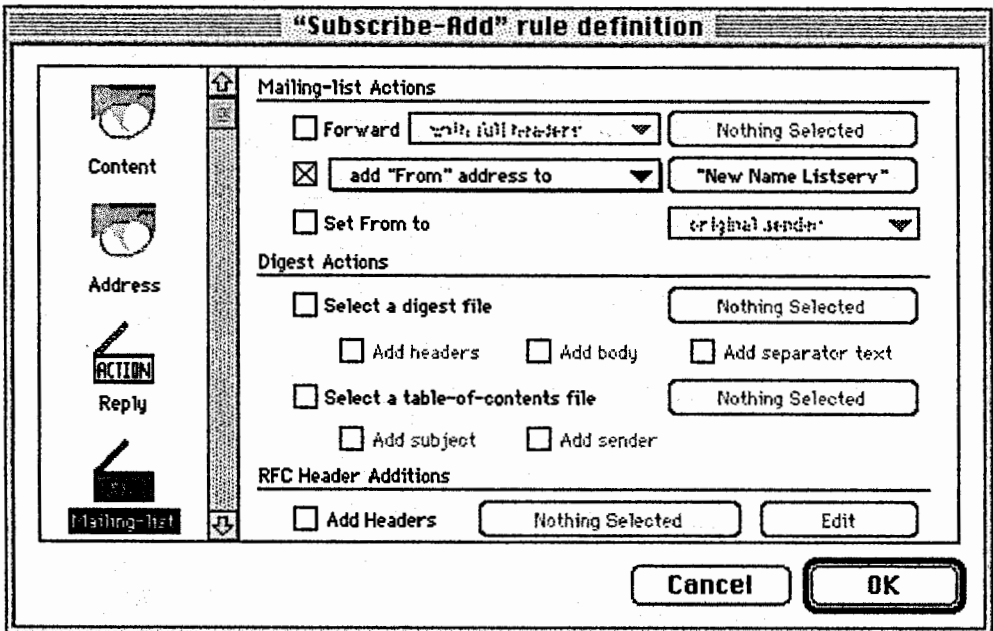


Figure 32

Step 12: Select Unsubscribe then click on Edit...

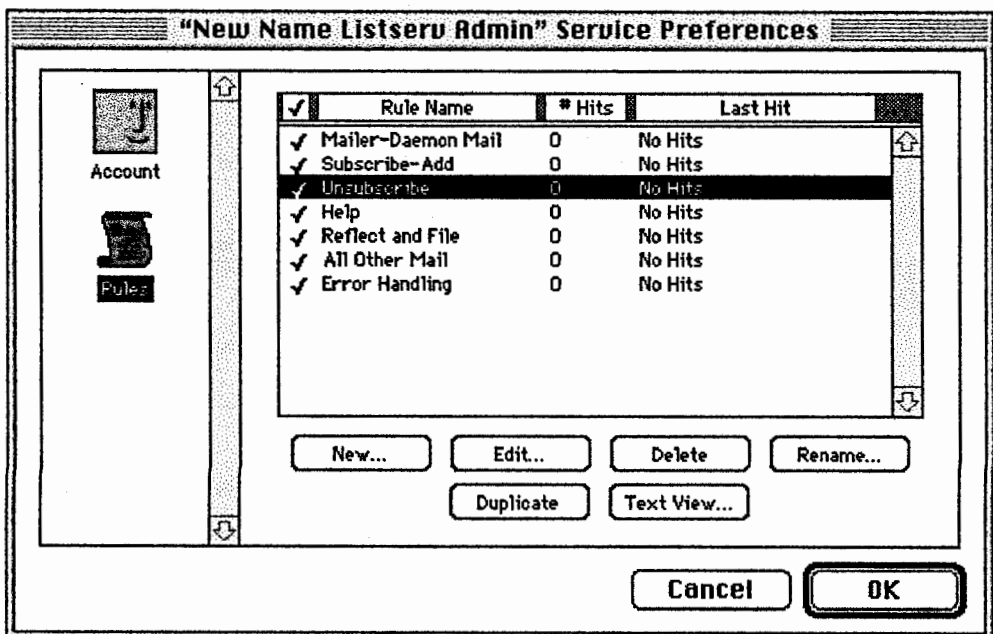


Figure 33

Step 13: In the “Unsubscribe” rule definition window, click on the Mailing-list icon. Below the Mailing-list Actions click on the “New Name Listserv Ad...” button to the right of the pop down menu containing delete “From” address from.

