# Impact of Moodle and SOUL in Teaching and Learning

A report in TDG project "Enhancing Teaching and Learning through Integrating Mobile Learning with Learning Management System"

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# A) Learning Management Systems in the HKU Community

Learning management systems (LMS) are Web 2.0 applications incorporating rich multi-media resources and a variety of educational activities, including providing online platforms for group discussion, uploading course materials, and grading assignments, etc. LMSs have been widely adopted in higher education, offering various tools that support educators' instructional tasks and students' learning activities (Schoonenboom, 2014).

Moodle, an open-source software LMS, has been registered in over 1,800 sites, is present in more than 193 countries, and available in 60 languages around the world (Celik, 2010; Hajjar, 2014). Moodle is also the main LMS adopted in the University. The Open edX is also used but largely for Massive Open Online Courses (MOOCs) and Small Private Online Courses (SPOCs). HKU SPACE, the community college associated with the University, uses the SPACE Open Universal Learning System (SOUL) as their LMS. SOUL is an e-learning platform developed from Moodle by HKU SPACE. Both Moodle at HKU and SOUL at HKU SPACE are mobile-enabled, supporting mobile web browser access with the Mobile Theme, while SOUL also has its native mobile application (the SOUL app) available for mobile devices with Android or iOS operation systems.

Being part of the project titled "Enhancing Teaching and Learning through Integrating with Learning Management System" funded by the Teaching Development Grant, this report aims to evaluate and thus compare the impact of Moodle and SOUL in teaching and learning.

# B) Evaluation of LMS usage and perceptions

#### Overview

For the evaluation in the University, fourteen courses from six faculties were involved: Arts, Dentistry, Education, Engineering, Medicine and Social Sciences, while one course with five tutorial classes from HKU SPACE participated. All courses were implemented with different LMS activity design and pedagogies. Therefore, any comparison is intended for interpretation in general but not meant on specific courses or groups of students. A pre-survey was administered in the first class of courses to elicit students' LMS usage patterns, perceptions with the LMS, and their opinions on LMS usage based on their previous experience, while a post-survey was conducted in the last class for the same elicitation based on their experience with Moodle (for HKU students)

and SOUL (for HKU SPACE) of the participating courses. A 7-point Likert scale from 1 ("never") to 7 ("several times a day") was used for usage patterns and a 6-point scale from 1 ("Strongly Disagree") to 6 ("Strongly Agree") was used for perceptions and opinions. Results of the post-survey were compared to those of the pre-survey to see changes that can reflect the impact of LMS on teaching and learning. Also, semi-structured interviews were conducted with both instructors and students after the end of courses.

# LMS Usage Patterns

Comparing the responses from pre- and post-survey, students from HKU SPACE reported a significantly higher frequency of accessing SOUL for fulfilling course requirements (3.23 vs. 3.45, p = .007) while students from HKU showed a statistically non-significant increase (4.55 vs. 4.59). HKU SPACE students also reported a statistically higher frequency of accessing SOUL for taking quizzes (1.91 vs. 2.33, p = .022) while HKU students again showed a statistically non-significant rise (2.65 vs. 2.95). Not all participating courses at HKU implemented online quizzes, while the HKU SPACE course implemented such quizzes as in-class short exercises with Choice Activity, an LMS function exclusive to SOUL. Choice Activity was accessed by students often using mobile devices.

In terms of interaction, HKU SPACE students reported a significant drop (1.83 vs. 1.65, p = .046) while HKU students reported a non-significant increase (2.40 vs. 2.86). Regardless of the LMS, students by and large preferred other channels of communication. For instance, email was usually used for liaison with instructors, and other mobile apps (e.g., Whatsapp, WeChat) were opted for both formal (e.g., group project discussion) and informal (e.g., non-academic talk) communication. HKU SPACE students scarcely interacted with each other using SOUL app, largely because they had used to communicate using other mobile apps (e.g., Whatsapp), and there were minimal interactive LMS activities (e.g., Forums) implemented.

