ICIC Express Letters
Part B: Applications
Volume **9**, Number **12**, December **2018**
 ISSN 2185-2766
pp. **1201–1208**

A COMPARISON OF LEARNING EXPERIENCE: SOCIAL LEARNING SYSTEMS AND E-LEARNING SYSTEMS IN HIGHER EDUCATION INSTITUTION

Tanty Oktavia[1,2], Meyliana[1], Suhono Harso Supangkat[3] and Harjanto Prabowo[2]

[1]Information Systems Department
School of Information Systems
[2]Computer Science Department, BINUS Graduate Program – Doctor of Computer Science
Bina Nusantara University
Jl. K. H. Syahdan No. 9, Kemanggisan, Palmerah, Jakarta 11480, Indonesia
toktavia@binus.edu

[3]Teknologi Informasi
Institut Teknologi Bandung
Jl. Ganesha No. 10, Lb. Siliwangi, Coblong, Kota Bandung, Jawa Barat 40132, Indonesia

Received June 2018; accepted September 2018

Abstract. *Due to the rapid growth of information technology in the digital era, social media arise as a new communication channel that can facilitate transparency and communication for every user. Based on this fact, many organizations take an opportunity to utilize social media as an additional channel to engage with their stakeholders. Social learning is one of the implementations of social media technology in higher education institution to collaborate with teaching and learning strategies. Many higher education institutions decide to involve social learning concept into their teaching and learning process because of the shifting generation of student, which most students today use social media to interact with each other. Based on this phenomenon, this study tried to compare the different impacts between e-learning as in condition and social learning system into learning outcome. In this study, authors divided two groups to test the linkages under different situations (social learning and e-learning systems) using sampling groups to draw the impact of these systems. This study is addressed to identify the influence of different channel learning media and to assess the influence into several output variables, which are participation, performance, and engagement. Moreover, concepts from information systems, education, and human behavior have been used with literature to the adoption of social learning systems. The result of this research has practical implications for higher education institution that is interested to implement social learning systems in their teaching and learning strategies.*
Keywords: Social learning, e-learning, Participation, Performance, Engagement

1. **Introduction.** In recent years, Web 2.0 has restructured every aspect of technology to be more interactive and dynamic platform that offers a tool that enhances collaboration between users [1]. Web 2.0 is critical in providing a channel to multiple sources, a support to promote, facilities to rate, recommend or certify contributions to learning community [2]. The growth on the web technology can provide learners with more valuable information and experiences. Moreover, digital technology enables a learner to interact with computer and other people, which the first type of interaction defined by individual learning model and the other is social learning model that focused on collaboration, peer teaching, debate with others using some devices [3]. This situation drives higher education institution all over the world to be more proactive and adaptive following the invention of technology in order to prepare graduates for unpredictable situation [4]. With

DOI: 10.24507/icicelb.09.12.1201

the increase of Internet self-efficacy, learners may feel less overwhelmed by the innovation brought by Web 2.0 technology that they may not realize, but they will have more confidence to adapt and educate [5]. Based on this situation, social media technologies begin to be used in many higher education institution functions and for several purposes [6]. Previous studies have shown that many students more enjoy using social media platform for learning process with enriching and complementing their learning activities due to its supportive aspects for learning process [7-9].

In recent years, various social media platform allows users to interact in multiple ways [10]. It can build learning platform in ways that are more learner-generated, collaborative, and engaging. Studying social media is understanding the characteristics that make these sites appealing to people [11]. This changed users to become content creator [12]. Successful integration of social media into a learning environment is challenging, and the success or failure of these situation depends on the learner participation, engagement, and performance [13]. Despite this fact, the education institution begins to elaborate these platforms to enrich teaching and learning experience [14]. The use of social media in higher education institution has connected in students' daily activities [9]. Many higher education institutions already implemented this platform as additional media into their teaching and learning strategies, which learners use personal tools to support them [15]. Therefore, this study wants to investigate the impact of social learning into teaching and learning experience process compared to e-learning platform already used in higher education. Several research questions were used as a parameter to conduct this study, and those questions are: Do social learning increase students' performance compared to e-learning systems? Do social learning increase students 'participation compared to e-learning systems? Do social learning increase students' engagement compared to e-learning systems?

To answer these research questions, we have designed experiment with two classification groups for the higher education environment. It presents an empirical comparison of three considered outputs that are participation, performance, and engagement. To evaluate those factors, we involved students from two classes with the same lecture from X University, which are the private university in Indonesia. From this evaluation we want to investigate the influence of social learning systems to increase learning outcome, so, we can explore the impact from different treatment of learning (social learning and e-learning system), which are best implemented into higher education institution.

