# Combining Facebook and Open Learner Models to Encourage Collaborative Learning

**Mohammad Alotaibi*, Susan BULL**
*University of Birmingham, UK*
*maa715@bham.ac.uk

**Abstract:** In this paper we describe the use of a social network application (Facebook) with individual open learner models at university level, to support collaborative learning. Results suggest that Facebook and open learner models can be used together to support collaborative learning. It also suggests that Facebook and open learner models can support sociability in collaborative learning: both were found to be useful.

**Keywords:** Open Learner Models, Online Social Networks, Collaborative Learning

## Introduction

Support for collaboration between learners is one of the aims of Computer-Supported Collaborative Learning (CSCL) [1] and Open Learner Models (OLM) [2]. In adaptive educational systems, an OLM is a learner model that is accessible by the learner. It is the representation of a learner's knowledge and skills, and sometimes their misconceptions or other attributes. Promoting learner metacognition through reflection; giving learners more control over their learning; helping learners to plan and monitor their learning and promoting collaboration and interaction between learners are some of the reasons behind opening the learner model [2]. Learners can make use of their OLM to identify their knowledge and misconceptions, etc. Then they can choose a suitable way to proceed in their learning. This addresses the first three reasons (above) for using an OLM. On the fourth (collaboration), three approaches to using OLM to support collaborative interaction and learning have been described: individual learner models available for peers to view; a group model comprising data from individual team members; and a combined group model which is available to group members [3]. We here focus on the first approach where students are presented with individual learner models (using OLMlets [4]). We aim to support both user collaboration around their OLM and social interaction by using online social networks.

In addition to collaboration, work has emphasized the importance of support for social interaction and communication between learners in CSCL environments [5],[6] [7]. Online social networks were developed to facilitate social interaction between users. However, the current generation of Web 2.0 social networking applications also offer tools that can support collaborative learning activities. Facebook, for example, provides several communication channels that can be used by learners to communicate with peers or instructors. It can support both synchronous and asynchronous discussion. It can also be used to create study groups by using the group tools to create online learning communities. Research in CSCL has raised the possibility of using online social networking applications to support CSCL aims like learner interaction and collaboration [8].

In this paper we describe the use of an OLM that can support collaborative learning and prompt learner discussion [4],[9] with the Facebook online social network application.

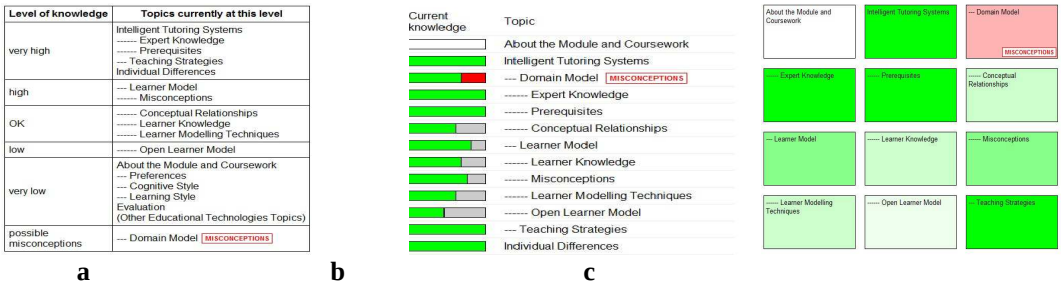
## 1. Supporting Collaboration and Social Interaction with OLM and Facebook

The fact that Facebook is used by many students in higher education motivated several researchers to explore the educational use of Facebook [10],[11]. Recent work on educational use of social networks suggests that in addition to support for social interaction, they can also be used to enhance critical thinking skills by providing tools that facilitate communication, interaction between learners and collaborative learning [12],[13].

