THE HONG KONG
POLYTECHNIC UNIVERSITY

Ref. No.
For official use only

Projects on Promoting Outcome-Based Approaches in Student Learning 2007-08
Application for OBA Funding

PART I: General Information

1. **Title**

    A learning and assessment engine for developing financial decision-making ability

2. **Name(s) of Applicant(s)**

    Project Leader

Name	Dept	Post	Groupwise	Ext.
Yiu Ka Fai Cedric	AMA	Assistant Prof	macyiu	6923

    Team Member(s)

Name	Dept	Post	Groupwise	Ext.
Chan Chi Kin	AMA	Assistant Prof	machanck	6928
Chan Chun Wah		Senior lecturer	macwchan	6918
Hung Kim Fai		Lecturer	makfhung	6929
Ip Wai Cheung		Associate Prof	mathipwc	6953
Wong Heung		Associate Prof	mathwong	6942
Yam Sheung Chi		Lecturer	mascpy	6931

3. **Total funding requested**

4. **Expected duration of project:** _____24_____ **months**

    Proposed commencement date: 1/9/2008

Expected completion date: 31/8/2010

PART II: DETAILS OF PROPOSAL

1.   Project objectives and significance

(What are your objectives in initiating this project? How does it align with institutional goals and targets in implementing outcome-based approaches in student learning?)

The project intends to develop an objective assessment tool and a supplementary learning engine to assess and guide students in achieving the intended learning outcomes:

a) Integrate knowledge in mathematics, statistics, finance and investment science to formulate problems mathematically and logically in a real-life situation, especially in investment analysis and management.

b) Master solution methodology to tackle planning and decision problems in investment, financial services, risk management and related areas.

c) Develop and apply mathematical and financial models effectively to solve problems in investment, financial services, portfolio management, risk management and related areas, with clarity and coherence in thought, hypothesizing and reasoning.

d) Utilize both quantitative and analytical techniques to forecast changes and make investment decisions that will affect a process in the future.

Through active participation in the activities and subsequent feedbacks from the assessment, students will become more competent and confident professionally on investment decisions and enhance their achievements of major programme outcomes. By providing real-life and complex scenarios, students are required to make real investment decisions under a real environment. This serves as a capstone project to give students an opportunity to demonstrate their competence in some of the learning outcomes. Most importantly, students will be more aware of risks in the activities and to develop the correct risk attitudes toward risk and uncertainty. Furthermore, by providing an active and objective assessment tools and learning engine, it is more effective to bring about the intended learning outcomes valued by today's employers. This helps to reinforce the Strategic Objective 1 of developing all-round students with professional competence.

2.   Target users

(Who are the intended users of the 'deliverables' of the project – faculties / departments management or programme/subject teams or students?)

The deliverables of this project are intended to assess selected programme outcomes of the full-time AMA BSc (Hons) in Investment Science. Hence the deliverables are expected to be adopted by the Programme Team to assess students enrolled in this Honours programme.

If the target users are students, complete the table below:

Programme code	Programme title	Credit units	Mode of study	Student intake quota per year
63023	Bachelor of Science (Honours) in Investment Science	66	Full-time	35

Please insert rows in the table if more space is required for additional information.

3. **Outcomes and deliverables**

(a) **Major outcomes and deliverables**
   (What will be the major outcomes and deliverables of the project?)

	Major outcomes and deliverables with descriptions
(i)	An online market asset selection software platform for portfolio management with advanced asset database for both quantitative and qualitative analysis.
(ii)	A transaction checking software system for final performance analysis as feedbacks, and a risk and return control software system to assist students on their decision making.
(iii)	Instruction guidebook for departmental academic staff.
(iv)	A set of feedback questionnaires for both academic staff and students.

Please insert rows in the table if more space is required for additional information.

(b) **Plan for developing and piloting / implementing the deliverables**
   (Detail the plan and procedures that you will adopt to develop and pilot/ implement the outcomes and deliverables. Also specify the dates of the pilot / implementation period)

In this project, we aim to develop an objective assessment tool and a supplementary learning engine. It requires the development of a web-based system with a direct link with a market data stream. In particular, we have subscription to the Bloomberg terminal and we will target our interface with the Bloomberg system. We subdivide the development and implementation in four workpackages.

WP1. Designing the platform (6 months)

We will discuss with financial experts on design of the platform. In particular, we will investigate the followings:

i)   Setting up a selection of tradable assets group and its number.
ii)   Selection of market data and analysis information to be included in system.
iii)   Decision on system capacity/ speed planning/ function scope.
iv)   Selection of hardware & software solution.

Investigations will be focused on the data collection and user requirement. Rules, trading procedures and characteristics for certain tradable asset class available in the market will be followed closely. We will then investigate the asset class, including:

- Standard class: stock, preferred share, bonds, asset-backed security, mutual fund.

