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Learning Management Systems (LMS) and Social Media in Higher Education

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Abstract. This paper provides a systematic and comprehensive review of social media use in higher education. We reviewed and synthesized relevant studies in the following 5 topics: 1) features of current LMS, 2) LMS gaps and criticisms, 3) social media learning theories, 4) instructional use of social media, and 5) alternative methods of using LMS. Our review reveals that many researchers have investigated these topics and proposed varying methods to integrate social media into teaching and learning. We also present opportunities for future research, including analyzing big data to draw more accurate conclusions on social media needs and usage in higher educational settings.

Keywords. Social Media, Learning Systems, Instructional Design, Personal Learning Environment, Big Data Analysis

1. Introduction

Studies conducted in Western countries have indicated that 93% of millennials spend time online [1], 99% of college students use Facebook [2], and 80% of faculty members use social media [3]. In addition, over half of the faculty members reported that they use social media within their teaching. Given these numbers, it is no surprise that social media's omnipresence is taking the Internet by storm. Furthermore, social media is increasingly becoming a part of educational reform. In 2009, only 10% of surveyed university students had used Facebook to discuss course-related problems with their peers [4]. By 2014, this number jumped to 81% [5]. In five short years, Western university students' use of Facebook for educational purposes skyrocketed.

This ever-increasing popularity of social media use by university students and faculty all over the world requires an investigation as to whether traditional learning platforms in higher education, specifically Learning Management Systems (LMS), are being eclipsed by Web 2.0 tools such as Facebook, Google Drive, Twitter and WeChat. This literature review focuses on what features LMSs should adopt in order to maintain purpose and relevancy for students and instructors, as well as the current Web 2.0 platforms and features students and instructors use for educational purposes.

Due to the fast-changing nature of Web 2.0 platforms, the scope of this review focuses on recent studies. Most of the studies discussed within this literature review were published within the last five years to this present writing in 2017.

2. Defining Social Media and Relevant Concepts

Social media has many different forms and can be divided into six different categories [6]: 1) Collaborative Projects (i.e. Wikipedia), 2) Blogs and Microblogs (i.e. Twitter), 3) Content Communities (i.e. YouTube), 4) Social Networking Sites (i.e. Facebook), 5) Virtual Game Worlds (i.e. World of Warcraft), and 6) Virtual Social Worlds (i.e. Second Life). Although these categories vary greatly, users all seem to be searching for the same functionality when choosing their preferred social media platform. Kietzmann [7] proposes a framework to support this idea and claims that there are seven functionalities that social media platforms may fall into: identity, conversation, sharing, presence, relationship, reputation, and groups (see Figure 1).

