Booksites as Web-based Dynamic Supplements to Computer Science Textbooks

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Abstract

Computer science textbooks can be productively supplemented by web-based resources. No matter how well a book describes the state of the field when it is written, over time new topics will emerge and valuable resources will become available. In contrast to the static pages of a book, the pages of a website can be highly dynamic and potentially always up-to-date. A website dedicated to supplementing a book, often referred to as a 'booksite', therefore offers a particularly valuable additional resource to instructors, students, and professional users of computer science textbooks in this age of the Internet. In this paper we describe several current booksites and consider both the benefits and work involved, based on our experience operating a booksite and studying others.

1 Introduction

Resource materials for instructors, students, and professionals to supplement a textbook have been around for some time. The medium has changed with the technology as we have seen paper-based supplements followed by slides, cassette-tapes, videotapes, videodisks, diskettes, CDs, and files stored at FTP sites. In addition to resource materials, discussions of computer science topics and pedagogical methods help improve teaching and learning. These discussions usually take place among instructors and professionals at conferences, via email and through newsgroups. Students too search for additional

references and have discussions of their own as they try to learn. With the development of the World Wide Web, we now have another method for making supplementary material and discussion available from the author(s); for sharing resources and methods between those trying to teach the same material; and for providing additional assistance to students. This environment however, has the potential to be more usable, current, and public. Textbook publishers recognized the value supplementary materials add to a book before the Internet was developed and now seem to be supporting web sites dedicated to supplementing a book, often referred to as a 'booksite'.

2 Booksite Advantages

A booksite supplementing a textbook can provide:

1. students with supplementary materials such as practice examination questions, study guides, on-line demonstrations, downloadable software, and links to related resources on the web. Research has shown that computer science students can do better with web-based resources supplementing lectures [5], particularly for more advanced courses [6]. While this was with local resources organized around local courses, a booksite should be able to achieve similar results.

2. instructors with supplementary materials such as examination questions, projects, lecture notes, teaching tips, downloadable software and links to related resources on the web.

3. instructors and students with a convenient method for giving feedback on the book.

4. designers additional insight into what users are interested in via automated page hit counting.

5. potential readers of the book a preview of the material it contains and the ability to order a copy on-line;

6. visitors with a search of the site or book for material on a particular topic using a local search engine.

7. users with communication services via shared teaching materials and through messages posted to the booksite or sent via an associated mailing list.

8. visitors with a diverse sensory experience by having sound, video, and animated materials.

Figure 1: The DTUI Booksite Homepage (http://www.awl.com/dtui/)

3 Example Booksites

Tools for HCI Education and Training: Ben Shneiderman's, *Designing the User Interface (*DTUI) [7] booksite at http://www.awl.com/dtui/, was originally designed by Blaise Liffick at Millersville University and is now being developed further by Roger Chapman at The Ohio State University. This booksite is titled "Tools for Human-Computer Interaction (HCI) Education and Training" and its homepage and site map are shown in figures 1 and 2 respectively. The site has four main areas: "The Book" contains various information about the textbook itself, much of which is intended to allow someone to get a quick overview of the book. "Chapter Supplements" has resources organized by the topics in each of the chapters, as the chapter is a fundamental frame of reference when working with the book. There is an introduction to the material of each chapter, a set of lecture notes that may be downloaded and printed onto transparencies or used directly on the web for presentations, and 552 web links organized by chapter topic and subtopic. There are also teaching tips and examination questions that have been submitted by users of the book, but at the time of writing these have not reached a sufficient number that they need to be divided into separate pages by chapter. "Other Course Aids" has additional supplemental resources that are not organized by chapter. In this area are 21 course descriptions and syllabi from adopters of the book, 6 short assignments and 21 more lengthy projects. "Community" has information about the DTUI mailing list for educators and professionals interested in discussing the book, the HCI curriculum, and HCI in general. The list currently has 67 subscribers. Experience with this list has shown it can be useful to only allow approved subscribers to post messages to the list in order to avoid spam messages. The community area also credits contributors to the site, and has a set of links for major HCI sites. Comments from users have been largely positive such as this anonymous note on Amazon.com: "It's jam packed with updates, study guides and errata." Instructors complain on occasions when the website has gone down and occasionally send email compliments such as "I really do

