

Exploring the Impact of Social Learning Networks in M-Learning: A Case Study in a University Environment

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Abstract. The high penetration of Internet, advances in mobile computing and the rise of smartphone usage has largely enhanced the use of social media in education. Moreover, nowadays social learning network (SLN) platforms have become an important educational technology component in higher education. Despite the fact that SLN are becoming ubiquitous in the higher education, there is relatively not much empirical work done investigating their purposefulness when integrated into the learning activities. This paper aims at exploring the impact of SLN in mobile assisted learning and to provide empirical evidence as to what extent SLN and mobile learning (M-learning) can improve the learning experiences. For this purpose, a quantitative experimental approach is used, and two survey questionnaires were conducted. The data is collected from 120 participants. In this study, we focus our intention on Edmodo and Kahoot platforms, which represent social media based tools that aid and support collaboration, knowledge sharing and group activities among students. Computer science students of the Tetovo University (TU) used these tools throughout one semester. From this study, there is significant evidence that students are very interested to use this SLN in a M-learning setting, indicating that SLN can be one of the promising pedagogical technologies that could contribute effectively to learning process.

Keywords: M-learning · Social learning networks · Higher education · Edmodo · Kahoot

1 Introduction

It is well-established fact that higher education nature has been changed radically due to the rapid development of mobile computing devices and internet capabilities. Mobile technology has become an indispensable part of the educational landscape at higher education setting, as it brings many opportunities and challenges to both students and academics [1]. Therefore, pedagogy should be remodeled to match with the current digital era [2].

Rapid development of internet technologies also brought many innovations in terms of social media services, which has penetrated different application domain, including those applicable to learning domain. In this aspect, SLN encapsulates a range of scenarios in which a number of people learn from one another through structured interaction. Current research indicates that teachers and instructors are reaching out to the use of different SLN applications in order to mediate and enhance their teaching and instructions as well as promote active learning of the students [3]. The proliferation of online communication has given rise to a number of SLN applications, ranging from Question and Answer (Q&A) sites (e.g., Quora), to enterprise social networks (e.g., Jive), to platforms for online education (e.g. Edmodo) [4].

The portability of smart devices has increased the use of social media in everyday life, giving users the opportunity not only to access the educational content from anywhere and anytime but also to interact and collaborate on the educational tasks via social interaction tools through different eLearning systems [5]. Nowadays, students are increasingly using social media for educational purposes; they also prefer to use social media to communicate with peers and instructors, and when used effectively, social media promotes learning by facilitating communication and information sharing [6–8].

Our study investigated the impact of Edmodo and Kahoot platforms in mobile assisted learning environment by providing empirical evidences on how these platforms facilitate the learning process. Moreover, the article aims at investigating whether these platforms enhance the students' engagement, motivation and learning.

We use Edmodo as an eLearning platform and implement gamification via Kahoot to evaluate student assessment. Edmodo is a closed social learning platform based on Web 2.0 and mobile assisted learning, while Kahoot represents a new generation game-based learning tool and platform based on a quiz concept, focusing more on engaging and motivating the students through attractive graphical interface.

The rest of the paper is structured as follows. In Sect. 2, we present literature review. Section 3 gives an overview of the methodological approach followed by analysis and results discussion in Sect. 4. The last section presents conclusion and some insight into future directions.

2 Related Work

The Oxford English Dictionary defines learning as “the cognitive process of acquiring skill or knowledge”. Within the research community, learning is defined as a social, intellectual activity that is primarily based on collaboration [9]. Wenger (2003) defines social learning in terms of social competence and personal experiences [10].

Technology has had a strong impact on the way people learn by providing new ways of collaboration, interaction and experiences. The technology nowadays has created new opportunities for interaction with learners and between learners. In this aspect, SLN emerges when learners exchange information on the educational topics in a structured way [4]. Edmodo and Kahoot represent instances of social media tools used to promote interaction and collaboration among learners. Despite being available for a while in the educational space, Edmodo (2008) and Kahoot (2013), there are few studies conducted

on their use and application to learning activities. Some of the studies identified are conducted towards the application of Edmodo [11–14] and Kahoot in learning process [15–17]. In [11], Edmodo is discussed and implemented as the network-learning environment, where the teaching process is demonstrated under the concept of flipped classroom. This study proves that this platform can stimulate student's learning interest and improve their ability of comprehension.

The use of social learning platforms in conjunction with the flipped classroom concept has been further studied by [12], where again Edmodo is selected as the online learning environment. This work indicated that the flipped classroom and the use of Edmodo exposes some ontological changes with respect to the use of digital technologies within education; as the study suggests, the duality of the real and online worlds is no longer relevant as this two notions seamlessly integrate.

