Learning Management Systems: Some Observations for Ukrainian Postsecondary Educational Institutions

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Abstract

The article highlights the significance of Learning Management Systems (LMS) for Ukrainian universities. The adoption of Moodle — an open source platform — is used in a global comparison of the current deployment of course management technology in higher education in Ukraine, in its neighbors in the EU and the CIS, and in the major world regions. The distribution of Moodle sites among Ukrainian user types is also presented. The article summarizes the benefits and increasing necessity of educational management technology and stresses the importance of an accompanying commitment of resources to faculty development in order to achieve a more effective educational environment in Ukraine.

Keywords: Technology innovation; Learning management system (LMS); International comparison of learning environments

Introduction

Virtually every aspect of teaching and learning has been affected by the application of an increasingly proficient internet infrastructure and an expanding range of sophisticated hardware devices and instructional software programs in the service of pedagogy. Despite some ongoing disquiet over its effectiveness within higher education (see Clark 1983[1], 1994[2], Yildiz, Tezer & Uzunboylu 2018[3]), advances in technology have entailed an expansion in the scale and scope of course assignments, curricular offerings, degree programs, as well as the institutions providing

[1] Clark, B. (1983). Governing the higher education system. The structure and governance of higher education. Guildford: Society for Research into Higher Education, 31-37.

[2] Clark, B. (1994). The research-teaching-study nexus in modern systems of higher education. Higher Education Policy 7.1, 11-17.

[3] Yildiz, E. P., Tezer, M., & Uzunboylu, H. (2018). Student Opinion Scale Related to Moodle LMS in an Online Learning Environment: Validity and Reliability Study. International Journal of Interactive Mobile Technologies (iJIM), 12(4), 97-108.

postsecondary offerings. Whereas the expansion of web-based course activities and the ubiquity of smart phones and tablets has changed and challenged the classroom environment, the spread of massively open online courses (MOOCs) — with the potential to provide advanced and continuous learning at low or no cost — is changing and challenging traditional modes of delivering content across a widening spectrum of subjects and students.

A meta-analysis by Schmid et al. (2014[1]) finds that, although pedagogy might trump technology in the design of effective instruction, it is the interaction between the two that is especially consequential for learning. In effect, it is the availability of new technological tools such as those mentioned above that enables a more diverse set of pedagogic approaches designed to encourage active learning. In a study for the New Media Consortium, Johnson et al. (2014[2]) highlight the technological trends in education that warrant continuous monitoring by universities. Seven categories of technology innovations and their effects are identified and tracked in the report and are summarized as:

— Consumer technologies that are adapted from non-educational sources and applied to learning objectives,

— Digital strategies to apply devices and software to enhance teaching and learning in and out of the classroom,

— Learning technologies developed with educational applications in mind to make learning more accessible and individually relevant,

— Social media technologies that distribute and coordinate information sharing and communication in large segments of society,

— Visualization technologies that assist the learner in making sense of large data sets,

— Enabling technologies alter our expectations of what devices and tools can and should do for us,

— Internet technologies are critical infrastructure that render the use of technology possible.

The considerable degree of synergy apparent in this list has consequences both for postsecondary educational institutions as well as for the environment in which they operate. At the micro level, it is evident that technological developments require supporting resources and structures throughout society to render innovation useful to the pedagogical objectives of colleges and universities. At the macro level, the effective application of specific educational innovations contributes positively to a society's educational pursuits; the development of human capital and technological capability; and improvements in socio-economic conditions. This paper explores this feedback process by focusing on the deployment of technology to manage the learning process in university settings around the world relative to its deployment in Ukraine. We use the example of the learning management system (LMS) to reflect the state of technology in higher education and the case of Moodle adoption to proxy the utilization of LMS in a global comparison relevant for Ukraine. The results indicate that Ukrainian universities and colleges need to expend some effort to catch up with the application of basic education technology found in its aspirational group: namely European Union universities. Along the way, it is important to recognize that the desired pedagogic improvements in Ukraine will require increased faculty and staff training to assure the effective adoption of innovations in pedagogical technology.

In the business of education, the application of technology to instruction is an attractive administrative tool to increase instructor productivity while lowering the costs of course and program delivery. From an instructional perspective, the technologies improve pedagogy and enhance interaction among students, between students and instructors, and between students and course content (Abrami et al., 2011[3]; Setuju et al. 2018[4]). One technology that has moved beyond trend to become a standard feature in postsecondary education is the LMS. At its core, a LMS enables instructors, either through a web-based interface or software application, to design and implement course content, monitor and assess student activity, and interact with students when not physically in the classroom. As such, a LMS provides core functionality in instruction that cuts across the seven categories of technology innovation and makes the learning process more transparent. Dahlstrom et al. (2014[5]) note that the LMS has an adoption rate of 99% among US

[1] Schmid, Richard F., Bernard, R., Borokhovski, E., Tamim, R., Abrami, P., Surkes, M., Wade, C., and Woods, J. (2014). The effects of technology use in postsecondary education ...

