George Boole (1815 - 1864)
First Professor of Mathematics in UCC
Assessment of Learning Outcomes in Higher Education

12 May 2017
Erasmus Plus conference,
University of Rijeka,
Croatia

Dr Declan Kennedy,
Department of Education,
University College Cork,
Ireland.
1. The experience in Ireland.

2. Clarifying what exactly we mean by Learning Outcomes.

3. Categories of learning outcomes for assessment.

4. Linking learning outcomes to teaching and learning activities and to assessment.
What are learning outcomes?

- Learning Outcomes are specific statements of what students should know and be able to do as a result of learning (Morss and Murray, 2005)

- Learning outcomes are statements of what is expected that a student will be able to DO as a result of a learning activity. (Jenkins and Unwin)

- A learning outcome is “a statement of what a learner knows, understands and is able to do on completion of a learning process” (European Qualifications Framework)

- Learning outcomes are explicit statements of what we want our students to know, understand or to be able to do as a result of completing our courses. (Univ. New South Wales, Australia)

- “Learning outcomes are statements that specify what learners will know or be able to do as a result of a learning activity. Outcomes are usually expressed as knowledge, skills or attitudes”. (American Association of Law Libraries)

- Learning outcomes are an explicit description of what a learner should know, understand and be able to do as a result of learning. (Learning and Teaching Institute, Sheffield Hallam University)
Working Definition

Learning outcomes are statements of what a student should know, understand and be able to demonstrate after completion of a process of learning.

- The learning activity could be, for example, a lecture, a module (short course) or an entire programme.
- Learning outcomes must not simply be a “wish list” of what a student is capable of doing on completion of the learning activity.
- Learning outcomes must be simply and clearly described.
- Learning outcomes must be capable of being validly assessed.
Aims and Objectives

The **Aim** of a programme or module is a broad general statement of teaching intention, i.e. it indicates what the teacher intends to cover in a programme or module or learning activity.

Example of aim: To give students an introduction to organic chemistry.

In some countries “Aim” is called a “goal”.

The **objective** of a module or lecture is a specific statement of teaching intention, i.e. it indicates one of the specific areas that the teacher intends to cover.

“My aim is to lose weight. My objective is to lose one kg per week”. My aim is to travel to Australia. My first objective is to get as far as Hong Kong”.

Objectives tend to be specific and measurable.
Aims and Objectives

Examples of objectives:

1. To give students an appreciation of the unique nature of carbon and its ability to bond to other carbon atoms.
2. To give students an understanding of the concept of hybridisation.
3. To ensure that students know some characteristic properties of alkanes and alcohols.
4. To make students familiar with a range of families of organic compounds: alkanes, alcohols, carboxylic acids and esters.

Aims are general and long term and refer to a series of lectures or unit of work (module).

Objectives are more specific and short term.
The language of aims and objectives

- To give students an understanding of ..... 
- To give students an appreciation of ..... 
- To make students familiar with ..... 
- To ensure that students know ..... 
- To enable students to experience ..... 
- To encourage students to ..... 
- To provide students with the opportunity to ..... 

etc.
Examples of Aims

- To give students an introduction to current theories and practice in the area of science education.
- To give students an understanding of what constitutes good science teaching.
- To give students an appreciation of the contribution that science education can make to the overall education of young people.
- To help students develop the knowledge and professional skills to teach science in the secondary school.
- To give students a critical understanding of current debates and issues relating to science education.
- To provide students with the opportunity to develop their critical thinking skills to enable them to engage in highly effective science teaching in schools.
- To assist students to develop as reflective practitioners with an understanding of research methods in education and how these can inform practice in the classroom.
From the definition of Learning Outcome we see:

- Emphasis on the student.
- Emphasis on the student’s ability to do something.

Focus on teaching – aims and objectives and use of terms such as *know, understand, be familiar with.*

- Outcomes: Focus on what we want the student to be able to do - use of terms such as define, list, name, recall, analyse, calculate, design, etc.

- Aims: Give broad purpose or general intention of the module.
- Objectives: Information about what the teaching of the module hopes to achieve.
- Learning outcomes are not designed to replace the traditional way of describing teaching and learning but to supplement it.
ASSESSMENT OF HIGHER EDUCATION LEARNING OUTCOMES

AHELO

FEASIBILITY STUDY REPORT

VOLUME 1
DESIGN AND IMPLEMENTATION
Karine Tremblay
Diane Lalancette
Deborah Roseveare

(2012)
Growing focus on student learning outcomes - Another trend sees a shift away from inputs towards outcome-based notions of higher education throughput. This shift has been most evident with the Bologna Declaration which aimed at establishing a European Higher Education Area and to write all higher education programmes in terms of learning outcomes by 2010. This trend is becoming global with many countries aligning their systems to be Bologna-compatible.

Emphasis on student centred learning and research on teaching-learning processes - The turn of the Century has also seen a shift in undergraduate education, from an "instruction paradigm" towards a "learning paradigm" in which the emphasis is no longer on the means but on the end. A corollary of this emphasis is to better understand the teaching-learning interplay. In this context, outcomes’ assessments are important for the evaluation of instructional effectiveness.
Learning Outcomes in UCC


Network of six EU universities involved.

