Preface

Over the last two decades, the landscape of higher education changed considerably, with more and more resources spent on technology supporting both face-to-face and distance learning educational models. This trend is influenced, to a large extent, by the tremendous growth of online learning, due to the unique role played by computer-related technologies for online course delivery and associated activities including technical support.

Nowadays, online courses are offered not only by ‘pure’ online educational institutions but also by traditional schools. According to the research by Allen and Seaman (2008) prepared for the recent Sloan Report, in the United States more than “twenty percent of all U.S. higher education students … [or] over 3.9 million students were taking at least one online course during the fall 2007 term; a 12-percent increase over the number reported the previous year” (p. 1). Moreover, distance learning courses are currently being offered not only to incoming college students and adult learners but also to K-12 students, increasingly covering practically all population groups from children to mature adults. We can expect that the recent economic downturn in the United States (and across the globe) will make a further positive impact on online enrollment due to rising fuel costs and rapid occupational shifts in the job market.

It is important to emphasize that the term distance learning can be applied either to pure online course offerings, where 100 percent of course content is delivered online, or to courses with only some of the content delivered online. The latter include blended or hybrid courses as well as traditional courses supported by Web-based content. Thus, there is no universal consensus on the use of terminology related to online forms of course delivery. For example, the Sloan Report quoted above considers online courses as “those in which at least 80 percent of the course content is delivered online” (p. 4).

While courses supported by online content can rely on commonly used multiple Web-enabled technologies, such as e-mail and instant messaging for communication between instructors and students or static Web content for displaying syllabi and course announcements, all Web-based and Web-supported forms of course delivery increasingly use specialized educational technologies called learning management systems (LMS) or course management systems (CMS). These technologies are widely used not only for ‘online’ course delivery but also for computerized support of traditional courses, as more and more students expect at least some access to all their classes through the World Wide Web.

LEARNING MANAGEMENT SYSTEMS: AN OVERVIEW

The use of computer technologies in educational practice goes back a few decades to the dawn of the ‘information revolution.’ While in the 1980s the importance of computers for education was still a mat-
ter of debate (Cuban, 1986), in the 1990s the explosive proliferation of personal computers, educational software, and the World Wide Web placed computer-assisted pedagogy at the center of the educational process.

This trend gave rise to rapid development of learning management systems – full-scale learning platforms supporting multiple facets of an educational process, from administrative functions to course delivery and assessment. Some researchers (Mallon et al., 2009) trace the emergence of LMSs to rudimentary “training management systems,” which later evolved into the full-scaled “e-learning platforms;” others (Bailey, 1993) emphasize the importance of integrated learning systems as precursors of contemporary learning management systems.

However, as with the term online course, there is no universal consensus on the semantic scope of the term learning management system, often used interchangeably with the term course management system. In the context of this publication, we do not find it productive to try to find one all embracing ‘essential’ definition of what a LMS is or to differentiate between a LMS and a CMS. Consequently, the two terms are often used interchangeably. In fact, the book can be considered as an attempt at the ‘ostensive’ definition of a LMS, covering a wide range of commercial and open-source LMSs and related technologies used in the institutions of higher education. At the same time, it is not our intention to cover in this publication LMSs used in the business world for corporate training and related purposes.

Currently, multiple LMS solutions for higher education can be purchased from the commercial providers such as the Blackboard Corporation, the dominant player in the United States with approximately 57 percent of the educational market, or obtained from the open-source community without any licensing cost. The most popular open-source products, Moodle, Sakai, and OLAT, are addressed in this book from multiple perspectives. Some institutions, especially ‘for profit’ schools, develop their own in-house proprietary e-Learning platforms not covered in this book. With a relative maturity of the LMS market, some participants are looking to move from their previously acquired LMS to a new product. The switch to a new product is usually motivated either by an attempt to reduce the cost of licensing and maintaining an expensive technology or by dissatisfaction with the existing LMS. The book should help both the novice in the area of educational software and the seasoned user to either install their first or to switch to a new, more suitable, LMS.

All LMS products, commercial and open-source, share virtually the same capabilities, providing administrative functions such as student registration and assessment as well as different forms of content management. Typically LMSs utilize advanced relational database software such as Oracle, Microsoft SQL Server, or (especially for open-source systems) MySQL. The use of relational databases with their emphasis on data independence greatly enhances security of LMSs, incorporating a variety of login ‘roles’ such as an instructor, a student, or a guest, among others. An instructor can either privately interact with the course participants or create discussion groups and teams with different profiles.

