

Educational approaches aimed at preparing students for professional veterinary practice

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Summary

Changes in society and dissatisfaction with current educational practices have led to changes in undergraduate veterinary curricula. New approaches that are thought to better prepare students for future professional veterinary practice are being introduced. One such change is a transition from conventional teacher-centred curricula to student-centred curricula. In student-centred curricula, students are actively involved in learning and teachers not only transmit knowledge but help students to obtain a deep understanding. Furthermore, learning within these curricula takes place in a multi-disciplinary context which is more relevant for the future of the profession. Another change is that more emphasis is put on training in academic skills, for instance, by establishing research internships. Finally, a new emphasis is being placed on training in more generic competencies, such as communication and business skills. These changes are assumed to better suit the profile of veterinary students today and in the future and to better prepare them for future veterinary practice.

Keywords

Active learning environments – Business skills – Communication skills – Competencies – Curriculum – Professional practice – Student-centred education – Veterinary curriculum.

Introduction

Roughly two decades ago, changes for the veterinary profession in general, and undergraduate veterinary education in particular, were proposed in both the United States of America (USA) (48) and Europe (20). More recently, further recommendations for veterinary education were published in the USA (8, 15). The aims of these reports were to ensure that veterinary graduates enter veterinary practice equipped with the appropriate knowledge and skills to meet contemporary professional and societal demands. Society today is characterised by an almost overwhelming growth in available knowledge and information. In earlier days, the objective of professional training was to provide students with the knowledge related to a specific domain and this knowledge was assumed to last their entire professional career. Nowadays, it is impossible for graduates to possess all the knowledge

they will need for the rest of their career. There is too much knowledge and there are too many skills and even those are bound to be at least partially outdated within a few years. With the exponential growth of the body of veterinary medical knowledge comes the problem highlighted in the above reports; that is, how to handle the 'information explosion' without causing curriculum overload (8, 15, 20, 48). An additional problem is the mismatch between academic veterinary training and professional veterinary practice, with recent graduates lacking the appropriate skills, abilities and confidence for economic success in a changing practice environment (8, 15, 20, 35, 48).

A central feature of the concern with veterinary education expressed in the above reports was general dissatisfaction with the outcomes of conventional veterinary education. Moreover, there was dissatisfaction among students about the imbalance between memorising material and comprehension, which they encountered during their

education (52). Conventional programmes are excessively focused on teachers delivering knowledge to students (teacher-centred), while the learning of students receives considerably less attention (52). In conventional educational programmes, it is the teachers who mostly determine what is to be learned, how, when and in what sequence. It is generally assumed that the role of students in these programmes is that of more or less passive recipients of knowledge and information (68).

In response to these issues, three radical changes were advocated for undergraduate veterinary education worldwide:

- decreasing reliance on conventional teaching (teacher-centred education) and increasing reliance on student-centred education (16, 20, 29, 48, 60, 63)
- increasing emphasis on academic skills development (16, 20, 48)
- increasing emphasis on generic, non-technical competencies relevant to the veterinary professional, such as communication skills and business management skills (2, 8, 14, 15, 16, 34, 48, 60).

Transition from conventional teacher-centred education to student-centred education

‘If students are to learn desired outcomes in a reasonably effective manner, then the teacher’s fundamental task is to get students to engage in learning activities that are likely to result in their achieving those outcomes... It is helpful to remember that what the student does is actually more important in determining what is learned than what the teacher does’ (56).

Over the past decades, thinking about learning has changed. The role of the teacher is no longer regarded as primarily concerned with transmitting information to students. The widely held current view is that teachers should use student-focused strategies to help students change their thinking about relevant subject matter. This student-centred approach requires teachers to put the students and their learning at the centre of their attention. Teachers are expected to stimulate students to learn by challenging their ideas through questioning, offering them problems to resolve, and asking them to discuss topics and present what they have learned (9, 26, 62). In student-centred curricula, students are actively involved in their own learning, through dialogue, discussion, questioning and collaborating with peers and teachers (6, 38, 51). The role of the teacher within student-centred curricula is that of guiding and stimulating students in their learning.

