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EMBEDDING LIBRARIANS IN THE CLASSROOM: A CASE STUDY AT HKUST LIBRARY

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Abstract

The introduction of new 4-year undergraduate program has unprecedented impacts on the curriculum design, pedagogies and student learning styles for higher education institutions in Hong Kong. In order to prepare for this challenging reform, the Hong Kong University of Science and Technology (HKUST) has strategically redeveloped its undergraduate curriculum. The new curriculum also emphasizes the student-centric approach, with new teaching initiatives to enhance students learning and personal development. Apart from equipping students with sound knowledge in specialized subject areas, graduates are also expected to develop high-level, transferable competencies including critical thinking, leadership, teamwork and information literacy.

For many years, the Library has been offering information literacy instructions in all means through orientation programs, course-related classes, credit-bearing information literacy course, database workshops and web-based tutorials. To support the new pedagogical reforms, the Library must be proactive in promoting ourselves to faculty and students as their partners in teaching, learning and research. The librarians must also recognize users' information needs and behaviors in order to deliver effective, relevant and creative services.

In spring, 2011, two reference librarians were invited to join a newly developed engineering course; worked closely with undergraduate students and faculty on solutions to real world challenges throughout the semester. It was the first time HKUST librarians embedded in a course. This collaboration not only strengthened our relationship with faculty and students, it also helped us better understand the learning and information-seeking behaviors of our young generations, and gave us directions on what and how to support student learning in the future. This paper chronicles the faculty-librarian collaboration; follows by the discussion of emerging opportunities and challenges for embedded librarianship in one of the signature courses at the HKUST.

Keywords: academic librarianship, collaboration, embedded librarian, embedded librarianship, engineering, higher education, information literacy, library instruction, peer learning

Background

In 1999, the Education Commission conducted a comprehensive review of the overall education system in Hong Kong. The objective was to examine how the education system could be transformed in order to meet future challenges of a globalized economy fuelled by burgeoning information and rapid technological advances. After years of considerable works and discussions, a new 4-year undergraduate curriculum would be introduced. Benefits of the new curriculum include more opportunities for students to acquire, integrate and apply knowledge spanning different disciplines; greater flexibility of study plans to suit students' aspirations and an additional year for students to participate in international exchange, corporate internships, undergraduate research opportunities program, etc. The first cohort of new students will commence the 4-year undergraduate program in fall 2012. Aligning with the new structure is the introduction of outcome based education which focuses primarily on student-centered learning. These transitions provide the Hong Kong University of Science and Technology (HKUST) an excellent opportunity to redevelop the undergraduate curriculum which is student-centric, with new teaching initiatives to enhance students learning and whole person development. Apart from equipping students with sound knowledge in specialized subject areas, graduates are also expected to develop high-level, transferable competencies including analytical, critical thinking, leadership, team work and information literacy in the new curriculum.

In order to support the coming pedagogical reforms and to reach out to students in information literacy, the Library has embarked on various collaborative projects and initiatives. In spring, 2011, two reference librarians volunteered to join a newly developed engineering course; work closely with undergraduate students on solutions to real world challenges throughout the semester. This new, pilot collaboration not only strengthened the relationship with faculty and students, it also helped the Library better understand the learning and information-seeking behaviors of new generation users, and gave us directions on what and how to support student learning in the future. In this article, the librarians will share their experience as embedded librarians, and discuss in details the emerging opportunities and challenges in this teaching alliance at HKUST.

Literature Review

For many years, the HKUST Library has offered an array of information literacy activities including library orientations, reference services, credit-bearing course, database workshops, and web-based tutorials which aim to cultivate students' information literacy competencies. At the same time, there is a growth in collaborative endeavors involving faculty and librarians in effort to enrich student learning experience. In many times, instruction librarians are invited to conduct one-off session or provide online materials to students that focus on the skills needed to complete a course-related assignment. Despite a number of research (Tumbleson and Burke, 2010; Bowler and Street, 2008) suggesting that reference service, one-off session, online information literacy tutorial are not the most effective approach to promote IL competencies to student, interest in embedded librarianship has been increasing across the higher education.

In an attempt to define embedded librarianship, Shumaker and Talley provide an appealing description; embedded librarianship is "...focusing on the needs of one or more specific groups, building relationships with these groups, developing a deep understanding of their work, and providing information services that are highly customized and targeted to their greatest needs. In effect, it involves shifting the basis of library services from the traditional, transactional, question-

and-answer model of reference services to one in which there is a high trust, close collaboration, and shared responsibility for outcomes" (Shumaker and Talley, 2007, p.9). Various types of embedded librarianships are also discussed and examined by Bower (2011). While it is not the intention to compare the nature of different embedded librarianships, the authors are particularly interested in embedded activities integrated into a course throughout the semester.

