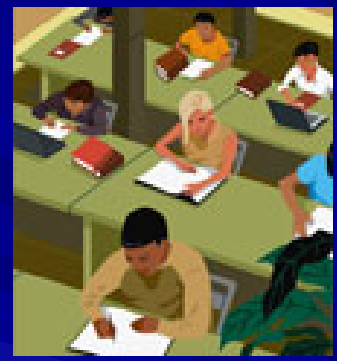
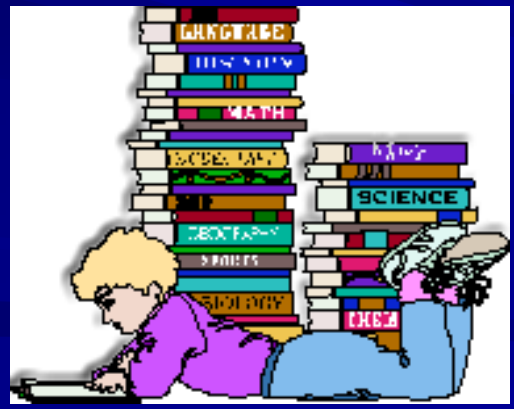
How do we begin the process of describing the programmes in our University in terms of Learning Outcomes?





22 June 2010
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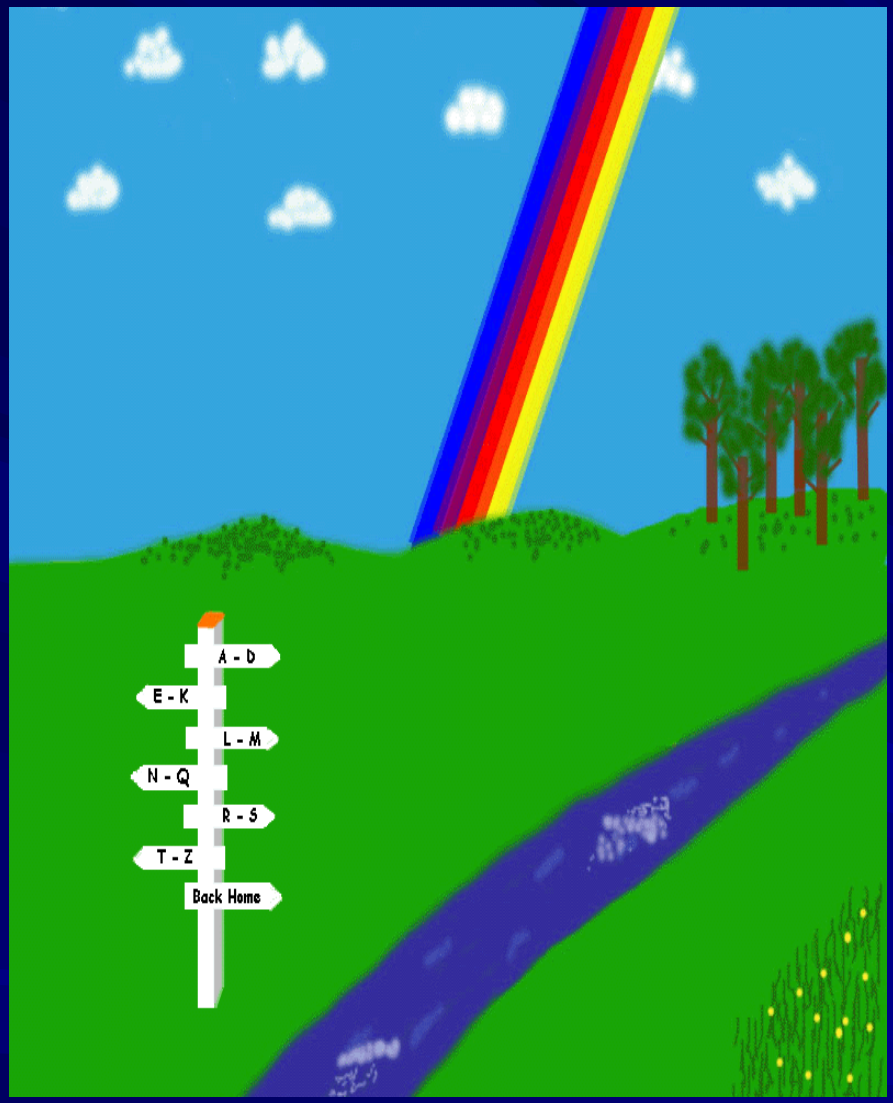
University College Cork



1. What are Learning Outcomes?
2. How do I write Learning Outcomes?
3. What are the benefits and potential problems of Learning Outcomes?

