

American Association of Collegiate Registrars
and Admissions Officers

Virtual Learning Environments

AACRAO
Policy
Summit

Serf's Up: Teaching and Learning with Serf, Your Servant on the Internet

by Fred T. Hofstetter, University of Delaware

Abstract

Serf is a Web-based teaching and learning environment developed at the University of Delaware. Serf can deliver courses anywhere in the world, using the World Wide Web as a distance education medium. Serf makes it possible to create and deliver courses in a self-paced multimedia learning environment that enables students to navigate a syllabus, access instructional resources, communicate, and submit assignments over the Web in unique and powerful ways. Instructors can easily access and grade the assignments via the Serf gradebook. At any time, students can click a button to see a report of their progress in a course, along with comments from their instructor and a prediction of their final grade. This article provides an overview of the student, instructor, and administrator sides of the Serf system. To set the stage, the article begins with a theoretical review of why someone would want to teach or learn over the Web.

Why Teach and Learn Over the Web?

Much of what happens in the traditional classroom was influenced heavily by the behaviorist movement, which dominated American psychology from about 1920 to 1970. Chief among the behaviorists was Skinner (1938, 1953), who saw that human behavior is powerfully shaped by its consequences. Skinner felt that psychology was essentially about behavior, and that behavior was largely determined by its outcomes. Two decades of computer-based learning materials were created based on Skinnerian principles. Hundreds of studies assessed their effectiveness. As documented in meta-analyses conducted by Kulik (1996) and his associates, students using computers learned significantly more in considerably less time than students without computers.

Although Skinnerian methods have been effective in training, the behaviorists fell short of what is most important in education for most educators. To educate, you must do more than modify behavior. To educate, you must help the student learn how to develop strategies for learning. Such is the goal of the cognitive movement in education. Cognitive psychology portrays learners as active processors of information. Students learn better when they can invent knowledge through inquiry and experimentation instead of memorizing facts presented in a teacher-dominated classroom (Piaget 1969).

Since there is only one teacher for many students, it is physically impossible for a teacher to support this kind of environment for each student in a traditional classroom. The World Wide Web helps by providing students with an interconnected world of knowledge to explore. Screen-capture and downloading enable students to collect what they discover and construct a framework for organizing and understanding. Since the learner is portrayed as an active processor who explores, discovers, reflects, and constructs knowledge, the trend to teach from this perspective is known as the constructivist movement in education. Serf provides an environment for teaching and learning from a constructivist perspective over the Web.

What is Serf?

Serf is an acronym that stands for server-side educational records facilitator. Coded entirely in server-side Java, Serf keeps the records in an SQL database residing on the server. Behind the scenes, Serf is a symphony of relational databases. The databases keep track of users, maintain states between interactions, deliver courses, and monitor student progress. There are databases for calendars, syllabi, assignments, grades, rosters, and styles. When a user logs on to Serf, each database plays its role toward creating the appropriate screen for the moment. The databases are like musicians in a symphony, where each player performs what's needed to produce the sound of the moment.

The quickest way to understand how the databases combine is to view the form that a Serf administrator uses to create a course. As illustrated in Figure 1, the course consists of the combination of a roster, a syllabus, a calendar, and a presentation style. By editing the presentation style, an institution can totally customize the look and feel of the Serf screens. You can even remove the Serf icon and the University of Delaware logo and replace them with your own institution's graphics.

The course creation form also lets you assign courses to a virtual room. This enables the students enrolled in that course to communicate with students in other courses assigned to that room. When an instructor grades assignments in a virtual room, all of the students in that room will appear. Thus, the virtual room enables more than one course to meet simultaneously in the same Serf space.

Fill in the blanks to give this course a name and title.

Prefix	COMM	Suffix	467	Section	011
Title Multimedia Literacy					

If you know the following information, you can pull down the menus and provide it now, or you can make these assignments later on.

Course Instructor	Hofstetter, Fred
Student Roster	EDDV 467-011 Multilit
Syllabus	Multimedia Literacy
Virtual Room	Multimedia Literacy
Course Calendar	Multilit Fall 1997
Presentation Style	Multimedia Literacy

To create the course, press the Create button.

Create

Figure 1. The Serf Course Creation Form.

