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## 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.

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## 1. Introduction

Learning outcomes are important for recognition ... 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 that you have obtained your degree?” This approach is of relevance to the labour market and is certainly more flexible when taking into account issues of life-long learning, non-traditional learning, and other forms of non-formal educational experiences. (Purser, Council of Europe, 2003)

In June 1999, representatives of the Ministers of Education of 29 European countries convened in Bologna, Italy to formulate the Bologna Declaration, aimed at establishing a common European Higher Education Area (EHEA). The overall aim is to improve the efficiency and effectiveness of higher education in Europe. The Bologna process spells out a number of “action lines” in which learning outcomes should play an important role (Adam, 2004, 2006). One of the logical consequences is that, by 2010, all programmes and significant constituent elements of programmes in third level institutions throughout the European Higher Education Area should be based on the concept of learning outcomes, and that curriculum should be redesigned to reflect this.

At the follow-up meeting in Berlin in 2003, the Ministers for Education issued a communiqué regarding the state of implementation of the Bologna process. They emphasised the creation of a common model for Higher Education in Europe, and encouraged national higher education systems to ensure – through the development of national frameworks of qualifications – that degrees (Bachelor and Masters) would also be described in terms of learning outcomes, rather than simply by number of credits and number of hours of study:

Ministers encourage the member States to elaborate a framework of comparable and compatible qualifications for their higher education systems, which should seek to describe qualifications in terms of workload, level, learning outcomes, competences and profile. They also undertake to elaborate an overarching framework of qualifications for the European Higher Education Area. (Berlin Communiqué 2003<sup>1</sup>)

It is worth noting that defining courses in terms of learning outcomes is not unique to Europe. Gosling and Moon (2001) have indicated that the outcomes-based approach to teaching is becoming increasingly popular at an international level:

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<sup>1</sup> <http://www.bologna-bergen2005.no>

The outcome-based approach has been increasingly adopted within credit frameworks and by national quality and qualifications authorities such as the QAA (Quality Assurance Agency for Higher Education) in the UK, the Australian, New Zealand and South African Qualification Authorities. (Gosling and Moon, 2001)

This article draws on the work of the higher education institutions involved in the European University Association (EUA) Quality Culture Network IV – Teaching and Learning<sup>2</sup> – during 2004/5, and of academic staff from different faculties in University College Cork, Ireland who rewrote all or part of their courses in terms of learning outcomes during 2005/6.<sup>3</sup>

## 2. What are learning outcomes?

The traditional way of designing modules and programmes was to start from the content of the course. Teachers decided on the content that they intended to teach, planned how to teach this content and then assessed the content. This type of approach focussed on the teacher's input and on assessment in terms of how well the students absorbed the material taught. Course descriptions referred mainly to the content of the course that would be covered in lectures. This approach to teaching has been referred to as a teacher-centred approach. Among the criticisms of this type of approach in the literature (Gosling and Moon, 2001) is that it can be difficult to identify precisely what the student has to be able to do in order to pass the module or programme.

**Moving from a teacher-centred approach...**

International trends in education show a shift from the traditional "teacher centred" approach to a "student centred" approach. This alternative model focuses on what the students are expected to be able to do at the end of the module or programme. Hence, this approach is commonly referred to as an outcome-based approach. Statements called intended learning outcomes, commonly shortened to learning outcomes, are used to express what it is expected that students should be able to do at the end of the learning period.

**... to a student-centred approach**

The outcome-based approach can be traced back to the work of the *behavioural objectives* movement of the 1960s and 1970s in the United States. One of the advocates of this type of teaching was Robert Mager, who proposed the idea of writing very specific statements about observable outcomes. He called these statements *instructional*

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<sup>2</sup> <http://www.eua.be>

<sup>3</sup> Copies of the UCC staff handbook on Learning Outcomes are available on request from Dr Norma Ryan ([n.ryan@ucc.ie](mailto:n.ryan@ucc.ie)).

*objectives* (Mager, 1975). Using these instructional objectives and performance outcomes, he attempted to define the type of learning that would occur at the conclusion of instruction and how that learning would be assessed. These instructional objectives later developed into more precisely defined learning outcomes.

## 2.1 Defining learning outcomes

A survey of the literature on learning outcomes comes up with a number of similar definitions of the term:

- Learning outcomes are statements of what is expected that the student will be able to do as a result of learning the activity. (Jenkins and Unwin, 2001)
- 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<sup>4</sup>)
- Learning outcomes are an explicit description of what a learner should know, understand and be able to do as a result of learning. (Bingham, 1999)
- Learning outcomes are statements of what a learner is expected to know, understand and/or be able to demonstrate after completion of a process of learning. (ECTS Users' Guide, 2005)
- Learning outcomes are explicit statements of what we want our students to know, understand or be able to do as a result of completing our courses. (University of New South Wales, Australia<sup>5</sup>)
- Learning outcome: a statement of what a learner is expected to know, understand and/or be able to demonstrate at the end of a period of learning". (Gosling and Moon, 2001)
- A learning outcome is a statement of what the learner is expected to know, understand and/or be able to do at the end of a period of learning. (Donnelly and Fitzmaurice, 2005)
- A learning outcome is a statement of what a learner is expected to know, understand and be able to do at the end of a period of learning and of how that learning is to be demonstrated". (Moon, 2002)
- Learning outcomes describe what students are able to demonstrate in terms of knowledge, skills and attitudes upon completion of a programme. (Quality Enhancement Committee, Texas University<sup>6</sup>)
- A learning outcome is a written statement of what the successful student/learner is expected to be able to do at the end of the module/course unit or qualification. (Adam, 2004)

