

HEIs' Academic Staff  
April 21-22, 2018



Assoc. Prof. Bundit Thipakorn  
Vice President for Educational Development  
King Mongkut's University of Technology Thonburi



writing “**L**EARNING  
**O**UTCOMES”



LEARNING  
OUTCOME?  
WHAT IS

describe the **result** of learning  
over a period of time – the result  
of what is **learned** versus what  
is **taught** ...

LEARNING OUTCOME

"Learning outcomes  
are statements that  
**describe** significant  
and essential  
**learning** that  
**learners** have  
**achieved**, and can  
**reliably**  
**demonstrate** at  
the end of a course  
or programme..."

**action/performance**  
that embody and reflect learner  
**competence**  
in using content, information, ideas  
and tools successfully ...

**clear** learning results that learners  
have to **demonstrate** at the  
end of significant learning experiences ...

LEARNING OUTCOME

can be referred to

**OBSERVABLE**

and

**MEASURABLE**

**COMPETENCE**

"KNOWLEDGE", "SKILLS", and "ATTITUDES"...

**VERIFIABLE**

measurable

clear

**SPECIFIC**

**PERFORMANCE**

precise

**BASED**

**ACHIEVABLE**

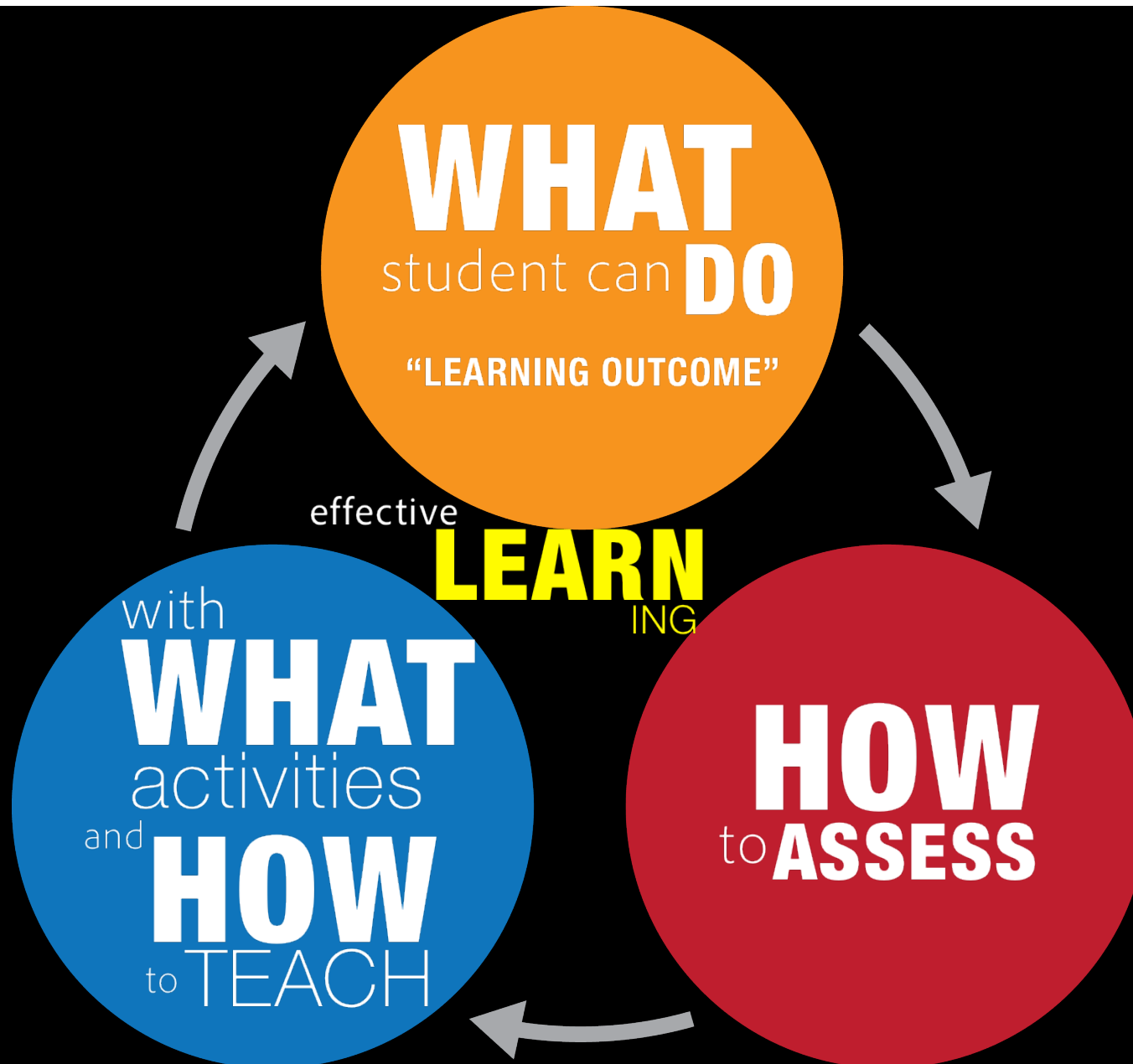
the characteristics of learning outcome:

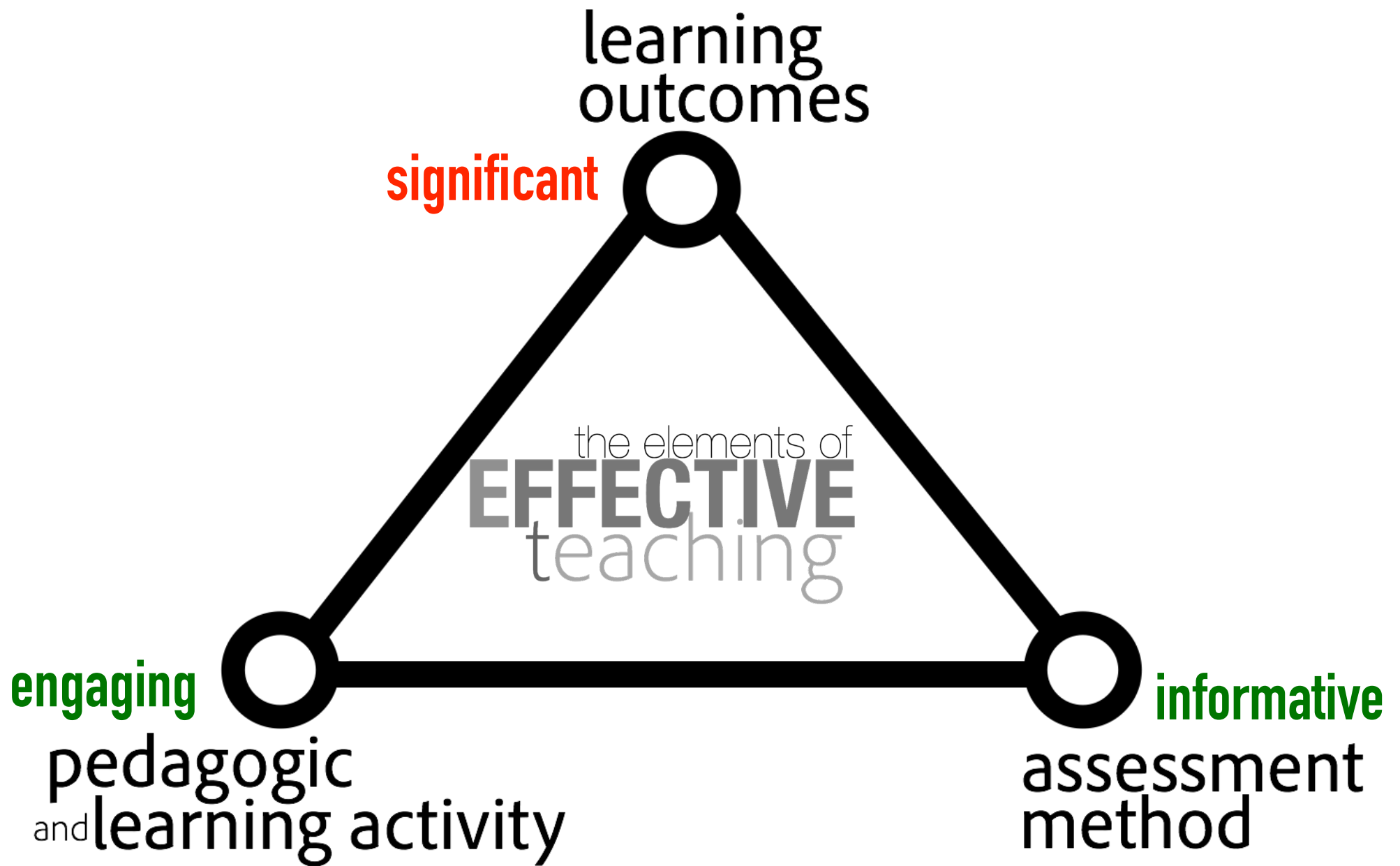
# Why Learning Outcomes?