OLM can support collaboration and discussion [4],[9]. Giving learners the option to release (open) their learner model to their peers and instructors has resulted in spontaneous collaboration, discussion and peer help [4]. Furthermore, students reported that they sensed a feeling of community and togetherness when they were using OLM at the same time, as one of the students describes: *When several people were using OLMlets at the same time, most notably in one of the small computer rooms, there came to be almost a community feel. Students were comparing their model against those of people in the room, and discussions were occurring spontaneously all the time* [4]. Here we aim to make use of this collaboration prompted by students' individual OLMs, and extend the social interaction from this collaboration using an existing social networking application that can provide tools for collaboration and social interaction between learners, to support collaborative learning.

## 2. The Use of OLM and Facebook to Support Collaboration and Social Interaction

Previous research considered Facebook and face-to-face discussion of an OLM, finding that students use both approaches [14]. We here consider the Facebook interactions in greater detail. OLMlets [4] is a domain-independent web-based OLM. It uses students' answers to multiple choice questions to construct a simple learner model. It then externalises learner models (consisting of knowledge level and possible misconceptions) in different formats, for example: tables with ranked list of topics, skill meters, boxes indicating knowledge level by color (Figure 1). OLMlets gives learners the option to open their learner models to other users such as peers and instructors. They can release their learner model either with their names visible or anonymously, in which case they cannot be identified. By releasing the learner model, learners can compare their learner models with those of their peers.




**a** **b** **c**

Figure 1: a: table view in OLMlets; b: skill meter view in OLMlets; c: boxes view in OLMlets

### *2.1. Participants, Materials and Methods*

Participants were 15 third year students in the School of Electronic, Electrical and Computer Engineering at The University of Birmingham, taking an Adaptive Learning Environments module. They used Facebook alongside OLMlets for 5 weeks as part of their course. OLMlets was introduced to students in a two hour lab session, and then they used it as they

wished in their own time. Students joined a secret Facebook group page for the class, to allow them to optionally discuss their learning with their peers. Students' participation in Facebook and their use of OLMlets was not assessed in this course. At the end of the fifth week, students returned a questionnaire about using Facebook with OLMlets, with response options on a five point scale (strongly agree – strongly disagree).

*2.2. Results*

Students' interaction moved from no interaction in the first week to higher level of interaction in weeks 2-4, and then decreased in the final week (see [14]). The nature of students' posts on Facebook varied. Students posted questions about different things related to their learning, such as questions asking for clarification about some aspects of adaptive learning environments. For example, a student asked on Facebook: *What is the domain any one?* They also posted questions related to their assessed course assignments, for example*: I'm a bit confused... My subject doesn't really have rules... just facts.. so how do I portray this?* Most of the posts on the Facebook wall were about the assessed coursework. In both cases students attempted to answer peers' questions on Facebook and ask for help from peers or the instructor when they were not sure of their answers. The examples below relate to one of the more common misconceptions identified in students' use of OLMlets, posted by the instructor to encourage discussion: "an intelligent tutoring system does not understand the domain model".

*Example 1. Student question and peer responses*
**S1**: *Can a domain model contain images or animation as well as text explanation?*
**S2**: *[The instructor] said if you wanted you could by you have to justify why.*
**S3***: I think what she wants in for the domain model to just contain expert knowledge, then the images will be held in the system. The teaching strategy would then choose when and how to use these images.*
**S4***: Yeah this is what S5 and I were discussing and I'm not 100% convinced either way. I maintained that you needed to keep in mind when "modelling" something like a domain … you'd keep just the expert knowledge there and maybe not worry about the format (i.e. images, text files, etc). When I type my ideas out and read them back they sound even more confusing than when they're in my head. S5? [Instructor?]*

*Example 2. Peer and instructor responses to a question about domain pre-requisites*
**S1:** *i'm under the impression it's domain model*
**S1:** *i've changed my mind, i'd say the teaching strategies. the teaching strategies have the pre-requisites for the learner, the domain model has pre-requisites for how the domain links itself together*
**S2:** *I think it is under teaching strategies.*
**Instructor:** *In OLMlets it comes under domain model.*
**S3:** *I said it had to be stored in the domain model. For all the other (more advanced) knowledge in the domain to be true, it was all linked and built upon the prerequisite knowledge – so for it to be true, it had to include the prerequisite stuff too.*

