Competency-based veterinary education

An integrative approach to learning and assessment in the clinical workplace

Harold Bok

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To Carla,
Thijs, Jurre and Julie

Contents

CHAPTER 1

Introduction

Introduction

Veterinary professionals must be ready to meet current and future society's needs from the moment they leave veterinary school. Therefore, one of the major responsibilities of any veterinary school is to develop training programmes that support students' competency development on the trajectory from novice student to veterinary professional. This thesis aims to enhance our understanding of using an integrative approach to learning and assessment in the clinical workplace to foster competency development in undergraduate veterinary education. This introductory chapter first describes the changes and challenges the veterinary profession has dealt with so far and how these have affected veterinary education. Subsequently, competency-based education is introduced as an approach to prepare students for clinical practice, with a strong emphasis on outcome abilities. Furthermore, a theory-based programmatic assessment model is discussed that allows integration of learning and assessment in the clinical workplace. To conclude, this chapter provides a description of the problem definition and the research questions, as well as the thesis outline.

Alignment of education with the role of veterinary professionals in healthcare

Up until the beginning of the twentieth century, the main focus in veterinary medicine was on the health of cattle and horses that were essential for transportation and agricultural productivity. As presaged by Christian Petersen in 1937 in his sculpture "The Gentle Doctor"[1], from the early 1950s, companion animal medicine became a substantial part of veterinarians' daily work. In this sculpture, veterinarians' concern and compassion for all animals, particularly our companion animals, is represented. More recently, due to a changing society and an ongoing global interdependence, veterinary professionals are increasingly placed in a central position in the relationship between animals, their health and well-being, and people, in relation with public health.[1,2] In the late 18th century, Claude Bourgelat, founder of the first college of veterinary medicine in Lyon, France, in 1761, already espoused this concept for his students.[3] In the eyes of Bourgelat, the veterinarian existed to serve the public by protecting food animal production, monitoring food quality and safety, controlling zoonoses and preserving the environment and biodiversity. As described in the Foresight Report, published in 2007, this integrated approach to animal, human and environmental health (i.e. "one health" approach) is one of the major challenges that the veterinary profession will likely be confronted with now and in the future.[2,4-8]

During the last decades, numerous scientific reports were published about relevant abilities of veterinary professionals.[9-12] More than 20 years ago, the Pew National Veterinary Education Program conducted a study known as "Future Directions for Veterinary Medicine".[13] This

1 *Christian Petersen, Iowa State University, College of Veterinary Medicine*

report led to significant advances in veterinary education, for example by emphasizing the importance of fostering problem-solving skills and self-learning capabilities among students. Furthermore, several reports and scholarly evidence emphasized the importance of generic, non-technical competencies (e.g. being able to effectively communicate with clients about clinical investigations, findings, interventions and prognosis) in addition to specific technical competencies for undergraduate veterinary education.[14-16] The importance for a veterinary professional to develop in all relevant competencies was underlined by the Foresight Report.

Competencies

Before continuing, it is important to tease apart how "competence" and "competencies" are used in this thesis. We support the view that competence can be defined as "the ability to do something successfully".[17] The ability to perform competently as a veterinary professional requires the integration of knowledge, skills, and attitudes in such a way that it suits one's specific context. Current medical curricula tend to identify competency domains or roles as areas specific to the profession in which students need to develop their performance. Examples of competency frameworks are the Canadian Medical Educational Directives for Specialists (CanMEDS) framework[18], and the Accreditation Council for Graduate Medical Education (ACGME) framework.[19] For example, in the CanMEDS framework a competency is described as physicians having the ability to "convey effective oral and written information about a medical encounter".[20] Currently, the veterinary literature provides no evidence-based competency framework for either undergraduate or postgraduate education.

Competency-based education

Increasingly, competencies are used to define the outcomes that should be developed in healthcare education, resulting in competency-based learning and assessment strategies. The arguments for this can be extended to include veterinary education as well. Based on an extensive literature review, Frank et al. recommended the following definition of competency-based education for health care professions: "Competency-based education (CBE) is an approach to preparing professionals for practice that is fundamentally oriented to graduate outcome abilities and organised around competencies derived from an analysis of societal and patient needs".[21] As described by Harden et al.[22], for a competency-based approach to education to be successful clearly stated, explicit and communicated competencies are required that describe what is expected at the end of training. Furthermore, content, educational strategies, teaching methods and assessment need to be aligned and based on the agreed competency framework. Despite increasing adoption of CBE in veterinary and medical education, its implementation has experienced some setbacks over the years.[23] In their review, published in 2002, Carraccio et al. conclude that the struggle to implement CBE programmes successfully is mainly due to the communities' inability to design reliable and valid workplace-based assessment strategies that help to determine whether a student

has reached a predefined threshold.[23] A decade later, this is still the major challenge in the promotion of CBE: development of methods and tools that both enhance learning and adequately assess competency development, especially in the clinical workplace.[24] In this thesis we take on this challenge and describe a line of research that may provide the foundation for an integrative approach to learning and assessment in undergraduate veterinary education. The next section explains the current perspective on what the pillars of such a foundation should be and in doing so indicates what topics were studied in this thesis.

An integrative, programmatic approach to learning and assessment

As described above, CBE is fundamentally oriented to support the continual pursuit of improving performance, based on relevant competencies. Students' years in undergraduate veterinary training, especially on courses in which learning is located in authentic clinical workplaces such as clerkships, provide students with the opportunity to integrate their knowledge, skills, and attitudes. When learning takes place at the clinical workplace, students work side by side with clinical staff experiencing a variety of authentic learning activities.[25] The close relationship between students and clinical teachers in this complex environment makes the clinical workplace ideally suited for CBE. In this environment learning and assessment can be focused on the exchange of performance-relevant information, i.e. feedback, in order to enhance competency development.

In recent years, examples are seen of curricula in medical education that implemented a programmatic approach to assessment in order to enhance students' learning towards the defined outcomes.[26-29] The introduction of CBE, with its focus on what is expected at the end of the training, caused a shift in focus in assessment towards measuring students' performance in authentic situations, i.e. the 'does'-level at the top of Miller's pyramid.[30] Assessing students at this level of performance provides an integrated, panoramic view on all relevant competencies.[31] This transition to the assessment of outcomes attained by the students stimulated the development of new assessment instruments, e.g. the mini-CEX and multisource feedback instrument, capable of measuring students' performance (i.e. competencies) while performing authentic tasks in the clinical workplace.[23,32] These instruments are usually intended to be formative and are based on providing meaningful feedback following observation of students' performance.[33,34] As described by Cowie & Bell, formative assessment is "the process used by teachers and students to recognise and respond to learning in order to enhance that learning, during the learning".[35] To acquire the goal of CBE and support students' competency development in a programmatic approach to assessment, all assessment activities need to be maximally informative to the learning. Recently, Van der Vleuten et al. described a theoretical model for programmatic assessment, built around learning, assessment and supporting activities, which besides improving the validity and reliability of measurements and documentation of competence development should maximally enhance

and facilitate students' learning.[36] In this model, assessment and learning are intertwined by making each individual assessment maximally informative for learning. In other words, every assessment should produce meaningful information to the student in such a way that it drives learning in a desirable direction. Within the clinical workplace, especially low-stakes, formative assessments suit this purpose. In the end, high-stakes assessment of learning for promotion or licensure is organised through the aggregation of many individual assessment data points.[36] Even though this theoretical model for programmatic assessment has been embraced by medical educators and has been piloted at a smaller scale[37], its feasibility and value at the level of an entire curriculum has not yet been studied. Exploring how these concepts interact with practice while implementing an integrated competency-based *and* assessment programme could help advance both practice and theory.

Another pillar in the foundation for an integrative approach to learning and assessment is the availability of high-quality, meaningful feedback that informs students about their competency development. In the clinical workplace, feedback is usually provided directly after observing students that have performed authentic tasks.[38] This provides students with information that they can use to consolidate or improve their performance. Ideally, performance-relevant feedback also offers insight into the steps they can take to achieve improvements.[39,40] Providing continuity in this process of feedback and reflection fosters students' competency development. Up to now, clinical workplaces have often been considered to comprise a rather unstructured learning environment and different factors, e.g. the clinical organisation, have been shown to influence students' learning within that environment.[41,42] Supporting students during their clinical training and providing them with meaningful feedback on their task performance requires time and effort. However, due to high task loads and work pressure, clinical teachers often refer to a lack of time with respect to their educational tasks.[43,44] Additionally, other factors, e.g. local (educational) culture, training, and the teacher's motivation, play a role in how clinical teachers support students in their learning.[43,45,46] Students, on the other hand, express concerns about clerkships related to issues like variation in frequency and quality of supervision, observation and feedback, variation in patient encounters, and variation in faculties' attitudes towards teaching and learning in the clinical environment.[41,46] Therefore, seeking and providing performance-relevant information in the clinical workplace is often perceived as difficult for both students and teachers.[47] This underlines the importance of developing a feedback-oriented educational programme that is embedded in a supportive learning environment and therefore allows to maximally enhance students' learning, particularly in a way that increases students' clinical competence.[48] As students and teachers are key-actors in this competency-based approach to education in the clinical workplace, further research is required in order to shed light on the underlying mechanisms that affect the exchange of performance-relevant information in competency-based workplace learning and assessment.

Summary of problem definitions and research questions

The aim of this thesis is to enhance our understanding of using an integrative approach to learning and assessment that will foster competency development in undergraduate veterinary education. Our review of the pillars on which such a curriculum should be founded indicates that there are several areas that need to be explored in order to achieve this aim. First, competency-based veterinary education requires educational strategies that are aligned and based on an agreed competency framework. An integrative veterinary competency framework that reflects the scope of today's veterinary professional practice can serve to guide the development of educational programmes along the continuum from novice student to practicing veterinarian. In veterinary literature there is currently no clearly defined integrative approach to curriculum development that is underpinned by a framework of competencies. This leads to the first research question:

» What overarching competency structure provides a solid foundation for competency-based education in veterinary medicine?

Second, recent developments regarding the interface between learning and assessment have led to a theoretical model that may support an integrative programmatic approach to learning and assessment.[36] However, at this point it is still unclear how this theoretical model interacts with practice when it is implemented in an undergraduate competency-based curriculum. This therefore raises the second research question, which is:

» How does theory interact with practice when implementing a competency-based assessment programme in undergraduate veterinary education?

Finally, the interaction between students and teachers is pivotal in creating information that helps students develop their competencies in the clinical workplace. Further research is required in order to shed light on the underlying mechanisms that affect the exchange of performance-relevant information in competency-based workplace learning and assessment. The final research question addressed in this thesis is:

» Which underlying mechanisms affect the exchange of performance-relevant information in competency-based workplace learning and assessment?

Building on and aiming to advance theoretical principles, the studies reported on in this thesis are part of a design-based research (DBR) approach that explores the interaction of theory with educational practice. As argued by Dolmans & Tigelaar, DBR studies could be a fruitful approach for design research, especially when designing workplace-based learning

environments and assessment programmes.[49] To put this into the words of Dolmans and Tigelaar, "design-based research can help to bridge the gap between research and practice, because it contributes towards theory testing and refinement on one hand and improvement of educational practice on the other hand".[49] Design-based educational research typically investigates the nature of learning as it takes place in authentic learning environments and moves forward in cycles of design, evaluation, and redesign.[49,50] The research described in this thesis is limited to one cycle of design and evaluation. Since DBR is aimed at advancing existing theories, the initial design is typically based on the theoretical principles of interest, and since a combination of quantitative and qualitative methods is most suitable to clarify complex interactions in authentic learning environments, DBR is also characterised by a mixed-methods strategy.[49,51] It needs to be pointed out that in this thesis mainly qualitative methods are used as they generate rich data that can lead to deeper understanding of differing perspectives. Furthermore, qualitative data allow us to explore how and why complex phenomena occur in the veterinary clinical workplace.[49]

Thesis outline

When using an integrative approach to learning and assessment to foster competency development in the clinical workplace, well-defined competencies are indispensable. Therefore, in Chapter 2 we report on a study that aimed at defining a competency framework for veterinary professionals. In Chapter 3 we took the framework a step further by exploring international perspectives on the perceived importance by veterinarians of the competency domains for the veterinary profession and their implications for veterinary education. We explored if there was a high degree of international consensus on what could be expected from a veterinary professional, and what should be taught in veterinary education. Chapter 4 reports on a study that described the development, implementation and evaluation of a competency-based assessment programme in undergraduate veterinary education. Informed by current theories on programmatic assessment, we designed a programme of assessment with low-stakes assessments that simultaneously provided formative feedback and input for summative decisions. The competency framework for veterinary professionals, described in Chapter 2, was used to align learning and assessment activities. In Chapters 5, 6 and 7, the results from the study described in Chapter 4 were further explored. Chapter 5 reports on the results of a study in which we tried to unravel students' feedback-seeking behaviours in the clinical workplace. In Chapter 6 we explored the interaction between teacher and student in the clinical workplace from the teachers' perspectives. We investigated teachers' use of mini-CEX in performance evaluations to provide narrative feedback in undergraduate clinical training. Chapter 7 discusses a social cognitive model of motivation that helps to explain different kinds of behaviour that emerge when individuals are confronted with challenges. In

this study, the current literature on self-theories was used to explore the relevance of these theories in relation to Chapters 5 and 6. With the studies described in Chapters 5, 6 and 7, we strove to increase insight into how teachers' and students' behaviour in the clinical workplace affects daily practice of enhancing insight into students' competency development. Chapter 8 discusses the results described in the previous chapters and provided a comparison with the literature. In addition to reflecting on the implications for veterinary education, we conclude by describing strengths and limitations, and implications for further research based on this thesis. Because this thesis is based on papers published separately in peer-reviewed, international journals, there is inevitably some repetition across chapters.

