Scholarly Report

ABSTRACT
The rapid development of information technology enables a better teaching and learning environment with the use of Information Technology in computer-aided learning. Many education institutes adopted learning management system (LMS) in their teaching and learning activities. Blended learning approach for project-based learning aims to develop blended learning strategies and approaches to apply eLearning techniques in traditional project-based subjects. It investigates effective approaches to use cognitive tools like information technology to enhance active construction of experience, situated learning and social interaction in project-based learning. This project involved two bachelor degree programs and a total of 140 students in two capstone project subjects for two academic years. Blended learning instructions required students to attend weekly face-to-face tutorial and submit self-reflective journal after the meeting to the eLearning platform. The eLearning platform also provided students with journal and discussion forum functions. Focus group interviews of students were made after the completion of each semester studies. The interview data and the content submitted to the eLearning system were further analyzed to evaluate the performance of the blended learning strategies. This report documented the action research project in developing blended learning strategies for project-based subjects. It discussed the results of the action research project and suggested ways to enhance the effectiveness of blended learning strategies in project-based subjects.

PROJECT-BASED LEARNING
Project-based learning is a teaching and learning approach that allows students to work on a project for an extended period of time to solve authentic problems with real-world context. Students engage actively in meaningful projects to construct experience by asking and refining questions, and interact with the community to produce artifacts that demonstrated the learning outcomes. Four major learning ideas namely (1) active construction of experience (2) situated learning (3) social interactions and (4) cognitive tools have been identified.

Active Construction of Experience: Constructivist learning theory believes that learning occurs as individuals construct knowledge through interaction with their environment and each individual’s knowledge construction is different. It suggests that learners should actively construct their knowledge through exploration and investigation due to teachers and teaching materials do not reveal knowledge to them. Knowledge building is a continuous process of completing a number of learning cycles that renders students “a holistic integrative perspective on learning that combines experience, perception, cognition and behavior” (Kolb, 1984). Project-based learning requires students to participate in real-world projects and actively construct their knowledge.

Situated Learning: Successful active construction of knowledge build upon the motivation of learners. When students acquire information that is meaningful and important to them, they will be better motivated to connect the new information with their prior knowledge. Situated learning means to provide students with a learning environment situated in an authentic, real-world context. It allows students to see the value and meaning of the project and find interest and excitement. Moreover, the knowledge acquired in a real-world situation also generalize better to a wider range of situations.

Social Interaction (Collaborative Learning): Learning can be improved by social interaction as “teachers, students and community members work together in a situated activity to construct shared understanding”
In solving real-world problems, multidisciplinary knowledge is needed and students would be benefited from working interdependently with others. Through sharing, using, and debating ideas with others, students construct their experience and knowledge and build a community of learners in project-based learning.

**Cognitive Tools:** Learning can be facilitated with the use of cognitive tools. For example, by using graphical representation, students can identify better the pattern in data. Through applying appropriate learning technologies, students can expand their learning experience. Learning can also be improved with the help of information technology like using learning management system to support in project-based learning.

**BLENDED LEARNING APPROACH FOR PROJECT-BASED SUBJECTS**

This project aims to develop strategies to apply eLearning methods in traditional project-based learning (PBL) approach. Design is a discipline that heavily relies on project-based learning and studio-based approach in conducting classes. Project-based subjects usually cannot be well catered in eLearning platform, and design faculty do not find benefit from using the eLearning system. This leads to a relatively low percentage of design faculty in using eLearning system for their teaching and learning activities. The purposes of this project is to investigate the learning approach of project-based learning and develop a strategy to implement blended learning in project-based subjects in design discipline.

The project involved two bachelor degree programs and a total of 140 students in two capstone project subjects for two academic years. Blended learning instructions required students to attend weekly face-to-face tutorial and submit self-reflective journal after the meeting to the eLearning platform. The eLearning platform also provided students with journal and discussion forum functions. Focus group interviews of students were made after the completion of each semester studies. The interview data and the content submitted to the eLearning system were further analyzed to evaluate the performance of the blended learning strategies.

30 final year students from the Bachelor of Art in Digital Media program and 40 final year students from the Bachelor of Art in Interactive Media program participated in this project in the academic year of 2014-2015 and 2015-2016. Students from these two programs had to complete their graduation projects in two capstone project subjects that last for a year long. The Capstone Project 1 subject in the first semester was comprised of lectures and tutorials to guide students to develop their project ideas and formulate project plans. The Capstone Project 2 subject in the second semester allowed students to complete their projects and produce artifacts that including self-reflective reports to demonstrate their learning outcomes.

