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Linking Competences & Learning Outcomes

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What are Learning Outcomes?

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- 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 Unwi
- 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 kn 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 shoul know, understand and be able to do as a result of learning. (Learning and Teaching Institute, Sheffield Hallam University)

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.

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 (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

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How are Learning Outcomes and Competences related?

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- Difficult to find a precise definition for the term “competence”.
- “Some take a narrow view and associate competence just with skills acquired by training” (Stephen Adam, 2004)
- In Tuning project, the term competence is used to represent a combination of attributes in terms of knowledge and its application, skills, responsibilities and attitudes and an attempt is made to describe the extent to which a person is capable of performing them
- ECTS Users’ Guide (2005) describes competences as “a dynamic combination of attributes, abilities and attitudes. Fostering these competences is the object of educational programmes. Competences are formed in various course units and assessed at different stages. They may be divided in subject-area related competences (specific to a field of study) and generic competences (common to any degree course)” (ECTS, 2005)

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Advice

If you are working in a system that uses competences to describe the programmes in your university, write each competence in terms of learning outcomes using the standard guidelines in the literature for writing learning outcomes

From the definition of Learning Outcome we see:
Emphasis on the learner.
Emphasis on the learner's ability to do something.

- 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.

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.

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.

Competence:

The student should be able to use the mass and energy balances for a given food process

Objectives:

- Understand scope of mass balances in food processing systems
- Understand appropriate use of mole fractions and mass fractions in mass balances

Learning outcomes:

- Describe the general principles of mass balances in steady state systems
- Draw and use process flow diagrams with labels on flow streams for mass balance problems
- Solve mass balance problems associated with food processing operations
- Design and solve mass balances for complex process flow systems, including batch mixing problems, multiple stage flow problems, problems with multiple inflows and outflows, recycle streams and multiple components, and processes where chemical reactions take place

Hartel and Foegeding (2004)

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Bologna Process:

a step towards achieving greater clarity in the scription of qualifications, by 2010 all modules d programmes in third level institutions roughout the European Union must be written terms of learning outcomes.

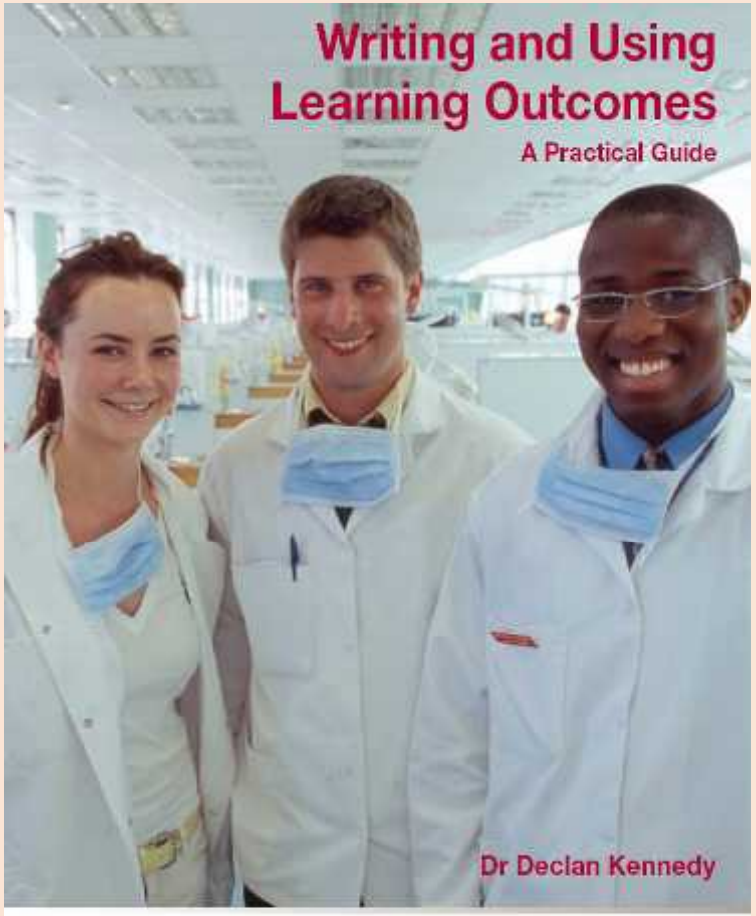
earning outcomes represent one of the sential building blocks for transparency within gher education systems and qualifications"

- Bologna Working Group, p.18 (December 04)

ajor contribution of exemplar material from ff taking "Postgraduate Certificate / Diploma Teaching and Learning at Higher Education".

aff training in UCC – lunchtime session and tting up of "Postgraduate Certificate / Diploma Teaching and Learning at Higher Education".

date, translated into Irish, Spanish, German, panian, Serbian, Russian, Lithuanian, Hebrew.