Consequently, it is no longer enough for teachers to give lectures; they are also expected to develop course materials and create learning situations that encourage students to actively engage in learning.

Educational methods that stimulate interactions between students and teachers are needed. Student-centred learning also requires assessment methods geared to stimulating deep learning in students instead of requiring only rote learning of facts. The role of the student needs to change accordingly; students should be active learners who ask questions and spend more time on self-directed study instead of passively listening to their teachers. From predominantly individual learners, students should also become competent team members, both in learning and work (58, 68).

Another change is that of the relationship between subject matter and individual disciplines. In former times, subject matter was mostly discipline based. However, today, subject matter is becoming integrated into broader, interdisciplinary themes, to provide meaningful learning contexts relevant to the future of the profession. This is expected to facilitate learning and student understanding of the subject matter (36). Conversely, discipline-based subjects that are taught in isolation are likely to be perceived as having little context, so that: ‘the horizon of students’ need to know is unlikely to rise beyond the passing of the next exam and the subject will be learned as a series of disembodied facts’ (6). A plethora of innovative strategies, instruction methods and educational interventions have been developed to enhance active learning in curricula. They range from fully-fledged, problem-based learning programmes to mixed (hybrid) curricula, with emphasis on small or medium-sized group learning, such as tutorials, seminars, workshops and projects. Key features include interaction among students and between students and teachers, combined with the use of teaching materials that promote problem solving and thinking (10, 11, 19, 27, 44, 50).

Academic training in undergraduate veterinary education

Increasing importance is being attached to academic training in (veterinary) medical curricula around the world. The explosion of new knowledge and the emergence of new technologies require that veterinary doctors are capable of appropriately appraising and using new knowledge. To do so, veterinarians need to be equipped with the knowledge and skills that enable them to make judicious use of the new bio-medical research

literature and ascertain when and how new developments and new evidence are relevant to professional practice in their particular setting (21, 28). In addition, the decline in the numbers of clinical scientists has given rise to a call for more clinical scientists who can translate clinical problems into research proposals and research results into applications in veterinary practice (28, 43, 53, 69).

To address these issues in undergraduate education, academic training is often aimed at introducing students into communities of science, providing access to scientific knowledge, offering research experiences and stimulating an attitude of critical reflection and life-long learning. Or, as Professor Wintzen put it: 'medical students need to learn to generate questions, formulate questions and seek answers to them. Learning this requires lots of practice. A science-oriented curriculum invites students to ask questions and helps them to find answers to these questions' (67).

In an undergraduate curriculum, these goals can be addressed through specific academic modules and also by electives which are mainly intended to offer students a broad orientation towards a subject (39, 42). Several universities have described levels of research competencies that veterinary medical students are expected to attain by the end of their studies. These competencies include:

- knowledge of the general principles and methodology of scientific research
- statistics skills
- literature-search skills
- the management of scientific knowledge.

There are several teaching options for incorporating research competencies into the curriculum. Some veterinary and medical schools offer evidence-based medicine courses or require students to take part in 'critical appraisal' journal clubs (18, 25, 32). Meng showed that activating learning environments in general (such as using small-group sessions) can enhance academic competencies (37).

One specific approach to improve scientific competencies in students (24, 46, 69) and stimulate their interest in an academic career (30) is to offer research internships with active, 'hands-on' participation in research. Characteristics shared by most research internships are comprehensive literature searches, empirical research and a final report on the work done. Vermunt described a research internship as an active type of learning, typically scheduled in the later years of the curriculum and of longer duration (three to six months) (64). Students are guided by one or two supervisors and write a project proposal defining the problem and outlining the goals and activities. Depending on the phase of the project, supervision is tailored to the

level of difficulty and the degree of independence of the student. The learning environment of such a research internship is in marked contrast with the regular undergraduate curriculum. Learning in undergraduate programmes is mostly well structured and all students are exposed to the same curriculum, study materials and assessments. Research internships/projects, by comparison, differ in subject, site and supervisors and require:

- the use of new skills for practical (laboratory) work
- the student to deal with new situations and uncertainties
- the student to develop their own ideas
- effective planning and time management (24, 33).