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[5] Dahlstrom, E., Brooks, D. C., Bichsel, J. (2014). The Current Ecosystem of Learning Management Systems in Higher Education: Student, Faculty, and IT Perspectives. p 3.

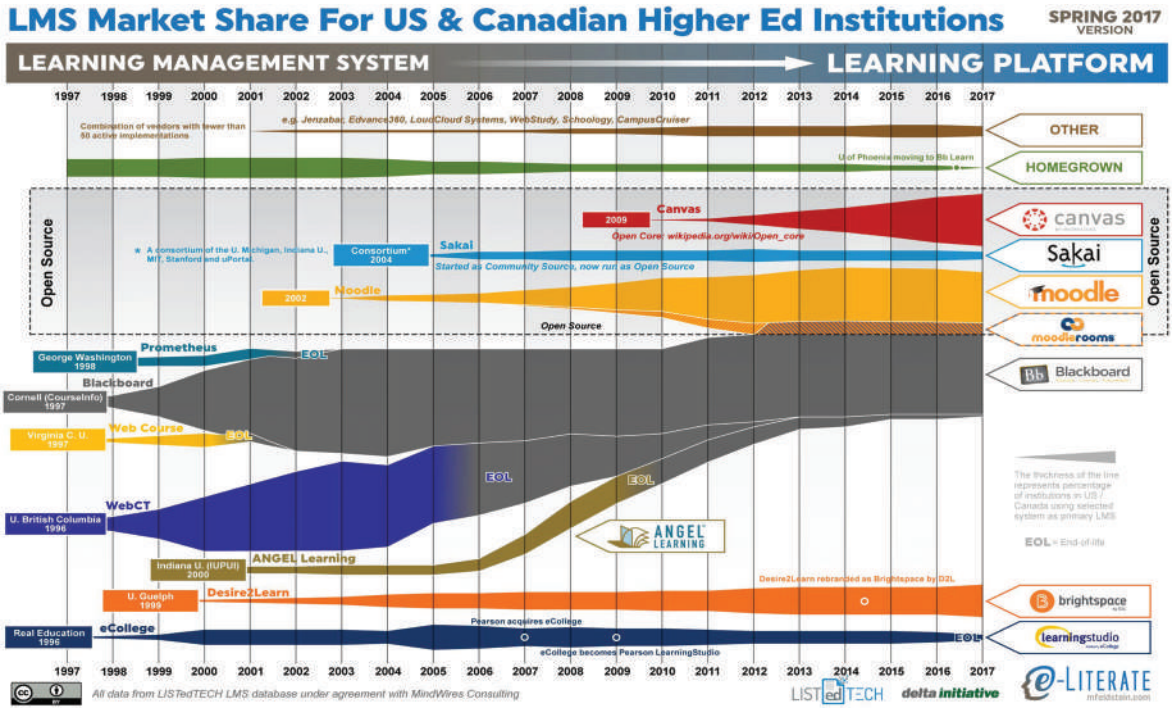

Figure 1. Evolution of LMS Providers, 1997-2017[1]

universities and colleges that Zafra et al. (2009[2]) attribute to the flexibility of pedagogy, location, and in hardware that is afforded by computer-assisted education.

In Figure 1 illustrates the marketplace evolution of LMS platforms among postsecondary institutions in English-speaking countries. Although, Blackboard currently dominates, its share of the market is declining in face of the increasing adoption of open source options. One such open source LMS is the Modular Object Oriented Developmental Learning Environment (Moodle) that facilitates the creation and delivery of flexible online course material and provides a platform for interaction and assessment. The data that it tracks enables detailed analysis of student and instructor behavior. Moodle is designed to support an interactive style of learning called Social Constructionist Pedagogy: an approach that posits that students learn best when they interact with the learning material, construct new material for others, and interact with other students about the material (Rice, 2011[3]).

However, the potential for further growth for all LMS providers is limited to switching between current providers among educational institutions in advanced markets and to increased adoption by newcomers internationally. Consequently, Ukrainian postsecondary educational institutions have access to a number of LMS vendors that fit the constraints they face. Because it is an open source LMS platform especially amenable to the budgetary constraints and intellectual property rights considerations in much of the developing and transition countries, the data focuses on the worldwide adoption of Moodle as a proxy for overall LMS adoption.

