

PLANNING FOR ASSESSMENT

Assessment Workshop

Science Week, 2010

Australian College of Veterinary Scientists

Glen Coleman

Table of Contents

1.	Planning for assessment	3
2.	Taxonomies of learning	4
3.	Activity one – learning outcomes	6
4.	Activity two – the assessment plan	9
5.	Activity three – critiquing written examinations	11
6.	Activity four – writing exam questions	17
7.	Activity five – marking schemes	19

Planning for assessment – writing exam questions is near the end, not the beginning.....

1. Define clear learning objectives
 - *Are they pitched at the right level (e.g. Bloom's taxonomy)?*
 - *Can the student/candidate read the learning outcomes and clearly understand what will be expected of him/her?*
 - *Are the learning outcomes described as behaviours that can readily be measured?*

2. Design an overall assessment program that is aligned with the learning outcomes
 - *Alignment - how well does the combined assessment program map onto the learning outcomes?*
 - *Don't over-assess, but do enough to make a reliable judgement about the candidate's performance against the learning outcomes*
 - *Is each learning outcome equivalent in importance, and is this reflected in the assessment strategies?*

3. Writing the examination
 - *Validity – setting questions that ask what you really need to know, e.g. instructional verbs matching required levels of learning outcome*
 - *Choice – why and how*
 - *Timing*
 - *Marking sheets*

4. How will you assign a mark or grade for overall performance?

5. Moderation – between examiners, between years, between chapters, between ACVSc and other similar bodies

Taxonomies of learning

There are many taxonomies of learning outcomes, but the one originally developed by Bloom and colleagues in the 1950s is most famous, and various modifications or iterations of it are still widely used.

Different aspects (or domains) of learning each may have their own hierarchy; e.g. cognitive domain, affective (attitudes & feelings), psychomotor, and communication skills & competencies. There has even been a taxonomy of learning outcomes developed for clinical training. For examinations, especially written examinations, it is the taxonomies of learning outcomes for the cognitive domain that are most relevant, and that is what we will focus on here. Refer to the Table on the next page.

Generally speaking, the learner needs to have mastered a lower level to be able to perform at a higher level. For example, Candidate X cannot *apply* knowledge gained (i.e. level 3) if she cannot remember the information (level 1) and does not understand (level 2) the ideas or concepts embodied in it. While there is some overlap between the levels, it is expected that senior students in a discipline such as veterinary science would be expected to achieve learning outcomes at the higher levels when compared with junior students. A similar requirement is likely for Fellowship versus Membership candidates.

There is a general view that universities spend too much time assessing at the lower levels, and that this can impact upon the validity of our assessment strategies. In other words, most university teachers aspire to develop skills of critical thinking and problem solving – but our learning outcomes and/or our assessment tasks often work at the lower levels of the scale. We are not, in fact, assessing for critical thinking and problem solving.....

The following table has been modified from a resource developed by Dr Clair Hughes at UQ's Tertiary Education Development Institute. She used a range of primary sources in developing the resource including "Revised Bloom's Taxonomy" retrieved 20 May, 2005 from <http://rite.ed.qut.edu.au/oz-teachernet/index.php?module=ContentExpress&func=display&ceid=29> and *Using Learning Outcomes to Design a Course and Assess Learning Outcomes*. http://www.hlst.heacademy.ac.uk/guide/current_practice/Learning.html and Moon, J. Linking Levels, Learning Outcomes and Assessment Criteria. Retrieved 30 May, 2007, from http://www.see-educoop.net/education_in/pdf/edinburgh-moon-oth-enl-t02.pdf

Instructional verbs that help elaborate the six levels of thinking in Bloom's taxonomy