Different roles are therefore expected of both the teachers/supervisors and the students: supervisors coach the students and function as role models; students become active learners. It is thought that students who actively participate in research will be more likely to become involved in research in their professional lives and may choose academic careers (57, 65, 69).

Preparation for professional practice

The ultimate goal of higher education is to prepare students for the dynamic working environment of the current labour market, by ensuring that they have acquired the appropriate competencies. Communication skills, leadership skills, skills in information use and management, independence, and planning and organisational skills are often cited as desired work competencies for a broad range of contexts and situations. Since these competencies can be used in many settings and domains, they are often referred to as 'generic' (42). Apart from generic competencies, every profession has its domain-specific competencies, such as the particular knowledge and skills of veterinary medicine (59).

In a study on labour market outcomes in the medical domain, Semeijn *et al.* demonstrated that the generic competencies displayed by students were a good predictor of success later on in their careers (defined as finding work, obtaining an academic position, gaining a suitable position and earnings) (54). In the area of veterinary medicine, mismatches were identified between the skills that veterinarians had obtained (through training) and those required for (career and economic) success and satisfaction in professional practice (8, 15, 34).

Several studies identified competencies that *do* lead to success as a veterinarian (in practice), including

interpersonal skills (e.g. managing people and processes and working effectively with clients and staff), business acumen, and growing and developing in a changing environment (e.g. enhancing scientific knowledge management) (7, 12, 34, 61). All of these competencies can be characterised as 'generic' or 'non-technical'.

Veterinary education can help students develop these generic, non-technical competencies (7, 20, 34, 48, 49). To do so, the educational underpinnings and the outcomes and objectives of undergraduate veterinary training need to be attuned to these different competencies and thus become more aligned with contemporary societal and professional demands. The CanMEDS framework (22) can provide a useful way of thinking about the different roles necessary for optimal preparation for medical practice. The important integrative role of the medical expert involves all specific medical technical competencies, such as:

- applying medical knowledge
- diagnostic reasoning
- clinical skills
- applying appropriate therapies, etc.

However, all of the other six roles (communicator, collaborator, manager, health advocate, scholar, professional) are mostly related to generic competencies.

Active learning environments (such as problem-based learning) in which generic competencies are emphasised appear to have a positive effect on the general skills of graduates, without negative effects on domain-specific knowledge or clinical skills (47). The Dutch veterinary curriculum strives to foster generic competencies through an active, student-centred learning environment and modules that are dedicated to these competencies, such as practical sessions in communication. Many veterinary and medical universities already use a variety of approaches to teach these generic skills or are planning to expand their approaches. A vast number of references to such skills, especially communication skills, are found in the literature on veterinary education (494 hits in the *Journal of Veterinary Medical Education* alone). Role plays, videotaped interactions with actual clients and professional development through the use of coaches are all examples of these new approaches (e.g. 1, 40, 55).

The present and future student

The student learning issues described above and the shift towards more student-centred approaches in teaching, with attention to developing generic competencies, all match up with the profile of the present and future student.

Pupils and students today are more globally oriented; they are highly skilled users of the enormous developments in information technology (as described in full detail by Jia Frydenberg in this issue) (23), and they are prepared to gather and handle many different kinds of information. These changes have consequences for the characteristics of veterinary students and future veterinary colleagues. Veterinary educators are certainly facing a different type of student. It is the responsibility of the profession and the veterinary schools to foster these new learners, attract them to a professional veterinary career, keep them motivated and stimulate them to become new veterinary leaders. An appropriate educational philosophy and matching teaching approaches and formats are necessary if veterinary education is to come close to realising these ideals.

Conclusion

Developments in the veterinary medicine profession and in society today forced veterinary medical educationalists to critically re-examine an almost universally held dogma of conventional, teacher-centred, veterinary education and shift their attention to student-centred learning environments and generic competency development.