- Derivatives: convertible bonds, options, warrants, future (commodity, currency, exotic, e.g weather index future), swaps (commodity, currency, credit risk).

The style, format and function of trading platform and transaction checking and performance report system will be looked at and supporting data for help menu will be defined.

3

WP2. System build up and implementation (6 months)

In this workpackage, we plan to set up the hardware platform and develop the software system as follows:

(i)   Set up hardware server and the required linux operating system.
(ii)   Acquire and install the necessary utility software.
(iii)   Set up MySQL database and its required indexing.
(iv)   Set up interface for accessing quantitative data.
(v)   Set up a portfolio selection system.
(vi)   Set up User friendly help menu system.
(vii)   Set up Evaluation Report system.

The structure of the system is depicted in the following schematic diagrams:

System Solution 1   System Solution 2
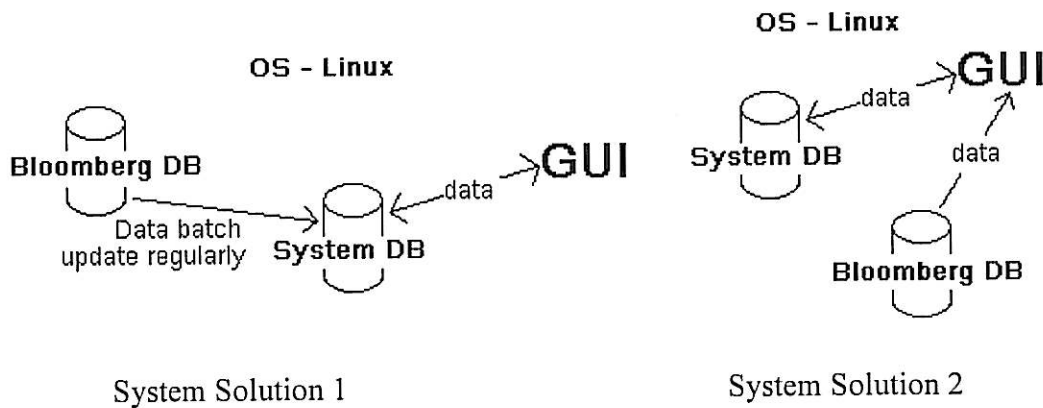
WP3. Prototyping and pilot run (6 months)

The developed system will be finalized in this workpackage. For Linux database and administration system, suitable updating and maintenance service will be set up for the required tasks. For the developed software system, PHP programming language integrated with XML, which is a widely-used general-purpose scripting language that is especially suited for web development, will be fine-tuned and integrated with the Bloomberg market databases. Pilot run by a group of selected students will be carried out.
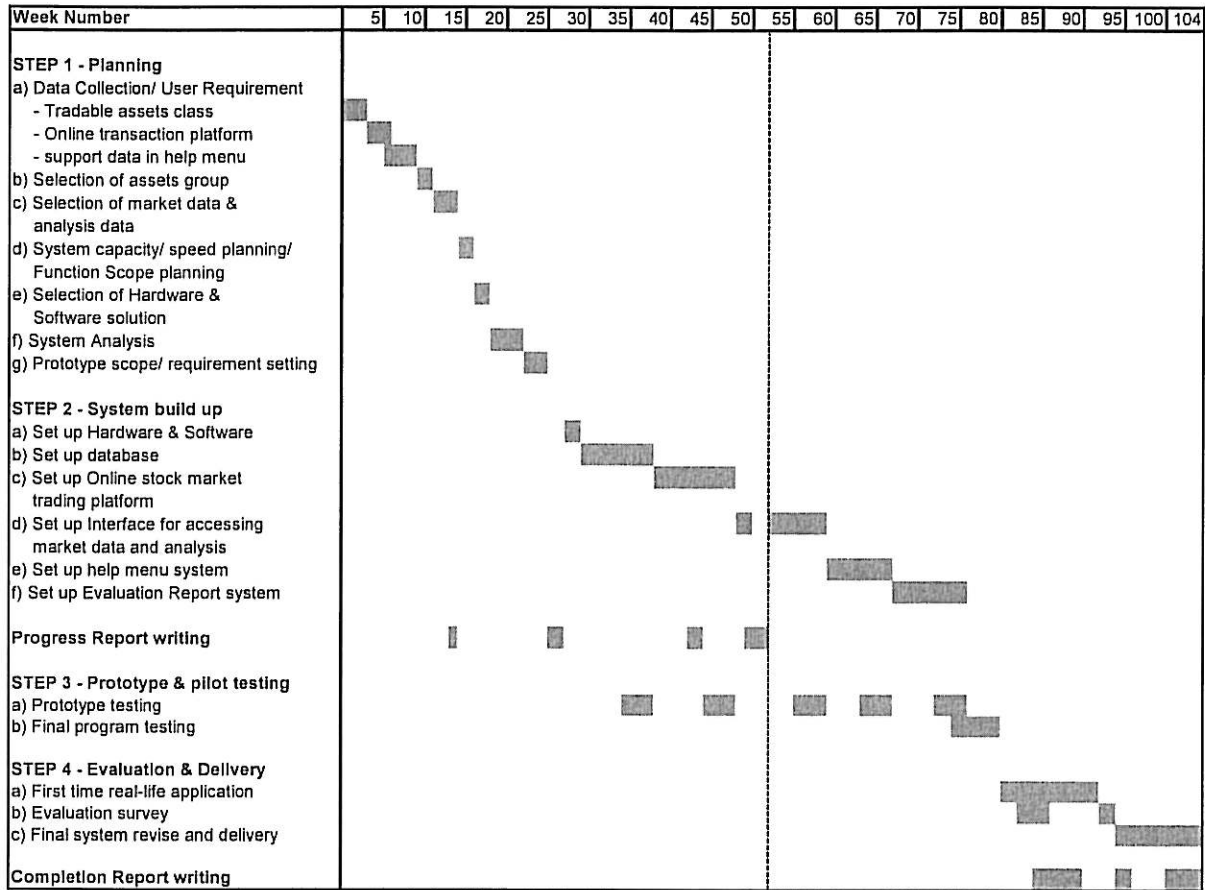
WP4. Evaluation (6 months)