Headed up by Prof. Aine Hyland, Education Dept. and Dr Norma Ryan Quality Promotion Unit

UCC An 18 month project - the report was published in 2005. The project concentrated on Learning Outcomes rather than Competences
A number of international conferences on Bologna Process were held in University College Cork – how I became involved.
Bologna Process:

- As a step towards achieving greater clarity in the description of qualifications, by 2010 all modules and programmes in third level institutions throughout the European Union had to be written in terms of learning outcomes.

- “Learning outcomes represent one of the essential building blocks for transparency within higher education systems and qualifications”
  
  - Bologna Working Group, p.18 (December 2004)

- Major contribution of exemplar material from staff taking “Postgraduate Certificate / Diploma in Teaching and Learning at Higher Education”.

- Staff training in UCC – lunchtime session and setting up of “Postgraduate Certificate, Diploma and Masters in Teaching and Learning at Higher Education”.

- To date, translated into 13 languages.

Order from [WWW.NAIRTL.IE](http://WWW.NAIRTL.IE)
Pisanje in uporaba učnih izidov
Praktični vodnik

dr. Declan Kennedy

izvirnik: University College Cork, Ireland | Coláiste Na Holmscole, Corcaigh, Éire, Januar 2007

NDP
HEA
UCC
Electronic copy of this book is available for free download.

If you insert "CORA Writing and Using Learning Outcomes A Practical Guide" into google search engine you will be able to download a free PDF of the book on Learning Outcomes by Dr Declan Kennedy. Alternatively, the book may be downloaded directly at https://cora.ucc.ie/handle/10468/1613
Abstract

Given that one of the main features of the Bologna process is the need to improve the traditional ways of describing qualifications and qualification structures, all modules and programmes in third level institutions throughout the European Higher Education Area should be (re)written in terms of learning outcomes. Learning outcomes are used to express what learners are expected to achieve and how they are expected to demonstrate that achievement. This article presents a summary of developments in curriculum design in higher education in recent decades and, drawing on recent practical experience, suggests a user-friendly methodology for writing modules, courses and programmes in terms of learning outcomes.
How are Learning Outcomes categorised in terms of Teaching and Learning and Assessment?
Benjamin Bloom  
(1913 – 1999)

He looked on learning as a process – we build upon our former learning to develop more complex levels of understanding.

Carried out research in the development of classification of levels of thinking behaviours in the process of learning. PhD University of Chicago in 1942.

Worked on drawing up levels of these thinking behaviours from the simple recall of facts at the lowest level up to evaluation at the highest level.
Bloom’s Taxonomy of Educational Objectives

- Bloom’s taxonomy (1956) is a very useful aid to writing learning outcomes.
- The taxonomy consists of a hierarchy of increasingly complex processes which we want our students to acquire.
- Provides the structure for writing learning outcomes
- Bloom’s Taxonomy is frequently used by teachers in writing learning outcomes as it provides a ready made structure and list of verbs.
Bloom (1956) proposed that knowing is composed of six successive levels arranged in a hierarchy.

1. Knowledge
2. Comprehension
3. Application
4. Analysis
5. Synthesis
6. Evaluation
This area is commonly called the **cognitive** ("knowing" or "thinking") **domain** (involving thought processes).

Bloom suggested certain verbs that characterise the ability to demonstrate these processes.

These verbs are the key to writing learning outcomes.

The list of verbs has been extended since his original publication.

The "toolkit" for writing learning outcomes!
1. Knowledge - ability to recall or remember facts without necessarily understanding them

- Use action verbs such as:
  - Arrange, collect, define, describe, duplicate, enumerate, examine, find, identify, label, list, locate, memorise, name, order, outline, present, quote, recall, recognise, recollect, record, recount, relate, repeat, reproduce, show, state, tabulate, tell.
Examples: Knowledge

- **Recall** genetics terminology: homozygous, heterozygous, phenotype, genotype, homologous chromosome pair, etc.
- **Identify** and consider ethical implications of scientific investigations.
- **Describe** how and why laws change and the consequences of such changes on society.
- **List** the criteria to be taken into account when caring for a patient with tuberculosis.
- **Define** what behaviours constitute unprofessional practice in the solicitor – client relationship.
- Outline the history of the Celtic peoples from the earliest evidence to the insular migrations.
- **Describe** the processes used in engineering when preparing a design brief for a client.
- Recall the axioms and laws of Boolean algebra.
2. Comprehension - ability to understand and interpret learned information

Use action verbs such as:
Associate, change, clarify, classify, construct, contrast, convert, decode, defend, describe, differentiate, discriminate, discuss, distinguish, estimate, explain, express, extend, generalise, identify, illustrate, indicate, infer, interpret, locate, predict, recognise, report, restate, review, select, solve, translate.
Examples: Comprehension