Authoring Courses with Serf

Instructors create courses with a Web-based syllabus editor that comes as part of Serf. The editor lets you insert, edit, move, or delete events on the syllabus. Because courses can contain many events, there's an index that lets the instructor locate a specific event quickly. Although Serf courses are delivered over the Web, the instructor does not need to know anything about HTML in order to create a syllabus. All of the HTML is generated automatically by Serf. Instructors who do know HTML, however, can further customize their Serf screens by using HTML. Figure 2 shows an example of a course syllabus being edited by a Serf instructor. When the instructor clicks the edit button, the instructional event editor pictured in Figure 3 appears. Figure 4 illustrates the different kinds of events a Serf syllabus can contain.

chatroom e-mail listserv newsgroup options index search log out

Internet Literacy

Editing Syllabus

Jump back [1](#) | [2](#) | [5](#) | [10](#) | [20](#) | [30](#) | [40](#) | [50](#) | to the [beginning](#)
[Brief Index](#) | [Detailed Index](#)

[Insert](#) | [Edit](#) | [Move](#) | [Delete](#) ? 56 | Weight=1 | Deadline=0 | EventID=62

Local ISP Who is the primary ISP in your area, and how much does that ISP charge per month for Internet service?

[Insert](#) | [Edit](#) | [Move](#) | [Delete](#) 57 | Weight=0 | Deadline=0 | EventID=82

Interlit Web Site Chapter 3 Go to [Chapter 3 of the Interlit Web Site](#) for links to the Internet Service Providers and technical resources mentioned in this chapter.

Figure 2. Creating a Course with the Serf Syllabus Editor.

Edit Syllabus Event

Shown here are the current settings for this event.
Make your desired changes, then click the Edit button.

Web Query assignment ▼

Enter the heading, or title, that will identify this event:

Local ISP

You may supply an optional block of text to appear on screen
with this event. The text may contain HTML tags.

Who is the primary ISP in your area, and how much does that ISP
charge per month for Internet service?

Check the tracking box if you want students to log their progress on this event.

☐ Tracking

If this event counts toward the student's grade in the course, specify the relative weight.

If this event has a deadline, specify how many days the student has to complete it.

Weight Days Allowed

Click the Edit button to record this item, or scroll down for other options.

Edit

Figure 3. The Instructional Event Editor.

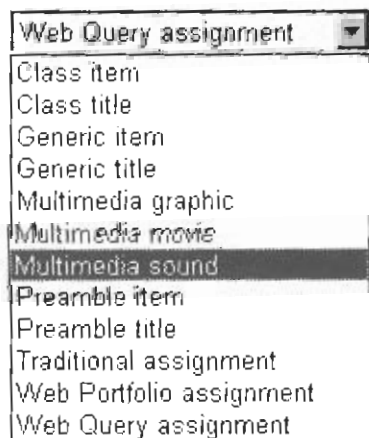


Figure 4. The Pull-Down Menu of Events
that can be on a Syllabus.

The Student Side of Serf

The first Serf screen the student sees is the logon screen, as pictured in Figure 5. If the student has never used Serf before, the student will have been given a "ticket" to get in. At the University of Delaware, for example, the ticket is the student's social security number. Students are told to go to the Serf logon screen and click the Ticket button. On-screen instructions prompt the student to choose a Serf name and password, which the student uses to log on to Serf.



Figure 5. The Serf Logon Screen.

During the fall of 1997, Serf is being used to deliver three courses at the University of Delaware: Internet Literacy, Multimedia Literacy, and Advanced Multimedia Design and Development. From the first day Serf went online, students have taken to it naturally. That's because Serf was designed to be intuitive and self-helping. For example, if the student logs on before the course begins, Serf displays the course preamble shown in Figure 6. Notice the communication options at the top of the screen; Serf is rich in communication among students, teaching assistants, and instructors.