The whole system will be evaluated thoroughly by collecting feedback from students and academic staff. We will invite professionals to observe and give suggestions for further improvement. The achievements for the intended learning outcomes will be assessed carefully via students' reports and performance on the tasks. The system will be improved after collecting all the recommendations.

Planned pilot period of the deliverables:
Start Date (dd/mm/yyyy): ......1/9/2009.....................
End Date (dd/mm/yyyy): ....31/1/2010.....................

4

Gantt Chart - Investment Simulation Platform Project

Week Number	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	104

STEP 1 - Planning
a) Data Collection/ User Requirement
  - Tradable assets class
  - Online transaction platform
  - support data in help menu
b) Selection of assets group
c) Selection of market data &
  analysis data
d) System capacity/ speed planning/
  Function Scope planning
e) Selection of Hardware &
  Software solution
f) System Analysis
g) Prototype scope/ requirement setting

STEP 2 - System build up
a) Set up Hardware & Software
b) Set up database
c) Set up Online stock market
  trading platform
d) Set up Interface for accessing
  market data and analysis
e) Set up help menu system
f) Set up Evaluation Report system

Progress Report writing

STEP 3 - Prototype & pilot testing
a) Prototype testing
b) Final program testing

STEP 4 - Evaluation & Delivery
a) First time real-life application
b) Evaluation survey
c) Final system revise and delivery

Completion Report writing

4. Dissemination and sharing plan
(How are you going to disseminate and share the outcomes and deliverables of your project?)

Throughout the period of using the developed system, all transactions will be recorded and a final report will be generated automatically for each student participated in the activities. Students are also required to hand in a detailed report to support their reasoning for their decision-making.

All the reports will be distributed and looked at by staff team members and sharing sessions will be organized to discuss on the reports. Presentations will be organized for students to present their reports and discuss with staff on the pros and cons of their selected portfolios and the corresponding decision-making. Emphasis will be on the risk and return attitudes that students developed over the course of the activities.

5. Evaluation plan
(How do you plan to evaluate the effectiveness of the project, particularly its impact on the implementation of outcome-based approaches in student learning in the PolyU?)

Based on the automatic transaction generating system, objective performance measures can be derived using market data. Benchmark performance in the market will be used to compare with the performance obtained by students.

From the submitted reports and presentations by individual students, staff members will assess the effectiveness of achieving the required learning outcomes. In addition, relevant

mentors, alumni and external reviewers such as financial professionals will be consulted and their evaluations of the achievement will be collected.

Apart from the objective performance measures and opinions from staff and professionals, questionnaires and exit survey will also be conducted to obtain the evaluation of the project from students.

6. Impact

(How will the project contribute to the success of the implementation of outcome-based approaches in student learning in the PolyU/ department/ programme/ subject?)

(a) The developed system helps as an additional assessment for students in making risky investment decision or solving particular financial problem in real-life. Students are required to hand in a detail report to support their reasoning for making the decision. The importance and trade-off between risk and return will be identified clearly throughout the course of activities and it helps the students to develop the correct risk attitudes on financial decision-making.

(b) The pre-requisites for the activities are comprehensive and would require students to combine different skills learnt in subjects, like accounting, economics, statistics, risk management, portfolio management and related areas. By using a real-life portfolio management platform to guide students on practical tasks, students will need to strengthen their learning outcomes and to polish their technical skills before working in the society.