- **Differentiate** between civil and criminal law
- **Identify** participants and goals in the development of electronic commerce.
- **Discuss** critically German literary texts and films in English.
- **Predict** the genotype of cells that undergo meiosis and mitosis.
- **Translate** short passages of contemporary Italian.
- Convert number systems from hexadecimal to binary and vice versa.
- **Explain** the social, economic and political effects of World War I on the post-war world.
- **Classify** reactions as exothermic and endothermic.
- **Recognise** the forces discouraging the growth of the educational system in Ireland in the 19th century.
- **Explain** the impact of Greek and Roman culture on Western civilisation.
- **Recognise** familiar words and basic phrases concerning themselves....when people speak slowly and clearly.
3. Application: ability to use learned material in new situations, e.g. put ideas and concepts to work in solving problems

Use action verbs such as:
Apply, assess, calculate, change, choose, complete, compute, construct, demonstrate, develop, design, discover, dramatise, employ, examine, experiment, find, illustrate, interpret, manipulate, modify, operate, organise, practice, predict, prepare, produce, relate, schedule, select, show, sketch, solve, transfer, use.
Examples application

- Construct a timeline of significant events in the history of Australia in the 19th century.
- Apply knowledge of infection control in the maintenance of patient care facilities.
- Select and employ sophisticated techniques for analysing the efficiencies of energy usage in complex industrial processes.
- Show proficiency in the use of vocabulary and grammar, as well as the sounds of the language in different styles.....
- Relate energy changes to bond breaking and formation.
- Modify guidelines in a case study of a small manufacturing firm to enable tighter quality control of production.
- Show how changes in the criminal law affected levels of incarceration in Scotland in the 19th century.
- Apply principles of evidence-based medicine to determine clinical diagnoses.
4. Analysis: ability to break down information into its components, e.g. look for inter-relationships and ideas (understanding of organisational structure)

- Use action verbs such as: Analyse, appraise, arrange, break down, calculate, categorise, classify, compare, connect, contrast, criticise, debate, deduce, determine, differentiate, discriminate, distinguish, divide, examine, experiment, identify, illustrate, infer, inspect, investigate, order, outline, point out, question, recognise, relate, separate, solve, sub-divide, test.
Examples: Analysis

- Analyse why society criminalises certain behaviours.
- Compare and contrast the different electronic business models.
- Categorise the different areas of specialised interest within dentistry.
- Debate the economic and environmental effects of energy conversion processes.
- Identify and quantify sources of errors in measurements.
- Calculate gradient from maps in m, km, % and ratio.
- Critically analyse a broad range of texts of different genres and from different time periods.
- Compare the classroom practice of a newly qualified teacher with that of a teacher of 20 years teaching experience.
- Calculate logical functions for coders, decoders and multiplexers.
- Recognise trends in atomic radii in the Periodic Table of the Elements.
5. Synthesis - ability to put parts together and create new ideas from old concepts

- Use action verbs such as:
  - Argue, arrange, assemble, categorise, collect, combine, compile, compose, construct, create, design, develop, devise, establish, explain, formulate, generalise, generate, infer, integrate, invent, make, manage, modify, organise, originate, plan, prepare, propose, rearrange, reconstruct, relate, reorganise, revise, rewrite, set up, summarise.
Examples: Synthesis

- Recognise and formulate problems that are amenable to energy management solutions.
- Propose solutions to complex energy management problems both verbally and in writing.
- Assemble sequences of high-level evaluations in the form of a program.
- Integrate concepts of genetic processes in plants and animals.
- Summarise the causes and effects of the 1917 Russian revolutions.
- Relate the sign of enthalpy changes to exothermic and endothermic reactions.
- Organise a patient education programme.
6. Evaluation: Ability to make a judgement of the value of material for a given purpose (Summative and Judgemental)

Use action verbs such as:
Appraise, ascertain, argue, assess, attach, choose, compare, conclude, contrast, convince, criticise, decide, defend, discriminate, explain, evaluate, interpret, judge, justify, measure, predict, rate, recommend, relate, resolve, revise, score, summarise, support, validate, value.
Examples: Evaluation

- Assess the importance of key participants in bringing about change in Irish history.
- Evaluate marketing strategies for different electronic business models.
- Appraise the role of sport and physical education in health promotion for young people.
- Predict the effect of change in temperature on the position of equilibrium in the given reaction.
- Summarise the main contributions of Michael Faraday to the field of electromagnetic induction.
2. The Affective Domain
AFFECTIVE DOMAIN ("Feeling") concerned with value issues: involves attitudes.