### Handout C 3.4-1-1 Some definitions of the term "learning outcomes"

<sup>4</sup> <http://www.aallnet.org/prodev/outcomes.asp>

<sup>5</sup> [http://www.ltu.unsw.edu.au/content/course\\_prog\\_support/outcomes.cfm?ss=0](http://www.ltu.unsw.edu.au/content/course_prog_support/outcomes.cfm?ss=0)

<sup>6</sup> [http://qep.tamu.edu/documents/writing\\_outcomes.pdf](http://qep.tamu.edu/documents/writing_outcomes.pdf)

Thus, we can see that the various definitions of learning outcomes do not differ significantly from each other. From these definitions, it is clear that:

- Learning outcomes focus on what the learner has achieved rather than the intentions of the teacher;
- Learning outcomes focus on what the learner can demonstrate at the end of a learning activity.

The following definition (ECTS Users' Guide, p. 47) of a learning outcome may be considered a good working definition:

Learning outcomes are statements of what a learner is expected to know, understand and/or be able to demonstrate after completion of a process of learning.

#### A working definition

The process of learning could be, for example, a lecture, a module or an entire programme.

## 2.2 What is the difference between aims, objectives and learning outcomes?

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 block of learning. Aims are usually written from the teacher's point of view to indicate the general content and direction of the module. For example, the aim of a module could be "to introduce students to the basic principles of atomic structure" or "to provide a general introduction to the history of Ireland in the twentieth century".

#### Aims

The objective of a module or programme is usually a specific statement of teaching intention, i.e. it indicates one of the specific areas that the teacher intends to cover in a block of learning. For example, one of the objectives of a module could be that "students would understand the impacts and effects of behaviours and lifestyles on both the local and global environments". (In some contexts, objectives are also referred to as goals).

#### Objectives

Thus, the aim of a module gives the broad purpose or general teaching intention of the module, whilst the objective gives more specific information about what the teaching of the module hopes to achieve.

One of the problems caused by the use of objectives is that sometimes they are written in terms of teaching intention and other times they are written in terms of expected learning, i.e. there is confusion in the literature in terms of whether objectives belong to the teacher-centred approach or the outcome-based approach. The situation is nicely summarised by Moon (2002) as follows:

#### Confusion

*Basically the term ‘objective’ tends to complicate the situation, because objectives may be written in terms of teaching intention or expected learning... This means that some descriptions are of the teaching in the module and some are of the learning... This general lack of agreement as to the format of objectives is a complication, and justifies the abandonment of the use of the term ‘objective’ in the description of modules or programmes. (Moon, 2002)*

#### Advantages of learning outcomes

Most teachers who have worked on the development of objectives for modules or programmes have encountered the above problem. One of the great advantages of learning outcomes is that they are clear statements of what the learner is expected to achieve and how he or she is expected to demonstrate that achievement. Thus, learning outcomes are more precise, easier to compose and far clearer than objectives. From one perspective, learning outcomes can be considered as a sort of “common currency” that assists modules and programmes to be more transparent at both local level and at an international level.

## 2.3 Learning outcomes and competences

In some papers in the literature, the term “competence” is used in association with learning outcomes. It is difficult to find a precise definition for this term. Adam (2004) comments that “some take a narrow view and associate competence just with skills acquired by training”. The EC Tuning project<sup>7</sup> which was initiated in 2000 used the term “competence” to represent a combination of attributes in terms of knowledge and its application, skills, responsibilities and attitudes and an attempt was made to describe the extent to which a person is capable of performing them.

#### Lack of clear definition

The lack of clarity or agreement in terms of defining the term competence is apparent in the ECTS Users’ Guide (2005), which describes competences as “*a dynamic combination of attributes, abilities and attitudes*”. The Guide goes on to state that “*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 into subject-area related competences (specific to a field of study) and generic competences (common to any degree course)*”.

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<sup>7</sup> Tuning Educational Structures in Europe, <http://tuning.unideusto.org/tuningeu/>

Since there does not appear to be a common understanding of the term competence in the literature, learning outcomes have become more commonly used than competences when describing what students are expected to know, understand and/or be able to demonstrate at the end of a module or programme. For that reason, the terms “competence” and “competency” are avoided in this article.

### 3. How can one write learning outcomes?

The learning outcome approach is, above all, a perspective and a mode of thinking in order to develop valid programmes. While being an essential part of the implementation phase, writing learning outcomes is of course only the visible surface of this perspective, or a consequence of its implementation. Having stated that, this article intends to use "writing" as the key word, but the intention is of course that the writing of these learning outcomes should be preceded by the thinking necessary for this change in approach.

The work of Benjamin Bloom (1913 – 1999) was found by the staff of University College Cork, Ireland, to provide a useful starting point when writing learning outcomes. Bloom studied in Pennsylvania State University, USA, and graduated with bachelor and master degrees from that institution. He then worked with Ralph Tyler at the University of Chicago and graduated with a PhD in Education in 1942.