<p align="center">1</p> <p align="center">Remembering</p> <p><i>Can the student retrieve relevant knowledge from long term memory?</i></p>	<p align="center">2</p> <p align="center">Understanding</p> <p><i>Can the student EXPLAIN ideas or concepts?</i></p>		<p align="center">3</p> <p align="center">Applying</p> <p><i>Can the student USE the new knowledge in another familiar situation?</i></p>	<p align="center">4</p> <p align="center">Analysing</p> <p><i>Can the student DIFFERENTIATE between and RELATE constituent parts?</i></p>	<p align="center">5</p> <p align="center">Evaluating</p> <p><i>Can the student JUSTIFY an opinion, decision or course of action?</i></p>	<p align="center">6</p> <p align="center">Creating</p> <p><i>Can the student GENERATE new products, ideas or ways of viewing things?</i></p>
<p>Recognise <u>Synonyms</u></p> <ul style="list-style-type: none"> Identify Recognise Indicate <p>Recall <u>Synonyms</u></p> <ul style="list-style-type: none"> List Name 	<p>Interpret <u>Synonyms:</u></p> <ul style="list-style-type: none"> Paraphrase Clarify Express <p>Exemplify <u>Synonyms</u></p> <ul style="list-style-type: none"> Illustrate... Give examples of Show <p>Classify <u>Synonyms</u></p> <ul style="list-style-type: none"> Categorise Organise 	<p>Summarise <u>Synonyms</u></p> <ul style="list-style-type: none"> Outline Précis <p>Infer <u>Synonyms</u></p> <ul style="list-style-type: none"> Extrapolate Predict Conclude <p>Compare <u>Synonyms</u></p> <ul style="list-style-type: none"> Contrast Match <p>Explain <u>Synonyms</u></p> <ul style="list-style-type: none"> Explain Discuss 	<p>Execute Applying knowledge (often procedural) to a routine task. <u>Synonyms</u></p> <ul style="list-style-type: none"> Carry out Measure Demonstrate Calculate Prepare <p>Implement Applying knowledge (often procedural) to a non-routine task. <u>Synonyms</u></p> <ul style="list-style-type: none"> Predict Solve Explain how Verify 	<p>Differentiate Distinguishing relevant from irrelevant parts or important from unimportant parts of presented material. <u>Synonyms</u></p> <ul style="list-style-type: none"> Discriminate Distinguish Relate <p>Organise Determining how elements fit or function within a structure. <u>Synonyms</u></p> <ul style="list-style-type: none"> Structure Integrate (Re)arrange Derive <p>Attribute Determining the point of view, bias, values, or intent underlying presented material. <u>Synonyms</u></p> <ul style="list-style-type: none"> Deconstructing Diagnose 	<p>Check Detecting inconsistencies or fallacies within a process or product. Determining whether a process or product has internal consistency. <u>Synonyms</u></p> <ul style="list-style-type: none"> Test Monitor Assess Appraise <p>Critique Detecting the appropriateness of a procedure for a given task or problem. <u>Synonyms</u></p> <ul style="list-style-type: none"> Judge Question Justify Defend Review 	<p>Generate Coming up with alternatives or hypotheses based on criteria <u>Synonyms</u></p> <ul style="list-style-type: none"> Hypothesize Propose Develop Synthesise Provide options <p>Planning Devising a procedure for accomplishing some task. <u>Synonyms</u></p> <ul style="list-style-type: none"> Design Formulate Revise Suggest <p>Producing Inventing a product <u>Synonyms</u></p> <ul style="list-style-type: none"> Compose Modify Alter Construct

Activity One – Learning Outcomes

Here is a set of learning outcomes for a fourth year BVSc course, *Principles of Clinical Practice*. Using Bloom’s taxonomy, assign a level of learning outcome to each learning outcome.

1. ANAESTHESIA	Level of Learning Outcome
1.1 Apply general principles and specific knowledge of anaesthetic techniques, anaesthetic monitoring and drugs used to provide anaesthesia and analgesia to a variety of clinical situations.	
1.2 Describe the relative suitability of different methods of euthanasia for a variety of species of animals and to discuss the social and legal responsibilities of the veterinarian with respect to euthanasia of animals.	
2. DIAGNOSTIC IMAGING	
2.1 Describe the principles and practice of radiography and radiation safety in the workplace.	
2.2 Select the most appropriate imaging modality for a given diagnostic challenge (radiography, ultrasound). Use your understanding of the basic physical properties of ultrasound to explain image production including the production of artefacts.	
3. SURGERY	
3.1 Explain the need for observation of strict asepsis and be able to carry out aseptic procedures.	
3.2 Describe and apply the principles of wound management. Specifically, students will be able to classify wounds and describe appropriate wound treatment.	
3.3 Discuss the principles of surgical practice including Halsted's principles, haemostasis, tissue viability, appropriate suture patterns and materials for a variety of situations.	
4. PHARMACOLOGY	
4.1 Describe the effects of kidney and liver disease on pharmacokinetics. Apply principles of decision making in drug prescribing.	
4.2 Demonstrate an understanding of autonomic anatomy and receptor types and discuss the effect of specific autonomic therapeutic agents on the bladder and the pupil of the eye	
4.3 Discuss drug residues in food and performance animals.	
5. TOXICOLOGY	
5.1 Describe the methods needed to effectively investigate and manage poisoning in all types of animals, including situations where litigation may be involved.	
6. EPIDEMIOLOGY	
6.1 Recognise the major epidemiological techniques for assessing effects of treatments and disease prevention strategies, and risk factors for diseases	
6.2 Appraise examples of evidence for potential for important selection bias, confounding and misclassification biases, and present basis for conclusions reached	

What levels would be relevant at Membership level, and at Fellowship level?

