# CONTENTS

## Foreword

Student assessment is a crucial aspect of quality assurance because it drives students learning if planned, conducted and reported appropriately. It is important to measure the achievement of learning outcomes. It is also important because the results of assessment form the basis in awarding qualifications. The methods for student assessment should be consistent, effective, reliable and in line with current practices. They should provide clear evidence on the achievement of learning outcomes.

The Code of Practice for Programme Accreditation (COPPA) and Code of Practice for Institutional Audit (COPIA) emphasise the need for Higher Education Providers (HEPs) to provide good processes for student assessment. Guidelines to Good Practices: Assessment of Students (GGP: AS) is produced to help HEP in the preparation of student assessment. The three aspects focused in this GGP: AS are relationship between assessment and learning, assessment methods, and management of student assessment, in line with the requirements of COPPA and COPIA. This guideline also includes a few examples of good practices.

It is important for HEP to bear in mind that student assessment should be consistent with the programme goals and intended learning outcomes. Since the aim of the GGP: AS is to make it easier for HEP to fulfill this important responsibility, hence, HEP should not simply copy from the GGP: AS guidelines when they assess students learning outcomes. HEP should demonstrate its capacity and ability to prepare good assessment at both the course and programme levels and show how they manage the assessment processes. This in itself will reflect its authority as an autonomous HEP.

Thank you.

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## Glossary

1) Analytic Judgment/Grading

Judgment based on specific assessment task/s. This can be part of the judgment made in measuring or evaluating the performance quality of students and programmes.

2) Assessment

A systematic and cyclical way to improve quality of students' performance and development by continuously collecting, analyzing and discussing direct and indirect data and evidences of students learning from multiple and diverse sources. Its purpose is to have deep understanding of what the students really know and can do, provide feedback to improve students learning, teachers' teaching (feed forward), curriculum planning and overall programme's effectiveness. The data collected in assessment is used by students, teachers, curriculum planners, and administrators to promote students learning and is not meant to make judgment.

3) Assess Forward

This concept is used in the document to indicate the opposite of the design backwards concept when designing curriculum. It refers to the process of collecting data starting at the classroom level and proceeding to the course level. Eventually, the data becomes part of evidences required in determining students learning leading to improved/modified instructional approaches and improving the effectiveness of a programme and the institution.

4) Assessment Methods

The assessment methods are simply the ways and strategies we collect data. It can be classified into four categories:

1) Selected Response & short answer;
2) Constructed or Extended Written Response;
3) Performance Assessment; and
4) Personal Communication.

| | | |
|---|---|---|
| 5) | Assessment Instruments/Tools | The measuring device used for learners to qualitatively and quantitatively provide direct and indirect evidences of learning and for teachers, curriculum designers and administrators to collect direct and indirect evidences of students learning gains and overall students learning experiences. This device must be constructively aligned to the learning outcomes (valid). By using appropriate assessment criteria, the device can provide highly accurate (reliable) data related to the learning outcomes attainment and achievement. Different measuring devices (belonging to any of the assessment methods) will be required to collect data dealing with different and varied learning outcomes. |
| 6) | Assessment Item | The question/s or statement/s constructed in an assessment instrument that will allow students to directly or indirectly demonstrate how much and how well they know, understand and able to transfer what they know to a variety of authentic context . |
| 7) | Assessment Task (AT) | An assessment task is a specific piece of work (performance or product) given by teachers to students in allowing them to show evidence of how much and how well they have mastered the learning outcomes. The task is given using an appropriate and aligned assessment instrument and must be integral to the learning outcomes attainment, provide explicit instruction and information about what students are required to do, inform the learner about the amount of time appropriate to complete the task, and provide clear |

and explicit scoring/assessment criteria and benchmark standards. Results from this task can be used to improve students' learning, measure their performance, make judgments about achievement, and assess programmes' effectiveness.

8) Classroom Assessment

Classroom assessment is a form of collecting continuous evidence that is usually done during face-to-face learning activities. The purpose of classroom assessment is to diagnose existing learning barriers in understanding and to identify students progress in attaining the learning outcomes. These evidences are used by the teacher to address the existing barriers and promote students learning by changing or adjusting the classroom instructional strategies and delivery system.

9) Competency

A competency is an underlying characteristic of a person/performer regarding his/her knowledge, skills and abilities which enables him/her to successfully and meaningfully complete a given task or role.

10) Constructive Alignment (CA)

Constructive Alignment is an approach to curriculum design in which the teaching and learning activities are designed to maximize learning by requiring students to engage and activate the verbs specified in the learning outcomes and for them to activate the same verb in the assessment tasks. The term construct refers to students constructing and structuring their own understanding and personally make meaning to what is to be learned. Alignment refers to a learning environment setup by the teacher that allow students to meaningfully engage with the action verb of the learning outcomes and engaging the same action verb again in the assessment task in order to solicit how well the outcomes are learned.

| 11) | Continuous Assessment | Data collection processes that are continuously done throughout the duration of a course/module or throughout the duration of a Programme to gather evidences of learning for the purpose of improving learning, modifying teaching and adjusting the curriculum design. It also includes data gathering that are used to assess how well courses offered by the programme support attainment of the programme learning outcomes. |
|---|---|---|
| 12) | Course Learning Outcomes (CLO) | Intended or desired learning gains in terms of declarative knowledge (factual, conceptual, procedural), functional knowledge (knowledge transfer), metacognitive knowledge, cognitive skills, practical skills, habits of mind, performance and ways to respond to events and people as a result of the learning experiences in the course/module. It contains the measurable action verbs, the substance/content to be learned and the targeted competency level. |
| 13) | Coursework Assessment | The traditional continual content-based data collection process and analysis such as testing, writing, presenting or performing that are used to evaluate the performance of students and how well they have learned the content that can also be used as part of the learning outcomes attainment. The score/grade contributes towards the final grade. |
| 14) | Criterion-referenced Assessment (CRA) | It is an assessment approach where the score/grade received by an individual reflects to how well the individual meets the assessment criteria related to the learning outcomes attainment. |
| 15) | Design Backward | An approach to curriculum design that begins with the "ends" in mind. The "ends" begin with crafting the |

programme aim (purpose and justification to offer the programme and the adopted philosophy) that support attainment of the country and university's mission. Once this aim is agreed upon, programme designers then craft the programme educational objectives (PEO) that will be used to support attainment of the programme aim. This is followed by deciding on the programme learning outcomes (PLOs), the performance criteria, the performance/outcomes indicators and the performance target intended for each PLO. Students development and assessment towards being competent for each PLO is then nurtured by planning appropriate combination of courses to be taken each semester, appropriate course learning outcomes (CLOs) and relevant course content for each course.

16) Direct Evidences

Evidences that are collected and analysed to demonstrate that actual learning has taken place. It informs students, teachers and other stakeholders, the depth, breadth and performance quality (what, how much and how well) that students have gained in terms of the relevant knowledge, understanding, skills, habits of minds and ways of responding to people and situation.

17) Evaluation

Evaluation is a process of using the evidences collected through assessment to make value judgment on students' performance and programme performance relative to the benchmark standards specified by the learning outcomes' performance criteria and performance target. For example, assigning a score/grade to an assessment task for a course and deciding on the students' next course of action or the programme's course of action is considered as evaluating the student or the programme.

18) Formative Assessment

Formative Assessment is a form of low-stakes assessment FOR learning and is part of the instructional process. It is about continuously collecting data as learning is in progress. When incorporated into classroom practice, it provides the information needed to adjust teaching and learning while they are happening. In this sense, formative assessment informs both teachers and students about student understanding at a point when timely adjustments can be made. These adjustments help to ensure students achieve the targeted learning outcomes within a set time frame.

19) Functional Graduates

Graduates who are competent and are able to persistently, responsibly and ethically transfer their knowledge, understanding, skills and abilities to identify and solve ill-defined, complex and difficult problems in their personal, social and professional journey.

20) Grading Criteria

This concept is used when making judgments on the quality of performance of assessment tasks or learning outcomes. Grades are usually based on either indirect grading of learning outcomes (analytical judgment of the assessment task aligned with the learning outcomes) or direct grading of the learning outcomes (holistic judgment). Performance quality for each grade is clearly described in the criteria.

21) Graduate Attributes

Graduate attributes are the learning traits and characteristics that are relevant and appropriate to the graduate's personal, social and professional role in life. These attributes are clearly indicated in the Malaysian Qualification Framework.

| 22) Holistic Judgment | Judgment that defines the performance quality and standard by combining all the performances solicited by assessment tasks. |
|---|---|
| 23) Indirect Evidence | Indirect evidence/s are evidences or data collected for the purpose of seeking students perception on their learning and their learning experiences. Examples include: Programme entrance and exit surveys, student interviews (e.g. graduating seniors) and alumni surveys. Indirect evidence of student learning also include student's grades. |
| 24) Learning Taxonomies | A classification system dealing with varying degree of cognitive complexity, skills complexity and the complexity of value system adopted when acting or responding to people, events and environment. |
| 25) Lesson Learning Outcomes (LLO) | These are the outcomes to be achieved upon completion of a lesson. The lesson outcomes are systematic formative measures in developing students' attainment of the CLOs. |
| 26) Measurement | Measurement is the product of measuring and quantifying attributes and/or learning outcomes. The measuring tool used are those described in the assessment instruments section. |
| 27) Norm-referenced Assessment (NRA) | Norm-referenced assessment is an assessment approach where students' grades are determined by comparing his/her performance to other students performance based on the normal bell-shaped curve. |
| 28) Outcome/Performance Indicators | See Performance criteria/indicators. |

29) Outcomes-Based Assessment (OBA)

It is an integrated, valid, reliable, fair, continuous (rather than continual and judgmental testing) and aligned approach to collecting evidences of students learning for the purpose of improvement by focusing more on formative assessment and providing timely feedback. It considers students diversity and employs multiple and diverse assessment methods. It is criterion-referenced where the learning outcomes and the benchmark standards become the assessment criteria when judgment is made at the end of a course and at the end of a programme.

30) Outcomes-Based Education (OBE)

An approach to education that begins with clearly focusing on high-quality, culminating demonstrations of significant learning in context and organizing everything in an educational system around what is essential for all students to be able to do successfully at the end of their learning experiences. This means starting with a clear picture of what is important for students to be able to do, then organizing the curriculum, instruction, and assessment to make sure this learning ultimately happens to all students.

31) Outcomes-Based Grading (OBG)

An approach to making judgment on students' performance quality in a course based on how well they have attained the learning outcomes. Course grades are assigned based on either indirect and analytical grading of assessment tasks aligned to the learning outcomes or direct and holistic grading of the learning outcomes.

32) Peer-assessment

Peer assessment involves students being responsible for making assessment decisions and judgments on other students work. It is an important part of formative assessment that should take place, especially in group

work where it becomes a way in which the group assesses itself. This form of assessment assist students' reflections, and helps the group members to understand that the decisions they made regarding the quality of their work are their own and that they should take responsibility for improving their work. As with any responsibility, the skill of peer-assessment should be developed incrementally (step-by-step) by the teacher.

33) Performance Assessment

An assessment method that uses student activities or products, as opposed to tests or surveys, to evaluate students' knowledge, skills, and development. Instruments include: essays, oral presentations, exhibitions, performances, and demonstrations. Examples include: reflective journals (daily/weekly); capstone experiences; demonstrations of student work (e.g. acting in a theatrical production, playing an instrument, observing a student teaching a lesson); products of student work (e.g. Art students produce paintings/drawings, Journalism students write newspaper articles, Geography students create maps, Computer Science students generate computer programmes, etc.).

34) Performance Criteria/Indicators

Performance criteria or performance indicators are specific, measurable statements identifying the specific knowledge, skills, attitudes and/or behavior students must demonstrate as indicators of achieving the outcomes. Simply put, performance criteria are those statements that define the learning outcomes and enable faculty to measure student competency. Each performance criterion must also specifically describe an acceptable level of measurable performance. For performance criteria that are not directly assessable, indirect indicators of the performance can be identified.

35) Performance Target    Specifies the threshold score and the threshold frequency to indicate the effectiveness of a programme. For example, an indicator that the programme is effective in achieving programme learning outcome related to acquiring and applying of knowledge and understanding is by targeting that 60% of the students score 70 or more in a programme exit examination. Another example could be to target 80% of the students indicated a score of 4 or higher on the Lickert-scale in a programme exit survey to indicate effectiveness on programme learning outcome related to lifelong learning.

36) Portfolio    An accumulation of evidence about individual proficiencies, especially in relation to the performance criteria for each of the programme learning outcomes. Examples include but are not limited to: Samples of student work including projects, journals, exams, papers, presentations, videos of speeches and performances.

37) Rubrics    A scoring/grading tool that contains a list of criteria and benchmark standards and used to score or grade assessment tasks or learning outcomes. Descriptors of the performance quality from the highest quality to the unacceptable quality for each criteria or for each learning outcomes will guide both the students in identifying their shortcomings and for the teachers to reliably score and grade the performance/product.

38) Self-assessment    Self assessment is a learning experience that involves the students understanding assessment criteria, and enabling them to take responsibility for making judgments about their own learning. This gives the learners the opportunity to reflect on what they do.

Students best benefit on the use of logs, diaries and digital recording devices to record their thoughts on the quality of their work so that they can improve themselves.