**Benjamin Bloom**

Bloom was a gifted teacher who carried out research on the development of a classification of levels of thinking during the learning process. He believed that teachers should design lessons and tasks to help students to meet stated objectives. Bloom identified three domains of learning – cognitive, affective and psycho-motor – and within each of these domains he recognised that there was an ascending order of complexity. His work is most advanced in the cognitive domain where he drew up a classification (or taxonomy) of thinking behaviours from the simple recall of facts up to the process of analysis and evaluation. His publication *Taxonomy of Educational Objectives: Handbook 1, the Cognitive Domain* (Bloom et al., 1956) has become widely used throughout the world to assist in the preparation of curriculum and evaluation materials. The taxonomy provides a framework in which one can build upon prior learning to develop more complex levels of understanding.

**Three domains of learning**

In recent years, attempts have been made to revise Bloom’s Taxonomy (Anderson & Krathwohl, 2001; Krathwohl, 2002) but the original works of Bloom and his co-workers are still the most widely quoted in the literature.



Bloom proposed that the cognitive or knowing domain is composed of six successive levels arranged in a hierarchy as shown in figure C 3.4-1-1.



**Fig. C 3.4-1-1 Hierarchy of cognitive domain**

#### **A hierarchy of thinking processes**

Bloom's taxonomy was not simply a classification – it was an effort by him to arrange the various thinking processes in a hierarchy. In this hierarchy, each level depends on the student's ability to perform at the level or levels that are below it. For example, for a student to apply knowledge (stage 3) he or she would need to have both the necessary information (stage 1) and understanding of this information (stage 2).

When talking about teaching, Bloom always advocated that when teaching and assessing students one should bear in mind that learning is a process and that the teacher should try to get the thought processes of the students to move up into the higher order stages of synthesis and evaluation.

### **3.1 Writing learning outcomes in the cognitive domain**

#### **Using correct verbs**

Bloom's taxonomy is frequently used for writing learning outcomes, since it provides a ready-made structure and list of verbs. It can be argued that the use of the correct verbs is the key to the successful writing of learning outcomes. Bloom's original list of verbs was limited and has been extended by various authors over the years. The list of verbs given in this article has been compiled from a combination of Bloom's original publication and from the more modern literature in this area. It is not claimed that the list of verbs suggested for each stage is exhaustive, but it is hoped that the reader will find the lists to be reasonably comprehensive.

In the following section, each stage of Bloom's taxonomy is considered and the corresponding list of verbs relating to each stage is proposed. Since learning outcomes are concerned with what the students can **do** at the end of the learning activity, all of these verbs are action (active) verbs.

**Action verbs****3.1.1 Knowledge**

Knowledge may be defined as the ability to recall or remember facts without necessarily understanding them. Some of the action verbs used to assess knowledge are as follows:

**Assessing knowledge**

*Arrange, collect, define, describe, duplicate, enumerate, examine, find, identify, label, list, memorise, name, order, outline, present, quote, recall, recognise, recollect, record, recount, relate, repeat, re-produce, show, state, tabulate, tell.*

Some examples of learning outcomes for courses in various disciplines that demonstrate evidence of knowledge include the following:

**Demonstrating evidence of 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.
- *Describe* the processes used in engineering when preparing a design brief for a client.

Note that each learning outcome begins with an action verb.

**3.1.2 Comprehension**

Comprehension may be defined as the ability to understand and interpret learned information. Some of the action verbs used to assess comprehension are as follows:

**Assessing comprehension**

*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, paraphrase, predict, recognise, report, restate, rewrite, review, select, solve, translate.*

**Demonstrating evidence of comprehension**

Some examples of learning outcomes that demonstrate evidence of comprehension are:

- *Differentiate* between civil and criminal law
- *Identify* participants and goals in the development of electronic commerce.
- *Predict* the genotype of cells that undergo meiosis and mitosis.
- *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.

**3.1.3 Application****Assessing application**

Application may be defined as the ability to use learned material in new situations, e.g. put ideas and concepts to work in solving problems. Some of the action verbs used to assess application are shown as follows:

*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.*

**Demonstrating evidence of application**

Some examples of learning outcomes that demonstrate evidence of application are:

- *Construct* a timeline of significant events in the history of Australia in the 19<sup>th</sup> 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.
- *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.

### 3.1.4 Analysis

Analysis may be defined as the ability to break down information into its components, e.g. look for inter-relationships and ideas (understanding of organisational structure). Some of the action verbs used to assess analysis are as follows:

#### Assessing analysis

*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.*

Some examples of learning outcomes that demonstrate evidence of analysis are:

#### Demonstrating evidence of analysis

- *Analyse* why society criminalises certain behaviours.
- *Compare* and contrast the different electronic business models.
- *Debate* the economic and environmental effects of energy conversion processes.
- *Compare* the classroom practice of a newly qualified teacher with that of a teacher of 20 years teaching experience.
- *Calculate* gradient from maps in m, km, % and ratio.

### 3.1.5 Synthesis

Synthesis may be defined as the ability to put parts together. Some of the action verbs used to assess synthesis are the following:

#### Assessing synthesis

*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.*

**Demonstrating evidence of synthesis**

Some examples of learning outcomes that demonstrate evidence of synthesis are:

- *Recognise* and formulate problems that are amenable to energy management solutions.
- *Propose* solutions to complex energy management problems both verbally and in writing.
- *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.