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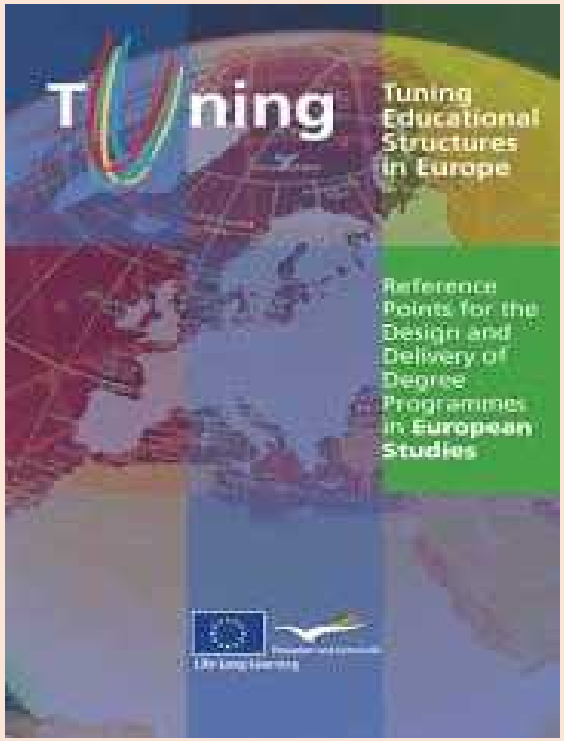
Tuning Guide

The purpose of this TUNING Guide is to offer clear guidance for formulating Degree Profiles. This includes defining Key Programme Competences and writing good Degree Programme Learning Outcomes.

The Guide is an innovative tool to assist in implementing the Bologna Process and the TUNING Process at the level of higher education degree programmes. It is meant for all those involved in the design and delivery of degree programmes.



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The Tuning Project made a distinction between generic and subject specific competences

Describes three types of generic competences:

- Instrumental competences: cognitive abilities, methodological abilities, technological abilities and linguistic abilities.
- Interpersonal competences: individual abilities like social skills (social interaction and co-operation).
- Systemic competences: abilities and skills concerning whole systems (combination of understanding, sensibility and knowledge; prior acquisition of instrumental and interpersonal competences required)

Generic Competences (Tuning)

1 Capacity for analysis and synthesis

2 Capacity for applying knowledge in practice

3 Planning and time management

4 Basic general knowledge in the field of study

5 Grounding in basic knowledge of the profession in practice

6 Oral and written communication in your native language

7 Knowledge of a second language

8 Elementary computing skills

9 Research skills

10 Capacity to learn

11 Information management skills (ability to retrieve and analyse information from different sources)

12 Critical and self-critical abilities

13 Capacity to adapt to new situations

14 Capacity for generating new ideas (creativity)
15 Problem solving
16 Decision-making
17 Teamwork
18 Interpersonal skills
19 Leadership
20 Ability to work in an interdisciplinary team
21 Ability to communicate with non-experts (in the field)
22 Appreciation of diversity and multiculturality
23 Ability to work in an international context
24 Understanding of cultures and customs of other countries
25 Ability to work autonomously
26 Project design and management
27 Initiative and entrepreneurial spirit
28 Ethical commitment
29 Concern for quality
30 Will to succeed

From the list of competences in Tuning Project:

- Many of these competences are of very general nature that it is difficult to understand what is meant by them
- Without this clarity, assessment of these competences would be extremely difficult if not impossible
- There does not appear to be any rules or guidelines for the writing of competences – some of the Tuning competences are written in terms of “ability”, some in terms of “capacity”, others are written in terms of skills and commitment whilst others are written in terms of knowledge
- Are Generic Competences = Transferable Skills?