39) Soft Skills

The generic skills or attributes that employers value and that students require in their professional and societal engagement. Example include the ability to communicate, manage information, manage time, manage resources, engage harmoniously with others, provide leadership and become responsible and active team members.

40) Student-Centered Learning (SCL)

Learning environments and approaches that focus on students. This means knowing about learners learning preferences, intelligences, existing knowledge, interest, listening and writing skills, family and cultural background, and other relevant information that can become a barrier to learning or that can enhance their learning and the learning of others in the learning community. Instructional approaches employed in developing their potential must be balanced and diverse to cater the diversity in learners.

41) Summative Assessment

The goal of summative assessment or high-stakes examination is to measure the level of success, performance quality, proficiency or how well students/course/module/programme have achieved the learning outcomes at the end of an instructional unit or a course/module/programme by comparing it against some standard or benchmark. The purpose is to make judgment by assigning a grade to the students and to make decision on the future of the students/course/module/programme.

| 42) Weighting | A quantitative way of assigning the significance or weight of a learning outcome in a list of learning outcomes for a course/module. This weighting indicates how essential the learning outcome is and will impact the way the final grade for a course/module is determined. |

# 1. Introduction

The 'Guidelines to Good Practices: Assessment of Students (GGP: AS)' is a document developed to assist Higher Education Providers (HEPs) to meet the standards on the item Assessment of Students, marked as Area 3 of the Code of Practice for Programme Accreditation (COPPA) and the Code of Practice for Institutional Audit (COPIA). COPPA is concerned with the practices applied by HEPs in curriculum design and delivery, whilst COPIA is primarily concerned with institutional processes that are applied in curriculum development and delivery. Both for programme accreditation and institutional audit, the assessors' concerns are primarily with the procedures and practices adopted by the institutions in the areas covered by the Codes, and whether these match the provisions of the Codes.

HEPs are discouraged **from simply copying the guidelines and samples given in the Appendices. Instead, HEPs must strive to develop their own curriculum design and delivery processes and assessment which best fit the needs and requirements of the HEP and its students.** In doing so, HEPs are expected to keep abreast with the latest developments in the disciplines they offer.

This document, 'Guidelines to Good Practices for Assessment of Students (GGP: AS)'*,* is premised on the fact that assessment is integrated with and cannot be separated from student learning. Furthermore, research (see for example, Biggs, 2003) suggests that assessment drives student learning and directly influences students' approaches to study. For example, if assessment tasks for a particular programme and course require students to only reproduce or regurgitate information, then students will study only to reproduce information.

The purpose of higher education begins with graduates being able to reproduce knowledge of terminologies, language, concepts, principles, theories, criteria and processes required for familiarisation with the discipline. This knowledge is the basis for learning experiences that nurture deep understanding of the subject matter. More importantly, the purpose of higher education is to develop in

students the ability to use their deep understanding so that they can identify, clarify and provide viable solutions to issues that concern the individual, the workplace, society and the country.

As stated earlier, the purpose of GGP: AS is to complement Area 3, Assessment of Students (**see Figure 1**) of the Malaysian Qualifications Agency (MQA) Code of Practice for Programme Accreditation (COPPA). It outlines best assessment practices and is applicable for all disciplines, programmes, courses and institutions. However, the Guidelines do not consider the assessment of masters and doctoral degrees by research. While the Guidelines are general in nature, HEPs should consider them in the context of their own institution and programmes. They also need to be considered in relation to the Description of Qualification Levels, as outlined in the Malaysian Qualifications Framework (MQF, 2007).

| Area 1<br><br>Vision, Mission, Educational Goals and Learning Outcomes | Area 2<br><br>Curriculum Design and Delivery | Area 3<br><br>Assessment of Students |
|---|---|---|
| Area 4<br><br>Student Selection and Support Services | Area 5<br><br>Academic Staff | Area 6<br><br>Educational Resources |
| Area 7<br><br>Programme Monitoring and Review | Area 8<br><br>Leadership, Governance and Administration | Area 9<br><br>Continual Quality Improvement |
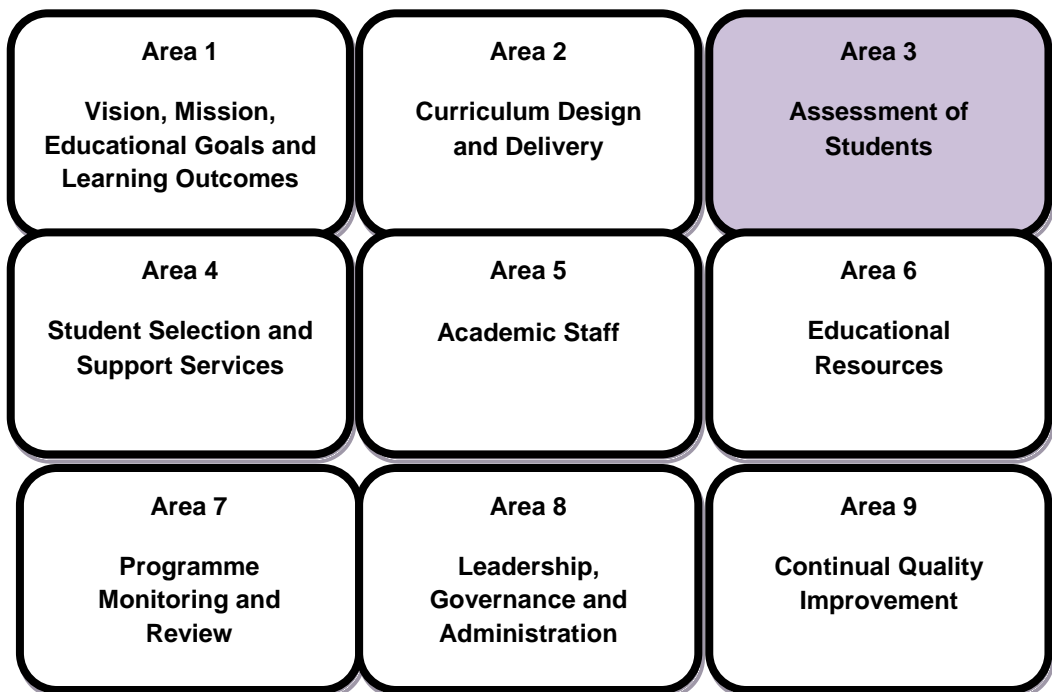
**Figure 1:    The Nine Malaysian Quality Assurance**

**Figure 2** shows the role of assessment and learning and teaching activities in the attainment of outcomes. Since assessment is an integral part of the learning and teaching process, assessment methods or the outcome indicators employed must be constructively aligned with the Programme Learning Outcomes (PLOs) and Course Learning Outcomes (CLOs). Ensuring this alignment will encourage students to take learning approaches that will result in the achievement of the CLOs and hence assist the attainment of the PLOs.
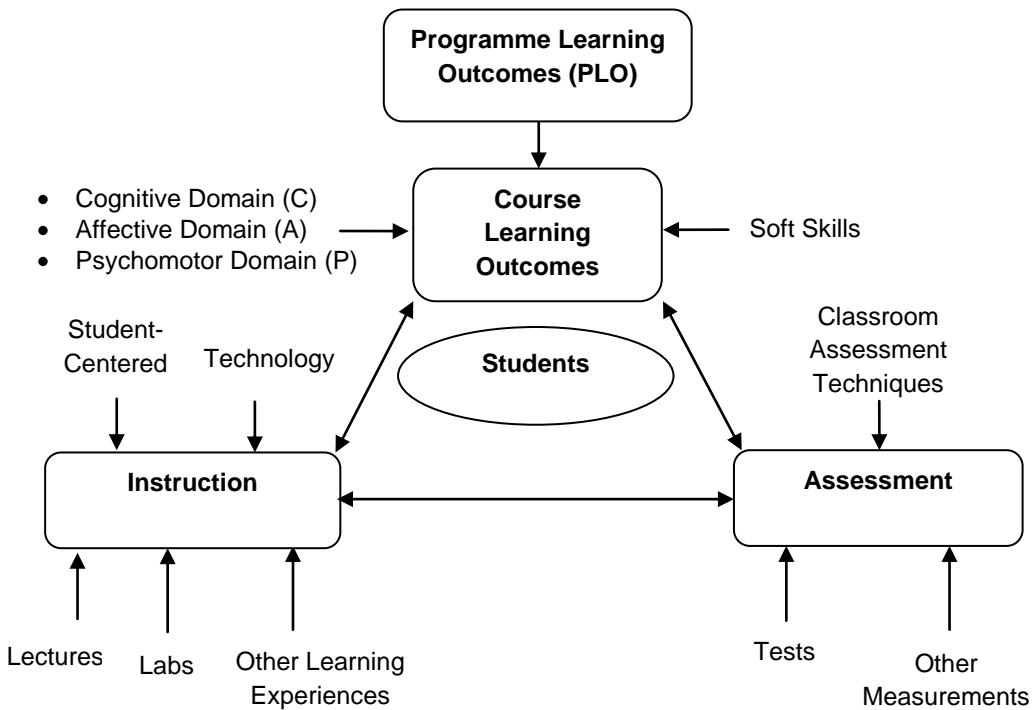


*Soft skills can be classified under the affective*

**Figure 2:    Relationship between Design, Delivery and Assessment**

Adapted from Felder, R. M. & Brent, R. (2003). Designing and Teaching Courses to Satisfy the ABET Engineering Criteria. *Journal of Engineering Education*, 92 (1), 7 - 25.

This document covers the following areas:

i.      Relationship between Assessment and Learning (Section 2);

ii.     Assessment Methods (Section 3); and

iii.    Management of Student Assessment (Section 4).

**Figure 3** shows the relationship between the assessment of students and the attainment of CLOs and PLOs as the means to support the attainment of the Programme Educational Objectives (PEO). It indicates the need to align assessment methods with the attainment of the learning outcomes (LO) and the need for a systematic student assessment process within the institution. The discussion provided in these guidelines addresses Area 3 of COPPA Standards, Assessment of Students.
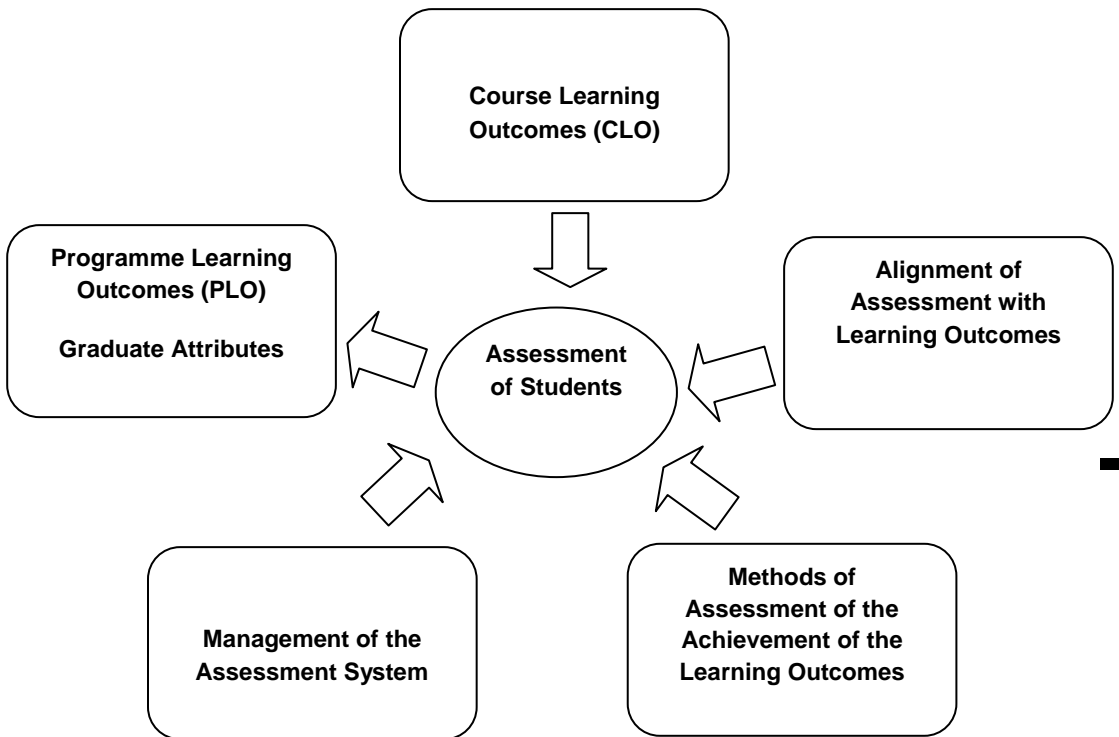


**Figure 3:     Assessment of Students and the Structure of the Guidelines**

## 2. Relationship between Assessment and Learning

Traditional educational practices centre on inputs where the content of the subject is merely delivered. Students are exposed to the curriculum, and at the end, an exam is given. Grades are assigned regardless of whether students have learned or not learned.

On the other hand, Outcomes-Based Education (OBE) specifies the desirable outcomes students should be able to demonstrate upon participating in the educational programme. These desirable outcomes ensure that students will become functional graduates.

### 2.1 Outcomes-Based Education and Domains of Learning

Assessment is a process of finding evidence that the LOs, which are the minimum performance or competence level, have been achieved when students have successfully completed a certain course or graduated from a certain programme offered by the HEP.