Research context

The studies described in this thesis were conducted at the Faculty of Veterinary Medicine, Utrecht University (FVMU) in the Netherlands. The six-year undergraduate curriculum consists of three years of preclinical training and three years of clinical clerkships. At the time we conducted our studies (2009-2013), a major curriculum reform provided us with opportunities to investigate competency-based educational strategies in the three years of predominantly workplace-oriented clinical training. From September 2010 onwards, this new programme consisted of clinical rotations in disciplines related to three tracks: equine health, companion animal health, and farm animal health. Apart from general rotations in different clinical departments, students mainly undertake rotations in disciplines related to their chosen animal species track. During their clinical rotations, students encounter a variety of learning activities while working side by side with clinical staff.

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CHAPTER 2

Development and validation of a competency framework for veterinarians

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Abstract

Changing demands from society and the veterinary profession call for veterinary medical curricula that can deliver veterinarians who are able to integrate specific and generic competencies in their professional practice. This requires educational innovation directed by an integrative veterinary competency framework to guide curriculum development.

Given the paucity of relevant information from the veterinary literature, a qualitative multi-method study was conducted to develop and validate such a framework. A competency framework was developed based on the analysis of focus group interviews with 54 recently graduated veterinarians and clients and subsequently validated in a Delphi procedure with a panel of 29 experts, representing the full range and diversity of the veterinary profession. The study resulted in an integrated competency framework for veterinary professionals, which consists of 16 competencies organised in seven domains: Veterinary Expertise, Communication, Collaboration, Entrepreneurship, Health and Welfare, Scholarship, and Personal Development. Training veterinarians who are able to use and integrate the seven domains in their professional practice is an important challenge for today's veterinary medical schools. The Veterinary Professional (VetPro) framework provides a sound empirical basis for the ongoing debate about the direction of veterinary education and curriculum development.

Introduction

Traditionally, veterinary medical education has centred on veterinary medical expertise, i.e. specific veterinary knowledge and skills, but this educational model appears less suitable to meet today's changing societal and educational demands. Society places increasing importance on generic competencies, such as communication with clients and colleagues and practice management, in addition to specific veterinary expertise.[1–3] This tendency is confirmed by research evidence concerning the importance of veterinarian-client communication and communication challenges identified in companion-animal practice.[4,5] Another agent for change is the international One Health initiative, which promotes worldwide interdisciplinary collaboration in all aspects of medical and veterinary care and accords a crucial role to veterinarians.[6–8] Change is also induced by the rapid development and accumulation of veterinary knowledge and technology, which calls for professionals who are able to engage in lifelong learning in order to keep up to date with new developments and provide evidence of sustained professional competence through peer assessment and evaluation of performance in practice.[1,9,10]

The gap between traditional veterinary medical education and the demands of modern veterinary medicine is reflected in the perceived inadequate preparation of graduates in terms of competencies like practice management and communication with clients.[3,11] Rising to these challenges, veterinary medical schools have undertaken efforts to broaden the scope of their curricula to include a wider range of competencies.[12,13] In the United Kingdom, the Royal College of Veterinary Surgeons (RCVS) and the Quality Assurance Agency for Higher Education (QAA) have defined "Day One" and "Year One Skills," which veterinarians should be able to perform immediately upon and one year after graduation, respectively.[14–16] Despite these developments, there is currently no clearly defined integrative approach to curriculum development underpinned by a framework of competencies that will sustain today's and tomorrow's veterinarians throughout their careers.[13] The literature offers little help in determining which competencies future veterinarians should master in order to be able to function as competent professionals. "Competency," as it is used in the present study, refers to the ability to integrate the knowledge, skills, and attitudes required to perform complex professional tasks.[17]

Over the past 15 years, medical education has seen efforts to develop integrative competency frameworks to guide educational innovation.[18] In Canada, the Canadian Medical Educational Directives for Specialists (CanMEDS) are based on extensive research conducted among patients and (para)medical personnel.[19–21] The CanMEDS competencies are described as seven roles that a specialist physician should be able to fulfil: medical expert, communicator, collaborator, manager, health advocate, scholar, and professional.

Over the years, the CanMEDS framework has been adopted by the medical councils of Denmark, Australia, New Zealand, and the Netherlands.[22–24] In the United States, the Accreditation Council for Graduate Medical Education (ACGME) has developed a comparable competency framework.[25] These frameworks have provided medical educators with guidelines to develop education and assessment programmes centred on relevant professional tasks.[23,26]

If veterinary medical education is to be able to continue to deliver competent veterinarians for the years to come, it should also be grounded in an integrative veterinary competency framework that reflects the full scope of today's veterinary professional practice. Such a framework can serve to guide the development of training and assessment programmes along the continuum from novice student to practicing veterinarian.[27] The present article describes the development and validation of a veterinary competency framework.

Materials and methods

We conducted a qualitative multi-method study comprising focus group interviews and a Delphi procedure conducted at the Faculty of Veterinary Medicine, Utrecht University (FVMU), the Netherlands between November 2009 and August 2010. We used focus groups because this method provides insight into the diversity of participants' opinions about a specific topic.[28] Qualitative analysis of the data from the focus groups resulted in a preliminary competency framework for veterinary competencies, which was subsequently validated in a Delphi procedure among veterinary (education) experts.

Focus group research

Participants

The aim of the present study was to gather opinions from different stakeholders in veterinary medicine. Veterinarians with between one and five years of experience after graduation were included because of their recent experience with the connection between the current veterinary medical curriculum and the current requirements of the veterinary profession. Three focus groups consisted of veterinarians who represent the three main differentiations within veterinary practice in the Netherlands, companion-animal medicine, farm-animal medicine, and equine medicine, and one group consisted of veterinarians who work in areas such as government bodies, industry, and university and research centres. Two focus groups consisted of clients, i.e. owners of companion, equine, and farm animals, who frequently (more than twice per year) consulted a veterinarian. The participants were recruited nationwide by convenience sampling to prevent selection bias.

Procedure

The group sessions lasted 90 minutes and were guided by a moderator (AJ, PvB) who used an interview guide consisting of questions to probe participants' perceptions regarding the knowledge and skills a veterinarian must possess to meet the requirements of professional practice. At the start of each session, the procedure was explained briefly. From the beginning of the data-collection process, we conducted an ongoing iterative process of data analysis, which resulted in some minor changes in the sampling and data-collection process.[29] Theoretical saturation was considered to have been reached when a new session yielded no new information. The focus group sessions were audio recorded. Within two weeks after a session, we performed member checking by e-mailing a summary of the discussion to the participants and asking them to confirm its accuracy. Two participants suggested minor additions and the other 52 agreed that the summary gave an accurate description.

Analysis

Transcriptions of the recorded sessions were analysed using software for qualitative data analysis (ATLAS.ti 5.0). The analysis followed several steps: data reduction, data display, drawing conclusions, and verification.[29] The first author analysed all of the data in an iterative process of data reduction by assigning codes, categorizing the codes into themes, and renaming and reorganizing the themes until a preliminary competency framework emerged. A second researcher (AJ) analysed a part of the transcripts in the same manner, and the two researchers discussed any discrepancies in their analyses until full agreement was reached. Further agreement on the framework was reached in an expert meeting between the two researchers (HB, AJ), two medical education experts (PT, CvdV), and one expert in veterinary education (PvB).

Delphi procedure

Participants

To cover as wide a range of veterinary activities as possible, the following individuals were invited to serve on the panel of the Delphi procedure which was intended to validate the preliminary competency framework that had emerged from the focus groups: veterinarians working in veterinary practice, government bodies, industry, FVMU and research centres, non-veterinarians active in professions and organisations related to veterinary medicine, and veterinary clients.[30] The individuals who participated in the Delphi procedure did not attend the focus groups.

Procedure

The panel members were invited to judge the relevance (on a five-point Likert scale where 1 = not relevant and 5 = very relevant) and wording of the competencies of the framework. After the first of the two rounds of the procedure, the panel members received written

feedback comprising the means and standard deviations of the relevance scores and a summary of the textual comments. Finally, panel members were asked to categorize the competencies into domains.

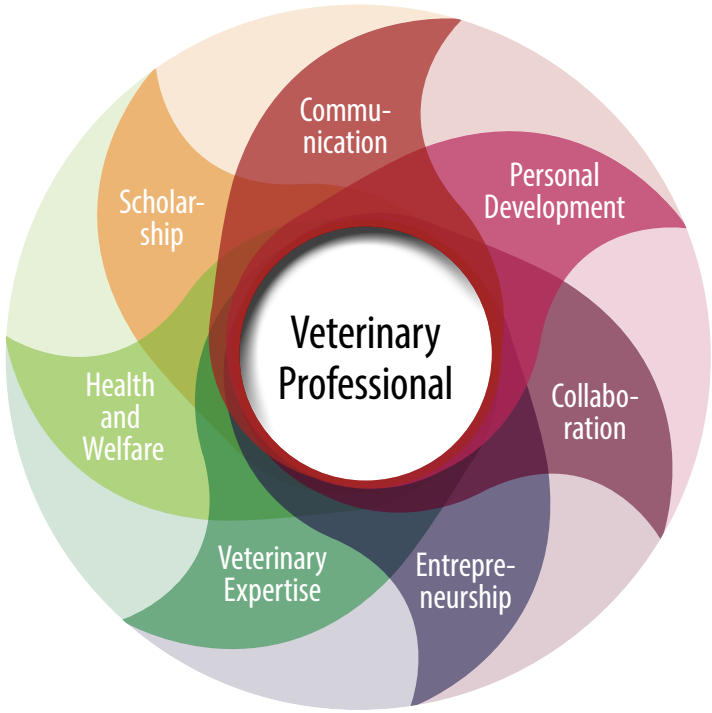
Analysis

After each Delphi round we calculated the mean scores and standard deviations and analysed the textual comments. In the absence of an existing standard, we used a strict definition of consensus: a competency had to be rated as relevant (4) or very relevant (5) by at least 80% of panel members.[31] Minor revisions were made to the wording in response to comments from panel members.

Ethical considerations

All participants in the focus groups and the Delphi procedure gave informed consent in response to a letter that explicitly stated that participation was voluntary and that gave assurance of full confidentiality.

Figure 1: The competency framework of the Veterinary Professional (VetPro).



Results

A total of 35 veterinarians and 19 clients participated in the focus groups, and 29 panel members participated in the Delphi procedure. One panel member did not complete the procedure. Tables 1 and 2 present the participants' background characteristics.

The focus group study resulted in a framework of 18 veterinary competencies categorized into seven domains. In the first round of the Delphi procedure, consensus was reached regarding the wording and inclusion of 10 competencies and their categorization. After the first round, the mean relevance scores, a summary of the qualitative comments (which were presented anonymously), and some minor adjustments of the competencies that had not met the relevance criterion were sent to the panel members. In the second round, consensus was reached regarding six of the remaining competencies. In Table 3 each competency is described separately to ensure comprehensiveness. It should be noted that the participants uniformly emphasized that multiple competencies are always used simultaneously and in an integrated manner during professional task performance. One participant reported the following:

> *"During a consultation I have to demonstrate specific veterinary skills while performing a physical examination. Simultaneously, I have to demonstrate communication skills when I explain the findings to and in some cases collaborate with the animal owner." (Group 2)*

Another participant said,

> *"When a sick animal needs veterinary treatment I have to take responsibility for this animal's health and welfare. I have to communicate my views based on my veterinary expertise to the animal owner and act in accordance with my own professional standards." (Group 3)*

The competency domains are described below with illustrative quotes from the focus groups and the Delphi panel. Figure 1 illustrates the framework, emphasizing the interconnectedness of the domains.

Veterinary Expertise

Veterinary expertise was considered very important to ensure the adequate performance of professional tasks. History taking, physical examination, and basic surgical skills were considered of crucial importance for a veterinary professional:

> *"Within the curriculum the opportunity must be offered to train basic veterinary skills, such as history taking and drug administration, not just in an educational environment, but preferably within the context of day to day practice." (Group 1)*

Practicing veterinarians and especially the clients also emphasized the importance of professional conduct in veterinary emergency situations. For example, one participant reported,

> *"If the animal owner panics in an emergency situation and you, as the responsible veterinarian, remain calm you gain a lot of respect from the animal owner." (Group 3)*

Table 1: Characteristics of focus group participants.

Focus groups	Group	N (54)	Age in years (range)	Working experience in months (range)
Veterinarians working in companion-animal, farm-animal, and equine medicine	1 2 3	7 9 9	31.1 (27–39) 29.0 (27–32) 29.1 (27–34)	32.6 (18–48) 31.4 (23–42) 29.9 (21–46)
Veterinarians working in government bodies and other veterinary-related professions or organisations	4	10	30.0 (27–33)	33.5 (10–55)
Clients (owners of equine and companion animals)	5	10	39.9 (24–62)	
Clients (owners of farm animals)	6	9	45.2 (30–57)	

Table 2: Characteristics of members of the Delphi panel.

Delphi panel members	N (29)	Age in years (range)
Veterinarians in practice (paid employment)	7	30 (28–32)
Veterinarians in practice (clinic director)	2 (3)*	52 (50–54); (38)
Veterinarians in higher education (University of Applied Sciences)	1	55
Veterinarians in higher education (University of Veterinary Medicine and University of Educational Sciences)	6	51 (47–57)
Veterinarians in industry	3	45 (29–63)
Veterinarians in government bodies	2	43 (30–56)
Animal welfare organisation	1	55
Clients	6	50 (40–59)

* *Although a total of 29 individuals participated in the procedure, 1 clinic director did not complete the procedure.*

Communication

All participants mentioned communication as an essential component of professional competence. The ability to communicate in an adequate professional manner with clients, colleagues, and others, an ability that is characterized by careful listening and respectful communication with different groups of people, was emphasized by the focus group participants and underlined by the Delphi panel:

> *"As an animal owner I find it very important that the veterinarian listens carefully to my story and shares his thoughts with me. Sometimes I felt I was not taken seriously and I did not like this at all. Consequently, I went to another veterinarian who treated me with more respect." (Group 5)*

> *"Clear and effective communication is an essential aspect of professional practice and this aspect is underrepresented within the veterinary curriculum." (Delphi panel member)*

It was also considered important for veterinarians to be able to build and maintain good functional relationships with different kinds of people.