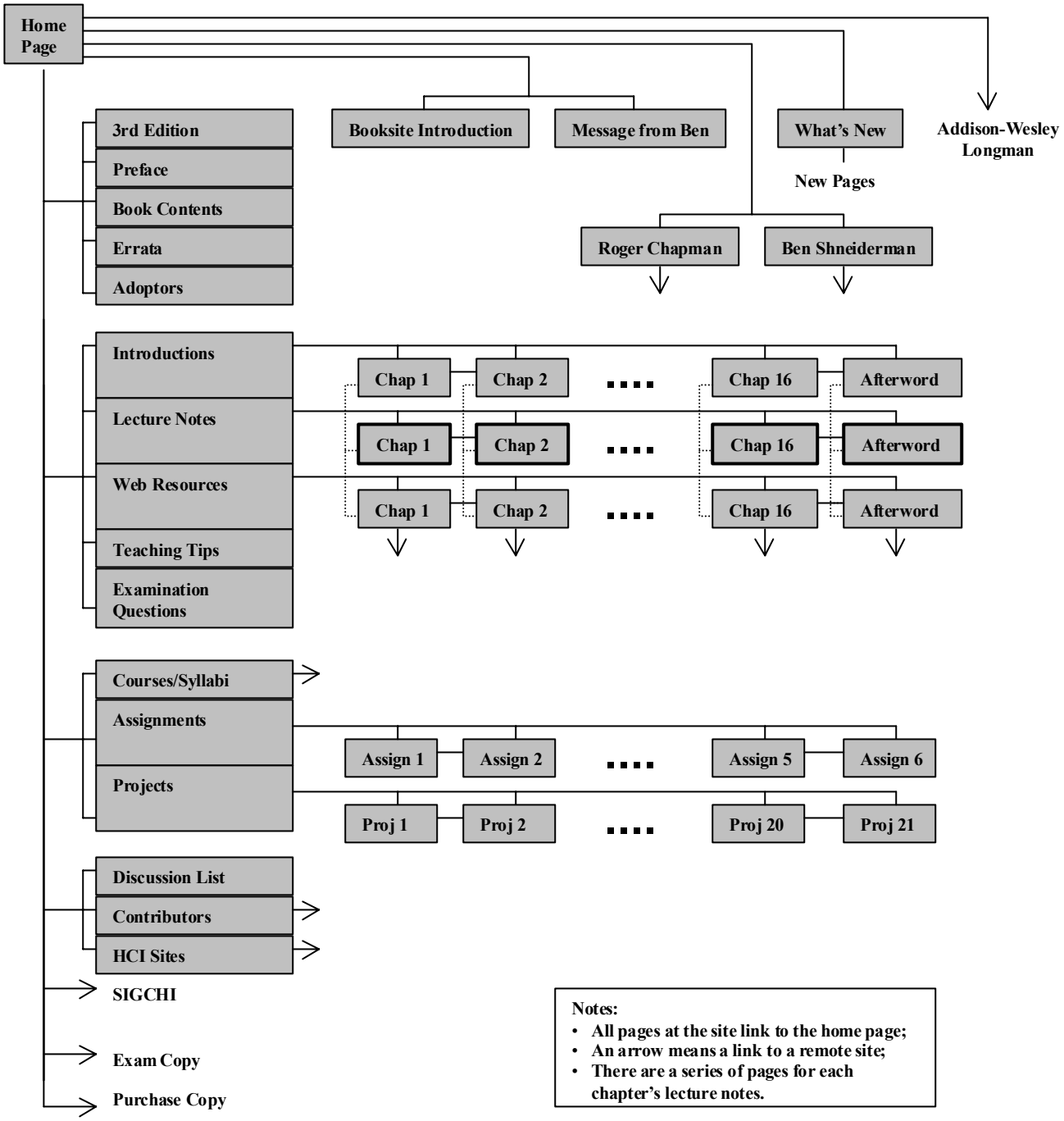

Figure 2: The DTUI Booksite Site Map

like the booksite very much. It is logically organized and are lots of great adjunct resources. I particularly like the projects and assignments area, as they have given me lots of good ideas for additional ways to approach active learning for the class experience." A logging tool used by Addison-Wesley Longman, called Summary (available at http://summary.net/), provides additional feedback. Data collected between Jan 18, 2000 and February 21, 2000 showed the site was visited from 2,722 unique hosts in 51 countries. A zipped file containing lecture notes was downloaded 139 times. The lecture notes and chapter related web links directories were visited the most (12% and 11% respectively). The site was visited most often using Microsoft Explorer (40%) and then using Netscape Navigator (30%).

Human-Computer Interaction: Dix, Finlay, Abowd, and Beale's, "Human-Computer Interaction" [4] booksite at http://www.hiraeth.com/books/hci/, is another to

supplement an HCI textbook. This site has chapter introductions, 69 web links organized by chapter, and three design projects, but unlike the DTUI booksite it also has answers for 54 online chapter exercises. It has overheads for the instructor, but mostly as downloadable postscript files. An interesting feature of this site is the ability to search the text of the book itself. This would seem useful to the potential user who wants to quickly check if there is any mention of a certain topic, or someone who already has the book, but wants to search for something that isn't mentioned in the index. The result of a search is a rank-ordered set of paragraphs that each contains the word(s) used in the search specification.

Shelly and Cashman: According to their own website [3], "Shelly and Cashman are the authors of the phenomenally successful Discovery Computers series of books for introductory computer courses, the most popular Microsoft Office books in the industry, and many other best-selling computer-related textbooks. Shelly and Cashman have introduced computers and computer software to millions of people, consistently providing the highest quality, most up-to-date materials in computer education." http://www.scseries.com/default.cfm is the homepage for the more than 50 books in the series. There are four main sections to the page. "Series Information" has general information about the Shelly and Cashman series, but also a Technology News area with links to sites such as zdnet.com, abcnews.go.com and wired.com for the latest events in the world of computer technology. "Teaching Resources" has downloadable test building