

Web-based Course Management Tools
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Web-based course management tools are Web authoring tools that integrate technological and pedagogical features of the Internet and the World Wide Web into a single, template-based authoring system to facilitate the design, development, delivery and management of Web-based courses and online learning environments. Web-based course management tools emerged when Web authoring tools like Adobe's PageMill, Microsoft's FrontPage and Macromedia's Dreamweaver were being increasingly used to create Web-based courses for online learning. The need for a more integrative structure to manage the delivery of such courses and facilitate the migration from face-to-face classroom instruction to Web-Based Instruction (WBI) resulted in the development of **one stop one shop** applications such as WebCt, Blackboard, Virtual-U, and TopClass among others. Unlike previous Web authoring tools, Web-based course management tools include instructor tools, learner tools, and technical administration tools allowing for different types of users and for multiple Internet and Web-based activities embedded within the tool itself.

Web-based course management tools incorporate various technological and pedagogical features including: Web links, search engines, synchronous and asynchronous communication, course announcement areas, student posting areas, tracking of student records and interactions, management of course information, and Web-based development capabilities, among others. The purpose is to provide a central location for delivery of course content, related information or links, provision of models of assignments, communication between instructors and students, and group process for development of shared projects, as well as development of Web-based products. These integrative tools present an opportunity to incorporate various instructional strategies using available features of the software, into a holistic course design. The following table helps the reader differentiate between Web authoring tools and Web-based course management tools.

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Category	General Features	Instructional Products
<p><i>Web-based Authoring Tools</i></p> <p>Examples include: FrontPage, DreamWeaver, Claris Homepage, Homesite, PageMill</p>	<ul style="list-style-type: none"> • Browser interface • Utilized with Internet-Based technologies • Open system (allows user to go beyond the boundaries through external linking to the WWW) • Extensible • Dynamic content • Enables active/collaborative media 	<ul style="list-style-type: none"> • Single Web pages and integrated Web sites for the purposes of information presentation to support classroom instruction • Structured Web sites resulting in a variety of formats for WBI • Personal and institutional homepages • Web publishing

	<ul style="list-style-type: none"> • Require a steep learning curve in order to take full advantage of their features • Used by a variety of users to develop Web sites for multiple purposes • Do not have specific instructor or learner tools 	<ul style="list-style-type: none"> • Organization of Web-based resources • Complex animations and interactions when used with high level scripting languages (Java, Javascript, C++) and other Web development tools
<p>Web-based Course Management Tools</p> <p>Examples include:</p> <p>WebCt, Blackboard, TopClass, Virtual-U, Lotus LearningSpace, Web Mentor, Symposium, TopClass, Convene, Embanet, Real Education, eCollege.com, E-Web, Internet Classroom Assistant, Softarc's FirstClass, Serf, Virtual-U, and Eduprise.com.</p>	<ul style="list-style-type: none"> • Browser interface • Utilized with Internet-Based technologies • Open system • Easy to use • Dynamic content • Enables active/collaborative media • Have specific tools for instructors, learners and administrators • Embedded communication tools (email, discussion forums, group tools) • Used primarily to manage and deliver online learning in educational institutions and online training in corporate settings 	<ul style="list-style-type: none"> • Online learning (e-learning) • Distance education programs • Courseware (WBI) • Knowledge networks • Knowledge portals • Asynchronous & synchronous learning environments • Distributed learning environments

For a more comprehensive list of authoring tools and a comparative analysis of their features, visit Bruce Landon's Website at: <http://www.ctt.bc.ca/landonline/index.html>. Below is a brief description of some of these tools and their associated URLs

WebCT (<http://www.webct.com/>)

WebCt currently has two editions, WebCt 3.5 standard edition and WebCt 3.5 Campus edition. The Campus edition offers a total online learning solution to institutions that wish to integrate their online courses with campus wide portals and student information systems. The Standard Edition is ideal for institutions that want a robust, pedagogically sound course platform, but don't need extensive features for enhanced scaling or integration with campus systems. In addition to facilitating the organization of course material on the Web, WebCT also provides a variety of tools and features that can be added to a course. Examples include a conferencing system, on-line chat, student progress tracking, group project organization, student self-evaluation, grade maintenance and distribution, access control, navigation tools, auto-marked quizzes, electronic mail, automatic index generation, course calendar, student homepages, embedded email, course content searches and more.