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 (Kennedy, 2013)

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

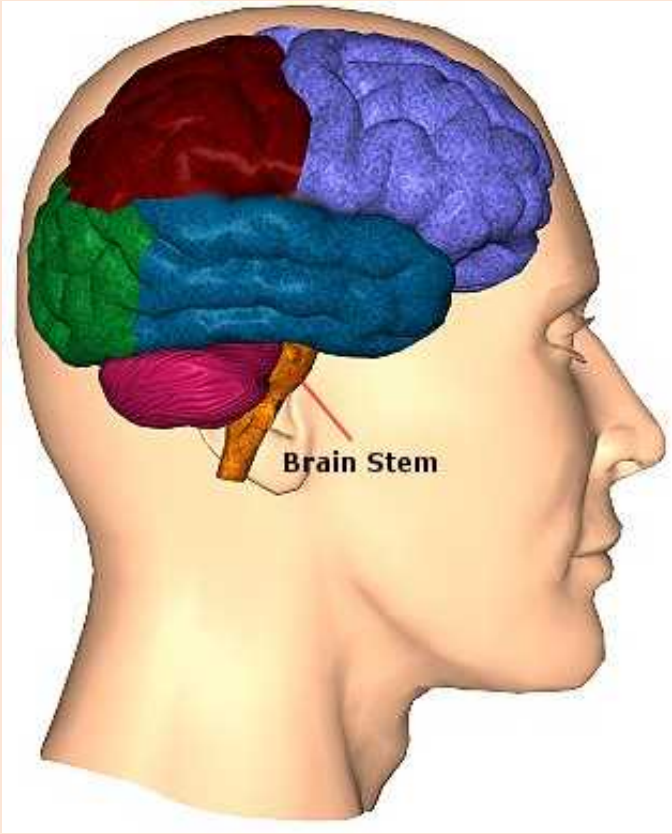
The list of verbs has been extended since his original publication

The "toolkit" for writing learning outcomes!

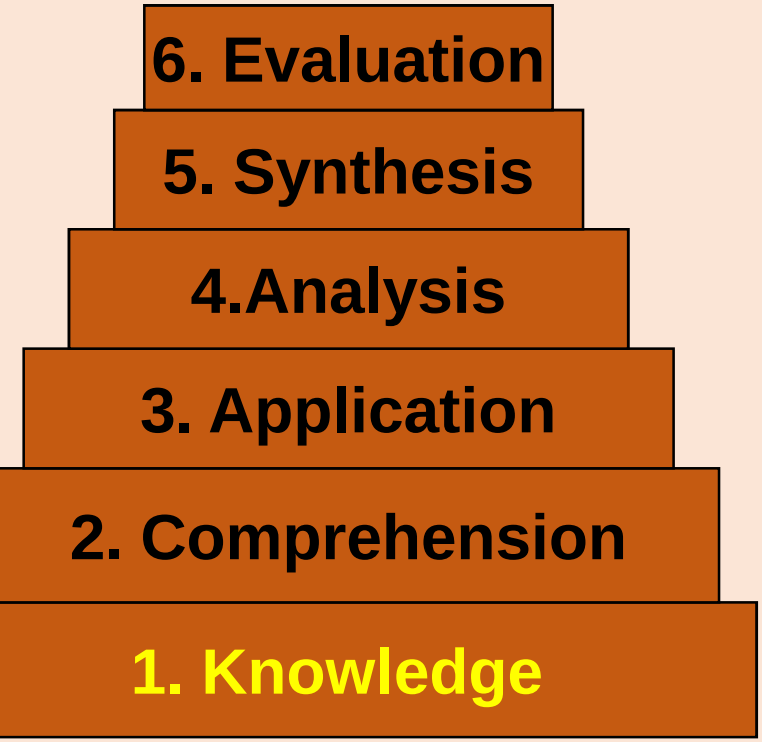
(Kennedy: 2013)

Bloom (1956) proposed that knowing is composed of six successive levels arranged in a hierarchy