With the advance of so-called Web 2.0, modern LMSs decisively moved towards allowing integration with multiple Web 2.0 enhanced technologies such as Facebook, Twitter, visual and audio tools, and ePortfolio supporting software. Moreover, some schools conduct classes in synchronous mode, making extensive use of conferencing software such as Adobe Connect or open-source DimDim.

As a related development, the proliferation of LMSs and supporting technologies made a definite impact on teaching methodologies. As students increasingly take courses in either online or hybrid format, they typically expect to have access to at least some course material online in all their classes. Consequently, even an instructor of a traditional face-to-face class must be able to use a LMS to one extent or another. At the same time, while faculty needs to master new computerized technologies,
software developers also should be able to accommodate best educational practices and methodologies. In particular, Web 2.0 applications may be used to enhance student interaction and collaboration (Beldarrain, 2006). In this respect, among the important challenges to LMSs mentioned by researchers is a necessity to incorporate constructivist pedagogy, active and collaborative learning, and personalized attention to all course participants. That is why this book, along with the coverage of LMSs and related technologies, also includes a thorough discussion of the interaction between technology and educational practice. In the next section, we provide a detailed guide to the book’s content.

**BOOK CHAPTERS OVERVIEW**

The book “Learning Management Systems for Online Teaching: Tools and Applications” is organized into four sections, beginning with the general coverage of LMSs and, then, consistently moving to the comparative analysis of the particular LMS products, review of technologies supporting different aspect of educational process, and, finally, to the best practices and methodologies for LMS-supported course delivery.

Section One, “Learning Management Systems: An Overview,” begins with a broadly-based overview by Anthony Pina focused on the LMSs typically used in academia. The chapter places a special emphasis on the commercial products. Among the LMSs reviewed are Blackboard, Desire2Learn, Angel, eCollege, Sakai, and Moodle. In this chapter, Dr. Pina introduces the reader to key features found in most LMSs and presents a comparative analysis of the most commonly used products. The chapter also serves as an introduction to Section Two which focuses on issues associated with selecting an appropriate LMS platform.

In the second chapter, Michael Piotrowski analyzes the concept of the e-Learning platform as a central technological component of online learning infrastructure. He first presents e-Learning platforms from the historical perspective tracing their development to the 1960s. He begins with the discussion of the early PLATO systems and proceeds to the currently used technological solutions such as Moodle and OLAT, thus paving the way to the comprehensive definition of an e-Learning platform. The chapter is an impressive attempt at a new practical definition of an e-Learning platform, aimed at overcoming the current disparity in evaluation criteria for existing and emerging e-Learning software solutions.

Section One concludes with the chapter by Wolfgang Hommel, where he addresses security and privacy of the e-Learning environment. He considers security and privacy management from the systemic perspective of sophisticated distributed environment prone to a variety of security risks. Examples of successful security measures are discussed in the context of the popular open-source LMSs OLAT and Moodle. Dr. Hommel presents an interesting analysis of how Federated Identity Management could support secure communication between e-Learning entities. The chapter is intended to provide guidance to developers as well as system and network administrators on integrating a newly adopted LMS into existing infrastructure.

Section Two, “Selecting a Suitable Learning Management System: Challenges and Solutions,” is focused on a variety of issues related to the process of selecting a LMS platform that satisfies a set of chosen criteria such as student and faculty profiles, affordability, adaptability, and robustness, among others. This section begins with a chapter by Cerstin Mahlow on choosing an appropriate e-Learning environment for a university. The author brings into focus her experience at the University of Applied
Sciences Northwestern Switzerland. In this context, she compares two open-source LMSs, Moodle and OLAT, and shows how OLAT better suits the requirements of her home institution.

In the next chapter, Juley McGourty and Angelica Risquez analyze the adoption of a popular open-source LMS Sakai at the University of Limerick, Ireland. The authors discuss in detail the motivation behind adopting a particular version of Sakai e-Learning platform at their home institution. They further proceed showing how the integration of Adobe Connect Pro software enhances students’ and faculty’s experience by providing a rich synchronous learning environment. The chapter includes a thorough examination of the pedagogical, technological, and social issues arising from the adoption of online tutorial pedagogy.

