



HAL
open science

Towards a social learning analysis using Learning Management System and Learning Experience to predict learners' success

Hiba Gharbaoui, Khalifa Mansouri, Franck Poirier

► **To cite this version:**

Hiba Gharbaoui, Khalifa Mansouri, Franck Poirier. Towards a social learning analysis using Learning Management System and Learning Experience to predict learners' success. Intelligent Tutoring Systems2023 (ITS 2023), Institute of Intelligent Systems, Jun 2023, Corfu, Greece. hal-04081102

HAL Id: hal-04081102

<https://hal.science/hal-04081102v1>

Submitted on 25 Apr 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Towards a social learning analysis using Learning Management System and Learning Experience to predict learners' success

Hiba Gharbaoui¹ Khalifa Mansouri³ and Franck Poirier³

¹ Modeling and Simulation of Intelligent Industrial Systems Laboratory – M2S2I ENSET Mohammedia, University Hassan II of Casablanca, Morocco

² Lab-STICC, University Bretagne Sud, Vannes, France

hiba.gharbaoui-etu@etu.univh2c.ma

khmansouri@hotmail.com

franck.poirier@univ-ubs.fr

Abstract. Online learning is an alternative to the traditional (face-to-face) educational system. Contrary to traditional teaching (classroom), distance learning is characterized by the lack of physical contact between instructors and students and also between students within a classroom. Unfortunately, some learners may fail or even stop learning online quite quickly. In addition, learners find it more difficult to learn, not because there is not enough content, but because there is too much and they cannot find what is useful and up-to-date. This study aims to prove the importance of using social and adaptive learning to overcome the problems that learners face in online learning platforms, we propose a model to determine the effects of using the two types of platforms in online learning, namely Learning Management System (LMS) and Learning Experience Platform (LXP) for two groups of learners in Moroccan higher education applying social learning analysis (SLA). Specifically, in this proposal we attempt to analyze data from the LMS and LXP platforms to build knowledge models about students and determine their learning styles based on their interactions on these platforms, improve their learning experience and predict the conditions that favor their progress and success in order to recreate the conditions for quality social learning and help learners find possible paths to success in the online learning platforms in Morocco.

Keywords: E-learning, social learning, learning analysis, Learning Management System, Learning Experience Platform.

1 Introduction

The social learning hypothesis, proposed by Albert Bandura, accentuates the significance of noticing, displaying and imitating the ways of behaving, perspectives, and profound reactions of others. Social learning theory examines the interaction of environmental and cognitive factors in influencing human learning and behavior [1].

In order to better understand the role of learners' social presence, this study tries to find out how these interactions work this will give us a lot of information to adapt our teaching to the way our students learn. The approach aims to enhance the effectiveness of student participation, for this we will use Learning Management System (LMS) and Learning Experience System (LXP) which are two types of platforms in online learning [2], and specific social learning analytics methods to analyze the data from both platforms such as the connections and interactions between students in order to predict the conditions that enable their progress and find the most appropriate type of learning for each. In this paper, Section 2 presents a theoretical background to understand the concepts of social presence in online learning and also presents the methods of social learning analysis as well as an explanation of LMS and LXP online learning platforms. Section 3 to discuss the research that was being done in this area. Our proposed system is to analyze data from the LMS and LXP platforms using social learning analytics in order to predict the conditions favoring learner success in e-learning platforms in Morocco this will be discussed in Section 4. The last section presents a conclusion and identifies our perspectives and the challenges that need to be addressed in the future.

2 Theoretical background

2.1 Social presence in online learning (social networks / social networks analytics)

Social networks allow people to quickly exchange information and knowledge and have been promoted with various applications for interpersonal interaction, communication and sharing [3] [4] Furthermore, learning is a social and collective outcome that is achieved through conversations, knowledge dissemination and social networks [5]. According to Christine Greenhow, "Now that we know what skills students are learning on the Internet, we need to encourage and help them to develop them further" [6]. Teenagers are not always aware of developing such abilities, which can be useful from both an academic and professional point of view. Going further, we also learn that the reduction of the digital divide between social backgrounds would take place with the use of these community media [7].

