

# Defining, constructing and assessing learning outcomes

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## Summary

Learning outcomes define the veterinary curriculum and inform students about what they must be able to demonstrate to succeed. Stakeholder consultation during their development ensures that programme learning outcomes equip graduates to contribute to the veterinary profession. Effective learning outcomes form a hierarchy linking the programme, its courses and tasks. Clear outcomes direct students towards higher quality learning by indicating the achievements intended, but leave scope for emergent learning outcomes. Defined technical competencies fit within this overarching framework, complementing higher order learning. Mapping is used to align learning outcomes horizontally and vertically so students are systematically guided towards entry-level competence and professional independence. Constructively aligned learning and assessment tasks ensure learners spend the focused time required to sequentially develop programme outcomes. Assessment by staff, peers and other stakeholders certifies achievement of intended outcomes. Effective assessment also empowers students to define and achieve their own learning outcomes, so they develop the habits of autonomous life-long learning. Evaluation of the quality and consistency of achieved outcomes informs ongoing programme improvement. If we are going to achieve the objectives of this set of papers, i.e. to improve public health education globally (*Rev. sci. tech. Off. int. Epiz.* 28 [2] 2009), then it is essential that they be well defined in the learning outcomes statement of all veterinary schools.

## Keywords

Assessment – Competency – Constructive curriculum alignment – Curriculum mapping – Grading criteria – Graduate attributes – Intended learning outcomes – Teaching and learning activities – Veterinary education.

## Introduction

Effective curriculum design starts with the end product in mind, a clear definition of the learning outcomes every graduate should achieve. Veterinary programmes worldwide share common goals: to educate graduates who will contribute to society through protection of animal health and shape the future achievements of the profession. Global management of animal disease, animal welfare, sustainable food production and veterinary public health are central to the relevance of veterinary science to society, determining whether the profession will pass Leighton's 'lifeboat test' (9). (In other words, if society's resources were suddenly and unexpectedly stretched to the

limit and priorities had to be identified, would the veterinary profession be worth 'saving'? Would it be considered an essential social institution that society cannot survive without?) Veterinarians need to think critically and apply knowledge and skills to solve new problems in animal health and production, improve veterinary public health and sustain life-long professional development. They must have technical expertise in comparative diagnostics and therapeutics (one medicine), client communication and patient management, and a commitment to animal welfare. These overarching 'graduate attributes' or 'programme intended learning outcomes' comprise the knowledge, skills, behaviour and attitudinal capabilities specific to the veterinary profession.

They incorporate the broader university aspiration to engage students imaginatively in building their knowledge so that they can transform themselves and their world.