In the last chapter of Section Two, Danilo Baylen and his coauthors present a case study with the focus on preparing faculty for the transition from the commercial LMS WebCT to another upgraded version of this popular e-Learning platform. As the authors note, the change was further complicated after the purchase of WebCT by the Blackboard Corporation. The research is empirically based and includes surveys of faculty at the authors’ home institution. The authors generalize their findings by identifying the factors crucial for the successful transition to a new learning platform and provide recommendations on training and support of faculty.

Section Three of the book, “Supporting Technologies for Student Tracking, Evaluation, and Synchronous Course Delivery,” offers a detailed discussion of software tools supporting a wide variety of LMS functionalities. In the first chapter, Sergey Butakov and Vladislav Scherbinin review plagiarism detecting tools and methodologies, including cross language plagiarism detection. The authors’ research covers popular software solutions, such as Turnitin and SafeAssign, which are often integrated into commercial and open-source LMSs. Furthermore, the chapter describes a new architecture for plagiarism detection infrastructure and its implementation as a plug-in tool for the LMS Moodle. The comprehensive analysis of plagiarism detection is an excellent source of information for faculty and college administrators alike.

The next chapter by Steven Tello and Luvai Motiwalla emphasizes the importance and examines the role of LMS functionalities in the implementation of assessment processes in higher education. The authors briefly review a number of commercial tools available for a variety of assessment activities such as planning, tracking, analysis, and reporting. The bulk of the chapter presents a case study focused on the design and implementation of a LMS-based assessment system, eOutcomes, at the University of Massachusetts Lowell, USA. The LMS used in conjunction with this project is Blackboard Vista 3.x.

The chapter by Daniel Tan, Adrian Lu, and Sheryl Wong from Nanyang Technological University in Singapore describes a new campus-wide e-Learning platform eUreka, designed and implemented at their home institution. They emphasize that the motivation behind eUreka arises from the project-based learning pedagogical paradigm adopted by their faculty. In this context, the authors address a variety of project-focused activities supported by eUreka and pay special attention to its ability to integrate Web 2.0 applications and features, such as an active ownership of the content created by students and enhanced student participation and collaboration.

In the next chapter, Ian Douglas considers the issue of tracking students’ participation in online courses. He describes tracking tools used in LMSs, using Blackboard as a typical example. He further presents and analyzes ongoing research efforts focused on improving current tracking practices and integrating them into existing e-Learning platforms. In this context, Dr. Douglas examines attempts to use data mining and visualization techniques to enhance tracking methodologies as well as overall course management. Among the technologies discussed are a visualization tool CourseVis with its recent implementation GISMO and a discussion analysis tool DAT.
Clark Shah-Nelson in his chapter offers a discussion and analysis of tools used for synchronous course delivery and support. The popularity of such tools has been growing with the increasing availability and decreasing cost of broadband Internet access. The chapter covers software solutions supporting instant messaging, conferencing, and collaboration. Among the popular tools discussed are a variety of instant messaging and Internet chat tools, and conferencing software such as FM Live Communication and DimDim. The author emphasizes that the latter can be easily integrated into the Moodle LMS platform. The use of synchronous communication software is examined from the perspectives of instructors, students, and technical support staff.

The chapter by Vickie Cook and Kara McElwrath investigates the problem of file management and sharing in an increasingly complex e-Learning environment. The authors link this issue to the growing popularity of Web 2.0 tools allowing speedy exchange of text, audio, and video files by both faculty and students. The different aspects of file storage, sharing, and management are considered from the perspective of systemic integration of a variety of tools, including Web 2.0 technologies, LMS solutions, and standard word processing and research software. The study is based on the University of Illinois’ experience and focused on using Xythos system in conjunction with the Blackboard LMS platform.

Paloma Moreno-Clari and Esteban Sanchis-Kilders offer a comprehensive analysis of plug-in online assessment tools for the popular open-source LMS dotLearn based on OpenACS architecture. The authors emphasize that the tools described are enabled to utilize a variety of third-party interfaces (API) and a wide range of Web resources such as Google, Flickr, and YouTube. The project, conceived and implemented at one of the largest European universities - the University of Valencia, is a valuable source of information for LMS administrators and software developers.