1. Receiving
2. Responding
3. Valuing
4. Organisation
5. Characterisation

- Willingness to receive information
- Active participation in own learning
- Commitment to a value
- Comparing, relating, synthesising values
- Integration of beliefs, ideas and attitudes
Active Verbs in Affective Domain

Appreciate, accept, assist, attempt, challenge, combine, complete, defend, demonstrate (a belief in), discuss, dispute, embrace, follow, hold, integrate, order, organise, join, share, judge, praise, question, relate, share, support, synthesise, value.
Examples of Learning Outcomes in Affective Domain

- Accept the need for professional ethical standards.
- Appreciate the need for confidentiality in the professional client relationship.
- Display a willingness to communicate well with patients.
- Relate to participants in an ethical and humane manner.
- Resolve conflicting issues between personal beliefs and ethical considerations.
- Embrace a responsibility for the welfare of children taken into care.
- Participate in class discussions with colleagues and with teachers.
3. Psychomotor Domain
PSYCHOMOTOR (“Doing”) DOMAIN:

Active verbs for this domain: bend, grasp, handle, operate, manipulate, perform, reach, relax, shorten, stretch, differentiate (by touch), perform (skilfully).
5. Psychomotor skills

- Work never completed by Bloom.
- Involves co-ordination of brain and muscular activity
- Active verbs for this domain: bend, grasp, handle, operate, manipulate, perform, reach, relax, shorten, stretch, differentiate (by touch), perform (skilfully), etc.
Laboratory skills
- Operate the range of instrumentation specified in the module safely and efficiently in the chemistry laboratory.
- Perform titrations accurately and safely in the laboratory.
- Construct simple scientific sketches of geological features in the field.

Clinical Skills
- Perform a comprehensive history and physical examination of patients in the outpatient setting and the general medical wards, excluding critical care settings.
- Perform venipuncture and basic CPR.

Presentation skills
- Deliver an effective presentation.
- Demonstrate a range of graphic and CAD communication techniques.
- Perform basic voice and movement tasks (theatre studies).
INTER RELATIONSHIPS BETWEEN THE THREE DOMAINS

KNOWLEDGE

SKILLS

ATTITUDE

Psychomotor

Cognitive

Affective
Writing Programme Learning Outcomes

Programme learning outcomes are learning outcomes that describe the essential knowledge, skills and attitudes that it is intended that graduates of the programme will be able to demonstrate.

The rules for writing learning outcomes for programmes are the same as those for writing learning outcomes for modules.

The general guidance in the literature is that there should be 5 – 10 learning outcomes for a programme and that only the minimum number of outcomes considered to be essential be included.
Two types of Programme Learning Outcomes

1. The first type of learning outcome refers to those learning outcomes that can be assessed during the programme, i.e. within the various modules.

2. “Aspirational” or “desirable” learning outcomes indicate what a good quality student would be expected to achieve by the end of the programme. This type of learning outcome may not be assessed at all but gives an indication to employers and other agencies the type of standard of practical performance that graduates of the programme will display at the end of the programme.
Example 1 Programme Learning Outcomes
[Undergraduate degree in Science Education]

On successful completion of this programme, students should be able to:

- Recognise and apply the basic principles of classroom management and discipline.
- Identify the key characteristics of excellent teaching in science.
- Develop comprehensive portfolios of lesson plans that are relevant to the science curricula in schools.
- Evaluate the various theories of Teaching and Learning and apply these theories to assist in the creation of effective and inspiring science lessons.
- Critically evaluate the effectiveness of their teaching of science in the second-level school system.
- Display a willingness to co-operate with members of the teaching staff in their assigned school.
- Foster an interest in science and a sense of enthusiasm for science subjects in their pupils.
- Synthesise the key components of laboratory organisation and management and perform laboratory work in a safe and efficient manner.
- Communicate effectively with the school community and with society at large in the area of science education.
Example 2 Programme Learning Outcomes
[Undergraduate Degree in Engineering]

On successful completion of this programme, students should be able to:

- Derive and apply solutions from knowledge of sciences, engineering sciences, technology and mathematics.
- Identify, formulate, analyse and solve engineering problems.
- Design a system, component or process to meet specified needs and to design and conduct experiments to analyse and interpret data.
- Work effectively as an individual, in teams and in multi-disciplinary settings together with the capacity to undertake lifelong learning.
- Communicate effectively with the engineering community and with society at large.
Example 3 Programme Learning Outcomes
[Masters in Computer Science Degree]

On successful completion of this programme, students should be able to:

- Perform problem solving in academic and industrial environments.
- Use, manipulate and create large computational systems.
- Work effectively as a team member.
- Organise and pursue a scientific or industrial research project.
- Write theses and reports to a professional standard, equivalent in presentational qualities to that of publishable papers.
- Prepare and present seminars to a professional standard.
- Perform independent and efficient time management.
- Use a full range of IT skills and display a high standard of computer literacy.
Making programme learning outcomes explicit for students of process and chemical engineering

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\textbf{A B S T R A C T}

There is a global shift in education from solely content-driven teaching to teaching that takes learning outcomes into account. This movement underpins much of the educational reform in the area of engineering education. Programme learning outcomes for degrees in engineering education are more commonplace as more and more professional accrediting bodies require fulfillment or compliance with prescribed learning outcomes. However, the students may not be presented with these learning outcomes as they are often “hidden” in documentation submitted by institutions for accreditation purposes and hence may not be divulged to students. Undergraduate students (2006–2008) taking the BE degree programme in Process & Chemical Engineering at UCC were first surveyed to assess their level of knowledge of the learning outcomes concept and of the degree programme learning outcomes. The contents of two documents used in applications for accreditation by professional accreditation bodies as well as professional Institution guidelines were reviewed to formulate the degree programme learning outcomes which were presented to the students. These students were then surveyed after the presentation. The results of the questionnaire completed by students demonstrated a major improvement in their knowledge of both the concept of learning outcomes and also of the degree programme learning outcomes. It also showed that the students found the session to be of overall beneficial value.
The benefits of Learning Outcomes