Moodle Utilization: A Global Comparison

Using data from Moodle.net, Figure 2 illustrates the per capita prevalence of Moodle sites globally. Australia and New Zealand lead in the number of sites per million population thereby ranking Oceania ahead of Europe and North America. At the opposite end, China (0.3), South Asia (0.6), and sub-Saharan Africa (0.7) trail in the adoption of Moodle as an LMS resource. Other regions that rank below the world average of 14.0 are Mideast/North Africa (2.6), East Asia (3.7), Southeast Asia (4.5), Central America/Caribbean (5.7) and Commonwealth of Independent States (8.3).

Ukraine is included with the Commonwealth of Independent States (CIS) data and at 13.9 sites

[1] State of Higher Ed LMS Market for US and Canada. URL: https:mfeldstein.com/state-higher-ed-lms-market-us-canada-spring-2017-edition/

[2] Zafra, A., and Ventura, S. (2009). Predicting Student Grades in Learning Management Systems with Multiple Instance Genetic Programming.

[3] Rice, W. (2011). Moodle 2.0 E-Learning Course Development. Packt Publishing Ltd.

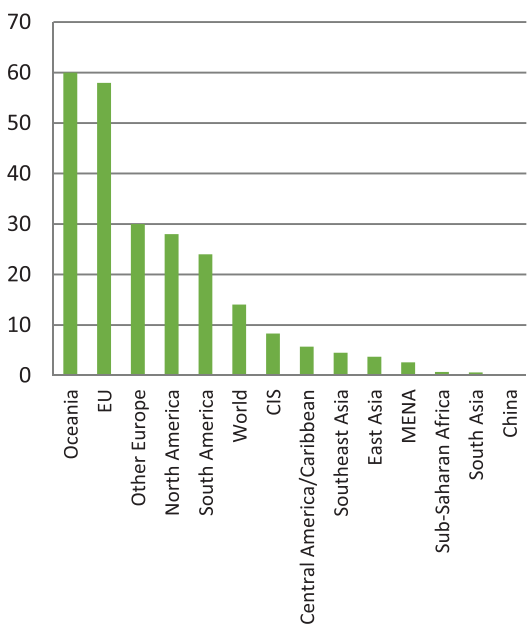

Figure 2. Moodle Utilization Rates, 2018, sites per million population

Source: Moodle.net, authors' calculations

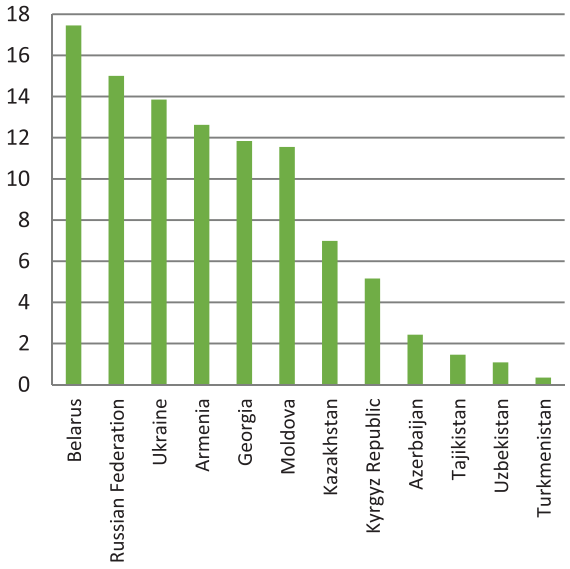

Figure 3. CIS Moodle Utilization Rates, 2018, sites per million population

Source: Moodle.net, authors' calculations

per million population — the country ranks above the CIS average, but almost at the global average (14.0), but far below the EU average (58.1). Figure 3 presents the comparison of Moodle utilization rates among the CIS countries. Belarus at 17.5 sites per capita is ahead of the global average in the region. However, given recent geopolitical events in Ukraine, Russia and the CIS might not prove to be the relevant reference points. The Ukraine-European Union Association Agreement, signed in mid-2014, commits Ukraine to the convergence of its policies and legislation to those in the EU. Although most attention centers on political, economic, financial, and judicial reforms required by Ukraine to achieve this convergence, action is also needed to conform to EU technical standards. Ukraine's Moodle deployment rate can serve as a proxy of the current gap between EU and Ukrainian technical standards in the area of higher education.