- Provide **direction** in the planning of a learning activity.
- Focus **learner's behaviour** on that is to be changed.
- Serve as **guidelines** for content, instruction and evaluation.
- Identify **specifically** what should be learned.
- Convey to learners exactly what is to be **accomplished**.

# Learning Outcomes

- Outcomes are **“ACHIEVED”** results or consequences of what was learned.
- Student learning outcomes catalog the **overarching “PRODUCTS”** of the programme/course and are the evidence that goals or objectives were achieved.
- Learning outcomes are exactly what **“ASSESSMENTS”** are **intended to show** — specifically what the student will be able to do upon completing the course.
- Learning outcomes are more **STUDENT-CENTERED**





learning  
outcomes

significant

**C**onstructive  
ALIGNMENT  
must be central and  
integral to programme  
design ...

ensuring  
**LEARNING**  
happens  
during studying

engaging

pedagogic  
and learning activity

informative

assessment  
method

# LEARNING OUTCOMES

expressing

WHAT

you want students

to **KNOW** and

**BE ABLE TO DO**

and **FEEL**

in language that is helpful for

**ASSESS  
MENT**

**what** learners can actually **DO** and  
**FEEL** with **what** they **know**  
① and have **learned** ...

② **what assignment** and the  
**learning pedagogy** and  
**activities** will aid learners mastering  
identified KNOWLEDGE, SKILLS, or  
ATTITUDE CHANGES ...

③ **how** to **assess** the  
**accomplishment** of learners ...

**ANSWERS**  
THESE  
QUESTIONS

“

learning outcomes  
must answer this  
question:

“Why should students  
**TAKE**  
this course?”

## Characteristics of learning outcome statement:

- reflect **essential knowledge, skills, or attitudes**;
- focus on “**results**” of the learning activities;
- reflect the “**end**” of the learning experience, what the learner **will know and be able to do**, rather than the means or the process;
- represent the “**minimum performances**” that must be achieved to successfully complete a course or programme.

“Outcomes are about performance, and this implies:

- There must be a performer – the student, not the teacher
- There must be something performable (thus demonstrable or assessable) to perform
- The focus is on the performance, not the activity or task to be performed

## Structure of a learning outcome statement:

- an **“ACTION”** word that identifies the performance to be demonstrated,
- a **“LEARNING STATEMENT”** that specifies **“WHAT”** learning will be demonstrated in the performance,
- a broad statement of the **“CRITERION”** or **“STANDARD”** for acceptable performance.

### Format #1:

To (action verb)  
(object) (target)  
(modifiers)

### Format #2:

The (target)  
(action verb)  
(modifiers)  
(object)

At the “**end**” of programme/my  
course “**students**” will be able to:

**Action Verb** + **Object** +  
**Qualifying Phrase**  
(how well)

identifying their performance  
to be demonstrated



Outcomes are about performance, and this implies:

- There must be a performer – the student, not the teacher
- There must be something performable (thus demonstrable or assessable) to perform
- The focus is on the performance, not the activity or task to be performed

# Objectives

- Objectives are “Intended” results or consequences of instruction, curricula, programs, or activities.
- Objectives describe the goals and intentions of the faculty who teaches the course.
- Objectives state the purpose and goals of the programme/course, often termed the input in the programme/course.
- Objectives focus on content and skills important within the classroom or program and may describe what the faculty will do.

# OBJECTIVES

**provide** an understanding of the kinematics and kinetics of machines and the fundamental concepts of stress and strain analysis

**develop** an analytical understanding of the kinematics and kinetics and elastic behaviours of machine elements under loading



# LEARNING OUTCOMES

**describe** the basic principles of kinematics and kinetics of machines and the fundamental concepts of stress and strain analysis

Using given principles, to **solve** a mechanical problem that involves loading and motion

**select** relevant principles to obtain the solutions for mechanical problems

**present** analyses and results of experiments in a proper format of a written report such that a technically qualified person can follow and obtain similar findings



Description	Example	
Course Goal / Learning Outcome	describes broad aspects of behavior which incorporate a wide range of knowledge and skill	Upon completion of this course the student will have reliably demonstrated the ability to use the conventions of grammar when creating paragraphs.
Learning Objectives	tend to describe specific, discrete units of knowledge and skill can be accomplished within a short timeframe	Given a paragraph of ten sentences, the student will be able to identify ten rules of grammar that are used in its construction.