(c) In the activities, students are required to integrate and apply the knowledge and skills acquired and developed over the course of their study in the programme in order to fulfil the requirement of managing a risky financial portfolio and work out a detailed risk and return analysis report. In this way, students can achieve learning outcomes progressively by referring to real market data throughout the course of their studies in various subjects. With user-friendly interface, students can learn during working on portfolio analysis, and this will trigger their interests in self-learning and creative thinking. This project stimulates active learning and motivates students to seek for further knowledge exploration.

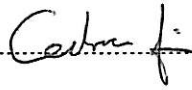## 7. Target date(s) for submission of progress and completion reports

	Planned submission date (mm/yyyy)
1. Progress report *(for projects whose duration lasts more than 1 year; to be submitted mid-way through the proposed project period)*	9/2009
2. Completion report *(to be submitted within 3 months after the project completion date)*	11/2010

PART III: BUDGET OF PROPOSAL

*Important Notes

1. Funding requests for equipment and/ or software will be considered only if:

   a. the equipment / software is essential to the successful implementation of the project, AND
   b. it is not available in the department concerned. The Project Leader has the responsibility to check this out.

2. The purchasing policies and procedures of FO must be followed for the procurement of approved items.

3. Funding request for conference attendance will not be considered.

Project Leader

Name: YIU KA FAI CEDRIC ....   Signature: ....

(in block letters)

Dept: AMA ....   Date: 30 January 2008 ....

PART IV: DEPARTMENTAL ENDORSEMENT

Endorsement by Chair of FLTC/ DLTC:

Comments on the proposal:

Name: _CHAN CHI KIN_ Signature: _(A. Ch___ Date: _30/1/2008_
      (in block letters)

Endorsement by Deputy HoD:

Comments on the proposal:

This is an excellent project to support outcome-based learning of the Department. It will develop a web-based system with a commercial data bank (Bloomberg) to enable our students to learn more effectively. I strongly support this project.

By endorsing this proposal, I agree that:

1. The proposal suitably addresses the School/Department's needs in promoting and implementing outcome-based approaches to student learning and will be considered as part of the School's/Department's Business Plan.

2. The School/Department will receive a funding as calculated for item (e) in the Budget section which I will use for providing the time release recommended by the project proposers, based on the Total Workload Model, to support them to work effectively on the project.

Name: _Dr CHAN CHEONG KI_ Signature: _____ Date: _29 January 2008_
      (in block letters)

Please return this form to Miss Miranda Fung, Secretary of Working Group on Outcome-based Education,
c/o Educational Development Centre
by 31 January 2008

8

Projects on Promoting Outcome-Based Approaches in Student Learning (OBA Funding): Application for the Call for Proposals 2007-08

<u>**Proposed Project: A learning and assessment engine for developing financial decision-making ability**</u>

In this project, the main objectives are to develop an objective assessment tool and a supplementary learning engine to assess and guide students in achieving the intended learning outcomes of the full-time AMA BSc (Hons) in Investment Science. Students will participate in the activities actively and will submit reports and present their results at the end of the semester.

In reply to the comments:

Indicate if there is any assessment rubric to be developed for the (i) reports submitted by students and (ii) presentations concerning the evaluation/assessment of the developed system; indicate if there is any professional in the relevant fields to be involved in designing (i) the assessment rubrics (if applicable) and (ii) the questionnaires

(i) In addition to the objective performance of the selected portfolios by students, we intend to develop a rubric to assess the reports submitted by students and their presentations concerning the evaluation/assessment of the developed system. The rubric will be developed by a panel composed of academic staff and professionals from company such as Convoy, Morgan Stanley, Goldman Sachs and Fortis Bank. In the developing process, we will seek advice from education professionals such as experts from the Education Development Centre. For the development of the questionnaires, we will invite experts from our Statistical Advisory Unit to give guidance.

Specify how the developed system is used to facilitate student learning

(ii) In the developed system, we intend to provide some help menus to give online information on some important formulas, models and methods. Although these are materials covered already in various lectures, the online help will provide a mean to remind students of the key concepts in a concise manner. In addition, the activities and the development system will provide a medium for discussion between students and academic staff and among students themselves. This will encourage active

learning by students.

Justify the budget for the software, books and references (Important Notes: The funding requests for such items will be considered only if: (a) they are essential to the successful implementation of the project, AND (b) they are not available in the department/PolyU.)

(iii) We try to use freeware as much as possible for this project, such as Linux OS and MySQL database. Our department has only basic software for static web system development. In order to develop dynamic web system with attractive design, such as moving graphics, rotating frames, we need the help of the software *Dreamweaver* and *Flash*.

Since we intend to use the freeware Linux OS and MySQL database, support will be very limited and we expect we need some reference books on these topics. In order to acquire the most updated knowledge in this fast moving field in a timely manner, we may need to purchase newest reference books that our library has not acquired yet.