Strategic Roadmap for the Development of the Outcomes-Based Approach (OBA)
in the
Faculty of Science
The Chinese University of Hong Kong

Submitted to the
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The Chinese University of Hong Kong

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(DRAFT)

1. Programme-level descriptions of desired student learning outcomes

The fundamental concepts of Outcomes-Based Approach (OBA) have long been entrenched in the teaching practices in the Faculty of Science at The Chinese University of Hong Kong (CUHK), and all programmes have initiated their efforts to take ownership in adopting OBA in a more explicit manner. All programmes have developed learning outcomes for their graduates through critical analyses of feedback collected from stakeholders, intensive reviews of literature and international practices, as well as extensive discussions and focus group interviews. Please refer to http://www.cuhk.edu.hk/sci/OBA/project_progress/project_progress04.html for the draft learning outcomes of all science programmes.

CUHK aspires to produce graduates who have depth in a specialty, breadth in general knowledge, bilingual proficiency, a basket of learning skills, and personal attributes including honesty and integrity. In the light of these university-level learning outcomes, the learning outcomes of each individual science programme are operationalized as knowledge, professional and generic skills, as well as values/attitudes needed by graduates. Programme-level learning outcomes not only articulate and define the specific components of learning outcomes at the university level, they also shape the faculty-level and university-level learning outcomes in the long run.

2. Strengths and challenges that the Faculty faces

While OBA concepts have long been the culture of the Science Faculty, many colleagues who are subject experts are not eloquent in using educational language. Frontline teachers are all successful learners in their respective fields, but most of them were educated in systems that did not put explicit emphasis on learning outcomes. Teachers all have their own experience and perception about what is important and how students can best learn in their respective disciplines. As there are only limited successful local relevant OBA experiences which are in science disciplines, it is understandable that some frontline teachers are "healthily skeptical" about the applicability, practicability, validity and effectiveness of the OBA.

With the introduction of the Integrated Framework for Curriculum Development and Review (IF) and the periodical programme reviews in 2004, programmes and frontline teachers become accustomed to making reference to the set of five elements,

namely, learning outcomes, content, learning activities, assessment and feedback for evaluation in the IF to develop and review academic curricular. Moreover, by leveraging the resources from various sources and support from internal and external units, such as Teaching Development Grant (TDG) projects, the Faculty office, the Centre for Promoting Science Education and the Centre for Learning Enhancement And Research (CLEAR), the Faculty has in recent years developed a very robust network to support teaching and learning development. Intense collaboration and close working relationship has also established with CLEAR. Major accomplishments of the Faculty in recent years along the OBA direction include:

(a) A number of teaching and learning activities have been organized at the faculty level, including seminars, workshops, forums and the launching of the Faculty's teaching and learning website for the dissemination of good practices (http://www.cuhk.edu.hk/sci/education/teachlearn_e.html).
(b) The two faculty-level and four programme-level TDG projects for the 2005-2008 triennium (http://www.cuhk.edu.hk/sci/TQA/doc/app_13b.pdf) have produced good results that build the capacity for the Faculty.
(c) Many programmes have organized programme-level retreats and professional development activities.
(d) There has been a high-level of participation by members of Science Faculty in activities that are organized by CLEAR.
(e) Recently, the Faculty's quality assurance system in teaching and learning that aligns with OBA and the IF had been reviewed and strengthened, and a "Staff Handbook on Teaching Quality Assurance" was published in December 2007. The Handbook provides teaching staff all the necessary information on quality assurance and is a vehicle to disseminate good practices. Printed copies were issued to all teaching staff and a user-friendly version is available online (http://www.cuhk.edu.hk/sci/TQA/).

3. How an OBA has been built into the Faculty's 3+3+4 plans

The University has formulated its Action Plan in teaching and learning for the upcoming several years (Supplementary Material for submission to QAC, SM8.1, January 2008), in which the development of OBA and the planning of 4-year curriculum are crucial elements. The Faculty's 2008 Strategy Meeting discussed the Action Plan, together with the planning of the 4-year curriculum and the OBA plan, and came up with the prioritized strategies which would be described in the next section. The specific strategies have been developed in the light of the University's Action Plan, and all the strategies are interwoven with the 3+3+4 plans and OBA development. Specifically, upon the completion of the planned actions at 2012, all the courses and programmes in the Faculty will have clear focus on outcomes.

