

# Quality Assurance for Online Tutorials

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## ABSTRACT

*E-teaching and E-learning are the latest trends in education. Much has been written on the content, the technical know-how, and the benefits of offering courses and tutorials online. However, the literature lacks discussion of how we can be assured of the quality of these online courses and tutorials. This paper describes five quality-assurance strategies adopted by the Hong Kong University of Science and Technology Library when producing its Information Literacy Tutorial (<http://library.ust.hk/serv/skills/infoliteracy.html>): project management, best practice benchmarking, user needs assessment, usability testing, and formative evaluation.*

## INTRODUCTION

E-teaching and E-learning have grown exponentially in the past few years. By December 1999, about half of the universities and colleges in the United States offered courses through the Internet or videoconferencing. (*BBC News*, 1999) E-teaching and E-learning have become major themes in education. To support these activities, many online self-paced tutorials have been created as part of an online course or as the sole component of a course. It is crucial to develop high quality online tutorials.

This paper discusses five quality-assurance strategies that tutorial creators can use to guarantee a high quality tutorial: project management, best-practice benchmarking, user-needs assessment, usability testing, and formative evaluation. The paper uses the online Information Literacy Tutorial (ILT) (<http://library.ust.hk/serv/skills/infoliteracy.html>), produced by the Hong Kong University of Science and Technology (HKUST) Library, as a case study to illustrate how the five strategies can be applied to the creation process.

## BACKGROUND

The ILT is designed to help students develop skills to search, locate, evaluate, and use information effectively in their life-long learning. It consists of six modules: (1) Exploring the Library; (2) Library Online Catalog I; (3) Library Online Catalog II; (4)

Finding Periodical Articles; (5) Searching the WWW; and (6) Evaluating & Citing Sources. Its target audience is first-year undergraduates at HKUST.

First-year undergraduates are required by their Schools to participate in Library orientation. Previously, the orientation consisted of a walking tour of the library and a hands-on library class held in the Library Computer Lab. The tour helped students familiarize themselves with the facilities, collection, and services of the library. The class showed students how to search for information in the library catalog and databases effectively.

To offer students an alternative way of learning, the library created the ILT for self-learners. Students can either join a tour and a class, or they can learn from the ILT on their own. In either case, students are required to take the quizzes on the ILT to show that they understand the key points presented in the six modules.

Our library began to design the first three modules in March 2000 and completed them in August 2000. Modules 4 – 6 were started in October 2000 and released 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. The quality-assurance strategies used in the process are discussed below.

## **PROJECT MANAGEMENT**

### **What is Project Management?**

It is the planning, scheduling, and controlling of project activities to meet project objectives.

### **Why Project Management?**

The ILT is targeted at about 1,900 first year undergraduates. Designing and managing an online tutorial for that many students is an “uphill task”. Without proper project management techniques, chaos might reign.

### **Two Key Techniques**

The two most important methods were the project management web site and the timetable.

#### *Project Management Web Site*

The web site “Information Literacy Tutorial for New Students” (<http://home.ust.hk/~lbsam/ILT/onl-clas.html>) tied together everything related to the project. It helped maintain a clear direction and facilitate communication among the project members. By keeping this working document up-to-date, we had a time-

saving strategy since everything related to the project (proposal, style guide, students' comments, etc.) could be found on the site easily and quickly.

### *Developing the Timetable*

Time Management is critical to the success of any project. We tried to set realistic deadlines for various stages of the project and to adhere to them. See <http://home.ust.hk/~lbsam/ILT/onl-clas.html#evaluation> for our project timeline for Modules 1-3.

## **BEST-PRACTICE BENCHMARKING**

### **What is Benchmarking?**

Learning by borrowing from the best and adapting their approaches to fit your own needs is the essence of benchmarking. (Bogan, C.E. and English, M.J., 1994, p. 3)

### **What are Best Practices?**

Best practices are documented strategies employed by highly acclaimed companies (Best Practices LLC, 2001). A simple definition for best practices could be “excellent ways of doing something, a product, an online tutorial, etc.”