2. Theoritical Background.

This research is aligned with previous studies about e-learning and social learning model. The following describes a basic theory along with the current research.

2.1. e-learning.

Today's concept of learning includes various aspects of the use of information and communication technologies [16]. The swiftness with which technology evolves, the access to the Internet and data broadcasting has been seen as a daily activity. In the Internet, millions of people interact to one another [17]. e-learning is one tremendous new paradigm in the modern education [18]. In the previous era, e-learning systems focus on measurement then management of learning process, which is only a few or no addition to the learning process. Moreover, they do not prepare material to complete content learning material. Otherwise, the new technology of e-learning was never built to support institution to manage, organize, collect, reuse, maintain, and target instructional material. The problem is, in some implementations of e-learning systems devolved, oriented on technical competency. As a result, there is expensive implementation cost, unused feature, and incompatible application. Instead, the designer should understand the trend and what essential components are in the e-learning systems. This guidance will specify a requirement of e-learning system for pedagogical and systems integration [19].

2.2. **Social media.** Today, social media has proved to increase the communication process. New form of social media is continuously being built, but the concept of all underlying platform is based on Web 2.0 concept [20]. According to this fact, there are many research agendas that head to all forms of social media [21]. Social media have many different channels, such as Internet forum, Weblog, social blog, microblogging, Wiki, podcast, photo or video sharing, rating, and social bookmarking [22]. Current social media systems, such as social networking sites, have different functions from previous environment on social services because they do not provide anonymity. Therefore, this tends to be extroverted, rather than introverted, and people tend to engage in social media platform in every sector [23]. In particular, this study focuses on Facebook, LINE, and YouTube based on the previous study, which students in higher education institution have preferences to use these social media for their teaching and learning process [24] because social media employ mobile and web-based technology which can make highly interactive platform that involved individuals and communities to share, co-create, discuss, and modify user-generated content [25]. Moreover, social media have attracted the interest of higher education institution to increase engagement and motivate their students to be more active [26].

2.3. **Social learning.** The acceleration of technology evolution has opened space for a new paradigm in many industry sectors [27]. The invention of Web 2.0 extremely changes information technology today. Regarding the teaching and learning activity in Web 2.0, it is different because learners no longer only get information from the classroom. The collaboration of knowledge for each user discusses with other learners and lecturers about particular courses which push them more active in the earning process [1]. According to this fact, there are many possibilities on how to use social media in the best possible way to capitalize on this platform. Previous studies are conducted to identify students' preference of using social learning platform. Students find social learning is more applicable and user-friendly which drives them to enjoy on an online platform [28]. The popularity of social learning among learners, instructors began to concern to apply this platform for increasing student's motivation. Moreover, some research concerning the application of social learning can make better students' skills and increase their participation and engagement level. So, in this study, we try to do lab experiment to prove this fact to the student in higher education institution.

3. **Methodology.** This study used a study experiment to examine the learning outcome (participation, performance, engagement) empirically. This section identified the experimental setting, which includes sample of study, experimental model, and procedures.

3.1. **Samples.** The sample involved in this study is 76 students who enroll in database system course in computer science program at the X University in Jakarta, Indonesia. All participants' age is between 17 and 23, who are computer science and cybersecurity major study program. Moreover, the students involved in this experiment are chosen using simple random sampling design, which has the same average academic performance.

3.2. **The experimental model.** The social learning system will be tested to identify the impact in the learning environment. The system was implemented as a simulated Internet environment for one semester. It used Chrome browser to download the learning materials that are stored on laboratory server. Information retrieved in this experiment, includs text, video, file presentation (.PPTX), and material course (.PDF, .DOCX).

The settings of the experiment were divided into two platforms that are:

1) Social learning systems
   This system is a new proposed system that can accommodate teaching and learning process. All these features in this system were combined using social media features (Facebook, LINE, and YouTube).
2) e-learning systems
   This is a current learning system that has e-learning functionality to support teaching and learning in the higher education institution.

In measuring the comparison of those learning platforms, the research variable consists of performance, participation, and engagement level.

Table 1. Research variables

Research Variables	Descriptions	References
Performance	Individual academic performance results were converted into performance improvement percentages	[29-31]
Participation	Participation is manifested variously, such as liking, disliking, commenting, uploading, sharing, consumption (reading and viewing)	[7,29,32]
Engagement	Social media engagement intended as the mutual shaping of technologies, information, and social interactions. Emotional engagement encompasses affective states that are experienced during learning	[33-35]

3.3. **Procedures.** According to the initial experiment, this study used random sampling which classified groups into two parts. Subject and material in this experiment are Database Systems course, which in each group were prepared a connection to classroom learning, self-study learning, and peer study learning.