6. Evaluation
5. Synthesis
4.Analysis
3. Application
2. Comprehension
1. Knowledge



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

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2. Comprehension - ability to understand and interpret learned information

Use action verbs like:

Associate, change, clarify, classify, construct, contrast, convert, decode, defend, describe, differentiate, discrimina 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

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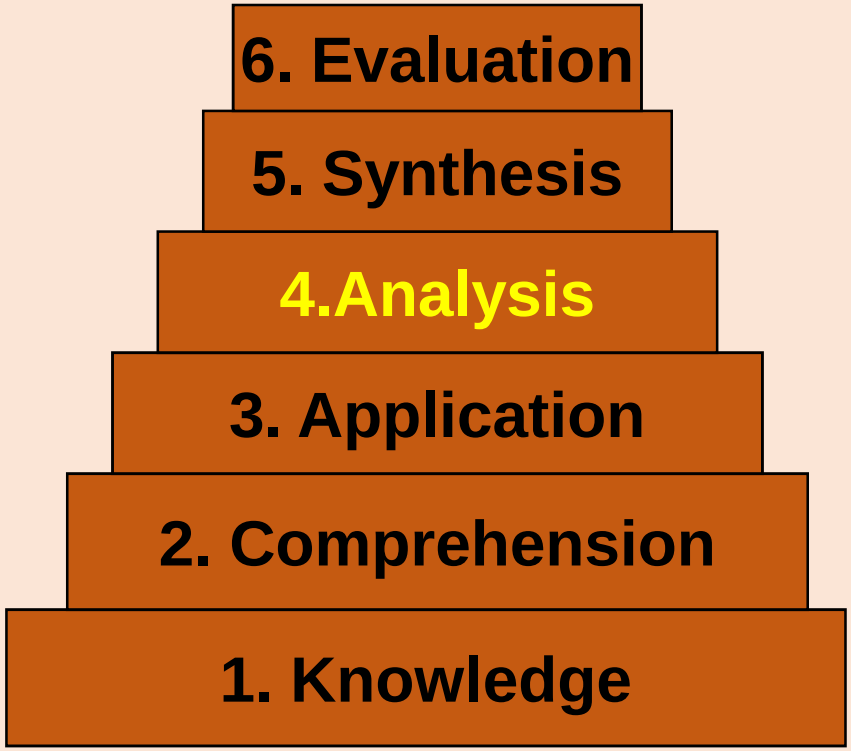
4. Analysis: ability to break down information into its components, e.g. look for inter-relationships and ideas (understanding of organisational structure



Use action verbs like:

Analyse, appraise, arrange, break dov
calculate, categorise, classify, compar
connect, contrast, criticise, debate,
deduce, determine, differentiate,
discriminate, distinguish, divide,
examine, experiment, identify, illustra
infer, inspect, investigate, order, outli
point out, question, relate, separate,
divide, test.

4. Analysis: ability to break down information into its components, e.g. look for inter-relationships and ideas (understanding of organisational structure)

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

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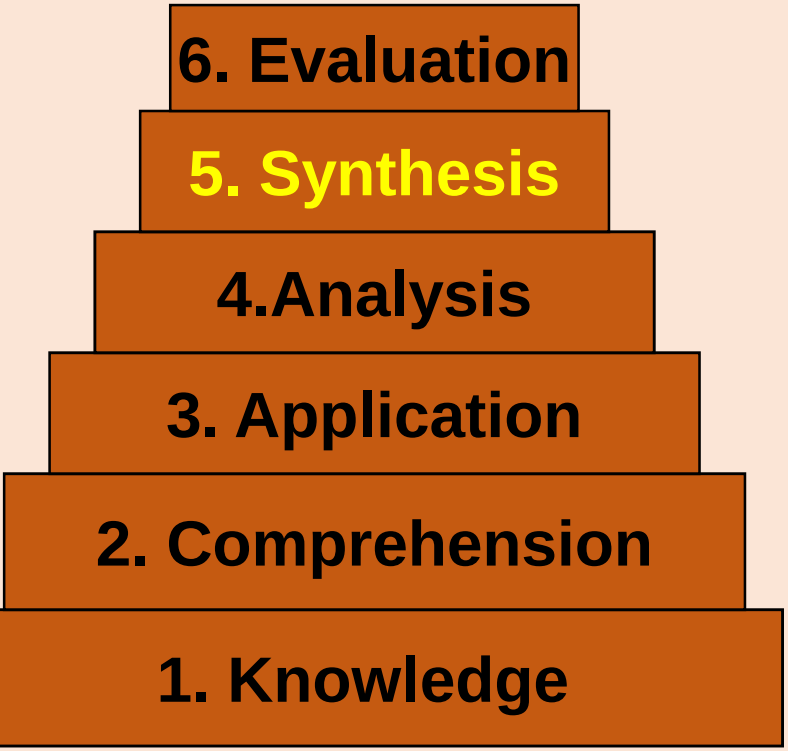
5. Synthesis - ability to put parts together



