Institutional Efforts in Implementing Outcome-Based Approach in student learning

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A reflective sharing on concrete experience

- **what** a university attempted to do and **how** it did it
- how the community of the university **developed its understanding and practices in** outcome-based approach to curriculum development, teaching, learning and assessment
- **lessons learnt** from our accomplishments and setbacks/challenges
- from the perspective of an **educational developer** supporting the initiative
On the learning curve …
How PolyU conceptualised its outcome-based approach to student learning

- **Theories**
  - Spady (Outcome-based education)
  - Biggs (Constructive alignment)

- **International best practices**
  - US (Learning outcomes assessment)
  - UK (Quality Assurance Agency for Higher Education)
  - Australia (Graduate attributes)
Outcome-Based Approach to student learning – Functions and Focuses

Two main functions

a) (QE) Quality Enhancement
b) (QA) Quality Assurance

Diversity of focuses

- USA – Institution accreditation (Assessment)
- Europe – Bologna process on Qualification Framework
- Australia – Graduate Attributes
- Professional bodies, e.g. ABET – Programme Accreditation
Outcome-based approach to student learning: 4 essential elements

1. Define intended learning outcomes
2. Design curriculum, teaching, learning & assessment to support attainment of outcomes
3. Alignment
4. Collect data on student attainment of outcomes
5. Use data to inform improvement of programmes
Some experience in defining learning outcomes

Define intended learning outcomes

Design curriculum, teaching, learning & assessment to support attainment of outcomes

Collect data on student attainment of outcomes

Use data to inform improvement of programmes
Mapping outcomes through the curriculum

University mission & role statement

↓

Institution outcomes

↓

Programme outcomes

↓

Subject outcomes
Overarching outcome for PolyU programmes: All round students with professional competence

Programme outcomes and subject outcomes expected to encompass

- Professional / academic knowledge and skills
- Attributes for all-roundedness
Clarifying learning outcomes as ‘professional competence’
Functioning Knowledge (Biggs)

Functioning Knowledge
Able to judge what knowledge / skills to apply
Able to apply such knowledge / skills effectively

Conditional Knowledge

Academic Knowledge

Procedural Knowledge
Professional competence in programme outcomes

- Concept largely accepted by programme leaders

- Departments offering professional programmes consulted with employers / field professionals on the competences expected of their graduates

- Most programmes articulated programme outcomes which appropriately portrait what a graduate will be able do as an emerging professional in their field
Standard of learning outcomes: Beware of ‘pendulum effect’:

What is the appropriate level of proficiency for degree graduates who are new to the profession?

Is this achievable?

Is this good enough?

Competence for experienced professionals

Competence for graduates (beginning professionals)

Limited to academic knowledge
# Standards of professional competence

<table>
<thead>
<tr>
<th>Experienced professionals</th>
<th>Beginning professionals (graduates)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Able to <strong>exercise</strong> professional decision in the consideration, evaluation, and justification of feasible alternatives in <strong>complex</strong> situations</td>
<td>Able to <strong>evaluate</strong> alternatives and <strong>justify</strong> feasible solutions for <strong>real-life</strong> problems</td>
</tr>
<tr>
<td>Able to <strong>handle</strong> the challenges and <strong>contribute</strong> to developments of the profession</td>
<td>Be <strong>aware</strong> of the challenges and developments of the profession and able to cope with them through continuous professional development</td>
</tr>
</tbody>
</table>
Mapping programme outcomes to subject outcomes
Common misalignments between subject outcomes and programme outcomes

<table>
<thead>
<tr>
<th>Programme outcomes</th>
<th>Subject outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>In terms of <strong>professional competence</strong> e.g. apply, solve, design, decide</td>
</tr>
<tr>
<td>b</td>
<td>The professional competence implies <strong>higher level understanding &amp; higher level intellectual skills</strong>, e.g. analyse, evaluate</td>
</tr>
</tbody>
</table>
Addressing misalignment (a):
From knowledge to competence

“For what purpose do the students need to know this?”

<table>
<thead>
<tr>
<th>Old version</th>
<th>Revised outcome statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Understand the concepts of Value Management with emphasis on Function Analysis and Life-Cycle Costing.</td>
<td>1. Understand the Value Management methodology</td>
</tr>
<tr>
<td>2. Understand the use of Value Management in different phases of a project life-cycle</td>
<td>2. Conduct function analysis and life-cycle costing for a project or part of a project</td>
</tr>
<tr>
<td>3. Apply VM to construction company business situations and technical situations.</td>
<td>3. Organise &amp; manage Value Management workshops in different phases of a project life cycle</td>
</tr>
<tr>
<td>4. understand and apply VM problem solving techniques as a management tool.</td>
<td>4. Ensure value for money for projects by applying value management tools in business situation or technical situations of a construction company</td>
</tr>
</tbody>
</table>

(With acknowledgements to Professor Geoffrey Shen, subject title: Value Management)
Addressing misalignment (b):
Levels of Understanding

“What do you mean understanding in your subject?”