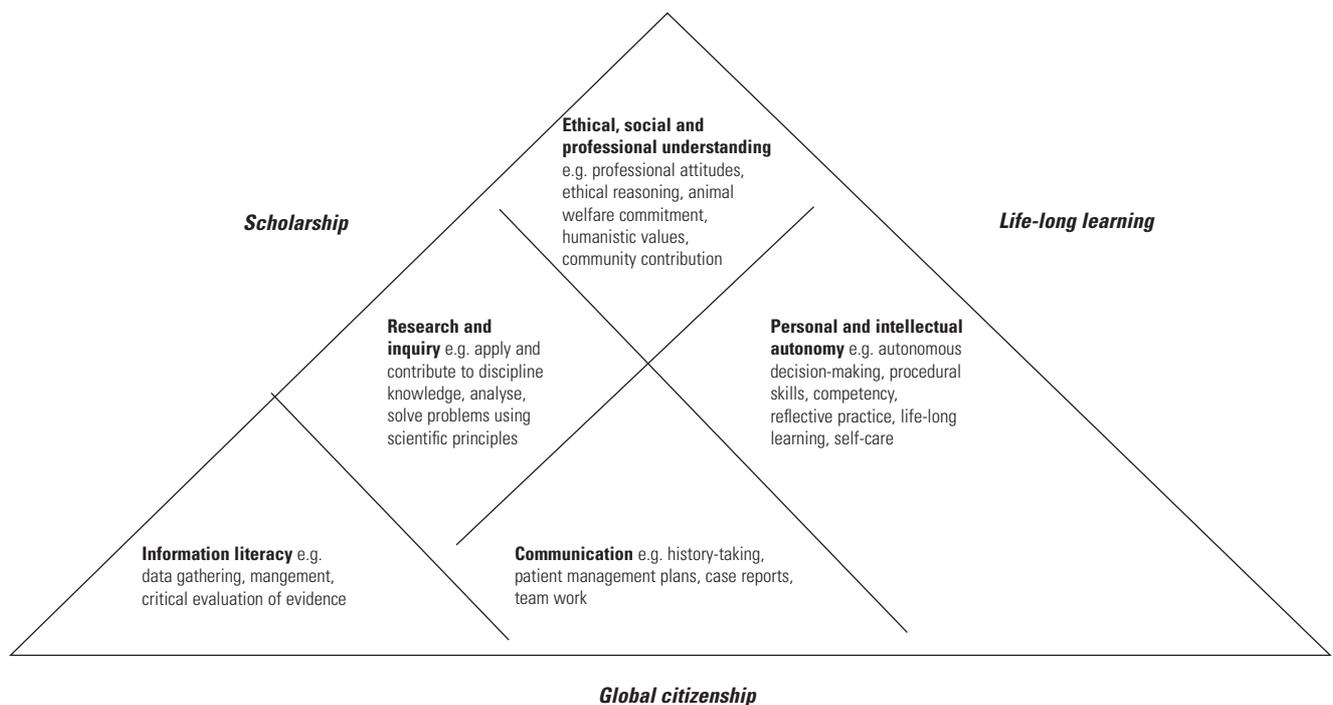
Learning outcomes define 'what the learner should be able to do', i.e. what they should be able to demonstrate or perform upon successful completion of their learning. They define, in language that learners can understand, the new and different capabilities and ways of thinking and practicing that students can reasonably expect to develop. 'Intended' learning outcomes (ILOs) (1) set out the standards required for professional independence. They determine what is taught and assessed. The 'outcomes of learning' are different and overlapping as they describe students' actual achievements as a result of their studies. Students achieve 'unintended or emergent' learning outcomes beyond and above those defined by the curriculum. While not required for graduation, the value of emergent learning outcomes must be recognised so that the breadth or depth of learning is not constrained by ILOs (7).

## Defining intended learning outcomes

Programme ILOs define the whole veterinary curriculum. They are the starting point for designing intended learning outcomes for courses (units or subjects). Programme ILOs communicate an overview of the expected, interwoven

outcomes for graduates, and can be conceptualised as a curriculum triangle (see Fig. 1). These complex, integrated capabilities relating to citizenship, scholarship, leadership and self-directed learning are generic to most university programmes. Graduate attributes, e.g. critical thinking, competence in problem solving, openness to change and engagement with the world, must be deeply embedded within a veterinary context to enable graduates to have a substantial impact on animal and human wellbeing (described in Peter Windsor's paper in this issue). Detailed programme ILOs provide a flexible scaffold for coherent alignment of the specific learning outcomes for each year, theme and course, linking the 'big picture' to the fine detail of individual courses (or units). They include competencies, which are the fine-grained, practical and technical expectations for new graduates. Competencies define the requirements for entry to the profession as an autonomous practitioner with case management responsibility under limited supervision (e.g. Day-One skills of the Royal College of Veterinary Surgeons) (14). However, they also include higher level outcomes such as the ability to use working theories that drive professional decision-making.

Stakeholders in veterinary education (including students, alumni, university staff and industry organisations) should be consulted to define expectations for future graduates (3, 17, 18). Veterinary programmes in North America, which have recently been defined by the American Veterinary Medical Association (AVMA) Council on Education, have expectations for core competency and accreditation which share much in common with those in



**Fig. 1**  
**Framework for veterinary graduate attributes (17)**

Australasia, the United Kingdom and other European countries. However, there is great variation in the developing world. Addressing the variation in veterinary public health, biosecurity and food safety training should be a key goal in the drive for internationalisation of veterinary education. Identification of common elements is achieved through collaboration on national statements (3), accreditation processes and benchmarking studies (18) which support progress towards shared global standards. The Foresight report of the Association of American Veterinary Medical Colleges (19) recommended diversification and an end to comprehensive education for omni-competent graduates to control curriculum overloading. This has commenced, with tracking and streaming enabling enhanced focus on aspects of practice and variation in programme outcomes. However, these changes must not lose sight of the core responsibilities of veterinarians: to protect animal and human health.

