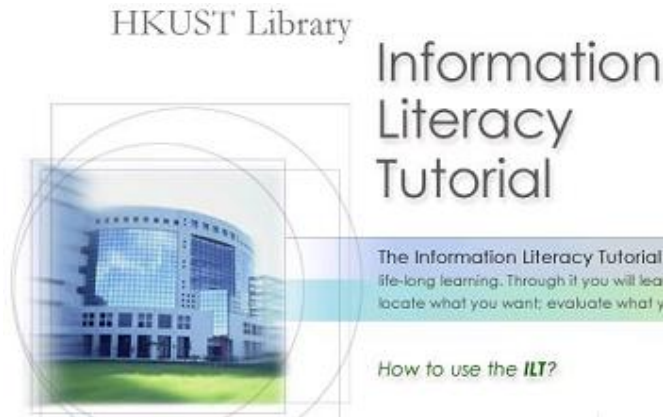


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Case Study 11: The Development and Management of the Online Information Literacy Tutorial at the HKUST Library

Introduction

This case study discusses the online Information Literacy Tutorial (ILT)¹ for 1,900 first-year students at the Hong Kong University of Science and Technology (HKUST), a research university emphasizing teaching and research in science, engineering, and business. Before the ILT, the orientation program for first-year students consisted of a walking tour of the library and a hands-on library class. The tour familiarized students with the facilities, collection, and services of the library; the class taught students how to search effectively for information in the library catalog and databases. To offer students an alternative way of learning, librarians created the ILT. Since then, our students have had the option of learning from the ILT on their own in addition to being able to join a tour and a class.

The librarians designed the ILT to help students develop skills in searching, locating, evaluating, and using information effectively in their life-long learning. When created in August 2000, it consisted of six modules: (a) Explore the Library, (b) Search the Library Online Catalog I, (c) Search the Library Online Catalog II, (d) Find Periodical Articles, (e) Search the Web, and (f) Evaluate and Cite Sources. We began to design the first three modules in March 2000 and finished them in August 2000. We completed Modules 4 to 6 several months later and released them in February 2001. The appendix “Designing Online Tutorials with WebCT: A Flow Chart” summarizes all the key steps we took in producing and managing the ILT.

Quality Assurance Strategies

Perhaps the best feature of our ILT is that it is highly user-oriented. We used six quality assurance strategies in building and managing it: (a) project management, (b) best practice benchmarking, (c) user needs assessment, (d) usability testing, (e) formative evaluation, and (f) “outsourcing” the design and technical expertise.

¹ <http://library.ust.hk/serv/skills/infoliteracy.html>

Project Management

Project management is the planning, scheduling, and controlling of project activities to meet project objectives. As anyone can imagine, designing and managing an online tutorial for 1,900 students is a difficult task. Without proper project management techniques, the effort, no doubt, would take more time and the results probably much less satisfying. The creation of the project management web site and the establishment of a timetable helped ensure the success of the ILT development.

The web site “Information Literacy Tutorial for New Students”² ties everything related to the project together. It helped us maintain clear direction and facilitated communication among the project members. By keeping this working document up-to-date, we saved considerable time since everything related to the project (i.e., proposal, style guide, students’ comments) could be found on the site easily and quickly. We also tried to set realistic deadlines for various stages of the project and adhere to them.

Best Practice Benchmarking

Bogan and English (1994) suggest, “Learning by borrowing from the best and adapting their approaches to fit your own needs is the essence of benchmarking” (p. 3). We identified excellent online tutorials from other libraries worldwide and learned from them. We posted a question on BI-L³ (a global online discussion group on library instruction that has about 3,000 members) asking for online tutorials created using WebCT (i.e., the courseware we decided to use for designing our tutorial). We examined instruction programs of award winners and major university libraries from around the world. Searching and browsing key information science journals also helped us locate excellent online tutorials. We also used search engines to mine relevant tutorials. Finally, we identified some useful tutorials through personal contact.