# LEVELS OF KNOWING – BLOOM'S REVISED TAXONOMY

**Remembering** - Define, describe, draw, find, identify, label, list, match, name, quote, recall, recite, tell, write

**Understanding** - Classify, compare, exemplify, conclude, demonstrate, discuss, explain, identify, illustrate, interpret, paraphrase, predict, report

**Applying** - Apply, change, choose, compute, dramatize, implement, interview, prepare, produce, role play, select, show, transfer, use

**Analysing** - Analyse, characterize, classify, compare, contrast, debate, deconstruct, deduce, differentiate, discriminate, distinguish, examine, organize, outline, relate, research, separate, structure

**Evaluating** - Appraise, argue, assess, choose, conclude, critique, decide, evaluate, judge, justify, predict, prioritize, prove, rank, rate, select, monitor

**Creating** - Construct, design, develop, generate, hypothesise, invent, plan, produce, compose, create, make, perform, plan, produce

# LEVELS OF KNOWING – THE SOLO TAXONOMY

**Unistructural** - Memorize, identify, recognize, count, define, draw, find, label, match, name, quote, recall, recite, order, tell, write, imitate

**Multi structural** - Classify, describe, list, report, discuss, illustrate, select, narrate, compute, sequence, outline, separate

**Relational** - Apply, integrate, analyse, explain, predict, conclude, summarize (précis), review, argue, transfer, make a plan, characterize, compare, contrast, differentiate, organize, debate, make a case, construct, review and rewrite, examine, translate, paraphrase, solve a problem

**Extended abstract** - Theorize, hypothesize, generalize, reflect, generate, create, compose, invent, originate, prove from first principles, make an original case, solve from first principles

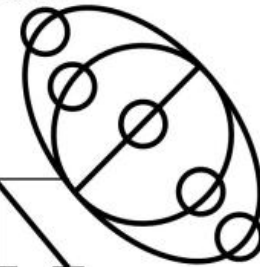
# SOLO TAXONOMY (after Biggs and Collis 1982)

Define  
Identify  
Do simple  
procedure

Define  
Describe  
List  
Do algorithm  
Combine

Compare/contrast  
Explain causes  
Sequence  
Classify  
Analyse  
Part/whole  
Relate  
Analogy  
Apply  
Formulate questions

Evaluate  
Theorise  
Generalise  
Predict  
Create  
Imagine  
Hypothesise  
Reflect



**Prestructural**





**Unistructural**

**Multistructural**

**Relational**

**Extended abstract**

# HOT ALIGNMENT DIAGRAM

Cognitive Domain Categories			Examples of Targeted Learning Interventions [Thinking and ICTs]			Student Learning Outcomes [Level of Understanding Displayed]		
Bloom's Taxonomy Anderson's Revision	Fogarty's Three Storey Intellect (Fogarty 1997)		De Bono's 6 Hats	HOT Visual Mapping & Self Assessment Rubrics (Indicative Verbs)	ICTs (e.g. Google)	SOLO Taxonomy Structure of Observed Learning Outcomes (Biggs and Collis 1989)		NCEA
Create  Evaluate	Output/ Applying	Evaluate Generalise Imagine Judge Predict Speculate If/ Then Apply a principle Hypothesise Forecast Idealise	Green Hat Blue Hat	Generalise Evaluate Predict	Using Google as a productive tool For example Google Blogger for authoring text and digital media.	 Extended Abstract	Learning outcomes go beyond subject and makes links to other concepts - generalises	Achievement with Excellence
Analyse  Apply	Process	Compare Contrast Classify Sort Distinguish Explain (why) Infer Sequence Analyse Synthesize Make analogies Reason	Yellow Hat Black Hat	Compare/contrast Classify Part Whole Sequence Cause Effect Analogy	Using Google as a communication tool. For example Gmail and Google Talk.	 Relational	Learning outcomes show full connections made, and synthesis of parts to the overall meaning	Achievement with Merit
Understanding  Remembering	Input/ Gathering	Complete Count Define Describe Identify List Match Name Observe Recite Select Scan	White Hat Red Hat	Describe Define Identify	Using Google as an informative tool. For example Dictionary Define Command	 Multistructural   Unistructural	Learning outcomes show connections are made, but significance to overall meaning is missing Learning outcomes show simple connections but importance not noted.	Achievement