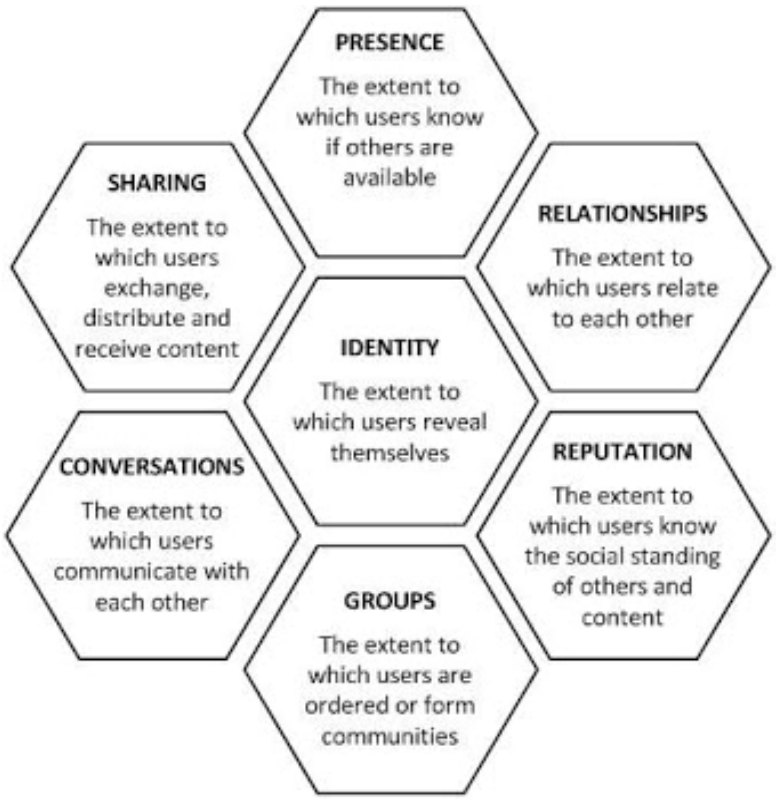

Fig 1. Social Media Functionality [7]

Tools and concepts associated with social media include:
a) Web 2.0: A stage of Web development that is characterized by webpages with user-generated content and the rise in social media. Examples of Web 2.0 websites include Instagram, blogs, wikis, and YouTube.
b) Connectivism: Learning theory that suggests learning is emphasized by roles of social and cultural contexts. It states knowledge is a network, and people learn through pattern recognition.

c) Personal Learning Environment (PLE): Individual learners' spaces that are student centric and are wholly customized by the learner themselves.

3. Features of Current Learning Management Systems (LMS)

Learning Management System (LMS) is a platform used by educational and corporate environments to manage learning—especially for administering, documenting, and tracking courses and training. Examples of a LMS include Blackboard, Moodle, WebCT, Sakai, and Saba Cloud. LMSs have quickly been accepted by higher education institutions as modern-day learning environments for students. These online platforms allow instructors to provide their students with learning materials and activities while tracking participation and progress through data systems and assessments. In the United States, higher education continues to experience an increase in computer and Internet use which necessitates the integration of LMSs in order to bring more instructors and students together.

Despite the substantial use of LMS in higher education, there is a growing awareness that student engagement levels in Web 2.0 environments far exceed their engagement in the LMS used by their institutions. Social media sites, blogs, and wikis offer students exceptional opportunities to create and share content as well as interact with others across the world. LMSs have not evolved enough to keep up with the pace of technology, especially with methods of interaction facilitated by online social networks such as Facebook and Twitter [1]. This discrepancy has challenged instructors to determine whether or not their LMS promotes autonomy or a culture of dependency and how social media might be incorporated to boost and maintain student engagement [8].

3.1 Blackboard, Moodle and Canvas

The widely used LMS in Western countries include Blackboard, Moodle and Canvas. However, Blackboard has been seen as an instructor-centered platform. It is mainly a place for instructor to post course material, to collect assignments, and to track students' learning. Moodle and Canvas emerged as more user-centered platforms. One of the main goals of Moodle and Canvas is to create a community of learners through collaborative tools and activities. According to Moodle, the main power of this activity-based model comes in combining the activities into sequences and groups, which can help guide participants through learning paths. Thus, each activity can build on the outcomes of previous ones (docs.moodle.org/32/en/Pedagogy). The design of Moodle and Canvas are based upon the socio-constructivist learning theory. Both platform encourage instructors and students to interact and to collaborate synchronously in chat rooms or asynchronously in wikis and forums [9].

3.2 Critiques of Current LMS

LMSs currently used in most universities are considered "institutionally-controlled platforms". Social media platforms are largely seen as "student-centric" rather than "institutionally-owned" due to the fact that students are not closely moderated and students are able to post without filtering their thoughts and ideas. LMSs tend to be extremely teacher-centered, affording instructors with an environment for digital content management. In our ever-evolving digital world, LMSs cannot keep up with

the current social media paradigm shift [1]. The current design of LMS does not focus on students' social constructivist approach to support lifelong learning.