Some students also posted messages to show their frustration, for example: *a part of me just died :(*. Other students posted messages showing sense of humor, for example, when the instructor used the Facebook Like button a student comments: *What I said is correct. I know this because [the instructor] liked it!*

Questionnaire responses (Table 1) show that 3 students released their learner model named to peers and 7 students released their model to peers anonymously. Most reported

that they used Facebook to find peers to work with. Students also reported that they used Facebook to seek help from peers. A few students stated that they tried to work out some OLMlets questions in Facebook and about half claimed the Facebook interaction to be helpful for answering OLMlets questions. Finally, most found Facebook and OLMlets helpful for their module, with 14 out of 15 students for Facebook and 13 for OLMlets.

Table 1. Questionnaire responses

| **Questionnaire item** | | **Questionnaire item** | |
|---|---|---|---|
| Released OLM named to peers | 3 | Released OLM anonymously to peers | 7 |
| Used FB to find collaborators | 12 | Used FB to find help from peers | 8 |
| Worked out OLMlets questions in FB | 4 | FB helped answer OLMlets questions | 7 |
| OLMlets useful for the module | 13 | FB useful for the module | 14 |

### *2.3. Discussion*

The different types of student postings show that Facebook can contribute positively to several factors when it is used alongside OLM. The first relates to learning and completion of coursework. Students used Facebook to ask specific questions about the subject (e.g. *what is the domain model?).* This student considered interacting with peers on Facebook as an option to find an answer to his question. It may also suggest that the student wants to benefit from having the instructor in the group to receive further explanation about this specific topic. Students also asked several questions about assessed work. Although working individually on their assignment, they interacted to discuss and ask questions about their work. This shows that students also considered their interaction with peers on Facebook as a way to support their learning during preparation of their coursework. We also find that students tried to construct knowledge together by commenting on each other's posts and answers, and this is one of the primary aims of CSCL. In the first example, when student S1 asked a question, 3 students attempted to answer even though they were not sure about their answer. The comments also show that S4 tried to find help from the instructor. The second example illustrates how students may give extended explanations even after 'the answer' has been given. From the above we suggest that students' interaction in Facebook, with the availability of the instructor, can support collaboration. The other important factor is the social factor. Students did not conceive Facebook as a formal learning environment; they often used both learning and sense of humour when commenting on peers' posts. We also find that Facebook can be used to support learning with OLM as some students tried to make use of Facebook to ask questions about their OLMs or find people to collaborate with.

When using OLM, students are expected to identify their level of knowledge and find out what misconceptions they have, and then they can choose their preferred way to improve their knowledge or overcome misconceptions. Giving them such control over their learning is one of the primary aims of OLM [2]. In the questionnaire responses we find that students tried to seek collaborators using the Facebook group when it was made available to them even though they were not instructed to do so, and their models represent their individual knowledge and misconceptions. We also find that there are students who did not share their model with peers, but who still tried to work with peers. This suggests that OLM can support collaboration and interaction in line with previous findings [4] [9]. We also find that the majority of students (12 out of 15) tried to find peers to work with on Facebook. This suggests that students considered Facebook interaction as a way to seek collaborators even though their coursework was assessed individually, and possibly considered Facebook as a way to extend their search for people to work with. Fewer students reported that they used Facebook to work out OLMlets questions with peers. This may be because they tried to find peers who can give them immediate feedback, while in Facebook they would have to wait if they and their peers are not online at the same time (as suggested for other asyn-

chronous discussion [15]). Indeed, previous work has considered use of Facebook, face-to-face discussion and OLMlets, finding that students use both discussion approaches [14]. We see that students show a positive attitude towards using Facebook with OLMlets to support their collaboration and discussion as 14 reported that they found using Facebook helpful for their learning in this module, and 13 found OLMlets helpful for the module.