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)
- 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).
- 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/or be able to demonstrate after completion of a process of learning

- The learning activity could be, for example, a lecture, a module 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 module or programme is a broad general statement of teaching intention, i.e. it indicates what the teacher intends to cover in a programme, module or learning activity.
- Example of aim: To give students an introduction to organic chemistry

- The objective of a module or programme is a specific statement of teaching intention, i.e. it indicates one of the specific areas that the teacher intends to cover.
- Examples of objectives:

1. Give students an appreciation of the unique nature of carbon and it 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.

From the definition of Learning Outcome we see:

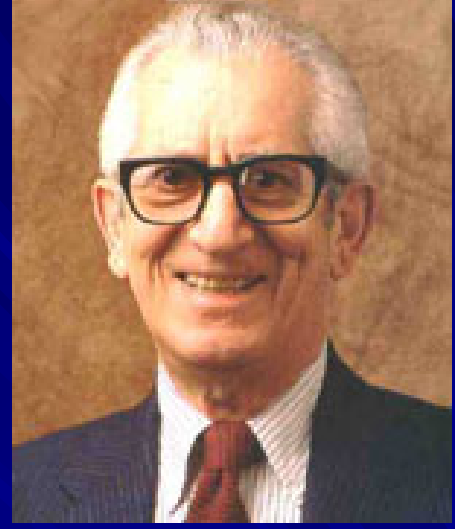
- Emphasis on the learner.
- Emphasis on the learner's ability to do something.

- Focus on teaching – aims and objectives and use of terms like *know, understand, be familiar with.*
- Outcomes: Focus on what we want the student to be able to do - use of terms like 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.

How do I write Learning Outcomes?

Benjamin Bloom (1913 – 1999)

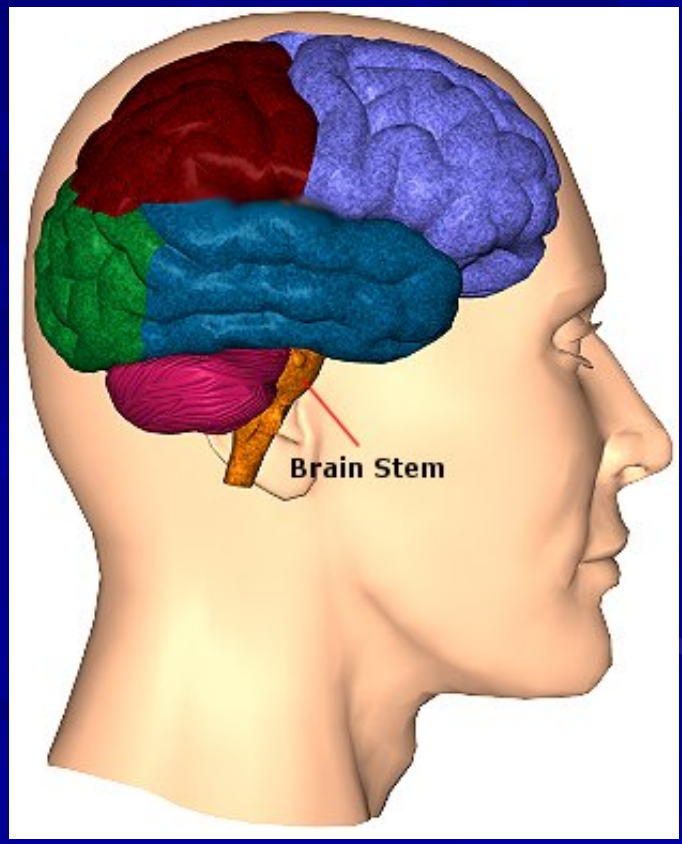


- He looked on learning as a process – we build upon our former learning to develop more complex levels of understanding
- Carried out research in the development of classification of levels of thinking behaviours in the process of learning. PhD University of Chicago in 1942.
- Worked on drawing up levels 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.



- 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 like:

  Arrange, collect, define, describe, duplicate, enumerate, examine, find, identify, label, list, 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 like:

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 like:

Apply, assess, calculate, change, choose, complete, compute, construct, demonstrate, develop, 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 like:

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, relate, separate, 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.