## Writing effective intended learning outcomes

The structure of an ILO is based on the verbs used to define what the learner will be able to ‘demonstrate or do’ differently as a result of their learning (1). The structure of an ILO is: verb and learning object, the context and any limits, e.g. ‘design an epidemiological investigation of an intensive livestock disease outbreak’. Verbs with a clear meaning that is well defined for novices are selected (e.g. construct, communicate), and verbs which rely on subjective judgment are avoided (e.g. know, appreciate) (8). Each ILO defines the specific object of learning, (e.g. devise ‘a parasite control programme’), its context (e.g. ‘bovine gastrointestinal emergencies’), and the expected achievement level (e.g. ‘for a referral letter’). Rural veterinary public health examples are outlined in Professor Windsor’s paper in this issue (20).

Effective ILOs promote high quality learning and divert emphasis from exhaustive curriculum coverage, a common

flaw in veterinary curricula (16). The overarching ILOs that are written for an individual course (there are usually between four and six) are unpacked into detailed, aligned, objectives for individual learning activities. Basic knowledge and competencies are incorporated as they are essential for attaining higher level, complex, integrative outcomes. For example, students in clinical therapeutics will ‘manage complex therapies for animals with serious infectious disease’. In the process, they will differentiate characteristics of the infectious agents, control factors contributing to disease, devise treatment plans, safely administer medication and adhere to relevant legislation.

Quality ILOs set high expectations for achievement through a focus on the intended transformation in students’ learning. Veterinary education should improve the quality of students’ thinking, their capabilities and orientation to the world. Graduates differ quantitatively in their ability to organise and recall a broad range of veterinary facts, formulae, dose rates, technical skills and capabilities. However, qualitative changes enable them to think differently, act differently, to see the world in more advanced ways and contribute autonomously to knowledge and practice. The breadth of curriculum content limits opportunities for students to transform themselves. Learning transformations occur when students actively integrate new ideas, apply their fledgling skills and contribute to a community of practice. The solution is to focus first on the learning students need to do to achieve qualitative change and then adopt teaching methods that support this outcome.

Programme ILOs map learning horizontally and vertically across the curriculum (see Table 1). Key skills are sequentially developed and assessed forming distinct themes spanning the programme, e.g. in communication, animal handling, diagnostic processes, professional behaviour, self-care and critical thinking. These themes can include barriers to progression if predetermined levels of achievement are not attained. A structure for embedding outcomes-based teaching, learning and assessment (1) has a programme head (leader), supported by a curriculum

**Table 1**  
**Mapped programme intended learning outcomes (pILO) and course ILOs (cILO) are aligned to teaching, learning and assessment tasks**

cILO	pILO 1 Maintain animal productivity	pILO 2 Use evidence to solve problems	pILO 3 Communicate effectively	pILO 4 Collaborate to lead team
<b>cILO 1</b> Safely handle livestock	3	2	0	1
<b>cILO 2</b> Describe normal structures	2	0	1	0
<b>cILO 3</b> Formulate clinical diagnosis in a group	1	3	2	3

0 = Not taught                      2 = Practised with feedback  
 1 = Taught, demonstrated      3 = Assessed

