

DoosMooc: An Online Learning Environment Equipped with Innovative Social Interactions

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Abstract—Recent rapid developments in information and communication technology have particularly facilitated social pervasive interactions with the potential ability to bring about great outcomes for collaborative learning activities. Classic web-based learning environments utilized in online or blended learning centers inadequately support learners to play active roles in learning processes. In response to this demand, this paper introduces DoosMooc, an integrated social learning environment equipped by a series of modified or redesigned actions, interfaces, representations and workflows which enable learners' communications and collaborative activities. Using the environment in an academic blended learning center has revealed the significant roles played by DoosMooc main features such as formal and semantic course contents, peer reviewed posting, portfolio, and leader box in facilitating students' social interactions leading to more qualified engagements in course learning activities.

Index Terms— E-Learning, portfolio, gamification, social learning

I. INTRODUCTION

DURING the recent years, our study on personalized web-based learning environment shifted from offering new aspects in learner modeling [1], to enhancing collaborative learning activities through more efficient grouping algorithms [2], and further to providing context-aware learning services [3], and finally to evaluating collaborative learning activities [4] [5] [6]. In order to respond to the recently highlighted need for interactive learning environments which allows for communication, collaboration, and authoring, we designed, implemented, and evaluated a new social learning environment, namely DoosMooc¹. It also provides solutions for analyzing and representing considerable amount of data produced during students' social and learning actions, represented as user portfolios and content peer reviewed models. The present paper describes the main features of DoosMooc as well as how it supports social learning activities.

A. Web-Based Learning Environment

Traditional learning management system (LMS) often provides facilities for teachers to share course contents, define learning activities such as assignments and discussions, and assess learners' participations. These kind of environments offer much less possibilities for learners to play active roles in learning processes [7] [8]. Actually, due to the recent rapid growth in social networks such as Facebook and Google+, learners expect

LMSs to supply facilities for sharing, commenting and even voting. In response to these demands, some newly designed learning environment have provided their courses with embedded social interactions for all participants [9] [10]. Although so far there is almost no document describing the relevant methodologies or results achieved by the mentioned commercial systems, the remarkable potential of online social networks to enhance learning experience was explained in some academic studies. Providing a traditional LMS with several social networks-related modules, Rodrigues et al. suggested that social networks can create communities to let the learners play active roles, shape their learning processes and easily interact and cooperate with each other [11]. Identifying the main principles on which an LMS can support personal learning activities, Jeremic et al. integrated social and semantic web technology along with the linked data paradigm to improve the interactivity of an ordinary LMS and let learners span their learning process across different tools and services [12]. It has also been revealed that allowing students to construct their learning environments through adding tools, resources, and people to their learning atmosphere enhances their feeling of ownership over their learning environments [13].

B. Social Learning

Social learning theory defines learning as a cognitive process which takes place in a social context where observing the consequences of a behavior (reward and punishment) let a learner make decisions about the performance of the activities [14]. The theory also emphasized that cognition, environment, and behavior are interrelated and play role in learning process. Empirical studies revealed that observing and imitating others can facilitate learners' knowledge sharing skills [15]. Given the importance of interactivity and engagement of student for successful learning processes, the role of discussion forums in knowledge construction and participants' communications was investigated [16]. To avoid inefficient learning discussions, participants' interactions and contributions were suggested to be managed from a holistic point of view [6], or be guided by a range of social and epistemic scripts [17].

II. MAIN FEATURES

This paper introduces DoosMooc E-Learning platform, developed by the University of Tehran². As shown in Figure 1, DoosMooc is similar to Google+. Some tabs are provided at the top of the page, and below them some boxes are sorted in two columns, each representing a course resource, forum or

¹ DoosMooc is a combination of Doost which means friend in Persian language and MOOC. This term emphasizes on the importance of social relationships between learners.