In the course of study, students had to attend weekly tutorial with their assigned supervisors. They should report their project progress and discuss with their supervisors problems encountered with proposed solutions. After the meeting, they had to summarize the tutorial discussion with their self-reflection and post to their own journal space. The journal should serve as personal log of the learning process of the students. Moreover, the journal also allowed their supervisors to review, comment and communicate with the students on their learning progress.

Students were invited to attend focus group interviews after each semester subject. The semi-structured questions mainly covered (1) difficulty in using the LMS, (2) efficiency of the LMS for PBL, (3) effectiveness of the LMS for PBL and (4) students’ understanding of the learning approaches of PBL.

**FINDINGS AND CONCLUSIONS**

This blended learning project aims to develop blended learning strategies and approaches to apply eLearning techniques in traditional project-based subjects. It investigates effective approaches to use cognitive tools like information technology to enhance active construction of experience, situated learning and social interaction in project-based learning.

Project-based learning is an established learning approach that allows students to actively participate in constructing experience in a situated learning environment with real-world context, and carry out social interaction with teachers, students and community members in resolving driving questions. Blended learning
The general functions of LMS in blended learning are to provide on-line support for course management including registration of students, distributing courses materials, collecting students’ assignments and allowing collaboration between students and teachers. The particular functions of LMS in project-based learning are to serve as cognitive tools to enhance the learning experience of students in active construction of experience and social interaction between students and teachers. Generally, students consider Blackboard LMS was useful in supporting their learning. Some students commented Blackboard LMS was not efficient in some functions that support project-based learning. They rather use some other platforms like Facebook, Google Drive or Drop Box to support their communication. Few students considered Blackboard LMS was ineffective, however some students occasionally avoided participating in journal writing and discussion forum claimed that they were too busy in working on their projects. This showed students might not well aware that completing assigned works in the LMS is part of the learning process, and actively participating in the dialogue with teachers and peers shall facilitate their learning.

Active construction of experience is one of the core components in project-based learning. Students experience deep learning only when they actively engage in constructing knowledge. This shall happen when students are highly motivated in their project. In order to maintain students’ motivation in using the LMS as a cognitive tool, we shall (1) reduce the barrier of the use of the LMS system or (2) increase the competence of students in using the LMS.

In project-based learning, students actively construct their experience by going through cycles of experiential learning. A complete experiential learning cycle demands self-reflection and internalization of experience. The LMS provides some ways to facilitate reflective learning. Journal is a self-reflective spaces and allows students to engage private dialogue with teachers. In some project-based learning, a student will meet his or her teacher regularly in tutorial sessions and normally the student will report the project progress as well as discuss problems encountered. The teacher shall act as a facilitator to advise the student ways to explore and resolve the problems by his or her own. The discussion content and the efforts the student attempted to deal with the problems could be documented as a journal and serve as a self-reflective learning. Frequently, students just focus on “doing” their project and forget the “learning” portion in project-based subjects. Journal writing allows them to spare appropriate time to review their learning and conduct self-reflection.

Collaborative learning is another core component of project-based learning. Normally real-world problems demand multidisciplinary knowledge to resolve. Sometimes students might work on a single person project, they still need to interact with other people or seek help from other expertise. Through sharing and debating ideas with others, students develop a broader knowledge base and improve communication and personal skills. Discussion board in LMS allows students to exchange ideas, debate topics, ask questions and work in groups.

RECOMMENDATIONS
In order to facilitate effective and efficient blended learning approaches for project-based subjects, the following good practice is suggested:

1. Use learning management system (eLearning platform) as a cognitive tool to improve the efficiency and effectiveness of the project-based learning features in (1) active construction of experience and (2) collaborative learning;
2. Motivate students to use the learning management system by customizing the system to be more user-friendly (reduce the barrier) and encourage students to attend on-line courses or improve their understanding through eLearning support website (build competence);
3. Use journal to facilitate a better self-reflective learning by giving journal assignments and communicate actively with students by providing comments and questions;
4. Apply discussion board to facilitate a better collaborative learning by encouraging students to share and comment on each other’s idea and work;
5. (Teachers) Participate proactively in the LMS by sharing comments, posting questions and discussing in both journal and discussion board.
FUTURE DEVELOPMENT
Project-based learning is a teaching and learning approach that allows students to work on a project for an extended period of time to solve authentic problems with real-world context. It will benefit students' learning in (1) greater depth of understanding (2) broader knowledge base (3) improving communication and interpersonal skills and (4) enhancing responsibility and independence. By using blended learning approach in project-based learning, it will improve the overall learning experience in project-based subjects especially in self-reflective learning and collaborative learning of students in their active construction of knowledge. Apart from further utilizing the strategies developed in this project to conduct our project-based subjects, the project team shall promote this blended learning approach to the teachers of the School as well as other faculty members that are using project-based approach in their teaching through the ePBL website and community of practice (CoP).