# Remembering Questions

- What is ...?
- Where is ...?
- How did \_\_\_\_ happen?
- Why did ...?
- When did ...?
- How would you show ...?
- Who were the main ...?
- Which one ...?
- How is ...?
- When did \_\_\_\_ happen?
- How would you explain ...?
- How would you describe ..?
- Can you recall ...?
- Can you select ...?
- Can you list the three ...?
- Who was ...?

# Understanding Questions

- How would you classify the type of ...?
- How would you compare ...? contrast ...?
- Will you state or interpret in your own words ...?
- How would you rephrase the meaning ...?
- What facts or ideas show ...?
- How would you summarize ...?
- What is the main idea of ...?
- Which statements support ...?
- Can you explain what is happening ...? what is meant ...?
- What can you say about ...?
- Which is the best answer ...?

# Applying Questions

- How would you use ...?
- What examples can you find to ...?
- How would you solve \_\_\_\_\_ using what you've learned ...?
- How would you organize \_\_\_\_\_ to show ...?
- How would you show your understanding of ...?
- What approach would you use to ...?
- How would you apply what you learned to develop ...?
- What other way would you plan to ...?
- What would result if ...?
- Can you make use of the facts to ...?
- What elements would you choose to change ...?
- What facts would you select to show ...?
- What questions would you ask in an interview with ...?

# Comparing Taxonomies

32

## Bloom's

Assesses **QUESTIONS** that the instructor asks.

Works on any type question (multiple-choice, open ended,...)

## SOLO

Assesses student's **RESPONSE** to questions.

Works for free-response questions (that is, checking a box in a multiple-choice question is not the skill being assessed)