4. Specific strategies that are gauged to capitalize on the strengths and address the challenges so as to achieve an OBA

Discussion on the development of OBA occurred at various faculty-level and programme-level meetings and teaching development activities. Effort has been made to collect feedback from frontline staff with a view to enhancing ownership.

The following strategies with specific actions that could capitalize on the strengths and address the challenges were formulated as a result of discussions at various levels.

Strategy 1: Identify and share good practices so as to build and expand capacity for the Faculty

There are many good initiatives in the frontline, and some of these works have been disseminated in the Faculty by means of various activities. To build and enhance the capacity for the Faculty based on these good works, and to maintain and expand the network for supporting teaching development, the Faculty will **collect the results of good initiatives in the Faculty and produce a deliverable for wide-dissemination** (**Action 1**).

Strategy 2: Encourage all programmes taking ownership in the OBA development

All science programmes have articulated their initial sets of learning outcomes and some programmes have commenced the process of developing various measurement instruments to gauge the achievement of learning outcomes. While the paces of development vary among the different programmes in the Faculty, the Faculty will continue to work with all programmes and CLEAR to **develop and refine these measurement instruments (Action 2)**.

Strategy 3: Enhance students' involvement

In addition to collecting feedback using quantitative-type questionnaires, the Faculty will assist programmes to **conduct focus group interviews with alumni and students using systematically and scientifically designed interview protocols to collect and analyze students' perspectives on learning outcomes (Action 3)**. Results can then be gainfully applied by programmes to refine their learning outcomes.

Strategy 4: Identify and work on common issues identified in programme reviews

Six out of 11 Science programmes have completed their first round programme reviews. By 2009, all programmes will have undergone the first review. Issues that are common to many programmes can be identified and actions will be coordinated at the faculty-level to address those issues. An example of actions in this regard is **to assist programmes to develop the "Courses x Learning Outcomes" matrix (Action 4)**. The matrices can then be used by programmes to implement actions that tackle recommendations in the programme reviews. For example, a well-planned matrix can be applied by programmes to develop a study roadmap for students, especially for Year 1 students, who sometimes fail to see the purpose and relevancy of courses and teaching approaches. Other potential common issues are the promotion of eLearning, and the design of outcomes-oriented learning activities (including laboratory activities) and assessment approaches.

Strategy 5: Align the Faculty's OBA plan with the University's Action Plan

Many priority areas in the University's Action Plan are outcomes-oriented. The Faculty's OBA plan will accord high priority on those action areas that need faculty coordination. Details are as follows.

The University's IF requires "each department together with the responsible teacher(s) to conduct and document its own course review at least once every three years", and the University's Action Plan specifies that the development of the "centralized database of all course outlines which result from course reviews" should be completed by 2011. In this regard, each science department had at least one teacher participating in CLEAR's "course outline service" in 2006. These teachers, with reference to the five elements in the IF, had reviewed their course in a thorough manner and then produced detailed OBA course outlines. Their works have been shared among science programmes. Built on these works, another priority action is to **assist teachers to develop outcomes-based courses through the operational development of OBA course outlines** (**Action 5**).

With regard to the monitoring of course delivery, the Faculty now conducts two evaluation exercises in each term: a mid-term survey conducted by individual staff members on a voluntary basis, and a term-end survey undertaken on departmental basis. All courses in the Faculty adopt the same set of questionnaires. To facilitate the development of outcomes-based courses, the University's Action Plan specifies that **the revision of CTE questionnaires to reflect a focus on outcomes (Action 6)** should be completed by 2009. This becomes another priority action for the Faculty.

In this connection, it is also the University's plan and hence our priority action to **examine and improve the psychometric property of the CTE questionnaire (Action 7).**

For the planning of the 4-year normative curriculum, two Assistant Deans will take the lead for the respective developments in the Biological and Physical science disciplines. Following the timeline in the University's Action Plan, **programme-level holistic outcomes will be framed for the 4-year curriculum (Action 8)** based on the revised sets of programme-level learning outcomes, and **OBA course outlines will be developed for all courses in the 4-year normative curriculum (Action 9)**.