5. Synthesis - ability to put parts together

- Use action verbs like:

Argue, arrange, assemble, categorise, collect, combine, compile, compose, construct, create, design, develop, devise, establish, explain, formulate, generalise, generate, 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 judge value of material for a given purpose

- Use action verbs like:

  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…
- Summarise the main contributions of Michael Faraday to the field of electromagnetic induction.

Bloom Revisited: Anderson and Krathwohl (2001)

Bloom (1956)

- Knowledge
- Comprehension
- Application
- Analysis
- Synthesis
- Evaluation

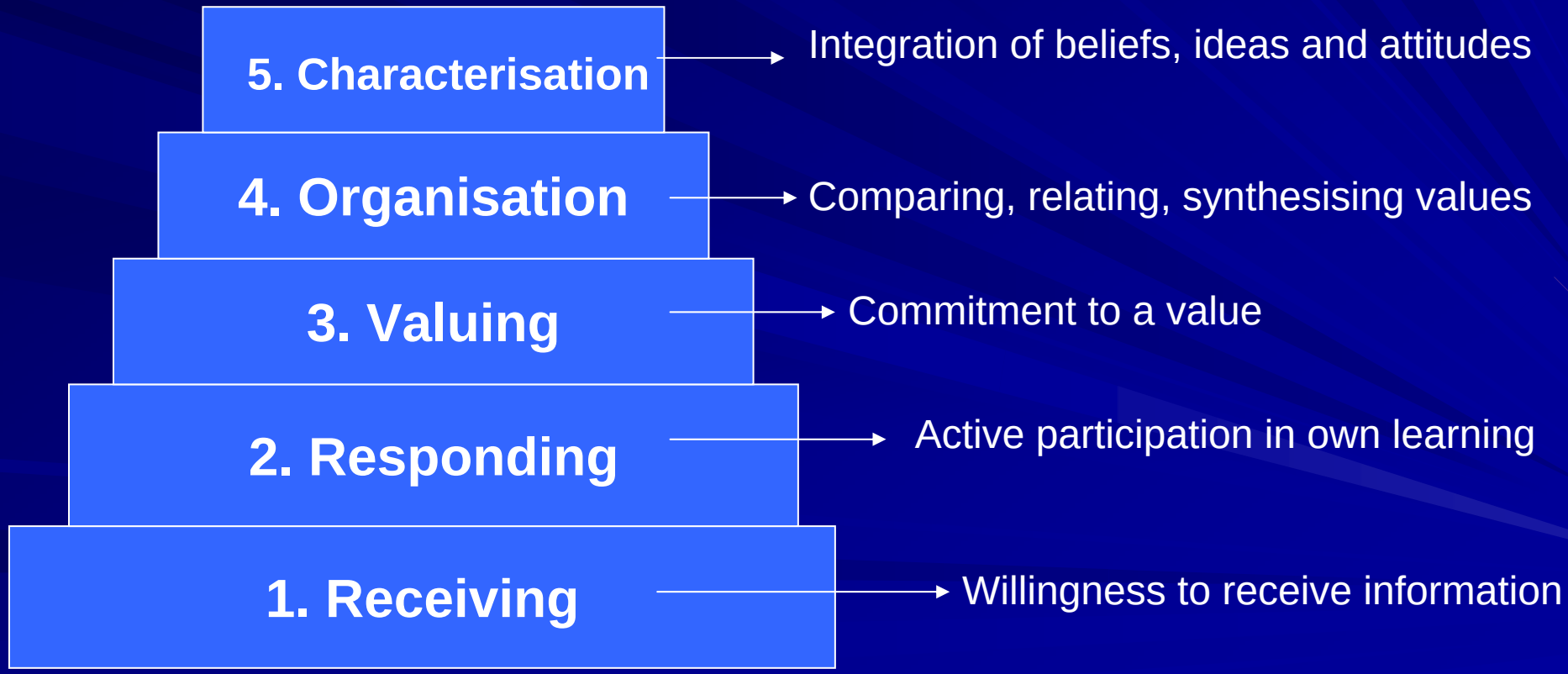
Anderson and Krathwohl (2001)

- To remember
- To understand
- To apply
- To analyse
- To evaluate
- To create

Analysis, Synthesis, Evaluation – Higher Order Thinking Skills

Two other domains in Bloom's Taxonomy

AFFECTIVE DOMAIN ("Feeling") concerned with value issues : involves attitudes.



Active verbs for 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.