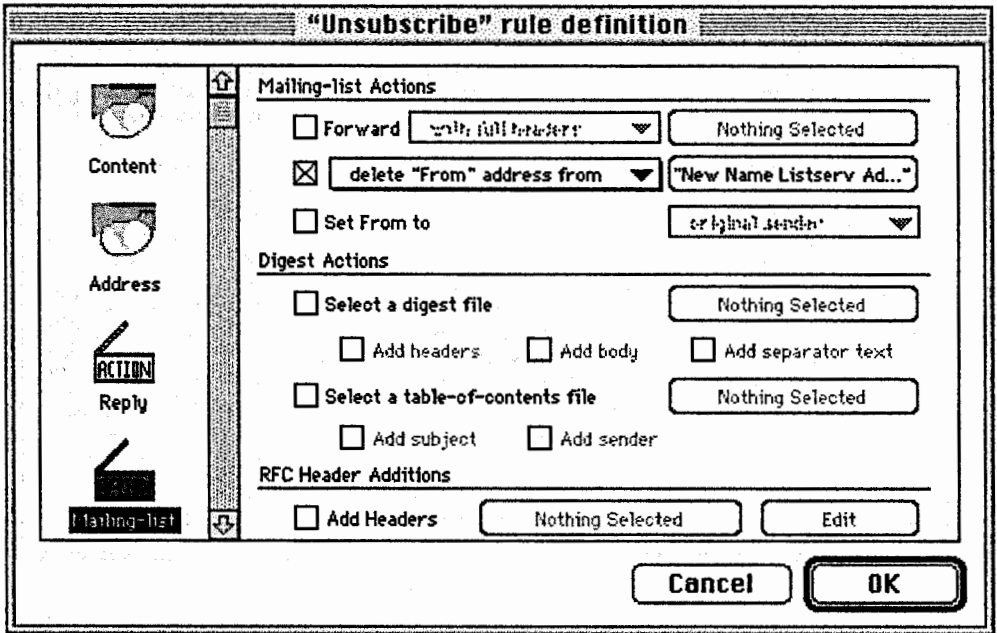


Figure 34

Step 14: Click on the X in the Check box to the left of the “New Name Listserv Admin” and make sure it becomes empty.

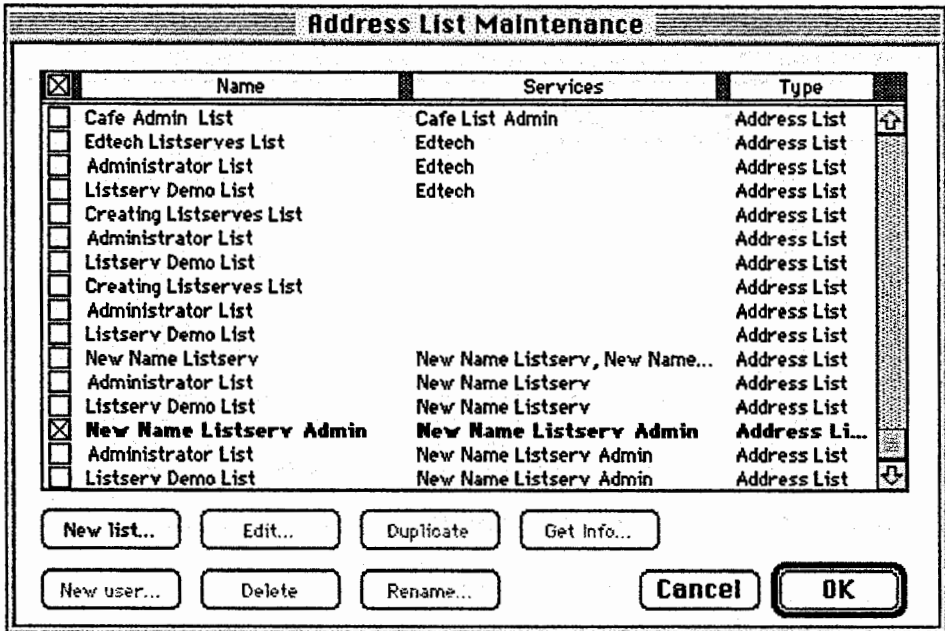


Figure 35

Step 15: Click in Check box to the left of service name “New Name Listserv” to create an X. Note that now the services for this name are “New Name Listserv” and “New Name Listserv Admin”. Click on OK.