Assessing outcome achievement entails defining performance criteria and the performance standards for each of the outcome elements or outcome attributes specified in each LO. At the programme level, this means formulating PLOs that would indicate, minimally, what the students will know and be able to do upon completion of the programme. The PLOs must address the generic LOs outlined by the Ministry of Education Malaysia (MOE) and MQA.

The PLOs must be aligned with the vision and mission of the HEP. In so doing, the programme aims and the PEOs need to be formulated. PEOs play an important role in that they enable evaluation of how graduates are contributing towards the society and industry within the first five years following their graduation. A systematic assessment approach is required for the alignment of the PEOs and the PLOs with the vision and mission of the HEP.

Student development in the three domains of learning or learning taxonomies is guided by hierarchical levels in each of the domains. These levels are typically used to define the minimum performance attainment on completion of a course and a programme. The most common classifications for the cognitive domain are the original Bloom's taxonomy (Bloom, 1956), the revised Bloom's taxonomy (Anderson & Krathwohl, 2001;, 2002) and the Structure of Observed Learning Outcome (SOLO) taxonomy, (Biggs, 1999; 2003).

The taxonomies proposed by Simpson (1972) and Dave (1975) are amongst those that can be used for the psychomotor domain, whilst for the affective domain, a taxonomy such as the one introduced by Krathwohl, Bloom and Masia (1973) can be used.

It should be noted that all the MQA and MOE LO domains encompass all three learning domains. The LO domains also include generic student attributes such as communication, teamwork, professionalism, life-long learning and leadership.

**Table 1** shows the LO domains outlined by MQA and MOE. The domain of learning for each LO domain is indicated in brackets where (C) is for the knowledge or cognitive domain, (P) is the skill or psychomotor domain and (A) is for the affective domain. Examples of the classifications and the associated verbs used for each classification in the learning domains can be found in Appendix 2 to Appendix 5.

**Table 1: MQA and MOE LO domains to be addressed by HEPs**

| No. | MQA LO Domains | MOE LO Domains |
|-----|----------------|----------------|
| 1.  | Knowledge (C) | Knowledge of the discipline-Content (C) |
| 2.  | Practical skills (P) | Practical skills (P) |
| 3.  | Social skills and responsibilities (A) | Thinking and scientific skills (C) |
| 4.  | Ethics, professionalism and humanities (A) | Communication skills (A) |

| No. | MQA LO Domains | MOE LO Domains |
|-----|----------------|----------------|
| 5. | Communication, leadership and team skills (A) | Social skills, teamwork and responsibility (A) |
| 6. | Scientific methods, critical thinking and problem solving skills (C) | Values, ethics, moral and professionalism (A) |
| 7. | Lifelong learning and information management skills (A) | Information management and lifelong learning skills (A) |
| 8. | Entrepreneurship and managerial skills (A) | Managerial and entrepreneurial skills (A) |
| 9. | ///////////////////////////// | Leadership skills (A) |

Assessment, in general, serves the purposes to:

i.    promote learning;

ii.   measure performance, by awarding grades which indicate whether and how well a particular student has attained the stated LOs;

iii.  determine whether a particular student is sufficiently well prepared in a subject area to proceed to the next level of instruction;

iv.   provide feedback to students which indicates levels of attainment and diagnoses misunderstandings and learning difficulties; and

v.    provide feedback to teaching staff to identify and diagnose ineffective teaching methods/ techniques.

Evidence of learning is obtained from assessing students' attainment of LOs, both formatively and summatively at the course level and at the programme level. Hence, at the programme level, a programme's impact is assessed by finding evidence of the attainment of PLOs.

In conclusion, the assessment of student learning provides evidence of the level of attainment. Such evidence can only be captured by taking a systematic approach to assessment.

### 2.2 Outcomes-Based Assessment

In Outcomes-Based Assessment (OBA), the assessment methods should be constructively aligned with the achievement of the LOs. The assessment methods should also support the learners in their learning progress (formative assessment) and validate their achievement of the LOs at the end of the process (summative assessment). For example, if the LO is to be able to give an explanation about energy conservation in thermodynamic processes, then the assessment methods and tasks chosen must involve the students providing explanations about energy conservation in thermodynamic processes.

An Outcomes-Based Assessment is criterion-referenced, where the LOs are the criteria to be assessed. This contrasts with norm-referenced assessment, where students' achievements are compared with each other. It requires academic staff to focus on the achievement of LOs.

The Outcomes-Based Assessment (OBA) involves choosing assessment tasks or instruments that are constructively aligned with the attainment of the LOs. It also means choosing assessment methods and tasks that will support learners in their learning progress, and that will validate their achievement of the LOs at the end of the learning.

OBA is a systematic assessment approach to find out how well students attain the intended CLOs and PLOs by holistically judging their LO attainment. Evidence gathered through OBA is used to judge how well the criteria specified by the LOs are attained.

### 2.3 Aligning Assessment with Learning Outcomes

The assessment of students' learning involves collecting evidence of outcomes attainment both at the course and the programme level. These outcomes are driven by the programme aims and the PEOs. Hence, the assessment of students' learning must involve using outcome indicators or assessment methods that include:

i.   indirect evidence of the programme's effectiveness in preparing graduates for their careers;

ii.   direct and indirect evidence that successful students have attained the competence level through the attainment of the PLOs; and

iii.   evidence that the courses offered by the programme directly or indirectly support the attainment of the PLOs.

In addition, the assessment instruments and the assessment tasks used to collect evidence must be appropriately aligned to the attainment of the LOs. **Figure 4** shows the flow of an assessment plan to find evidence of LO attainment and to determine the performance standard of that attainment, either at the course level or at the programme level.

set **learning outcomes** for the unit
↓
design **assessment tasks** based on learning outcomes
↓
create specific assessment criteria that align the designed learning outcomes for the task
↓
develop **performance standards** for each criteria against which the students work will be assessed. This ideally will be in the form of an assessment rubric
↓
construct overall achievement standards to arrive at a **grade** for the assessment task

**Figure 4:    Flow of an assessment plan to find evidence and performance standard of LO attainment**

An Outcomes-Based Education (OBE) curriculum design starts with the determination of the programme aim, which outlines the philosophy, rationale and purpose of the programme. For example, the aim of offering a BSc (Hons.) in Information Technology is as follows:

*The BSc in Information Technology aims to produce IT graduates who are innovative, creative, ethical, responsible, professional and recognised*

*internationally to support Malaysia's aspirations of becoming an industrialised nation.*

While the programme aim may not be directly assessed by the HEPs, the impact of the programme can be indirectly assessed through its attainment of the PEOs. Supporting the PEO attainment requires successful graduates to have attained the PLOs and therefore to be already competent upon completion of the programme.

 **Figure 5** indicates the Assessment Forward Model compared to the Design Backwards Model proposed by Wiggins (for example, Wiggins & McTighe, 2005). Examples of which outcome indicators are used to assess PLO attainment and which outcome indicators are used to assess PEO attainment are shown in Appendix 7 and Appendix 8.
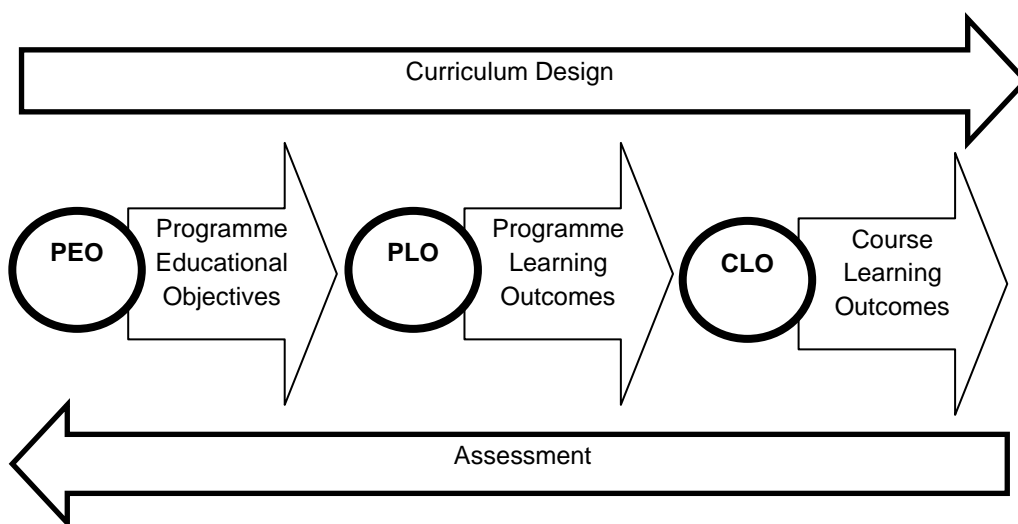


**Figure 5:** **"Assessment Forward Model" compared with "Curriculum Design Backwards Model"**

In any programme, courses are offered to directly and indirectly support the attainment of PLOs. These courses generally follow the progression of complexity in abilities (cognitive, psychomotor and affective) from low to higher order. The number of CLOs for each course may range between three and five. Hence, assessing students' learning in a course may require

assessment methods that are varied. Table 2 in this section shows examples of PEOs, PLOs, CLOs and some of the constructively aligned outcome indicators/methods.

**Table 2:** **Description and Examples of PEOs and LOs along with Examples of some Possible Constructively Aligned Assessment Methods or Outcome Indicators**

| Definition and Examples | Programme Educational Objectives | Programme Learning Outcomes | Course Learning Outcomes |
|---|---|---|---|
| **Definition** | Broad statements that describe the career and professional accomplishments of graduates within 5 years upon graduation | The abilities (cognitive, psychomotor and affective) that graduate should be able to demonstrate at the time of graduation. | Specific statements of what the learners are expected to achieve at the end of the course. |
| **Example of Statement (Cognitive Domain)** | IT instructors who apply fundamental knowledge and practical skills in providing services to the IT industries locally and globally. | At the end of the programme, students should be able to: 1. apply mathematics and science concepts, principles, theories and laws essential to IT. 2. perform algorithm, programming and diagnostic procedures essential to IT. | At the end of the courses, students can: 1. explain differentiation and integration concepts, principles, and algorithm. 2. perform second order differentiation and triple integration techniques to determine |

| Definition and Examples | Programme Educational Objectives | Programme Learning Outcomes | Course Learning Outcomes |
|---|---|---|---|
| | | | slopes, sign of the slopes, area and volume of mathematical functions. |
| **Example of Statement (Affective Domain)** | IT instructors who lead and effectively communicate with team members in solving workplace and professional issues. | At the end of the programme, students should be able to:<br>1. demonstrate effective communication skills;<br>2. demonstrate effective teamwork in a multidisciplinary team; and<br>3. demonstrate leadership skills. | At the end of the course, students should be able to:<br>1. give a verbal presentation by utilising ICT technology.<br>2. support and respect team members' opinions and ideas during team-related tasks.<br>3. demonstrate leadership skills in team-related tasks. |
| **Examples of Assessment Methods / Outcome** | • Alumni surveys<br>• Alumni interviews<br>• Employer surveys | • Entrance Survey<br>• Exit survey<br>• Exit interviews | • Tests<br>• Projects<br>• Reports<br>• Oral |

| Definition and Examples | Programme Educational Objectives | Programme Learning Outcomes | Course Learning Outcomes |
|---|---|---|---|
| **Indicators** | • Employer interview<br>• Job offers, starting salaries (relative to national benchmarks).<br>• Admissions to graduate school. | • Exit exam<br>• Standardised test (eg. Graduate Record Examination – GRE, the Collegiate Learning Assessment (CLA) and the National Survey of Student Evaluation (NSSE) | Presentation<br>• Proposal<br>• Summary<br>• Critiques<br>• Assignments<br>• Journals<br>• Portfolio |

The assessment methods in Table 2 are only samples of methods that may be employed to assess students' learning. Assessment methods chosen must be aligned with the process of finding evidence of the LOs attainment and must be consistent with the student learning time required to complete the task. They must also consider practical issues in scoring and providing feedback for the purpose of promoting learning. For example, entrance and exit exams are appropriate to assess growth in knowledge and understanding. A portfolio can also be used to assess student holistic development. Standardised assessment instruments used world-wide to show attainment of undergraduate LOs are the Collegiate Learning Assessment (CLA) and the National Survey of Student Engagement (NSSE).

The construction of assessment items aim to show evidence of learning at the competency level specified in the LO statements. Competency levels can be determined by referring to taxonomies such as Bloom's (original/revised), SOLO, Simpson's and Krathwohl's.

### 2.4  Grading Criteria

Outcomes-based assessment   procedures require academic staff and programme heads to move away from a quantitative and analytic view of students' knowledge attainment through the averaging of marks from various assessment tasks, to practices that qualitatively and holistically make judgment of LO attainment. In outcomes-based grading, students' learning is demonstrated by their attainment of the LOs. Biggs (2003) considers the purpose of assessment tasks (ATs) as the following:

i.   they provide students with the opportunity to demonstrate whether or not they have achieved the LOs and what level their performance is in those LOs;

ii.   they provide evidence allowing academic staff to make a judgment about the level of a student's performance against the LOs and to award a final grade;

iii.   they are appropriately designed or selected to address the LOs that need to be assessed; and

iv.   different ATs address different LOs.