In addition, there is a lack of connection between formal and informal learning in the current LMS(s). Higher education institutions need to provide more adaptive environments for their students by opening them up to Web 2.0 tools. Furthermore, Personal Learning Environments (PLE) must be redefined in order to allow students to openly choose the tools they want to use without being tied to a specific context or time period, which is often experienced with a LMS [10]. LMSs are limited in their ability to adapt to the shift in preference for user-centric and social learning. As early as 2006, Researchers (e.g., Dalsgaard [11]) have recommended that organizations should move beyond a centralized and integrated LMS and towards the usage of distinct tools used and managed by the students themselves. This perspective illuminates the importance of a Social Connectivist approach to e-learning.

4. Instructional Use of Social Media Tools: Review of Research

Social media has been used, with varying degrees of effectiveness, by instructors throughout the United States. In fact, instructor use of Web 2.0 tools is progressing at a rapid rate. There are numerous experimental studies that analyze how instructors are using social media to enhance their pedagogy. Current social media tools used include: Twitter, Facebook, Linked-In, Blogs, Wikis, WeiBo (microblogging in China), and WeChat, a powerful tool that integrates social media with learning, shopping, banking, paying bills, and Uber-type of car services.

4.1 Western Social Media Tools: Twitter and Facebook

Twitter is a microblogging tool that has been used by higher education in several ways. Instructors can tweet assignments, share links, share conference notes and answer questions. Some instructors have used Twitter as a backchannel for student discourse during a lecture. Instructors join or ask students to participate in real-time discussions via tweet-ups. Studies have shown that Twitter was effective as a back channel during live events to encourage immediate participation—especially at places or events where there may be a lack of feedback due to nervousness or shyness. Microblogging allows for more immediate participation and also invites virtual participation.

Facebook has gained massive popularity among users of all ages. An exploratory study by Wang and colleagues [12] used Facebook for higher education in a Singaporean institute. The study took place in two elective courses over the term of a semester. In the courses, Facebook operated as a tool for announcements, sharing course documents, course tutorials, discussions, and surveys. This interactivity was permitted by the following Facebook features: 1) Facebook wall, 2) Event function, and 3) Feedback space or discussion function. Students agreed that Facebook was successful as their LMS [12]. A study conducted in 2014 explored the potential educational value of Facebook by distributing a survey to 387 subjects [5]. Based on the survey data, platforms were ranked based on four aspects related to education. The survey revealed that E-learning platforms do not rank as the number one choice for any of the four educational aspects. Instead, students preferred to use Facebook and online bulletin board/forums (BBS) for interacting with others, reviewing and sharing resources, and communicating with instructors.

4.2 Eastern social media tools: WeiBo and WeChat

Weibo, similar to Twitter, is a microblogging tool widely used in China. Due to the nature of the Chinese language, the 140-character count allows for more content, as a single Chinese character is representative of a full English word. Weibo's additional features include in-line pictures, video uploads, games, threaded comments, and private chatting. According to a 2012 study on the motivations and usage patterns of Weibo, three of the eight trending topics most related to learning consisted of: 1) professional development, 2) information seeking, and 3) citizenship behavior. The following (Table 1) represents these categories with their sub categories that directly reflect learning behaviors [13].

Table 1. Motivational factors that influence the use of Weibo

Motivational Factors	Subcategories influenced by learning		
Professional Development	Exchange working experience	Exchange learning experience	Updates on industry development
Information Seeking	Search and learn information	Learn about news	Get help from others
Citizenship Behavior	Provide help to others	Provide information to others	Recognition for knowledge

Finally, **WeChat** has quickly become the burgeoning social media platform since its 2011 inception. A study by Bosma, Owsiany, Scharff and Yau [14] examined the usage of WeChat and WeLearn (a learning management platform that takes advantage of the mobile features of WeChat) within a college English curriculum. WeChat as a social platform has become widely popular, especially in China. Its advantages over traditional responsive websites include:

- Accessibility – especially instantaneous accessibility via mobile device
- Popularity – nearly 1 billion users in 2018 according to Tencent
- Flexibility – users can customize the menu and navigation
- Record tracking – WeLearn allows for tracking users' learning paths and progress.