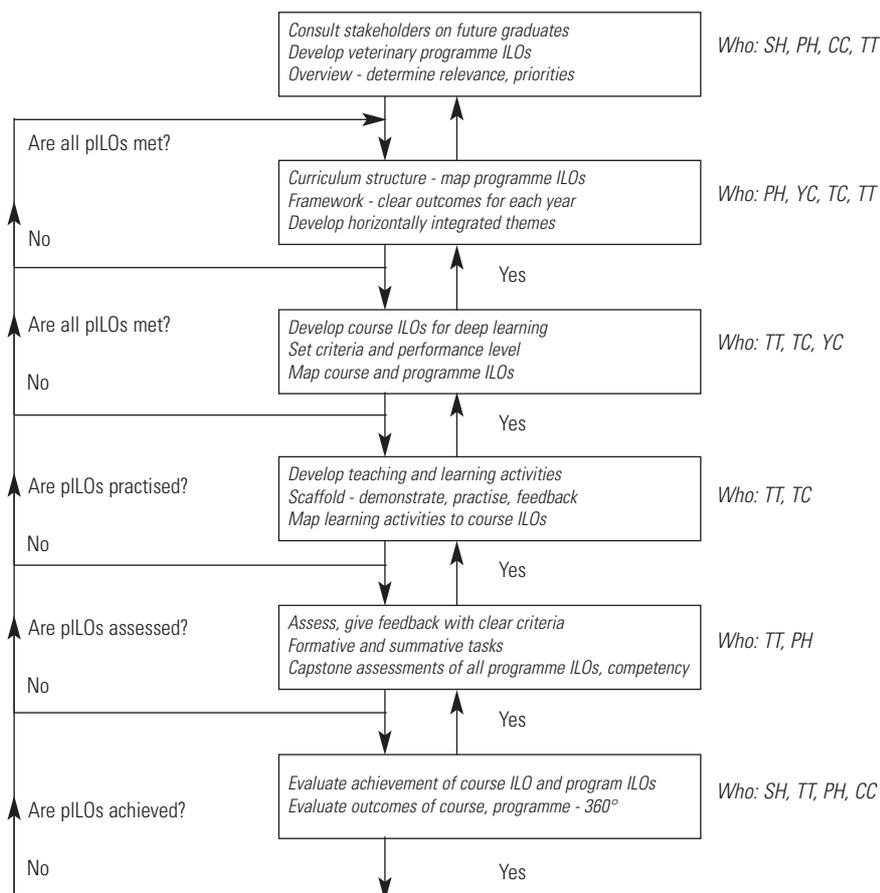
committee made up of year coordinators who are tasked with shaping the overall curriculum directions. The year coordinators manage the courses within their years, with each course coordinator leading a teaching team. Alongside this, theme coordinators (or working groups) draw teachers together to work on overarching themes which ensure vertical and horizontal alignment of key programme outcomes that span several years of the programme (see Fig. 2).

ILO verbs form a hierarchy from simple to complex, setting expectations which influence students' approaches to learning (12). Low-level verbs, such as define, describe, recall, identify and list, direct learners to accumulate knowledge. These activities are common in traditional 'foundation' courses which emphasise passive transmission of basic facts; however, students struggle to apply their learning in a different context in the future. Verbs that direct students to think or act differently, e.g. to relate, hypothesise, solve problems, analyse, integrate and justify,

are used to stimulate higher quality learning. They describe transferable skills used in different disciplines. The Structured Observation of Learning Outcomes (SOLO) taxonomy (1) classifies verbs which describe learning ranging from low to higher order. It provides a hierarchical structure that values higher order learning and extends Bloom's taxonomy (1). SOLO links the verbs that define outcomes directly to the teaching and learning activities and assessment tasks.

## Achieving intended learning outcomes

Learning tasks and assessments that are constructively aligned to ILOs have a profound, positive impact on what and how students learn. Higher level ILOs guide learners to focus on challenging learning activities, e.g. by using critical analysis and evidence-based decision-making, and



**Fig. 2**

### Veterinary curriculum alignment with intended learning outcomes

pILOs: programme intended learning outcomes

SH: stakeholders

PH: programme head

CC: course coordinators

TT: teaching teams

TC: theme coordinators

YC: year coordinators

**Table II**  
**The Structured Observation of Learning Outcomes taxonomy is used to develop higher quality learning outcomes**

SOLO taxonomy	Verbs	Examples of course ILO
<b>Quantitative shift</b>		
Unistructural	Identify	Identify major breeds of livestock
	List	List components of a monogastric diet
Multistructural	Describe	Describe the role of local legislation in animal welfare
	Outline	Outline the effect of dietary change on rumen function
<b>Qualitative shift</b>		
Relational	Differentiate	Differentiate the distinctive reproductive structures and strategies of domestic animals
Extended abstract	Reflect	Reflect on client communication to enhance effectiveness
	Create	Create an engaging presentation on animal health for local farmers

SOLO: Structured Observation of Learning Outcomes

ILO: Intended learning outcome

shift the emphasis from memorisation. This ‘student-centred’ learning is designed to enmesh students in personally meaningful, lasting learning. A constructivist approach emphasises the role of learners as active participants in structuring their own deep understanding. Superficial, strategic, low-level activities such as rote learning and passive listening in lectures are discouraged. Learning activities which put students at the centre are effective because students who adopt deep approaches develop complex conceptions of a subject, have better learning experiences and enduring, quality outcomes (12).