Figure 4 compares the rates of Moodle utilization in the 28 EU member states. Spain (179.4 sites per capita) has the highest rate in the EU whereas Romania (17.8 sites per capita) has the lowest rate. Consequently, the lowest Moodle utilization rate in the EU is above the rate found in Ukraine and other CIS states. Many of Ukraine's neighbors in central and eastern Europe, who have been in the process of converging to EU political, economic, and technical standards before and since joining the regional group, have some of the most advanced rates of Moodle adoption as a LMS technology. In addition to the extremely high level found in Slovenia (155,3), the two Baltic states (Estonia at 72.2 and Lithuania at 64.4) and the Czech Republic (68.5) have achieved utilization rates above the EU average (58.1). The lowest Moodle utilization rates among the recent EU members are found in the three Balkan states of Bulgaria, Croatia, and Romania who joined in and after 2007 and therefore have engaged only relatively recently in adopting EU technical standards. Using Moodle as a proxy, indicates that Ukraine is currently at a level of technical

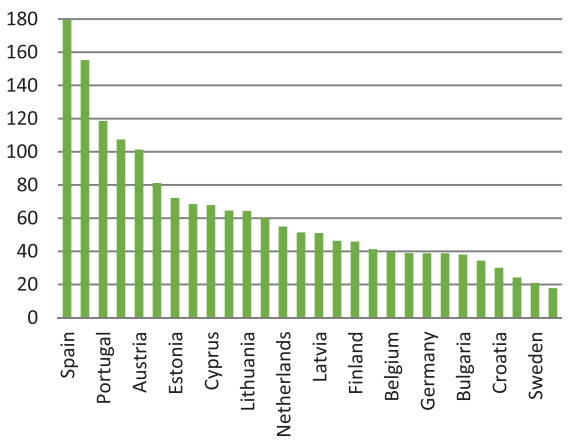

Figure 4. EU Moodle Utilization Rates, 2018, sites per million population

Source: Moodle.net, authors' calculations

standards in education that is uncompetitive with its immediate EU neighbors and incompatible with its EU aspirations.

Learning Management Systems (LMSs) are becoming increasingly common not only in universities, but also in primary and secondary schools, businesses, and religious organizations. Figure 5 summarizes the distribution of Ukrainian Moodle sites among these users. Universities, both public and private, maintain the largest share of Moodle sites. Among the 657 registered institutions of higher education in Ukraine, Moodle sites were implemented in 55,8 % of them (compared to 15.4% in 2014). More sites are expected following the 2013 decree of the Ukrainian Ministry of Education to introduce distance learning and web resources for postsecondary education. Private sector education/ training companies in Ukraine have recognized the benefits of LMSs and a growing number employ Moodle in a variety of courses in business; foreign languages; gymnastics and rehabilitation; and design, ceramics, and other arts. Additionally, Moodle is used by driving schools, for private secondary school tutoring, and for courses in theological and bible studies. Both within and outside of Ukrainian higher education, open source LMSs — like Moodle — are proving to be a convenient, well-structured, and free tool to enhance skill development, content delivery, and course management. However, the effective application of a LMS requires that institutions adopt a formal, systematic approach that extends beyond the installation of adequate hardware and the introduction of software and web interfaces. As we can see below, training and guidance of faculty, staff, and students is also essential. The important aspect in faculty training could be the faculty visits, courses or fellowships at foreign universities, especially from OECD countries, that have attained a high level of LMS implementation into higher education[1].

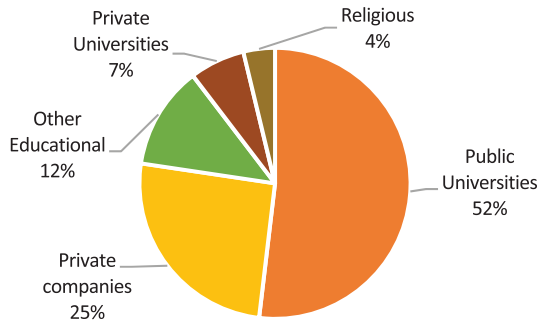

Figure 5. Distribution of Ukrainian Moodle Sites, 2018

Source: Moodle.net, authors' calculations

[1] Research Universities: International Experience and Prospects in Ukraine: Monograph / [A.F. Pavlenko, L.L. Antonyuk, N.V. Vasilkova, D.O. Ilnytskyy et al.] ... 2014 ...