After trying out and comparing a number of online tutorials, we determined the benchmarks we hoped to emulate when producing our own tutorial such as; standardization across modules, user-friendly visual environment and hands-on user interactive learning. This exercise spared us the problem of re-inventing the wheel and shortened the development time tremendously. It ensured the quality of our tutorial compared with the best tutorials available.

² <http://web.hku.hk/~samchu/ILT00/onl-clas.html>

³ It is now called Information Literacy Instruction List (ILI-L).

User Needs Assessment

The first step in designing a user-centered tutorial is to learn the needs of the target user group. We assessed our users' needs for the tutorial in two ways. First, we solicited input from colleagues in the Circulation and Reserve Departments on what should be included in Module 1 (Explore the Library, which essentially covers the various library services, facilities, and collection). These colleagues manage the physical facilities and collection of the library. They have frequent contact with first-year students and understand what concerns students most regarding our services at the Circulation and Reserve counters.

We also interviewed nine second- and third-year students to find out their information needs while they were in their first year. We divided the interviews into two parts. First, we solicited free thoughts from the students about the services and resources of the library they consider important or less important to know in their first month of their studies. Then, we prompted them by following a tentative outline of the three modules, asking about the omission of any important items from the proposed modules. This exercise helped the designers identify things important to students. For example, seven of the nine students pointed out the importance of Course Reserve to first-year students since all of them had to determine the location of assigned readings.

HKUST Library's Usability Study

The next step involved a usability study. Usability studies are designed to examine and improve the accessibility of a product. The product can be anything: a software program, a web site or an online tutorial. Usability studies help create a user-friendly product. As Fowler (1998) said:

Probably the best reason to test for usability is to eliminate those interminable arguments about the right way to do something. Your design team can go around in circles for years without finding the right solution to an interface problem... With human-factors input and testing, however, you can replace opinion with data. Real data tends to make arguments evaporate and meeting schedules shrink.



In the past several years, many libraries have conducted usability studies on their online tutorials (Bender & Rosen, 2000; Bury & Oud, 2005) or library web sites (McGillis & Toms, 2001; Prown, 1999). One of the most popular and important usability methodologies is the "think aloud" method, which asks participants to verbalize their thoughts while working on a task. This methodology allows developers to observe and analyze user behavior of a product to achieve a goal (Clairmont, Dickstein, & Mills, 1998).

The initial usability test for Modules 1 to 3 involved two groups of testers: (a) a think-aloud group and

(b) a self-paced group. The think-aloud group had five students. We asked each student to think aloud while “test-driving” the tutorial. A project team member observed the students and noted problems that they encountered. The self-paced group consisted of 15 students who went through the three modules on their own and e-mailed us their comments.

Most of the usability group of the 20 students consisted of undergraduates from different departments in the first three years of study. We preferred undergraduate students since they were our target users; however, we invited a few graduate students anticipating that their more mature ideas would add another dimension and further help improve the tutorial. To minimize the gender effect, we recruited an equal number of male and female testers. The students offered a good mix of feedback and different opinions.

The usability test results from both the think-aloud group and the self-paced group revealed that our ILT had considerable room for improvement. An example of this need for further improvement is exhibited by the following problem sentence on the final page of each module identified through the think-aloud group:

"Please return to  home and take the  quiz for this module."

Many students repeatedly clicked on the two images as if they were hyperlinks. Once we discovered this problem, we removed these misleading cues by replacing the icons with text.

Conducting the usability test for the think-aloud group proved a time-consuming process. Each of the five testers took an average of three hours to complete the tutorial. Nevertheless, the think-aloud group gave us more critical comments than the self-paced group. Thus, when we conducted the second usability test for Modules 1 to 3, we put the time issue aside and we adopted just the think-aloud method.

Formative Evaluation

A formative evaluation process takes place during the creation or implementation of a product, allowing modifications to be made before the product is complete. For Modules 1 to 3, we went through five stages of formative evaluation: (a) initial evaluation, (b) design evaluation, (c) content evaluation, (d) product evaluation, and (e) implementation evaluation.