Grading assessment tasks that are aligned with the LOs will reveal attainment and performance of the LOs. Grading the  attainment of LOs involves a holistic judgment on all the tasks. Hence, when deciding on a course grade, the academic staff must first agree on whether to grade the attainment of LOs or to grade assessment tasks and later infer attainment of LOs.

When determining or developing grading criteria, the following characteristics are considered meaningful:

i.   **Consistent**: Generic criteria and generic descriptors of performance standards  will ensure consistency in determining grades. Consistency in the meaning of grades should be systemic within an institution.

ii.  **Accurate**: Accurate refers to the reliability and validity of grade determination, which reflects actual student achievement in relation to the LOs as described by the performance standards and validated by performance from multiple assessment tasks.

iii. **Meaningful**: Grades must communicate useful information to students and to all who are interested in or who need to know about students' learning.

iv.  **Support Learning**: Grades should motivate students to improve on their performance.

# 3. Assessment Methods

Assessment may require direct examination or observation of students' displayed knowledge or skills, which can be assessed based on measurable LOs. Attainment of outcomes in the cognitive and psychomotor domains can be directly assessed, whilst those of the affective domain, soft skills and values may be more difficult to assess, resulting in a more subjective assessment. Direct assessments involve examining actual samples of students' work and these include exams, quizzes, reports, portfolios and presentations. On the other hand, indirect assessments refer to the "analysis of reported perceptions about student mastery of learning outcome" (Allen, 2004). It may be in the form of employer surveys, exit interviews of graduates and self-reports by students or by others such as the supervisor during industrial attachment.

## 3.1 Planning Assessment Tasks

Attention has to be given in the planning of assessment tasks for students. In the rest of the section, discussion on assessment tasks focuses on the course LOs. This must be conducted throughout the course and academic staff must have a sound understanding of the assessment methods.

It is of utmost importance that assessment methods are aligned to both outcomes and the instructional delivery. Constructive alignment, a term coined by John Biggs (Biggs, 1999) posits that the curriculum is designed so that the learning activities and assessment tasks are aligned with the LOs that are intended in the course, resulting in a system that is consistent.

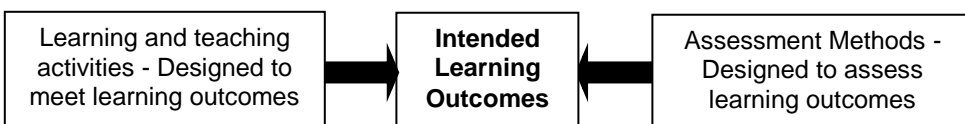| Learning and teaching activities - Designed to meet learning outcomes | → | **Intended Learning Outcomes** | ← | Assessment Methods - Designed to assess learning outcomes |
|---|---|---|---|---|

**Figure 6:** **Aligning learning outcomes, learning and teaching activities and assessment. Adapted from Biggs (1999) p. 27**

For instance, in order to achieve the LOs of a certain course the case study or problem-based learning approach may be regarded as the most suitable. Thus, the teaching approach and activities chosen would demand for rather specific methods of measuring those outcomes. To cater for the diversity in outcomes to be achieved, assessment methods chosen must be aligned to the teaching approaches. In conducting good practice in assessing course LOs, various considerations need to be taken into account. The following are some pertinent considerations.

### 3.1.1  Communicating the assessment plan to students

The assessment plan should be communicated to students in writing at the beginning of the semester. Academic staff should provide the course description which includes a brief summary of the course topics and requirements, the general format of the course, instructional materials and assessment methods, mark apportionment, and grading criteria and schedule for the assessments. Clear grading criteria such as rubrics and performance standard for the assessment of student work should be made available to students in hardcopy or electronic forms.

Academic staff should provide ongoing feedback on students' performance as the class progresses. They may provide feedback to the class following the completion and grading of continuous assessment tasks. This could include a summary of the student's overall performance, as well as strategies for improvement.

### 3.1.2  Planning of Assessment

The planning of assessment tasks for a given course must take into account the level and the credit value of the course. Thus, academic staff must gauge whether the number and the complexity of the assignments to be given commensurate with the credit load of the course. The expected time needed to complete a given assessment task must be based on the MQA's Guidelines for Good Practices:

Curriculum Design and Delivery (GGP: CDD) for determining Student Learning Time (SLT). For example, the MQA has proposed that a 2000-word assignment would require 10 to 20 hours of SLT. The preparation time needed by students for every hour of test is also provided in the SLT guideline.

### 3.1.3 Diversity

Assessment tasks should provide opportunities for students to display their knowledge, talents, competencies and/or skills. Based on the LOs, each task has to be planned to determine the achievement of the outcome/s. The following table suggests tasks and grading instruments that may be used to measure various attributes.

**Table 3: Examples of Tasks and Grading Instruments for Assessing Various Attributes**

| Attributes to be Assessed | Examples of Outcomes to be Measured | Examples of Assessment Tasks | Suggested Grading Instruments |
|---|---|---|---|
| Creativity | Ability to generate new creations / designs (e.g. unique, original, outstanding creations / designs). | • Creative projects / products (art and design, architecture, engineering) <br> • Performances (music, theatre) | Rubrics |
| Leadership | Ability to lead a group of students to undertake a project. | • Group projects (e.g. organising an event, conducting a mini research) <br> • Presentations <br> • Debates | Rubrics |

| Attributes to be Assessed | Examples of Outcomes to be Measured | Examples of Assessment Tasks | Suggested Grading Instruments |
|---|---|---|---|
| Critical thinking and problem solving | Ability to diagnose, analyse, implement and suggest solutions. | • Tests / Exams<br>• Lab experimentation<br>• Projects<br>• Presentations<br>• Studio work | Answer schemes<br><br>Rubrics |
| Values | Ability to show a person's/team's principles or standards of behaviour. | • Presentations<br>• Posters<br>• Reflection papers | Rubrics |
| Entrepreneurial skills | Ability to develop a feasible business plan.<br><br>Ability to apply knowledge, skills and critical understanding of the theories, concepts, issues and challenges in conducting a business project. | • Proposal of business plans<br>• Conducting business projects | Rubrics<br>Checklist |

### 3.1.4 Weighting

The weighting of assessment tasks must be proportionate to the emphasis in the CLOs, the learning activities/tasks and the importance of the contents to the CLO attainment. Assessment comprise of ungraded and graded continuous (assignments/quizzes/tests/midterm

assessment) assessment tasks and may include final graded assessments. The weighting must adhere to the stated assessment weighting for the course as approved by an academic committee.

### 3.1.5 Coverage

Assessment provides feedback on the degree to which course LOs are achieved. As shown in **Table 4**, LOs for every lesson (Lesson LOs - LLO) are mapped to course LOs to ensure that each lesson LO contributes to the achievement of one or more of the course LOs (CLO). Consequently, the content to be taught is determined based on the lesson Los to be achieved. However, lesson Los may differ from assessment outcomes because it is not possible to assess all content taught due to constraints such as time. Thus, asseessment may only cover a sample of the content that is taught but the staff must assure that the content assessed represents the course content.

**Table 4:     Mapping of Lesson Learning Outcomes to Course Learning Outcomes**

| Course LOs (CLO) | Lesson LOs contributing to the Course LOs |
|---|---|
| CLO 1 | **Lesson LOs** 1, 4, 6 |
| CLO 2 | **Lesson LOs** 2, 7, 8 |
| CLO 3 | **Lesson LOs** 3, 5 |
| CLO 4 | **Lesson LOs** 1, 4 |

### 3.1.6 Assessment Criteria

Assessment criteria must be established for assessing tasks and should be made known to students in writing and given together with the tasks. It guides the academic staff in assessing the tasks objectively, and helps learners to meet the expectations of the tasks. This practice also encourages students to self-assess, thus improving the quality of their work. Assessment criteria are defined as the specified standards against which learners' performance is measured.

The marks awarded for the attainment of each criterion needs to be made clear. It can be communicated through various forms of rubrics (Appendix 9: Examples of Rubric).

### 3.2 Conducting both Formative and Summative Assessment

On-going formative assessments are conducted throughout a course, embedded and linked directly to the current learning and teaching activities. Through observations and interactions in the classroom, the assessment helps the academic staff gain feedback on students' progress. In-class tasks can be given to assist students in monitoring and improving their learning. Providing feedback to students about their learning is crucial in understanding the use of the term *assessment for learning*.

*Assessment for learning* is the process of seeking and interpreting evidence for use by the learners and academic staff. The interpretation is then used to decide where the learners are in their learning and to indicate the next step to be taken to promote learning (Assessment Reform Group, 2002). With the increased use of coursework and continuous assessment, it offers the opportunity for academic staff to provide constructive feedback in helping learners improve future learning. Formative assessment is *assessment for learning.*

*Assessment as learning* requires students to play an active role in becoming independent in their own learning and assessment (Earl, 2003). In order to incorporate assessment as learning in the learning process, academic staff should help students to develop skills to conduct self-evaluation and metacognition and to design instructions and assessments to monitor student learning.

On the other hand, summative assessments are used to measure what students have learned at the end of a learning unit. Summative assessment refers to the assessment of student learning which involves grading and certification and is used for institutional accountability and quality assurance

purposes. The results can then be communicated to the students and parents. Summative assessment is *assessment of learning.*

## 3.3 Types of Assessment

Multiple assessment methods should be adopted in measuring the attainment of LOs, which include diverse attributes to be measured. The selection of assessment tasks is made based on common practices in one's respective field and on the experience of academic staff. The choice of instruments must be determined based on the performance criteria, in terms of the qualities and abilities sought in the learner, which are explicitly stated in the LO statements. For example, in requiring students to portray creativity and innovation, the assessor/academic staff may require a studio project, the development of a product and the performance or case studies which can appropriately measure the abilities of the students in producing an output such as through experimentation, expression and exploration. Likewise, to assess the cognitive domain and critical thinking skills, various methods can be used including critiques, reviews, reports or tests.

Case studies and group projects are able to determine students' abilities to apply theory to practice, apart from determining their communication, managerial, critical thinking and problem solving skills. Case studies and group projects may also be used to measure the affective domain in terms of values, attitudes, professionalism, team work, communication, lifelong learning and ethics. In assessing performance or demonstration techniques, an assessor/academic staff can adopt any of the following methods or may choose to combine these methods: demonstrations, role play, posters, laboratory reports, illustrated manuals or simulations.

### 3.3.1. Coursework Assessment

Although the following list is not exhaustive, the measurement of learning gains through coursework can be made through presentations, essays, critiques, reviews, projects, case studies, portfolios, simulations, development of products, capstone projects, reflective journals, exhibitions, performances (e.g. music, theatre), clinical work, posters, debates, lab reports, manuals and essays.

### 3.3.2. Examinations and Tests

Examinations and tests reflect the cumulative attainment of LOs. Among others, the purpose of examinations and tests is to enhance the students' abilities, such as the ability to articulate, argue, analyse, justify, communicate ideas and to assess critically. These abilities can be demonstrated through essays and structured open-ended questions. Although objective questions are able to measure higher order thinking, they do not promote some other abilities that can be tapped by subjective questions. Some of the tests that can be adopted in classroom assessment are written tests, oral tests, practical tests and standardised tests. Standardised tests can be purchased for the measurement of communication skills or critical thinking skills, among others.

Apart from the graded tasks, ungraded tasks such as short quizzes and minute papers may provide formative feedback for students to gauge their achievement of LOs and to allow the academic staff to improve or modify their teaching. Procedures that involve elements of self and peer-assessment can also be implemented. Self-assessment is a valuable way of encouraging participants to evaluate and reflect on their own learning. Peer assessment is especially useful in determining the attainment of skills such as leadership, team work and communication. Table 5 provides examples of methods of assessment.

### 3.3.3 Workplace Based Assessment

To ensure the attainment of PLOs and to better prepare students for the workplace, training at the workplace allows students to be immersed in a real-work environment, thus allowing them to relate theory to practice. To evaluate their working ability, well planned assessments must be in place. **Table 5** provides examples of possible tasks and the suggested grading instruments.