Wallace [13] conducts another interesting experiment, where authors try to investigate the student preference towards the incorporation of Edmodo on student's engagement and responsible learning. The study revealed that Edmodo encourages engagement and responsible learning, and the students' preference of the platform is mainly emphasized towards resources, communication, such as forums, and also for other online activities. The experiences of using Edmodo to support problem-based learning are addressed in [14]. Although the literature argues that cultural differences can play an important role in the acceptance of this platform [18], the results of the [14] indicate that Edmodo has positive acceptance in blended learning and supports problem based learning.

Recently, the innovative use of social media tools in higher education institutions for educational purposes is giving rise to the game-based pedagogy. Most of the works in this field is directed towards the use of game-based learning apps and their effect on the students. Hence, [15] study the specific elements in game-based learning, where authors investigate how to use points and audio effects by using the Kahoot platform. Their study reveal that there exist some differences whether audio and points are used in game-based learning for concentration, engagement, enjoyment and motivation. Authors in [16] perform another experiment where Kahoot is compared to traditional non-gamified assessment platforms, as well as the usage of traditional paper forms for formative assessment. The results show improvements with regard to motivation, engagement, enjoyment and concentration, but there is no evidence that there is a significant learning improvement. Another study [17] uses Kahoot in classroom activities to observe student's interaction, attention and motivation. The authors pointed out that this platform motivates interaction among students and allows students to concentrate more in order to achieve learning activities in the classroom.

Despite the substantial body of knowledge on the use of Edmodo and Kahoot tools in learning activities, there is still a need for further empirical addresses the impact of these two platforms (Edmodo and Kahoot) used together in a mobile assisted learning environment. Therefore, in this paper we have constructed one such study trying to contribute to the understanding of these two SNL tools and their contributions to the learning process.

3 Settings of the Study

In order to achieve the purpose of this study, which is to investigate the role and impact of Edmodo and Kahoot on the student's engagement, motivation and learning, we seek answers to the following research questions:

- **RQ1:** What are the learning experiences with the two observed SLN in an m-learning environment and to what extent they can contribute to learning process?
- **RQ2:** Can different SLN affect learner's experience in terms of engagement and motivation in the context of their course?
- **RQ3:** What are the learner's perceptions on the limitations, advantages and structural differences between the observed SLNs?

We use quantitative approach to perform the analysis of the questionnaire data. The main motivation to conduct this study is based on the scarcity of research works, where social-media based learning environments like Edmodo and Kahoot are incorporated together to perform m-learning and assessment in classroom context on higher education settings in a developing country context.

3.1 Sample and Study Instrument

This study is focused on the higher education students and it was conducted with the participation of students from Tetovo University, which is a public university in Macedonia. The participants include 120 bachelor students from Computer science department in the following courses: Data structures, Programming 1, Computer architecture, Digital circuits 1, IT ethics and System software. This study took place around 12 weeks during the 2016 fall semester. Data from the study has been collected with two online surveys.

The methodological framework is given in Fig. 1, and consists of three stages. We initially use a questionnaire to evaluate student's learning experiences and familiarity with social media and SLN in m-learning environment. This represent the first stage of our study. The questionnaire is conducted at the beginning of each of the courses. At the second stage, the learners are asked to attend lessons, have access to the course materials, upload assignments/homework and perform other educational tasks using Edmodo with their mobile devices. In this stage, in which the m-learning and assessment takes place, we observe and measure, among others, the user interaction with the SLN and by using Kahoot we perform an assessment for each of the courses. Moreover, learners were encouraged to use these platforms for doing teamwork assignments and project development. On the other hand, Kahoot is used to perform assessment activities, in a form of quizzes. Before commencement of this stage, students received a short introduction to Edmodo and Kahoot in their classroom class. The third stage involves another questionnaire (post-study), which was administered at the end of the courses, and is used to gather learners' experiences with Edmodo and Kahoot as well as their impact on learning.