At the initial evaluation stage, three reference librarians assessed the feasibility of producing the tutorial and studied the needs of the target user group. For design evaluation, three other reference librarians had to address fundamental design issues: How many modules are needed? What should be included in each of the modules? When the design team (i.e., the group of reference librarians) finished creating the first draft of the tutorial, we invited the instructional design team of the university's Center for Enhanced Learning & Teaching (CELT) to examine the content of the tutorial. Based on their evaluations, the designers made revisions and enriched the tutorial with relevant graphics.

By the time the design team completed building the entire tutorial, all the reference librarians evaluated the product by assessing the tutorial's content, design, presentation, usability, and interactivity. The product evaluation involved a usability test as described above. Two weeks before going live with the tutorial, the team conducted an implementation evaluation by having a second usability test with five new first-year students. Several librarians then looked at the tutorial once more and made final revisions. We officially launched The ILT at the end of August 2000.

“Outsourcing” the Design and Technical Expertise

Our library did not build and run the online tutorial alone. We tapped into the expertise of the University's CELT. To save time and cost, we used their licensed courseware WebCT as a platform for our tutorial. We kept our user database on their server. Whenever we had technical questions regarding the use of WebCT, CELT's colleagues provide us immediate assistance. CELT also had lent us their design expertise by creating an attractive home page, a coherent tone and style, and interesting graphics and animations for the tutorial.

Assessment and Outcomes

Users of ILT Decrease over Time

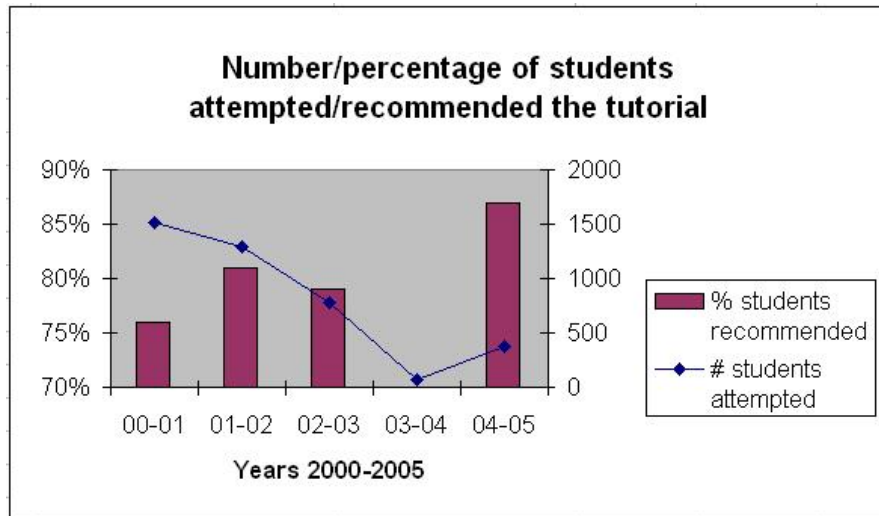


Figure 3. Number/percentage of students attempted/recommended the tutorial

Figure 3 show that the tutorial had a great response in year 2000-01 with 1,516 users (82% of all first-year students). Unfortunately, this figure dropped in the following years and we reached only 65 students in year 2003-04. When we first implemented the tutorial, we had permission from all schools to advertise it as a school requirement in our promotion leaflets and e-mails. This requirement provided the driving force for most students to attempt the tutorial. However, students soon found out that no penalty existed for not completing the tutorial. Possibly, senior students tipped off new students about this and the participation rate of our ILT suffered three years in a row. The drop in year 2003-04 is particularly profound, largely because we removed this unenforceable requirement with the statement “highly recommended by the schools.” It is quite a challenge to motivate students to use the tutorial. For year 2004-05, the rate had a minor revival because the library partnered with a semi-online English course offered by the Language Center that reached 20% of all first-year students. The course director realized the usefulness of the tutorial, and he allocated a few extra points for students who completed the tutorial. Besides, the library motivated the students by giving those who scored at least 90% on all the quizzes a chance to win one of the two HKD 500 book coupons. As a result, 378 students took the tutorial.