At present, many veterinary institutions around the world use interactive learning approaches, whether in fully-fledged problem-based learning programmes or in more mixed curricula, with a variety of approaches, ranging from traditional lectures to small-group seminars, workshops, tutorials and e-learning modules. Many institutions are starting to pay attention to generic, non-technical competencies, such as academic skills, communication skills and business skills. In the veterinary educational literature, more and more attention is being given to student-centred approaches to learning and to outcomes other than those that are specifically veterinary technical. Most studies are descriptive and report on the content of the educational programme, the best practices and ideas for changing teaching (see 3, 4, 5). Some seek justification for the use of active learning approaches through small-scale (e.g. one interactive lecture) effect studies (see 11, 12, 45). Some studies address extensive curriculum revisions (31). Since curriculum reforms at the undergraduate level may leave their stamp on the way that veterinary medicine is practised in the future, it is important to examine and understand the educational processes (13, 17) and results of the new programmes being developed and implemented in veterinary schools. The match between the future student and veterinary training should be constantly monitored and adjusted accordingly. For a veterinary curriculum to be effective, the quality of and match between input (which students enter veterinary training), throughput (what happens in the

curriculum; the educational processes) and output (recent graduates) needs to be assured, studied and improved upon. An excellent example of a veterinary curriculum based upon the principles described in this paper is

provided by Windsor in his sequence of reports elsewhere in this issue (66). ■

Approches pédagogiques de la préparation des étudiants à l'exercice professionnel de la médecine vétérinaire

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Résumé

Les transformations de la société et le mécontentement devant les pratiques pédagogiques actuelles ont amené les responsables de l'enseignement vétérinaire à reconsidérer les programmes de formation initiale. De nouvelles approches sont ainsi introduites afin de mieux préparer les étudiants à l'exercice de la médecine vétérinaire du futur. L'une de ces approches consiste à centrer l'apprentissage sur l'étudiant et non plus sur l'enseignant, comme c'était le cas dans les programmes traditionnels. Les programmes centrés sur l'étudiant font participer activement les apprenants au processus d'apprentissage, de sorte que les enseignants ne se contentent plus de transmettre un savoir mais doivent aider les étudiants à aboutir à une compréhension approfondie de ce qu'ils apprennent. De plus, l'apprentissage dans ces programmes intervient dans un contexte pluridisciplinaire qui reflète mieux l'avenir de la profession. En outre, l'accent est davantage mis sur les compétences scientifiques, notamment à travers la mise en place de stages consacrés à la recherche. Enfin, l'acquisition de compétences plus générales est également visée, par exemple dans les domaines de la communication ou du commerce. Ces changements ont pour but de se rapprocher du profil actuel et futur des étudiants en médecine vétérinaire, afin de mieux les préparer à l'exercice de la médecine vétérinaire de demain.

Mots-clés

Activité professionnelle – Compétence – Compétence commerciale – Compétence en communication – Enseignement centré sur l'étudiant – Environnement propice à l'apprentissage actif – Programme d'enseignement – Programme d'enseignement vétérinaire. ■

Teorías educativas para preparar a los estudiantes a la práctica veterinaria profesional

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Resumen

Los cambios registrados en la sociedad y el descontento con las prácticas de enseñanza han llevado a modificar los planes de estudios veterinarios. Actualmente, las escuelas de veterinaria están incorporando nuevas teorías para mejorar la preparación de los futuros profesionales a la práctica veterinaria. Una de ellas consiste en la sustitución de la enseñanza

convencional, basada en los profesores, por planes de estudios centrados en los estudiantes. En estos últimos, que incorporan la participación activa de los estudiantes, los profesores no se limitan a impartir conocimientos, sino que ayudan a los estudiantes a profundizarlos. Además, la formación se imparte en circunstancias multidisciplinarias, mucho más pertinentes para los futuros profesionales. La creación de pasantías de investigación, otro de los cambios introducidos, refleja la importancia que se concede a las competencias teóricas. Por último, también se presta una mayor atención a otras competencias de índole más general, como la comunicación y la gestión. Esas teorías educativas deberían corresponder a las expectativas de los estudiantes de veterinaria, tanto actuales como futuros, y prepararlos mejor para la práctica de la profesión.

Palabras clave

Capacidad de comunicación – Capacidad de gestión – Competencia – Contexto de aprendizaje activo – Enseñanza centrada en los estudiantes – Plan de estudios – Plan de estudios veterinarios – Práctica profesional.



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