**Table 5:    Tasks and Grading Instruments for Workplace Based Assessment**

| Types of Workplace-Based Immersion Programmes | Examples of Outcomes to be Measured | Examples of Assessment tasks | Suggested Grading Instruments |
|---|---|---|---|
| Practical training | Ability to solve problems in the workplace | Solve a specific workplace problem and prepare a report | Rubrics – Assessor is to rate the student's ability through:<br>• observations;<br>• discussions with the supervisor/peer workers; and<br>• the effectiveness of the decision. |
| | Ability to communicate orally and in writing | • Reports<br>• Presentations | Rubrics – Assessor is to rate the student's ability through:<br>• observations; |

| Types of Workplace-Based Immersion Programmes | Examples of Outcomes to be Measured | Examples of Assessment tasks | Suggested Grading Instruments |
|---|---|---|---|
| | Ability to plan projects assigned | • Proposals<br>• Reports<br>• Presentations<br>• Development of products (if applicable) | • meetings and discussions with the supervisor/peer workers; and<br>• reports and presentation. |
| Studio project | Ability to plan projects assigned | Proposals | Rubrics |
| | Ability to explore and experiment on the project | Drawings<br>Portfolios | Rubrics |
| | Ability to synthesise the body of work | • Final products<br>• Journals<br>• Presentations | Rubrics |
| | Ability to communicate the project work. | • Journals<br>• Presentations | Rubrics |
| Clinical Training | Ability to solve clinical problems | • Written tests<br>• Oral tests | Answer schemes |
| | Ability to show analytic skills | • Objective structured clinical examinations (OSCE) | Answer schemes |
| | Ability to demonstrate critical thinking skills | • Objective structured clinical examinations | Answer schemes |

| Types of Workplace-Based Immersion Programmes | Examples of Outcomes to be Measured | Examples of Assessment tasks | Suggested Grading Instruments |
|---|---|---|---|
| | | (OSCE)<br>• Long case examinations | |
| | Ability to communicate effectively | • Objective structured clinical examinations (OSCE)<br>• Long case examinations<br>• Mini Clinical evaluation Exercise (CEX) | Answer schemes<br><br>Rubrics |
| | Demonstrate patient management skills | Portfolios | Rubrics |

## 3.4 Review of Assessment Methodologies and Currency with Development in Best Practices

Sources in determining currency and best practices of assessment include:

i.     external assessors of study programmes
ii.    reports on / analysis of the achievement of LOs
iii.   vetting committees at the department or faculty level
iv.    students' feedback
v.     employers' feedback
vi.    academic staff's feedback

### 3.4.1 Validity and Reliability of Assessment

Validity and reliability are two important assessment principles, apart from flexibility and fairness. To ensure that the assessment can provide sufficient evidence of students' competence, it must be both valid and reliable. To ensure adherence to assessment principles, the HEP policy on assessment must be in place.

### 3.4.1.1 Validity of Assessment

Validity refers to the ability of the assessment to measure what it is supposed to measure. Among the three types of validity; construct, content and criterion validity, content validity may be the most important type of validity to ascertain in developing assessment tasks especially for examinations and tests. Content validity is based on the extent to which a measurement reflects the specific intended domain of content (Carmines & Zeller, 1991). In other words, content validity shows the extent the measurement matches the learning outcomes. Since the coverage of test items may just be a sample of contents covered in a course, the extent that the selected test items reflect the entire contents indicates the content validity. Content validity of assessment tasks are determined by the assessment vetting committee. The vetting committee should also judge the fairness in terms of distribution of marks for each assessment task.

The validity issue in assessment will touch on two areas: relevancy and representative. 'Relevancy' is the extent to which the assessment is appropriate with the student's ability. 'Representative' meanwhile is concerned with whether the assessment can represent a group of students or body of opinions.

Some key factors to ascertain validity in an assessment are as follows:

i.   Assessment methods and instruments must be appropriate with the desired levels of learning outcomes to be attained.

ii.  Assessments given throughout the semester should be in various forms (such as tests, assignments, presentations) to assess the different learning domains and the CLOs determined for the course. More than one task and source of evidence are needed as a basis of judgment of students' competence.

iii. Test coverage has to be balanced, covering most of the main ideas and important concepts in proportion to the emphasis they received in class.

iv.  Examination and test questions should be validated by another person with expertise in the area assessed.

### 3.4.1.2 Reliability of Assessment

Reliability refers to the degree of consistency and accuracy of the assessment outcomes. It reflects the extent to which the assessment will provide similar outcomes for candidates with equal competence at different times or places, regardless of the assessor conducting the experiment (Department of Education and Training, 2008, pg. 10).

Thus, reliability includes consistency in assessment and grading. It reflects the extent the marking by an examiner is accurate, consistent, reliable, fair and acceptable. This could be easily established through conformity to the answer and marking schemes or rubrics. Academic staff are also recommended to provide sufficient and timely feedback on assessment tasks to allow students to improve their performance and progress. Complete and accurate information on assessment must be provided for students.

Openness in assessment must be practised. This requires the sharing of arrangements and requirements of the assessment process and the marking criteria with students in the early part of the semester.

Several approaches, which can be applied to increase reliability in assessment, are illustrated below:

i. Provide clear instructions on how to answer questions in all tests. Ambiguous questions and unclear directions must be avoided. For assignments or projects, provide students with specific guidelines on requirements and expectations, including information on how to ensure authenticity.

ii. Develop marking schemes/rubrics as a guide to ensure standardization in marking. Vague scoring criteria threaten reliability.

iii. Ensure a fair distribution of marks for each question/task.

iv. Provide clear guides for observing and recording evidences.

v. Ensure that the test venue is conducive and that the tests are administered in a fair manner.

vi. In cases of multiple examiners, conduct moderation in marking. The appointed moderators determine appropriateness of the standards and marking.

vii. Develop tests of appropriate length. Very short tests are less reliable.

In order to maintain a high validity and reliability of assessment, students undertaking a particular course in all sites must get the same opportunities in terms of contents, coverage, resources, and expertise of academic staff. Tests and examinations should be given and submitted/administered at the same time and under the same conditions.

Feedback on the appropriateness of assessment methods are made through reports and discussions at the department and faculty levels, based on review and recommendations made by stakeholders such as external assessors, academic staff, moderators, and students. Suggestions and conclusions arising from these meetings determine the improvements that need to be addressed in the assessment methods.

## 4.  Management of Student Assessment

The HEP has significant responsibilities with regard to student assessment. The HEP's role as a qualifications-awarding body is strongly implicated in the integrity of its assessment system. Thus, the HEP needs to develop and implement its own assessment processes and procedures through the HEP's administrative processes as shown in **Figure 7**. The figure provides an overview of the structure, function and integration of the assessment processes and procedures at the institutional level. At some institutions, assessment matters are a part of the curriculum review process. There may also be differences across institutions in the structures.

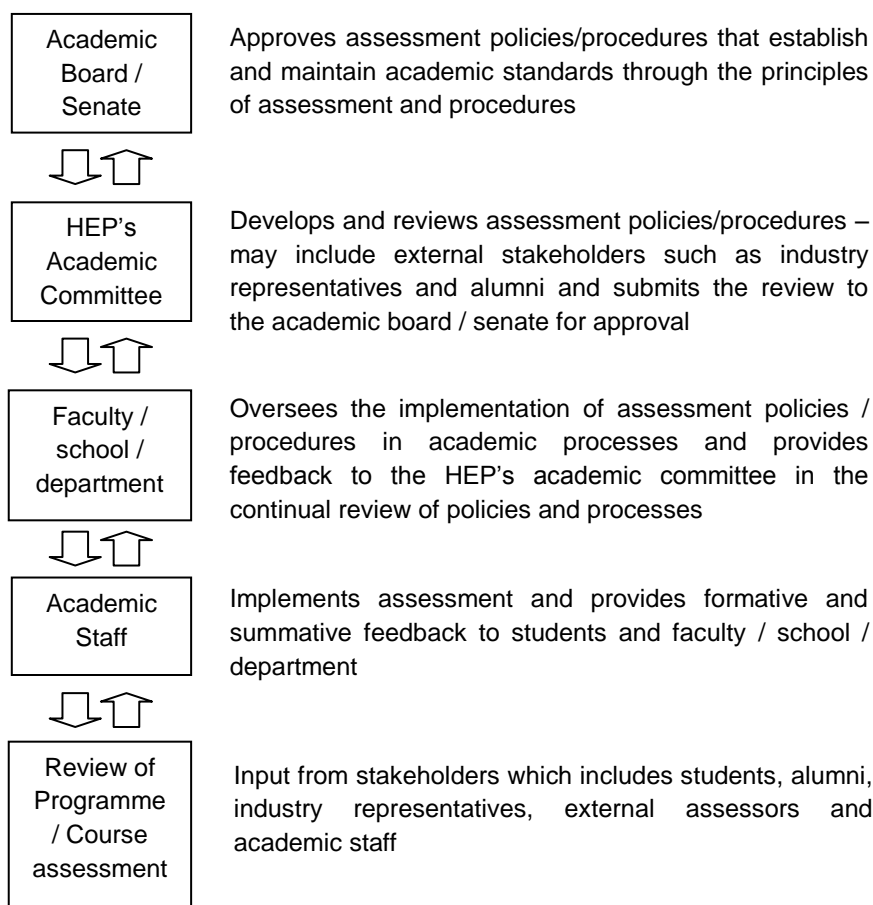| | |
|---|---|
| Academic Board / Senate | Approves assessment policies/procedures that establish and maintain academic standards through the principles of assessment and procedures |
| HEP's Academic Committee | Develops and reviews assessment policies/procedures – may include external stakeholders such as industry representatives and alumni and submits the review to the academic board / senate for approval |
| Faculty / school / department | Oversees the implementation of assessment policies / procedures in academic processes and provides feedback to the HEP's academic committee in the continual review of policies and processes |
| Academic Staff | Implements assessment and provides formative and summative feedback to students and faculty / school / department |
| Review of Programme / Course assessment | Input from stakeholders which includes students, alumni, industry representatives, external assessors and academic staff |

**Figure 7:    Assessment integration and process at institutional level**

It is incumbent on HEPs to take a systematic approach to the assessment of their students' learning. This is the basis for ensuring the integrity of students' learning and the reputation of the HEP in terms of academic standards and quality of graduates.
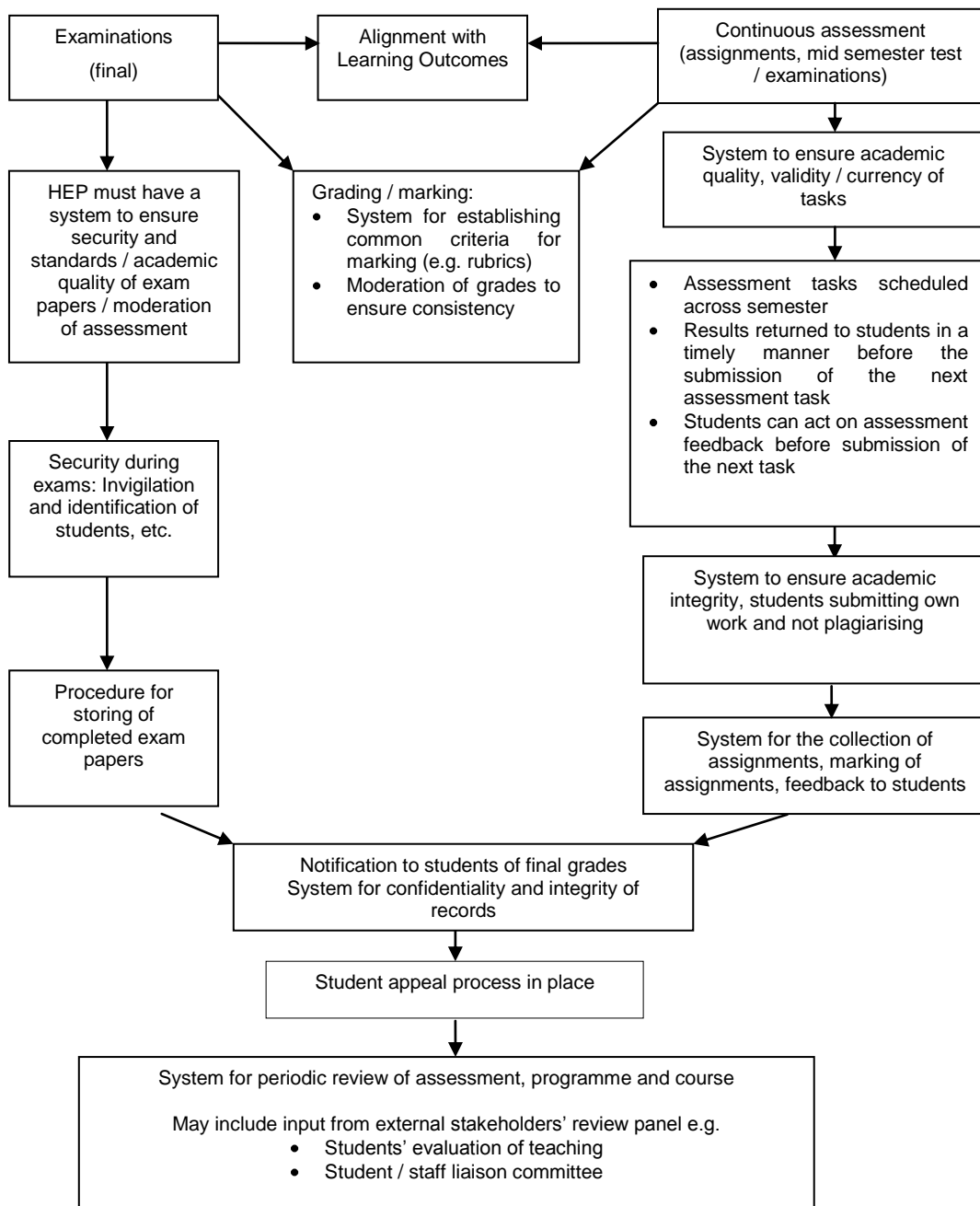


**Figure 8: Assessment process**

**Figure 8** demonstrates the following points in diagrammatic form:

i. Students need to receive feedback on their performance in the assessment, so that they can gauge their attainment of outcomes thus helping them to improve learning.

ii. For the academic staff, continuous assessment provides valuable information about their students and their learning, so that they can tailor or fine-tune the learning and teaching programme to address learning needs and strengths.

iii. Academic staff should be trusted in establishing procedures for planning, assessing and monitoring the course. This means that the assessment can be designed along sound educational principles to elicit responses in line with the desired LOs

iv. The system also needs to be secure so that the assessment is valid and reliable, and students' confidentiality is maintained. Processes must be in place to ensure this.

v. The environment in which they study must value and encourage scholarly and creative achievements and be conducive for these.

vi. Processes for students to appeal against the results of assessment must be in place and be integrated into the system.

vii. In line with the principles of quality assurance and improvement, the HEP's assessment system should undergo periodic review. This provides information that can be used for the assessment system to evolve and improve. The views of external stakeholders and students on the learning and teaching programme and its assessment should also be integrated into the review and improvement. Importantly, this process of looking at the assessment system from a range of stakeholder perspectives provides the basis for it to be inclusive and responsive to external situations, current issues and changes. An assessment review is usually integrated with a review of the academic programme as a whole.

viii. As has been outlined earlier in this document, the major value of an assessment system is its ability to enhance learning for all students. It needs to be noted that assessment reviews by the HEP are part of regular evaluations of the HEP's quality system.