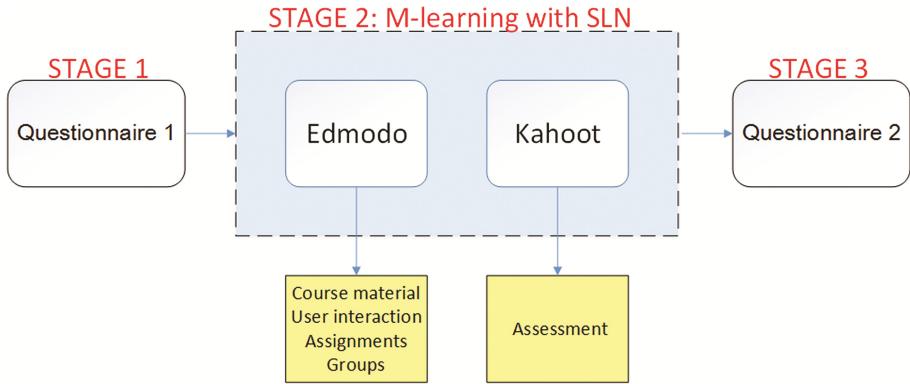


Fig. 1. Schematic representation of the methodological framework

3.2 Sampling Technique and Survey Structure

For this study we use the *Purposive homogeneous sampling* method where the participants are all members belonging to one similar subgroup (computer science students), and are carefully selected with the expectation that each participant will provide unique and rich information of value to the study [19].

Before starting to administer the questionnaires, an ethical approval from the Faculty and the students is obtained. All the participants were kindly informed that their participation in this study is on voluntary basis and the responses they provide will remain completely confidential.

The first questionnaire consists of 16 items (questions), and is made of three parts. The first part contained questions about participant's demography, including: name, e-mail address, study level, age, whereas the second part includes questions related to the student's familiarity and awareness about m-learning and also for social media tools as learning aid separately. The third part includes questions related to the student's experiences with the usage of SLN in a mobile assisted environment, with special focus to Edmodo and Kahoot apps.

The second questionnaire consisted of 30 five point Likert scale items whose values ranged from 1 = Strongly Disagree to 5 = Strongly Agree. The main idea behind these questionnaire relies on understanding as to what extent students are satisfied with these platforms as learning aid, and to examine the suitability of the platforms towards strengthening engagement, motivation and communication among students when used for M-learning in higher education. Sample items included "Do you think that social media learning networks encourage the student-student and student-teacher collaboration in M-learning", "The Edmodo app keeps me more focused with the subject", "Kahoot can help me get better grades", etc. Some items have been adopted from relevant studies, such as [14, 16].

4 Analysis and Discussion

Based on the student's demographic data, which were asked at the first questionnaire, results revealed that female students were 24.5% as compared to male students (75.5%). All the students are studying computer science at the undergraduate level, more specifically, 40.9% of students belong to first year (Programming 1, Digital circuits 1), 17.4% to second year (Computer architecture, Data structures), 25.5% to the third year (IT Ethics), while only 16.4% (System Software) are students attending their fourth year of studies. The rest of the sections presents the findings that answer our three research questions.

RQ1. What are the learning experiences with the two tested observed SLN in m-learning environment?

By analyzing the students' experiences and awareness towards social media and m-learning, results have indicated that before conducting this study, 67.3% of the students have already used social media (Facebook, Youtube, Twitter) for learning, as opposed to wikis, blogs, and audio/video podcast. On the other hand, it is interesting to note that only 47.3% have used mobile devices in their education, while the majority of them have used laptop and desktop computers (52.7%). As can be seen from Table 1, which presents the pre-study calculated results, the learners are uncertain about m-learning usage and advantages (Mode = 3), while the majority of them didn't have any experience of using SLNs, having also a poor perception for the suitability of SLN for m-learning (Mode = 2). They recognize the positive impact that in general SLN could contribute to learning (Mode = 4), but they lack information for the functionalities of Edmodo and Kahoot and have no previous experience with this tools for learning.

RQ2. Can different SLN (Edmodo and Kahoot) affect the learner experience in terms of engagement and motivation in the context of their course in a m-learning setting?

Table 1. Student's experiences and awareness towards m-learning and SLN tools

Question	Mean	Mode	Standard deviation
I have enough knowledge about the m-learning advantages	3.08	3	0.88
I use my smartphone for learning	2.78	3	0.82
Social media tools are suitable for m-learning	2.89	2	0.95
I frequently use social media tools for learning	1.96	2	0.86
I frequently use social media with my smartphone for learning	1.99	2	0.86
In general, social media tools can have positive impact on learning	3.55	4	0.86
I have information about the functionalities of Edmodo and Kahoot	1.78	2	0.78
We have already used Edmodo and Kahoot in the classroom	1.40	1	0.51

To determine the answer of this question, we asked students to reflect upon the impact of these tools on their engagement and motivation in learning. As indicated in the Table 2, approximately 44% of students agree that Edmodo helped them to engage more and discuss learning concepts with colleagues ($M = 3.96$, $SD = 0.96$), while only 28% of them agree when using Kahoot ($M = 3.75$, $SD = 3$). This result could be attributed to the fact that both these tools help learners' to increase the interaction since they have system functions to engage them in discussions, albeit having differences in the user interface.