Learning tasks to develop outcomes can be designed using an ‘acquisition or performance’ model (15). The acquisition model emphasises ‘having’ knowledge through concept acquisition and building, e.g. mastery of disciplinary understanding. This ‘declarative knowledge’ is developed through traditional teacher-directed methods of exposition (e.g. lecture) and facilitation (e.g. tutorial) which sequentially develop learners’ quantitative control of content. In contrast, the performance model emphasises learning by ‘doing’ through contribution within a learning community, where students create ‘functioning knowledge’ within an authentic context (e.g. collaborative projects, professional placements) (1). Creation of functioning knowledge requires a shift from ‘teacher-focused’ didactic methods which are linked to superficial learning approaches to deep ‘student-centred’ approaches to teaching (12, 13). However, a detailed discussion of design of teaching activities is beyond the scope of this paper (see Biggs [1]).

## Assessing learning outcomes

Assessment is used to measure student achievement of learning outcomes, rank students, maintain academic standards, direct student learning, provide feedback to students and staff and to prepare students for life. There is a continuum between ‘formative’ (supporting learning)

and ‘summative’ (measuring achievement) assessment. A mix of tasks is required to achieve the diverse goals and to recognise the different achievements of students. Those assessing student work include staff, peers and stakeholders. Assessors should also include the students themselves, where the goal is to create autonomous, self-regulating learners. Good assessment focuses on qualitative change in learning, not just the quantitative accumulation of correct answers (13).

Assessment design in veterinary programmes has a profound impact on learning quality and quantity. The nature of the assessment tasks influences students’ selection of learning topics, the timing of learning effort, the depth of their approach and quality of outcomes (5, 12). Tasks that are not aligned to the outcomes, lack authenticity and reward recall (e.g. multiple choice or short answer questions) have a detrimental impact, reducing the impetus for deep learning. Constructively aligned assessment tasks drive quality learning by appropriately directing effort (12). Assessment can be improved with the range of novel tools available, e.g. interviews, journals, online problem-solving case studies, video review, exhibitions, logs, diaries, contracts, newsletters, portfolios, posters, oral presentations, simulations and work-based evaluation (4, 6). Clinical competency assessment methods used in AVMA-accredited schools include clinical records, checklists, skill logs, multiple choice exams, case simulations, skill examinations, global ratings, and standardised patients, among others, reflecting the diversity of practice and intense debate on optimal assessment (6). Effective assessment rewards achievement and gives students a fair opportunity to demonstrate their learning in a meaningful way. For example, students required to ‘undertake an epidemiological investigation of a disease outbreak’ could be quantitatively assessed with a quiz (on definitions and procedures) but would be more effectively assessed through placements in an animal disease control centre (portfolio, presentation or supervisor report). Staff require training and support to develop the skills of reflective

practice during introduction of new techniques so that they can create, use and validate new assessment methods.

All programme ILOs should be directly assessed in an authentic setting prior to graduation (e.g. in capstone assessments [those that assess most, if not all, programme learning] of performance in clinical placements). This confirms consistent achievement of the knowledge, skills and behaviour required for a successful transition to veterinary practice. Students are prepared by sequential assessment of components of programme ILOs in earlier courses. For example, in equine placements students demonstrate 'restraint and examination of an injured horse'. In junior years they are assessed for competence in handling (animal husbandry), knowledge of equine anatomy, physical examination (equine medicine) and identification of abnormal responses (behaviour).

The basic requirements for assessment that is robust, fair, reliable, transparent and discourages plagiarism are met by using a diverse range of instruments that are appropriate to specific learning outcomes. No single method is sufficient. Objective, 'convergent' questions are reliable, transparent, cheap and easy to manage, e.g. simple problems with one correct solution. They often lack authenticity, validity and relevance in assessing clinical competence. In practice settings, competency checklists are used for repeated assessment of students as satisfactory/unsatisfactory, e.g. 'induction of anaesthesia' (steps include pre-oxygenation performed, correct induction dose administered, intubation at appropriate anaesthetic depth, heart rate monitored). Other techniques are needed for 'divergent', subjective assessment of higher order cognitive and non-cognitive outcomes, particularly those which depend on context (e.g. professional and ethical behaviour). In anaesthesia placements this may include a mix of written reports (e.g. analgesia plan, anaesthetic record, case report article, referral letter), oral communication (e.g. multiple case presentations, journal article review, complications report), and self- and staff-assessment of competency based on case series, self- and supervisor-evaluation.

