

Putting the Instructor in Charge: Component Architecture and the Design of a Course Web Site.

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Abstract: This paper describes the “component architecture” of the web and how teachers can use various existing components of the web – plugins, websites, applets, web services etc., to develop complex applications with limited investment of resources. Furthermore, the pieces of independent software units can be coordinated towards a final product that effectively hides the “duct tape” that holds the pieces together. This “mix and match” approach towards developing educational software saves money and time and allows information sharing across activities in an integrated fashion which in turn.

Introduction

One of the most important tasks faced by a teacher is designing the classroom learning environment. Either consciously or instinctively (or a combination thereof), teachers chose the topics that will be covered, they structure the classroom conversations, they assign tasks for students to work on, and they provide tools and resources to students. It can be argued that some of the resistance teachers felt towards technology (specifically computer-based technologies) could have been caused by a feeling of losing control of their classrooms. Until recently, teachers did not have access to technology, could not participate in its design and its integration into their teaching practices.

Introducing Component Architecture and the Web

We believe that we are at a new position now. New technologies (such as the Web) allow teachers to take on a far more proactive role in the design and implementation of new technologies. One concept that we believe is key to teachers becoming designers has been called “the component architecture of the web.” That is, using various existing components of the web (plugins, websites, applets, web services etc.) instructors can develop very complex applications with limited investment of resources. Furthermore, the pieces of independent software units can be coordinated towards a final product that effectively hides the “duct tape” that holds the pieces together (Zhao, Mishra, Ferdig, in press). This “mix and match” approach towards developing educational software has two main advantages: (a) it saves money and time; and (b) it presents different functions in an integrated fashion which in turn; (c) allows information sharing across activities.

Teachers as designers

It is our contention that the component architecture of the web allows us to easily, and inexpensively, develop complex, diverse, dynamic, and pedagogically sound web sites. It is for these reasons that we argue for teachers to become designers of their own technological solutions. To support this claim, we describe a web site that was used to support a teacher professional development course taught by the first author. We describe the goals of this undertaking, how existing components of the web were used to meet these goals, and the lessons we learned from this undertaking. We conclude by contrasting our approach with a course web site developed using an existing prepackaged approach offered by Blackboard.com.

Putting the pieces together for a course web site

The web site was designed for use in a graduate educational technology course consisting primarily of in-service teachers (with a few master’s students in educational technology). Students in this course worked in design teams to develop computer-based products that would be useful for teaching and learning. To meet the needs of the course, we needed to develop a technology environment that would help us with effectively communicating within project teams, across project teams, and among all class participants, managing projects, providing access to readings, and archiving artifacts developed in the course. Instead of developing or purchasing a large software package, we assembled an efficient environment from mostly free software and existing services on the web. All of these components were integrated into the course web site seamlessly.

The web site included standard course information—the syllabus, readings, pictures of artifacts developed, and powerpoint presentations based on lecture. Beyond these basic resources, the web site employed several other technologies to meet other course needs. The technologies, or components used for the design of the web site were as follows:

Blogger.com: A free web service that allowed the faculty to update and ftp web pages to one part of the web site without having to use any web- or HTML-editing facility.

Egroups.com: A web service for managing mailing lists and threaded discussion groups. Egroups also offered, (a) an archive of all communications; (b) a classlist (with pictures) and contact information; (c) web polls; (d) a group calendar, and (e) 20 MB of web space for archiving files and readings.

Idrive.com: Each student in the class was required to register for an Idrive account. Idrive offers its users 50MB of free web space to upload, save and share files. In addition, Idrive also offers unlimited web space for files that are saved directly off the Internet. This feature is useful to practicing teachers who wish to “file” useful lesson plans and other web sites for future reference.

Apart from the organizational and pragmatic uses of these free services, the course web site also attempted to offer a new way of thinking about learning in today’s networked environment. These options were seamlessly integrated into the class site by maintaining all of the course options in one frame while presenting the “outputs” site in the other frame.

The History Channel: The course page linked to the History Channel web site that provided information about “this day in history” and “this day in the history of technology.”

Searches via Google, Encyclopedia Britannica and Meriam Webster: To emphasize how information on the web could be easily accessible the course web site has fields that allow students to search Google, Encyclopedia Britannica and Merriam Websters Dictionary.

Lessons learned

We see the development and maintenance of such a system as an ongoing experiment to study and reflect on what is possible using freely available services on the Internet. Some things we have learned are: (a) Users of the system see an integrated web-site and were unaware of how the entire system is cobbled together from what is essentially freeware on the web; (b) One can reinterpret the functionality of software i.e. they can be used in ways and within contexts that were not envisaged by the designer of the original computer program. For instance, Blogger was used to maintain an announcements page. This was not something that Blogger was designed to do but which worked out quite well; (c) Trouble shooting the system is quite easy. If the mailing list does not work for some reason it is because egroups is down, not because there is something wrong with the whole class site. In fact, the loss of one component does not bring down the entire course site; (d) This system gave the instructor much more freedom and flexibility than the system run by the university; (e) Such a system should be within the reach of common teachers financially and technically.

Course web sites using Blackboard.com

We offer a contrast of our component approach with a pre-packaged system such as Blackboard.com. This company offers an integrated web course site development and presentation environment, developed for and by educators. However, Blackboard.com constrains the options the instructor would like to have. For instance having a listserv (which could be accessed just through email), with built-in web archives (as in Egroups) was important to the instructor. However Blackboard.com allows just web based discussion forums which would be hard to access on a slow phone line. Also, the instructor may want to disable certain options available (say, on-line chat). Though Blackboard.com allows instructors to disable online chat it provides no way of removing the chat button from the options. Moreover integrating functionalities such as the web search from within the course site, is not easily done with Blackboard.com. And finally, using Blackboard.com as a solution does not allow students to learn about the messy process of design of through an actual case study—the course site itself.

By constructing this class web site, we not only provided students with tools that made their participation in the class easier, we also gave students an example of how to design and integrate technology into classrooms. Since the main goal of the class was to help teachers integrate technology, the web site was one way to help “lead by example.”

References

Zhao, Y., Mishra, P., & Ferdig, R. F. (in press). Putting the pieces together: The power of component architecture and the design of web-based learning environments. Computers in Schools.