In her article, Dugan (2008), a resources development librarian at Purdue University, discusses the experiences working with agricultural economics students on a semester-long marketing project. Similar embedding collaboration is also documented by Hearn (2005) in an English writing course at the Daniel Webster College. Both librarians suggest a number of benefits stemming from these embedded programs. For instance, moving the library services from a physical location closer to faculty and students results in building a closer relationship with them, it also make library services and resources more visible . As the information literacy movement is gaining momentum in the Hong Kong new curricular reform, embedded librarianship model provides the Library and faculty an innovative way to deliver information literacy instructions effectively to undergraduate students.

Common Core Program and Engineering Solutions to the 21st Grand Challenges

The Common Core Program is a key component of the new 4-year undergraduate curriculum. It is designed to broaden students' horizons beyond their chosen specialist disciplines; provide them with a broad and balanced education foundation for intellectual growth and whole person development. Students are required to complete 36 credits of common core courses from different subject areas including Arts & Humanities, Chinese & English Communication, Science & Technology, Social Analysis and Quantitative Reasoning. Among the 36 credits, 9 must be taken from School Sponsored Courses (SSCs). SSCs "are hallmark courses of the offering Schools and are representative of the uniqueness and values of the Schools" (HKUST Undergraduate Core Education Office, 2012).

"ENGG 1110 Engineering Solutions to Grand Challenges of the 21st Century" is one of the SSCs offered by the School of Engineering. In 2009, the National Academy of Engineering (NAE) identified 14 global grand challenges faced by mankind which await engineering solutions. This course is inspired by the NAE's call to engineers to meet these challenges and "make the world not only a more technologically advanced and connected place, but also a more sustainable, safe, healthy, and better place" (National Academy of Engineering, 2008). By taking this course, students can thereby appreciate the contributions of engineering and technology to society.

ENGG 1110 is a 3-credit introductory course for first year undergraduates, it adopts a problem-based, collaborative learning approach where students are introduced to two open end, real world engineering problems by two subject experts. Students have to work collaboratively in groups of four, exploring different scenarios and come up with possible engineering solutions. In this course, students not only learn how to tackle problems from multiple dimensions, but also evaluate solutions in terms of feasibility, scalability and sustainability. Finally students need to formulate the best solution and present as well as justify their recommendations both orally and in writing. Traditional instructor-centric teaching is therefore replaced by student-centric facilitation of learning.

First Embedding Experience (Spring 2011)

ENGG 1110 was first piloted in Spring 2011 with 16 engineering students divided into 4 groups. The first challenge was on water supply in Hong Kong and the Pearl River Delta region, and the second challenge about electric power generation in Hong Kong. The teams had to focus on one particular aspect of the challenge defined by the subject expert. After the first two introductory sessions, students were introduced to different research skills and tools in a library workshop conducted by one of the engineering librarians at the HKUST Library. In the workshop, students were first asked to complete a short, online multiple-choice survey on information skills. Then, they were grouped and asked to compare two engineering articles selected from a scholar journal and a handbook based on their scope, breadth and depth of subject coverage, level of scholarship and content structure. After the group discussion exercise, the librarian commented on their findings and presented an overview of different types of engineering literature. In the second half of the workshop, students were introduced to several engineering databases and different effective search strategies. The librarian also discussed how to make proper citation to avoid plagiarism. By the end of the session, the librarian shared the online survey summary with students, and related their answers back to the session learning experiences.

While the one-off library session was appreciated by the class, these ENGG 1110 students were expected to conduct self-directed research and would need ongoing guidance and feedback on information strategies during their research process. In order to equip student with better research skills, the engineering librarian proposed the idea of embedded librarianship to the faculty where librarians attended regular classes and discussion to provide timely and appropriate assistance to students. The idea was well received by faculty as it was considered as a valuable service and additional learning opportunity to the students. With the strong support from the Library administration, one engineering librarian and one business librarian started attending weekly lectures from mid-February. After the introduction of each challenge by the expert, students were required to work in groups and discuss in-class to tackle the challenge. Librarians could offer their expertise to meet students' information needs in these discussion sessions.

In addition to the written reports, students were also assessed on their presentations by the course instructors, subject experts and their peers. To help students deliver a quality presentation, the embedded librarians invited the Library Learning Commons (LLC) manager to offer a session on "Effective Presentation Skills". The session was successful, and later in the semester, the LLC manager was invited by the faculty to develop a rubric for assessing the student presentation skills.