Collaboration

Collaborating with colleagues and other professionals either within or outside one's professional work environment was considered an important aspect of veterinary practice. It was also said that veterinary professionals should be able to support and guide colleagues and other personnel:

> *"In our profession it is essential to collaborate with other professionals representing all areas of the veterinary profession and beyond, especially with regard to the current attention for the one health principle." (Group 4)*

Entrepreneurship

The participants emphasized the importance of entrepreneurship. It is important for veterinarians to be able to organise and manage their own activities in their work environment. According to one participant,

> *"Of course you should be able to manage your time. You need to be a time manager and be able to efficiently and effectively schedule your daily programme." (Group 2)*

Table 3: Results of the Delphi procedure for the competencies and domains of the preliminary veterinary competency framework.*

Domain		Competency *The veterinarian is able to:*	Consensus on relevance (%) during round 1 of Delphi procedure	Consensus on relevance (%) during round 2 of Delphi procedure
Veterinary Expertise	1	Perform veterinary activities in an adequate manner	100	
	2	Perform adequately in veterinary emergency situations	96.6	
Communication	3	Communicate effectively with clients, colleagues, other personnel, and third parties	96.6	
	4	Establish and maintain functional relationships	82.8	
Collaboration	5	Collaborate effectively with colleagues, practice assistants, and third parties within and outside one's own organisation	100	
	6	Effectively guide personnel, clients, and third parties	**51.7†**	82.1
Entrepreneurship	7	Plan and organise one's own practice activities	89.7	
	8	Manage the pharmacy and product stock in accordance with quality standards	**69.0**	85.2
	9	Efficiently contribute to business administration	**48.3**	81.5
	10	Ensure a responsible and transparent system of quality assurance in one's professional work environment	**72.4**	92.6

Table 3 continued »

» Table 3 continued

Domain		Competency *The veterinarian is able to:*	Consensus on relevance (%) during round 1 of Delphi procedure	Consensus on relevance (%) during round 2 of Delphi procedure
Health and Welfare	11	Take responsibility in relation to public health	93.1	
	12	Take responsibility in relation to animal health and animal welfare	96.6	
	13	Balance different interests in relation to public health, animal health, animal welfare and practice management in a responsible manner	86.2	
Scholarship	14	Critically appraise, use, and discuss scientific and professional publications	**69.0**	81.5
	15	Design and conduct scientific research	**27.6**	**37.0**
	16	Educate and teach using didactically sound approaches	**13.8**	**55.6**
Personal Development	17	Critically reflect on the quality of (one's own) professional activities and take action to improve it	**72.4**	92.6
	18	Act in accordance with appropriate standards of individual professional behaviour	96.6	

* *To be included in the final Veterinary Professional (VetPro) framework, a competency had to be rated as relevant (4) or very relevant (5) by at least 80% of panel members.*

† *Boldface type indicates less than 80% consensus on relevance.*

The ability to make a professional and efficient contribution in the area of business administration was also mentioned explicitly. This includes having a business-like attitude, leadership and management skills, sufficient knowledge of economic/management principles, and the ability to think and plan strategically and organise a transparent quality assurance system with clear allocation of responsibility. One participant reported,

> *"What I missed during my education are basic principles of entrepreneurship. This is important because it makes no difference if you work in a veterinary clinic or somewhere else; you have to be enterprising, innovative and show the courage to make a constructive contribution towards the organisation." (Group 4)*

Health and Welfare

Health and welfare was identified as a competency domain that reflects the connection between public health and animal health. Newly graduated veterinarians must be able to take responsibility for public health, animal health, and animal welfare. This implies that they must be able to balance differing interests not only in relation to these areas but also in relation to commercial interests:

> *"As veterinarians we are not only responsible for the immediate health of the animal in need, but we also have a responsibility towards society, i.e. clients and the health of other animals." (Group 2)*

Scholarship

Scholarship as a competency domain was characterized as the ability to critically appraise the scientific literature, use the resulting information, and discuss it with others. Participants also emphasized the importance of professional development in relation to continuing veterinary education and lifelong learning:

> *"Our veterinary clinic is based upon evidence based medicine. We try to find a scientific foundation for our treatments and not just use the drug everyone is using." (Group 1)*

The focus group participants also mentioned the ability to conduct scientific research and educate and teach colleagues, co-workers, and students using sound pedagogical principles. However, the relevance scores on these competencies did not reach the required level of consensus in the Delphi procedure (Table 3).

Personal Development

The domain of personal development was defined as the ability to reflect on one's professional performance in order to take steps to improve it and as the awareness of important individual

characteristics when working as a professional. For example, one participant recalled,

> *"After a visit to a client, when I'm driving back to the clinic I reflect on what happened and try to formulate alternative actions to improve my future performance." (Group 3)*

Discussion

Using two qualitative research methods we arrived at an integrated competency framework for veterinary practice composed of 16 competencies and organised in seven domains: Veterinary Expertise, Communication, Collaboration, Entrepreneurship, Health and Welfare, Scholarship, and Personal Development. An important viewpoint with respect to the framework was that professional performance of complex tasks in veterinary practice requires the integration of different competencies. This integrative ability is an essential characteristic of today's veterinary professional.

In contrast with medical competency frameworks, such as the CanMEDS and the ACGME frameworks, within which professionalism is a separate competency, the VetPro framework integrates aspects of professionalism in all domains, putting the veterinary professional at the centre of the framework. Today, a comparable tendency to broaden the scope of professionalism is seen in medical education as well.[32] The domain of personal development in the VetPro framework focuses on individual professional effectiveness, specifically on dealing with feedback and the ability to reflect. These competencies are important for veterinary professionals today and should be included in the veterinary curriculum. Another difference from medical competency frameworks is the emphasis on entrepreneurship, along with the strong focus on business administration and quality assurance, as a crucial competency domain for the modern veterinary professional. Although organisation, management, and quality assurance are also important in medical frameworks, veterinary medicine differs in its stronger emphasis on business administration and innovation.

If universities are to equip their veterinary students with the ability to use the required competencies in an integrated manner, they should offer students a curriculum with a programmatic approach in which the competencies are integrated. The VetPro framework is designed to provide an empirical basis for discussions about the goals of veterinary education. Within curriculum development in undergraduate and continuing veterinary medical education, the framework can serve as a guideline in the development and implementation of education and assessment programmes. For example, an assessment programme based on the competency framework can provide guidance to faculty regarding the assessment of students' task performance. The longitudinal assessment of a variety of tasks by a

variety of observers enables the monitoring and evaluation of the ways in which students' competencies are developing. The VetPro framework also emphasizes the importance of continuing attention to generic competencies during curriculum development.

The multi-method research design based on proven methods of qualitative educational research[28,30,31] is a strength of the present study and supports the validity and reliability of the framework. Another strength is the representative sample which reflects the breadth and diversity of the veterinary profession in the Netherlands. A limitation of the study is that it was restricted to the Dutch setting. However, the competency frameworks applied in medical education (e.g. CanMEDS) generally seem to be valid in an international context.[22] Another limitation is that the VetPro framework is specifically tailored to the present day situation in veterinary medicine. Considering that veterinary medicine will continue to change, we recommend an ongoing process of evaluation and validation of the competency framework to ensure its sustained value in the future.

Additional studies should investigate if the VetPro framework can play a role in veterinary education that is similar to the role played by the CanMEDS and ACGME competency frameworks in medical education. It will be worthwhile to examine whether and how the framework can contribute to the development of a curriculum aimed at the integration of the relevant competency domains.

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CHAPTER 3

Veterinary professionals for the 21st century: Opening up an international discussion

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Abstract

Objective

Due to the global and interprofessional nature of human and animal health, and subsequent necessity of international collaboration, in this study we explored international perspectives on the perceived importance by veterinarians of requirements for the veterinary profession and their implications for veterinary education.

Design

Quantitative, comparative study.

Sample

1137 veterinarians from 10 countries.

Procedures

Veterinarians working in- and outside clinical practice received a questionnaire and responded to two questions on the importance of described competencies for veterinary professional practice and veterinary education using a Likert-scale. Reliability analysis and confirmatory factor analysis were performed for justification of the scale construction. A Friedman test, one-way ANOVAs, post hoc one-sample t-tests with Bonferroni corrections and effect sizes were used for exploration of the data.

Results

In general the described competencies were perceived as important for both professional practice and education. Competencies related to Veterinary Expertise were believed most important. For the Veterinary Expertise, Entrepreneurship, and Scholarship domains some substantial differences (based on statistical significance and effect size) were found in perceived importance between participating veterinarians in different countries.

Conclusions and Clinical Relevance

There is a high degree of international consensus on what could be expected from a veterinary professional in the full range and diversity of the veterinary profession, and what should be taught in veterinary education. In order to empower international and interdisciplinary collaboration and the sharing of educational resources along the veterinary continuum from undergraduate education to professional learning, an international discourse on the definition of a competent veterinary professional is required.

Introduction

Since the beginning of the 21st century, health professionals (e.g. veterinarians, medical doctors) within global health systems have been confronted with a number of challenges.[1-4] As Frenk et al.[4] described in their Lancet commissioned paper, persistent challenges with respect to "our collective failure to ensure the equitable sharing of health progress", together with new challenges such as "new infectious, environmental, and behavioural threats, superimposed upon rapid demographic and epidemiological transitions" threaten our global health systems. In addition, both within and between countries, health systems are becoming more complex, placing additional demands on health workers who are struggling to keep pace with developments.[4,5] There is evidence that professional education in medicine and veterinary medicine has not always developed in parallel with these challenges.[6-9] For instance, described programme outcomes (i.e. competencies) may not be appropriately aligned with patient and population needs.[4] Due to global interdependence and the international migration of health professionals, we are increasingly observing a range of health and education-related challenges, including global mobility of people, livestock and food; lack of international accreditation systems for education; and limited resources for both educational and patient care needs. Considering these contemporary issues and future challenges, a redesign of professional health education is necessary and timely.[4]

Veterinary professionals are playing an increasingly crucial role in global health systems. The international One Health initiative, which promotes worldwide interprofessional collaboration in all aspects of healthcare, both human and animal, recognizes this critical position for veterinarians.[10-13] However, recent scientific evidence has pointed out inconsistencies between the demands of modern veterinary medicine, veterinary curricula, and career success.[2,14,15] Jaarsma et al.[6] and Doucet and Vrins[16] reported in survey studies that graduates feel insufficiently prepared regarding non-technical veterinary competencies such as communication skills and business management. As veterinarians are vital members of global healthcare teams, the increasingly international and interdependent veterinary profession must strive to find consensus about what might be expected of a competent veterinary professional and how veterinary education can best meet the needs of all its stakeholders. In this paper we argue that if we want competent veterinary professionals ready for the challenging global needs of the 21st century, an international discussion about relevant competencies is an essential prerequisite.

Over the years, the medical profession has seen several initiatives at achieving better-performing health systems underpinned by a sound educational philosophy.[17-20] For instance, in Canada, the Canadian Medical Educational Directives for Specialists (CanMEDS) was developed through consultation with patients and (para)medical staff.[21,22] It has since

been adopted by many medical associations around the world.[23-26] Throughout the medical continuum, such frameworks (e.g. CanMEDS, Tomorrow's doctors, Accreditation Council for Graduate Medical Education core competencies) provide a guideline to align education with professional practice.[25-28]

To inform an international discussion on the needs of veterinary professionals we used the Veterinary Professional Competency Framework (VetPro) as our starting point.[29] This framework has been used as a foundation for educational and certifying programmes in the Netherlands[30,31], and describes seven domains, subdivided in eighteen competencies, relevant for the veterinary professional: Veterinary Expertise, Communication, Collaboration, Entrepreneurship, Health and Welfare, Scholarship, and Personal Development.[29] Using this framework, the current study aimed to explore international perspectives on the perceived importance and implications of the framework's competency domains for the veterinary profession and education. Data were collected through online surveys of veterinarians from ten countries, asking them to rate the importance of competencies.

Materials and methods

The VetPro competency framework

The Veterinary Professional Competency Framework consists of seven domains (Veterinary Expertise, Communication, Collaboration, Entrepreneurship, Health and Welfare, Scholarship, and Personal Development), which are subdivided into 18 competencies (Table 1).[29] The framework was developed in the Netherlands through a qualitative multi-method study by conducting focus groups and a Delphi procedure with clients and veterinarians representing the full range and diversity of the veterinary profession.[29]

Setting

This study was conducted in the Netherlands (NL), Spain (SP), Norway (NO), United States (USA), South Africa (SA), Switzerland (SW), Canada (CA), United Kingdom (UK), Malaysia (MA), and Australia (AU). These countries were included because of existing professional relationships. Table 2 provides demographic information about the veterinary profession within the participating countries.

Participants and procedure

Between March and September 2012, the first author (HGJB) coordinated the data collection. To cover as wide a range of veterinary activities as possible, the following individuals were included: veterinarians working in veterinary clinical practice, e.g. small animal medicine, farm animal medicine, and equine medicine; and veterinarians working outside clinical

practice, e.g. at government bodies, in industry, at university, or at research centres. Within the Netherlands, all licensed veterinarians were invited to fill in the questionnaire. Within the other nine countries, the relevant co-author coordinated the distribution by sending recipients an email containing a link to the online questionnaire. Convenience sampling was used to select participants in each participating country.[32] Per country participants were sampled striving towards maximum variation in gender, age, employment and profession (Table 3). Participants from a certain region could be overrepresented based on the co-author's appointment. In Spain veterinarians from the Madrid region were invited from the lists of the Spain Professional College. In the other participating countries co-authors' directories were used to recruit respondents; in Norway, veterinarians were invited from Oslo and surrounding areas; in the United States, mainly from the state of California; in South Africa, from Pretoria; in Canada, mainly from the province of Alberta; in Australia, veterinarians were mainly invited from New South Wales; and in the United Kingdom, Switzerland and Malaysia, respondents were distributed throughout the country.