software, options to build a customized text order by combining various titles in the series, and links to summary pages for each of the textbooks, where a desk copy can be ordered or online supplements downloaded. To order a text or download instructor's resources a username and password must be obtained by telephone. "Student Center" has an option for downloading student data disk files for the textbooks and links to a website for each book that has materials to be used in conjunction with the book when working on exercises. Students can also purchase a book online in this section. "Support" has options for finding local sales representatives, technical support, and an online survey on the effectiveness of Shelly and Cashman teaching tools.

Computer Confluence: George Beekman's booksite for his computer literacy textbook *Computer Confluence: Exploring Tomorrow's Technology* [1] at the easy to remember address http://www.computerconfluence.com/ presents the table of contents and a brief introduction to each chapter, but from a student perspective the site seems largely a collection of links organized by topics within chapters. There is an Instructors Forum [3], which requires a password obtained from a sales representative for the publisher. Instructors can share their experiences with the book and download teaching resources. The book comes with a CD-ROM that, "supplements and reinforces the printed material in the book with state-of-the-art 3D animation, audio, and video. It also includes a software sampler for hands-on experimentation and interactive study materials that provide immediate student feedback." This explains why there are few resources for students on the booksite itself.

One nice feature of this booksite is the fact that, although this site has fewer web links to remote sites for each topic in a chapter than the DTUI site, there is a brief summary of what is found at each location, rather than just the title.

Given the title of this textbook it is perhaps not surprising to find a 27-minute online Shockwave interview [2] by Dr. Moira Gunn for "Tech Nation... Americans and Technology" a weekly interview show syndicated on National Public Radio (NPR) stations, where George Beekman discusses the evolving role of multimedia in education and speculates on the impact of multimedia technology on our future. With the increased bandwidth of the Internet and the continued development of technologies such as streaming audio and video it would seem likely that booksites will have more resources like this, and a book such as this one will not come with a CD in the future, because the multimedia resources will all be downloaded.