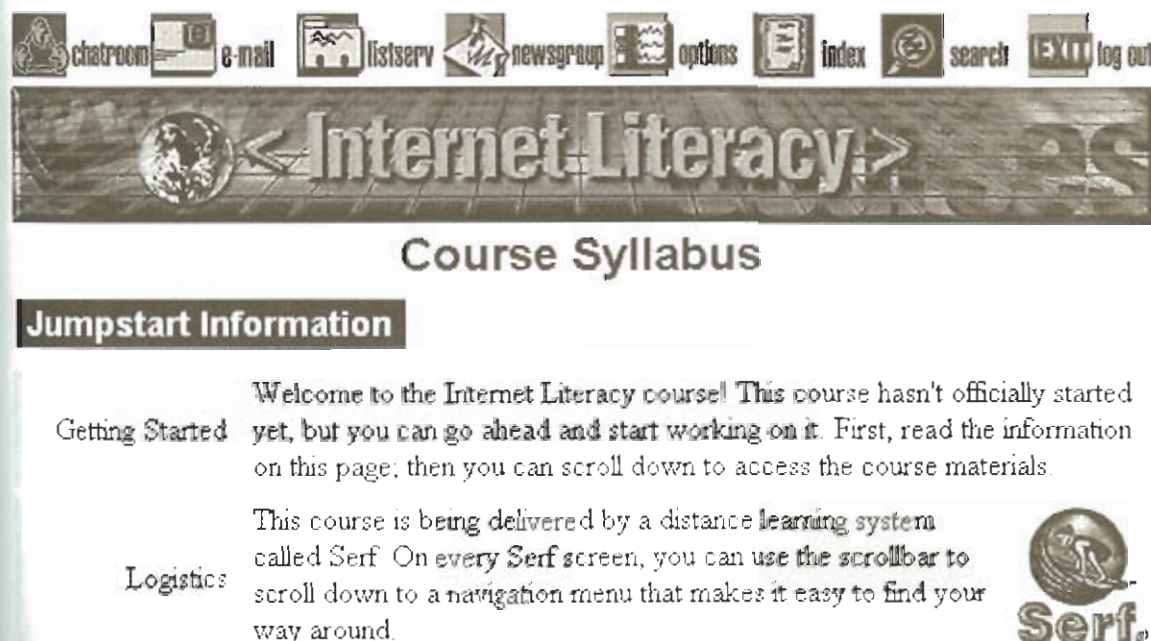


Figure 6. The Course Preamble.

At the bottom of every student screen, the control panel shown in Figure 7 appears, providing a broad range of additional options. These include a personal calendar, on which the student can set alarms to provide advanced notice of upcoming events.

Syllabus	Assignments	Calendar	E-Mail	System
Current Class		Daily		Logon
Brief Index	Inspect	Weekly	Instructor	Logout
Detailed Index	Submit	Monthly	Assistant	Password
Preamble	Grades	Add Event	Classmate	CD-ROM Setup
Search		Delete Event	Register	Switch Courses
View Complete		Change Event		

Figure 7. The Student Control Panel.

At any time, the student can ask to see a detailed index of the course. Figure 8 displays an excerpt from the Internet Literacy syllabus; the camera icons indicate movies that are linked to the syllabus as multimedia learning resources.

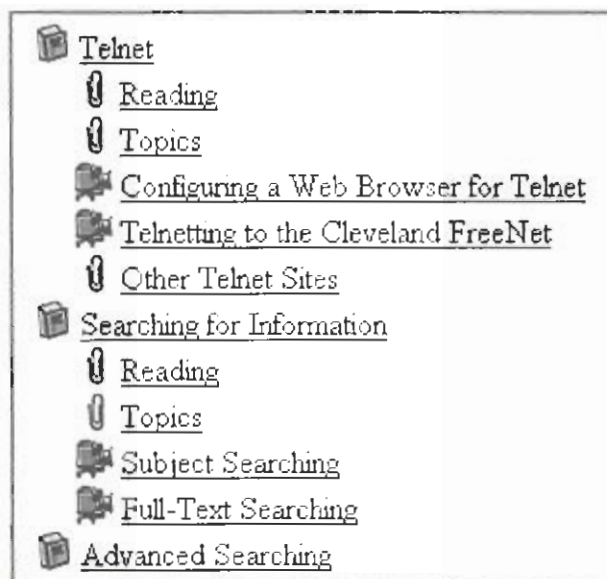


Figure 8. Part of an Index from a Serf Syllabus.