Because of these advantages, WeChat public platforms allow for many possibilities in terms of customizing the app to cater towards instructor and student needs. A study conducted to explore a community college professor's using of WeChat in his class indicates a strong advantage of having a communication record, in addition to instantaneous communication [14].

Taking advantage of the mobile features of WeChat, several leading e-learning companies in China (e.g., Shanghai's Longtime Inc.) developed a learning management platform called WeLearn. Figure 2 shows an exemplary mobile learning course with a WeLearn component (see Figure 3), which is simplistic and mobile-friendly. In comparison, Guo and her colleagues' study [15] find that WeLearn also has the following advantages over a traditional or responsive website:

- Accessibility: once users subscribe to it, they can easily access it from their WeChat account.

- Usability: Users can use WeChat to send instant messages, call, video-conference, transfer files, and form personal and professional groups.
- Flexible menu and navigation: an instructor can customize the menu in WeLearn and encourage students to interact in WeChat.
- Record Tracking: WeLearn is a learning management system light. It has the ability to track every user's learning path and progress.

Fig 2. Interface of An Exemplary WeLearn Course

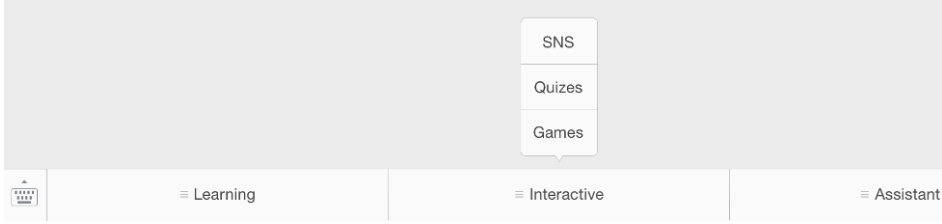

Fig 3. The Navigation Menu of WeLearn

By analyzing the features of WeChat and WeLearn and examining related studies, Guo and her colleagues [15] provided suggestions on how to integrate WeChat-based mobile learning into the College English curriculum in Higher-Educational Institutions of China. They discovered that the WeChat Open platform can be designed to help to track down, record and manage learning and tutoring as well as the monitoring and management of learning and tutoring. Micro-community organically formed in WeChat can be developed to achieve interactive communication between students and teachers or among students.

5. Alternative Methods of Using LMSs

Stern and Willits [1] assert that no one could have predicted the impact social media trends would have on higher education. The underlying question is whether higher education can bridge the gap between LMS and social media. Higher education is capable of pursuing a balance between the two. Other researchers (e.g., Dabbagh & Kitsantas [16]) note that the learner is responsible for learning in their Personal Learning Environment (PLE). Presently, students utilize Web 2.0 tools concurrently with their institution's LMS.

A study conducted by García-Peñalvo and colleagues [17] proposes three methods for integrating social and Web 2.0 tools with a LMS: (1) Parallel existence which keeps the formal (LMS) and informal (social and web) environments separate, but running side by side; (2) Opening of the LMS, which pushes LMS features to other web services (unidirectional); (3) full integration of external tools into the LMS by coding Web 2.0 tools directly into the LMS. Most methods of LMS utilization we reviewed fall into one of these categories.

5.1 Parallel existence

In parallel existence, the formal (LMS) and informal (Web 2.0) learning environments remain separate. PLEs and LMSs simply coexist in this scenario. Students would maintain usage of an LMS while applying another tool, such as Google Drive, in their learning. The benefit for learners is that they are in control of the decision-making process to use their preference of tools efficiently and effectively [10]. As of today, running an LMS concurrently with informal social learning tools is the most discussed and accepted method in the training sphere [15]. One such study by Sclater [8] examines whether or not LMSs, specifically Moodle, are destined to continue as the primary means of organizing the online learning experience for students. Sclater [8] concludes that an LMS's ability to integrate Web 2.0 systems into an LMS is inconsequential. The key concern with integrating is overloading LMSs with too many features that may be better off as separate systems. Sclater [8] proposes that LMSs will become more of a management information system, working in the background. Students can export the information from LMSs and view it in the environments they prefer.