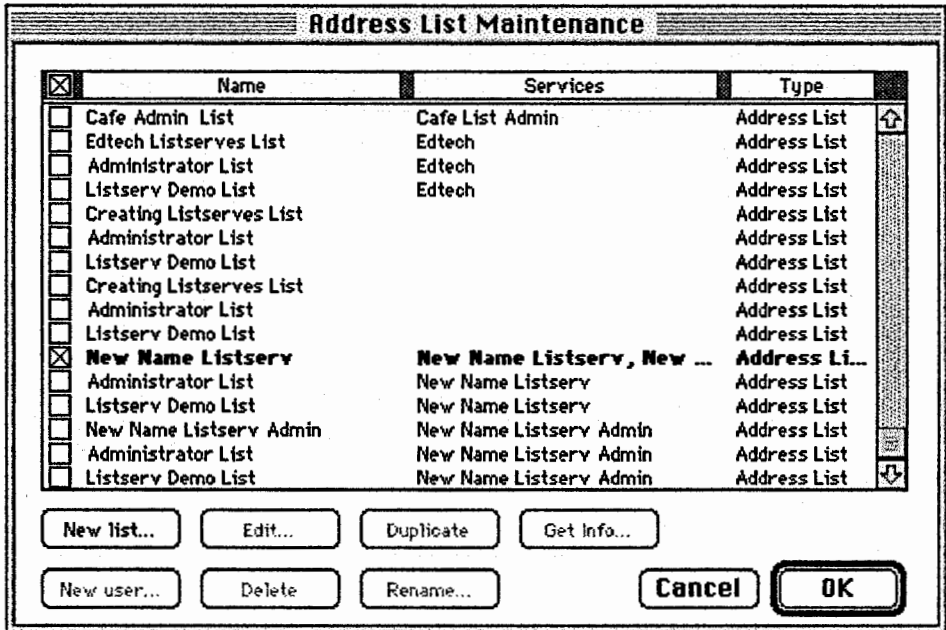


Figure 36

Step 16: Click OK in "Unsubscribe" rule definition window.

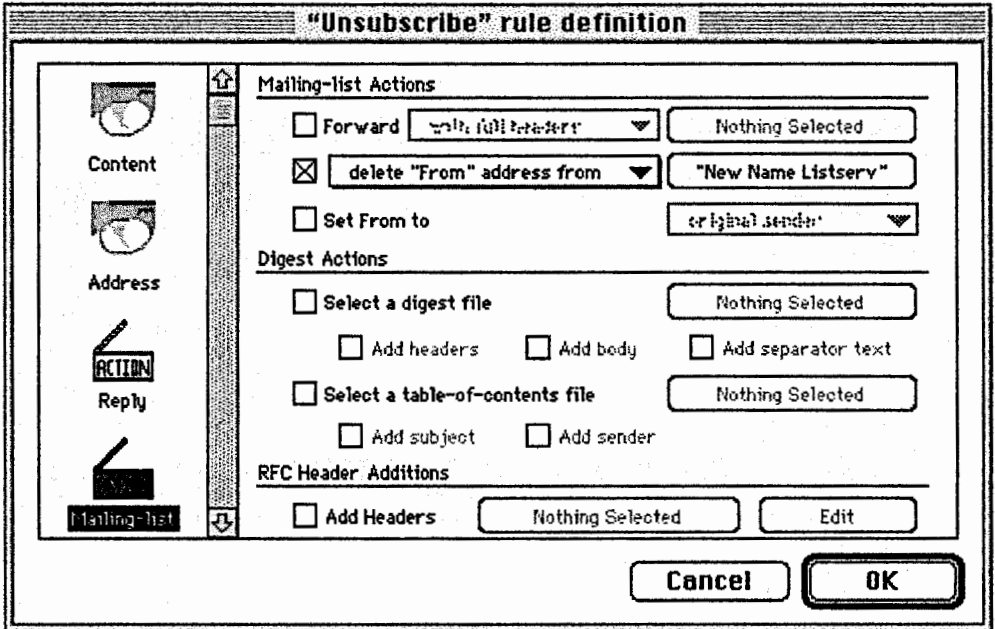


Figure 37

Subscribing members to new listserve

Step 1: Click on the service “New Name Listserv” to select then click on Edit...