# Perceptions with LMS

Both Moodle (4.35 vs. 4.55, p < .05) and SOUL (3.76 vs. 4.11, p = .01) received an improvement in students' ratings for its learners' interface, though the improvement for SOUL (+0.35) outperformed that for Moodle (+0.20). Both HKU and HKU SPACE students complimented that the interface of the LMS was user-friendly. However, Moodle was perceived to have room for further improvement in its appearance which included but not only limited to its colour theme (white and grey) while the pages of SOUL was relatively more colourful (skyblue).

Regarding the mobile access to LMS, many students of the participating courses at HKU requested a native mobile application of Moodle, because of the inconvenience of accessing Moodle using the mobile web browser. Meanwhile, students at HKU SPACE praised the features and functionality of the SOUL app, particularly its function of pop-up notifications as reminders of announcements and assignment deadlines.

Moodle was rated significantly more positively in terms of its help in achieving student learning outcomes (3.96 vs. 4.37, p < .05) while the corresponding ratings for SOUL improved but non-significantly (3.29 vs. 3.42). This could be related to the constant emphasis on outcome-based

learning (OBL) at the University while not as emphasized in HKU SPACE. When HKU students were relatively more aware of their course learning outcomes compared to the HKU SPACE counterparts, the relevant LMS perceptions would also yield a difference.

Regarding students' satisfaction of the LMS as a whole, Moodle received a significant improvement in this rating (4.11 vs. 4.48, p < .05), whereas SOUL was also rated better yet not significantly (3.54 vs. 3.70). Explanation can partially be derived from students' opinions on using the LMS as reported in next section.

## Opinions on LMS usage

Four constructs form the Unified Theory of Acceptance and Use of Technology (UTAUT) model were conceptualized to affect students' behavourial intention (BI) in using the LMS: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC). These five constructs are also highly related to students' satisfaction with a system (Venkatesh et al., 2003). Moodle received a significant improvement (p < .05) in all five constructs (PE: 4.01 vs. 4.33; EE: 4.27 vs. 4.45; SI: 4.03 vs. 4.20; FC: 4.18 vs. 4.45; BI: 4.12 vs. 4.39). In contrast, SOUL only received non-significant improvement for EE (3.79 vs. 3.87) and even lower ratings for the other four constructs.

Nonetheless, the more revealing findings lie in the predictive model through which the PE, EE, SI and FC are used to predict BI of using the LMS. The model on predicting HKU SPACE students' usage intent of SOUL achieved an R square of 70.8%, while that on HKU students' usage intent of Moodle was 68.3%. In the prediction model for SOUL usage, effort expectancy (EE) was a significant factor ( $\beta = .410$ , p = .008), indicating SOUL was expected to be easy to use in order for the HKU SPACE students to employ it in their learning. This corroborates with the finding that SOUL received an improvement in terms of its user-friendliness, in the sense that SOUL made it easy for students to access their learning materials. On the other hand, performance expectancy (PE) was significant ( $\beta = .518$ , p < .05) in the prediction model for Moodle usage. Consistently, students in interviews expressed that they would be more motivated to participate in a learning activity on Moodle if it contributes to part of their course assessments.

# C) Recommendations on LMS in HKU

In terms of LMS activities, HKU courses can learn from HKU SPACE with regard to its implementation of quizzes on LMS. In-class short quizzes are useful for students to review concepts and knowledge delivered in class, especially shortly after students receive the input. Mobile access to LMS for quiz-taking can be facilitated by preparing short multiple-choice questions. Moreover, the design and implementation of LMS activities at HKU should continue to follow the University's emphasis on outcome-based learning (OBL), i.e., each LMS activity is linked with a course learning outcome. Another area where HKU SPACE acts as a role model for the LMS of HKU is that the interface of Moodle can be more colourful like SOUL, as the appearance of an LMS is no less important than its functionality, as shown from students'

comments. HKU can also consider the idea of developing a native Moodle app to facilitate students' mobile access to Moodle, which helps to fully utilize the potential of integration of mobile learning (m-learning) with LMS.

## References

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