Table 2. The impact of SLNs to engagement and motivation

Question	Mean	Mode	Standard deviation
Edmodo helps me to engage and discuss learning concepts with colleagues	3.96	4	0.96
Do you think Kahoot empowers dialog and discussions in the class	3.75	3	1.06
Learning with Edmodo in a smartphone increases my motivation	4.35	5	0.91
I enjoyed the assessment with Kahoot app and feel more motivated to learn	4.33	5	0.84

Concerning motivation, the study reveals that the majority of students strongly agree that both platforms have had high motivational impact on them.

The result could refer to the reason that no courses at all were previously introduced through SLN platforms in a m-learning setting at Tetovo University, but rather by using the conventional methods of teaching. Hence, the aspirations of learners towards m-learning with SLN are very high, as they found these tools very motivational and interesting.

RQ3. What are the students' perceptions on the limitations, advantages and structural differences between the observed SLNs?

The findings related to limitations, advantages and structural differences between Edmodo and Kahoot are presented in Table 3. Basic observations from the set of questions seems to be that student overall have had a positive experience on using Edmodo, but they are more toward neutral when it comes to the benefits of Edmodo for increasing the knowledge on the subject. One thing to be investigated is the fact if the course content affects the usefulness of SLN tools?

At the curiosity level students seems to find the use of the tool very interesting, especially through mobile device. They were very positive on the usefulness of the tool to support interaction and communication with the teacher. They seems to have good experiences with using of Edmodo app for submission of homework as well as they highly recommend the app to other users.

As far as Kahoot is concerned, it seems that we have a more converging situation. The majority of students agreed that the purpose of it is for assessment. In addition, as such it can provide the necessary support for personalized learning experience. The have

Table 3. Student's perceptions towards limitations, advantages and differences of the observed SLNs

Question	Mean	Mode	Standard deviation
Edmodo is suitable and satisfies my needs for m-learning	4.18	4	0.74
Edmodo makes easy to be updated with learning	3.94	4	0.99
Do you think Edmodo helped you to increase your knowledge for the subject	3.76	3	0.97
Learning with Edmodo in a smartphone increases my motivation	4.35	5	0.91
Edmodo helped me to get more information or assistance from the teacher	4.05	5	1.00
I always submit on time my homework with Edmodo	4.25	5	1.03
Would you recommend to others to use the Edmodo app	4.39	5	0.84
Kahoot platform is suitable for assessment	4.60	5	0.74
The Kahoot mobile app helps me to manage better my studies	3.84	4	0.98
Do you think that Kahoot can be used to follow the success for every student	3.92	5	1.05
Do you think that Kahoot based assessment is more effective and accurate than the traditional one	3.88	5	1.03
Do you believe Kahoot help you identify your weaknesses	4.09	4	0.96
Kahoot would enable me to get higher grades	3.85	5	1.02
Kahoot adds more value to m-learning	4.23	4	0.79

slightly lower score when it come to the use of Kahoot for managing of their studies. As well as supporting them identifying the weaknesses.

Students see a more usefulness on the Kahoot when it comes to ability to support them getting higher grades. Despite having the mode 5, still the mean value is lower while and standard deviation relatively higher. This indicates that the majority of students had an overall good experience with Kahoot when it comes to their course performance. In comparison to Edmodo, Kahoot seems to have been liked more by the students. Especially they were able to see a more tangible added value on the use of Kahoot compared to Edmodo. The most interesting result is that students suggest that they will continue using Kahoot in the future as well. Interesting observation seems to be that Kahoot sees to have influenced students perceptions that m-learning is more assessment oriented compared to traditional learning. The ability for faster feedback seems to have supported this understanding.

Another interesting observation that comes from this study is the fact that the use of technology seems to support the perception for increased creativity as well as motivation among students. In the context of higher education, the technology, in particular social media tools are instrumental to support the interactions between peers as well as with the teacher. Furthermore, they represent an effective tool for teachers to engage students and to encourage them to broaden their knowledge and skills aimed at making learning more meaningful, fun and effective [20].

5 Conclusions

Social media tools provide services and various new ways of communication, using computers and mobile devices. In this paper we presented an approach of application of SLN in m-learning and provide an insight on their impact for the learning activities. For this study, students in various computer sciences courses were participating in our study to share their perceptions and experience of working with social media based tools, attend lessons and conduct different learning activities with Edmodo and Kahoot, and finally provide their feedback related to the use of the observed SLN.

Findings from this work indicated that, overall, SLN tools support better engagement in the classroom and increase the potential for interactions among peers and teachers as they also help students to be part of the m-learning community without any restrictions of time and place. It seem that from the two tools investigated here, the students have better received Kahoot.

Further, results point to the need to conduct future research on the correlation between course content, pedagogical approaches and supporting tools used.

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