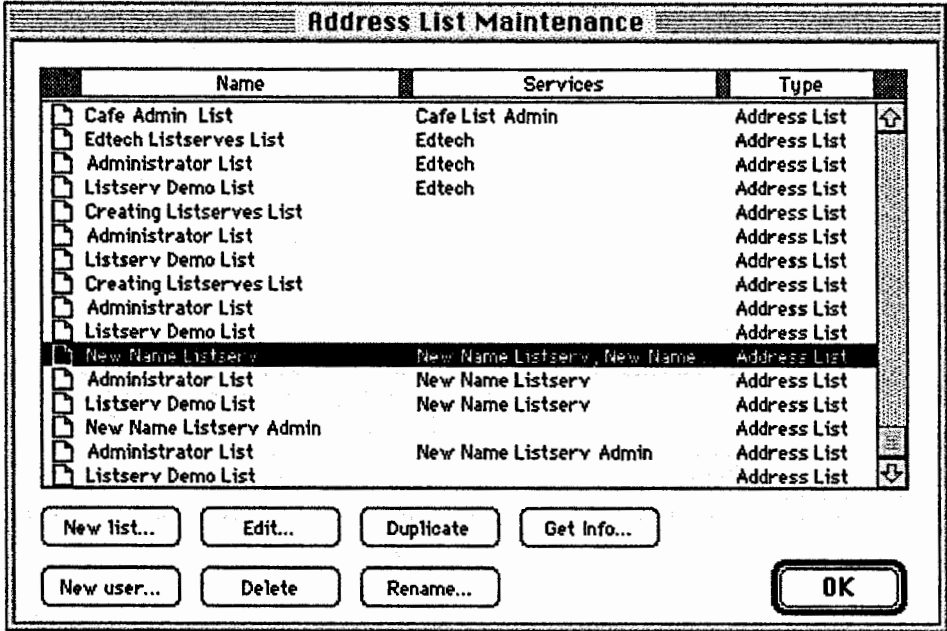


Figure 38

Step 2: Click on New...

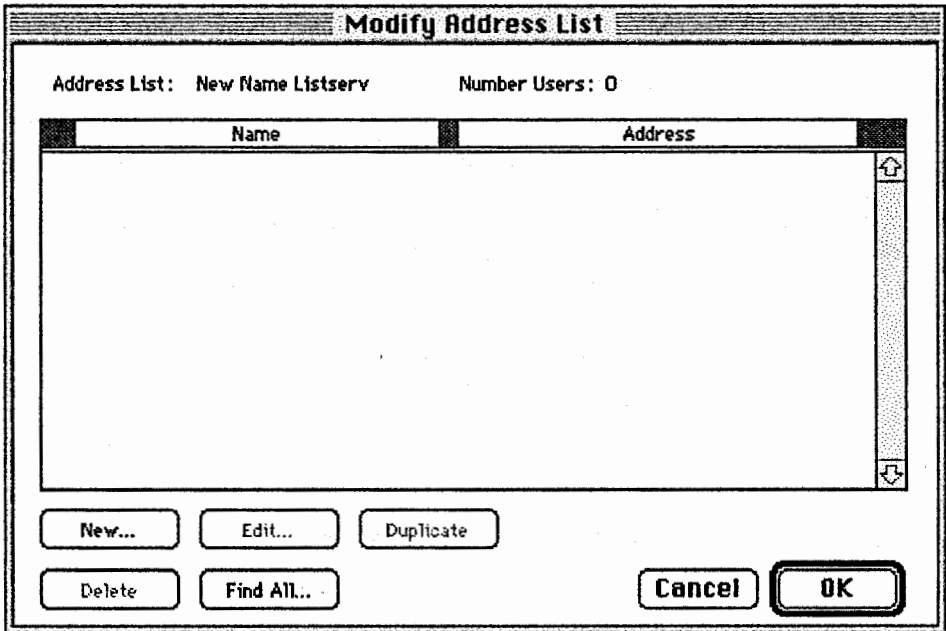


Figure 39

Step 3: Key in Name and email address of member. Click on OK in Add User window. Repeat Steps 2 and 3 until membership is complete, then click on OK in Modify Address List window.