² <http://www.doosmooc.com>

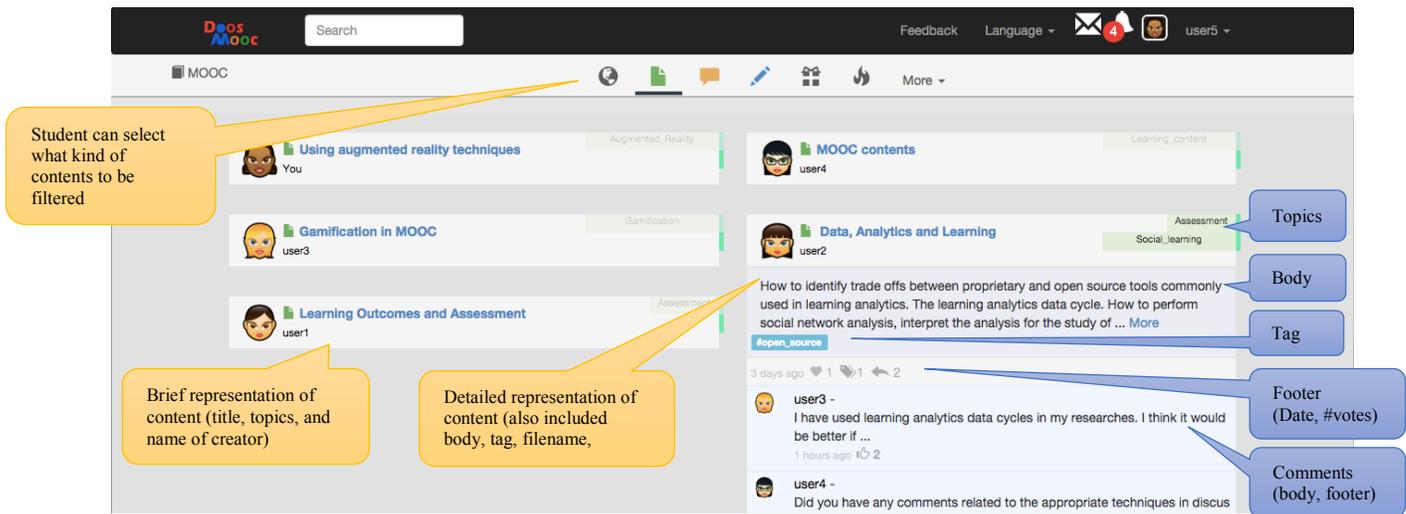


Figure 1- A sample course View in DoosMooC consisting 5 brief and 1 detailed representations of learning content

assignment. All course contents are shown by default, because the *All* tab (globe icon) is the default tab. But a user can filter a certain type of course contents by selecting another tab, for example *Resources* (green icon), *Forums* (yellow icon), and *Assignment* (blue icon). In the case of brief view of a resource in Figure 1, the small box displays the title and the topics covered by the content, while the detailed schema of a resource depicted in the figure indicates that the resource covers two topics, has one tag, and has so far received one vote and two comments. The following subsections will describe formal and semantic course structure and the concepts of *topic*, *tag*, *vote* and *comment*. Actually, DoosMooC was designed based on the hypothesis that Google plus-like appearance of a learning environment would make the environment more familiar and attractive to learners. Therefore, it will be supposed to subsequently increase the learners' social interactions and lead to more qualified learning activities and contents.

DoosMooC is a social network based learning environment made based on MVC framework and Bootstrap, and hosted on www.doosmooC.com. It has been recently used in a formal course in order to be refined and preliminarily evaluated. Similar to any other LMS, DoosMooC allows teachers to share learning content, define course assignments, and set up learning forums. However, it supports realizing social learning theories through providing students with affordances similar to those for teachers. Students can share educational resources, design assignments, and grade answers uploaded by their peers. The environment also provides students with means for social interaction through which they can express their feelings about all course content shared by instructors and peers. The environment collects all social actions and calculates contents and users' credits. Indeed, commenting and voting mechanisms made it possible to recognize more popular and informative contents. The environment also reports most active and most popular users. Participants can view a summary of their correspondent tracked and gathered data as their open model. The mentioned features are described in details in the following subsections.

A. Formal and Semantic Course Structure

In this environment, all students and teachers could share

almost any sort of learning contents such as texts, files, and images. However, they are asked to assign structured and unstructured metadata for their shared contents to make them more accessible and informative. Indeed, participants could choose structured metadata from a pool of topics already determined by the course teacher, create new tags, or use the tags assigned for other contents. Topics represent a course organization and consist of all subjects expected to be covered during the course. The structure helps students see their progress in all course topics and evaluate their progress in comparison to peers. These detailed reports are available in the tab of Portfolio to be further described.