Students' development in learning outcomes in the "generic skills" and "values/attitude" dimensions can be enhanced by having students participated in out-of-classroom activities. The Faculty together with its constituent programmes, through working with student societies, will consolidate their roles in supporting students' experiential learning. Specifically, the Faculty will **systematically collect and analyze the faculty- and programme-level data on experiential learning with a view to supporting the development of the Learning Portfolio System (Action 10).**

5. Prioritization of the strategies

All the actions will be completed before 2012, and implementation will be in line with the timeline of the University's Action Plan. The following table provides a summary of the timeline that reflects the prioritization of the strategies. The relevancy of the

proposed actions to the priority action areas specified in the University's Action Plan is also highlighted.

Action	**Item in University Action Plan**	**07/ 08**	**08/ 09**	**09/ 10**	**10/ 11**	**11/ 12**
1. Collect the results of good initiatives in the Faculty and produce a deliverable for wide-dissemination	3.7		xx	x		
2. Develop and refine instruments for measuring the achievement of learning outcomes	2.11 2.12	x	x	x	x	
3. Conduct alumni and students' focus group interviews with systematically and scientifically designed interview protocols to collect and analyze students' perspectives on learning outcomes	3.3		x	xx		
4. Develop the "Course x Learning Outcomes" matrix	3.3 3.5 3.6 4.4	x	x	x		
5. Develop outcome-based courses through the operational development of OBA course outlines	2.9	x	x	x		
6. Revise CTE questionnaires to reflect a focus on outcomes	3.8	x	x			
7. Examine and improve the psychometric property of the CTE questionnaire	3.9	x	x	x		
8. Frame programme-level holistic outcomes for the 4-year curriculum	3.3 3.5 5.1	x	x	x	x	
9. Develop OBA course outlines for all courses in the 4-year normative curriculum	2.9 3.3 3.6 5.1		x	x	x	x
10. Systematically collect and analyze the faculty- and programme-level data on experiential learning with a view to supporting the development of the Learning Portfolio System	4.7 7.1			x	x	xx

6. Detailed proposal for work on the strategy with priority number one

We have already started and will continue to work on many of the action areas. Much endeavour will be put in the upcoming year on the compilation of a deliverable to disseminate good practices (Action 1). In the 2005-2008 triennium, the Faculty has a total of two faculty-level and four programme-level TDG Projects (http://www.cuhk.edu.hk/sci/TQA/doc/app_13b.pdf), and all these projects have

achieved impressive good progress. Preliminary results of these projects together with a number of good practices in the Faculty have been continuously disseminated. Based on these works, we will systematically collect the results of these initiatives and produce a deliverable to share and promote these practices. With the anticipated support of the OBA funding, staff playing the role of educational specialists in the Faculty will be deployed to work on this priority action. We will conduct in-depth interviews with leaders in these initiatives, collect, analyze and collate the project results and then produce a deliverable for wide dissemination. The deliverable will be in the format of a book or a CD. Copies will be distributed to members of the Faculty, and complimentary copies will be available to other faculties. All relevant materials will be uploaded onto the Faculty's Teaching and Learning website (http://www.cuhk.edu.hk/sci/education/teachlearn_e.html) for ease of reference. This action area is selected as priority number one because the process can expand the network in the Faculty, providing greater support for teaching development. Moreover, the role of the Centre for Promoting Science Education in supporting teaching development initiatives will be consolidated, particularly in the production of the deliverable.

7. Monitoring mechanism

The Faculty convenes a one-day Faculty Strategic Planning Workshop every year during which teaching and learning is one major item for discussion. In effect, the strategic directions stated in this Roadmap are the results of discussions in the Workshop held in January 2008. The progress of the proposed action stated in the Roadmap will be reported annually in the Faculty Strategic Planning Workshop and monitored by the Faculty Board. Daily operations will be discussed and monitored by the Faculty Executive Committee.

8. Plans for addressing the time around 2012

The Faculty conducts periodical comprehensive reviews on its quality assurance system in teaching and learning. Since 1994, a total of four reviews have been conducted. The most recent one took place in 2007, which led to the fourth edition of the Faculty's "Staff Handbook on Teaching Quality Assurance" (http://www.cuhk.edu.hk/sci/TQA/). We plan to conduct another comprehensive review at round 2012, in which the progress of adopting OBA will be examined thoroughly. Areas that need improvement will be identified and timely actions can be formulated to ensure smooth transition from the present system to the 4-year system.