Activity Two – Assessment plan

Here is the total assessment plan & tasks for the 2009 offering of *Principles of Clinical Practice*.

Assessment Task	Due Date	Weighting	Learning Objectives
<i>Exam - during Exam Period (Central)</i> VETS4012 Principles of Clinical Practice	Examination Period	55%	1.1, 1.2, 2.2, 3.1, 3.2, 3.3, 4.1, 4.2, 4.3, 5.1
<i>Exam - outside Exam Period (School)</i> Mid-semester exam	8 Apr 09 09:00 - 8 Apr 09 09:50	20%	1.1, 2.1
<i>Article Review</i> Epidemiology Assignment	20 May 09 - 20 May 09	20%	6.1, 6.2

Clinical Practical Work Sessions

Assessment Task	Due Date	Weighting	Learning Objectives
<i>Case Study</i> CPW - Anaesthesia Case Study	11 Mar 09 - 12 Jun 09 Assignments due one week after your CPW session	5%	1.1

Midsemester exam; A 40 min examination with 10 minutes perusal will be held on the 9th April in Room 3-309 at 9:00AM. This exam will be on the material covered in the first 6 lectures in anaesthesia (10%) and the four radiography lectures (10%). Questions will be posted on the VETS4012 Blackboard site by the 28th March. Students are expected to prepare material to enable them to answer all the questions provided. A selection of these questions will appear on the exam paper. This is NOT an open book exam.

Anaesthesia: Criterion: - Detailed knowledge and understanding of the effect of anaesthesia on the respiratory system, anaesthetic breathing systems, intermittent positive pressure ventilation and the pharmacology of drugs in anaesthesia. Standard: - High marks will be awarded to those who demonstrate a high level of both factual recall and deep understanding of the aforementioned topics as well as the ability to critically evaluate the available alternatives.

Radiography: Criterion: - Factual recall and application of radiation physics and radiation safety. Standard: -High marks will be awarded to those who demonstrate a high level of factual recall and a high level of problem solving within this field.

Article review; Each student will be allocated a scientific paper and asked to critically review the reported study, using the framework taught during semester. The output is a short report. The assignment details will be available at the first Epidemiology lecture.

This assignment will evaluate the student's ability to apply the framework taught during the course to critically evaluate a specific scientific study and to explain reasons for their conclusions about the evidence provided in the paper. Highest grades will be awarded where the framework is applied comprehensively, and where conclusions are supported by sound logic and reported in a clear and succinct manner.

Anaesthesia case study; You will attend two CPW sessions in the Small Animal Surgery (Wednesday and Friday 10.30 – 1.00). Select a case you have been involved with during a CPW session and use this as the basis of your assignment. You will need to access the case file to examine relevant information about your case. You may need to discuss your case with the primary care clinician and the anaesthetist.

Activity Three – Critiquing written examinations

To follow is the 2009 end of semester examination for *Principles of Clinical Practice*. This was a 2-hour examination (+10 minutes perusal) carrying 55% of the assessment weighting for the course.

SECTION A Surgery

Question 1

- a) **List** Halsted's Principles. 1 mark
- b) **Define** the term Asepsis 1 mark
- c) **Briefly describe** how we can optimise the chance of achieving asepsis
 - (i) In the preparation of instruments and theatres,
 - (ii) In the preparation of the patient,
 - (iii) In the preparation of the surgeon. 3 marks
- d) Define the term 'nosocomial infection' 1 mark
List 5 ways we can reduce the incidence of these types of infection in our veterinary hospitals. 1.5 marks

SECTION B Surgery

Question 2

- i) List 5 principles of aseptic operative technique 2.5 marks
- ii) An 8-year-old male Labrador was hit by a car 24 hours prior to presentation to your clinic. Physical examination reveals a 10cm diameter full thickness skin wound over the left flank. Using the principles of wound management, describe your treatment of this case. 5 marks

SECTION C Surgery Practical Classes

Question 3

- i) Describe how you would close an exploratory laparotomy incision in a 20kg bitch (be sure to include information on suture material and pattern). 2.5 marks
- ii) Describe how you would perform a biopsy of a lesion located along the margin of a hepatic lobe during exploratory laparotomy. 2.5 marks

SECTION D Toxicology

Question 4

- i) List three (3) ways that a toxin may enter the body of a companion animal and identify which route of entry is most common.
- ii) List three (3) emetics that may be used in pets suspected or known to have ingested a toxin.
- iii) Name the most commonly used adsorbent in treating pets with suspected or known toxin ingestion and briefly describe the mode of action of this adsorbent.