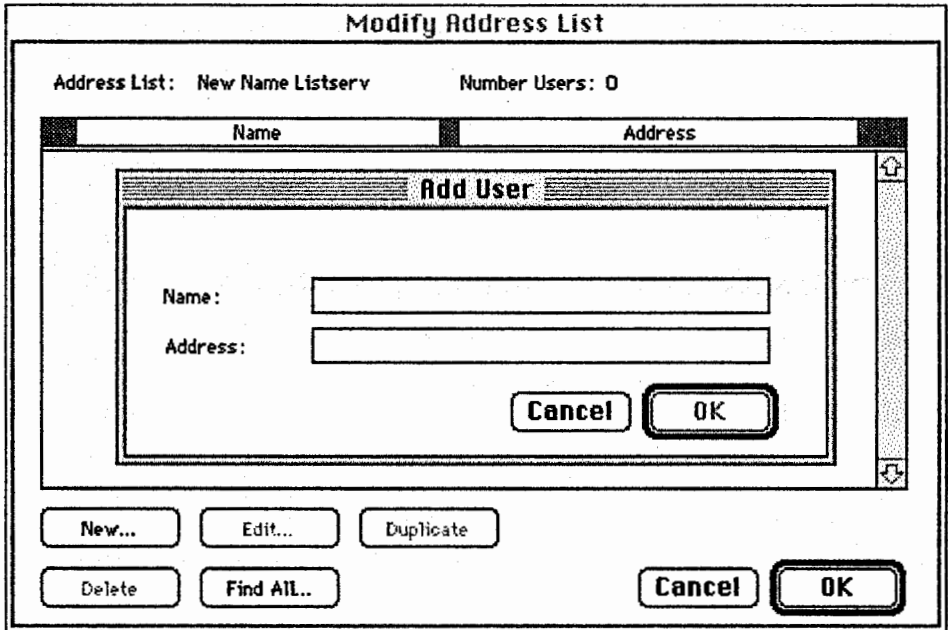


Figure 40

Step 4: Click on OK in Address List Maintenance window.

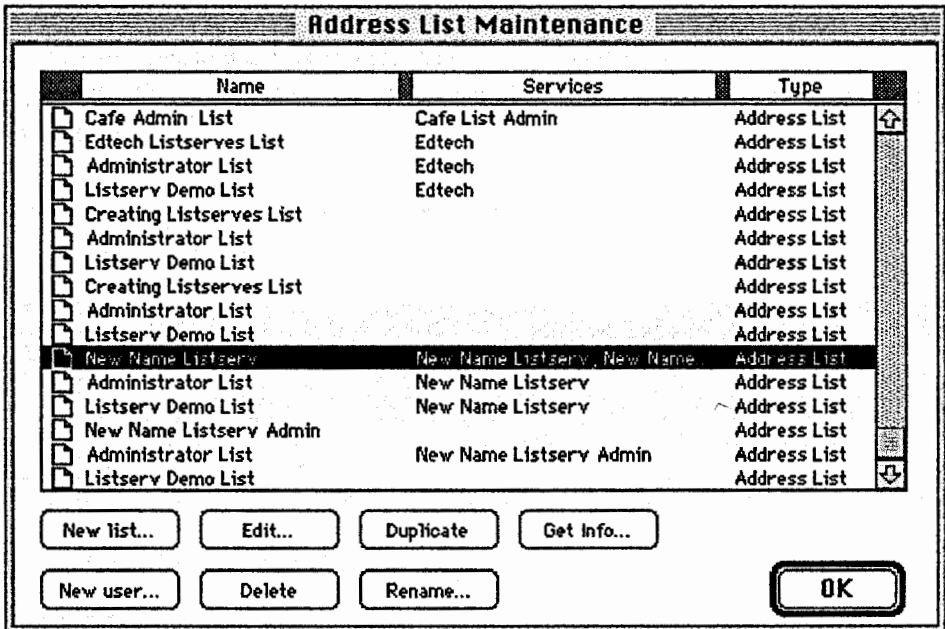


Figure 41

Establishing a NetForum

Step 1: Contact Information Technology Services for a new forum in NetForum. Presently this is Jack Miller at 273-5943 or jack.miller@uni.edu. The new forum will be assigned a url, a username and a password.

Step 2: Using a web browser access the forum's url. Click on the New Topic icon to create new topics.