### **What is Best-Practice Benchmarking for Building Our Online Tutorials?**

We identified excellent online tutorials from other libraries worldwide and learned from them.

### **How to Identify Best Practices?**

#### *Online Discussion Groups*

We posted a question on BI-L (a global online discussion group on library instruction that has about 3,000 members) asking for online tutorials created on WebCT (<http://www.webct.com/>), i.e., the courseware we decided to use for designing our tutorial.

#### *Quality Instruction Programs of Libraries*

We examined the instruction programs of award winners and major university libraries from around the world (See BI Programs of Other Academic Libraries <http://home.ust.hk/~lbsam/bi/programs.html>) which yielded fruitful results.

### *The Literature and the Web*

Searching and browsing key information-science journals helped us locate excellent online tutorials. We also used search engines to mine relevant tutorials.

### *Personal Contact*

In addition, we identified some useful tutorials through personal contact.

### **Benefits of Best-Practice Benchmarking?**

After trying out and comparing a number of online tutorials, we learned what best-practice benchmarks were. We then followed these benchmarks when producing our own tutorial. This exercise spared us the problem of re-inventing the wheel and shortened the development time tremendously. It ensured our tutorial was in line with the best tutorials available.

### **Learning from Bad Examples**

Not every online tutorial examined was of good quality. Some were poorly designed and caused a lot of problems for their users. These bad examples taught us what to avoid when designing our tutorial.

### **USER-NEEDS ASSESSMENT**

Online tutorials are meant for users, not designers. Therefore, the tutorial should be user-centered rather than designer-centered. Unfortunately, quite a few tutorials we examined were designer-centered and users would find them difficult to use, or even useless.

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:

#### **Solicited Ideas from Library Colleagues**

We brainstormed on Module 1 (introduction to library services, facilities, and collection) by asking colleagues from Circulation and Library Reserve to give us ideas on what should be included in the module. They have frequent contact with first-year undergraduates and understand the needs of these students very well. Their contribution was substantial.

#### **Interviewed Second and Third Year Students**

Second- and third-year students know (or wished they knew) what they needed when they were in their first year. We interviewed nine of these students. The interview was divided into two parts: (1) Soliciting free thoughts from the students, and (2)

Prompting students' ideas by showing them a tentative proposal of the three modules and asking them what they considered important for first-year students. We asked the students whether there were any important items missing from the proposed modules. (See "Initial Evaluation for Module 1-3: Interview Students" <http://home.ust.hk/~lbsam/ILT/ini-eval.html> and Results of "Initial Evaluation for Module 1-3: Interview Students" <http://home.ust.hk/~lbsam/ILT/in-eva-r.html>)

## **USABILITY TESTING**

### **What are Usability Studies?**

These are studies designed to examine how usable a product is. The product can be anything: a software program, a web site, or an online tutorial. The goal is to improve the usability of the product.

### **Why Usability Studies?**

Usability studies help create a truly usable (user-friendly) product. As Susan 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."

### **Who Uses It?**

Most computer-related companies have at least one usability lab. See these examples, Microsoft's usability lab (<http://www.microsoft.com/Usability/tour.htm>) and NCR's usability lab ([http://www.ncr.com/repository/brochures/services/sa\\_usabilitylab.pdf](http://www.ncr.com/repository/brochures/services/sa_usabilitylab.pdf)). Some libraries such as Yale University Library (<http://www.library.yale.edu/~prows/nebic/nebictalk.html>) conduct usability tests as well.

### **"Think Aloud" Usability Study**

One of the most popular and important usability studies is the "think aloud" method (more commonly called Usability Test). It observes and analyzes user behavior with a product or a product prototype. It comprises five key components:

1. The goal: to improve the usability of a product
2. Testers represent real users
3. Testers do real tasks
4. User behavior and commentary are observed and recorded
5. Data is analyzed to uncover problems. Corrections are then recommended  
(Clairmont, M., Dickstein, R. and Mills, V., 1998)

## HKUST Library's Usability Study



The usability test for Modules 1-3 (<http://home.ust.hk/~lbsam/ILT/usa-test.html>) employed two groups of testers: a “think-aloud” group and a self-paced group. The think-aloud group had five students and each of them was asked to “think aloud” while “test-driving” the tutorial. A project team member observed the student and noted down problems that s/he encountered. The self-paced group consisted of fifteen students who went through the three modules on their own and emailed us their comments.