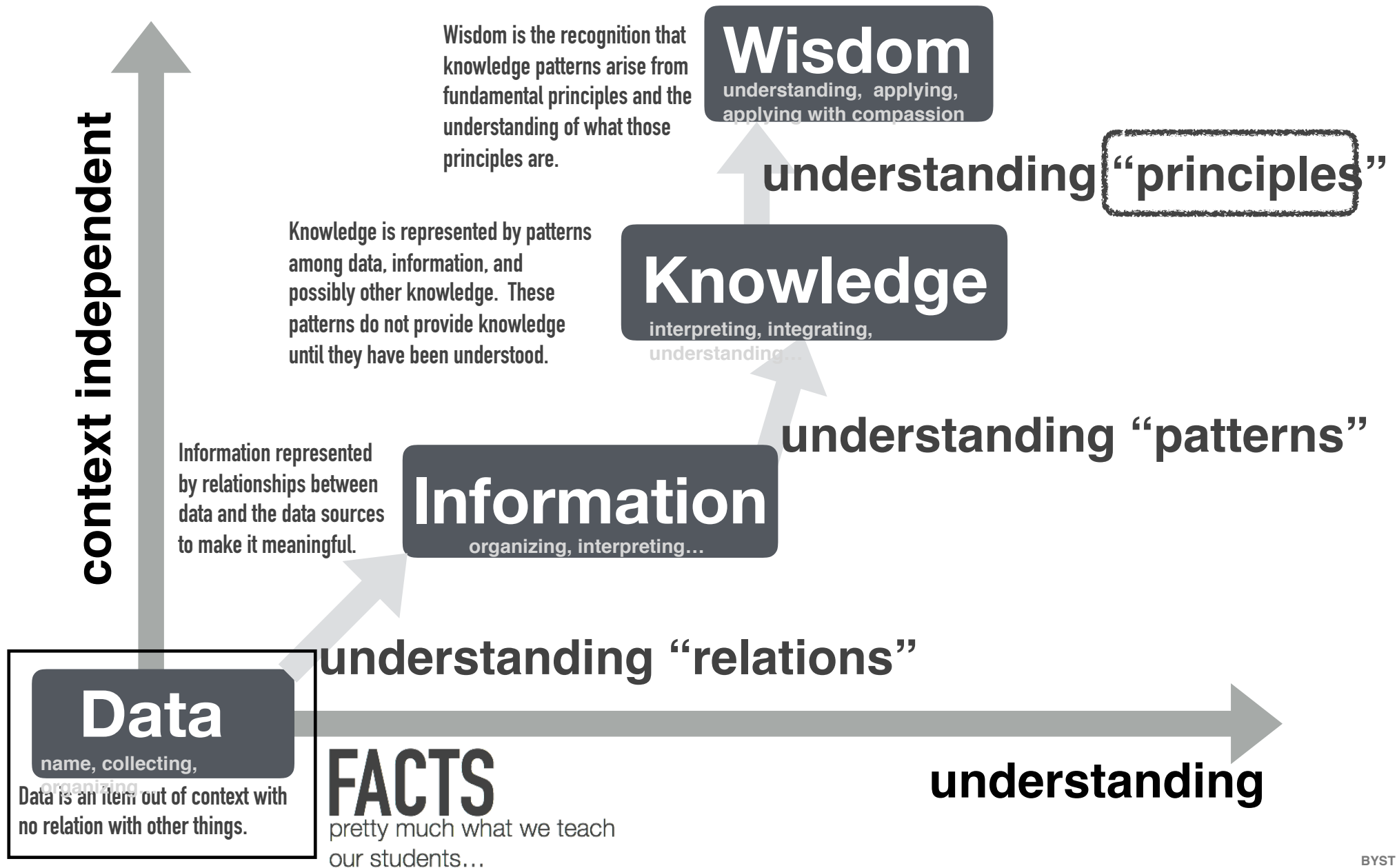
# Using Bloom



# Using Bloom



- “
- KNOWLEDGE is “knowing” but WISDOM is “understanding”.
  - KNOWLEDGE and WISDOM are “interconnected”.
  - KNOWLEDGE is “obtained” but WISDOM is “developed”.
  - Both KNOWLEDGE and WISDOM need “data” and “information.”
- ”



data:



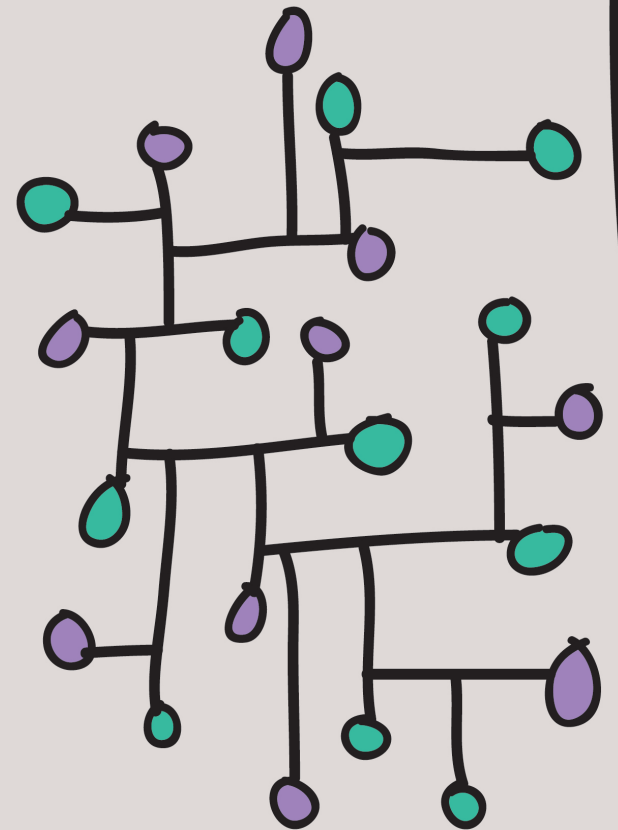
@bestqualitycrab

information:

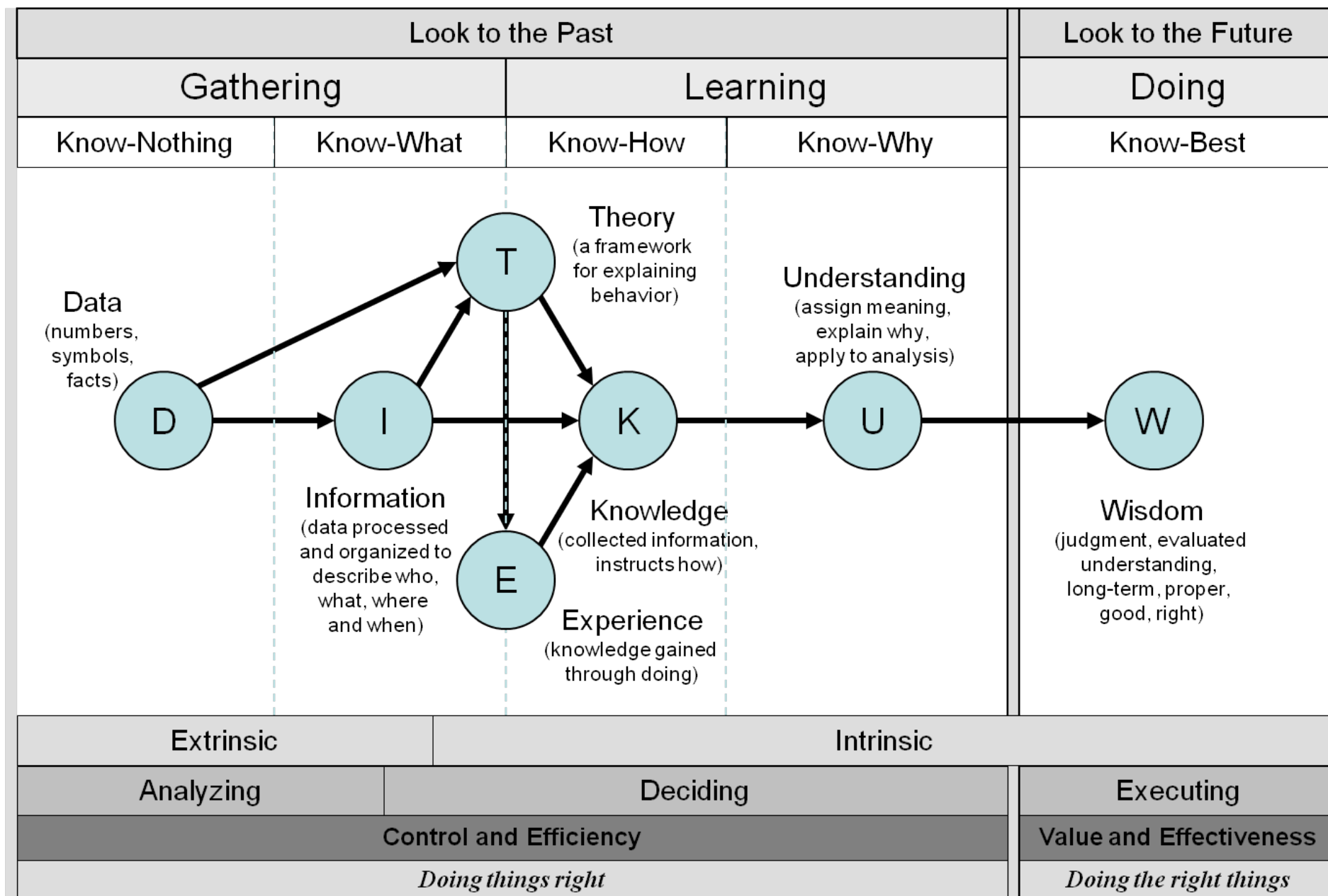


@gapingvoid

knowledge:



@gapingvoid



# Checklist for writing learning outcomes

- ☐ Have I focussed on outcomes not processes, i.e. have I focussed on what the students are able to demonstrate rather than on what I have done in my teaching?
- ☐ Have I begun each outcome with an active verb?
- ☐ Have I used only one active verb per learning outcome?
- ☐ Have I avoided terms like know, understand, learn, be familiar with, be exposed to, be acquainted with, and be aware of?
- ☐ Are my outcomes observable and measurable?
- ☐ Are my outcomes capable of being assessed?

# Checklist for writing learning outcomes

- ☐ Have I included learning outcomes across the range of levels of Bloom's Taxonomy?
- ☐ Do all the outcomes fit within the aims and content of the module?
- ☐ Have I the recommended number of outcomes (maximum of nine per module)?
- ☐ Is it realistic to achieve the learning outcomes within the time and resources available?

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

**Table 3.2** Examples of verbs used in writing aims and learning outcomes.  
(Fry et al., 2000 p. 51)

# 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. In order to describe the way in which we deal with things emotionally, Bloom and his colleagues developed 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 his/her 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.

