A System for Assessment in Large Class

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Background

- The need to administer two examinations during the Spring semester when the FINA course is delivered to a large class of few hundred students.

- Each examination requires substantial resources in preparation (i.e. >300 hrs).

- Time is used in designing and ensuring clarity of questions, administering the examination in several large lecture theaters, hiring and training 25-30 proctors, and marking the examination in a consistent, efficient and fair manner.
Action Research Cycle

- **Planning**: identified user requirements for creating a system that will be used to conduct continuous assessment using less resources.

- **Action**: built a secured online assessment system with student, instructor and administrator interfaces.

- **Evaluation**: conducted 2 rounds of usability tests with TAs/demonstrators and students.

- **Reflection**: made refinement onto the system that fit users’ preferences.
Planning

To design an assessment system which is

- **efficient**: does not require great deal of resources
- **effective**: provides a consistent and fair test to all students by creating randomized tests of “equal” difficulty; incorporates efficient & consistent marking
- **flexible**: allows students to take the test at various assigned times in one or two days
- **secure**: prevents students from communicating with their peers through PCs or internet, and stops them from downloading/ printing the assessment paper.
SOAS System Features (I)

- Create a secure system which consisted of the **student examination interface**, **instructor interface** and **administrator interface**.
- Feature that ensure **security**: Student’s workstation are configured to run SOAS test only.
- Students are **prohibited to communicate** with each other through PC to PC connection or through the internet. Whenever students login the SOAS system, they could neither open any other programs nor connect to the internet. They would not be able to copy any examination questions.
SOAS System Features (II)

- **Student exam interface:** examination timer; skip/review questions

- **Instructor interface:** simple or compound questions that support MC, text-based or questions with attachment; randomization of questions and answer options; automatic calculation and marking for MC questions; display results per student or per question.

- **Administrator interface:** users management, import/export questions and all features at instructor interface
Instructor Interface

Question Randomization

For large class
Purely randomized questions
(All different questions)

For small class
Purely the same Questions
(All common questions)

Partially randomized questions
(Different questions)

+ Partially the same questions
(Common questions)
Instructor Interface - Login

![Login Page]

*Secure Online Assessment System*

- **Username:** [Enter]
- **Password:** [Enter]

- Login

*E.g. ITSC account*
Instructor Interface – Question Type

Please select a question type: Multiple Choice

OK  Cancel
Instructor Interface – Question Categorization

![Image of Instructor Interface with categories and sub-categories for question creation]
Instructor Interface – Input Question

The mixture of debt and equity used by the firm to finance its operations is called:

Option 1: A Label for this option
Text for this option
working capital management.
Points for this option
Feedback for this option

Option 2: B Label for this option
Instructor Interface – Student List

![Instructor Interface Interface Image]

- **Name of Registered Student**
  - 1. Charlotte Chow
  - 2. Dennis Tong
  - 3. Nadia Chiu

- **Number of Attempt**
  - 0
  - 0
  - 0

**Buttons:**
- Add Student
- Upload Student List
Student Exam Interface - Login

Welcome to the Secure Online Assessment System!

Username: 
Password: 
Submit

e.g. ITSC account
Student Exam Interface – Start Exam

Please read the information below carefully before pressing the "Start!" button.

General Information

- Name: Dennis Tong
- Section: 
- Assessment: FINA
- No. of Attempt Allow: Multiple
- Attempt: 1
- Time Allow: 1 Hr(s) 0 Min(s)
- Status: new
- Date: 5/9/04

[Start] [Back]
Student Exam Interface – Attempt Question

The mixture of debt and equity used by the firm to finance its operations is called:

- A. working capital management.
- B. financial depreciation.
- C. agency cost analysis.
- D. capital budgeting.
- E. capital structure.

Submit
Instructor Interface – View Report as Sorted by Student
Instructor Interface - Report as Sorted by Student
Instructor Interface – Report as Sorted by Question
Evaluation

- Usability Test I: Students
- Usability Test II: TAs/ demonstrators
Usability Tests - Objectives

Student exam interface
- to test question randomization
- to test using questions with different answer types: e.g. MC, text-based
- to test simple questions & compound questions
- to test whether assessment can be continued after re-booting the PC
- to test whether submission of answer would be rejected after the pre-assigned time had passed

Instructor interface
- to mark questions, re-adjust previously marked questions & calculate total scores
- to generate report
## Two Usability Tests - Design

<table>
<thead>
<tr>
<th></th>
<th>FINA Students</th>
<th>FINA TA/Demonstrators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. of Participants</strong></td>
<td>70</td>
<td>5</td>
</tr>
<tr>
<td><strong>Data Collection Date</strong></td>
<td>11 Jul 2003</td>
<td>17 Jun 2003</td>
</tr>
<tr>
<td><strong>Student Exam Interface</strong></td>
<td>Tested</td>
<td>Tested</td>
</tr>
<tr>
<td><strong>Instructor Interface</strong></td>
<td>N/A</td>
<td>Tested</td>
</tr>
<tr>
<td><strong>No. of trial test questions</strong></td>
<td>20 simple Q &amp; 1 compound Q</td>
<td>60 simple Q &amp; 1 compound Q</td>
</tr>
<tr>
<td><strong>Time allowed</strong></td>
<td>30 mins</td>
<td>40 mins</td>
</tr>
</tbody>
</table>
Two Usability Tests – Procedure

- Aim: to test the SOAS’s **student exam interface** by simulating the actual exam procedure & environment.

- **Briefing by Facilitator**
  - Facilitator briefed TAs/demonstrators/students about the test procedure and circulated instruction sheets to them.

- **U-Test I**
  - **Students**

- **U-Test II**
  - **TA/Demonstrators**

- **Trial test**

- **Post-task questionnaire**

- **Discussion**

- **Observers and invigilators** jotted down field notes on participants’ behavior in using SOAS system.

- There were gifts rewarded to students scored the top 2 highest marks. Students were motivated to achieve good score, as if in normal exam.
Finding (1)

Quantitative opinions from students:

- Timer easily read: 74% Very/quite easy, 19% Average, 2% Not quite/not easy at all, 5% Unanswered
- Skip/Jump Back: 66% Very/quite easy, 22% Average, 10% Not quite/not easy at all, 2% Unanswered
- Overall ease of navigation: 66% Very/quite easy, 19% Average, 9% Not quite/not easy at all, 7% Unanswered
- Login process: 81% Very/quite easy, 10% Average, 5% Not quite/not easy at all, 3% Unanswered

(N: 58 students)
Finding (II)

Several **refinements** were made with reference to the qualitative opinions from TA/demonstrators:

- **Student exam interface**
  (e.g. change timer bar to a ‘stop watch’ time counter, etc.)

- **Instructor interface**
  (e.g. enhanced the preview function: give a preview of all questions to be randomized for a single class assessment, etc.)
Future Implementation

- A **designated classroom** reserved for conducting real examination/test using SOAS is currently under renovation.
- The key to implementing SOAS is **to select and codify questions**, which test a student’s understanding and critical thinking ability for a given subject.
- As an **extension of this project**, a colleague at the ISMT department will use SOAS in upcoming semester(s).
End of Presentation

Thank You!

SOAS website: <http://celt.ust.hk/cli/projects/soas/>