We continually explore new channels to boost the participation rate of the ILT. Recently, we shared our library instruction effort, the new one-credit elective course for undergraduates “Eureka! Information skills for life-long learning,” with the associate vice-president for academic affairs

(undergraduate studies) of our university. Our efforts so impressed him that he asked us to submit a proposal to make it a required course for all undergraduates once our undergraduate program expands from three to four years in 2008. We plan to integrate ILT into this required course.

Students' Satisfaction of ILT Improves During the Same Period

While the tutorial participation declined over the years, students' satisfaction with the ILT increased. In 2000-01, the tutorial had a moderately positive evaluation with 702 out of 922 students (76%) indicating they would recommend the tutorial to others. This percentage fluctuated for the next two years. Due to the limited sample size, we did not analyze the data for 2003-04. Year 2004-05 enjoyed the highest rating with 87% of the students who completed the evaluation recommending the tutorial.

How Does Our Library Upgrade the Tutorial?

Every year, we examine students' evaluation on various aspects of the tutorial including content, design, and quizzes of the modules. In 2000-01, our tutorial had 116 content pages, 58 self-test questions, and about 60 quiz questions. The evaluation consistently showed that the number of topics and amount of materials covered overwhelmed the students. We, therefore, combined two modules into one and trimmed down the content substantially. By 2004-05, the ILT had 68 content pages, 26 self-test questions, and 37 quiz questions. Our students taught us one important principle in bibliographic instruction: "Less is more."

How Do We Know If Students Are Learning What We Expect Them to Learn?

Our goal is to help students learn efficiently and effectively the materials presented in the ILT. On average, 86% of the students achieved the pass mark⁴ for the quizzes in all four years. Thus, students on the whole have met our expectations. Beyond this overall picture, we also analyzed the data on students' performance for each of the quiz questions. We paid particular attention to questions on the two extremes – the very difficult questions and the very easy ones. For year 2001-02, only 17% of the students selected the right answer for the most difficult question, while 92% answered the easiest question correctly. For content pages that were related to the difficult questions, we modified content pages related to the difficult questions so these pages explained concepts and ideas more clearly. In addition, we revised the difficult questions by making them easier and/or providing students with more hints. For overly easy questions, we made them more challenging or replaced them with higher-level questions.

Conclusion

⁴ The pass mark for each of the five quizzes of the five modules was originally set at 80% for year 2000-01 and 2001-02, and it was lowered to 70% for year 2003-04 and 2004-05.

A tremendous amount of time and effort are involved in building and maintaining a user-oriented online tutorial. Is it worth the effort? For our library, the answer is clearly “yes.” The 4,000 students that have been trained online in the past five years have justified our original decision. The high percentage of students who indicated that they would recommend the tutorial to others demonstrates that our alternative mode of teaching has been successful. The library has been recognized as one of the earliest pioneers in applying online teaching and learning on campus. The web page of the University’s CELT has featured twice the ILT as a good model for online education. We have been invited to give a talk to our faculty and staff to share our experience in creating the tutorial. Yet, just as the idiom “one man’s meat is another man’s poison” suggests, one library’s experience may not be transferable to another. What works well in one circumstance may not be worth the time and effort in another circumstance. The feasibility and desirability of finding and committing sufficient resources for the development of a successful online tutorial is dependent on the particular circumstances of a library. One must carefully scrutinize in detail the potential costs and benefits before arriving at a decision.

For the librarians who would like to take on the challenge, they will find useful the six quality assurance strategies discussed in this article. Obtaining students’ feedback on the tutorial and analyzing whether or not they are learning as expected are essential. Updating the tutorial on an ongoing basis to reflect the current needs of the users is also vital for its continual success. A high-quality, user-friendly tutorial will certainly be welcomed by many students, as exemplified by this encouraging remark from one of our ILT users:

The ILT modules help me to revise what I've learned and enhance my skill. I'm very pleased with how UST librarians made the modules and set the quizzes. It made me feel that the staff here is serious about academic studies. This gives me confidence in studying at this University, and now I feel I start to love UST!!