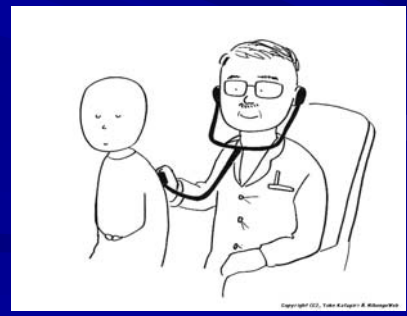
Examples of Learning Outcomes in Affective Domain

- 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.

PSYCHOMOTOR (“Doing”) DOMAIN:

Work never completed by Bloom.

Involves co-ordination of brain and muscular activity. Active verbs for this domain: bend, grasp, handle, operate, perform, reach, relax, shorten, stretch, differentiate (by touch), perform (skilfully).



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).

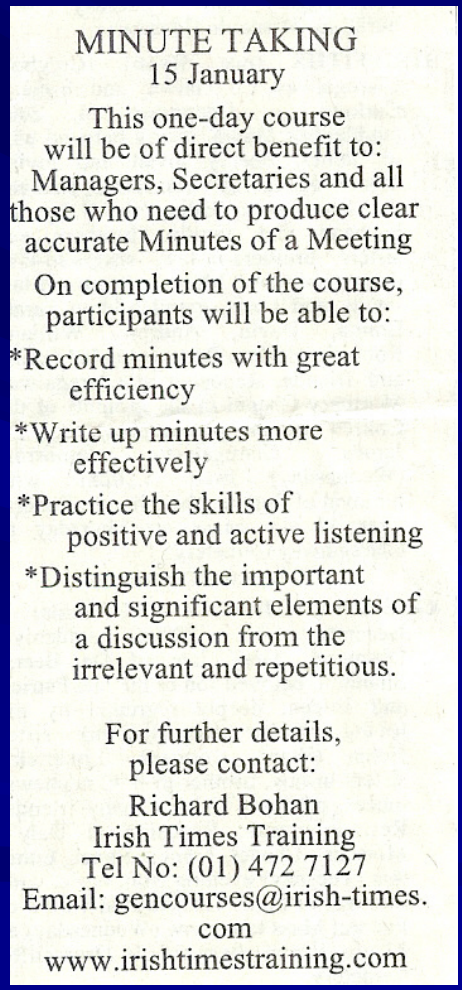
- **Module Title**: Dental Surgery – 5th Year Dental Students
- **Module Code**: DS5001

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

- Summarise relevant information regarding the patient's current condition to generate a differential diagnosis
- Formulate an appropriate treatment plan and justify the proposal giving due consideration to patient expectations and limitations
- Arrange appropriate tests and demonstrate the ability to interpret tests and reports
- Administer local anaesthetics safely and perform basic dento-alveolar surgical procedures in a professional manner showing good clinical governance
- Recognise, evaluate and manage medical and dental emergencies appropriately
- Differentiate between patients that can/can not be safely treated by a GDP
- Manage competing demands on time, including self-directed learning & critical appraisal
- Master the therapeutic and pharmacological management of patients with facial pain and oro-facial disease

(Learning outcomes written by Dr. Eleanor O'Sullivan)

Learning Outcomes in Advertising



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Learning Outcomes

- The ECTS credit system is the common currency for education.
- Learning Outcomes are the common language for education.
- Facilitate comparability across the various systems in different countries.
- Facilitate diversity – formal learning, informal learning, life long learning, etc.
- The term “competency” is commonly used to point the learner in the general direction but caution must be exercised when using this term.

The challenge of beginning the task of writing Learning Outcomes

- It is vital that learning outcomes are clearly written so that they are understood by students, colleagues and external examiners.
- When writing learning outcomes it may be helpful to you if you focus on what you expect students to be able to demonstrate upon completion of the module or programme.
- It is standard practice to list the learning outcomes using a phrase like “On successful completion of this module, students should be able to:” [list of learning outcomes]
- Avoid complicated sentences. If necessary use one than one sentence to ensure clarity.
- General recommendation: 5 – 8 learning outcomes per module.
- Avoid certain words…….

Words of advice …..

- “The key word is DO and the key need in drafting learning outcomes is to use active verbs”. (Jenkins and Unwin, Fry et al.)
- “They [Learning Outcomes] are statements describing observable behaviour and therefore must use ‘action verbs’”… Words like “appreciate” and “understand” do not help students because there are so many interpretations of their meaning. It is more transparent and helpful to be specific about expectations (Morss and Murray).
- Avoid verbs like “know”, “understand”, “be familiar with”, “be exposed to” (Osters and Tiu)
- “Try to avoid ambiguous verbs such as “understand”, “know”, “be aware” and “appreciate”. (Sheffield Hallam Guide).
- “Care should be taken in using words such as ‘understand’ and ‘know’ if you cannot be sure that students will understand what it means to know or understand in a given context” (Univ NSW).
- Certain verbs are unclear and subject to different interpretations in terms of what action they are specifying…… These types of verbs should be avoided: know, become aware of, appreciate, learn, understand, become familiar with. (American Association of Law Libraries).