The Instructor Side of Serf

Figure 9 shows the control panel that instructors use to navigate Serf. An instructional events index provides quick access to any part of a syllabus that the instructor may wish to inspect or edit. The gradebook has been designed to make it quick and easy for instructors to grade assignments. When the instructor clicks the Gradebook button, the class grade report appears as shown in Figure 10. If a student has submitted an assignment that the instructor has not yet graded, a "Grade Me" trigger appears in the Pending column. Clicking the Grade Me trigger takes the instructor to the individual grades form shown in Figure 11. When the instructor clicks an assignment to grade it, the grade form shown in Figure 12 appears. The instructor can assign either a letter grade or a percentage, and there is also a window in which the instructor can leave a message that the student will receive the next time the student clicks the Inspect Assignments button.

Syllabus	Student Views	Administrative	Personal Calendar	System
Edit	Current Class	Gradebook	Daily	Logon
View	Brief Index	Switch Courses	Weekly	Logout
Brief Edit Index	Detailed Index	View Roster	Monthly	Password
Detailed Index	Preamble	Add to Roster	Add Event	CD-ROM Setup
Edit Calendar	Search	Drop from Roster	Delete Event	Register E-mail

Figure 9. The Instructor Control Panel.

Student Name	Serf Name	Pending	Graded	Average	Final
<u>Doe, John</u>	jdoe		6 of 6	B	B
<u>Jones, Benjamin</u>	Ben Jones	<u>Grade Me</u>	4 of 6	B+	I
<u>Smith, Mary</u>	mary		6 of 6	A	A

Figure 10. The Class Grade Report.

Assignment	Grade	Date
E-mail	<u>A+</u>	21-Sep-97 12:27:12 PM
Listserv	<u>A+</u>	21-Sep-97 12:27:20 PM
Home Page	<u>Grade Me</u>	21-Sep-97 12:22:21 PM
Term Paper	<u>Grade Me</u>	21-Sep-97 12:22:51 PM
Multimedia Project	<u>B</u>	21-Sep-97 12:27:29 PM
Newsgroup	<u>A</u>	21-Sep-97 12:28:00 PM
	Final Grade: I	

Figure 11. The Individual Grades Form.

To assign a grade to the student named Benjamin Jones,
 whose Serf name is Ben Jones,
 for the assignment named Term Paper,
 use either the Letter Grade menu, or the Percent menu,
 to select the grade you want to assign.

Letter Grade Percent

The URL submitted by the student is:

<http://www.udel.edu/benjones/mpeg.html>

If you want to leave a comment for the student regarding this assignment,
 you may do so in the box below

You could improve this paper by visiting <http://www.mpeg.org> and
 searching the MPEG FAQ for information on the scalability of
 digital video recordings.

Click the Grade button to record the student's grade

Figure 12. The Grade Assignment Form.

The System Side of Serf

Serf's object-oriented database design facilitates the administrative aspects of creating or importing student rosters, assigning rosters and instructors to courses, and exporting grades at the end of a course. Because calendars are stored as objects, updating a calendar at the beginning of an academic term causes the events on the course syllabus automatically to inherit the dates on the new calendar.

Figure 13 shows the Serf system options that an institution's Serfmaster uses to oversee the Serf server. The monitor options make it possible for the Serfmaster to watch over the system remotely via the Web, without needing to be present physically at the server. The import and export features enable the publishing and distribution of Serf courses.

System Staff	Administrators	Instructors	Assistants	Students
List Create Delete	List Create Delete	List Create Delete	List Create Delete Assign Unassign	List Create Delete Add to Roster Drop from Roster
Users	Courses	Calendars	Rosters	Rooms
List States Records	List Create Delete Edit Switch	List Create Delete Reconfigure	List Create Delete Reconfigure View Current	List Create Delete
System Commands	Syllabi	Current Calendar	Styles	Grading
Logon Logout SQL Your Password Other's Password CD-ROM Setup	List Create Delete Reconfigure	List Edit	List Create Delete Reconfigure Edit Current Edit Default	Gradebook
Change Levels	Current Syllabus	Personal Calendar	Student Views	E-Mail
System Administrator Instructor Assistant Student	List View Edit Brief Edit Index Detailed Index Preamble	Daily Weekly Monthly Add Event Delete Event Change Event	Current Class Brief Index Detailed Index Preamble Search Syllabus	Instructor Assistant Classmate Register
Configure	Monitor	Import	Export	Database
Cookies Driver Scope Threads	Console Memory Threads Trace Shut Down	Calendar Roster Style Syllabus	Calendar Grades Roster Style Syllabus	Backup Restore

Figure 13. Serf System Options.