Group 1 (Treatment Group) is using social learning system, which combined social media functionality into e-learning feature.

Group 2 (Control Group) is using e-learning system already implemented in the higher education institution.

4. **Results.** The increasing growth of social media technologies, such as Facebook, Twitter, and MOOC, has provided people with more opportunities to connect, collaborate, and learn [36]. In measuring the impact, we set a design experiment to investigate the different impacts between e-learning and social learning platform.

Tests were conducted to see the resulting output in the form of performance, number of participative participation, and the engagement of each experiment performed.

4.1. **Performance.** To examine the overall student performances based on academic evaluation, the final score between treatment group and control group was analyzed. There are 38 participants using e-learning systems as usual and the same number using social learning systems for one semester. After that, we examined the final grade from two groups using hypotheses.

H_0: The grade performance activities between social learning and e-learning are not different.

H_1: The grade performance activities between social learning and e-learning are different.

Here is the result for two groups that were experimented by using R software with the alpha 5%:

```
> t.test(data$Nilai1,data$Nilai2,var.equal=TRUE,alternative=c("greater"))
      Two Sample t-test
data: data$Nilai1 and data$Nilai2
t = 2.2368, df = 74, p-value = 0.01416
alternative hypothesis: true difference in means is greater than 0
95 percent confidence interval:
 1.365246 Inf
sample estimates:
mean of x mean of y
 83.90263  78.55526
```

According to the result, p-value from this measurement is 0.01416, which means the p-value is below the alpha value (0.05). It can be concluded that the performance grade between social learning and e-learning systems has a significant difference with a mean value 78.55526 for e-learning and 83.90263 for social learning.

4.2. **Participation.** To measure the participation factor, the activity log between e-learning and social learning systems was analyzed. There are 38 participants using e-learning systems and the same number using social learning systems for one semester. After that, we analyze the activity log from two groups using hypotheses.

H_0: The activity log between social learning and e-learning has the same number.

H_1: The activity log between social learning and e-learning has the different number.

Below is the result of two groups that were experimented using R software with the alpha 5%:

```
> t.test(data$Log.1,data$Log.2,var.equal=FALSE)
      Welch Two Sample t-test
data: data$Log.1 and data$Log.2
t = −7.3819, df = 60.93, p-value = 5.134e-10
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 −51.92056 −90.50049
sample estimates:
mean of x mean of y
109.50000  38.28947
```

Based on the result, p-value from this measurement is 5.134e-10, which means the p-value is below the alpha value (0.05). It can be concluded that the number participation between social learning and e-learning systems has a significant difference with a mean value 38.28947 for e-learning and 109.50000 for social learning.

4.3. **Engagement.** To measure the engagement factor, the engagement tendency between e-learning and social learning systems was analyzed by using questionnaire. There are 38 participants using e-learning systems and the same number using social learning systems for one semester. After that, we analyze the result of questionnaire of two groups using hypotheses:

H_0: The engagement level between social learning and e-learning has the same level.

H_1: The engagement level between social learning and e-learning has the different level.

The result for two groups that were experimented using R software with the alpha 5% is

```
>t.test(data$Engagement.A,data$Engagement.B,alternative=c("two.sided"),var.equal
=F)
      Welch Two Sample t-test
data: data$Engagement.A and data$Engagement.B
t = 2.8098, df = 63.32, p-value = 0.006586
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
0.1649632 0.9771420
sample estimates:
mean of x mean of y
4.102105    3.531053
```

Based on the outcome, p-value from this measurement is 0.006586 which means the p-value is below the alpha value (0.05). It can be concluded that the engagement level between social learning and e-learning systems has a significant difference with a mean value 3.531053 for e-learning and 4.102105 for social learning. The evidence is growing that social learning dedicated to support teaching and learning can be useful in any learning mechanism [37]. The result showed the significant impact of social learning to enhance students' learning experience for higher education institution based on three indicator parameters, which are performance, participation, and engagement level.

5. **Discussion & Implication.** In summary, social media allows students to interact more intense mediated by a raft of tool, including in supporting their learning process, connecting within dynamic and rich social environment, rather than learning individually using learning management system. The study investigates student's preferences on social media in the learning process, which have direct impact to the indicators of success. Those indicators are performance, participation, and engagement.