Reviews involve an inquiry process focused on two questions:

1. Does the system provide information useful for making decisions and taking action?
2. Are the actions taken educationally beneficial?

More specifically, reviewers consider how well the system adheres to each of the assessment principles. To ensure that timely and effective reviews are conducted, a continuing group needs to have responsibility for monitoring the review process. Students, other educators and experts also provide feedback about classroom and university practices.

Reviews of overall assessment system and the whole academic programme require broad participation from all stakeholders including educators, students and assessment and curriculum specialists.

The most important criterion for assessment review is that assessment does not harm student learning and that it promotes active and engaged learning.

**34**

## 5. Summary

This GGP: AS document, in discussing the key role of assessment in student learning, asserts the importance of assessment being well-constructed and systematically implemented. The LOs, on which assessment is based, are derived from a number of sources: the HEP's vision and mission, the MOE and MQF LO domains, and the LOs of the particular educational programme.

In practical form, this GGP: AS document addresses these points:
i.     the purposes of student assessment and methods for its implementation; and
ii.    the participation and roles of the various sections of the HEP in the overall assessment system.

Given the significant role of assessment in student learning and the student experience, the GGP: AS document has put forward the following:
i.     Relationship between Assessment and Learning
ii.    Assessment Method
iii.   Management of Student Assessment

Overall, the objective is to assist HEPs and academic staff to enhance learning and teaching experiences with regards to assessment for the benefit of the students, the academic staff, the HEP overall and the future societys in which the HEP graduates will participate.

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## Appendix 1: Levels in Bloom's Cognitive Domain

Bloom's taxonomy of learning objectives is used to define how well a skill or competency is learned or mastered. A fuller description of Bloom's taxonomy is given in the following pages but a brief summary of the activities associated with each level is given below.

1.  At the Knowledge Level of Learning, a student can define terms.
2.  At the Comprehension Level of Learning, a student can work out assigned problems and can give examples of what they did.
3.  At the Application Level of Learning, a student recognizes what methods to use and then use these methods to solve problems.
4.  At the Analysis Level of Learning, a student can explain why the solution process works.
5.  At the Synthesis Level of Learning, a student can combine the parts of a process in new and useful ways.
6.  At the Evaluation Level of Learning a student can create a variety of ways to solve a problem and then, based on established criteria, select the solution method best suited for the problem.

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http://enpub.fulton.asu.edu/mcneill/blooms.htm. Accessed January 2010 & re-accessed August 2011.

## Appendix 2: Examples of Cognitive Processes and Action Verbs in Bloom's Taxonomy

Bloom's levels of thinking process begin by recognizing and recalling facts, concepts, theories, principles, procedures, criteria and steps on self learning. The recognition and recalling process is essential towards performing more complex cognitive tasks especially in understanding events, abstraction, cause and effect of physical phenomena and answering familiar textbook problems. The cognitive complexity increases as the tasks move from understanding to higher order thinking skills such as justifying an idea or action and generating new products or new ways of viewing things.

| Elaboration on the six levels of thinking in Bloom's taxonomy | | | | | | |
|---|---|---|---|---|---|---|
| **1**<br>**Remembering**<br>*Can the student RECALL information?* | **2**<br>**Understanding**<br>*Can the student EXPLAIN ideas or concepts?* | | **3**<br>**Applying**<br>*Can the student USE the new knowledge in another familiar situation?* | **4**<br>**Analysing**<br>*Can the student DIFFERENTIATE between and RELATE constituent parts?* | **5**<br>**Evaluating**<br>*Can the student JUSTIFY an opinion, decision or course of action?* | **6**<br>**Creating**<br>*Can the student GENERATE new products, ideas or ways of viewing things?* |
| **Recognising**<br>Locating knowledge in memory that is consistent with presented material.<br>*Synonyms*<br>• Identifying<br>• Finding<br>• Selecting<br>• Indicating<br><br>**Recalling**<br>Retrieving | **Interpreting**<br>Changing from one form of representation to another<br>*Synonyms*:<br>• Paraphrasing<br>• Translating<br>• Representing<br>• Clarifying<br>• Converting<br>• Rewriting<br>• Restating<br>• Expressing | **Summarising**<br>Drawing a logical conclusion from presented information.<br>*Synonyms*<br>• Abstracting<br>• Generalising<br>• Outlining<br>• Précising<br><br>**Inferring**<br>Abstracting a general theme or major point | **Executing**<br>Applying knowledge (often procedural) to a routine task.<br>*Synonyms*<br>• Carrying out<br>• Measuring<br>• Constructing<br>• Demonstrating<br>• Computing<br>• Calculating<br>• Manipulating<br>• Operating | **Differentiating**<br>Distinguishing relevant from irrelevant parts or important from unimportant parts of presented material.<br>*Synonyms*<br>• Discriminating<br>• Selecting<br>• Focusing<br>• Distinguishing between<br>• Separating | **Checking**<br>Detecting inconsistencies or fallacies within a process or product. Determining whether a process or product has internal consistency.<br>*Synonyms*<br>• Testing<br>• Detecting | **Generating**<br>Coming up with alternatives or hypotheses based on criteria<br>*Synonyms*<br>• Hypothesizing<br>• Proposing<br>• Developing<br>• Engendering<br>• Synthesising<br>• Providing options<br><br>**Planning**<br>Devising a |

| **Elaboration on the six levels of thinking in Bloom's taxonomy** | | | | | | |
|---|---|---|---|---|---|---|
| **1**<br>**Remembering**<br>*Can the student RECALL information?* | **2**<br>**Understanding**<br>*Can the student EXPLAIN ideas or concepts?* | | **3**<br>**Applying**<br>*Can the student USE the new knowledge in another familiar situation?* | **4**<br>**Analysing**<br>*Can the student DIFFERENTIATE between and RELATE constituent parts?* | **5**<br>**Evaluating**<br>*Can the student JUSTIFY an opinion, decision or course of action?* | **6**<br>**Creating**<br>*Can the student GENERATE new products, ideas or ways of viewing things?* |
| relevant knowledge from long-term memory.<br>*Synonyms*<br>• Retrieving<br>• Naming<br>• Reproducing<br>• Recounting | **Exemplifying**<br>Finding a specific example or illustration of a concept or principle<br>*Synonyms*<br>• Instantiating<br>• Illustrating...<br>• Representing<br>• Giving examples of<br>• Showing<br><br>**Classifying**<br>Determining that something belongs to a category (e.g., concept or principle).<br>*Synonyms*<br>• Categorising<br>• Subsuming | *Synonyms*<br>• Extrapolating<br>• Interpolating<br>• Predicting<br>• Concluding<br>• Extending<br>• Generalising<br><br>**Comparing**<br>Detecting correspondences between two ideas, objects, etc<br>*Synonyms*<br>• Contrasting<br>• Matching<br>• Mapping<br><br>**Explaining**<br>Constructing a cause-and-effect model of a system.<br>*Synonyms* | • Preparing<br>• Producing<br>• Drawing up<br>• Practising<br><br>**Implementing**<br>Applying knowledge (often procedural) to a non-routine task.<br>*Synonyms*<br>• Using<br>• Estimating<br>• Predicting<br>• Solving<br>• Changing<br>• Discovering<br>• Explaining how<br>• Verifying<br>• Finding | • (Sub)dividing<br>• Examining<br>• Relating<br><br>**Organising**<br>Determining how elements fit or function within a structure.<br>*Synonyms*<br>• Outlining<br>• Structuring<br>• Integrating<br>• (Re)arranging<br>• Categorising<br>• Ordering<br>• Deriving<br><br>**Attributing**<br>Determining the point of view, bias, values, or intent underlying presented material. | • Monitoring<br>• Concluding<br>• Assessing<br>• Appraising<br>• Discriminating<br>• Determining<br><br>**Critiquing**<br>Detecting the appropriateness of a procedure for a given task or problem.<br>*Synonyms*<br>• Judging<br>• Questioning<br>• Justifying<br>• Defending<br>• Discussing<br>• Criticising<br>• Arguing<br>• Including<br>• Rating | procedure for accomplishing some task.<br>*Synonyms*<br>• Designing<br>• Formulating<br>• Combining<br>• Compiling<br>• Devising<br>• Revising<br>• Putting together<br>• Suggesting<br><br>**Producing**<br>Inventing a product<br>*Synonyms*<br>• (Re)constructing<br>• Composing<br>• Modifying<br>• Altering<br>• Building<br>• Enlarging |

| **Elaboration on the six levels of thinking in Bloom's taxonomy** | | | | | | |
|---|---|---|---|---|---|---|
| **1**<br>**Remembering**<br>*Can the student RECALL information?* | **2**<br>**Understanding**<br>*Can the student EXPLAIN ideas or concepts?* | | **3**<br>**Applying**<br>*Can the student USE the new knowledge in another familiar situation?* | **4**<br>**Analysing**<br>*Can the student DIFFERENTIATE between and RELATE constituent parts?* | **5**<br>**Evaluating**<br>*Can the student JUSTIFY an opinion, decision or course of action?* | **6**<br>**Creating**<br>*Can the student GENERATE new products, ideas or ways of viewing things?* |
| | • Organising | • Elucidating<br>• Constructing models | | <u>*Synonyms*</u><br>• Deconstructing<br>• Comparing<br>• Contrasting<br>• Diagnosing | • Ranking<br>• Valuing | |

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From http://www.tedi.uq.edu.au/downloads/assessment/quickbites/Blooms-levels-of-thinking.doc. From "Revised Bloom's Taxonomy" retrieved 20 May, 2005 from http://rite.ed.qut.edu.au/oz-teachernet/index.php?module=ContentExpress&func=display&ceid=29 and *Using Learning Outcomes to Design a Course and Assess Learning Outcomes.* http://www.hlst.heacademy.ac.uk/guide/current_practice/Learning.html and Moon, J. Linking Levels, Learning Outcomes and Assessment Criteria. Retrieved 30 May, 2007, from http://www.see-educoop.net/education_in/pdf/edinburgh-moon-oth-enl-t02.pdf.

## Appendix 3: Two-Dimensional Bloom's Revised Cognitive Domain

This two-dimensional cognitive domain allows you to specify the learning complexities (depth or competency) in the four knowledge dimensions. The cells can be used to indicate the learning outcomes and hence the assessment targeted for each course.

| | Cognitive Process Dimension: From Lower Order (1 & 2) to Higher Order (3-6) Thinking Skills | | | | | | |
|---|---|---|---|---|---|---|---|
| | This revised Bloom's Taxonomy will assist you as you work to improve instruction to ensure that<br>• Standards, lessons, and assessments are aligned.<br>• Lessons are cognitively rich.<br>• Instructional opportunities are not missed. | **1.Remember:** retrieving relevant knowledge from long term memory<br>1. Recognizing<br>2. Recalling | **2. Understand:** determining the meaning of instructional messages<br>1. Interpreting<br>2. Exemplifying<br>3. Classifying<br>4. Summarizing<br>5. Inferring<br>6. Comparing<br>7. Explaining | **3. Apply:** carrying out or using a procedure in a given situation<br>1. Executing<br>2. Implementing | **4. Analyze:** breaking material into its constituent parts and detecting how the parts relate to one another and to an overall structure or purpose<br>1. Differentiating<br>2. Organizing<br>3. Attributing | **5. Evaluate:** making judgments based on criteria and standards<br>1. Checking<br>2. Critiquing | **6. Create:** putting elements together to form a novel, coherent whole or make an original product<br>1. Generating<br>2. Planning<br>3. Producing |
| Knowledge Dimension | **A. Factual Knowledge:** basic elements that students must know to be acquainted with a discipline or solve a problem in it.<br>a. Knowledge of terminology<br>b. Knowledge of specific details and elements | | | | | | |
| | **B. Conceptual knowledge:** the interrelationships among the basic elements within a larger structure that enable them to function together<br>a. Knowledge of classification<br>b. Knowledge of principles and generalizations<br>c. Knowledge of theories, models and structures | | | | | | |

| | Cognitive Process Dimension: From Lower Order (1 & 2) to Higher Order (3-6) Thinking Skills | | | | | | |
|---|---|---|---|---|---|---|---|
| | This revised Bloom's Taxonomy will assist you as you work to improve instruction to ensure that<br><br>• Standards, lessons, and assessments are aligned.<br>• Lessons are cognitively rich.<br>• Instructional opportunities are not missed. | **1.Remember:** retrieving relevant knowledge from long term memory<br>1. Recognizing<br>2. Recalling | **2. Understand:** determining the meaning of instructional messages<br>1. Interpreting<br>2. Exemplifying<br>3. Classifying<br>4. Summarizing<br>5. Inferring<br>6. Comparing<br>7. Explaining | **3. Apply:** carrying out or using a procedure in a given situation<br>1. Executing<br>2. Implementing | **4. Analyze:** breaking material into its constituent parts and detecting how the parts relate to one another and to an overall structure or purpose<br>1. Differentiating<br>2. Organizing<br>3. Attributing | **5. Evaluate:** making judgments based on criteria and standards<br>1. Checking<br>2. Critiquing | **6. Create:** putting elements together to form a novel, coherent whole or make an original product<br>1. Generating<br>2. Planning<br>3. Producing |
| **Knowledge Dimension** | **C. Procedural knowledge:** How to do something: methods of inquiry, and criteria for using skills, algorithms, techniques and methods<br>a. Knowledge of subject specific skills and algorithms<br>b. Knowledge of techniques and methods<br>c. Knowledge of criteria for determining when to use appropriate procedures | | | | | | |
| | **D. Metacognitive knowledge:** knowledge of cognition in general as well as awareness of one's own cognition<br>a. Strategic knowledge<br>b. Cognitive tasks, including appropriate contextual and conditional knowledge<br>c. Self-knowledge | | | | | | |