### *Mix of the Student Testers*

Most of the 20 students were undergraduates from Years 1 to 3 and were in different departments. A few were postgraduate students. We preferred undergraduate students since the tutorial was designed for them. The postgraduate students were invited in the hope that their more “mature” ideas would help improve the tutorial. The testers were equally divided between male and female. The 20 students were a good mix and offered different opinions.

### *Usefulness of the Usability Test*

The usability test results (<http://home.ust.hk/~lbsam/ILT/use-resu.html>) revealed our ILT had plenty of room for improvement. Here is one example. Originally there was a message on the final page of each module:

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

Many students repeatedly clicked on the two logos as if they were hyperlinks. By replacing the icons with text, we eliminated the problem.

### *Think-aloud Group Versus Self-paced Group*

The “think-aloud” group helped us identify more problems than the self-paced group. Although this method was more time consuming, it was more rewarding. Therefore, when we conducted the second usability test for Modules 1 to 3, we only adopted the “think aloud” method.

### *The Second Usability Test*

The second usability test for Modules 1 to 3 (<http://home.ust.hk/~lbsam/ILT/usa-test2.html>) served as an important evaluation before the ILT was implemented. Five new first-year students signed up for the test. We excluded students from other years because new first-year students represented the real users of the tutorial. See <http://home.ust.hk/~lbsam/ILT/use-resu2.html> for the results of the second usability test.

## **FORMATIVE EVALUATION**

### **What is Formative Evaluation?**

This is a process that evaluates a product from start to finish. In other words, you start evaluating your product while you are creating it. If you evaluate your product when it is completely finished, you may find it too late to make any effective modifications.

### **Formative Evaluation for Our Tutorial**

For Modules 1 to 3, we went through five stages of formative evaluation: initial evaluation, design evaluation, content evaluation, product evaluation, and implementation evaluation. (<http://home.ust.hk/~lbsam/ILT/onl-clas.html#evaluation>)

## **CONCLUSION**

By applying these five methods of quality assurance (project management, best-practice benchmarking, user-needs assessment, usability testing, and formative evaluation), we achieved our goal of producing a highly usable online tutorial. Students' comments have confirmed our belief that the tutorial is indeed user-friendly and useful. For the past two years, over 1,000 first year students have tried the tutorial by early October. Over 80% of those who filled out the evaluation said that they would recommend the tutorial to others. One wrote:

"The [Information Literacy Tutorial] 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 are serious about academic studies. This gives me confidence in studying at this University, and now I feel I start to love UST!!"

To maintain the high quality of the ILT, we constantly review and update it by incorporating the newest possible technologies and the latest development in information literacy.

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## REFERENCES

BBC News (1999). US Colleges Move Courses Online.

[http://news.bbc.co.uk/low/english/education/newsid\\_575000/575327.stm](http://news.bbc.co.uk/low/english/education/newsid_575000/575327.stm)

(retrieved: November 6, 2001)

Best Practices LLC (2001). Best Practices FAQ.

[http://www.best-in-class.com/site\\_tools/faq.htm#best\\_practice](http://www.best-in-class.com/site_tools/faq.htm#best_practice)

(retrieved: November 22, 2001)

Bogan, C E and English, M J (1994). *Benchmarking for best practices: Winning through innovative adaptation*. New York: McGraw-Hill.

Clairmont, M; Dickstein, R and Mills, V (1998). Testing for Usability in the Design of a New Information Gateway.