In recent years, Social Network Analysis (SNA) has attracted increasing attention as a methodology in the field of education [8]. SNA is often applied to analyze interconnected forum user networks to study the structural patterns and underlying relational organization of learning communities in online courses. The participation gap between active and inactive learners has been studied by Poquet and Dawson [9] [10]. Thoughtfully, Social Network Analysis (SNA) considers each actor as a node of the whole network, Whereas the various connections between them are conceptualized as lines interfacing the hubs and called edges or connections [11].

2.2 Learning Analytics / Social Learning Analytics

Currently, it is possible to retrieve social data from various social sources, such as Twitter, Facebook, Instagram, YouTube and learning platforms like LMSs and LXPs. This data can be the main source of information to do the Learning analytics (LA) and Social Learning analytics (SLA).

Learning analytics (LA) is a discipline that aims to exploit the hidden potential of interaction data generated by the use of online learning environments [12]. According to Sclater [13], The goal is to analyze the digital traces left by learners in order to better understand them and optimize learning. In fact, learning analytics focuses on the detection, collection, analysis and exploitation of digital traces left by learners in their daily activities, in order to understand and optimize learning and the different environments in which it occurs [14], [15]. On the other hand, Learning Analytics (LA) is a very important discipline of artificial intelligence, due to its ability to exploit learning data, generate information and knowledge to improve learning processes.

One of the subclasses of Learning Analytics (LA) is Social Learning Analytics (SLA), The SLA focuses on relationship building and provides an opportunity to identify interventions that can enhance the potential of the network to support stakeholder learning [2]. Social Learning Analytics (SLA) seeks to gain hidden insights from large amounts of data, usually educational in nature. SLA focuses primarily on Social Network Analysis (SNA) and web analysis to uncover patterns of interaction and behavior of educational social actors. Social Learning Analytic (SLA) is a subfield of LA, which focuses on how students acquire knowledge in a social context, often without being controlled, in collaboration with other [16] [12] [17].

2.3 Learning Management System / Learning Experience Platform

Supporting learners via web-based platforms is not new. For decades, learning management systems (LMS) such as Blackboard and Moodle have served as the foundation for online learner support. LMSs provide a comprehensive digital learning environment where teaching and learning materials can be delivered, stored, and assessed. Often these systems are also linked to administrative functions such as student registration and student performance tracking [18].

However in recent years, third generation platforms called LXP have been developed that claim to provide a more interactive, current and social learning experience, the so-called learning experience platforms recently begun to replace the use of LMSs in higher education. LXPs combine aspects of a social media platform with a virtual learning environment. The term was coined by Josh Bersin, who also compared these new platforms to "Netflix for learning" and the expression is still used today [19]. Uploading content is quick and easy for all users, with the integration of a limited number of applications - an LXP functions as a platform rather than a system with different building blocks like an LMS.

3 Related works

Social networks can enhance peer-to-peer and educator-student interaction, especially when used to search for data, publish articles, engage in discussions and communicate [20]. Other than social networks, there are user-generated content (UGC) platforms in e-learning such as LMSs and LXPs. Content creation is no longer limited to the course instructor, but in an LXP, everyone creates content [21]. In the LMS, the learning journey is largely linear, with a learner completing one task and then moving on to the next. An LXP system aims to increase engagement and experience sharing among users, rather than functioning as a repository of information. The recent push in higher education toward online and distance learning, already a trend prior to the pandemic, has accelerated and allowed for a more rapid introduction of LXPs into higher education [18]. To analyze student interactions in online learning platforms, researchers have introduced five categories of analysis. The first two categories are intrinsically social (Social network analysis, Discourse analysis), while the other three are potentially "socialized", i.e., usefully applied in social settings (Content analysis, Alignment analysis and Contextual analysis) [16].

In [17], They suggest analyzing external data from the web and social networks to build knowledge models about students and to improve the learning processes that occur in smart classrooms. For this there are several factors and dimensions to consider that could affect the learning experience (LX) to decrease the failure or dropout rate in Online Learning Environments (OLEs). In [22], the proposed research model consists of 38 factors categorized along 5 dimensions: learner characteristics, instructor characteristics, system characteristics, course characteristics, and social aspects. This study [23] examined learner satisfaction with e-learning systems in higher education. Results indicate that diversity of assessments, course flexibility, social interactions, system quality, and perceived usefulness have positive effects on learner satisfaction. The results of this research will be useful to both institutions and practitioners of e-learning systems.