*SC SDE (Pat Mohr). Adapted from Lorin W. Anderson, David R. Krathwohl et al (Eds.) *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives* © 2001; published by Allyn and Bacon, Boston, MA © 2001 by Pearson Education; reprinted by permission of the publisher

# Appendix 4: Psychomotor Domain – Simpson's Model

The psychomotor domain (Simpson, 1972) includes physical movement, coordination, and use of the motor-skill areas. Development of these skills requires practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution. The seven major categories are listed from the simplest behavior to the most complex. The MQA and MOE LO domains belonging to the psychomotor taxonomy include practical skills and entrepreneurship.

| Level | Category or 'level' | Description | Examples of activity or demonstration and evidence to be measured | Action verbs which describe the activity to be trained or measured at each level |
|-------|---------------------|-------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 1 | Perception | Awareness, the ability to use sensory cues to guide physical activity. The ability to use sensory cues to guide motor activity. This ranges from sensory stimulation, through cue selection, to translation. | Use and/or selection of senses to absorb data for guiding movement<br><br>Examples: Detects non-verbal communication cues. Estimate where a ball will land after it is thrown and then moving to the correct location to catch the ball. Adjusts heat of stove to correct temperature by smell and taste of food. Adjusts the height of the forks on a forklift by comparing where the forks are in relation to the pallet.<br><br>"By the end of the music theatre program, students will be able to relate types of music to particular dance steps." | chooses, describes, detects, differentiates, distinguishes, feels, hears, identifies, isolates, notices, recognizes, relates, selects, separates, touches |
| 2 | Set | Readiness, a learner's readiness to act. Readiness to act. It includes mental, physical, and emotional sets. These three sets are dispositions that | Mental, physical or emotional preparation before experience or task<br><br>Examples: Knows and acts upon a sequence of steps in a manufacturing process. Recognize one's abilities and limitations. Shows desire to learn a new process (motivation). NOTE: This subdivision | arranges, begins, displays, explains, gets set, moves, prepares, proceeds, reacts, shows, states, volunteers, responds, starts |

| Level | Category or 'level' | Description | Examples of activity or demonstration and evidence to be measured | Action verbs which describe the activity to be trained or measured at each level |
|---|---|---|---|---|
| | | predetermine a person's response to different situations (sometimes called mindsets). | of Psychomotor is closely related with the "Responding to phenomena" subdivision of the Affective domain.<br><br>"By the end of the physical education program, students will be able to demonstrate the proper stance for batting a ball." | |
| 3 | Guided Response | Attempt. The early stages in learning a complex skill that includes imitation and trial and error. Adequacy of performance is achieved by practicing. | Imitate or follow instructions, trial and error<br><br>Examples: Performs a mathematical equation as demonstrated. Follows instructions to build a model. Responds hand-signals of instructor while learning to operate a forklift.<br><br>"By the end of the physical education program, students will be able to perform a golf swing as demonstrated by the instructor." | assembles, builds, calibrates, constructs, copies, dismantles, displays, dissects, fastens, fixes, follows, grinds, heats, imitates, manipulates, measures, mends, mixes, reacts, reproduces, responds sketches, traces, tries |
| 4 | Mechanism | basic proficiency, the ability to perform a complex motor skill. This is the intermediate stage in learning a complex skill. Learned responses have become habitual and the movements can be performed with some confidence and proficiency. | Competently respond to stimulus for action<br><br>Examples: Use a personal computer. Repair a leaking faucet. Drive a car.<br><br>"By the end of the biology program, students will be able to assemble laboratory equipment appropriate for experiments." | assembles, builds, calibrates, completes, constructs, dismantles, displays, fastens, fixes, grinds, heats, makes, manipulates, measures, mends, mixes, organizes, performs, shapes, sketches |

| Level | Category or 'level' | Description | Examples of activity or demonstration and evidence to be measured | Action verbs which describe the activity to be trained or measured at each level |
|---|---|---|---|---|
| 5 | Complex Overt Response | expert proficiency, the intermediate stage of learning a complex skill. The skillful performance of motor acts that involve complex movement patterns. Proficiency is indicated by a quick, accurate, and highly coordinated performance, requiring a minimum of energy. This category includes performing without hesitation, and automatic performance. For example, players often utter sounds of satisfaction or expletives as soon as they hit a tennis ball or throw a football, because they can tell by the feel of the act what the result will produce. | Execute a complex process with expertise<br><br>Examples:  Maneuvers a car into a tight parallel parking spot. Operates a computer quickly and accurately. Displays competence while playing the piano.<br><br>"By the end of the industrial education program, students will be able to demonstrate proper use of woodworking tools to high school students." | assembles, builds, calibrates, constructs, coordinates, demonstrates, dismantles, displays, dissects, fastens, fixes, grinds, heats, manipulates, measures, mends, mixes, organizes, sketches<br><br>NOTE: The key words are the same as Mechanism, but will have adverbs or adjectives that indicate that the performance is quicker, better, more accurate, etc. |
| 6 | Adaptation | adaptable proficiency, a learner's ability to modify motor skills to fit a new situation. | Alter response to reliably meet varying challenges.<br><br>Examples:  Responds effectively to unexpected experiences.  Modifies instructions to meet the | adapts, adjusts, alters, changes, integrates, rearranges, reorganizes, revises, solves, |

| Level | Category or 'level' | Description | Examples of activity or demonstration and evidence to be measured | Action verbs which describe the activity to be trained or measured at each level |
|---|---|---|---|---|
| | | Skills are well developed and the individual can modify movement patterns to fit special requirements. | needs of the learners. Perform a task with a machine that it was not originally intended to do (machine is not damaged and there is no danger in performing the new task).<br><br>"By the end of the industrial education program, students will be able to adapt their lessons on woodworking skills for disabled students." | varies |
| 7 | Origination | creative proficiency, a learner's ability to create new movement patterns. Creating new movement patterns to fit a particular situation or specific problem. Learning outcomes emphasize creativity based upon highly developed skills. | Develop and execute new integrated responses and activities.<br><br>Examples: Constructs a new theory. Develops a new and comprehensive training programming. Creates a new gymnastic routine. | arranges, builds, combines, composes, constructs, creates, designs, formulates, initiate, makes, modifies, originates, re-designs, trouble-shoots |

http://www.humboldt.edu/~tha1/bloomtax.html & http://academic.udayton.edu/health/syllabi/health/lesson01b.htm. Accessed June 2009.

## Appendix 5: Affective Domain- Krathwohl

The Affective Domain addresses interests, attitudes, opinions, appreciations, values, and emotional sets. This domain includes the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes. The MQA and MOE LO domains belonging to the affective taxonomy include communication, teamwork and social responsibilities, ethics, morality, professionalism, lifelong learning, management and leadership.

| Level | Category | Description | Examples | Action Verbs |
|---|---|---|---|---|
| 1 | Receiving | The student passively attends to particular phenomena or stimuli [classroom activities, textbook, music, etc.] The teacher's concern is that the student's attention is focused. Intended outcomes include the pupil's awareness that a thing exists. Emphasis is on awareness, willingness to hear, selected attention. | Listens attentively, shows sensitivity to social problems.<br><br>Listens to others with respect. Listens for and remembers the name of newly<br><br>"By the end of the lesson, students will listen attentively to ideas from their team members." | Attends, accepts, asks, chooses, describes, follows, gives, holds, identifies, listens, locates, names, points to, selects, selectively attends to, replies, uses. |
| 2 | Responding | The student actively participates. The student not only attends to the stimulus but reacts in some way.<br><br>Emphasis is on active participation on the part of the learners. Learning outcomes may emphasize compliance in responding, willingness to respond, or satisfaction in responding (motivation). | Completes homework, obeys rules, participates in class discussions, shows interest in subject, enjoys helping others.<br><br>Gives a presentation. Questions new ideals, concepts, models, in order to fully understand them. Knows safety rules and practices | Acclaims, aids, answers, applauds, approves, assists, complies, conforms, discusses, greets, helps, labels, performs, practices, presents, reads, recites, reports, selects, tells, writes, volunteers. |

| Level | Category | Description | Examples | Action Verbs |
|---|---|---|---|---|
| | | | them.<br><br>"By the end of the lesson, students will able to perform a quick check on their team participation performance." | |
| 3 | Valuing | The worth a student attaches to a particular object, phenomenon, or behavior. Ranges from acceptance to commitment (e.g., assumes responsibility for the functioning of a group). Attitudes and appreciation.<br><br>Valuing is based on the internalization of a set of specified values, while clues to these values are expressed in the learner's overt behavior and are often identifiable. | Demonstrates belief in democratic processes, appreciates the role of science in daily life, shows concern for others' welfare, demonstrates a problem-solving approach.<br><br>Is sensitive towards individual and cultural differences (value diversity). Shows the ability to solve problems. Proposes a plan to bring about social improvement and follows through with commitment. Informs management on strongly felt matters.<br><br>"By the end of the program, students will be able to demonstrate the scientific approach when resolving physical issues." | Assists, completes, debates, demonstrates, denies, differentiates, explains, follows, forms, increases proficiency in, initiates, invites, joins, justifies, proposes, protests, reads, relinquishes, reports, selects, shares, studies, supports, works. |
| 4 | Organization | Brings together different values, resolving conflicts among them, and starting to build an internally | Recognizes the need for balance between freedom and responsible behavior. | Accommodates, adheres, alters, arranges, balances, combines, compares, |

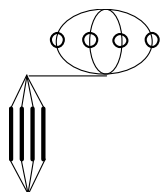| Level | Category | Description | Examples | Action Verbs |
|---|---|---|---|---|
| | | consistent value system--comparing, relating and synthesizing values and developing a philosophy of life.<br><br>Organizes values into priorities by contrasting different systems. The emphasis is on comparing, relating, and synthesizing values. | Understands the role of systematic planning in solving problems. Accepts responsibility for own behavior.<br><br>Explains the role of systematic planning in solving problems. Accepts professional ethical standards. Creates a life plan in harmony with abilities, interests, and beliefs. Prioritizes time effectively to meet the needs of the organization, family, and self.<br><br>"By the end of the environmental studies program, students will be able to organize the conservation efforts of urban, suburban and rural communities." | completes, defends, explains, formulates, generalizes, identifies, integrates, modifies, orders, organizes, prepares, relates, synthesizes. |
| 5 | Internalizing values: Characterization by a Value or Value Complex | At this level, the person has held a value system for a sufficiently long time to control his/her behavior, has developed a characteristic "life style." Behavior is pervasive, consistent, predictable, and most importantly, characteristic of the learner. Instructional objectives are concerned with the student's general patterns of | Concerned with personal, social, and emotional adjustment: displays self reliance in working independently, cooperates in group activities (displays teamwork), maintains good health habits. | Acts, discriminates, displays, influences, interprets, listens, maintains objectivity modifies, performs, practices, proposes, qualifies, questions, respects, revises, serves, solves, uses evidence, verifies. |

| Level | Category | Description | Examples | Action Verbs |
|-------|----------|-------------|----------|--------------|
| | | adjustment (personal, social, emotional). | Uses an objective approach in problem-solving. Displays a professional commitment to ethical practice on a daily basis. Revises judgments and changes behavior in light of new evidence. Values people for what they are, not how they appear.<br><br>"By the end of the counseling program, students will be able to objectively interpret evidence presented by clients during a therapy session." | |

http://www.humboldt.edu/~tha1/bloomtax.html & http://academic.udayton.edu/health/syllabi/health/lesson01b.htm. Accessed June 2009. Adopted from: Benjamin S. Bloom, Bertram.

B. Mesia, and David R. Krathwohl (1964). Taxonomy of Educational Objectives (two vols: The Affective Domain & The Cognitive Domain). New York. David McKay.