Questionnaire

The questionnaire was available online and invitations were distributed by email. Respondents were asked to give their opinion on the importance of the eighteen competencies (Table 1) described in the VetPro framework on a nine-point Likert scale (1-not important through 9-very important). Each domain was accompanied by a description of the underlying competencies.[33] The two main questions asked were:

» How important do you think the described competencies are for a veterinarian in your country? (Professional practice)

» How important is it that the described competencies are taught at the veterinary schools in your country? (Education)

Question 1 will be referred to as perceived importance for professional practice, and Question 2 as perceived importance for education.

Data analysis

The validity of the a priori scales for the seven domains of the VetPro framework presented in Table 1 was checked by performing a confirmatory factor analysis (CFA) for the corresponding measurement model, and reliability analyses for each of the seven scales. This scale construction procedure was applied for the 'professional practice' data as these aspects were regarded as the most essential for the concept.[29] For ease of comparison between 'professional practice' ratings and 'education' ratings (see above), the education scales by definition were taken to be identical to the professional scales. In the scale

construction procedure for the CFA the next fit indices were used to check the fit of the measurement model: the minimum discrepancy divided by the degrees of freedom (CMIN/DF), the goodness-of-fit index (GFI), the Tucker-Lewis index (TLI), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA).[34,35] In the analysis a reliability (Cronbach's alpha) of 0.70 or higher was considered sufficient. Based on the results of the scale construction it was decided whether the existing VetPro scales could be maintained or should be modified.

The resulting two sets of domain variables, one set for professional practice and a similar set for education, were used in subsequent analyses. The rating of a domain variable was obtained by calculating the mean across the ratings of the corresponding competencies. In order to investigate whether the pattern of ratings over domains were consistent across countries, ratings for professional practice and education, respectively, were analysed at the country level (10 mean ratings per domain). Because of the small sample size (10 countries) a non-parametric test (Friedman test) was performed for the 10 sequences of domain ratings. Between-country differences in domain ratings for professional practice and education, respectively, were investigated at the rater level by performing a one-way ANOVA over the 10 countries for each domain. When significant differences were detected, post hoc one-sample t-tests were performed comparing the sample of ratings at rater level within a country (single country mean) with the overall mean rating. In this procedure the overall mean rating was calculated as the average of the country means and was considered to represent the population mean rating. The procedure involved ten comparisons, one for each of the ten countries. Therefore, a Bonferroni corrected significance level $p<0.005$ (=0.05/10 countries) was applied for each comparison. Effect sizes were calculated as the difference between a country's mean domain rating and the overall mean rating, divided by the standard deviation of the within country ratings (Cohen's d).[36] In this study we focused on the major deviations from the overall mean, and therefore, we decided only to discuss significant deviations with effect sizes above 0.50.[36] Statistical software was used for statistical analyses in general[2], and for the CFA[3].

Confidentiality and ethical considerations

Participation in this study was voluntary and participants were assured of confidentiality. All participants in this study gave written informed consent. The ethical review board of the Dutch Association for Medical Education (NVMO-ERB) approved the study.

2 SPSS version 20, SPSS Inc, Chicago, Ill.

3 AMOS 18.0, SPSS Inc, Chicago, Ill.

Table 1: The Veterinary Professional competency framework (VetPro).[29]

Domain		Competency *The veterinarian is able to:*
Veterinary Expertise	1	Perform veterinary activities in an adequate manner
	2	Perform adequately in veterinary emergency situations
Communication	3	Communicate effectively with clients, colleagues, other personnel and third parties
	4	Establish and maintain functional relationships
Collaboration	5	Collaborate effectively with colleagues, practice assistants and third parties within and outside one's own organisation
	6	Effectively guide personnel, clients and third parties
Entrepreneurship	7	Plan and organise one's own practice activities
	8	Manage the pharmacy and product stock in accordance with quality standards
	9	Efficiently contribute to business administration
	10	Ensure a responsible and transparent system of quality assurance in one's professional work environment
Health and Welfare	11	Take responsibility in relation to public health
	12	Take responsibility in relation to animal health and animal welfare
	13	Balance different interests in relation to public health, animal health, animal welfare and practice management in a responsible manner
Scholarship	14	Critically appraise, use and discuss scientific and professional publications
	15	Design and conduct scientific research
	16	Educate and teach using didactically sound approaches
Personal Development	17	Critically reflect on the quality of (one's own) professional activities and take action to improve it
	18	Act in accordance with appropriate standards of individual professional behaviour

Table 2: Number of veterinary schools and veterinarians in participating countries.

Country	Veterinary schools (n)	Number of veterinarians (n)	Funding (Public/ Private)	Percentage of veterinarians employed in (%): Government	Industry	Academia	Private practice	Other
Netherlands[1]	1	4.434	1/0	6.7	7.9	9.1	72.7	3.6
Spain[2]	11	26.760	9/2	29.4	28.0	5.1	37.2	0.3
Norway[3]	1	2.650	1/0	23.0	5.0	8.0	64.0	0.0
United States[4]	28	97.111	-	3.7	5.6	6.8	63.6	20.3
South Africa[5]	1	2.541	1/0	12.0	2.0	3.0	83.0	0.0
Switzerland[6]	2	3.746	2/0	5.5	5.2	8.4	73.2	7.7
Canada[7]	5	12.590	5/0	10.0	6.0	5.0	75.0	4.0
United Kingdom[8]	7	25.221	7/0	7.9	3.2	5.5	80.5	2.9
Australia[9]	7	10.724	7/0	5.0	7.0	5.0	67.0	16.0
Malaysia[10]	1	1.894	1/0	19.4	48.4	12.4	19.8	0.0

1 *According to Royal Netherlands Veterinary Association (2012)*
2 *According to Spain Professional College (2012)*
3 *According to Norwegian Veterinarians Association (2012)*
4 *According to American Veterinary Medical Association (2012)*
5 *According to South African Veterinary Council (2012)*
6 *According to Swiss Veterinary Association (2012)*
7 *According to Canadian Veterinary Medical Association (2012)*
8 *According to The Royal College of Veterinary Surgeons (2012)*
9 *According to Australian Companion Animal Council (2009)*
10 *According to Malaysian Veterinary Council (2012)*

Results

A total of 1137 recipients responded to the questionnaire. Characteristics of respondents per country are illustrated in Table 3.

Table 3: Characteristics of survey respondents.

	NL	SP	NO	USA	SA	SW	MA	CA	UK	AU	Total
N	493	170	61	64	61	62	69	55	41	61	1137
Gender (% female)	-	58.2	50.8	57.8	23.0	40.3	53.6	54.5	48.8	45.9	49.8
Age (mean)	-	39.8	44.7	43.7	42.2	46.8	39.0	45.1	44.9	48.4	43.1
Employment (% employee)	50.1	60.8	73.7	73.4	70.5	67.7	72.5	67.9	69.2	44.3	58.9
Profession (% clinical practice)	80.1	58.3	41.0	64.1	50.8	48.4	45.6	63.6	48.8	63.9	65.7

Employment (% employee) refers to the percentage of responding veterinarians working as an employee compared to those employing personnel. Profession (% clinical practice) refers to the percentage of responding veterinarians working in clinical practice compared to veterinarians working in non-clinical professions. NL=Netherlands, SP=Spain, NO=Norway, USA=United States of America, SA=South Africa, SW=Switzerland, MA=Malaysia, CA=Canada, UK=United Kingdom, AU=Australia

Table 4: Goodness of fit measures from CFA for the domains described in the VetPro framework.

	CMIN/DF	GFI	TLI	CFI	RMSEA
VetPro framework	3.00	0.93	0.93	0.95	0.06

Criterion values for fit indices: CMIN/DF < 2, GFI > 0.9, TLI > 0.9, CFI > 0.9, RMSEA < 0.08

For the CFA to be representative for all countries involved in the study, a balanced sample was obtained by resampling the original sample of 1137 participants. For the CFA sample random samples of 50 participants per country were obtained, resulting in a sample of size 491 (for the UK there were only 41 participants in all). The CFA for the seven domains defined by the a priori scales showed a satisfactory fit according to 4 of the 5 fit indices shown in Table 4. The reliability of the domain Veterinary Expertise, being 0.68, did not reach the criterion level

of 0.70, but is still acceptable. The reliability of the other six domains varied from 0.78 to 0.87 indicating scales of sufficient internal consistency (Table 5). The results of the CFA and the reliability analyses were found to be supportive for the a priori scales, and, therefore, these scales were used in subsequent analyses.

Table 5: Reliability analysis.

N=491	Items (N)	α
Veterinary Expertise	2	0.68
Communication	2	0.80
Collaboration	2	0.82
Entrepreneurship	4	0.85
Health and Welfare	3	0.83
Scholarship	3	0.78
Personal Development	2	0.87

The competencies (N=18) were rated by a total of 1137 participants. For the domain ratings the overall mean per domain is shown for professional practice and for education in the second last column of Table 6. The overall mean of these ratings amounts to 7.8 (SD 0.7) for professional practice, and to 7.4 (SD 0.7) for education. Figure 1 presents a bar chart of the domain ratings, showing the average pattern of overall means for professional practice and for education. The Friedman test was found to be highly significant for professional practice ($\chi^2(6)= 47.73$, $p<0.001$) as well as for education ($\chi^2(6)= 50.53$, $p<0.001$), indicating that the typical pattern of the 10 overall mean rating sequences per domain was significant (i.e. consistent pattern of mean domain ratings between countries) for professional practice and education.

For each domain and for professional practice as well as education Table 6 presents the differences between the single country mean and the overall mean, the average of the ten single country means. For all competency domains, overall means were above 6.4. The value 5 was defined as the neutral rating on the 9-point Likert-scale. All fourteen ANOVAs, investigating between-country differences, were significant ($p\leq0.003$) except for the competencies related to Health and Welfare for professional practice ($p=0.087$). Significant differences of a single country mean with the overall mean are indicated in Table 6 with an asterisk, and the corresponding effect size (ES) is indicated between the brackets. Significant findings ($p<0.005$) with considerable ES (≥0.50) were considered substantial deviations and therefore were highlighted in the table.

For the Veterinary Expertise, Entrepreneurship, and Scholarship domains some substantial differences (ES≥0.50) were found. In the Netherlands, substantially lower ratings were found (ES 0.69, $p<0.001$ for professional practice; ES 0.56, $p<0.001$ for education) as compared to the other countries. In comparison respondents from the United States and Switzerland scored substantially higher for importance on professional practice (USA ES 0.56, $p<0.001$; SW ES 0.86, $p<0.001$). Respondents from the United Kingdom rated the Entrepreneurial competencies for professional practice less important (ES 0.62, $p<0.001$). South-African respondents were more likely to agree on the importance of education in relation to Entrepreneurship (ES 0.67, $p<0.001$) as compared to other countries. On the Scholarship domain, Malaysian respondents agreed substantially more on its importance for the veterinary profession (ES 0.61, $p<0.001$). Spanish respondents were more likely to agree on the importance of training scholarly competencies in veterinary education programmes (ES 0.56, $p<0.001$).

Figure 1: Overall mean per domain regarding importance for professional practice and importance for education (SD indicated next to the bar).

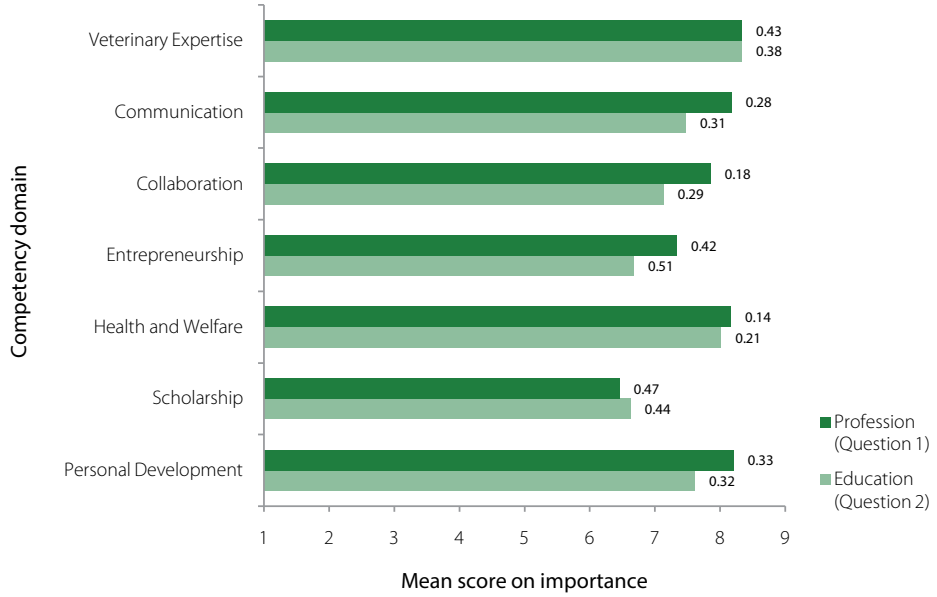

Table 6: Differences between the single country mean and the overall mean of perceived importance per competency domain for professional practice (P) and education (E).