5.2 Opening the LMS

This scenario represents a system where Web 2.0 tools are accessible from within the LMS. Conversely, the LMS would not be accessible through those external tools. The biggest critique is the institutional barriers of opening up their LMS. Institutional belief is that the LMS simply serves as information exportation rather than connections with Web 2.0 features [17]. This interoperability initiative allowed the LMS to integrate into external tools as a widget. García-Peñalvo and colleagues [17] postulate that students should use a Personal Learning Environment (PLE) and LMS concurrently, and both systems should be able to interoperate. However, in doing so, they state using web services and interoperability services to open up an LMS has proven very difficult to implement. Their study [17] states the difficulty in building an architecture for exporting to a LMS, which suggests this method may not be worth pursuing due to its complicated implementation.

5.3 Integration of external tools

This scenario emphasizes the idea that the institution chooses the external tools that will be integrated into the LMS. Learners will not have the freedom to choose their preferred platforms. External tools would be integrated as gadgets on the interface [17]. Integrating the LMS and PLE is attainable, but is far from being achieved.

5.4 Dynamic course platform

An alternative framework, named the Dynamic Course Platform (DCP), was proposed by Stern and Willits [1]. A DCP works as an a la carte program where instructors choose appropriate pedagogical tools while preserving the university LMS. Although Stern implemented several different methods within a couple of courses that she taught. Her studies included utilizing a personal blogging site (Wordpress) as the platform for an online course as well as incorporating Twitter into a separate pop culture course. Following her experimentation, Stern and Willits [1] recommend a tri-fold Dynamic Course Platform. The three elements of the platform include: 1) Wordpress, 2) Twitter, and 3) Blackboard (or other LMS). Wordpress serves as a tool for group projects, blogs, pages, and delivery of course content. Twitter serves as a communication and networking tool. Lastly, Blackboard or a similar LMS incorporates gradebook, assessment facilitation and course email.

6. Conclusions

Through this review, we identify several opportunities for future study: First, data need to be obtained that summarize what students and instructors desire in an LMS. Student and instructor non-negotiables need to be outlined (e.g. gradebook, assessment tools, and submission features). Formal surveys need to be conducted to gather conclusive data on student and instructor preferences of the LMS version modifications. A professor's main focus is ensuring organization on a course-to-course level. However, due to this, higher education LMSs are not student-centric, meaning they do not focus on student learning development throughout one's learning career ([11][10][1][8]). Student-centric learning promotes a social connectivist approach, which can include easy communication with fellow classmates, organizing events or study groups, logging personal achievement, and maintaining connections with classmates beyond a course-to-course level. These are all social features that current LMSs do not adequately provide. There is an opportunity to uncover more conclusive analytical data regarding what features students and instructors want in an LMS.

A second avenue for future research regards identifying which LMS integration method is most favorable among university students and instructors. For instance, some studies suggest minimal change – simply running an LMS in parallel with third-party software tools (like Google Docs) to meet instructional needs. Others go as far as to suggest the "tumbling of the LMS ivory tower" [1]. The struggle of determining an appropriate integration method leads to questions such as:

a) What might a dynamic learning platform that incorporates traditional LMS features as well as social media, look like?
b) How can instructors incorporate social media with their LMSs to facilitate learning while ensuring student security and privacy?

c) Additionally, how can instructors determine the efficacy of social media tools in relation to teaching and learning?

There is no definitive consensus on where LMSs stand with new Web 2.0 norms, creating an opportunity for further research in integration methods and their efficacy.

The third route for additional research is further exploring the facets necessary for a new platform that strips away all the unnecessary and outdated features of an LMS. Instead of determining which existing integration method is most favorable, the fundamental features favored for learning should be investigated. This is based on the idea that a large social platform, dedicated to education and life-long learning, does not yet exist.