4 Proposed system

Our model (figure 1) focuses on social learning as a solution to our problem in order to predict the success or failure of learners in Moroccan universities (higher education), improve their learning experience and suggest the type of platform suitable for each student. For this we proposed to use two e-learning platforms LMS and LXP, LMS to focus more on the administration of learning than on the experience, whereas LXP to focus on the ability to facilitate a personalized, learner-oriented learning.

The chosen LMS is Moodle which is a learning platform designed to provide teachers, administrators and learners with a single robust, secure and integrated system for creating personalized learning environments [24], and the chosen LXP is Myskillcamp [25] which is an all-in-one learning experience platform. One can create, edit, import and purchase courses directly in Myskillcamp, build and launch learners on personalized learning paths and even check progress and completion rates with their analytics.

We chose these two platforms because they are designed for teaching and learning, easy to use, free, with no licensing costs, their multilingual capabilities ensure that no language barrier hinders online learning, they are flexible and customizable platforms that can serve small classrooms as well as large organizations, robust, secure and private with a large number of resources available.

So we will collect the data from these platforms using the data retrieval technique, after this generated data will be cleaned and preprocessed. There are several tools to facilitate data mining, namely MMT (Moodle Mining Tool) and ADE (Automatic Data Extraction) [26]. Generally speaking, there are three methods of data extraction, the first method of extraction is xAPI. For example, Watershed which has a way to extract data from virtually any LRS "Learning Record Store" which is a database used to store all the information of a learning ecosystem in xAPI format, even if it is not fully compliant. And many LRSs have xAPI functionality that can pass xAPI data to Watershed as an activity provider. An API connection is used for the second approach. Most platforms include APIs that enable access to their data or enable the creation and download of reports. API access involves technical know-how, comprehension of the applicable documentation, as well as the necessary tools and credentials. The final approach uses an Excel or CSV file. You may get a report from most platforms and explore with the data in Excel or another data tool of your choosing [27].

The data that will be extracted is the content of the links between students, which means the interests that connect them, their interactions in the learning groups and the level of engagement in each group. After cleaning the data we will have interpretable data that will be analyzed using Social Learning Analytics (SLA) where we seek to obtain information hidden in large amounts of educational data. This concept focuses mainly on Social Network Analysis (SNA) and web analysis, to discover interaction and behavior patterns of educational social actors [17].

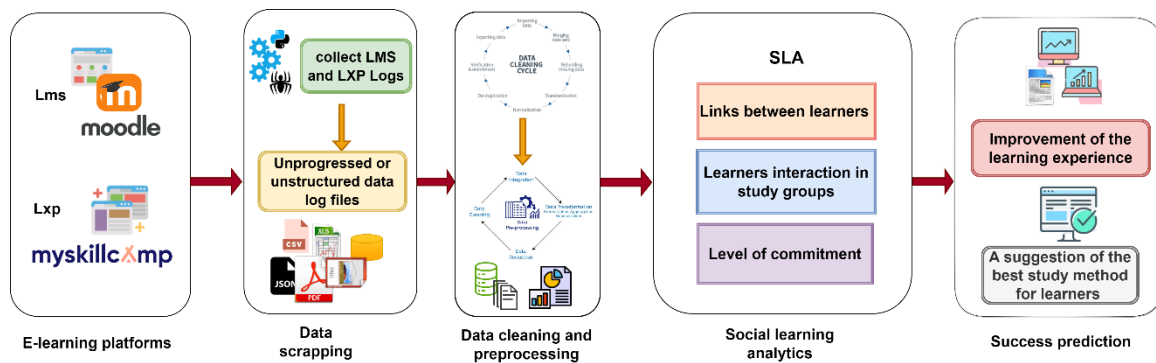


Fig. 1. Social learning as a solution to predict the success of learners

The analysis will therefore focus on three main axes "the content of the links between students", "the interaction of the learners in the work groups" and the "level of commitment (increase or decrease)" in the two LMS and LXP platforms, we will therefore look for the relationship between these axes and the success rate of the learners.