Section Four of the book, “Learning Management Systems and Best Practices in Online Education” begins with a broadly-based study by Nory Jones and Christian Graham and focused on improving hybrid and online course delivery with emerging technologies. The chapter examines how distance learning teaching methodologies could be enhanced by emerging software technologies, in particular Web 2.0 tools and applications. Among the tools and applications reviewed are Weblogs, a variety of social networking tools, Second Life, videoconferencing, and wireless technologies. The use of emerging technologies is linked to the active learning paradigm.

In his chapter, Kam Vat offers a comprehensive study of electronic portfolios as assessment and teaching tools. He addresses the issue from a variety of perspectives and links the use of electronic portfolios to the constructivist teaching methodology. The author further examines the implementation of electronic portfolios with readily available free tools and such LMSs as Desire2Learn and Sakai. The chapter concludes with an interesting and well-presented case study of electronic portfolio design for the broadly-based programming course in computer science.

The chapter by Ricardo Rademacher Mena offers a thorough examination of successful practices for teaching and design of online science classes. Though the author’s research is focused primarily on physics and mathematics courses, his findings can be easily generalized to any science classroom. He reviews the best practices for designing non-graded as well as graded assignments such as research papers, online discussions, and lab simulations. The study is supported by multiple examples presented using a popular open-source LMS Moodle.

The chapter by Tobias Zimmermann, Karen-Lynn Bucher, and Daniel Hurtado presents a dialogue oriented teaching methodology for hybrid courses delivered utilizing an open-source LMS, OLAT. The authors argue that this approach allows instructors to successfully overcome the challenge of handling
large classes by enhancing social learning, creative thinking, and problem-solving skills. They emphasize the role of a powerful LMS such as OLAT for the implementation of dialogue learning in large classes with up to several hundred students. The bulk of the chapter offers a detailed implementation of the dialogue didactic methodology.

The chapter by Vladimir Riabov and Brian Higgs examines a variety of free software tools used by the authors for online synchronous and asynchronous course delivery in computer science. They place a special emphasis on using the tools for virtual labs and student course projects. In particular, the authors review tools for the implementation of Unified Modeling Language diagrams, computer programs written in C/C++/JAVA programming languages; they also cover popular free tools for classes in data communication, database systems, networking, and Web development. The chapter concludes with examples of students’ research papers and projects.

In their chapter, Hao Jiang, Craig Ganoe, and John Carroll explore case-study libraries in the context of implementation of case-based learning methodology. The authors begin by outlining the advantages and limitations of case-based learning in educational process and identify the key elements necessary for successful implementation of case studies. They discuss an example of the case-study library supporting engineering programs and further illustrate this approach by presenting the interactive usability case library developed by the authors and implemented in a server-client architecture framework.

Michael Beaudoin, as the title of his chapter suggests, presents experiences and opinions of online students and identifies competencies important for a successful e-Learning environment. The study is based on the survey administered online to American, Israeli, Mexican, and Japanese students. The author discusses the complex relationship between technologies used in online education and successful pedagogical methodologies. He notes that, as the study suggests, technological medium is often less important to online learners than instructional support. The appendix to the chapter lists fifty-eight questions used in the survey.

Finally, Melanie Shaw, Kelley Walters, and David Long investigate activities and assessment techniques typical for online and hybrid courses. Their study is not only based on cutting edge academic research but also utilizes results of the survey conducted by the authors. Among the survey parameters are LMS usage, course length, programs of study, and user preferences. The LMSs used by the survey participants include Blackboard, WebCT, Angel, Moodle, and eCollege among others.

CONCLUSION

With the rapid proliferation of distance learning, schools confront the difficult problem of choosing and managing an appropriate technological environment that fits their budget, technical resources, curriculum, pedagogy, and profile of the student body. In this context, the book is intended to fill the gap in the current literature on the interaction between LMSs, supporting technologies, and relevant teaching methodologies. This book is intended for administrators, faculty, subject specialists, and all those looking to launch a new or to expand an existing distance learning program. In particular, it covers commercial and open-source LMSs as well as technologies used for synchronous and asynchronous course delivery, and it offers a comprehensive discussion of factors influencing the transition from one LMS to another. The reader will also find coverage of virtual labs, electronic portfolios, and technological solutions related to the problems of plagiarism, student tracking, assessment, and security of e-learning environment. The thorough scholarly research is complemented by interesting case studies. We hope
that this book will prove to be a comprehensive guide on the available technological solutions in the area of online education.

REFERENCES