- Help to explain more clearly to students what is expected of them and thus help to guide them in their studies – motivation and sense of purpose
- Help teachers to focus more clearly on what exactly they want students to achieve in terms of knowledge and skills.
- Help teachers to clarify their thinking about what they want to achieve and the common language of learning outcomes helps to facilitates discussion with colleagues.
- Helps to define the assessment criteria more effectively.
- Help to provide guidance to employers about the knowledge and understanding possessed by graduates of programmes, i.e. show the value of the programme in terms of programme learning outcomes and module learning outcomes.
- Help to start discussion on Teaching and Learning in third level institutions.
How do I link Learning Outcomes to Teaching and Learning Activities and to Assessment?
Having designed modules and programmes in terms of learning outcomes, we must now find out if our students have achieved these intended learning outcomes.

How will I know if my students have achieved the desired learning outcomes? How will I measure the extent to which they have achieved these learning outcomes?

Therefore, we must consider how to match the method of assessment to the different kinds of learning outcomes e.g. a Learning Outcome such as “Demonstrate good presentation skills” could be assessed by the requirement that each student makes a presentation to their peers.

When writing learning outcomes the verb is often a good clue to the assessment technique.
Misconceptions about Assessment

“A view of teaching as the transmission of authoritative knowledge has little space to accommodate the idea that different methods of assessment may be appropriate for the evaluation of different parts of the subject matter or that assessment techniques themselves should be the subject of serious study and reflection. In such a conception, lecturers see teaching, learning and assessment as tenuously related in a simple linear sequence”.

“Assessment is something that follows learning, so there is no need to consider its function as a means of helping students to learn through diagnosing their errors and misconceptions and reinforcing their correct understanding”.

“Assessment, like teaching, is something done to students ....Assessment classifies the students on the criterion of how well they have absorbed the data thus transmitted. What could be simpler?”

(Ramsden, 2005)
Assessment – assidere - growth

Assessment is an integral part of teaching and learning. It includes:
- Continuous feedback,
- Documentation of learning,
- Rubrics

It should be part of our class planning.
It should be to the forefront when designing Learning Outcomes.

Assessment is an essential component of a successful teaching and learning process.
Formative Assessment

- Assessment FOR learning – gives feedback to students and teachers to help modify teaching and learning activities, i.e. helps inform teachers and students on progress being made.

- Assessment is integrated into the teaching and learning process.

- Clear and rich feedback helps improve performance of students (Black and Williams, 1998).

- Usually carried out at beginning or during a programme, e.g. coursework which gives feedback to students.

- Can be used as part of continuous assessment, but some argue that it should not be part of grading process (Donnelly and Fitzmaurice, 2005).
Summative Assessment

- Assessment that summarises student learning at end of module or programme – Assessment OF Learning.
- Sums up achievement – no other use.
- Generates a grade or mark.
- Usually involves assessment using the traditional examination.
- Only a sample of the Learning Outcomes are assessed – cannot assess all the Learning Outcomes.
Continuous Assessment

- A combination of summative and formative assessment.
- Usually involves repeated summative assessments.
- Marks recorded.
- Little or no feedback given.
Assessment

“Assessment is the process of gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand and can do with their knowledge as a result of their educational experiences” (Huba and Freed, 2000)


“A way of finding out what our students know and can do”
## Trends in assessment

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<th>Traditional</th>
<th>Changing approaches</th>
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<tr>
<td>Examinations</td>
<td>Course work</td>
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<tr>
<td>Lecturer-led</td>
<td>Student-led</td>
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<tr>
<td>Product assessment</td>
<td>Explicit criteria</td>
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<td>Vague criteria</td>
<td>Skills</td>
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<tr>
<td>Content</td>
<td>Group work</td>
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<tr>
<td>Individual</td>
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SOME INDICATORS OF EFFECTIVE ASSESSMENT IN HIGHER EDUCATION

A checklist for quality in student assessment
(Source: Centre for the Study of Higher Education, Australia)

1. Assessment is treated by staff and students as an integral component of the entire teaching and learning process.

2. The multiple roles of assessment are recognised. The powerful motivating effect of assessment requirements on students is understood and assessment tasks are designed to foster valued study habits.

3. There is a faculty/departmental policy that guides assessment practices. Subject assessment is integrated into an overall plan for course assessment.
Common assessment techniques in Higher Education

- Paper/thesis
- Project
- Product development
- Performance
- Exhibition
- Case study.

- Clinical evaluation
- Oral exam
- Interview
- Research assignment
- Portfolio
- Others??
Interrogating our assessment

1. Have we included a good balance of learning outcomes in our modules? *(e.g. Bloom’s Taxonomy)*

2. How do we know if students have achieved the intended learning outcomes: is there a good match between learning outcomes and assessment?