This will allow us to conclude the role of social learning in the success of students in these platforms specifically their interactions and participations in the online discussion forums of the courses and thus track the progress of learners and give them targeted and better feedback, in order to provide them with an improved learning experience that will help them succeed and self-regulate.

5 Conclusion

The social environment in which an e-learning action takes place can play a major role in a learner's persistence and success. Peer and instructor opinions can influence learners' choices in using a learning system. This study aims to test the hypothesis of the role and importance of the use of social and adaptive learning to overcome the problems that learners face in online learning platforms and its role in their success, we propose a model to determine the effects of the use of the two main online learning platforms "LMS and LXP" in Moroccan higher education, We seek to analyze the interactions and social presence in learning groups as well as the level of engagement of learners, how their activity is evaluated on the basis of social learning analysis (SLA) in order to predict the success and the best types of learning for each learner, thus improving their learning experience.

Our future goal is to conduct an experiment where we will apply SLA concepts to analyze data extracted from the LMS and LXP platforms.

From this analysis, we will dedicate the importance of social learning in e-learning environments and suggest the best learning method for each learner in order to predict and guarantee the success of learners in e-learning environments in Moroccan educational systems.

References

1. « Albert Bandura's Social Learning Theory | Simply Psychology ». <https://www.simplypsychology.org/bandura.html>
2. J. J. Díaz-Lázaro, I. M. S. Fernández, et M. del M. Sánchez-Vera, « Social Learning Analytics in Higher Education. An experience at the Primary Education stage », *J. New Approaches Educ. Res.*, vol. 6, n° 2, Art. n° 2, juill. 2017, doi: 10.7821/naer.2017.7.232.
3. C.-M. Chen, Y.-L. Hsieh, et S.-H. Hsu, « Mining learner profile utilizing association rule for web-based learning diagnosis », *Expert Syst. Appl.*, vol. 33, n° 1, p. 6-22, juill. 2007, doi: 10.1016/j.eswa.2006.04.025.
4. T.-T. Wu, « Using smart mobile devices in social-network-based health education practice: A learning behavior analysis », *Nurse Educ. Today*, vol. 34, n° 6, p. 958-963, juin 2014, doi: 10.1016/j.nedt.2014.01.013.