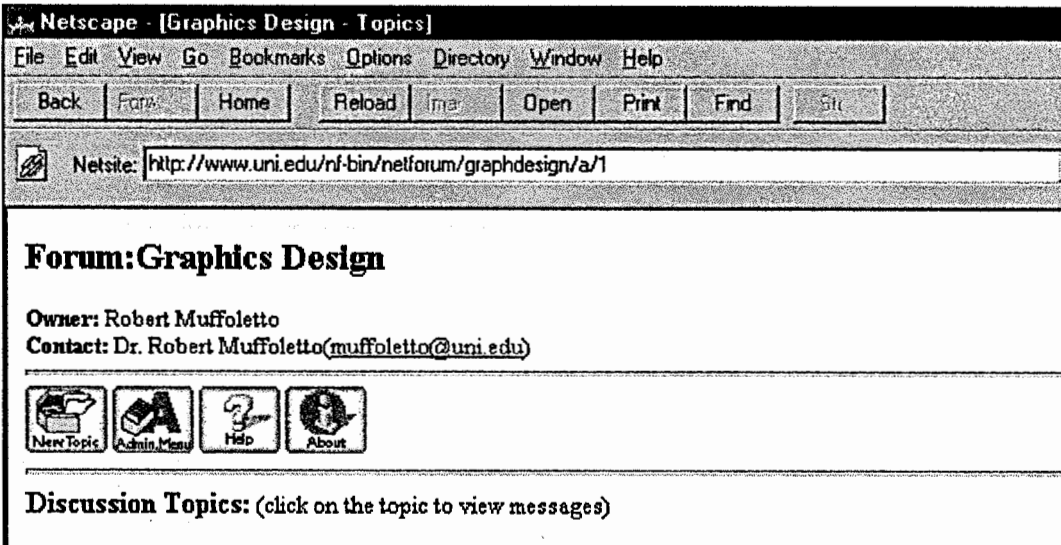






Figure 42

Step 3: On the Add Topic screen, first key in the username and password.

Graphics Design - Add Topic

Filling out this form will create a new topic, to add messages to an existing topic choose that topic from the topic list

**⚠ Adding topics to this board is restricted to board owners.
Please enter your username and password:**

Username:

Password:

Figure 43

Step 4: Scroll down the screen and key in the required information.

Required Information:

Topic Name:

Your Name:

Figure 44

Step 5: Scroll down the screen and key in any optional information desired.

Optional Information:

.

Your 's Web Site:
http://

Your Email Address:

Your Web home page:
http://

Topic Description:

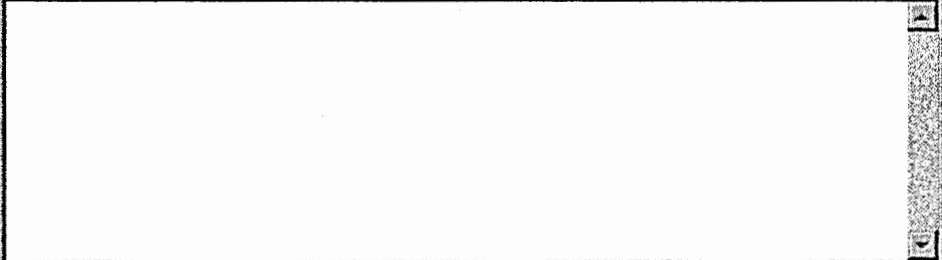


Figure 45

Step 6: Scroll down the screen, keep HTML as the formatting option, click on Preview Topic Information button.

Formatting Options for Description:

Translated Text

HTML

Preformatted Text

Figure 46

Step 7: A screen is displayed illustrating how the topic will appear in the forum click on the Edit some more button if it is not as desired or click on the Post the topic to keep.

This is how the topic information will appear in the forum:

Topic Name: Testing Area
Topic Posted by: Belle Cowden (bcowden@mcleod.net)
Date Posted: Wed Apr 22 5:48:52 US/Central 1998
Topic Description: This is a test area to practice NetForum postings.

Figure 47

Establishing a GraphicForum

Step 1: Using a web page editor open the file graphicforum.htm located in the folder for this new section (from Preparing new section folders, steps 3 and 4)