3. How can we improve assessment so that it tests the intended learning outcomes?
Implications of MI Theory for Innovative Forms of Teaching, Learning and Assessment

“If we truly accept and value the theory of MI, then we are obliged as teachers to be far more inventive in our teaching. We must search for and develop methodologies that will allow all intelligences to shine in the learning experience. ……we must grasp the notion of constructivism with both hands and give the students the freedom to explore and construct knowledge and understanding, beginning with their own strengths”. (Hyland (ed.) Final Report MI Project, 2000, p. 126)
One of the big challenges is to move away from assessment based solely on terminal exams – not intelligence fair, forcing all kinds of learning to fit into the paper and pencil test straight jacket.

Purposes of Assessment: feedback, diagnosis, motivation, guidance, learning support, selection, grading, certification, progression, professional recognition, gate-keeping…..
The aim of assessment should be to encourage students to

– Collaborate and converse with others, to take responsibility for their work provoking and engaging in recollection and revision - and to amplify their understandings and apply them in powerful ways or in new or surprising contexts.

(Gardner 1991, 51)
FOR A FAIR SELECTION EVERYBODY HAS TO TAKE THE SAME EXAM: PLEASE CLIMB THAT TREE
## Example of Matching the Assessment to the Learning Outcome

<table>
<thead>
<tr>
<th>Learning outcomes</th>
<th>Assessment?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Demonstrate good presentation skills.</td>
<td>a) Multiple choice questions</td>
</tr>
<tr>
<td>2. Formulate food product</td>
<td>b) Prepare a 1000-word research proposal</td>
</tr>
<tr>
<td>3. Identify an area for research</td>
<td>c) Lab-based project</td>
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<tr>
<td>4. Identify signs and symptoms of MS in a patient</td>
<td>d) Make a presentation to peers</td>
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</tbody>
</table>
Giving feedback to students

- Make it quick, clear and focussed
- Relate it to the assessment criteria and learning outcomes.
- Learning Outcomes are usually written at threshold level. “Learning outcomes should be treated as threshold statements. They should not describe the performance of the average or typical student as so many people in workshops seemed to assume” (Moon 2002 p. 8).
- Use rubrics or formal marking schemes to show how well the requirements are met.

Steps in feedback:
- Affirm what is done well
- Clarify: ask questions about specific aspects
- Make suggestions for improvement
- Give guidance about what the student needs to do next

The statement below is no longer acceptable due to the transparency of learning outcomes.

I cannot tell you what a first class honours is but I will know it when I see it!
In the first instance a teacher asks for clarification of a point being made. ‘Can you tell me more about?’, I note what you say about... would you like to say more/elaborate?...’ This extends the conversation and allows the student time to articulate the point more clearly. The teacher does not make a judgement on the point being made, by either agreeing or disagreeing with it but, rather, allows the students to move away from what is often a monosyllabic first response to a more considered reply.

Having gone through a process of clarification a teacher may then offer a judgement, a value, on the point made. This should be in a very positive tone, for example, 'I like your point about.....', or 'that is a very interesting concept', which, again, keeps the conversations open.
Concerns: On the third step of the ladder, a teacher is given an opportunity to voice his/her concerns, in ways that will allow the student an opportunity to think through the answer again.

Suggest: It is particularly helpful when the teacher, using the final step, offers one or more suggestions, which the student should consider when revisiting the work – it usually helps to give two alternatives where possible to allow the student to make the decision...
Assessing your assessment – is it doing the job you want it to do? Is it comprehensive?

<table>
<thead>
<tr>
<th>Learning Outcome 1</th>
<th>Assessment Task 1 e.g. Written Exam</th>
<th>Assessment Task 2 e.g. Project</th>
<th>Assessment Task 3 e.g. Presentation</th>
<th>Assessment Task 4 e.g. Lab work</th>
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<tbody>
<tr>
<td>Describe...</td>
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<tr>
<td>Learning Outcome 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investigate..</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning Outcome 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstrate..</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
To what extent has each Learning Outcome been achieved?

Not a question of “yes” or “no” to achievement of Learning Outcomes.

Rubric: A grading tool used to describe the criteria which are used in grading the performance of students.

Rubric provides a clear guide as to how students’ work will be assessed.

A rubric consists of a set of criteria and marks or grade associated with these criteria.
## Linking learning outcomes and assessment criteria.

<table>
<thead>
<tr>
<th>Learning outcome</th>
<th>Assessment criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>Grade 2 : 1</td>
</tr>
<tr>
<td>On successful completion of this module, students should be able to:</td>
<td>Outstanding use of literature showing excellent ability to synthesise evidence in analytical way to formulate clear conclusions.</td>
</tr>
</tbody>
</table>
Important to ensure that there is alignment between teaching methods, learning outcomes and assessment criteria.

Clear expectations on the part of students of what is required of them are a vitally important part of students’ effective learning (Ramsden, 2003)

This correlation between teaching, learning outcomes and assessment helps to make the overall learning experience more transparent and meaningful for students.

For the good teacher, learning outcomes do not involve a “paradigm shift”.