5. J. S. Brown et P. Duguid, « Organizational Learning and Communities-of-Practice: Toward a Unified View of Working, Learning, and Innovation », *Organ. Sci.*, vol. 2, n° 1, p. 40-57, févr. 1991, doi: 10.1287/orsc.2.1.40.
6. « Article 4 - Les réseaux sociaux : outils d'apprentissage en devenir ? - Article 1 – Apprenance ». <https://b.21-bal.com/doc/2311/index.html?>
7. J.-P. Pinte, « Vers des réseaux sociaux d'apprentissage en éducation », *Cah. Dyn.*, vol. 47, n° 2, p. 82-86, 2010, doi: 10.3917/lcd.047.0082.
8. M. de Laat, V. Lally, L. Lipponen, et R.-J. Simons, « Investigating patterns of interaction in networked learning and computer-supported collaborative learning: A role for Social Network Analysis », *Int. J. Comput.-Support. Collab. Learn.*, vol. 2, n° 1, p. 87-103, mars 2007, doi: 10.1007/s11412-007-9006-4.
9. P. Oleksandra et D. Shane, « Untangling MOOC learner networks », in *Proceedings of the Sixth International Conference on Learning Analytics & Knowledge*, New York, NY, USA, avr. 2016, p. 208-212. doi: 10.1145/2883851.2883919.
10. W. Zou, X. Hu, Z. Pan, C. Li, Y. Cai, et M. Liu, « Exploring the relationship between social presence and learners' prestige in MOOC discussion forums using automated content analysis and social network analysis », *Comput. Hum. Behav.*, vol. 115, p. 106582, févr. 2021, doi: 10.1016/j.chb.2020.106582.
11. Á. Hernández-García, I. González-González, A. I. Jiménez-Zarco, et J. Chaparro-Peláez, « Visualizations of Online Course Interactions for Social Network Learning Analytics », *Int. J. Emerg. Technol. Learn. IJET*, vol. 11, n° 07, Art. n° 07, juill. 2016, doi: 10.3991/ijet.v11i07.5889.
12. R. Ferguson, « Learning analytics: drivers, developments and challenges », *Int. J. Technol. Enhanc. Learn.*, vol. 4, n° 5-6, p. 304-317, janv. 2012, doi: 10.1504/IJTEL.2012.051816.
13. « Learning Analytics Explained | Niall Sclater | Taylor & Francis Group ». <https://www.taylorfrancis.com/books/mono/10.4324/9781315679563/learning-analytics-explained-niall-sclater> (consulté le 18 juin 2022).
14. Y. S. [href='https://orcid.org/0000-0001-7906-0994' class='orcid-link'>](https://orcid.org/0000-0001-7906-0994), K. Mansouri, et F. Poirier, « TaBAT: Design and Experimentation of a Learning Analysis Dashboard for Teachers and Learners », *J. Inf. Technol. Educ. Res.*, vol. 20, p. 331-350, juill. 2021.
15. « Best Coursera Courses & Certificates in 25 categories [2022] », 7 mai 2022. <https://www.codespaces.com/coursera.html> (consulté le 18 juin 2022).
16. R. Ferguson et S. Buckingham Shum, « Social learning analytics: five approaches », in *Proceedings of the 2nd International Conference on Learning Analytics and Knowledge*, New York, NY, USA, avr. 2012, p. 23-33. doi: 10.1145/2330601.2330616.
17. J. Aguilar, O. Buendia, A. Pinto, et J. Gutiérrez, « Social learning analytics for determining learning styles in a smart classroom », *Interact. Learn. Environ.*, vol. 30, n° 2, p. 245-261, févr. 2022, doi: 10.1080/10494820.2019.1651745.

18. A. Cockrill, « From Learning Management Systems to Learning Experience Platforms: Do they keep what they promise? Reflections on a rapidly changing learning environment », mai 2021, doi: 10.25401/cardiffmet.14611932.v1.
19. « A New World of Corporate Learning Arrives: And It Looks Like TV – JOSH BERSIN ». https://joshbersin.com/2017/06/a-new-world-of-corporate-learning-arrives-and-it-looks-like-tv/?zd_source=hrt&zd_campaign=3171&zd_term=chiradeepbasumallick
20. T.-T. Wu, « Using smart mobile devices in social-network-based health education practice: A learning behavior analysis », *Nurse Educ. Today*, vol. 34, n° 6, Art. n° 6, juin 2014, doi: 10.1016/j.nedt.2014.01.013.
21. « LMS vs. LXP: How and Why They're Different ». <https://unboxedtechnology.com/blog/learning-management-system-lms/>
22. Y. Safsouf, K. Mansouri, et F. Poirier, « A New Model of Learner Experience in Online Learning Environments », in *Information Systems and Technologies to Support Learning*, Cham, 2019, p. 29-38. doi: 10.1007/978-3-030-03577-8_4.
23. Y. Safsouf, K. Mansouri, et F. Poirier, « Smart learning environment, measure online student satisfaction: a case study in the context of higher education in Morocco », in *2020 International Conference on Electrical and Information Technologies (ICEIT)*, mars 2020, p. 1-5. doi: 10.1109/ICEIT48248.2020.9113189.
24. « Moodle - Open-source learning platform | Moodle.org ». <https://moodle.org/>
25. « About us | myskillcamp ». <https://myskillcamp.com/about-us>
26. F. Ali et S. Ng, « Moodle Data Retrieval for Educational Data Mining », *Int. J. Sci. Eng. Technol.*, vol. 4, p. 523-525, nov. 2015, doi: 10.17950/ijset/v4s11/1105.
27. How Do I Extract Learning Data from My LMS or LXP? » <https://www.watershedlrs.com/blog/learning-data-ecosystems/how-to-extract-learning-data-from-lrs/>