Competency domain		NL	SP	NO	USA	SA	SW	MA	CA	UK	AU	Overall mean	p (ANOVA)
Veterinary Expertise	P	-0.92* (0.69)	-0.32* (0.27)	0.10 (0.11)	0.35* (0.56)	0.01 (0.01)	0.44* (0.86)	-0.41 (0.30)	0.32* (0.46)	0.30 (0.41)	0.12 (0.11)	8.33	0.000
	E	-0.73* (0.56)	0.19 (0.20)	0.23 (0.27)	0.27 (0.34)	0.01 (0.01)	0.32* (0.46)	-0.67* (0.49)	0.16 (0.19)	0.19 (0.18)	0.01 (0.01)	8.33	0.000
Communication	P	-0.11 (0.12)	-0.53* (0.41)	-0.37 (0.32)	0.26 (0.31)	0.16 (0.21)	-0.18 (0.15)	0.12 (0.15)	0.26 (0.27)	0.17 (0.23)	0.22 (0.26)	8.17	0.000
	E	0.24* (0.18)	-0.15 (0.09)	-0.22 (0.14)	0.14 (0.10)	0.21 (0.17)	-0.71 (0.35)	-0.10 (0.06)	0.13 (0.08)	0.33 (0.29)	0.11 (0.08)	7.47	0.000
Collaboration	P	-0.15* (0.14)	-0.33* (0.22)	-0.09 (0.07)	0.24 (0.26)	-0.05 (0.05)	0.05 (0.05)	0.16 (0.15)	0.05 (0.04)	-0.14 (0.13)	0.23 (0.26)	7.85	0.003
	E	0.24* (0.18)	0.21 (0.14)	0.02 (0.01)	-0.18 (0.11)	-0.11 (0.07)	-0.73 (0.34)	0.14 (0.09)	0.07 (0.06)	0.09 (0.06)	0.21 (0.18)	7.13	0.001
Entrepreneur-ship	P	0.07 (0.06)	0.10 (0.07)	-0.04 (0.04)	-0.24 (0.18)	0.47* (0.44)	0.23 (0.19)	0.43* (0.41)	-0.45 (0.34)	-0.87* (0.62)	0.29 (0.31)	7.33	0.000
	E	0.61* (0.46)	0.38* (0.24)	-0.13 (0.10)	-0.57 (0.31)	0.83* (0.67)	-0.36 (0.19)	0.01 (0.01)	-0.53 (0.30)	-0.57 (0.35)	0.29 (0.21)	6.67	0.000
Health and Welfare	P	-0.07 (0.07)	0.19 (0.20)	-0.21 (0.16)	0.01 (0.01)	0.07 (0.09)	-0.05 (0.05)	0.07 (0.06)	-0.11 (0.10)	-0.11 (0.09)	0.22 (0.29)	8.16	0.087
	E	0.02 (0.02)	0.41* (0.44)	0.04 (0.03)	-0.02 (0.02)	0.00 (0.00)	-0.28 (0.18)	-0.23 (0.16)	-0.15 (0.13)	-0.01 (0.01)	0.25 (0.23)	8.01	0.000
Scholarship	P	-0.33* (0.23)	0.51* (0.35)	-0.06 (0.04)	-0.02 (0.01)	-0.11 (0.07)	-0.55 (0.32)	0.97* (0.61)	-0.23 (0.16)	-0.47 (0.28)	0.31 (0.23)	6.45	0.000
	E	0.05 (0.03)	0.80* (0.56)	0.08 (0.06)	-0.33 (0.19)	-0.19 (0.13)	-0.42 (0.25)	0.48 (0.31)	-0.36 (0.21)	-0.48 (0.26)	0.40 (0.27)	6.62	0.000
Personal Development	P	-0.25* (0.24)	-0.68* (0.42)	-0.16 (0.13)	0.31* (0.42)	0.31* (0.48)	-0.26 (0.19)	0.02 (0.02)	0.34* (0.46)	0.19 (0.23)	0.20 (0.24)	8.20	0.000
	E	0.06 (0.05)	-0.37* (0.23)	0.32 (0.26)	0.10 (0.07)	0.12 (0.08)	-0.67 (0.33)	-0.23 (0.14)	0.27 (0.20)	0.21 (0.15)	0.21 (0.19)	7.61	0.000

*Significant differences (*) (p<0.005) with effect sizes (displayed in parentheses) above 0.50 are **highlighted***

Discussion

By conducting a quantitative comparative study across ten countries, we aimed to generate information that can start an international discussion on the needs of veterinary professionals in the increasingly interdependent and challenging veterinary profession worldwide. The results of this study demonstrated that, on a conceptual level (i.e. importance of described domains), there was a high degree of international consensus on what could be expected from a veterinary professional in the full range and diversity of the veterinary profession, and what should be taught in veterinary education (i.e. no significant differences between ratings on competencies). Considering there was both consensus and disagreement with respect to the perceived importance of the competency domains between countries, the VetPro competency framework proved to be a valid and valuable starting point for further discussion.

We aimed to explore whether veterinarians living in different countries and within different cultures around the world have different perceptions about the importance of predefined competencies related to the veterinary profession. As would be expected, respondents from all participating countries perceived technical competencies related to veterinary expertise as very important for professional practice and veterinary education. Also with respect to the non-technical competencies (e.g. competencies related to Communication, Collaboration, Health and Welfare, and Personal Development), respondents from the ten participating countries agreed on their importance for both professional practice and on the important role of veterinary education in providing the knowledge, skills, and attitudes around these competencies. These results are in line with a survey study by Lane and Bogue[37] amongst faculty members of five North American colleges of veterinary medicine. They reported an increased awareness regarding the importance of non-technical competencies for veterinary graduates. Also Rhind et al.[38] reported in a survey study with final-year students and recent graduates from three veterinary schools in the United Kingdom that the non-technical competencies of communication skills, recognition of own limitations, ability to cope with pressure, problem solving and decision making skills were rated unanimously important or very important by students and graduates alike. In a systematic review of all published literature around business skills, Cake et al.[39] described the importance of business skills for career success, but also discussed the issue of veterinarians perceiving those skills almost universally of relatively lower importance. For example, Coe et al.[40] identified a theme of veterinarians feeling some unease in discussing financial issues with clients. Consistent with the literature reporting that veterinary professionals are increasingly playing a crucial role in global health systems, i.e. a One Health approach[10-13], our results have shown an international consensus with respect to the importance of competencies related to health issues (described within the Health and Welfare domain).

However, as described in literature, competencies are context- and time-dependent, and their perceived importance may differ between countries.[23] Cultural and historical issues can influence the degree to which certain competencies are perceived as important. As a consequence, every country or region might want to emphasize certain competencies more than others.[41] This was represented in our data by some substantial between country variations with respect to the perceived importance of competencies for professional practice and veterinary education. However, the results also illustrated that on a higher conceptual level, i.e. competency domains, there was a high degree of international consensus about what is to be expected of a veterinary professional. While the clinical functions of veterinarians are becoming increasingly homogenous throughout the developed world, there are still distinct differences in terms of educational expectations required for graduation. Differences in educational traditions might explain some of these differences, but there are likely more factors that influence how education is aligned with the needs of stakeholders.[42] More research that focuses on both the participants in education (i.e. teachers and learners) and the beneficiaries of a well-trained veterinarian workforce (i.e. the clients) could help elucidate and describe these factors, and help shape the future of education. That future does not need to exist of consensus on all levels of the educational system. In terms of international accreditation, international collaboration and the exchange of professionals between countries, reaching an agreement on which competencies are important could be essential. On the other hand, at a national or regional level, a contextualized elaboration of required competencies could strengthen the way in which the veterinary profession contributes to One Health.

Several limitations must be taken into account regarding the reliability and validity of this study. First, due to the sampling procedure (inviting recipients by email), exact response rates could not be calculated. Therefore, the final number of respondents only represented a small and possibly biased percentage of veterinarians in a specific country. Because one country could harbour multiple cultures[43], this could negatively affect the validity of this study. Although there was good agreement on the importance of the described competencies, cultural differences could have influenced the interpretation of the questions and competencies. However, the aim of this study was to explore international perspectives on the perceived importance and implications of the framework's competency domains for the veterinary profession and education. Therefore, representativeness for a country's mean perceived importance could not be claimed. Potential biases could have influenced the ratings on the rating scales between countries, which requires further research. Furthermore, proportions of respondents from different countries varied, with one country comprising almost a third of the total sample. This bias was corrected for evaluation of the overall means for each competency domain by using the average of the ten single country means as a reference. In this study, predominately veterinarians were surveyed from countries with private practice

as the main employment form. Veterinarians from other countries, for example countries where veterinarians are mostly employed by the government (e.g. countries in the Middle East), could have different viewpoints towards competencies. However, this underlines the main message of this paper and emphasizes the importance of opening up an international discussion.

This study sought to begin an investigation into veterinarians' perceptions of what is expected of a veterinary professional in the 21st century from an international perspective. By opening up an international discourse on the definition of a competent veterinary professional, with consequent benefits for patients and populations worldwide, commonly perceived important competencies could be identified in order to empower international and interdisciplinary collaboration and the sharing of educational resources along the continuum from undergraduate to postgraduate and professional veterinary education. The differences in countries' perceptions regarding specific competencies should be acknowledged and discussed. By opening up the discussion on these differences, and inviting researchers across the globe to conduct further research, the international veterinary profession will build a shared understanding and anticipation of national or regional differences, providing direction for developing veterinary education programmes that are aligned with local, national and international stakeholder needs.

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CHAPTER 4

Programmatic assessment of competency-based workplace learning: When theory meets practice

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Abstract

Background

In competency-based medical education emphasis has shifted towards outcomes, capabilities, and learner-centeredness. Together with a focus on sustained evidence of professional competence this calls for new methods of teaching and assessment. Recently, medical educators advocated the use of a holistic, programmatic approach towards assessment. Besides maximum facilitation of learning it should improve the validity and reliability of measurements and documentation of competence development. We explored how, in a competency-based curriculum, current theories on programmatic assessment interacted with educational practice.

Methods

In a development study including evaluation, we investigated the implementation of a theory-based programme of assessment. Between April 2011 and May 2012 quantitative evaluation data were collected and used to guide group interviews that explored the experiences of students and clinical supervisors with the assessment programme. We coded the transcripts and emerging topics were organised into a list of lessons learned.

Results

The programme mainly focuses on the integration of learning and assessment by motivating and supporting students to seek and accumulate feedback. The assessment instruments were aligned to cover predefined competencies to enable aggregation of information in a structured and meaningful way. Assessments that were designed as formative learning experiences were increasingly perceived as summative by students. Peer feedback was experienced as a valuable method for formative feedback. Social interaction and external guidance seemed to be of crucial importance to scaffold self-directed learning. Aggregating data from individual assessments into a holistic portfolio judgement required expertise and extensive training and supervision of judges.

Conclusions

A programme of assessment with low-stakes assessments providing simultaneously formative feedback and input for summative decisions proved not easy to implement. Careful preparation and guidance of the implementation process was crucial. Assessment for learning requires meaningful feedback with each assessment. Special attention should be paid to the quality of feedback at individual assessment moments. Comprehensive attention for faculty development and training for students is essential for the successful implementation of an assessment programme.

Background

In recent decades, society and professional associations have come to place increasing importance on generic competencies and evidence of sustained professional competence[1,2], giving rise to competency-based education with emphasis on outcomes, competencies, and learner-centeredness.[3] The shift to competency-based education challenged medical educators to develop new methods of teaching and assessing clinical competence. Based on the notion that using one single assessment method can compromise the reliability, validity, impact on learning, and other quality criteria of assessment[4], Van der Vleuten and Schuwirth proposed a holistic, programmatic approach to assessment aimed at improving the validity and reliability of measurements and documentation of competency development.[5] In recent years, developments are seen in undergraduate and postgraduate education to design programmes of assessment monitoring trainees' progression towards defined standards of performance.[6-9] Assuming that combining different assessment instruments and supplementing traditional instruments with modern ones can not only counteract the downsides of using a single assessment instrument[5,10-12], but also provide a holistic overview of students' competency development for formative feedback and summative decisions[12], Van der Vleuten et al. proposed a model of programmatic assessment aimed at optimising the education and certification functions of assessment.[13] They formulated a set of theoretical principles to meet the requirements of maximum facilitation of learning (assessment for learning) and maximum robustness of high-stakes decisions (assessment of learning), while also supplying information for the improvement of curricular quality.[13]

Building on and aiming to advance these theoretical principles, we undertook a development study including evaluation to explore the interaction of theoretical principles with educational practice. The aim of this study was to investigate the nature of learning as it takes place in authentic learning environments, bridging the gap between research and practice. We designed and implemented an assessment programme and collected and analysed quantitative and qualitative evaluation data (Figure 1) to guide redesign. In accordance with the "conventional structure for reporting on experiments that evolve over time" proposed by Collins et al. we consecutively describe the goals and elements of the design and the methods used to collect and analyse the evaluation data.[14] Finally, we present the findings from the analysis of the evaluation data, discussing these in light of the assessment principles informing the programme. Based on the theoretical principles described by Van der Vleuten et al.[13] we identified four overarching challenges to be met by the assessment programme and translated these into research questions:

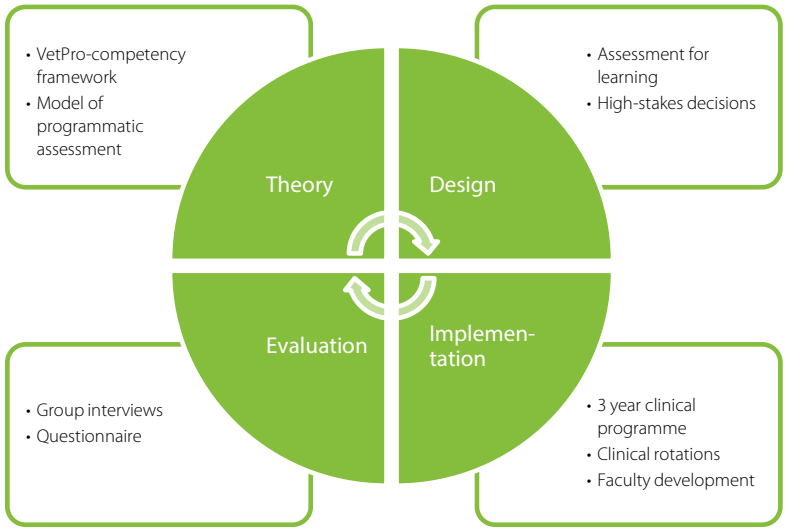
» Can data from multiple individual assessments be used to combine formative (assessment for learning) and summative (assessment of learning) functions of assessment?