There is a dynamic equilibrium between teaching strategies and Learning Outcomes.
Teacher-Centred Approach – Aims and Objectives.

Student-Centred Approach - Learning Outcomes
It is important that the assessment tasks mirror the Learning Outcomes since, as far as the students are concerned, the assessment is the curriculum: “From our students’ point of view, assessment always defined the actual curriculum” (Ramsden, 1992).

Biggs (2003) represents this graphically as follows:

```
Teacher Perspectives: Objectives → Learning Outcomes → Teaching Activities → Assessment

Student Perspectives: Assessment → Learning Activities → Outcomes
```

“To the teacher, assessment is at the end of the teaching-learning sequence of events, but to the student it is at the beginning. If the curriculum is reflected in the assessment, as indicated by the downward arrow, the teaching activities of the teacher and the learner activities of the learner are both directed towards the same goal. In preparing for the assessment, students will be learning the curriculum” (Biggs 2003)
“Constructive Alignment” (Biggs, 2005)

Constructive

- The students construct understanding for themselves through learning activities. “Teaching is simply a catalyst for learning” (Biggs, 2003).
- “If students are to learn desired outcomes in a reasonably effective manner, then the teacher’s fundamental task is to get students to engage in learning activities that are likely to result in their achieving those outcomes…. It is helpful to remember that what the student does is actually more important in determining what is learned than what the teacher does” (Shuell, 1986)

Alignment

- Alignment refers to what the teacher does in helping to support the learning activities to achieve the learning outcomes.
- The teaching methods and the assessment are aligned to the learning activities designed to achieve the learning outcomes.
- Aligning the assessment with the learning outcomes means that students know how their achievements will be measured.
Constructive alignment is the deliberate linking within curricula of aims, learning outcomes, learning and teaching activities and assessment.

Learning Outcomes state what is to be achieved in fulfilment of the aims.

Learning activities should be organised so that students will be likely to achieve those outcomes.

Assessment must be designed such that students are able to demonstrate that they have met the learning outcomes.

Constructive alignment is just a fancy name for “joining up the dots”.

(Morss and Murray, 2005)
Steps involved in linking Learning Outcomes, Teaching and Learning Activities and Assessment

1. Clearly define the learning outcomes.
2. Select teaching and learning methods that are likely to ensure that the learning outcomes are achieved.
3. Choose a technique or techniques to assess the achievement of the learning outcomes.
4. Assess the learning outcomes and check to see how well they match with what was intended.

If the learning outcomes are clearly written, the assessment is quite easy to plan!
LEARNING OUTCOMES

TEACHING AND LEARNING ACTIVITIES

ASSESSMENT
## Linking Learning Outcomes, Teaching and Learning Activities and Assessment

<table>
<thead>
<tr>
<th>Learning Outcomes</th>
<th>Teaching and Learning Activities</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognitive</strong></td>
<td>Lectures</td>
<td>• End of module exam.</td>
</tr>
<tr>
<td>(Demonstrate: Knowledge, Comprehension,</td>
<td>Tutorials</td>
<td>• Multiple choice tests.</td>
</tr>
<tr>
<td>Application, Analysis, Synthesis,</td>
<td>Discussions</td>
<td>• Essays.</td>
</tr>
<tr>
<td>Evaluation)</td>
<td>Laboratory work</td>
<td>• Reports on lab work and research project.</td>
</tr>
<tr>
<td></td>
<td>Clinical work</td>
<td>• Interviews/viva.</td>
</tr>
<tr>
<td></td>
<td>Group work</td>
<td>• Practical assessment.</td>
</tr>
<tr>
<td></td>
<td>Seminar</td>
<td>• Poster display.</td>
</tr>
<tr>
<td></td>
<td>Peer group presentation etc.</td>
<td>• Fieldwork.</td>
</tr>
<tr>
<td><strong>Affective</strong></td>
<td></td>
<td>• Clinical examination.</td>
</tr>
<tr>
<td>(Integration of beliefs, ideas and</td>
<td></td>
<td>• Presentation.</td>
</tr>
<tr>
<td>attitudes)</td>
<td></td>
<td>• Portfolio.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Performance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Project work.</td>
</tr>
<tr>
<td><strong>Psychomotor</strong></td>
<td></td>
<td>• Production of artefact etc.</td>
</tr>
<tr>
<td>(Acquisition of physical skills)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning outcomes</td>
<td>Teaching and Learning Activities</td>
<td>Assessment</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td><strong>Module ED2100</strong></td>
<td><strong>Cognitive</strong></td>
<td><strong>10 credit module</strong></td>
</tr>
<tr>
<td></td>
<td>Lectures (12)</td>
<td><strong>Mark = 200</strong></td>
</tr>
<tr>
<td></td>
<td>Tutorials (6)</td>
<td>End of module exam.</td>
</tr>
<tr>
<td></td>
<td>Observation of classes (6) of</td>
<td>Portfolio of lesson plans</td>
</tr>
<tr>
<td></td>
<td>experienced science teacher</td>
<td>(100 marks)</td>
</tr>
<tr>
<td></td>
<td>(mentor)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Affective</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Participation in mentoring</td>
<td>Report from school mentor</td>
</tr>
<tr>
<td></td>
<td>feedback sessions in school (4)</td>
<td>End of project report.</td>
</tr>
<tr>
<td></td>
<td>Participation in 3 sessions of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UCC Peer Assisted Learning</td>
<td>(50 marks)</td>
</tr>
<tr>
<td></td>
<td>(PAL) Programme.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Peer group presentation</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Psychomotor</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teaching practice</td>
<td>Supervision of Teaching Practice</td>
</tr>
<tr>
<td></td>
<td>6 weeks at 2 hours per week.</td>
<td>Assessment of teaching skills</td>
</tr>
<tr>
<td></td>
<td>Laboratory work</td>
<td>(50 marks)</td>
</tr>
<tr>
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</tbody>
</table>
Does every learning outcome have to be assessed?