Students pay attention to the 'backwash' (hidden messages) on what is important in assessment, derived from their reading of past exam questions, model answers and staff feedback on their progress (13). Students use the backwash to decide what is most important and valued and hence where to put their effort. A fundamental shift follows when students are graded on qualitative differences in their achievement of ILOs rather than on accumulation of marks for individual pieces of assessment. This shift is achieved by using grading criteria based on ILOs, not assessment tasks. Achieving the outcomes becomes the main game rather than jumping assessment hurdles (1).

Feedback provided to promote learning must be timely and constructive, explaining and exemplifying

expectations, so that students will act upon it (6). Feedback that directly addresses the level of achievement of specific learning outcomes accurately guides students in where to place their learning effort. It should be provided for all assessment tasks ('formative' and 'summative'). Students prefer personalised feedback from staff; however, assessment must be managed in an integrated way to avoid unsustainable workloads for students and markers. Constructive feedback can be provided in a range of ways including computer-generated, group, generic, peer and self-feedback against grading criteria (5), e.g. the online evaluation system for clinical placements at the University of California, Davis (6).

A structured assessment programme systematically documents how well students achieve curriculum ILOs and provides stakeholders with robust assurance of the quality of individual graduates and the veterinary programme. Data should be collected on rates of student achievement of ILOs, mastery of threshold concepts, competencies, skills and behaviour. Reflection and action based on evidence of the strengths and weaknesses of the programme drives continuous improvement (Fig. 2). An annual, faculty-wide overview of assessment outcomes in each theme, year and course in the veterinary programme helps to keep the balance by ensuring that key programme ILOs (e.g. communication, ethical reasoning and team work) receive sufficient emphasis without duplication.

Assessment planners in veterinary programmes play a critical, but often overlooked role in managing the tension between rewarding broad graduate outcomes and ensuring achievement of a defined set of knowledge, competencies and skills. Clinical competency assessment using checklists, skills tests, and objective structured clinical examinations and simulations (7). Assessment using a range of techniques (portfolios, mini clinical examinations, independent learning projects, communication tasks, role plays, case logs and 360° evaluations) allows for diverse achievements and experiences to be rewarded (divergent, unexpected but desirable outcomes). Clinical competency assessment using checklists, skills tests, and objective structured clinical examinations and simulations guides students to achieving minimum 'threshold' levels of technical achievement. However, clinical assessment should not be limited to this, but should include authentic tasks that enable students to demonstrate thoughtful, reflective, appropriate selection and use of technical skills within a broader framework of professional case management (7). Assessment using a range of techniques (portfolios, mini clinical examinations, independent learning projects, communication tasks, role plays, case logs and 360° evaluations) allows for diverse achievements and experiences to be rewarded (divergent, unexpected but desirable outcomes). The reliability of assessment of clinical performance is improved by repeated sampling and the use of global judgments, while detailed checklists are

less effective. Mini clinical examinations based on expert observation of 6 to 8 short consultations have gained strong support in medicine for their validity, reliability and inter-examiner consistency (11) and have promise for veterinary medicine. In speech pathology, a well characterised national system of workplace assessment is in place in Australia (10). This uses defined criteria and a continuous scale to assess performance at different stages of student development.

Assessment for autonomous, sustainable practice after graduation is important but often overlooked. Students need practice in designing their own learning outcomes and demonstrating and reflecting on their achievement (self-assessment). Tasks which create the commitment to reflective practice include learning journals, problem-based learning, self-assessment and discussion of progress in achievement of learning outcomes with placement supervisors. The processes involved develop students capacity for self-directed life-long learning and realistic self-assessment, which are among the most enduringly important outcomes of higher education (2). The opportunity to polish these skills in a professional workplace is particularly important because the gulf in responsibility between supervised and autonomous practice is the most difficult aspect of the transition to practice for new graduates.