Based on the carried-out experiments, the obtained results show that students' performance, participation, and engagement level of social learning system intend to have a positive significance compared to e-learning system platform. The result of this study identified that the consistent adoption of social media could affect student experiences. This concluded that social media can be used to support learning process that can adjust higher education institution learning pattern. The affordance findings indicate that students from today's generation prefer to use social media that can collaborate on their learning process. This study has its limitation, the experiments' participant is only 38 participants, and the experiment only involved one subject course, which is Database Systems course. In the future, we plan to expand the size of the sample participants and to add more categories subject course for evaluation, so that we can generalize the outcome of this research into many subject courses.

6. **Conclusion.** The innovation of teaching and learning collaborated with social media has developed in the Web 2.0 generation. The free access to information using Internet and collaboration in knowledge exchange using web technology has tremendously changed educational institution learning pattern. This is the proliferation of the technology in social media with new educational platform and priorities that offers the potential transformational forms in learning environment. This situation fruitfully enhances teaching and learning experience which is expected to act as active participants in the social and financial change of global economy. This research has considered two groups in response to test the increasing of participation, performance, and engagement with social

learning systems. As a result, those groups have a positive impact using social learning compared to e-learning in terms of performance, participation, and engagement level. These affordances stimulate the participatory culture in the learning environment that can increase the engagement level, in which participants feel connected with one another. Moreover, the deployment of social media for learning can support learner's self-direction and knowledge creation.

REFERENCES

[1] J. J. P. C. Rodrigues, F. M. R. Sabino and L. Zhou, Enhancing e-learning experience with online social networks, *IET Communications*, vol.5, no.8, p.1147, 2011.

[2] C. Holland and M. Judge, The potential and practice of learning 2.0 in higher education future learning spaces, *IGI Global*, no.2007, pp.2-4, 2013.

[3] T. Chan, Social design of network learning society, *Proc. of the International Conference on Computers in Education (ICCE'02)*, 2002.

[4] A. G. Shchitov, O. G. Shchitova, D. A. Shchitova, P. Stasinska and D. T. C. Chieu, Features of the learning modular system moodle use in teaching the Russian language to Russian and foreign students at an institution of higher education, *Procedia – Social and Behavioral Sciences*, vol.215, pp.170-175, 2015.

[5] C. Cromer, Understanding Web 2.0's influences on public e-services: A protection motivation perspective, *Innovation: Management, Policy & Practice*, vol.12, no.2, pp.192-205, 2010.

[6] M. El, A. El, J. Segers and I. Pais, Technology adoption in employee recruitment: The case of social media in Central and Eastern Europe, *Computers in Human Behavior*, vol.57, pp.240-249, 2016.

[7] V. Balakrishnan and G. C. Lay, Students' learning styles and their effects on the use of social media technology for learning, *Telematics and Informatics*, vol.33, no.3, pp.808-821, 2015.

[8] G. Veletsianos and C. C. Navarrete, Online social networks as formal learning environments: Learner experiences and activities, *International Review of Research in Open & Distance Learning*, vol.13, no.1, 2012.

[9] J. Mao, Social media for learning: A mixed methods study on high school students' technology affordances and perspectives, *Computers in Human Behavior*, vol.33, pp.213-223, 2014.

[10] A. Jalali, J. Sherbino, J. Frank and S. Sutherland, Social media and medical education: Exploring the potential of Twitter as a learning tool, *International Review of Psychiatry*, pp.1-7, 2015.

[11] M. L. Khan, Social media engagement: What motivates user participation and consumption on YouTube?, *Computers in Human Behavior*, vol.66, pp.236-247, 2017.

[12] J. E. Rodriguez, Social media use in higher education: Key areas to consider for educators, *Journal of Online Learning & Teaching*, vol.7, no.4, pp.539-550, 2011.

[13] B. Dyson, K. Vickers, J. Turtle, S. Cowan and A. Tassone, Evaluating the use of Facebook to increase student engagement and understanding in lecture-based classes, *Springer Sci. Media Dordr.*, 2014.

[14] R. R. V Rasiah, Transformative higher education teaching and learning: Using social media in a team-based learning environment, *Procedia – Social and Behavioral Sciences*, vol.123, pp.369-379, 2014.

[15] G. M. Munguatosha, P. B. Muyinda and J. T. Lubega, A social networked learning adoption model for higher education institutions in developing countries, *Horizon*, vol.19, no.4, pp.307-320, 2011.

[16] J. Dašić, P. Dašić and V. Šerifi, Evolution of e-learning, *The 7th International Conference on Quality, Management, Environment, Education, Engineering (ICQME 2012)*, Tivat, Montenegro, 2012.