» Can information from individual assessment data points be aggregated meaningfully?

» Can assessment drive desirable learning?

» How can the assessment programme promote reflective and self-directed learning activities?

Figure 1: Cycles of design, implementation, evaluation and redesign.



The goals and elements of the programme of assessment

Setting

A major curriculum reform at the Faculty of Veterinary Medicine, Utrecht University (FVMU) in the Netherlands offered an opportunity to design and test a competency-based assessment programme for the three-year clinical phase of the six-year undergraduate curriculum. Launched in September 2010, the new clinical phase comprises one to seven week clinical rotations in disciplines related to three tracks: equine health, companion animal health, and farm animal health. Students select one track and work side by side with clinical staff in the workplace where they encounter a variety of learning activities. Formal teaching is aimed at promoting in-depth understanding of topics encountered during clinical work.

Research team

The research was conducted by a team consisting of clinical supervisors with expertise in curriculum development, assessment, and clinical supervision, faculty with expertise in educational design, and educational researchers with expertise in curriculum development and workplace-based assessment (WBA). Starting their activities in September 2009, the team met in monthly progress meetings, consulting, if necessary, external experts on specific subjects.

The design of the assessment programme

The assessment programme was designed in accordance with the model of programmatic assessment proposed by Van der Vleuten et al.[13] Built around learning activities, assessment activities, supporting activities, intermediate evaluations, and final evaluations, the programme was designed to meet the five main goals formulated by the research team. These goals were based on the theoretical principals and, as a consequence, in alignment with the research questions:

» To give students insight into their learning and longitudinal competency development.

» To offer learning opportunities which are also potential assessment opportunities.

» To ensure that the main focus is on meaningful feedback to further attainment of predefined professional competencies.

» To promote reflective and self-directed learning activities.

» To enable faculty to make robust (defensible and transparent) high-stakes (promotion/remediation) decisions.

These starting points and the competency framework for veterinary professionals (VetPro) underpinned the initial assessment blueprint developed by the team.[15] The VetPro competency framework consists of seven domains (Veterinary Expertise, Communication, Collaboration, Entrepreneurship, Health and Welfare, Scholarship, and Personal Development) subdivided in eighteen competencies. The framework was originally developed through a multi-method study with clients and veterinarians representing the full range and diversity of the veterinary profession.[15] The assessment instruments were in alignment with the competency framework to enable aggregation of information in a structured and meaningful way. Several discussion sessions with educational experts and the team resulted in an assessment programme, which, starting in September 2010, was piloted (Figure 2).

Figure 2: Competency-based assessment programme at FVMU introduced in September 2010.

Learning activities	• The clinical programme (years 4, 5, and 6) is organised around the competency framework for the veterinary professional (veterinary expertise, communication, collaboration, entrepreneurship, health and welfare, scholarship, and personal development) • The programme consists of approximately 17 clinical rotations, depending on the animal track selected • Students perform clinical tasks in patient care in the university hospital or at an external location • Students work in teams with other students of different levels of experience • Seminars and lectures focus on specific knowledge and cases (approximately 30% of total time) • Self-study time is used to increase in-depth insight into specific clinical cases (approximately 35% of total time)
Assessment activities	• To provide feedback and assess students' competency development the following instruments are used: mini clinical evaluation exercise (mini-CEX), multisource feedback (MSF), and evidence based case reports (EBCR). The assessment is guided by the domains of the competency framework • The assessment instruments are standardized by the use of a numerical value containing descriptors (5-point Likert-scale) and offer space for narrative feedback on student performance • The (low-stakes) workplace-based assessments (WBAs) are documented in an online portfolio structured around the domains of the veterinary competency framework • Clinical supervisors conducting WBAs have no information about students' previous results • Annually, two progress tests assess clinical reasoning skills and specific in-depth knowledge
Supporting activities	• Students are expected to reflect upon information obtained from learning and assessment activities • Based on feedback received students analyse their strengths and weaknesses and based on these formulate specific 'learning' questions • The questions are discussed in peer-group (intervision) sessions with six students and a clinical teacher (mentor) • These discussions result in specific learning goals for the upcoming period • The process is facilitated and structured by personal development plans (PDP) based on the competency framework for the veterinary professional
Evaluation activities	• An independent portfolio review committee (PRC) conducts an intermediate evaluation after six months of clinical training • This evaluation is based on pre-set performance standards • In order to reach a reliable and valid judgement low-stakes assessments (multiple observers and multiple cases) are aggregated over a longer period of time (six months to one year) to illustrate competency development • Standardised forms are used for portfolio judgement and strengths and weaknesses are identified • The same committee performs an end-of-year evaluation • Individual data points are aggregated to arrive at a mark based on pre-set performance standards • A qualitative judgement is given and, if necessary, supplemented with an advice for remediation • The assessment programme focuses on remediation and advice for future learning

Figure 2 continued »

» Figure 2 continued

Single assessment data points:
minimum number of data points to be collected during six months of training

12 Mini-CEXs (peers, teachers)
1 Multisource feedback round (MSF)
2 Evidence based case reports (EBCR)
2 Personal development plans (PDP)
2 Knowledge tests / progress tests

Digital portfolio

Feedback: Low stakes
"Assessment *for* learning"

Evaluation: High stakes
"Assessment *of* learning"

The programme focused on the integration of learning and assessment by motivating and supporting students to arrange for WBAs that provide feedback to monitor their competency development. Students were expected to take responsibility for managing and documenting their development. To help students reflect on their learning and assessment activities, supporting activities were offered: small group sessions to discuss learning goals with peers and a clinical supervisor (mentor) and individual student-mentor meetings. Annually, at a six-month interval, an intermediate and a final evaluation was conducted based on predefined performance standards. The primary objective of the intermediate evaluation was to provide students feedback on longitudinal competency development to be used to formulate new learning goals to prepare for the final (high-stakes) evaluation leading to a summative decision (go/no go). Prior to the pilot, workshops with faculty and students were organised led by external experts on workplace-based assessment, programmatic assessment, and change management. Aim of the workshops was to find consensus about the building blocks of the assessment programme (e.g. goals, instruments). Subsequently, all participating faculty-members and students received a hands-on training in providing and seeking feedback on the clinical workplace and received information about the design and goals of the assessment programme.

Methods

Questionnaire and group interviews

To evaluate the assessment programme, we collected quantitative ratings on items from the quality assurance questionnaire administered after each clinical rotation, relating to feedback, supervision, assessment, and learning activities. The fifteen items related to these issues were completed on a five-point Likert scale (1 = fully disagree and 5 = fully agree). A score of >3.5 was assumed to indicate attainment of the objectives of the assessment

programme. These quantitative data provided starting points for further inquiry during group interviews. The latter are generally considered to be a suitable method for encouraging open discussion of views to yield in-depth information.[16] The interviews were structured around the four core elements of the programmatic approach described by Van der Vleuten et al.[13]: learning activities, assessment activities, supporting activities, and evaluation activities. The interviewees were asked to consider elements of the programmatic design that they thought stimulated or impeded learning. Input for the group interviews was also provided by the minutes of the monthly meetings of the research team.

Procedure and participants

In September 2010 85 students, entering their three years of clinical training, piloted the new assessment programme. From April 2011 until May 2012, these students voluntarily completed the quality assurance questionnaire. In May and June 2012, two student groups (S1 and S2) and one group of clinical supervisors (T1) were interviewed. The interviewees represented the three animal species tracks and had started the clinical programme in September 2010. All 85 students were invited to participate. After sending the invitational e-mail, 18 students volunteered to participate in the group interviews. The participating students were divided into two groups (eight and ten students). Also, 15 clinical supervisors received an invitational e-mail to join a group interview. The first eight supervisors volunteering to participate were invited. Each group interview lasted 90 minutes and was facilitated by a moderator (PvB). The interviews were audiotaped, transcribed verbatim, and participants were requested to comment on the accuracy of a summary of the interview. Three participants proposed minor additions.

Analysis

Using SPSS version 20 we calculated mean scores for the quantitative data. The interview transcripts were analysed using software for qualitative data analysis (ATLAS.ti version 6.2.24). The first author (HGJB) wrote a preliminary descriptive summary of the findings and discussed it with the moderator until consensus was reached. The transcripts of the group interviews were coded resulting in a list of topics. Subsequently, these emerging topics were organised based on the research questions. The first author (HGJB) was responsible for coding the data and constructing the topics in lessons learned. The research team discussed the results until full agreement was reached.

Confidentiality and ethical approval

The study was approved by the ethical review board of the Dutch Association for Medical Education (NVMO-ERB), and written informed consent was obtained from all interviewees. Participation was voluntary and participants were assured of confidentiality.

Results

Between April 2011 and May 2012, 198 quality assurance questionnaires completed by 54 students (64% of total) were returned. The results for the selected items were analysed and discussed in the group interviews (Table 1). Of the 18 participating students, 16 were female and the mean age of the groups was 25.5 years (S1, range 23–32) and 25 years (S2, range 22–33). Of the eight participating clinical supervisors four were female and the mean age was 44.3 years (range 33–58). We present the results, with illustrative quotations, for each of the four research questions.

Can data from multiple individual assessments be used to combine formative and summative functions of assessment?

Students were expected to obtain feedback from mini-CEX and MSF. In the course of the programme students experienced more and more resistance to these instruments as they increasingly perceived the assessments as primarily summative rather than formative as intended by the programme designers. This made it difficult for students to attend to the formative aspects. Students felt the mini-CEX form emphasized the assessor role of the supervisor, especially due to the overall numerical rating and the fact that the scores on the competency domains were recorded in the portfolio, which was also used for summative assessment.

> *"Because my clinical supervisor has to fill in an assessment form, I cannot make a distinction between his or her role as assessor and coach. Therefore, a mini-CEX is not formative in my opinion." (S2)*

Despite their increasing reluctance to use the WBA instruments, students indicated a need for meaningful formative feedback and acknowledged the importance of documenting feedback. They experienced peer feedback as truly formative and used it to monitor their competency development.

> *"While doing clinical work I learn a lot from senior students. … they observe my performance and give valuable feedback indicating how I can improve." (S2)*

The value of peer feedback was recognised by clinical supervisors too:

> *"Within the ICU (Intensive Care Unit) a senior student and a junior student have to work as a team. I noticed that this responsibility has a positive effect on senior students, not only on their engagement with patient care but also on their willingness to give feedback to junior students." (T1)*

Clinical supervisors too experienced problems with the formative function of the assessment instruments. They expressed a desire to enter a pass/fail judgement on the assessment form and were unhappy that they had no influence over the weighing of individual assessments in the ultimate summative decision.

> *"In the previous assessment programme it was clear to me how my judgement of student performance influenced the summative score at the end of the clinical rotation. In the new programme I do not know if my feedback will be interpreted accurately and how it will affect the final mark." (T1)*

The findings raise doubts about the formative nature of individual assessments. While formative assessment implies assessment for learning, students perceived individual data points as primarily summative, i.e. as assessment of learning. This perception was due to assessments being recorded in the portfolio and used for summative decisions and it was reinforced by the generally low quality of the feedback.

Can information from individual assessment data points be aggregated meaningfully?

The assessment programme comprised one intermediate and one final summative evaluation every year (Figure 2). The portfolio review committee (PRC) noticed that the monitoring of longitudinal competency development was impeded by the tendency of supervisors to give high marks and their difficulty in formulating high quality feedback (item 5, Table 1). Moreover, human professional judgement plays a crucial role in aggregating information from multiple, subjective, qualitative data sources for high-stakes decisions (promotion/remediation), and PRC members felt they were not ready for this role and found it hard to judge student portfolios against the benchmark of competence at graduation level. Another problem noticed by students and supervisors was that evaluation activities (items 7 and 9, Table 1) were not well aligned with learning and assessment activities. This was mainly due to poor alignment of students' individualised training programmes with the rigid scheduling of evaluations.

> *"The portfolio review committee experienced difficulty comparing student portfolios because students' training programmes are individualised while the intermediate and final evaluations are scheduled annually. Consequently, students have different amounts of data points in their portfolios, and a lot of variation can be seen between the evidence compiled." (From minutes meeting portfolio review committee)*

The evaluation activities depended heavily on the quality and expertise of judges. These summative evaluation are based on information derived from multiple individual formative assessments containing meaningful and information-rich feedback. Formative assessment

tasks are thus similar to diagnostic expertise tasks, making specific demands on teachers skills and consequently on teacher training programmes. Difficulties in visualizing students' competency development were linked to ratings being generally above students' true performance levels, poor qualitative feedback, and the difficulty of collecting feedback on all the required competencies. Clinical supervisors appeared to need more extensive training in the use of the WBA instruments, while the PRC called for on the job training, constant feedback, and supervision.

Table 1: Relevant items from the quality assurance questionnaire.

General course information (five-point Likert scale: 1= fully disagree, 5: fully agree)		Mean	SD	N
1	My teachers take the initiative to evaluate my performance.	2.82	1.01	188
2	My teachers take the initiative to evaluate difficult situations in which I have been involved.	3.18	1.01	165
3	My teachers occasionally observe me when taking a history.	2.96	1.01	159
4	My teachers assess not only my veterinary expertise but also other competencies such as teamwork, organisational skills, and professional behaviour.	3.35	1.03	183
5	My teachers give regular feedback on my strengths and weaknesses.	3.42	0.91	183
6	It is useful to use a portfolio.	3.31	0.98	162
7	The portfolio gives me insight into my development as a professional.	3.02	0.95	161
8	The assessments in my portfolio are based on direct observation.	3.14	1.04	160
9	The information in my portfolio is based on observations of multiple tasks by multiple observers.	3.19	1.00	160
10	The mini-CEX-form allows me to document useful information.	3.45	0.59	60
11	The mini-CEX-form is easy to use.	3.08	0.95	61
12	At the start of a clinical rotation, arrangements are made about when to use a mini-CEX form for a direct observation.	2.21	0.89	61
13	I take the initiative for a mini-CEX.	4.24	0.63	59
14	Mini-CEXs enable me to identify my strengths and weaknesses.	3.56	0.63	57
15	It is easy for me to ask a clinical teacher to do a mini-CEX.	2.95	0.89	58

Can assessment drive desirable learning?