Use action verbs like:

Argue, arrange, assemble, categori
collect, combine, compile, compose,
construct, create, design, develop,
devise, establish, explain, formulate,
generalise, generate, integrate, inver
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

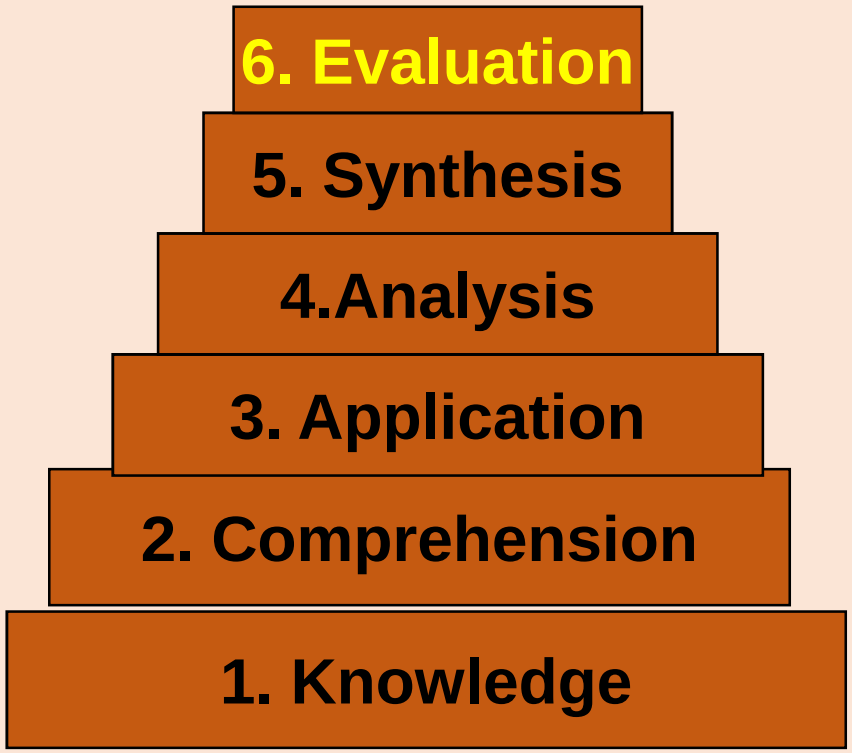
Integrate concepts of genetic processes in plants and animals

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

Evaluation: Ability to Judge Value of a 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…