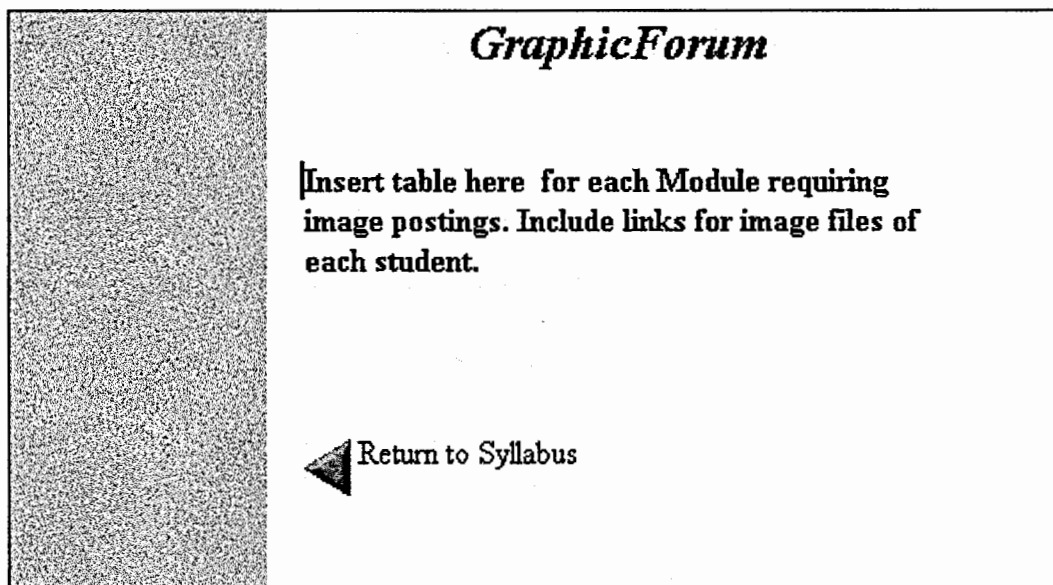


Figure 48

Step 2: Create a heading and table entry for each module requiring GraphicForum entries. (The number of table cells is dependent on the number of students in the class.)

Step 3: Create a folder for this new section on the edtech2 server (Macintosh 6300) within the graphic_forum folder. For each module create a folder within the new folder.

Step 4: Save graphicforum.htm.

Modifying template files

Step 1: Using a web page editor open the file listserv.htm located in the documents folder for this new section (from Preparing new section folders, steps 3 and 4)

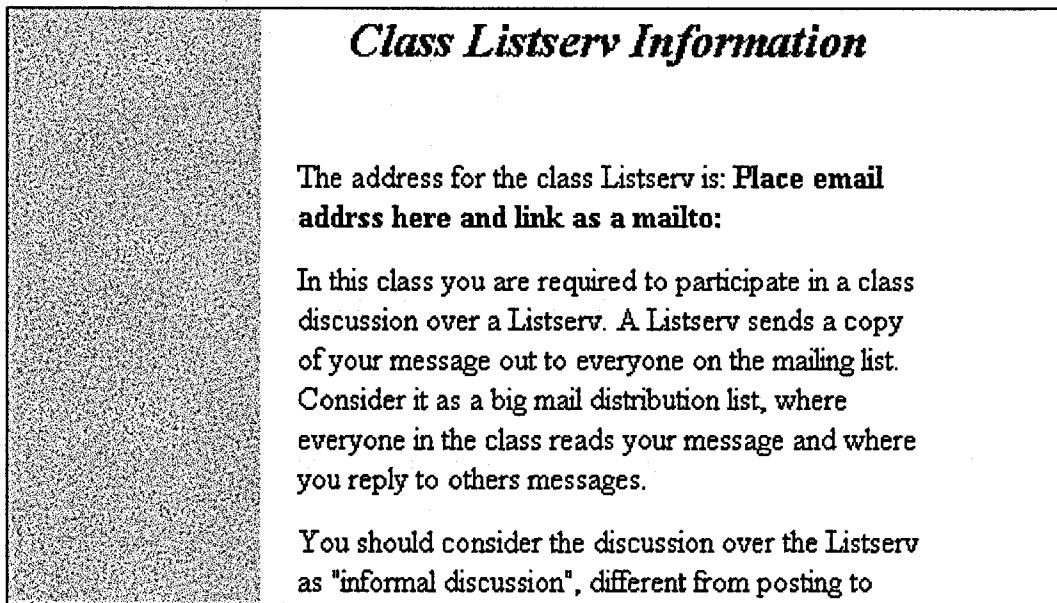


Figure 49

Step 2: In the space provide key in and create a mailto link to the listserv for the new section.