The Uses of Moodle

As noted above, a LMS like Moodle can enhance interaction among students and develop course-related social material and references through its online chats, forums, workshops, wikis, and glossary functions. Huang et al. (2013[2]) provides evidence that Moodle is applied differently and successfully in traditional, blended, and online learning environments as well as how it can address the limitations to student interaction present in large class-size settings. Table 1 makes comparisons between social networking sites like Facebook and the functions provided by a LMS. The successful application of these interactive tools in an LMS platform can be enhanced when the instructor understands the manner in which students use their social networks and structures interaction to mimic these interactions among classroom peers.

Moodle can also expand the points of contact between students and instructors. Course deliverables and expectations can be set and amended through Moodle functions that manage course announcements, resources, and schedules. The course gradebook provides instructors the ability not only to transmit their grades of student work, but also the capability to comment on specific aspects of each student's performance — and schedule appointments — with a view to guide students to better performance.

Probably the most important pedagogical enhancement of a LMS comes from the expanded options for the student to engage with course material. Indeed the most widely used feature of Moodle is its function as a repository for course information and documents. Learning of previously covered material can be assessed by using the LMS to submit assignments and journals, as well as via online quizzes and surveys. The delivery of new information is assisted via online lessons, tutorials, course notes, and lessons. Many publishers link the adaptive and interactive learning tools, multimedia, and other online resources connected to their textbooks to various LMS platforms. Consequently, instructors can encourage or require students to prepare — in a personalized manner — for classroom activity by engaging with course content outside of formal class sessions. This facilitates the implementation of the flipped classroom where class time is devoted to involving students with course content in interactive activities rather than the delivery of lectures on new content.

[2] Huang, C., Wang, Y., Wu, T., Wang, P. (2013). An empirical analysis of the antecedents and performance consequences of using the moodle platform. International Journal of Information and Education Technology, 3.2, 221-221.

Table 1

COMPARISON OF TOOLS IN SOCIAL NETWORKING SITE (SNS) AND LEARNING MANAGEMENT SYSTEM (LMS)[1]

Tools	SNS (Facebook)	LMS (Moodle)
Forum	+	+
Blog	+	+
Messaging	+	+
Media Sharing	+	
Wiki		+
RSS	+	+
Chat	+	+
Calendar	+	+
Tagging	+	+
Own Brand	+	
Visual Design	+	
Real-time Activity Stream	+	
Groups	+	+
Friends	+	
Profile Pages	+	+
File sharing		+

Despite its near universal presence in postsecondary education in many countries, few LMS platforms are employed to their full capacity. Faculty engagement with their institution's LMS focuses more on the distribution of assignments and other course information to students and less on the LMS's interaction functionality and other advanced features. This limited use reflects the technology synergy effects and feedback processes noted above and indicates that the willingness and ability of faculty to use available LMS technology cannot be ignored. Dalhstrom et al. (2014[2]) notes that faculty require a LMS system that has intuitive features backed with flexible training and support resources. Faculty motivation is also stressed as a key element to the successful implementation of LMS technology. Surveys, at US and non-US universities alike, indicate that faculty members must be presented with clear evidence that students would benefit from use of a LMS and its specific components. Faculty at non-US universities also require release time — free from other responsibilities — to (re)develop their courses to encourage adoption of LMS features. Finally, the stability and consistency of the LMS platform must also be proven to instill confidence that the technology will work as planned when needed.

[1] Table 1 is based on the format provided in Brady, K., Holcomb, L., Smith, B. (2010). The use of alternative social networking sites in higher educational settings: A case study of the e-learning benefits of Ning in education. Journal of Interactive Online Learning, 9.2, 151-170.

[2] Op. cit.

Summary

If postsecondary institutions in countries like Ukraine, with low LMS deployment rates, endeavor to match the usage in more developed educational environments — like those in the EU — they must do more than simply make the technology available. Attention and resources must also be committed to systems for faculty training as well as the support of a reliable LMS. Faculty (and student) motivation cannot be ignored. University administration must recognize the commitment in time, attention, and confidence that is required by faculty to make LMS technology applicable and effective. Faced with heightened international competition for students and endemic budgetary constraints, along with the increased assessment demands of governments and accreditors, the effective deployment of innovative educational technology holds significant consequences for each university. Failure to remain relevant and competitive in the rapidly changing educational environment ultimately translates to a degradation of program and faculty quality that will not go unnoticed by current and future students. As an essential input to national competitiveness, postsecondary institutions contribute to the ease with which a society creates, implements, and adapts its physical, human, and social resources to attain its objectives for sustainable growth and development. The effective deployment of a LMS like Moodle among postsecondary educational institutions is by no means sufficient to attain these micro or macro goals. It is, however, reflective of the necessary approach to educational technology that must inform the work of Ukraine's universities and faculty.

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