Some examples of learning outcomes in the affective domain are:

- ◎ 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 students of all abilities in the classroom.
- ◎ Appreciate the management challenges associated with high levels of  
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.

# 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 is true to say that this domain has been less well discussed 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.

**For example, Dave (1970) proposed a hierarchy consisting of 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 practising 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

**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-and-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

**Simpson (1972) developed a more detailed hierarchy consisting of seven levels (cont'd):**

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.

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

Some examples of learning outcomes in the psychomotor domain are:

- ◎ Deliver effective local anaesthesia in the mandible and maxilla and identify the appropriate agents that may be used.
- ◎ Perform at least ten local anaesthetic administrations and evaluate your performance with your instructor.
- ◎ Prescribe and process at least ten radiographs and evaluate them with your instructor.
- ◎ Demonstrate proficiency in Cardio-Pulmonary Resuscitation.
- ◎ Use a range of physiology equipment to measure physiological function.
- ◎ Operate the range of instrumentation specified in the module safely and efficiently in the chemistry laboratory.
- ◎ Administer successfully and in a safe manner with minimal risk to patient and operator, infiltration and regional nerve block

Some examples of learning outcomes in the psychomotor domain are

(Cont'd):

- Present the methodology and findings of the research project in an oral report.
- Design a well-illustrated poster presentation to summarise the research project.
- Examine a patient extra-orally and intra-orally.
- Use the following software effectively and skilfully: MS Word, Excel and Powerpoint.
- Perform a surgical dressing using an aseptic technique.
- Sketch the pump characteristic curve, pipeline curve, the pump-pipeline operating point and show how each of these can be altered in a practical manner.
- Record an accurate impression of the mouth and identify all anatomical features of importance.

# Learning outcomes for a module in Restorative Dentistry

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

- Examine a patient extra-orally and intra-orally.
- Formulate an appropriate treatment plan based on an understanding of the disease process present and a prediction of the likely success.
- Identify dental caries and restore a tooth to functional form following caries removal.
- Record an accurate impression of the mouth and identify all anatomical features of importance.
- Design a partial denture with appropriate support and retention.
- Administer successfully and in a safe manner with minimal risk to patient and operator, infiltration and regional nerve block anaesthesia.

# Learning outcomes for a module in Economics

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

- Recognise the main indicators of stock market timing.
- Describe and distinguish between the main economic indicators.
- Interpret Irish National Income and Expenditure Accounts.
- Differentiate between monetary and fiscal policy.
- Perform economic calculations, which enable the learner to appreciate economic concepts with greater clarity.
- Criticise budgetary decisions using economic criteria.
- Construct and interpret company accounts and accounting ratios.
- Formulate appropriate budgetary policy in response to changes in the business cycle.
- Assess the stance of government fiscal policy.

Module Title: Dental Surgery – 5th Year Dental Students

Module Code: DS 5001

Learning outcomes written by Dr Eleanor O’Sullivan.

## COGNITIVE

- Recall anatomy and basic physiology of the head and neck.
- Outline aetiology, symptoms, pathology, diagnosis and treatment of oro-facial diseases.
- List the steps involved in patient assessment, including procedures for specific tests.
- Apply this format to record a thorough case history of an unseen patient.

- Summarise relevant information regarding the patient's current complaint/status.
- Arrange appropriate tests.
- Demonstrate the ability to interpret tests and reports.
- Evaluate all available information and knowledge to generate a differential diagnosis.
- Formulate an appropriate treatment plan and justify the proposal giving due consideration to patient expectations and limitations.

# AFFECTIVE

- Manage patients with facial pain and oro-facial disease.
- Differentiate between patients that can/can not be safely treated by a general dentist.
- Develop good communication skills (verbal and non-verbal).
- Master the skills required to obtain informed consent, deal with medico-legal issues and dental phobia; deliver health promotion advice.
- Demonstrate professional behaviour and good clinical governance.
- Display the capacity to value and participate in projects which require teamwork.
- Manage competing demands on time, including self-directed learning & critical appraisal.

# Psychomotor

- Prescribe, and process dental radiographs.
- Administer local anaesthetics safely.
- Perform basic dento-alveolar surgical procedures.
- Prescribe appropriate drugs.
- Master skills required to manage intra- and post-operative complications.
- Recognise, evaluate and manage dental emergencies appropriately.
- Recognise and manage medical emergencies appropriately.