Step 3: Save listserv.htm

Step 4: Using a web page editor open the file netforum.htm located in the documents folder for this new section (from Preparing new section folders, steps 3 and 4)

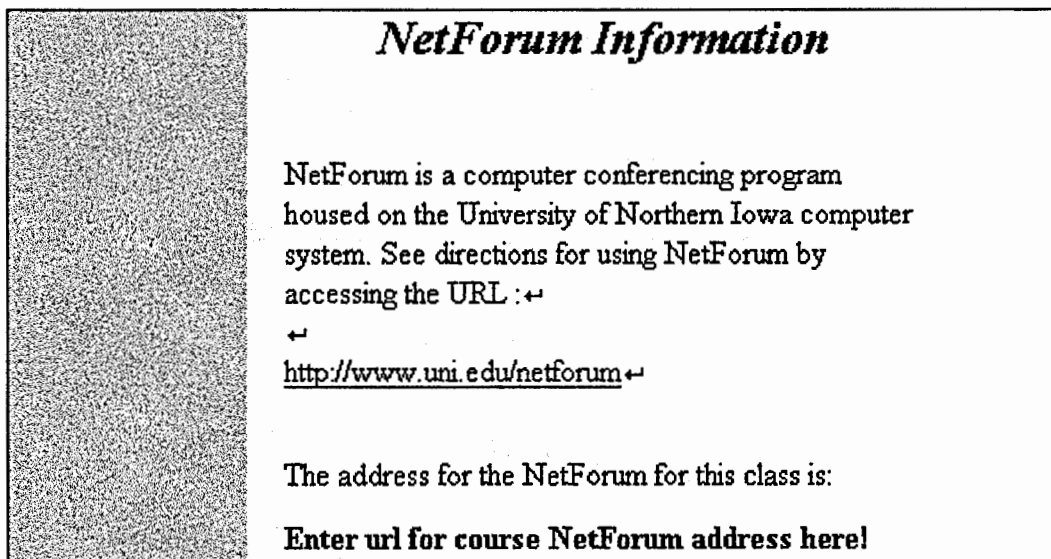


Figure 50

Step 5: In the space provide key in and create a link to the url for the forum for the new section.

Step 6: Save netforum.htm

Step 7: Using a web page editor open the file timeline.html located in the documents folder for this new section (from Preparing new section folders, steps 6 and 7).

Step 8: Key in the appropriate dates for each module and make any necessary changes.

Step 9: Save timeline.html

Step 10: Using a web page editor open the file index.html located in the folder for this new section (from Preparing new section folders, steps 6 and 7)

Step 11: Key in the appropriate semester and instructor information.

<i>Put Semester Here</i>
← Instructor Name ← Mailing Address ← Email Address

Figure 51

Step 12: Create the appropriate links for the external documents make any necessary changes.

Syllabus
<u>Getting Ready for this class</u> ←
<u>Telecommunication Skills Required</u>
<u>Course Description</u> ←
<u>Course Organization</u> ←
<u>Course Requirements</u> ←
Course Timeline (external) ←
Course Listserve (external)
Netforum Information (external) ←
Netforum Discussion Area (external) ←
Graphic Forum (external)

Figure 52

Step 13: Save index.html

CHAPTER FIVE

Conclusions and Recommendations

In conclusion this project was a very rewarding experience. I gained a great deal of technical skills as well as furthering my understanding of distance learning via the web. My initial desire was to look at the existing web-based courses in the Educational Technology program and to develop an effective long term system for offering new sections of these courses. What I feel this project has produced is a 'recipe' for others to follow for creating a new section as well as a model for the structure of instructional materials on a web server.

There is much more work that can be done with the existing materials as well as the need for further experimentation with new technologies to add to the existing system. One recommendation I offer is to look at the documents and images folders within each course and further divide them into folders for each of the modules. This is particularly necessary for the 240:138g, Graphics Production, course because of the number of documents as well as the number of supporting images. Another suggestion is for the GraphicForum, the system for receiving digital assignments, I envision the potential of developing an interactive web database program to facilitate this process.

The virtual classroom I feel is still an unfamiliar territory to learners and instructors. It is a big initiative to design and develop web-based instruction and I

feel it takes an extremely concerted effort to establish the sense of community over the web. I believe that the tools being used in the Educational Technology program, the NetForum, listservs and CU-SeeMe are a positive approach to attempt to create an interactive environment. A suggestion I would make based on my experience of being a web learner as well as observing other classes is that the instructor needs to clearly establish how each of the tools are used and to consistently apply them within the semester.

In closing I am very honored to have had the opportunity to work with this project and I look forward to future opportunities to work with the design development and delivery of web-based curricula with the Educational Technology program.

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