Checklist for writing learning outcomes for modules

- Have I begun each outcome with an active verb?
- Have I avoided terms like *know*, *understand*, *learn*, *be familiar with*, *be exposed to*, *be acquainted with*, *be aware of* and *appreciate*?
- Have I included learning outcomes across the range of levels of Bloom's Taxonomy?
- Are my outcomes observable and measurable?
- Do all the outcomes fit within the aims and content of the module?

Writing Programme Learning Outcomes

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

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 of Programme Learning Outcomes [BSc(Ed)]

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.

Further Example of Programme Learning Outcomes

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.

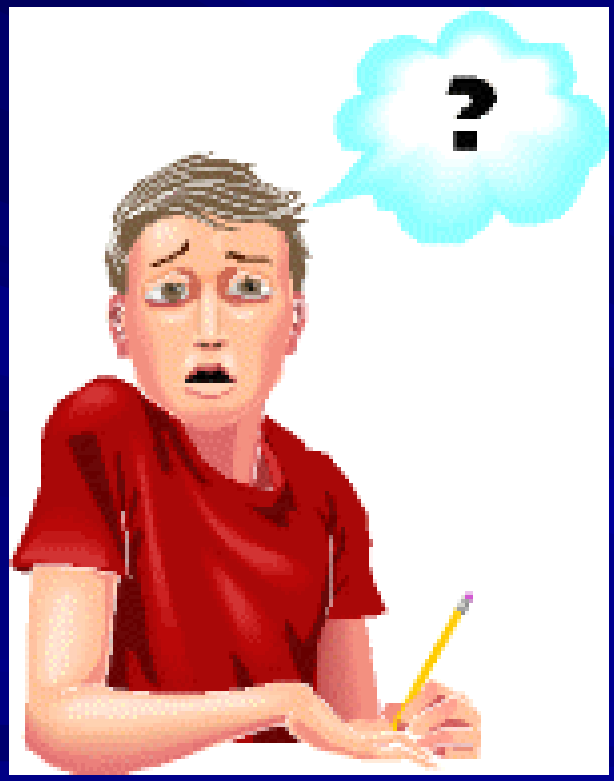
[Undergraduate engineering degree]

Further Example of Programme Learning Outcomes

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 mature computer literacy. [Postgrad Comp Sc degree]

What are the benefits and potential problems of Learning Outcomes?



"Learning Outcomes represent one of the essential building blocks for transparent higher education systems and qualifications… It is important that there should be no confusions about their role, nature and significance or the educational foundations of the Bologna process will be weakened"

(Adams S, 2004)

“Learning outcomes represent what is formally assessed and accredited to the student and they offer a starting point for a viable model for the design of curricula in higher education which shifts the emphasis form input and process to the celebration of student learning”

(Allan J, 1996)

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.

International Recognition and Mobility

"Learning outcomes are important for recognition, since the basis for recognition procedures is in the process of shifting from quantitative criteria such as the length and type of courses studied, to the outcomes reached and competencies obtained during these studies. The principal question asked of the student or the graduate will therefore no longer be "What did you do to obtain your degree?" but rather "What can you do now you have obtained your degree?". This approach is of more relevance to the labour market and is certainly more flexible when taking into account issues of lifelong learning, non-traditional learning and other forms of non-formal educational experiences"

Council of Europe, 2002.

Potential problems with Learning Outcomes

- Could limit learning if learning outcomes written within a very narrow framework – lack of intellectual challenge to learners.
- Learning outcomes should not be reductionist but rather expansive and intended to promote the higher order thinking skills.
- Danger of assessment-driven curriculum if learning outcomes too confined.
- Could give rise to confusion among students and staff if guidelines not adhered to when drawing up learning outcomes, etc.

Writing and Using Learning Outcomes: a Practical Guide



Declan Kennedy, Áine Hyland, Norma Ryan

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.

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 must 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 in Teaching and Learning at Higher Education”.
- To date, translated into Irish, Spanish, German, Albanian, Serbian, Russian, Lithuanian.

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