- In theory “yes” but in practice “no”.
- In some cases they have to be assessed, e.g. licence to practice (e.g. medicine) or to perform essential tasks (e.g. aircraft pilot).
- When assessment is limited purely to an examination paper, it may not be possible to assess all the Learning Outcomes in such a short space of time – sampling of Learning Outcomes.
- Even if all the Learning Outcomes are assessed on an examination paper, due to choice of questions, a student may not be assessed on all of them.
Our Students and Graduates

What do we wish our graduates to be capable of when they leave our institution?

Gardner (1999) talks of school graduates who will need to be *highly literate, flexible, capable of troubleshooting/problem-finding, adaptable to changing roles*…..

Are they capable of this when they leave school and come to University?

Are they capable of this when they leave University?

If not – why not?

Black *et al* (2003) state that *establishing good formative assessment practices requires that most teachers make significant changes*. *This involves extra work and risk taking*
Group Work

Group work can combine many aspects of feedback and enrich understanding. It provides students with opportunities to engage in self and peer assessment and to moderate and regulate their responses before obtaining teacher assessment. It honours different intelligences and allows students to show understanding in the way that is best for them.
<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>
Student-centred learning and the teaching mission of higher education

14. We reassert the importance of the teaching mission of higher education institutions and the necessity for ongoing curricular reform geared toward the development of learning outcomes. Student-centred learning requires empowering individual learners, new approaches to teaching and learning, effective support and guidance structures and a curriculum focused more clearly on the learner in all three cycles. Curricular reform will thus be an ongoing process leading to high quality, flexible and more individually tailored education paths. Academics, in close cooperation with student and employer representatives, will continue to develop learning outcomes and international reference points for a growing number of subject areas. We ask the higher education institutions to pay particular attention to improving the teaching quality of their study programmes at all levels. This should be a priority in the further implementation of the European Standards and Guidelines for quality assurance.
The Centre for the Integration of Research, Teaching and Learning (CIRTL) University College Cork

- Director Dr Marian McCarthy
- Has provided a continuous series of lunchtime seminars on Teaching and Learning throughout each academic year.
- “Taking a Learning Outcomes approach to Teaching and Learning”
- “Learning Outcomes-how can we be sure they have been achieved?”
- “Getting to Grips with Assessing Creative and Original Student work - Unpredictable Learning Outcomes”
- Drop-in workshops on Learning Outcomes.
Postgraduate Certificate, Diploma and MA in Teaching and Learning in Higher Education

- To date 4 cycles of the Postgraduate Certificate course have been completed involving 170 staff.
- A total of 90 staff members have completed the Postgraduate Diploma course.
- The MA in Teaching and Learning at Higher Education has been completed by 20 staff members.
- Has provided a great resource throughout the university – seminars based in individual Departments.
“Writing, Using and Assessing Learning Outcomes is a Process not an Event”
Learning Outcomes

At the end of this presentation you should be able to:

- Distinguish between Aims, Objectives and Learning Outcomes.
- Interpret Bloom’s Taxonomy to create and evaluate Learning Outcomes.
- Discuss the various forms of Assessment.
- Explain how to link Learning Outcomes to Teaching and Learning Activities and to Assessment.
References


Dave, R H (1975) *Developing and Writing Behavioural Objectives* (R J Armstrong, ed.) Educational Innovators Press


Fung M, Lee W and Wong S () A new measure of generic competencies.


Jenkins, A. and Unwin, D. *How to write learning outcomes*. See the following URL:

[https://www.ubalt.edu/cas/faculty/faculty-matters/How%20to%20write%20student%20learning%20outcomes.pdf](https://www.ubalt.edu/cas/faculty/faculty-matters/How%20to%20write%20student%20learning%20outcomes.pdf)


REFERENCES ASSESSMENT


REFERENCES (continued)

- Wilson, D. 2001 *The Dimensions of Understanding*. Assessment for Understanding,
References – Web Sites


DeSeCo projet : http://www.desco.admin.ch/


Framework website: www.nfq.ie

National Qualifications Authority of Ireland: www.nqai.ie


Tuning Educational Structures in Europe: http://tuning.unideusto.org/tuningeu/


www.bologna.ie