Other Booksites: While the major book publishers and distributors online are providing at least basic summary details now for their books, there appear to be few booksites like those described previously for computer science textbooks at this time. Lewis and Rieman's, "Task-Centered User Interface Design: A Practical Introduction", available by anonymous ftp from ftp.cs.colorado.edu (with a simple front-end on the World Wide Web at: http://www.acm.org/~perlman/uidesign.html) is interesting because it is the first shareware book on interface design. While this may suggest to some that it is probably not a very good book, it is actually an excellent practical guide to user interface design and evaluation, making it a good choice for a supplementary text for software engineering courses.

Other computer science related books online or booksites include:

- The On-Line Books Page at http://digital.library.upenn.edu/books is hosted by the University of Pennsylvania Library. It has over 9,000 books available for free reading online (with 259 in mathematics and computer science).
- The National Academy of Sciences has 1,350 books online in full text including many on computer topics at http://www.nationalacademies.org/publications/
- The *Connected Family* booksite at http://www.connectedfamily.com/main.html is an entertaining site for Seymour Papert's book discussing the benefits of parents and children learning about computers together.

- The booksite http://mitpress.mit.edu/e-books/Hal/ contains *HAL's Legacy: 2001's Computer as Dream and Reality*. This site contains the full text of some chapters and abstracts for others.

4 Practical Considerations

Experience with the DTUI booksite has taught us that while a booksite can be a very useful supplement to a book, it is a dynamic up-to-date resource only to the extent that people are able to make it so. For instance, a person or persons are needed to:

Provide access to, and support for, a web server to host the booksite: In the case of the DTUI booksite, the book publisher, Addison Wesley Longman, provides this itself. This demonstrates that publishers may recognize that hosting a booksite can make the book more attractive to potential adopters and buyers. However, having a publisher host the web pages can complicate updating the booksite if that is not done by the publisher or made a simple process by, for instance, ftp transfers.

Develop the supplementary materials: The author of the book may develop these, but there is also the potential to involve users of the book by including material such as their syllabi, examination questions, projects, teaching tips or studying tips. These may be stored on the machine hosting the booksite or links to the material developers' pages may be used. In the case of the DTUI booksite much of this type of material is kept on the machine hosting the booksite, but links are used for the more dynamic material, such as descriptions for courses where the book is used.

Design and implement the interface to the booksite: Good booksite design requires a person with skills in both HCI and a language or tool that can be used to implement that design on the web. The author of the book may have those skills, but prefer to see someone else assume this responsibility, as is the case with the DTUI booksite.

Keep any web links to remote sites maintained: When there is much material elsewhere on the web related to the material of a book, it is a service to users to organize links to that material and connect them appropriately to the organization of the book and booksite. At the DTUI booksite it is a significant amount of work to maintain the links to remote sites as pages are moved or removed from the web, and new relevant pages are added. A person or persons may be assigned this responsibility, but if the community of book users also contribute in this effort it helps tremendously. There is software for automatically checking for broken links, which helps reduce the workload, but finding quality new resources is much more labor intensive.

Interact with the users of the booksite: Visitors to a booksite expect to be able to find an email address on the site for situations when they have a comment, question or suggestion for those maintaining that site. A person or persons are therefore needed to respond to these messages reasonably promptly.

5 Conclusions and Future Directions

In this paper we have introduced many potential benefits of a booksite and described several sites, each with a different design in some respects. We hope this is useful to those interested in booksite development so that ultimately more personal and community learning takes place while books still provide a convenient core catalyst resource as technological developments continue to provide additional potentially useful "mind tools".

A well-supported dynamic booksite has much to offer as a supplement to a static book. However, it is important not to underestimate the skills, workload and financial resources that will be needed to make a booksite a useful complement and not simply a less static poorly designed supplement.

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