**3.1.6 Evaluation****Assessing evaluation**

Evaluation may be defined as the ability to judge the value of material for a given purpose. Some of the action verbs used to assess evaluation are:

*Appraise, ascertain, argue, assess, attach, choose, compare, conclude, contrast, convince, criticise, decide, defend, discriminate, explain, evaluate, grade, interpret, judge, justify, measure, predict, rate, recommend, relate, resolve,*

**Demonstrating evidence of evaluation**

The following are some examples of learning outcomes that demonstrate evidence of evaluation are:

- Assess the importance of key participants in bringing about change in Irish history Evaluate marketing strategies for different electronic business models.
- Summarise the main contributions of Michael Faraday to the field of electromagnetic induction.
- Predict the effect of change of temperature on the position of equilibrium.
- Evaluate the key areas contributing to the craft knowledge of experienced teachers.

Note that the verbs used in the above six categories are not exclusive to any one particular category. Some verbs appear in more than one category. For example, a mathematical calculation may involve merely applying a given formula (application – stage 3) or it may involve analysis (stage 4) as well as application.

### 3.2 Writing learning outcomes in the affective domain

Whilst the cognitive domain is the most widely used of Bloom's Taxonomy, Bloom and his co-workers also carried out research on the **affective** ("attitudes", "feelings", "values") domain (Bloom et al., 1964). This domain is concerned with issues relating to the emotional component of learning and ranges from basic willingness to receive information to the integration of beliefs, ideas and attitudes.

**Emotional component of learning**

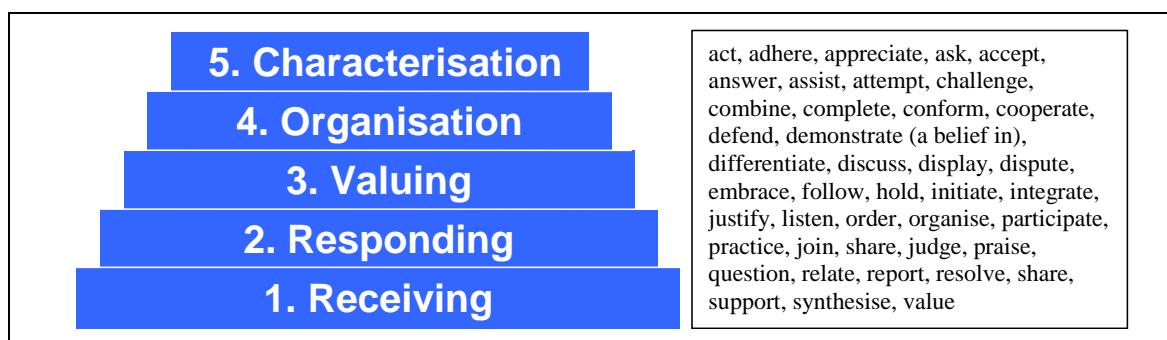
In order to describe the way in which we deal with things emotionally, Bloom and his colleagues developed five major categories:

**Five major categories**

1. **Receiving.** This refers to a willingness to receive information, e.g. the individual accepts the need for a commitment to service, listens to others with respect, shows sensitivity to social problems, etc.
2. **Responding.** This refers to the individual actively participating in his or her own learning, e.g. shows interest in the subject, is willing to give a presentation, participates in class discussions, enjoys helping others, etc.
3. **Valuing.** This ranges from simple acceptance of a value to one of commitment, e.g. the individual demonstrates belief in democratic processes, appreciates the role of science in our everyday lives, shows concern for the welfare of others, shows sensitivity towards individual and cultural differences, etc.
4. **Organisation.** This refers to the process that individuals go through as they bring together different values, resolve conflicts among them and start to internalise the values, e.g. recognises the need for balance between freedom and responsibility in a democracy, accepts responsibility for his or her own behaviour, accepts professional ethical standards, adapts behaviour to a value system, etc.
5. **Characterisation.** At this level the individual has a value system in terms of their beliefs, ideas and attitudes that control their behaviour in a consistent and predictable manner, e.g. displays self reliance in working independently, displays a professional commitment to ethical practice, shows good personal, social and emotional adjustment, maintains good health habits, etc.

**Major affective categories and active verbs**

The major categories of the affective domain and some active verbs commonly used when writing learning outcomes for this domain are shown in Fig. C 3.4-1-2. Some examples of learning outcomes in the affective domain are:



**Fig. C 3.4-1-2 Hierarchy of affective domain and some action verbs**

Bloom and his colleagues (and subsequent authors) have linked the various levels in the affective domain to specific verbs. However, this level of detail will not be explored in this article.

**Examples of learning outcomes**

Some examples of learning outcomes relevant to the affective domain are as follows:

- Accept the need for professional ethical standards.
- Appreciate the need for confidentiality in the professional client relationship.
- Value a willingness to work independently.
- Relate well to pupils of all abilities in the classroom.
- Appreciate the management challenges associated with high levels of change in the public sector.
- Display a willingness to communicate well with patients.
- Resolve conflicting issues between personal beliefs and ethical considerations.
- Participate in class discussions with colleagues and with teachers.
- Embrace a responsibility for the welfare of children taken into care.
- Display a professional commitment to ethical practice.