Serf Communication Features

Serf contains a point-and-click e-mail grid that makes it quick and easy to send e-mail to any student, teaching assistant, or course instructor. Serf has special support for the ParaChat network, which provides real-time communication options for students in Serf courses. Buttons at the top of every Serf screen provide instant access to the course listserv (i.e., electronic mailing list) and newsgroup. Students use threaded newsgroups to maintain conversations on different topics throughout a course.

Tracking Student Progress

There are three ways in which Serf tracks student progress: Web queries, Web portfolios, and Tracking boxes.

- **Web queries.** A Web query is a question that the instructor asks on a syllabus. When Serf serves a class containing a Web query, the student must answer the question on the syllabus, as illustrated in Figure 14. At any time, the instructor can inspect the answers to the Web queries, which can also count toward the student's grade in the course.
- **Web portfolios.** Serf takes advantage of the terrific new Web-page creation tools provided in the latest versions of Netscape Communicator and the Microsoft Internet Explorer. Instead of submitting assignments on paper, students create Web pages, mount the pages on the Web, and submit the URLs (i.e., Web addresses) of the Web pages in response to Web portfolio assignments. At any time, the instructor can review the Web portfolio submissions, assign grades, and provide feedback via the Serf portfolio feedback form.
- **Tracking boxes.** If the instructor wants an item on the syllabus to be tracked, the instructor can enable that event's Tracking option. When Serf serves the class containing this event, the student will be presented with a tracking box, and the student will be told to click the box upon completing the event. At any time, the instructor can inspect the status of the tracking boxes for any student in the course.

There's a knack to writing a hypertext in such a way that the wording makes it clear what will happen when the user triggers the link. List three different ways you could write a hypertext instruction on the screen which, when clicked, takes the user to your home page.

Writing a
Hypertext

?	This is a Web Query assignment. Click <u>Submit</u> when you're ready to answer the question.
☺	This item counts 2 points toward your grade in the course.

<< back
next >>

Figure 14. How a Web Query Appears on the Internet Literacy Syllabus.

The Future of Serf

Serf is being developed according to a systematic approach based on the continuous cycle of improvement used in Total Quality Management (TQM). This means that the most important input to the future of Serf will come from its users. Already, many features have been added or modified based on the pilot testing that was conducted prior to the release of Version 1.0, upon which this article is based.

A special aspect of Serf is the manner in which it integrates multimedia CD-ROM into the Web-based learning environment. Until now, so-called "hybrid" CD-ROMs have used the Web as a way of providing links to more up-to-date information than what was pressed onto the CD. Serf reverses this process. Instead of using the Web to extend a CD, Serf uses the CD to support the Web. The Serf CD-ROM option enables the students to configure their CD-ROM drives as real-time multimedia resources in support of an online syllabus.

The Serf CD-ROM option offers publishers a new way of packaging multimedia teaching and learning materials. Internet Literacy is the first course to be delivered this way. It will be interesting to see whether publishers will become attracted to this way of delivering multimedia courses over the Web.

How to Find Out More About Serf

To find out more about Serf, go to Serf's home page at <http://www.udel.edu/serf>. There you will find more detailed information about how Serf started, who is using it, and what is contained in the Serf product. You can also request a demonstration logon that will enable you to take Serf for a test drive and experience personally the environment that has been described in this paper.

References

Kulik, James A. "Meta-Analytic Studies of Findings on Computer-Based Instruction." In Eva L. Baker and Harold F. O'Neill, Jr. (eds.) *Technology Assessment in Education and Training*. Hillsdale, N.J.: Lawrence Erlbaum, 1996.

Piaget, J. *The Mechanisms of Perception*. New York: Basic Books, 1969.

Skinner, B. F. *The Behavior of Organisms*. New York: Appleton-Century-Crofts, 1938.

Skinner, B. F. *Science and Human Behavior*. New York: Macmillan, 1953.