<table>
<thead>
<tr>
<th>Qualitative learning outcome</th>
<th>Extended abstract understanding</th>
<th>Relate to other information &amp; theories e.g. generalize, criticize, hypothesize, reflect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relational understanding</td>
<td></td>
<td>See relationship among facts taught e.g. compare, contrast, explain cause, relate, apply, analyse</td>
</tr>
<tr>
<td>Quantitative learning outcome</td>
<td>Knowing more facts</td>
<td>Recall a mass of information e.g. identify, list, describe, combine, do algorithms</td>
</tr>
</tbody>
</table>

(simplified from Biggs’ SOLO Taxonomy)
Subject Outcomes
- Beware of ‘Quantum Jump’

How can we pave the way to the ultimate outcomes when teaching in the subjects?

Know

Compare, identify, explain, relate, discuss, interpret, justify, evaluate

Apply, Design, Solve problem,
Striving to achieve the institutional outcome of ‘all-round development’ for students
Integrating generic outcomes into the formal curriculum

- It is expected that all programmes incorporate generic competences with flexibility in identifying the generic competences which are appropriate to their programmes.

- Strong reaction from academic staff:
  - Why are these generic skills relevant to my programme/subject?
  - Whose responsibility to cultivate all-roundedness
  - Not our expertise to teach generic skills …
  - Not even enough room for professional stuff, how to squeeze in generic skills…
Fulfilment of institutional generic outcomes

- It is expected that all programmes incorporate generic competences

- Extra-curricular activities can be counted on for fulfilment of institutional generic outcomes not included as programme outcomes.

In such cases, departments should

a) explain clearly to students such expectations
b) motivate students to attend such activities
Institutional concerted efforts to developing all-roundedness

- All-round development *stipulated* to be embedded in academic programmes (from 2005/06)

- Work-integrate education *mandatory* for all full-time undergraduate programmes (from 2005/06)

- A wide range of extra-curricular activities organised by Faculties / Departments & academic support units for *voluntary participation*
Articulating generic outcomes

- Be able to work collaboratively within a team, and have an understanding of leadership and be prepared to lead a team. *(Teamwork and leadership)*

- Demonstrate an understanding of the elements of entrepreneurship, such as active discovery and exploitation of opportunities, prudent risk taking and experimentation of novel ideas or methods. *(Entrepreneurship)*

- Recognise the need to better themselves through continual learning and be able to plan and reflect on their own learning, as well as being able to use lifelong learning skills such as information literacy for learning autonomously for professional or personal development. *(Lifelong learning)*
Including a curriculum map in programme submission
## Curriculum map

<table>
<thead>
<tr>
<th>Programme Outcomes</th>
<th>Subject Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HK123</td>
</tr>
<tr>
<td>1. To design a system, component, or process to meet desired needs</td>
<td>I</td>
</tr>
<tr>
<td>2. To identify and solve applied science problems</td>
<td>I</td>
</tr>
</tbody>
</table>

Key:  
- **I** = Introduced;  
- **R** = Reinforced;  
- **A** = Assessed
Curriculum mapping

- Provides a *holistic view of*
  - the *extent* that each intended outcome will be *taught and assessed* in the programme
  - the *progressive development* of each programme outcome via the different subjects at different stages
- Allowing *gaps* (e.g. under-addressed outcomes) and other *problems* (e.g. over-represented outcomes) to be identified
Important!

Curriculum mapping should be a collaborative effort of the programme team
Aligning teaching, learning and assessment with intended learning outcomes

Define **intended learning outcomes**

Design curriculum, teaching, learning & assessment to support attainment of outcomes

Alignment

Collect data on student attainment of outcomes

Outcomes Assessment

Use data to inform improvement of programmes
Programme document to include ...

For each subjects

- Description of major teaching & learning methods with **justification** that they are **conducive to the attainment of intended subject outcomes**

- Description of major assessment methods with **justification** that they are **appropriate for assessing the intended subject outcomes**
Learning outcomes assessment and evidence-based improvement

Define intended learning outcomes

Design curriculum, teaching, learning & assessment to support attainment of outcomes

Collect data on student attainment of outcomes

Outcomes Assessment

Use data to inform improvement of programmes
On the learning curve –
What is Learning Outcomes Assessment?
On learning outcomes assessment …

‘Outcome assessment is not about examination’ (M. Stone, 15 Dec 05, PolyU Symposium)

‘…the process of assembling broader evidence of programme or institutional effectiveness that goes beyond the performance of individual students.’ (Ewell, UGC Consultant on Learning Outcomes)

‘…the systematic collection, review and use of information for the purpose of improving student learning.’ (Marchese)
Student learning outcomes assessment

Student learning outcomes assessment refers to the **systematic** collection, review and use of data or evidence regarding students’ achievement of the intended learning outcomes on graduation, to improve institutional and/or programme effectiveness in facilitating student learning.