### 3.3 Writing learning outcomes in the psychomotor domain

The psychomotor domain mainly emphasises physical skills involving co-ordination of the brain and muscular activity. From a study of the literature, it would appear that this domain has been less well developed in the field of education than either the cognitive or affective domain. The psychomotor domain is commonly used in areas like laboratory science subjects, health sciences, art, music, engineering, drama and physical education. Bloom and his research team did not complete detailed work on the psychomotor domain as they claimed lack of experience in teaching these skills. However, a number of authors have suggested various versions of taxonomies to describe the development of skills and co-ordination.

#### Physical skills

For example, Dave (1970) proposed a hierarchy consisting of five levels:

#### Five levels

1. **Imitation:** Observing the behaviour of another person and copying this behaviour. This is the first stage in learning a complex skill.
2. **Manipulation:** Ability to perform certain actions by following instructions and practicing skills.
3. **Precision:** At this level, the student has the ability to carry out a task with few errors and become more precise without the presence of the original source. The skill has been attained and proficiency is indicated by smooth and accurate performance.
4. **Articulation:** Ability to co-ordinate a series of actions by combining two or more skills. Patterns can be modified to fit special requirements or solve a problem.
5. **Naturalisation:** Displays a high level of performance naturally (“without thinking”). Skills are combined, sequenced and performed consistently with ease.



This hierarchy and some examples of action verbs for writing learning outcomes in the psychomotor domain are shown in figure C 3.4-1-3:

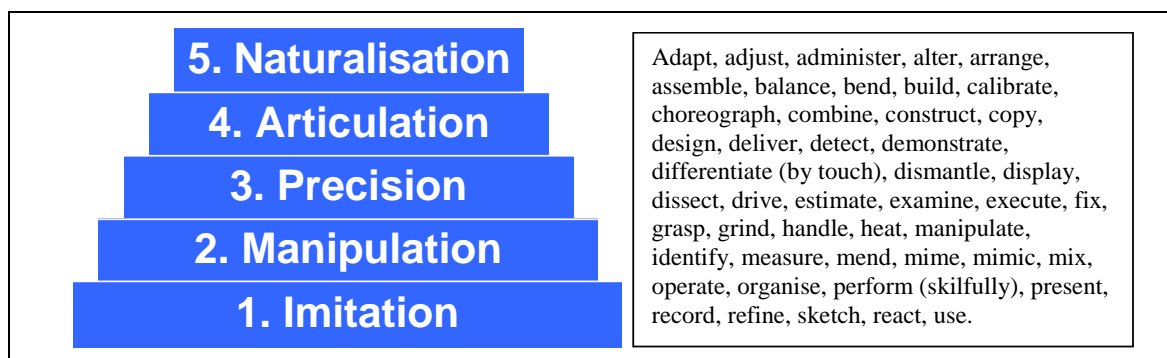


Fig. C 3.4-1-3 Hierarchy of psychomotor domain and some action verbs

#### Other taxonomies

Subsequently, Simpson (1972) developed a more detailed hierarchy consisting of seven levels:

1. **Perception:** The ability to use observed cues to guide physical activity.
2. **Set (mindset):** The readiness to take a particular course of action. This can involve mental, physical and emotional disposition.
3. **Guided response:** The trial-an-error attempts at acquiring a physical skill. With practice, this leads to better performance.
4. **Mechanism:** The intermediate stage in learning a physical skill. Learned responses become more habitual and movements can be performed with some confidence and level of proficiency.
5. **Complex Overt Responses:** Physical activities involving complex movement patterns are possible. Responses are automatic and proficiency is indicated by accurate and highly coordinated performance with a minimum of wasted effort.
6. **Adaptation:** At this level, skills are well developed and the individual can modify movements to deal with problem situations or to fit special requirements.
7. **Origination:** The skills are so highly developed that creativity for special situations is possible.

Other taxonomies in the psychomotor domain have been developed by Harrow (1972) and Dawson (1998). Ferris and Aziz (2005) developed a taxonomy in the psychomotor domain specifically for engineering students.

In general, all of the various taxonomies in the psychomotor domain describe a progression from simple observation to mastery of physical skills.

### 3.4 Practical advice for writing learning outcomes

Fry *et al* (2000) when giving practical advice for writing learning outcomes recommend the use of “unambiguous action verbs” and list many examples of verbs from Bloom’s Taxonomy. In order to show the differences between the vocabulary used in writing aims and learning outcomes, the authors listed some examples of verbs as shown in Table C 3.4-1-1.

**Unambiguous action verbs**

**Table C 3.4-1-1 Examples of verbs used in writing aims and learning outcomes. (Fry et al., 2000 p. 51)**

Aims	Outcomes
Know	Distinguish between
Understand	Choose
Determine	Assemble
Appreciate	Adjust
Grasp	Identify
Become familiar	Solve, apply, list

The following guidelines may be of assistance when writing learning outcomes:

- Begin each learning outcome with an action verb, followed by the object of the verb followed by a phrase that gives the context.
- Use only one verb per learning outcome.
- Avoid vague terms like know, understand, learn, be familiar with, be exposed to, be acquainted with, and be aware of. These terms are associated with teaching objectives rather than learning outcomes.
- Avoid complicated sentences. If necessary use more one than one sentence to ensure clarity.
- Ensure that the learning outcomes of the module relate to the overall outcomes of the programme.
- The learning outcomes must be observable and measurable.
- Ensure that the learning outcomes are capable of being assessed.
- When writing learning outcomes, bear in mind the timescale within which the outcomes are to be achieved. There is always the danger that one can be over-ambitious when writing learning outcomes. Ask yourself if it is realistic to achieve the learning outcomes within the time and resources available.
- As you work on writing the learning outcomes, bear the mind how these outcomes will be assessed, i.e. how will you know if the student has achieved these learning outcomes? If the learning outcomes are very broad, they may be difficult to assess effectively. If the learning outcomes are very narrow, the list of learning outcomes may be too long and detailed.
- Before finalising the learning outcomes, ask your colleagues and possibly former students if the learning outcomes make sense to them.
- When writing learning outcomes, for students at levels beyond first year, try to avoid overloading the list with learning outcomes which are drawn from the bottom of Bloom's taxonomy ( e.g. *Knowledge* and *Comprehension* in the cognitive domain). Try to challenge the students to use what they have learned by including some learning outcomes drawn from the higher categories (e.g. *Application*, *Analysis*, *Synthesis* and *Evaluation*).

**Handout C 3.4-1-2      Guidelines for writing learning outcomes**

#### 4. How are learning outcomes linked to teaching and assessment?

When writing learning outcomes, it is important to write them in such a way that they are capable of being assessed. Clearly, it is necessary to have some form of assessment tool or technique in order to determine the extent to which learning outcomes have been achieved. Examples of direct assessment techniques are the use of written examinations, project work, portfolios, grading system with rubrics, theses, reflective journals, performance assessment, etc. Examples of indirect assessment methods are surveys of employers, comparison with peer institutions, surveys of past graduates, retention rates, analysis of curriculum, etc.

**Assessing learning outcomes**

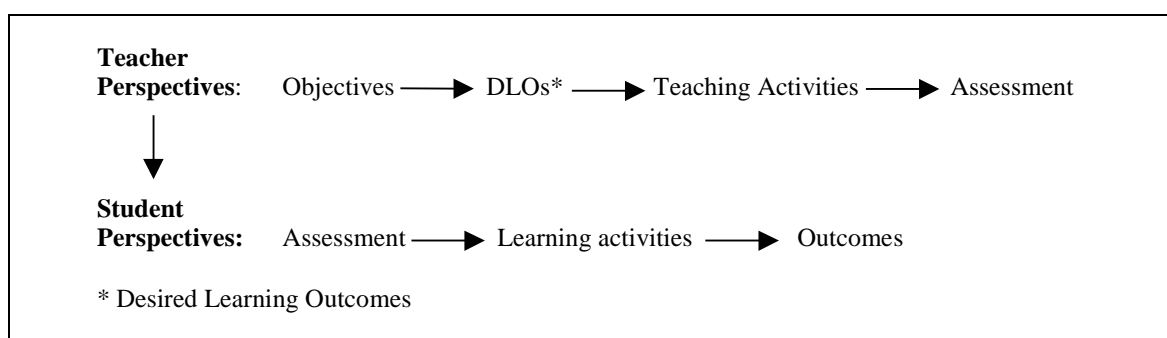
The challenge for teachers is to ensure that there is alignment between teaching methods, assessment techniques, assessment criteria and learning outcomes. This connection between teaching, assessment and learning outcomes helps to make the overall learning experience more transparent. Student course evaluations show that clear expectations are a vitally important part of effective learning. Lack of clarity in this area is almost always associated with negative evaluations, learning difficulties, and poor student performance. Toohey (1999) recommends that the best way to help students understand how they must achieve learning outcomes is by clearly setting out the assessment techniques and the assessment criteria.

**Aligning teaching, assessment and learning outcomes**

In terms of teaching and learning, there is a dynamic equilibrium between teaching strategies on one side and learning outcomes and assessment on the other side.

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 defines the actual curriculum" (Ramsden, 2003). This situation is represented graphically by Biggs (2003b) as follows:

**Assessment must mirror learning outcomes**



**Fig. C 3.4-1-4**

**Teacher and student perspectives regarding assessment**

**Link between curriculum and assessment**

In stressing this point, Biggs (2003) emphasises the strong link between the curriculum and assessment as follows:

*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)*

One cannot over-emphasise the importance of assessment in the teaching and learning process. As already stated (Ramsden, 2003) as far as the students are concerned, the assessment **is** the curriculum. They will learn what they think will be assessed, not what may be on the curriculum or even what has been covered in lectures! The old adage that “assessment is the tail that wags the dog” is very true.

#### **4.1 Linking learning outcomes, teaching and assessment**

**Formative assessment**

Assessment is often described in terms of **formative assessment** or **summative assessment**. Formative assessment has been described as being assessment FOR learning. It has been described as assessment that “refers to all those activities undertaken by teachers, and by the students in assessing themselves, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged” (Black and Williams, 1998). In other words, formative assessment helps to inform the teacher and the students as to how the students are progressing. Formative assessment is usually carried out at the beginning of a programme or during a programme. The students’ performance on the assessment tasks can help the teacher to make decisions about the direction of the teaching to help the learning process. It has been clearly shown (Black and Williams, 1998) that by giving feedback to learners, formative assessment can help improve the learning and performance of students.

**Main characteristics**

The main characteristics of formative assessment include:

- Identification by teachers and students of the learning outcomes and the criteria for achieving these.
- The provision of clear and rich feedback in an effective and timely fashion.
- The active involvement of students in their own learning.
- Good communication between teacher and students.
- The response by the teacher to the needs of the students.