## Grading learning outcomes

Grading criteria explicitly establish the standard of achievement required to obtain particular grades (see Table III). They can assess components, learning outcomes and provide a global judgment of student achievement. Criteria

make transparent the differences between quantitative and qualitative achievement. This is the basis of 'criterion-referenced' grading which rewards students for achieving pre-determined standards. The alternative is 'norm-referenced' grading using a normal distribution curve (1), however, this is not appropriate for educating students to standards required by the profession. Rubrics and matrices make explicit to staff and students the levels of achievement expected for multiple learning outcomes. Criteria developed for common tasks (e.g. essay, group project, presentation) articulate the expectations for a graduate (e.g. critical writing) and then set progressive standards for each year of the veterinary programme. These standards are used in developing assessments of course ILOs that contribute to achievement of programme ILOs and vertical alignment (e.g. retrieving articles in year 1, research poster in year 2 and journal article in year 4).

Well defined outcomes form the basis for continuous improvement of curriculum and learning. The quality of the curriculum and its graduates can be benchmarked with other institutions by comparing their programme ILOs and students' achievement. Accreditation drives systematic reflection on the appropriateness of learning outcomes and the success of a programme in achieving its goals. An effective veterinary curriculum is flexible and responsive; it is a work in progress to ensure all students achieve the programme learning outcomes. Good academic structures support ongoing review of ILOs, teaching and learning activities, assessment, grading and evaluation. Effective School or Faculty structures and processes for review ensure the continued relevance of curriculum outcomes, provide mechanisms for fine tuning ILOs and keep the focus on providing an education that will transform the next generation of veterinary graduates.

**Table III**

**Example of the Structured Observation of Learning Outcomes grading criteria for physical examination of an animal**

Grade	Criteria for physical examination
Unsatisfactory (prestructural): missing essential elements, incorrect	Incomplete examination, not sensitive to animal or owner responses, comfort and safety
<b>Quantitative shift</b>	<b>Basic elements of capability accumulated</b>
Marginal (unistructural): preliminary but incomplete response	Basic examination, inconsistent sequence, little adjustment to accommodate animal or owner responses, comfort and safety, finds clinical signs not present
Satisfactory (multistructural): multiple elements which are not inter-related or adapted	Complete, consistent sequence in examination, overlooks minor/subtle abnormalities, addresses basic animal and owner comfort and safety
<b>Qualitative shift</b>	<b>Transformed structure and coherence in performance</b>
Proficient (relational): multiple elements are integrated in a coherent response	As for satisfactory, plus efficient, logical sequence, varies according to development of clinical hypotheses, identifies minor signs, responds to animal and owner ensuring their comfort and safety
Excellent (extended abstract): thorough, coherent response which is generalised to higher level	As for proficient, plus succinct, timely, sequence tailored to problem and patient, confident in examination, gathers feedback, reflects and improves on performance

## Conclusions

Conceptual change in students' ideas about a discipline is facilitated when they perceive clear goals and standards, effective teaching, opportunities for autonomy in learning and fair assessment (13). This conducive environment occurs when intended learning outcomes are clear at a programme and course level (and supported by high quality learning activities and assessment) and students' efforts towards attaining these goals are enthusiastically supported by skilled teaching staff.

The way teachers think about learning outcomes and use them has a profound impact not only on students' thinking and engagement with learning but also on the quality of teaching and assessment (12). Development and effective use of ILOs require a supportive, committed leadership and timely staff development to help staff create new ways of designing learning activities. Curriculum designers need to engage staff to work in a team-focused, collaborative way to ensure consistent development, integration and uptake.

Unlike veterinary curricula of old, it has become increasingly recognised that the education programme of every veterinary school should be based upon achieving its

defined and detailed learning outcomes, and all that is discussed in this paper related to this. Education must start with a top-down approach: define the product expected and then create the curriculum and training programme that will achieve this defined product. This must be complemented by a bottom-up process of gathering and evaluating evidence of the impact on learning and continual curriculum adjustment. The entire set of papers presented in this volume is devoted to the essential need to markedly improve the knowledge and insights of veterinary students regarding global public health. To do this, all veterinary schools must detail this within their expected learning outcomes, and then create the educational programme that will achieve this objective. If this does not occur this objective will likely not be reached.