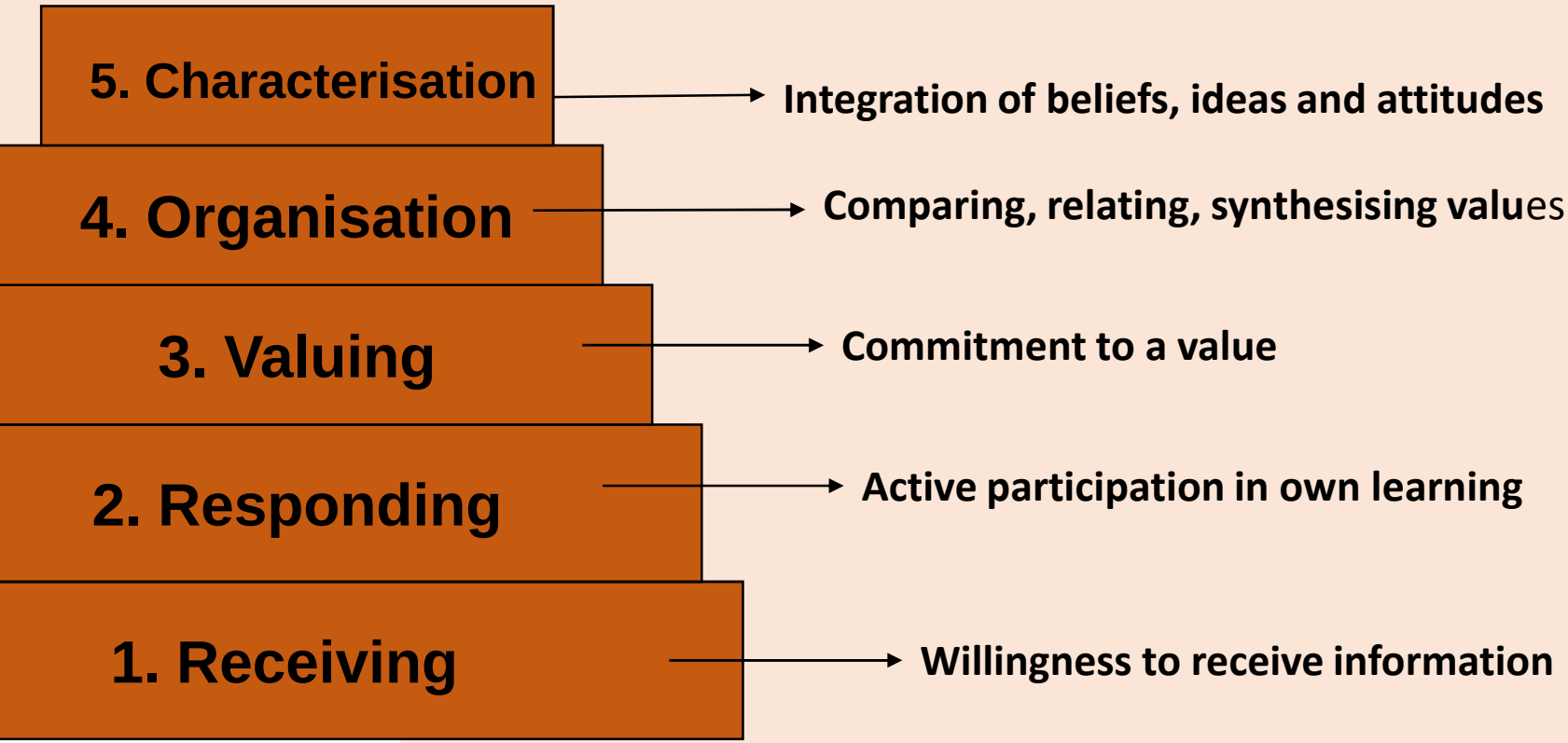
Summarise the main contributions of Michael Faraday to the field of electromagnetic induction

Bloom Revisited: Anderson and Krathwohl (2001)

Bloom (1956)	Anderson and Krathwohl (2001)
Knowledge	To remember
Comprehension	To understand
Application	To apply
Analysis	To analyse
Synthesis	To evaluate
Evaluation	To create

Analysis, Synthesis, Evaluation – Higher Order Thinking Skills

Two other domains in Bloom's Taxonomy



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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

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How do we write Learning Outcomes?

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- Begin each learning outcome with an active verb, followed by the object of the verb, followed by the context
- Use only one verb per learning outcome
- Avoid vague terms (like know and understand and be familiar with) - these are associated with teaching objectives rather than learning outcomes
- The learning outcomes must be observable and measurable
- Ensure that the learning outcome of the module relate to the learning outcomes of the programme

- Ensure that the learning outcomes are capable of being assessed
- Bear in mind the timescale within which the outcomes are to be achieved. Don't be over-ambitious. Is what you are asking realistic?
- Bear in mind how these learning outcomes will be assessed : how will you know if the student has achieved these outcomes?
- Avoid overloading the list of learning outcomes with the first three levels of the taxonomy - try to challenge the students
- Your module should include continuous assessment - assessment that takes place at more than one point of the module (this can be oral and informal, as well as formal and written)

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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, University College Cork)

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Questions?

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