In short, formative assessment is part of the teaching process rather than the grading process.

**Summative assessment** is assessment that tries to summarise student learning at some point in time – usually at the end of a module or programme. Summative assessment has been described as “end-of-course assessment and essentially means that this is assessment which produces a measure which sums up someone’s achievement and which has no other real use except as a description of what has been achieved” (Brown and Knight, 1994).

### Summative assessment

Thus, the use of summative assessment enables a grade to be generated that reflects the student's performance. Unfortunately, summative assessment is often restricted to just the traditional examination paper and does not involve other areas like project work, portfolios or essays. Because of the nature of summative assessment, not all learning outcomes can be assessed at any one time. Assessment of just a sample of learning outcomes is common.



In theory, continuous assessment is a combination of summative and formative assessment. In practice, continuous assessment often amounts to repeated summative assessments with marks being recorded but little or no specific feedback being given to students.

### Continuous assessment

Clearly, it is important that the method of assessment that we use should attempt to test whether or not the learning outcomes have been achieved. Interestingly, it has been found that the range of assessment of students is very limited, with approximately 80 % of assessment being in the form of exams, essays and reports of some kind. (Brown, 1999). For example, a study of assessment practices in University College, Dublin, Ireland found that a random sample of 83 teaching staff used a total of 256 assessments when asked to describe one of their courses, i.e. approximately 3 assessments per course. Of these assessments, the majority were summative (84 %) and a minority were formative (16 %).

Developing links between learning outcomes, teaching strategies, student activities and assessment tasks is very challenging for the teacher. The following table may be of help in developing these links.

**Table C 3.4-1-2 Linking learning outcomes, teaching and learning activities and assessment**

Learning outcomes	Teaching and Learning Activities	Assessment
Cognitive  Affective  Psychomotor	Lectures  Tutorials  Discussions  Laboratory work  Clinical work  Group work  Seminar  Peer group presentation	End of module exam  Multiple choice tests  Essays  Practical assessment.  Fieldwork  Clinical practice  Presentation  Project work

There may not be just one method of assessment to satisfy all learning outcomes and it may be necessary to choose a number of assessment methods.

### Constructive alignment

The curriculum should be designed so that the teaching activities, learning activities and assessment tasks are co-ordinated with the learning outcomes. Biggs (2003) refers to this type of process as involving constructive alignment. (The *constructive* part refers to the type of learning and what the learner does. The *alignment* part refers to what the teacher does). Biggs points out that in a good teaching system, the method of teaching, learning activities and method of assessment are all co-ordinated to support student learning.

*When there is alignment between what we want, how we teach and how we assess, teaching is likely to be much more effective than when it is not (aligned)... Traditional transmission theories of teaching ignore alignment. (Biggs 2003a)*

It is clear from the above that there are three basic tasks involved in the constructive alignment of any module:

### Three basic tasks

1. Clearly defining the learning outcomes.
2. Selecting teaching and learning methods that are likely to ensure that the learning outcomes are achieved.
3. Assessing the student learning outcomes and checking to see how well they match with what was intended.

## 4.2 Assessment criteria and learning outcomes

Learning outcomes specify the minimum acceptable standard to enable a student to pass a module. Student performances above this basic threshold level are differentiated by applying grading criteria. Grading criteria are statements that indicate what a student must demonstrate to achieve a higher grade. These statements help to differentiate the levels of performance of a student. By making these criteria clear to students, it is hoped that students will aim for the highest levels of performance.

### Grading criteria

Giving a bare grade to a student does not provide adequate feedback on their performance since the grade simply indicates an overall level of competence. This overall grade does not identify strengths and weaknesses on specific learning outcomes. However, if the grading system is tied to some form of scoring guide, it can be a very useful way of identifying areas for improvement that need to be addressed.

A scoring guide that is used in assessment is often referred to as a rubric. A rubric is a grading tool used to describe the criteria used in grading the performance of students. In general, each rubric consists of a set of criteria and marks or grades associated with these criteria. Thus, rubrics help to define the criteria of the system of assessment by describing performance at different points on a rating scale.

### Grading tool

For example, a scoring rubric used for one of the learning outcomes in module ED6001 of the Master's Degree in Science Education at University College Cork, Ireland, is as follows:



#### internet tip

Further information on creating and using detailed rubrics for various types of student assessment can be found on the website of the University of Monmouth, USA:

<http://its.monmouth.edu/FacultyResourceCenter/rubrics.htm>



Table C 3.4-1-3 Linking learning outcomes and assessment criteria

Learning outcome	Assessment criteria				
	Grade 1	Grade 2 : 1	Grade 2 : 2	Pass	Fail
On successful completion of this module, students should be able to: Summarise evidence from the science education literature to support development of a line of argument.	Outstanding use of literature showing excellent ability to synthesise evidence in analytical way to formulate clear conclusions.	Very good use of literature showing high ability to synthesise evidence in analytical way to formulate clear conclusions.	Good use of literature showing good ability to synthesise evidence in analytical way to formulate clear conclusions.	Limited use of literature showing fair ability to synthesise evidence to formulate conclusions.	Poor use of literature showing lack of ability to synthesise evidence to formulate conclusions

## 5. Towards the future with learning outcomes

### Key characteristics

As already indicated, international trends in education show a shift from the traditional “teacher-centred” approach to a more “student-centred” approach. While traditionally the focus was on what the teacher did, in recent years the focus has been on what students have learned and can demonstrate at the end of a module or programme. Among the key characteristics of outcome-based education listed by Harden (2002) are:

- The development of clearly defined and published learning outcomes that must be achieved before the end of the programme.
- The design of a curriculum, learning strategies and learning opportunities to ensure the achievement of the learning outcome.
- An assessment process matched to the learning outcomes and the assessment of individual students to ensure that they achieve the outcomes.