Students indicated that it was difficult for them to monitor their competency development (items 5, 7, Table 1) due to shortcomings in the use of the WBA instruments. Initially, clinical supervisors had to get used to the new instruments, but apart from this temporary problem there was a general feeling among students and the PRC that feedback from clinical supervisors was not sufficiently specific and meaningful and focused on what went well rather than on enhancing student learning.

> *"The feedback I received on my performance was not specific enough, because the clinical supervisor did not observe my performance at all, he could only make some general comments." (S1)*

Both qualitative and quantitative information (items 1, 2, 3, 8, 12, 13, 15, Table 1) indicated that it was difficult for students to take responsibility for their own learning process, partly due to students' reluctance to add to their supervisors' workload by asking for feedback and partly due to supervisors' busy schedules:

> *"During patient rounds there is no time to write down feedback in students' digital portfolios. I give oral feedback, which they should record in their portfolio." (T1)*

It seems that effective use of WBA instruments to drive learning and provide meaningful feedback is conditional on proper feedback and assessment training. Students need feedback seeking skills, while supervisors need skills to provide appropriate qualitative feedback.

How can reflective and self-directed learning activities be promoted?

Although six peer group sessions every year enabled students to discuss their learning goals, students indicated a preference for sessions with an individual coach or mentor, preferably the same one throughout their clinical training, who was familiar with their individual competency development.

> *"I feel that the evidence I am collecting in my portfolio is not visible to anyone. At this stage of my training I feel the need for more personal guidance from someone who really has insight into my competency development and can advise me. This should be my mentor." (S2)*

Reflective behaviour was not sufficiently promoted by the peer group meetings, which were considered to be ineffective in connecting supporting and evaluation activities with specific learning and assessment activities. It appears to be important to scaffold self-directed learning by offering students social interaction and external direction from a personal mentor.

Discussion

The evaluations indicate that designing and implementing a competency-based assessment programme poses quite a challenge and demands intensive preparation and perseverance. The theoretical principles provided useful guidelines, and evaluating the programme and formulating lessons learned were vital steps towards improving the programme. The mixed composition of the research team (containing both clinical supervisors and educational researchers) was a key factor during the development and implementation phase. The clinical staff members on the research team played an invaluable role in facilitating the transfer of the assessment programme on paper to its implementation in practice. We will discuss the answers to each of the research questions.

Can data from multiple individual assessments be used to combine formative and summative functions of assessment?

The evaluation data provided no conclusive answer to the question if formative and summative functions of assessment can be combined in multiple assessment data points. Despite general acceptance of the usefulness of WBA instruments for formative assessment, their value for summative purposes is disputed.[17,18] The definition of formative assessment as used in the FVMU assessment programme proved to be misleading. The fact that all data points ultimately contributed to the final summative decisions caused students to perceive all individual assessments as summative rather than formative. In the eyes of the students, the final summative judgement was merely postponed until after the data points from the assessments were aggregated. The mismatch between the intended purpose of individual assessments and students' perceptions of its role may partly be explained by students' and teachers' insufficient preparation for and instruction about the new programme. The programme designers may have underestimated the fundamental importance of faculty development and student training. Furthermore, it seems that the criteria for the final assessment could have been explained more clearly: which performance standards were used, how data were aggregated, how the final mark was determined, which remediation programmes were possible, and which purposes were served by the assessment programme. If students and clinical supervisors would have interpreted the value of individual low-stakes assessments in the same way students may have been better able to focus on the potential learning value of WBAs rather than on their summative consequences.

Can information from individual assessment data points be aggregated meaningfully?

In the FVMU assessment programme a competency framework is used to aggregate information from individual data points of similar content.[12,15] Since what a test or item assesses is not determined by its format but by its content[19] and considering that assessments should

not be trivialised in the pursuit of objectivity (e.g. by designing scoring rubrics for portfolios[20]) it seems of the utmost importance that in programmes of assessment subjective elements should be optimised by the sampling procedure and by combining information from various sources in a qualitatively meaningful manner.[7] Inevitably, this involves human judgement implying that the quality and expertise of judges are crucial for the quality of assessment.[21,22] This has important implications for teacher training. A single briefing, workshop, or training session does not suffice for assessors to reach the required level of expertise. On the job training, constant feedback, and supervision are needed.[12] This is in line with the findings from this evaluation, and we consequently redesigned the programme by including biweekly PCW meetings for training purposes and to exchange experiences.

Can assessment drive desirable learning?

In their theoretical model Van der Vleuten et al. defined learning and assessment activities as two separate entities whose boundaries are blurred.[13] Assessment activities are part of the learning programme[23], but can they drive desirable learning? During the clinical clerkships students encountered many and varied learning activities (physical examination, history taking, ward rounds) each offering potential assessment opportunities. According to Prideaux, assessment and learning should be aligned to achieve the same goals and outcomes.[24] This is congruent with the principle that all assessment activities, and as a consequence all learning activities, should be maximally meaningful to learning. This is consistent with the conceptual shift from assessment of learning to assessment for learning[25], and further still to assessment as learning. Previous studies have shown that trainees indicated a need for structure and guidance in the transition from novice to the level of being competent. A programme of assessment containing instruments structured to facilitate this process, could support learning and monitor progression at higher levels of professional development.[7,8] The FVMU assessment programme, however, appears to have failed in creating an environment that gives full reign to assessment for learning. Feedback appears to have been the main stumbling block. Perceiving all WBAs as summative and a burden to supervisors, students were reluctant to ask for assessment with feedback, while supervisors claimed that time constraints impeded high quality feedback. This is in line with research reporting difficulties encountered while implementing tools to provide formative feedback.[26,27] Besides the poor quality of narrative feedback and the lack of direct observation, the administrative burden was mentioned as an explanation for trainees to perceive narrative formative feedback as not very useful.[26,27] For the coming years the main challenges will lie in creating a clinical environment that is intrinsically supportive of feedback, e.g. by simplifying documentation (e.g. user-friendly assessment instruments using mobile devices), feedback training for students and supervisors, and integrating WBA within the clinical organisation, as described in earlier research.[28]

How can reflective and self-directed learning activities be promoted?

From the literature we know that it can be quite a challenge to have students reflect upon feedback let alone use it to plan new learning tasks.[29,30] To address this problem Van der Vleuten and Schuwirth proposed a combination of scaffolding of self-directed learning with social interaction, leading to the peer group meetings in the programme.[13] Both students and supervisors acknowledged the value of peer feedback in teams of senior and junior students. Previous research also showed potential benefits of peer-assisted learning for both junior and senior students.[31,32] Ten Cate and Durning recognised the potential of peer-assisted learning during undergraduate clinical training, or "cognitive journeymanship", and of incorporating valuable information from peer feedback (high-stakes assessment).[32] The use of peer feedback is also in line with the notion that variety in instruments and sources is prerequisite for a complete picture of learner performance.[10,33] Recent research into students' feedback-seeking behaviour during clinical clerkships showed that students sought information from different sources depending on a context-dependent assessment of the potential risks and benefits of feedback.[34] Apparently, when seeking feedback to achieve certain goals students strive to balance expected negative effects with potential benefits. We therefore propose to encourage teamwork during clinical rotations to encourage the use of feedback skills by students. Furthermore, students seemed to prefer social interaction and external direction by a personal mentor. This mentor could play an important role in guiding students to reflect on their past performance and in planning new learning goals. This is in line with literature stating that scaffolding of self-directed learning needs mentoring.[29]

Conclusions

To conclude, we would like to stress that putting assessment theory into practice by creating an environment that is conducive to assessment for learning requires careful attention to the implementation process. More specifically, it is essential to provide assessment and feedback training for students and supervisors, incorporate WBA within the organisation of clinics and wards, and design user-friendly WBA instruments. Quality feedback from clinical supervisors seems to be at the heart of the assessment process. In the FVMU assessment programme we found tension between the learning aspect of assessment and its contribution to high-stakes decisions. The difficulty of combining these two functions clearly needs further study. The issue of whether or not assessment forms should require quantitative ratings seems another topic for further consideration. The need to give a quantitative mark may have offered an excuse for refraining from narrative qualitative feedback. Other strategies for enhancing the quality of feedback that should be investigated are the use of modern technology (e.g. handheld devices to record feedback, voice recorders) or the use of scoring rubrics.

Future research

The findings of this study reveal a plethora of opportunities for further research. Besides the topics proposed by Van der Vleuten et al.[13] we would be especially interested in determining under which circumstances formative and summative assessment can be combined and on students' and supervisors' views regarding this issue. The influence of peer feedback on student learning and its potential role in an assessment programme deserve further study as well. Studies might also pursue promising developments in digital assessment tools to facilitate the capturing of feedback, enhance the quality of feedback, and reduce assessor workload.

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CHAPTER 5

Clarifying students' feedback-seeking behaviour in clinical clerkships

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Abstract

Context

Why and how do students seek feedback on their performance in the clinical workplace and which factors influence this? These questions have remained largely unanswered in research into workplace learning during clinical clerkships. Research on feedback has focused mainly on feedback providers. Whether and how feedback recipients actively seek feedback are under-examined issues. Research in organisational psychology has proposed a mechanism whereby feedback seeking is influenced by motives and goal orientation mediated by the perceived costs and benefits of feedback. Building on a recently published model of resident doctors' feedback-seeking behaviour, we conducted a qualitative study to explore students' feedback-seeking behaviours in the clinical workplace.

Methods

Between April and June 2011, we conducted semi-structured face-to-face interviews with veterinary medicine students in Years 5 and 6 about their feedback-seeking behaviour during clinical clerkships. In the interviews, 14 students were asked about their goals and motives for seeking feedback, the characteristics of their feedback-seeking behaviour and factors influencing that behaviour. Using template analysis, we coded the interview transcripts and iteratively reduced and displayed the data until agreement on the final template was reached.

Results

The students described personal and interpersonal factors to explain their reasons for seeking feedback. The factors related to intentions and the characteristics of the feedback provider, and the relationship between the feedback seeker and provider. Motives relating to image and ego, particularly when students thought that feedback might have a positive effect on image and ego, influenced feedback-seeking behaviour and could induce specific behaviours related to students' orientation towards particular sources of feedback, their orientation towards particular topics for and timing of feedback, and the frequency and method of feedback-seeking behaviour.

Conclusions

This study shows that during clinical clerkships, students actively seek feedback according to personal and interpersonal factors. Perceived costs and benefits influenced this active feedback-seeking behaviour. These results may contribute towards the optimising and developing of meaningful educational opportunities during clerkships.

Introduction

Feedback plays a crucial role in student learning in the clinical workplace[1–3] by encouraging students to think about their performance and ways of improving it with the aim of reducing discrepancies between actual and desired performance.[4–6] As well as ensuring high-quality patient care, observation with feedback by clinicians, students and others is essential for the development of competencies in the clinical workplace, which are prerequisite to a student's future work as a professional.[7,8] Feedback encourages students to perform well, ensures that inadequate performance is identified and can specify which aspects of performance require improvement and what steps students can take to achieve this.[9] According to Archer, feedback plays a central role in supporting cognitive, technical and professional development.[10] However, feedback in the clinical workplace is often difficult for both supervisors and recipients because the clinical setting is unpredictable and different teaching methods are used within it.[11] Despite these challenges, feedback on clinical performance is described as the 'cornerstone of effective clinical training'.[9] Research into workplace learning has yielded valuable insights into the provision of feedback, but the role of those receiving or actively seeking feedback has remained under-explored.[12,13] Understanding of students' feedback-seeking behaviours in the clinical workplace may contribute towards optimising the educational value of clinical training.

In organisational and social psychology, numerous studies have examined both the provision and seeking of feedback. In organisational psychology, the term 'feedback-seeking behaviour' was coined by Ashford and Cummings to refer to processes involved in inviting feedback.[14,15] The theoretical model constructed by these authors proposes three primary motivators of feedback-seeking behaviour: the desire for useful information (instrumental motive), the desire to defend or enhance one's ego (ego-based motive), and the desire to protect or enhance the impressions that others hold of one (image-based motive).[14] The further development of this model in social science research has clarified the processes and outcomes of feedback-seeking behaviour.[16–18] An important notion in this model is that the goals of those seeking feedback determine how they obtain information about their performance.[19–23] Based on self-theories about personal attributes, a learning goal orientation can be distinguished from a performance goal orientation,[20] described by Dweck as, respectively, 'a desire to learn new skills, master new tasks, or understand new things' and 'winning positive judgements of your competence and avoiding negative ones'.[24] The relationship between goal orientation and feedback-seeking behaviour is mediated by motivation; in other words, based on a predominant motive, a specific goal is formulated, which then guides the feedback-seeking behaviour.[21] Goal orientation also determines how the perceived costs and benefits of feedback are weighed in decisions about feedback seeking.[17,25] The expected benefits are related to the expertise and credibility of the feedback source, which, in turn influences feedback-seeking behaviour.[26] For example,

individuals with a learning goal orientation are likely to seek an expert's opinion, regardless of their own performance level. Organisational psychology involves the study of human relations and interactions within organisations, such as relationships between employees and executives. Ashford et al.[22] stated that individual behaviour cannot be separated from the culture in which it occurs and, consequently, the real challenge for further research is to incorporate a cross-cultural perspective. Further research should investigate the ways in which feedback-seeking behaviour differs between settings, including the clinical workplace.[22]

As described in the social and organisational psychology literature, feedback-seeking behaviour is a complex phenomenon. Teunissen et al. investigated whether an attending physician supervisory style and the resident doctor's goal orientation influenced residents' feedback seeking, specifically with regard to the ways by which residents obtain information about the specific task of working night shifts.[12] The study showed that residents' goal orientations influenced their perceptions of the expected negative effects and potential benefits of asking for feedback. Furthermore, the attending physician supervisory style seemed to partially influence the residents' feedback-seeking behaviour. As the study by Teunissen et al.[12] was limited with regard to context and investigated only one outcome measure (i.e. the frequency of feedback seeking), further qualitative research is needed to clarify which other factors play a role in feedback-seeking behaviour in undergraduate clinical education, and specifically how undergraduate veterinary medicine students seek feedback in the clinical workplace. Clinical clerkships are generally considered to comprise a rather unstructured learning environment and different factors have been shown to influence students' learning within that environment.[27–29] We therefore conducted an exploratory study building on theoretical models from social and organisational psychology to shed light on three research questions. (i) Why do students seek information about their performance? (ii) What factors influence students' feedback-seeking behaviour? (iii) How do students in the clinical workplace seek information about their performance?