## 3. Summary

This paper has described the use of Facebook to help support student interaction about their understanding and open learner models in a university context. It finds that both social and knowledge-related aspects of social networking were used, and the OLM is available to provide a focus for discussion. This extends previous research of face-to-face discussion prompted by OLMs available to peers [4], to a context where discussion can continue easily when students are not physically or temporally together.

## References


[1] Stahl, G., Koschmann, T., & Suthers, D. (2006). Computer-Supported Collaborative Learning: An Historical Perspective. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (pp. 409-425). Cambridge: Cambridge University Press

[2] Bull, S. & Kay, J. (2007) Student Models that Invite the Learner In: The SMILI Open Learner Modelling Framework, *IJAIED* 17(2), 89-120.

[3] Bull, S. & Vatrapu, R. (2011). Supporting Collaborative Interaction with Open Learner Models: Existing Approaches and Open Questions, *Computer Supported Collaborative Learning* 2011.

[4] Bull, S. & Britland, M. (2007). Group Interaction Prompted by a Simple Assessed Open Learner Model that can be Optionally Released to Peers. In: *PING Workshop*, UM2007.

[5] Kreijns, K., Kirschner, P., Jochems, W., & van Buuren, H. (2007). Measuring Perceived Sociability of Computer-Supported Collaborative Learning Environments. *Computers & Education* 49(2), 176-192.

[6] Vatrapu, R., Suthers, D., & Medina, R. (2008). Usability, Sociability, and Learnability: A CSCL Design Evaluation Framework. *International Conference on Computers in Education* (ICCE 2008), (CD-ROM).

[7] Kreijns, K., Kirschner, P., & Jochems, W. (2002). The Sociability of Computer-Supported Collaborative Learning Environments. *Educational Technology & Society*, 5(1), 8-22.

[8] Greenhow, C. (2009). Social Network Sites and Education: Emerging Research within CSCL. In A. Dimitrakopoulou (Ed.), *Computer-supported Collaborative Learning 2009*, Rhodes, Greece.

[9] Johan, R. & Bull, S. (2010). Promoting Collaboration and Discussion of Misconceptions Using Open Learner Models, in A. Bader-Natal, E. Walker & C.P. Rose (eds), *Proceedings of Workshop on Opportunities for Intelligent and Adaptive Behaviour in Collaborative Learning Systems*, ITS'10, 9-12.

[10] Lampe, C., Ellison, N., & Steinfield, C. (2008). Changes in Use and Perception of Facebook. *Proceedings of ACM Conference on Computer Supported Cooperative Work* , ACM: New York, 721–730.

[11] Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The Benefits of Facebook 'Friends': Social Capital and College Students' Use of Online Social Network Sites. *J. of Computer-Mediated Communication* 12, 1143–1168.

[12] Ajjan, H., & Hartshorne, R. (2008). Investigating Faculty Decisions to Adopt Web 2.0 Technologies: Theory and Empirical Tests. *The Internet and Higher Education*, 11(2), 71-80.

[13] Mason, R. (2006). Learning Technologies for Adult Continuing Education'. *Studies in Continuing Education*, 28(2), 121-133.

[14] Alotaibi, M. & Bull, S. (2012). Using Facebook to Support Student Collaboration and Discussion of their Open Learner Models, *Workshop on Web 2.0 Tools, Methodology, and Services for Enhancing Intelligent Tutoring Systems*, *Intelligent Tutoring Systems 2012.*

[15] Wang, Q.Y. & Woo, H.L. (2007). Comparing Asynchronous Online Discussions and Face-to-Face Discussion in a Classroom Setting, *British Journal of Educational Technology* 38(2), 272-286.