B. Peer Reviewed Posting

The environment offered many social interactions facilities within the scope of the course similar to modern web-based social networks. Course participants are allowed to leave comments describing their ideas about learning contents or to express their feelings and understandings through some predefined vote labels such as "Interesting", "Like it", "Bored", "Lost Interest" or many others. Different types of votes are available for different types of contents. All social interactions are considered as signs of content popularity and effectiveness, enabling the environment to highlight and recommend the most appropriate contents for each learner.

C. Social Open Model for Course Contents

The main significant problem in social learning environments is the huge number of actions taken by the environment participants. As illustrated in Figure 2, any of the DoosMooC contents can accept creation, management, social, special, and metadata actions. Instead of representing actions taken by all participants which lead to long and hard to read learning contents with hard to trace recent status, some strategies are designed and implemented in DoosMooC, which consider the role of the actions in peers' social learning processes. Strategies shown in the figure imply that some actions may be represented in two styles of brief and detailed schemas, while the others may be shown just in detailed schema and be hidden in other situations. In this way, participants are notified of all social and

learning actions taken by all peers in manners useful for their learning processes. These strategies make DoosMoooc distinguishable from other social networks which try to attract viewers by as interesting representations as possible.

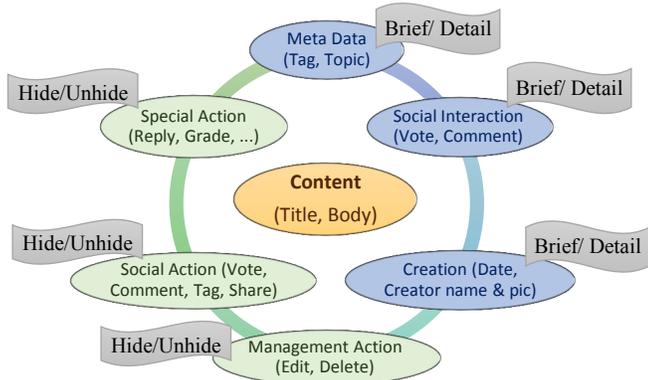


Figure 2- Action impacts on content representation

D. Portfolio: Visualized Socially Based Learner Model

As shown in Figure 3, portfolio is a graphical representation of students' progresses provided based on all learning and social actions taken by them during a course. Each student's portfolio of any course consists of a time curve of all educational activities by date, and two bar charts of knowledge and social credits achieved by him/her in the course topics. Since the charts report the minimum and the maximum values of all grades next to a student's own grades, they help the student understand his/her position among the peers and manage his/her learning activities to make expected improvements. Since all portfolio items are separately reported for course topics, it needs that firstly the course topics have been precisely defined by the teacher, and secondly all participants have tried to assign corresponding topics when they shared new contents such as resource, forum, discussion, and assignment.

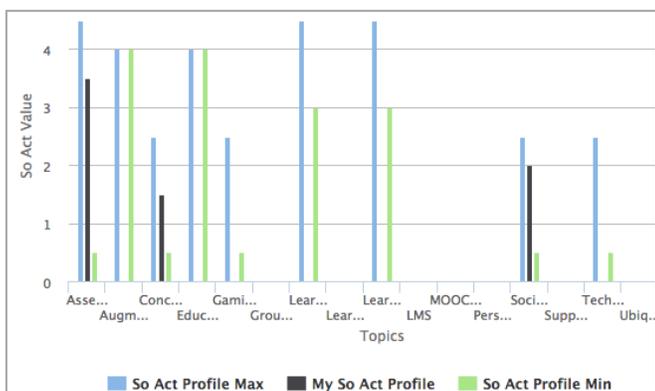


Figure 3- Part of a student's portfolio which shows social actions taken for all topics of a course besides the minimum and the maximum values

E. Leader Box: First level of gamification

DoosMoooc recognizes the most active and popular students as Leaders. A box similar to Figure 4 appears at the top of each course page and shows the picture and a summary of the activities of the students who are distinguished as the most popular ones. The box also represent the most active students who have participated in course activities seriously. The

selections are based on all learning and social activities taken by all students during a limited time period to be chosen from a drop-down list consisting of the last week, the last month, and the whole duration of a course.