BlackBoard (<http://www.blackboard.com>)

Blackboard offers three levels of its online development software: Blackboard.com, a free course creation tool which includes features such as content organization, class discussions, group communication tools, online quizzes tool, electronic mail, an announcements posting area, and a digital dropbox among others; Blackboard 5, a more comprehensive e-learning software that includes customizable institution-wide portals, online campus communities, and an advanced architecture allowing easy integration of multiple administrative systems in addition to a course management system; and Blackboard CampusWide, which allows institutions to manage student registration and accounts, process financial transactions, and control everything from facility access to user identification.

TopClass (<http://www.wbtsystems.com/products/products.html>)

TopClass provides a virtual environment to manage all aspects of content and class management and to deliver a flexible learning environment built upon Web standards. It includes features such as security (unique user ID), online registration and enrollment, collaborative tools (email, threaded discussion groups, bulletin board), a testing engine, student progress tracking, content and user searching, summary reporting, and course assembly tools that are platform independent.

Virtual-U (<http://www.vlei.com/>)

Virtual-U is an online learning application made up of various integrated components. These include the VGroups conferencing system which gives instructors the ability to easily set up collaborative groups and define structures, tasks and objectives; course structuring tools (the Workspace and the Course Syllabus) which enable instructors to create complete courses online without programming knowledge; student performance tracking (the Gradebook); and system administration tools.

Lotus LearningSpace (<http://www.lotus.com/home.nsf/welcome/learnspace/>)

Lotus LearningSpace runs on the Domino Web Server. Components of the software include instructor tools such as the Schedule which provides a means of structuring the course's assignments; the MediaCenter which is the tool for creating the knowledge-base of a LearningSpace course and works in conjunction with the Multimedia Library; the CourseRoom which is an interactive, facilitated environment for secure student-within-team, student-to-peer and student-to-instructor collaboration. There is also a student profiles feature and an Assessment Manager. LearningSpace 4 is part of IBM Mindspan Solutions.

Web Mentor (<http://www.avilar.com/avilar/msubfrm.html>)

WebMentor is a training environment for developing, administering, and delivering web-based training over the Internet, Intranets, and Extranets. The browser-based authoring system supports course authoring and editing. The delivery system supports video and audio from local storage such as a CD-ROM; a customizable interface; large courses with many lessons; individualized instruction; and a flexible, multi-level lesson structure. WebMentor also includes support for administration, assessment, reporting, collaboration, and documentation.

Pedagogical Implications of Authoring Tools

Authoring tools have evolved over the last decade based on technological and pedagogical innovations from authoring bounded, program-controlled learning systems

such as Computer-Based Instruction (CBI) to authoring unbounded, learner-centered environments such as Web-Based Instruction (WBI). From a technological perspective, the Internet has revolutionized teacher-to-learner and learner-to-learner communication by making these interactions time and place independent through the use of email, discussion boards, and other Internet-based technologies that facilitate asynchronous learning and information delivery. Web-based course management tools now include such features and components under an integrated structure. The WWW has also changed the nature of instructional content and resources from a well-defined and stable knowledge base to an unfiltered and dynamic information base. CDROM-based authoring tools have commonly relied on stable content to organize and structure instruction which is why the resulting learning system is typically bounded and program-centered. Web-based course management tools now include features and components that allow instructors and learners to modify content and contribute resources resulting in flexible and active information structures.