Acknowledgments

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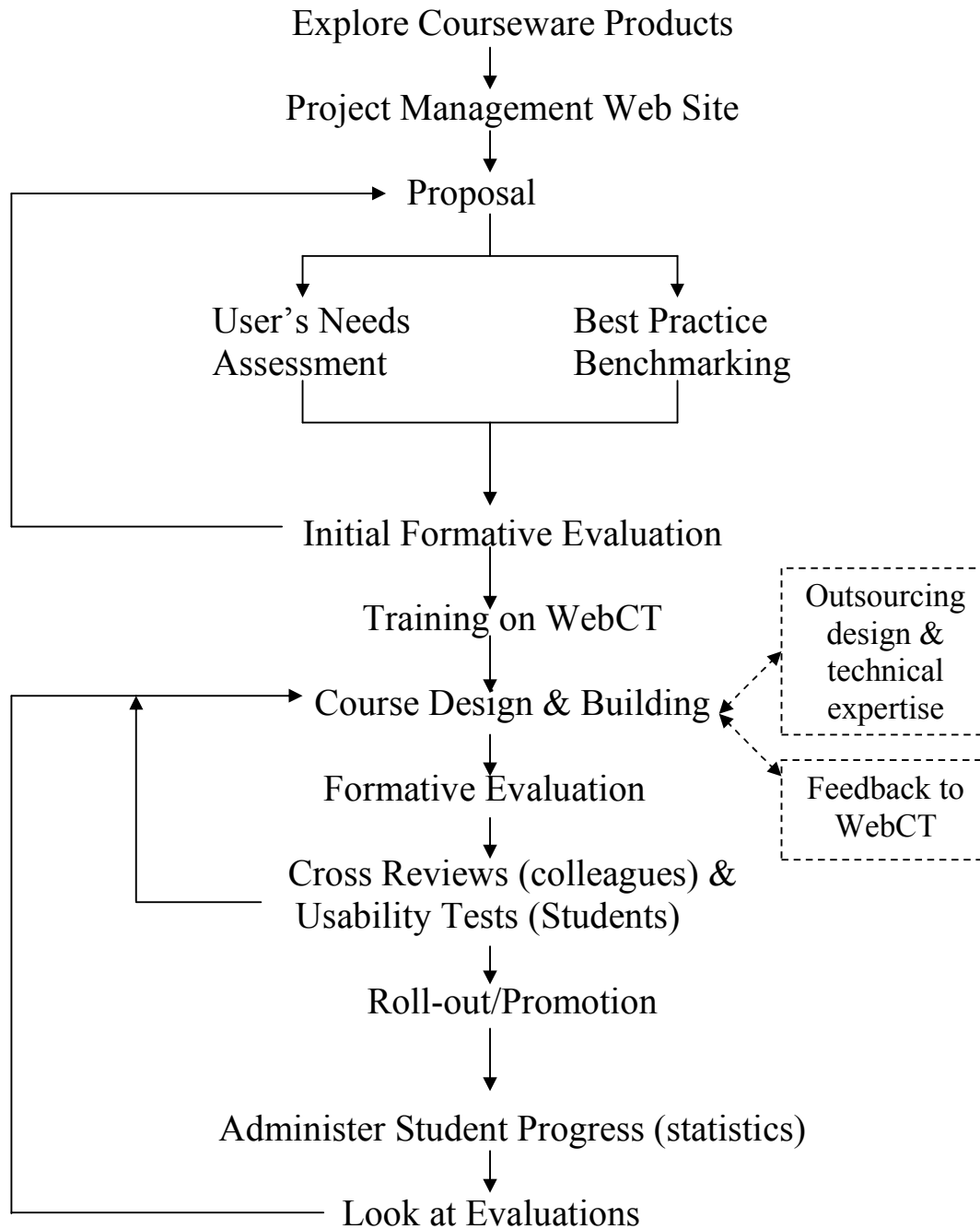
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Appendix

Designing Online Tutorials with WebCT: A Flow Chart



- This chart was originally designed by Catherine Kwok, and was revised by Sam Chu.