As the course was on pilot and adopted new teaching pedagogy, staff from the Center of Engineering Education and Innovation (E²I) conducted a focus group meeting to collect student feedback. Although there was no question related to the embedded librarian service in this meeting, the librarians did receive a very encouraging note from the faculty,

"I would like to register a vote of thanks to the dedicated and helpful library staff for their contributions to the course. Look forward to continuing this model of collaboration in the future". (Professor Edmond Ko, Course Proposer and Senior Advisor to the Provost)

Second Embedding Experience (Fall 2011)

As the partnership was quite successful, the embedded librarian service continued in the fall semester. The course structure remained similar with two new challenges on solid waste

management and sustainable transportation. However, enrolment was expanded to 32 students and 5 undergraduate peer tutors were introduced to the class to promote multi-layered peer learning. These peer tutors were recruited based on their demonstrated performance in the previous ENGG 1110 class. Among them, four were team coaches and one was the peer tutor coordinator who coordinated class activities among students, experts and peer tutors. They also served as mentors who were responsible for team coaching and facilitating group discussion. To strengthen peer learning and collaboration, the peer tutor coordinator created a Facebook (FB) Group (<http://www.facebook.com/groups/284974008184791/>) for the class, and group members were welcome to share news, Websites, library resources and search tips relevant to the project topics with others.

In reviewing the library instruction content, the embedded librarians noticed that most of the students were not familiar with library resources and scholarly materials, and they heavily relied on Google and Web documents for coursework. In addition, citations in the final reports were incomplete and inconsistent. Hence, the embedded librarians made two adjustments on teaching materials and activities which focused more on evaluating Web resources. Students were asked to compare a Web document and a scholarly journal article in terms of authority, timeliness, reliability and suitability. It was hoped that students would become more critical when using Web resources. An IEEE style help guide was posted on the Learning Management System (LMES) for students' quick reference. "Effective Presentation Skills" session was repeated by the LLC manager. Surprisingly after this library session, the LLC manager received a number of consultation requests from several student groups for further advices. In the final presentation session, the two embedded librarians were invited to evaluate students' performance based on an assessment rubric developed by the LLC manager and course proposer.

To gather students' feedback on the embedded librarian service, several questions were included in the focus group meeting. Results were positive; students acknowledged that they had learned better information search skills, particularly on formulating search strategies and evaluating information sources. Other than comments from the focus group, the following encouraging remarks by student and faculty reassured the value of the embedded service:

"In my ENGG 1110 class last semester, I worked closely with the embedded librarians. I got assistance from them when I had problems or when I need clarifications on information search. I appreciated their services very much." (2nd year engineering student, Library Services Quality Survey 2011)

"The model of collaboration we used in ENGG 1110 is a successful one and we certainly look forward to continuing it in the future. Many thanks to you and your colleagues for enriching students' learning experience." (ENGG 1110 Course Instructor)

Third Embedding Experience (Spring 2012)

The embedded librarians suggested a new initiative to analyze references used by students in their reports for quality, relevancy and completeness. The objective was to reinforce students the needs to evaluate sources and use information responsibly. However, as report submission to the librarians was not mandatory, and quality of references would not contribute towards the final project grade, only 4 groups sent their reports to the librarians. Nevertheless, librarians summarized common mistakes made by students and recalled criteria on selecting and citing sources in-class. The E²I team planned to involve librarians in leading focus group discussion to investigate students'

adoption and usage pattern of online collaboration tools such as FB, Dropbox and Google Docs. It was also important to note that the course enrolment would accommodate up to 100 students per semester. Thus, using popular communication channels to interact with student outside of normal class times would be highly desirable.

Benefits and Challenges

Embedded librarianship is a new attempt at the HKUST Library, we are fortunate to collaborate with faculty who value the importance of information literacy skills, critical thinking skills and problem solving skills to enhance student learning. The ENGG 1110 embedded program has multi-faceted benefits to students, faculty and librarians. Over the three semesters, we have gained many useful insights which are all deserved for further exploration.

Building Information Literacy Competencies – Based on the "*Information Literacy Competency Standards*" approved by the Association of College and Research Libraries (ACRL), an information literate student should be able to:

1. determine the nature and extent of the information needed.
2. access needed information effectively and efficiently.
3. evaluate information and its sources critically and incorporate selected information into his or her knowledge base and value system.
4. use information effectively to accomplish a specific purpose, no matter work as individual or in group.
5. understand many of the economic, legal, and social issues surrounding the use of information and accesses and use information ethically and legally.