Source: Learning Outcomes Assessment Plan 2008-12 (Learning and Teaching Committee, PolyU, 2008)
Mapping and assessing learning outcomes at three levels

Mapping learning outcomes across 3 levels

- Institutional outcomes
- Programme outcomes
- Subject outcomes

Assessment of learning outcomes at 3 levels

- Assess **effectiveness of the institution** in achieving overarching goal set for students
- Assess **effectiveness of the programme** in attaining programme outcomes for students
- Assess **effectiveness of the subject** in facilitating students to attain subject outcomes
## Subject assessment VS Programme/Institution learning outcomes assessment

<table>
<thead>
<tr>
<th>Focus</th>
<th>Subject assessment</th>
<th>Institution / Programme learning outcomes assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus</td>
<td>knowledge and skills specific to individual subject</td>
<td>broad qualities which require integration &amp; application of knowledge &amp; skills from many subjects</td>
</tr>
<tr>
<td>Purpose</td>
<td>assess performance of students – give a grade</td>
<td>evaluate effectiveness of institution/programme</td>
</tr>
<tr>
<td>Unit of assessment</td>
<td>performance of individual students</td>
<td>aggregate performance of cohort of students</td>
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Institution / programme learning outcomes assessment cannot rely on subject assessments but requires different methods and processes.
2-tier learning outcomes assessment framework

- **Programme-level & subject-level learning outcomes assessment** are the responsibility of Departments
  - Departments are required to submit their Programme Learning Outcomes Assessment Plan (P-LOAP)

- **Institution-level learning outcomes assessment** is coordinated centrally to assess the broader institutional outcomes that are difficult to measure at the programme or subject levels
  - 3 pilot project to explore suitable methods for institution-level learning outcomes assessment
Programme Learning Outcomes Assessment
Collect and use outcomes data for improving programmes

- Which of the learning outcomes of the programme have been *satisfactorily achieved by students*, and which outcomes *need improving*?

- What *improvement actions* are needed to enhance programme effectiveness, and how?
Common assessment data

- **Direct evidence**
  - course-based assessment (e.g. final year project)
  - performance assessment (e.g. practicum)
  - standardised tests (e.g. critical thinking inventory)
  - learning portfolio
  - professional or licensure exam
  - etc.

- **Indirect evidence**
  - students’ self assessment of learning gains
  - students’ engagement in learning activities
  - students’ feedback on learning experience or environment
  - graduate survey
  - alumni survey
  - employer survey
  - etc.
## Programme learning outcomes assessment plan

<table>
<thead>
<tr>
<th>Programme intended learning outcomes</th>
<th>Learning outcomes assessment methods</th>
<th>How the data will be collected (Who, How, When)</th>
<th>Criteria for success</th>
<th>How the data will be disseminated/used for improvement</th>
</tr>
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<tbody>
<tr>
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Institution-level learning outcomes assessment
Piloting 3 direct assessment methods for institution-level learning outcomes assessment

- Collegiate Learning Assessment (CLA)
- Course-embedded assessment
- Portfolio assessment
Piloting ‘Collegiate Learning Assessment’

- **The Collegiate Learning Assessment**
  - developed by the U.S. Council for Aid in Education (CAE)
  - a standardised online open-ended test
  - direct measures of critical thinking, analytical reasoning, problem solving and written communications skills

- **Main objectives of the pilot project**
  - examine cross-cultural validity of CLA by correlating individual students’ CLA scores with their subject assessment data and scores on GSLPA
  - benchmarking PolyU students’ mean CLA score with the CLA norms of U.S. counterparts.
Piloting course-embedded assessment

Main objectives of the pilot project

- Identify subjects *suitable* for assessment of the broad generic outcomes, e.g. problem solving, critical thinking, innovation and creativity
- *Design / redesign* existing assessment in these subjects for collecting data specific to the learning outcomes
- *Develop generic rubrics* which can be used across disciplines to allow aggregation of data for the purpose of institutional assessment
Piloting portfolio assessment

**Main objectives of the pilot project**

- Develop an online platform to support submission and assessment of students’ portfolios for outcomes assessment purposes.
- Identify generic learning outcomes that are difficult to measure in subject assessments
- Coach students to compile portfolio to demonstrate their achievement of the learning outcomes with their *best* work, e.g. course work, reflection on work-based learning, evidence of participation in co-curricular
- Develop appropriate assessment rubric

**Challenges**

- Difficult to solicit buy-in of students and to provide support for guidance to them in compiling their individual portfolio.
- Workload involved in reviewing the portfolios
Reflections
Implementation issues

- Shared understanding and vision
- Know-how
- Workload & motivation
- Time for the new paradigm to ‘sink in’
- Ownership by staff at all levels
- Involving students as partners
- Sustained efforts throughout the different phases
- DON’T see it as a paper exercise
Educational change is a complex learning (and unlearning) process for all involved, not an event.

(Scott, 2000)