For instance, there are many large platforms that have been favored in certain pillars of our lives. Facebook has become the dominant fixture in maintaining and keeping track of our interpersonal relationships with friends and family. LinkedIn is the preferred social network for maintaining professional working relationships. However, there is no social platform that adequately encompasses the "learning" pillar of our lives. Through this review, we envision a social platform that performs the administrative duties that instructors and institutions require from an LMS, as well as the user-centric social features that students so direly crave, such as WeLearn. This new social platform could include features that support a world-wide robust social network of academic people and resources and allows for easy communication amongst peers—features not yet available in any mainstream LMS or social media platform. All platforms hosted the big data, which can be analyzed to draw more accurate conclusions on social media needs and usage in higher educational settings.

References

[1] D.M. Stern, M.D. Willits, Social media killed the LMS: Re-imagining the traditional learning management system in the age of blogs and online social networks. *Educating Educators with Social Media* (2011), 347-373. Emerald Group Publishing Limited.

[2] M. Sponcil, P. Gitimu, Use of social media by college students: Relationship to communication and self-concept. *Journal of Technology Research* 4 (2013), 1.

[3] M. Blankenship. How social media can and should impact higher education. *The Education Digest*, **76**(7) (2011), 39.

[4] C. Madge, J. Meek, J. Wellens, & T. Hooley, Facebook, social integration and informal learning at university: It is more for socializing and talking to friends about work than for actually doing work. *Learning, Media and Technology* **34(2)** (2009), 141-155.

[5] B.S. Jong, C. H. Lai, Y.T. Hsia, T.W. Lin, & Y.S. Liao, An exploration of the potential educational value of Facebook. *Computers in Human Behavior*, 32 (2014), 201-211.

[6] A.M. Kaplan, M. Haenlein, Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons* **53(1)** (2010), 59-68.

[7] J.H. Kietzmann, K. Hermkens, I.P. McCarthy, B.S. Silvestre, Social media? Get serious! Understanding the functional building blocks of social media. *Business horizons* **54(3)** (2011), 241-251.

[8] N. Sclater, N., Web 2.0, personal learning environments, and the future of learning management systems. *Research Bulletin* **13(13)** (2008), 1-13.

[9] K. Brandl, Are you ready to "Moodle". *Language Learning & Technology* **9(2)** (2005), 16-23.

[10] M.A. Conde, F. García, M.J. Rodríguez-Conde, M. Alier, A. García-Holgado, Perceived openness of Learning Management Systems by students and teachers in education and technology courses. *Computers in Human Behavior*, **31** (2014), 517-526.

[11] C. Dalsgaard (2006). Social software: E-learning beyond learning management systems. *European Journal of Open, Distance and E-Learning* **9(2)** (2006), http://www.eurodl.org/index.php?p=archives&year=2006&hal&article=228

[12] Q. Wang, H. Lit Woo, C., Lang Quek, Y. Yang, M. Liu, Using the Facebook group as a learning management system: An exploratory study. *British Journal of Educational Technology* **43(3)** (2012), 428-438.

[13] L. Zhang, L., I. Pentina Motivations and usage patterns of Weibo. *Cyberpsychology, Behavior, and Social Networking* **15(6)** (2012), 312-317.
[14] T. Bosma, N. Owsiany, N. Scharff, K. Yau, Applying WeChat and WeLearn in the Community College Classroom. Internal report submitted to a graduate-level research course (2015), San Diego State University.
[15] M. Guo, M. Wang, H. Sun, A Pilot Study of Using Mobile platforms (WeChat and WeLearn) in College English Curriculum. In J.C. Augusto and D. Preuveneers (Eds), *Ambient Intelligence and Smart Environments* **19** (2015), 178-188.
[16] N. Dabbagh, A. Kitsantas. Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. *The Internet and Higher Education* **15(1)** (2012), 3-8.
[17] F.J. García-Peñalvo, M.Á.C. González, M.A. Forment, M.J.C. Guerrero, Opening learning management systems to personal learning environments. *J. UCS* **17(9)** (2011), 1222-1240.