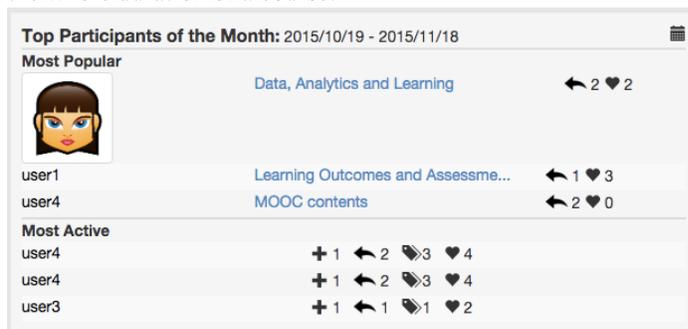


Figure 4- A Leader box

F. Interactive easy to use interfaces

DoosMoooc lets students take learning and social actions through action icons provided below a course content. Each icon normally open a correspondent easy-to-use interface just besides the content with no need to navigate across different pages. Throwing away unneeded details in order to have enough room for effective ones, such interfaces provide optimized levels of information representation which display required data and ask as much less questions as possible. These interfaces may smartly change during time in response to the content recent status.

III. EVALUATION

As a preliminary evaluation, a formal course in an Iranian public university was managed through DoosMoooc. The course had 18 enrolled students, lasted 16 weeks, and comprised of two phases in order to let the researchers investigate the learners' acceptance toward the new environment in comparison to an ordinary learning management system, as well as the issues to be regarded in the future versions. Moodle version 2.6.1 [7] was used in this study as a virtual learning environment for several weeks and was then replaced by the DoosMoooc platform. At the end of the course, the students participated in an interview to express their ideas about DoosMoooc and Moodle and the significant features of each. Table 1 shows the functional or non-functional (F/N) features, mentioned by the students and whose numbers are reported in the right column.

As the table indicates, the features highlighted by the students for Moodle are mainly functional and can be easily provided in the next version of DoosMoooc; however, those highlighted for DoosMoooc such as *Portfolio* are supported by its innovative socially-based infrastructures which are not available in ordinary learning management systems such as Moodle. Almost all students enjoyed DoosMoooc non-functional features such as *Social Relationships*. Furthermore, as few students mentioned, DoosMoooc has facilitated observational learning and promoted learners' self-awareness, considered as outcomes of all supported social learning activities. Accordingly, it can be concluded that DoosMoooc can respond to the need for social media in education and opportunities for collaboration which have been identified as two of ten top trends for the period of 2012 through 2017 [18].

TABLE I
SUMMARY OF THE RESULTS OF THE STUDENT INTERVIEWS

	F/N	Feature	#
Moodle	F	Variety of Learning Activities	8
	F	Grade Book	8
	F	Weekly Format	7
	F	Online Users	7
	F	Plugins	5
	N	Organized View	14
	N	Detailed Management Interfaces	7
DoosMooc	F	Portfolio	12
	F	Sharing Resource	9
	F	Leader Box	6
	F	Self & Peer Assessment	5
	F	Adaptation	3
	N	Learners Social Interactions	16
	N	Social Environment	8
	N	Similar to Social Network	7
	N	Dynamic Organization by learner	7
	N	GUI	5
	N	Observational, Social Learning	5
	N	Mobile view	3
	N	Self-Awareness	2
Both	F	Notification & Email	11
	F	Messaging	4

F/N Functional / non-functional feature

IV. CONCLUSION

This paper introduced DoosMooc as a member of the next generation of classic teacher-centered learning management systems such as Moodle. Actually, classic LMS provided lots of facilities for instructors but a few functionalities for students. Teachers could create contents in their courses while students were pure consumers with no room for sharing and commenting. However, DoosMooc is learner-centered where learners could play significant roles in their learning processes. They could share learning contents, assign appropriate metadata, participate course discussions, and socially interact with their peers through comments and votes. The social interactions provided in DoosMooc brought about some new characteristics for ordinary activities like forums. Indeed, instead of just writing pure text, participants were allowed to tag and clarify the concepts stated through their new posts. Considering vote functionality it's easier for participants to understand which subject and discussions are more popular than others. DoosMooc also provides graphical representations of all students as *Portfolio* as well as representing the most popular and the most active learners as *Leaders*. A preliminary evaluation in a blended learning environment demonstrated the feasibility and the opportunities that drive from the socially based DoosMooc infrastructure. More specifically, the main provided features benefit learners in experiencing real social learning activities and achieving higher levels of awareness.

Future work will include an extension of the preliminary studies to evaluate dimensions considered in the design and the implementation of DoosMooc through some detailed investigations. Additional features and plugins will be added in the future version of the environment in order to provide learners with a wider range of learning activities.

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