<http://dizzy.library.arizona.edu/library/teams/access9798/1ft2paper.htm>

(retrieved: November 20, 2001)

Fowler, S (1998). Appendix B: Usability Test. An appendix in *GUI Design Handbook*

NY: McGraw Hill. <http://www.fast-consulting.com/appb.htm>

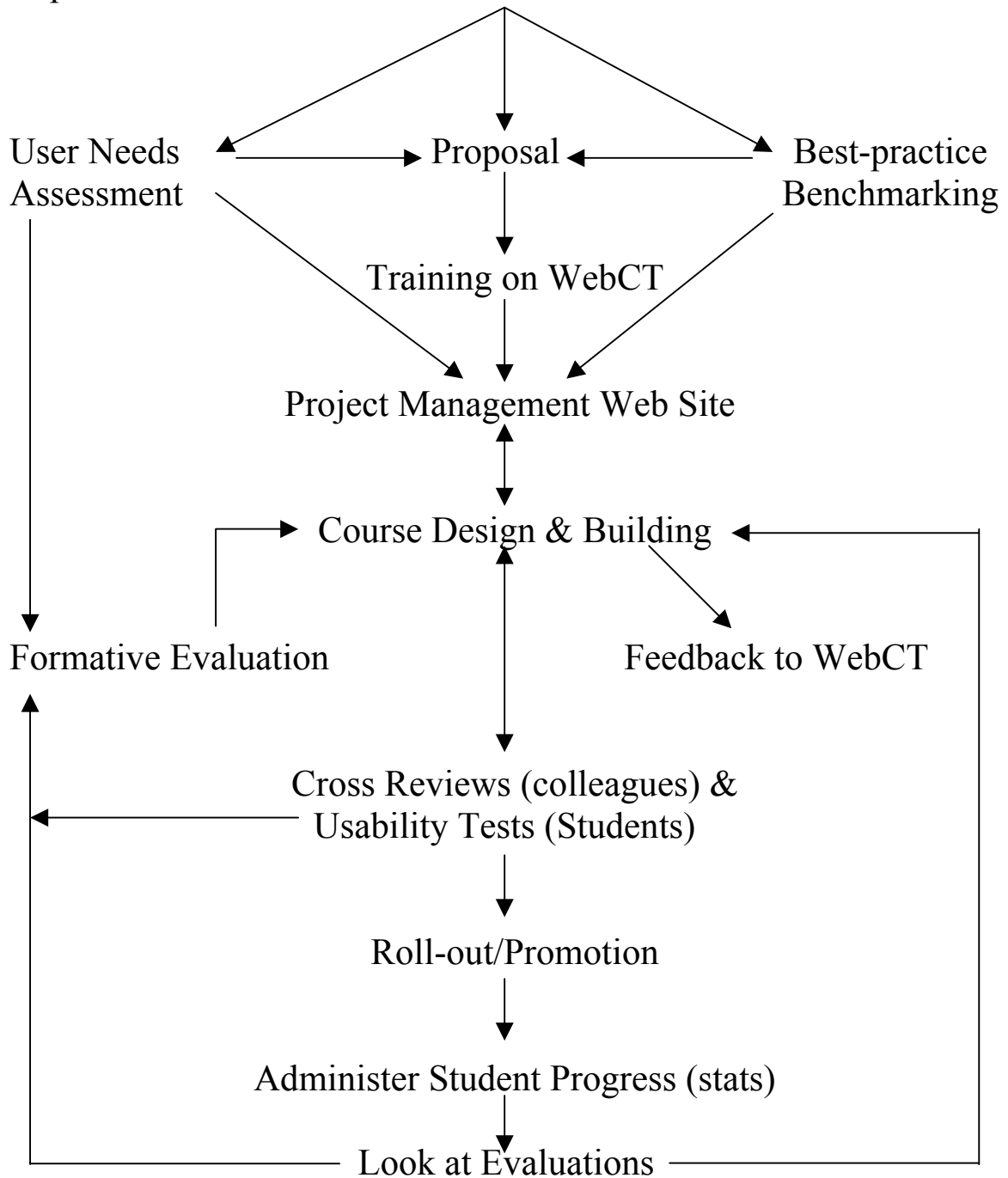
(retrieved: November 20, 2000)



Appendix

# Designing Online Tutorials with WebCT: A Flow Chart

Explore Courseware Products



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