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## Définition, construction et évaluation des objectifs d'apprentissage

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### Résumé

Les objectifs d'apprentissage définissent les programmes d'enseignement et désignent les compétences dont les étudiants doivent pouvoir faire preuve afin de se qualifier. La consultation préalable des parties prenantes lors de l'élaboration de ces objectifs d'apprentissage permet de s'assurer que les acquis des diplômés leur permettent de participer à la profession vétérinaire. Les objectifs d'apprentissage forment une hiérarchie qui relie un programme d'études à des cours et à des activités. Des objectifs clairement définis orientent les étudiants vers un apprentissage de meilleure qualité où les résultats attendus sont indiqués, tout en laissant une marge pour l'émergence d'autres objectifs d'apprentissage. La définition de compétences techniques entre dans ce cadre général et complète d'autres apprentissages plus élaborés. Les représentations cartographiques destinées à aligner les objectifs d'apprentissage sur un plan horizontal et vertical permettent aux étudiants d'acquérir méthodiquement les compétences dont ils ont besoin pour entrer dans la vie active et pour devenir autonomes professionnellement. L'alignement constructif de l'apprentissage et les activités d'évaluation permettent aux apprenants de répartir leur temps conformément à la progression des objectifs du programme. La réalisation des objectifs est certifiée à l'issue d'une

évaluation conduite par le personnel, par des pairs et par d'autres intervenants. Une évaluation efficace donne également aux étudiants la possibilité de définir et de réaliser leurs propres objectifs d'apprentissage, ce qui les prépare à poursuivre un apprentissage autonome tout au long de la vie. L'évaluation de la qualité et de la cohérence des objectifs atteints fournit des indications utiles pour l'amélioration des programmes. L'amélioration de l'enseignement de la santé publique à l'échelle mondiale préconisée dans les différents articles de ce numéro de la *Revue (Rev. sci. tech. Off. int. Epiz., 28 [2], 2009)* passe par une prise en compte effective de cet aspect dans les objectifs d'apprentissage annoncés par les écoles vétérinaires.

#### **Mots-clés**

Activités apprenantes et didactiques – Alignement constructif d'un programme – Attributs des diplômés – Cartographie d'un programme – Compétence – Critères de notation – Enseignement vétérinaire – Évaluation – Objectifs attendus d'apprentissage.



## **Definición, elaboración y evaluación de los resultados pedagógicos**

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#### **Resumen**

Los resultados pedagógicos definen el plan de estudios veterinarios y determinan lo que el estudiante debe estar en condiciones de demostrar para obtener el título. El hecho de consultar a las partes interesadas durante el proceso de elaboración asegura que los resultados pedagógicos del programa sirvan para que el titulado pueda contribuir a la profesión veterinaria. Cuando están bien formulados, los resultados pedagógicos forman una jerarquía que vincula entre sí el plan de estudios, las materias que lo integran y los estudios propiamente dichos. Cuando están claramente enunciados, encaminan al estudiante hacia un aprendizaje de mayor calidad porque evidencian lo que se espera de él, pero al mismo tiempo dejan margen para la aparición de nuevos resultados pedagógicos. La adquisición de las competencias técnicas definidas encaja en este marco general y viene a complementar el aprendizaje de orden superior. Los esquemas se utilizan para brindar una representación lineal de los resultados pedagógicos tanto horizontal como verticalmente, y de esta manera dirigir sistemáticamente a los estudiantes hacia los niveles de partida requeridos en cuanto a competencia e independencia profesional. El alineamiento constructivista del aprendizaje y las actividades de evaluación sirven para que los alumnos se dediquen de forma selectiva y durante el tiempo necesario a adquirir poco a poco lo que el programa les ofrece. La evaluación realizada por el profesorado, sus propios compañeros y otras partes interesadas certifica la obtención de los resultados pedagógicos previstos. Una evaluación eficaz prepara también a los estudiantes para definir y obtener sus propios resultados pedagógicos, de forma que adquieran hábitos útiles para seguir aprendiendo por su cuenta durante toda la vida. La evaluación de la calidad y coherencia de los resultados obtenidos determina el proceso de mejora

continua de los programas. Para que los objetivos declarados de este conjunto de artículos (*Revista científica y técnica de la OIE*, 28 [2], 2009), a saber, la mejora a escala mundial de la enseñanza en materia de salud pública, se vean cumplidos, es fundamental que estén bien definidos e integrados en la exposición de resultados pedagógicos de todas las facultades de veterinaria.

#### Palabras clave

Actividades pedagógicas y didácticas – Alineamiento constructivista del aprendizaje – Atributos del titulado – Competencia – Criterios para la obtención del título – Enseñanza veterinaria – Esquema de planes de estudios – Evaluación – Resultados pedagógicos deseados.



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