From a pedagogical perspective, this means more flexibility in the design of WBI. Depending on how the tools' features are used in a course by the instructor and the learners, the "pedagogical philosophy" underlying the teaching and learning process can range from a strict instructivist approach to a radical constructivist approach (Reeves & Reeves, 1997). A strict instructivist approach typically results in a Web-based course that has a tutorial structure in which the content is organized by the instructor and *delivered* or imparted to the students; and a radical constructivist approach typically results in a more learner-centered pedagogy where students use Web features as tools to construct their own knowledge representations by restructuring content and creating and contributing their own resources to the course structure (Bannan & Milheim, 1997; Reeves & Reeves, 1997). It is more likely therefore that courses initially designed for traditional learning environments and later transformed to a Web-based format using a Web-based course management tool will undergo a *pedagogical reengineering* that is more constructivist and less instructivist in nature (Dabbagh & Schmitt, 1998). The presence of Internet-based communication tools, collaborative tools, and Web publishing tools in Web-based course management authoring systems make such pedagogical implications possible.

In an evaluation of Web-based course authoring tools conducted by Dabbagh, Bannan-Ritland, and Silc (2001), it was revealed that the intersection between pedagogical considerations and the attributes of Web-based authoring tools yields the most educational impact. It was suggested that a comprehensive advisement mechanism included within Web-based authoring tools, providing guidance in the areas of pedagogical approach, instructional strategy, and on-line support and resources will facilitate more effective and engaging instructional designs. Currently the only Web-based course management tool with such an advisement mechanism is Virtual-U.

The *Instructor Tools and Support* feature of Virtual-U offers instructional design guidelines for instructors to help them shape the online learning environment into a student-centered approach. The developers of Virtual-U claim that their tool is different from other tools in that it focuses on teaching and learning in the context of educational principles and research (Harasim, 1999). The goal of the authoring tool was "to provide a flexible framework to support advanced pedagogies based on active learning, collaboration, multiple perspectives, and knowledge building" (Harasim, 1999, p. 45).

Another critical factor that could impact the pedagogical use of authoring tools is whether the learner is perceived as the *user* or *producer* of hypermedia learning environments. Hedberg et al (1997) argue that if the activities of the learner are regarded as the central focus in an educational context then learners should be thought of as software (courseware) producers rather than software users in the development of educational software for both bounded CD-ROM titles and unbounded Web-based resources. They propose the integration of learner tools that allow users for example to organize information in a meaningful way by positioning elements on the screen, creating new links, and generating multimedia objects. Such cognitive tools could include a notebook to copy, edit and format text; a visual graphics tool to create marker buttons that point to multimedia elements such as video, audio, or pictures and enable the learner to manipulate those elements; and a cognitive mapping tool (concept mapping tool) allowing flexible information representation (Hedberg & Harper, 1998). The *learners as producers* concept supports a generative approach to learning which aligns with a constructivist epistemology.

Learning objects systems architecture is also paving the way to support the generative use of authoring tools (Bannan-Ritland, Dabbagh, & Murphy, 2000). A learning objects system adopts an object-oriented approach for storing and metatagging instructional content and instructional strategies. Uneditable media objects called 'Primedia' can be stored in a database and accessed for multiple uses in multiple contexts. Primedia can range from low to high granularity depending on their relative size as a learning resource, with highly granular resources increasing the efficiency of online instructional support systems due to their greater potential for reusability (Quinn, 2000; Wiley et al., 1999). With database-driven websites becoming increasingly popular it is certain that the future of hypermedia learning environments will be powered by such technologies instead of the static, 'hard-coded' HTML documents. Authoring systems will be designed for the creation of generically encoded reusable information allowing the design process to proceed by specifying learning resources, creating links among the resources, and authoring content independently of format (Davidson, 1993; Robson, 2000). The idea is to define learning objects or resources such that each learning resource has specific instructional properties enabling its pedagogic integration with other resources. Depending on who creates, assembles and links these objects, the pedagogical philosophy of the hypermedia learning environment can vary from an instructivist to a constructivist approach resulting in a directed or open-ended learning environment as discussed above.

Currently Web-based course management tools do not facilitate the construction of learning objects however they do support some reusability of content due to the inherent archival nature of the Web as a delivery medium. They also support cognitive tools that enable users to engage in reflective and collaborative practices. The technology is still emerging with the goal being "to develop **compatible bonding** of the Web with CD-ROMs through software that, in unison, packages information access tools such as audiovisual, aural, and textual imports into *courseware* (Hedberg et al., 1997, p. 52)."

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