## Appendix 6: SOLO Taxonomy as a Reflection of Levels of Student Performance

Structure of Observed Learning Outcome (SOLO) taxonomy is a taxonomy that indicates complexity of the cognitive learning. It is especially beneficial when setting cognitive tasks or assessment items and designing rubrics (the performance standards) for grading the task. When using this taxonomy for writing learning outcomes and grading, it informs learners and faculty staff on the criteria and the standards of answers required to show evidence of attainment at the various competency or levels of cognitive performance.

| SOLO category | Representation | Type of outcome | Solution to problem | Structure of essay |
|---|---|---|---|---|
| Unanticipated extension (Extended Abstract) | | Create Synthesise Hypothesise Validate Predict Debate Theorise | Solution to problem which goes beyond anticipated answer.<br><br>Project or practical report dealing with real world ill-defined topic. | Well-structured essay with clear introduction and conclusion. Issues clearly identified; clear framework for organizing discussion; appropriate material selected. Evidence of wide reading from many sources. Clear evidence of sophisticated analysis or innovative thinking. |
| Logically related answer | | Apply Outline Distinguish Analyse Classify Contrast Summarise Categorise | Elegant solution to complex problem requiring identification of variables to be evaluated or hypotheses to be tested.<br><br>Well-structured project or practical report on open task. | Essay well-structured with a clear introduction and conclusion. Framework, which is well developed exists. Appropriate material. Content has logical flow, with ideas clearly expressed. Clearly identifiable structure to the argument with discussion of differing views. |

| SOLO category | Representation | Type of outcome | Solution to problem | Structure of essay |
|---|---|---|---|---|
| Intermediate | | | Solution to multiple-part problem with most parts correctly solved but with some errors.<br><br>Reasonably well-structured project or practical report on open task. | Essay fairly well structured. Some issues identified. Attempt at a limited framework. Most of the material selected is appropriate. Introduction and conclusion exists. Logical presentation attempted and successful in a limited way. Some structure to the argument but only limited number of differing views and no new ideas. |
| Multiple unrelated points | | Explain<br>Define<br>List<br>Solve<br>Describe<br>Interpret | Correct solution to multiple-part problem requiring substitution of data from one part to the next.<br><br>Poorly-structured project report or practical report on open task. | Essay poorly structured. A range of material has been selected and most of the material selected is appropriate. Weak introduction and conclusion. Little attempt to provide a clear logical structure. Focus on a large number of facts with little attempt at conceptual explanations. Very little linking of material between sections in the essay or report. |
| Single point | | State<br>Recognise<br>Recall<br>Quote<br>Note<br>Name | Correct answer to simple algorithmic problem requiring substitution of data into formula.<br><br>Correct solution of one part of more complex problem. | Poor essay structure. One issue identified and this becomes the sole focus; no framework for organizing discussion. Dogmatic presentation of a single solution to the set task. This idea may be restated in different ways. Little support from the literature. |

| SOLO category | Representation | Type of outcome | Solution to problem | Structure of essay |
|---|---|---|---|---|
| Misses the point | | | Completely incorrect solution. | Inappropriate or few issues identified. No framework for discussion and little relevant material selected. Poor structure to the essay. Irrelevant detail and some misinterpretation of the question. Little logical relationship to the topic and poor use of examples. |

SOLO Taxonomy (Biggs 2003). From: http://naticluster.wikispaces.com/file/view/The_SOLO_taxonomy_as_a_guide_to_setting_and_marking_assessment.doc. Accessed April 2010.

# Appendix 7: Example of a Systematic Approach to Directly and Indirectly Assessing Programme Learning Outcomes

Outcome Indicators (OI) are assessment tools used to collect evidence of students' performance and attainment. The program learning outcomes (PLO) are statements of what students know and are able to do upon completion of the program and are derived from the nine (9) MOE LO domains or the eight (8) MQF LO domains. Direct evidences of knowing and abilities are assessed through quantitative and qualitative methods. Indirect evidences deal with perceptions of students on their learning experiences rather than the actual knowing and abilities. Since a few methods are required to validate inference of PLO attainment, data is collected by using more than two (2) direct evidences and data for at least one (1) indirect evidence.

| | PLOs Outcome Indicators/Assessment Methods | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| OI1 | Entrance Survey (such as MOE's My3S) | | | | | √ | √ | √ | | | √ |
| OI2 | Entrance Exam (such as standardized Tests) | √ | | | | | | | | | |
| OI3 | Exit Exam (such as CLA, standardized Tests) | √ | | | | | | | | | |
| OI4 | Exit Interview | √ | √ | | √ | √ | | | | | |
| OI5 | Exit Survey (such as MOE's My3S and NSSE) | | | | | √ | √ | √ | | | √ |
| OI6 | Course-Embedded Assessment | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| OI7 | Capstone Course/Project | | √ | √ | √ | | | √ | √ | √ | |

| PLOs Outcome Indicators/Assessment Methods | | PLO1 | PLO2 | PLO3 | PLO4 | PLO5 | PLO6 | PLO7 | PLO8 | PLO9 | PLO10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| OI8 | Final Oral Presentation (Live or Videotape) | √ | | | √ | √ | | | | | |
| OI9 | Portfolio | | √ | √ | √ | | | | | | |
| OI10 | Peer & Self Evaluations | | | | √ | | √ | | | | √ |

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## Appendix 8: Example of a Systematic Approach to Assessing Programme Educational Objectives

Collecting evidences for the attainment of program educational objectives is done by using indirect outcome indicators (assessment tools). It is best to use at least two assessment tools in order to validate inferences obtained from the data collected. Indicated below is an example of outcome indicators used to collect evidences.

| PEOs Indicators/Assessment Methods | | PEO1 | PEO2 | PEO3 | PEO4 |
|---|---|---|---|---|---|
| OI1 | Employer Survey | | √ | √ | √ |
| OI2 | Alumni Survey | | √ | √ | √ |
| OI3 | Alumni Interviews | √ | | | |
| OI4 | Stakeholder Survey | | | √ | |
| OI5 | Job Offers | √ | | | |
| OI6 | Starting Salaries | | √ | | |
| OI7 | Admission to Graduate Programs | √ | | | |
| | Admission to professional qualification | | | | |

## Appendix 9: Examples of Rubric to Assess Different Outcomes

Rubrics may be used to measure several different skills or a specific performance. The following rubric may be used to measure students' ability to gather relevant information which is part of the MQA's outcomes on information management and lifelong learning skills. Criterion being assessed is the appropriateness of literature cited.

**Example 1: Rubric to Assess a Component of Information Management and Lifelong Learning Skills**

| Standard | Mark (Max 20) | Required Performance |
|----------|---------------|----------------------|
| **Very poor** | 0 - 1 | No literature cited. |
| **Poor** | 2 - 4 | Some literature cited, only some references to argument. |
| **Marginal** | 5 - 6 | Literature cited is appropriate, no citations at some crucial points. |
| **Adequate** | 7 - 8 | Literature cited is appropriate and covers all crucial points; however, it is limited to references supplied by the teaching staff. |
| **Good** | 9 - 10 | Literature cited is appropriate and covers all crucial points, includes some references found by the students independent of the teaching staff. |

Source: http://www.tedi.uq.edu.au/downloads/Criteria.pdf.

The following rubric is an example of assessment guideline for a research proposal. It can be used as an indication of the attainment of writing skills and critical thinking skills.

**Example 2: Rubric to Assess Research Proposal**

| Criteria for Evaluation | Incompetent-------------Highly competent | | | | | |
|---|---|---|---|---|---|---|
| **INTRODUCTION** | | | | | | |
| 1. Identifies research problems and key issues. | | 1 | 2 | 3 | 4 | 5 |
| 2. Appropriateness of objectives/purpose given the purpose, design and methods of study. | | 1 | 2 | 3 | 4 | 5 |
| 3. Appropriateness of research problems/hypotheses. | | 1 | 2 | 3 | 4 | 5 |
| 4. Clarity of operational definitions for all variables studied. | | 1 | 2 | 3 | 4 | 5 |
| **LITERATURE REVIEW** | | | | | | |
| 5. Provides comprehensive analysis of literature. | 0 | 1 | 2 | 3 | 4 | 5 |
| 6. Demonstrates ability to critically evaluate past literature. | 0 | 1 | 2 | 3 | 4 | 5 |
| 7. Shows ability in presenting literature review and forming themes. | 0 | 1 | 2 | 3 | 4 | 5 |
| 8. Provides a strong theoretical framework of study. | 0 | 1 | 2 | 3 | 4 | 5 |
| **METHODOLOGY** | | | | | | |
| 9. Appropriateness of research design. | 0 | 1 | 2 | 3 | 4 | 5 |
| 10. Appropriateness of target population and selection of samples. | 0 | 1 | 2 | 3 | 4 | 5 |

| Criteria for Evaluation | Incompetent-------------Highly competent | | | | | |
|---|---|---|---|---|---|---|
| 11. Appropriateness of sample size and sampling procedure for the research questions and methodology. | 0 | 1 | 2 | 3 | 4 | 5 |
| 12. Appropriateness of instruments/methods for gathering data. | 0 | 1 | 2 | 3 | 4 | 5 |
| 13. Validity of instruments. | 0 | 1 | 2 | 3 | 4 | 5 |
| 14. Reliability of instruments. | 0 | 1 | 2 | 3 | 4 | 5 |
| 15. Appropriateness of data gathering procedures. | 0 | 1 | 2 | 3 | 4 | 5 |
| 16. Appropriateness of data analysis. | 0 | 1 | 2 | 3 | 4 | 5 |
| **OVERALL** | | | | | | |
| 17. Utilizes appropriate language and grammar. | 0 | 1 | 2 | 3 | 4 | 5 |
| 18. Citation structure and format follow acceptable protocols. | 0 | 1 | 2 | 3 | 4 | 5 |
| 19. Viability of study. | 0 | 1 | 2 | 3 | 4 | 5 |
| 20. Coherence of purpose, questions, interventions, data gathering methods, and data analysis methods. | 0 | 1 | 2 | 3 | 4 | 5 |
| **TOTAL MARKS** | | | | | | |

The following rubric, in the form of mark bands may be used to measure the attainment of entrepreneurial skills. A description of the performance expected for a range of scores is usually provided.

**Example 3: Example of Entrepreneurial Skill**

| Mark Band | Criteria | Range of scores |
|---|---|---|
| 1 | • Very little, if any, successful attempt to analyse or evaluate information before making decisions.<br>• Limited ability to apply the skills of enterprise to the identification of a suitable project or activity.<br>• No variety in the methods of communication employed, or the<br>• communication was not suitable for the intended audience<br>• Some knowledge of enterprise concepts and terminology | 1-4 |
| 2 | • Some attempt to analyse information before making decisions<br>• Reasonable ability to apply the skills of enterprise to the<br>• identification of a suitable project or activity<br>• A variety of communication methods employed, but not completely suitable for the audience | 5-7 |
| 3 | • Ability to analyse information and evaluate courses of action before making decisions<br>• Good ability to apply the skills of enterprise to the identification of a suitable project or activity<br>• A variety of communication methods employed, fully suitable for the audience | 8-10 |

**Mark Band 1 : 1 to 4 marks**
Work at this level is likely to be incomplete.  The candidate may present only one of the two required pieces or two partially completed pieces of work.  The work presented may be written notes rather than the formats requested.  To gain marks in this task, however, there must be some use of relevant business concepts and terminology.
To achieve 4 marks candidates must show some evidence of the identification of a suitable project.  Therefore, candidates who present only the wall chart are unlikely to gain higher than 3 marks as they will not be demonstrating this aspect.

**Mark Band 2 : 5 to 7 marks**
Work at this level will provide evidence that both required tasks have been attempted. The wall chart/information leaflet and report will not be entirely suitable for the audience – there may be errors in the layout, spelling or language used.  There will

be evidence to show how the problem or need was identified and evidence of some attempt to evaluate their own entrepreneurial skills.

**Mark Band 3 : 8 to 10 marks**
To achieve Mark Band 3, candidates must produce evidence for both of the required tasks.  In the report they will consider both the advantages and disadvantages of each project before making a decision.  Candidates at this level will have used relevant terminology from the syllabus in their evidence and will have presented their materials using the required layouts.  The language and layouts chosen will be suitable for the chosen audiences.

Source:
http://www.cie.org.uk/docs/qualifications/new_qualifications/enterprise/0454%20Enterprise%20Teacher%20Guide.pdf.

## APPENDIX 10: PANEL MEMBERS

| NO. | NAME | ORGANISATION |
|-----|------|--------------|
| 1. | Aida Suraya Mohd Yunus (Prof. Dr.) | Universiti Putra Malaysia |
| 2. | Elango Sambandam (Prof. Dr.) | International Medical University |
| 3. | Glenda Marian Crosling (Prof. Madya Dr.) | Monash University |
| 4. | Hassan Siraj | Ministry of Education |
| 5. | Hjh. Ruminah Muhammad Zain | Ministry of Human Resource |
| 6. | Jaafar bin Jantan (Prof. Madya Dr.) | Universiti Teknologi MARA |
| 7. | Mohd Mustafa bin Mohd Ghazali (Prof. Dr.) | Universiti Teknologi MARA |
| 8. | Mohd Saleh Jaafar (Prof. Dato' Ir. Dr.) – Chairperson | Universiti Putra Malaysia |