[17] M. A. Garito, Distance learning: The new era of the university, *Procedia – Social and Behavioral Sciences*, vol.93, pp.1749-1754, 2013.

[18] P.-C. Sun, R. J. Tsai, G. Finger, Y.-Y. Chen and D. Yeh, What drives a successful e-learning? An empirical investigation of the critical factors influencing learner satisfaction, *Computers & Education*, vol.50, no.4, pp.1183-1202, 2008.

[19] J. Ismail, The design of an e-learning system: Beyond the hype, *The Internet and Higher Education*, vol.4, pp.329-336, 2002.

[20] L. A. Mcfarland and R. E. Ployhart, Integrative conceptual review social media: A contextual framework to guide research and practice, *Journal of Applied Physiology*, vol.100, no.6, pp.1653-1677, 2015.

[21] A. G. van der Vyver, B. Williams and M. A. Marais, Using social media as a managerial platform for an educational development project: Cofimvaba, *Int. J. Inf. Educ. Technol.*, vol.5, no.12, pp.10-13, 2015.

[22] Falahah and D. Rosmala, Study of social networking usage in higher education environment, *Procedia – Social and Behavioral Sciences*, vol.67, pp.156-166, 2012.

[23] T. Correa, A. W. Hinsley and H. G. De Zúñiga, Computers in human behavior who interacts on the web: The intersection of users' personality and social media use, *Computers in Human Behavior*, vol.26, no.2, pp.247-253, 2010.
[24] T. Oktavia, H. L. H. S. Warnars and S. Adi, Integration model of knowledge management and social media for higher education, *TELKOMNIKA Telecommunication, Computing, Electronics and Control*, vol.15, no.2, 2017.
[25] J. H. Kietzmann, K. Hermkens and I. P. McCarthy, Social media? Get serious! Understanding the functional building blocks of social media, *Business Horizons*, vol.54, 2011.
[26] R. Junco, The effect of Twitter on college student engagement and grades, *Journal of Computer Assisted Learning*, pp.1-14, 2010.
[27] S. Lemos and N. Pedro, Improving the quality of e-learning courses in higher education through student satisfaction, *World Academy of Science, Engineering and Technology*, vol.66, no.6, pp.1108-1114, 2012.
[28] K. Balasubramanian, V. Jaykumar and L. N. Fukey, A study on 'student preference towards the use of edmodo as a learning platform to create responsible learning environment', *Procedia – Social and Behavioral Sciences*, vol.144, pp.416-422, 2014.
[29] H. M. Selim, Critical success factors for e-learning acceptance: Confirmatory factor models, *Computers & Education*, vol.49, pp.396-413, 2007.
[30] Y. Wang, H. Wang and D. Y. Shee, Measuring e-learning systems success in an organizational context: Scale development and validation, *Computers in Human Behavior*, vol.23, pp.1792-1808, 2007.
[31] T. L. Hun, C. K. Loy and R. M. K. Hansaram, A study on predicting undergraduate's improvement of academic performances based on their characteristics of learning and approaches at a private higher educational institution, *Procedia – Social and Behavioral Sciences*, vol.93, pp.1957-1965, 2013.
[32] B. H. Khan, *Managing e-learning: Design, Delivery, Implementation, and Evaluation*, Information Science Publishing, 2005.
[33] C. Mcloughlin and M. J. W. Lee, Social software and participatory learning: Pedagogical choices with technology affordances in the Web 2.0 era introduction: Social trends and challenges, *Ascilite*, pp.664-675, 2007.
[34] J. Hong, M. Hwang, E. Szeto, C. Tsai and Y. Kuo, Internet cognitive failure relevant to self-efficacy, learning interest, and satisfaction with social media learning, *Computers in Human Behavior*, vol.55, pp.214-222, 2016.
[35] P. Spagnoletti, A. Resca and Ø. Sæbø, Design for social media engagement: Insights from elderly care assistance, *Journal of Strategic Information Systems*, vol.24, no.2, pp.128-145, 2015.
[36] D. Vu, P. Pattison and G. Robins, Relational event models for social learning in MOOCs, *Social Networks*, vol.43, pp.121-135, 2015.
[37] N. A. Iahad, M. Mirabolghasemi and S. H. Huspi, A blended community of inquiry approach: The usage of social network as a support for course management system, *2012 International Conference on Computer and Information Science, ICCIS 2012 – A Conference of World Engineering, Science and Technology Congress, ESTCON 2012 – Conference Proceedings*, vol.1, pp.180-183, 2012.