- iv) List three (3) medications commonly used as a gastrointestinal protectant in dogs and cats suspected of having ingested a poison.
- v) Which clotting factors are affected by a rodenticide toxicity in the dog and which clotting pathways are compromised? 5 marks

SECTION E

Pharmacology

Question 5

You are prescribing a new and novel agent claimed to give pain relief to patients with maladaptive pain. The patient is a 13 year old dog that sustained a vertebral injury and has developed allodynia in one hind leg. The dog has an elevated plasma creatinine and has mild jaundice (elevated total and conjugated bilirubin). The dog is also treated with digoxin for mitral insufficiency.

- i) Describe the pathophysiology of neuropathic pain and LIST the mechanisms of action of drugs that COULD be used to treat neuropathic pain 5 marks
- ii) What precautions would you take in prescribing ANY drug for THIS patient? 4 marks
- iii) Describe how plasma creatinine can be used to guide the prescribing of a drug that is excreted by the kidney. 3 marks

SECTION F

Diagnostic imaging

Question 6

Explain what "**Acoustic Shadowing**" refers to in diagnostic ultrasound.

Include in your answer why it occurs, what it looks like, how it can help or hinder the study, and give some examples of situations where you will see it. 5 marks

SECTION G

Anaesthesia

Question 7

A German Shepherd dog has presented to your clinic with a grossly distended abdomen, rapid shallow ventilation and signs of circulatory shock. A diagnosis of gastric dilatation and volvulus has been made and the dog is to have surgery. You are responsible for the management of this case, **excluding surgery**. What is your plan for anaesthesia and analgesia for this dog? Discuss your preoperative assessment and stabilisation, and pre- intra- and post-operative monitoring and management. Include common complications in your discussion. 10 marks

Question 8

A Rottweiler is presented to your practice for euthanasia. The reason that the owner has requested euthanasia is that the dog has become progressively more aggressive towards both humans and other dogs with time. Describe how you would perform euthanasia on this dog? 3 marks

Does each question provide a valid measure of the relevant learning outcome stated for the course? (If a question maps onto a learning outcome you revised, how does it compare against your revised learning outcome.)

Do the instructional verbs in the questions map onto higher or lower learning outcomes as per the modified Bloom's taxonomy?

Exploring the level of learning being assessed against the taxonomy in more detail, what level of performance is each question assessing?

	<i>Remembering</i>	<i>Understanding</i>	<i>Applying</i>	<i>Analysing</i>	<i>Evaluating</i>	<i>Creating</i>
<i>Q1</i>						
<i>Q2</i>						
<i>Q3</i>						
<i>Q4</i>						
<i>Q5</i>						
<i>Q6</i>						
<i>Q7</i>						
<i>Q8</i>						

Do you think the exam is pitched at the right level for this group of students?

Think of the overall structure of the paper (e.g. compare Q1 with Q8) and the variations in formatting between questions – does this matter?

There is no choice for candidates in this paper. Does this matter? What is the rationale for choice in an exam paper? Are there any potential pit-falls? What would you need to consider in introducing choice into this paper?

Think of the marks allocated per question. Does this allocation of marks help or hinder the candidate's approach to the paper?

One of the most difficult judgements for a new examiner is allocating time to answer particular questions – many new examiners do not allow enough time for candidates to think, prepare and respond. See for example;

What are the two/three main parasites of commercial pigs in Australia? What disease condition/s is each parasite associated with? How are they diagnosed and controlled?
(5 marks = 5 minutes)

Comment on the time allocation for questions in this paper. What would be a method for checking time allocation is reasonable?

Pass the exam question you have written to your neighbour/group for feedback on (a) what information/work they believe the candidate is being asked to provide/undertake by the question, and (b) how long they believe it would take to answer the question.

Activity Five – Marking Schemes

Using the feedback on your draft exam paper (provided by your colleague in the last question), develop a marking scheme for the question/s you have written, in which you detail the information/outputs you expect from the candidate in response to the question. Include the time required by the candidate to produce this.

Why is the provision of such a marking scheme important, particularly in the College context?