### 5.1 Advantages of learning outcomes

Whilst there has been some criticism of outcome-based education in the literature, a learning outcomes approach to teaching and learning has received strong support at an international level. For example, Jenkins and Unwin (2001) assert that learning outcomes:

- Help teachers to tell students more precisely what is expected of them.
- Help students to learn more effectively: students know where they stand and the curriculum is made more open to them.
- Help teachers to design their materials more effectively by acting as a template for them.
- Make it clear what students can hope to gain from following a particular course or lecture.
- Help teachers select the appropriate teaching strategy matched to the intended learning outcome, e.g. lecture, seminar, group work, tutorial, discussion, peer group presentation or laboratory class.
- Help teachers to tell their colleagues more precisely what a particular activity is designed to achieve.
- Assist in setting examinations based on the materials delivered.
- Ensure that appropriate teaching and assessment strategies are employed.

When writing about the embracing of learning outcomes in medical education, Harden (2002a) comments that “where it has been implemented, outcome based education has had a significant and beneficial impact. Clarification of the learning outcomes in medical education helps teachers, wherever they are, to decide what they should teach and assess, and students what they are expected to learn”. In another paper, Harden (2002b) describes how learning outcomes have been used to develop a model for use in medical training:

*Learning outcomes can be specified in a way that covers the range of necessary competences and emphasises the integration of different competences in the practice of medicine. An important feature of the three-circle model of learning outcomes is that it does just that. In the inner circle are the seven learning outcomes relating to what a doctor is able to do, i.e. the technical competences expected of a doctor (‘doing the right thing’); in the middle circle the learning outcomes relating to how the doctor approaches his or her task with knowledge and understanding and appropriate attitude and decision-making strategies (‘doing the thing right’); and in the outer circle the ongoing development of the doctor as an individual and as a professional (‘the right person doing it’). Harden, 2002b, p. 153*

Adam (2004) summarises the advantages of learning outcomes under 4 main headings:

#### **Learning outcomes in medical education**

### 1. Course and module design

Learning outcomes can:

- Help to ensure consistency of delivery across modules and programmes.
- Aid curriculum design by clarifying areas of overlap between modules and programmes.
- Help course designers to determine precisely the key purposes of a course and to see how components of the syllabus fit and how learning progression is incorporated.
- Highlight the relationship between teaching, learning and assessment and help improve course design and the student experience.
- Promote reflection on assessment and the development of assessment criteria and more effective and varied assessment.

### 2. Quality assurance

Learning outcomes:

- Increase transparency and the comparability of standards between and within qualifications.
- Possess greater credibility and utility than traditional qualifications.
- Play a key role by acting as points of reference for establishing and assessing standards.

### 3. Students

Learning outcomes provide:

- Comprehensive sets of statements of exactly what the students will be able to achieve after successful study.
- Clear information to help students with their choice of module and programme. This can lead to more effective learning.
- Clear information to employers and higher education institutions on the achievements and characteristics associated with particular qualifications.

## 4. Mobility

Learning outcomes:

- Contribute to the mobility of students by facilitating the recognition of their qualifications.
- Improve the transparency of qualifications.
- Simplify credit transfer.
- Provide a common format that helps promote lifelong learning and can assist in creating multiple routes through and between different education systems.

For further development of the advantages of using learning outcomes, particularly in an educational reform context, please see Adam, S. (2006) *An introduction to learning outcomes*, Article B.2.3-1 of this Handbook.

## 5.2 Potential problems with learning outcomes

One of the main concerns about the adoption of learning outcomes is the philosophical one that academic study should be open-ended and that learning outcomes do not fit in with this liberal view of learning (Adam, 2004). This need not be the case if learning outcomes are written with a focus on higher-order thinking and application skills. However, if learning outcomes are written within a very narrow framework, this could limit learning and result in a lack of intellectual challenge to learners.

Other potential problems are:

- There is a danger of an assessment-driven curriculum if learning outcomes are too confined.
- Learning outcomes could give rise to confusion among students and staff if guidelines are not adhered to when drawing up these learning outcomes.

### 5.3 Some concluding points

The international movement away from a “teacher-centred” approach to a more “outcome-based” approach to education has gained increased momentum from the Bologna process, with its emphasis on student-centred learning and the need to have more precision and clarity in the design and content of curricula. It is clear that learning outcomes play a key role in ensuring transparency of qualifications and of qualification frameworks. They are also central to contributing to the implementation of the various action lines of the Bologna process throughout the European Higher Education Area.

The requirement to make the teaching and learning process more transparent and more explicit presents a challenge to all involved in education. In the short term, this involves preparing for the immediate challenge of expressing modules and programmes in terms of learning outcomes. In the longer term, the adoption of the learning outcomes approach has the potential to help embrace a more systematic approach to the design of programmes and modules.

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