Unfortunately, most of the traditional reference interview and one-shot instructional sessions are limited to competencies one, two and five (Sinclair, 2009). However, our embedded program allows us to work closely with students throughout a semester, and help them gradually to build up competencies 3 and 5 under seamless guidance of the librarians.

Faculty-Librarian Relationship - The new partnership increases the library's visibility to the engineering school, which may lead to more opportunities for collaboration across other departments. Sharing responsibility with faculty also helps cultivate a long-term collegial spirit between the two parties, and faculty see us as their teaching partners. Partnering with faculty in teaching also affects students' perception and raises "the stature of the librarian as educator to the students" (Hearn, 2005, p.225).

The path leading to a blooming partnership is traversed without a good relationship between faculty and librarian. Building a constructive faculty-librarian relationship requires tremendous effort and communication. A number of studies (McCarthy, 1985; McGuinness, 2006; Gilman, 2006) have discussed about the barriers to develop a positive faculty-librarian relationship. In an attempt to identify the essential factors contributing to the healthy relationship, Ivey (2003) carries out a study and finds that the effectiveness of information literacy programs significantly depends on:

- A shared, understood goal
- Mutual respect, tolerance, and trust
- Competence for the task at hand by each of the partners, and
- Ongoing communication

We are fortunate that our faculty-librarian partnership has reflected all aforementioned factors, and it has developed and evolved in multiple ways for the past 3 semesters. Fundamental to this growth has been the time invested in collaboration and gaining the respective trust of each party. Frequent and ongoing communication is also crucial to the success of embedded librarian program. In the course of time, we get to know the strengths and weaknesses of each others, appreciate the contributions devoted to the class by each party and establish a shared goal, mutual trust and the delegation of responsibility.

Teaching Pedagogies – The embedded librarianship not only increases our visibility, we also learn different exemplary teaching strategies and pedagogies from the faculty and subject experts, such as inductive teaching methods and structured controversies. We hope to share these invaluable practices and experiences with other library colleagues, and apply them when designing and delivering library instructions in future.

Challenges - Despite the benefits previously discussed, it would be helpful to pause and reflect upon some challenges exist. First of all the time commitment to the embedded program is quite high. In addition to attending regular lectures and participate in group discussion, we also need to communicate and work with the ENGG 1110 students outside of normal class. It may affect other scheduled Library duties such as reference services and other instruction sessions. Needless to say, we are also puzzled by the return of investment of our embedding effort - how much information literacy skills would students gain from us. We definitely need to develop a systematic approach to evaluate students' information competencies to measure our impact.

Facebook Group - There is a growing awareness in higher education of students' engagement in Web 2.0 environments; however, both LMES and the course FB page are under-utilized in this course. The course instructor and subject experts are not active in online discussion; the LMES is used primarily for posting lecture notes and announcements. Based on our observation in the last 2 semesters, students like to use Dropbox and Google doc to share documents and Facebook Group to communicate with team members. Meanwhile, a big advantage of Facebook over LMES is that the Group can pass on to students enrolled in next term where the LMES system is a close, authenticated application that only targets at a specific group of students at a particular semester. The Facebook Group can also be served as a repository of collective engineering ideas. Unfortunately, the FB Group does not achieve our desired level of interaction as students are quite apathetic about sharing information with other groups on Facebook. We hope to gather useful feedback on how to use Web 2.0 tools effectively for learning in the regular focus group meeting. With our expertise in information management, we can better utilize these online social networking tools to facilitate learning.

Future Plan

The success of the embedded librarianship hinges not only on the commitment of faculty and librarians, but also on continuous support from the academic departments and library, as well as understanding the future challenges. While we are pleased with our embedding experience in the ENGG1100 course, we are looking into other initiatives to further improve the program. One proposed idea is to have an assessment on literacy information. We believe that partnering assessment of student learning is a powerful way to enhance our role in the embedded librarianship. A simple "source table" (McMillen & Fabbi, 2010) can be used to evaluate the information sources selected by the students. We can also design an assessment rubric for faculty to assess information

literacy competencies in the students' final reports. Another idea is to expand the embedded team to involve other subject librarians, which is crucial for fostering staff professional development and organizational learning in the Library.

As more higher education institutions like HKUST recognize the importance of information literacy, embedded librarianship is a viable model for transforming the conventional way of teaching information literacy to students. On the other hand, librarians must be proactive in building new partnerships with academic departments and delivering valuable service to faculty and students.

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