Methods

Setting

The study was conducted among students in the clinical phase (Years 5 and 6) of the 6-year undergraduate curriculum of the Faculty of Veterinary Medicine, Utrecht University (FVMU), Utrecht, the Netherlands. The Uniform Clinical Rotation Programme in Year 5 comprises 30 weeks of rotations in different clinical departments; Year 6 consists of rotations varying in length from 1 day to 6 weeks in disciplines in line with the student's chosen animal species track (i.e. equine health, companion animal health, farm animal health), in which students work alongside clinicians in an authentic learning environment.

Study design

As relatively little is known about students' feedback-seeking behaviour in the veterinary clinical setting, we designed an explorative qualitative study using an interpretive approach.[30,31] Our aim was to contribute to understanding of the feedback-seeking behaviour of students in a clinical learning environment by describing our perceptions of that behaviour as they resulted from the analysis of interviews with students. The interviews were structured based on theoretical concepts of feedback-seeking behaviour.[19–23] We combined inductive and deductive approaches to gain insight into feedback-seeking behaviour. This topic has received rather limited attention in medical education research and therefore we also considered previous work in fields outside medical education.[32] We used semi-structured, face-to-face interviews to gain in-depth information and encourage students to openly share their views.[33]

Participants and procedure

Between April and June 2011, the principal researcher (HGJB) interviewed students who had been sampled by maximum variation sampling to ensure that the sample included students following a variety of animal species tracks and in various phases of training. The logic and power of maximum variation sampling lie in selecting information-rich cases for in-depth study.[33] Of the 31 students invited by e-mail to participate, 12 did not respond and five declined to participate because they were not interested. Interviews with the 14 participating students were planned by e-mail and conducted at FVMU. The interviews lasted 45–60 minutes and were audiotaped. Within one week of the interview, each participant was asked to comment on a one-page summary of his or her interview in order to support a member-checking protocol.[34] The summary was written by the principal researcher and reflected participants' answers to the main questions in the interview. Eight participants responded to this request, but made no suggestions for change. To facilitate the identification of new issues in subsequent interviews, data collection and analysis were performed iteratively. Interviewing continued until theoretical saturation was reached.

Interview development

The interviews were structured using questions about students' goals and motives in seeking feedback, characteristics of their feedback-seeking behaviour and factors influencing this behaviour. The questions were based on the research questions and a theoretical framework derived from social and organisational psychology (Figure 1).[19–23] Two pilot interviews resulted in minor changes to the wording but not the content of the questions. The main questions were:

» Why do you seek information about your performance of a clinical task?

» Which factors influence the way you seek feedback?

» How do you obtain information about your performance?

Figure 1: Frame of reference for feedback-seeking behaviour.[12,20]

Analysis

Verbatim transcriptions of the interviews were analysed using software for qualitative data analysis (ATLAS.ti Version 6.2.24; Scientific Software Development GmbH, Berlin, Germany). We used a template analysis method[35] involving an iterative process of reducing and displaying the data, culminating in a template consisting of codes representing categories and factors, and the relationships among them. Based on the theoretical framework, we designed an initial template, which was modified in the subsequent iterative process of data collection and analysis. We used the theoretical framework and the conceptual model only in designing the interview structure; we used an inductive approach to analyse the interviews. The analysis resulted in an extensive list of codes, which were categorised. The principal researcher (HGJB) coded all transcripts and constructed themes. Using the list of codes, another researcher (PWT) re-coded the eighth interview. The two researchers reached agreement on the discrepancies between their analyses through discussion. After 12 transcripts had been coded, theoretical saturation was reached and the final template was constructed. HGJB, two medical education experts (PWT, CPMvdV) and two experts in veterinary medical education (ADCJ, PvB) agreed on the final template after discussion. The coding of the two remaining interviews confirmed the final template.

Confidentiality and ethical considerations

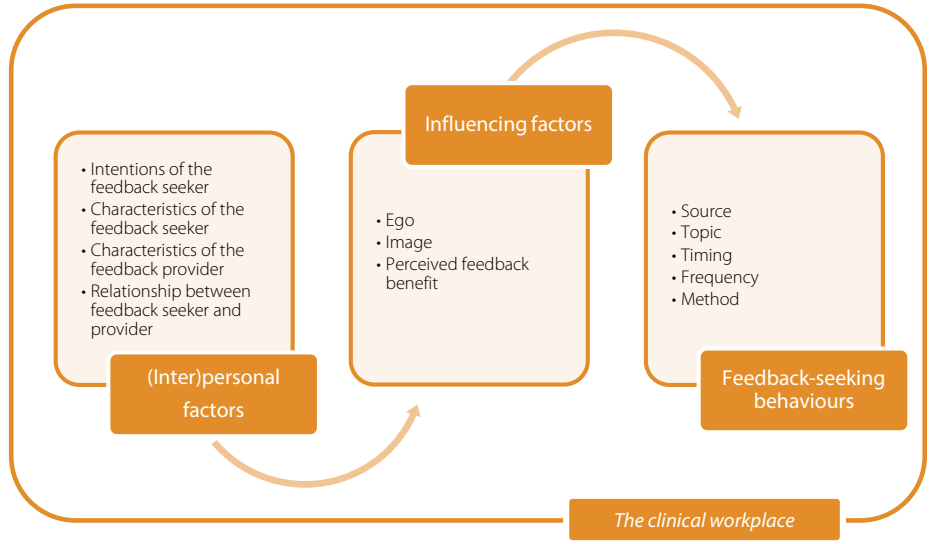
Participation was voluntary and participants were assured of confidentiality. Written informed consent was obtained before the interviews and the study was approved by the ethical review board of the Dutch Association for Medical Education (Nederlandse Vereniging voor Medische Onderwijs [NVMO]).

Results

The participants included students on each of the three animal species tracks. Five participants were in Year 5 and nine were in Year 6. Nine participants were female. The mean age of participants was 26.5 years (range: 23–33 years).

The results for the three main research questions (Why do students seek feedback? What influences students' feedback-seeking behaviour? How do students seek feedback?) are presented consecutively. The main categories to result from the analysis are interrelated, which shows that students dynamically adjust their feedback-seeking behaviour to fit a particular context. The interactions between the categories are illustrated in Figure 2.

Figure 2: Factors influencing feedback-seeking behaviour in clinical clerkships.



Why do students seek feedback?

Depending on various contextual aspects (e.g. logistics of patient care, type of clinical setting), personal and interpersonal factors that determine feedback-seeking behaviour were found to interact continuously. Feedback-seeking behaviour was determined by the factors perceived by students as most salient.

Personal factors: intentions of the feedback seeker

The analysis indicated that distinctive goals can motivate students in seeking feedback (e.g.

receiving positive judgements by demonstrating clinical competence, developing clinical competence and growing as a professional by improving knowledge and skills) and in avoiding feedback (e.g. avoiding negative judgements and avoiding having to demonstrate inferior clinical competence compared with one's peers). Furthermore, students were motivated to seek feedback out of a sense of responsibility towards patients and clients, which stimulated them to seek feedback to improve their clinical competence. One student remarked:

> *"I feel responsible for a patient's [animal] well-being, and although I am generally inclined to avoid negative judgements, I felt compelled to ask for feedback to optimise my task performance." (P8)*

Students also mentioned that they sought feedback on general competencies, such as communication skills and professional behaviour, because they thought this type of feedback would benefit their personal development outside the clinical setting.

Personal factors: characteristics of the feedback seeker

Feedback-seeking behaviour was also influenced by a student's personal characteristics, such as his or her physical and mental well-being:

> *"…it also depends on my own state of mind, for example, when I'm tired or not in a good mood, I feel less motivated and have less energy to actively participate and ask for feedback … in those instances I will assume a more passive role." (P2)*

The extent of a student's interest, experience and confidence concerning a specific clinical topic and his or her self-assessed knowledge and performance of a specific task could stimulate or inhibit feedback seeking, depending on the student's reasons for seeking feedback. The extent to which students felt they were part of a team, their involvement in patient care and their self-perceived communication skills all stimulated students to ask for feedback:

> *"One of my supervisors treated me as one of the guys. As if I was a graduate veterinarian. This was a very strong motivator for me to participate actively in daily clinical practice and as a result I asked more frequently for feedback." (P5)*

Personal factors: characteristics of the feedback provider

Students indicated that the characteristics of the feedback provider, such as good communication skills, willingness to provide feedback and accessibility to students, encouraged them to seek feedback. They also remarked that asking for feedback was

promoted by a safe learning climate, in which students had time to ask questions and supervisors were willing to answer them:

> *"In my opinion, an experienced supervisor who is in control of the clinical situation and able to create time for learning opportunities is more likely than an inexperienced supervisor to create a safe learning environment for feedback." (P7)*

Supervisors had to seem credible to students and this credibility was enhanced when supervisors observed task performance before giving feedback. Students preferred to ask for feedback from supervisors whom, according to their students' previous experiences or preconceptions, they perceived as skilled and experienced in the task in question.

Interpersonal factors: the relationship between the feedback seeker and provider

The student–supervisor relationship influenced feedback-seeking behaviour in different ways. As the duration of a relationship increased, the student became more likely to ask for feedback. The hierarchical nature of the student–supervisor relationship and the combining by supervisors of the roles of feedback provider and assessor were also important:

> *"Because at the end of the day our clinical supervisor will judge my performance in the workplace, I feel reluctant to ask for feedback… I very much appreciate the opinion of my supervisor and so this influences my behaviour." (P4)*

What influences students' feedback-seeking behaviour?

The analysis revealed three factors influencing students' actual feedback-seeking behaviour: ego, image, and perceived benefit. The expected negative effects and potential benefits of asking for feedback influenced which personal and interpersonal factors directed feedback-seeking behaviour.

Ego

Before asking for feedback, students weighed the perceived ego costs (i.e. negative emotions resulting from negative feedback) and benefits (i.e. enhanced self-esteem arising from positive feedback). The outcome of this analysis depended on personal and interpersonal factors. Students who were eager to master a specific clinical task were likely to let expected benefits from feedback (credible feedback provider) prevail over expected costs (a loss of confidence as a result of negative feedback). Students who asked for feedback to increase their self-esteem and gain recognition took account of the risk for damage to their ego by feelings of incompetence imposed by negative feedback or the behaviour of the supervisor. This process is illustrated by this student:

"I feel miserable when I ask for feedback about my clinical performance and my supervisor tells me I should really have mastered this by now. When that happens, I feel stupid, which is bad for my self-esteem and confidence. As a result I don't ask for feedback at all." (P8)

Image

Perceived image costs and benefits represented another influencing factor. Students felt that in the clinical workplace, peers, clients and supervisors had certain preconceptions (images) about them. This presented students with a choice between seeking feedback in the hope that it would improve their image, or refraining from seeking feedback in order to prevent any potential damage to their image. Based on the interaction between personal and interpersonal factors, students appeared to make an assessment of the potential risks and benefits and to embark on context-specific feedback-seeking behaviour. For example, a student mentioned that she adapted her feedback-seeking behaviour depending on the composition of the group that might witness the feedback (e.g. the number of peers present):

"In our peer group we have created an environment in which we can trust each other and everyone feels comfortable to ask for feedback about their performance. This feeling of trust in which we don't have to fear face-threatening situations has a stimulating effect on the frequency of our feedback-seeking behaviour." (P3)

If a student decided against inviting feedback, he or she would monitor the behaviour of others in order to evaluate his or her own behaviour while maintaining a positive image.

Perceived feedback benefit

In addition to a weighing of the potential risks and benefits of outcomes relating to ego and image, the perceived relevance, quantity and quality of feedback also impacted students' feedback-seeking behaviour. For example, students placed less value on feedback received from a supervisor who had not observed the subject performing the task in question. Furthermore, the value of received feedback was judged in relation to a student's goal:

"When I perceive a specific clinical topic as not very relevant, I am less motivated to seek feedback on my performance, especially when my supervisor is surly." (P2)

How do students seek feedback?

Personal and interpersonal factors were influenced by the balance between expected negative effects and potential benefits, which, in turn, gave rise to specific feedback-seeking behaviours.

Feedback source and topic orientation

In the clinical workplace, students obtained information about their performance on a specific clinical task from other students, supervisors (e.g. specialists, residents), clients, nursing staff or a combination of these. Depending on their context-dependent assessment of potential risks and benefits, students would approach a specific feedback source:

"If I want to have an equal discussion about a specific topic, I am more likely to ask for feedback from my peers than from my supervisor." (P7)

In the clinical workplace, students sought feedback on specific veterinary knowledge, specific veterinary skills and in-depth knowledge relating to a task they were required or had been required to perform. Over time and depending on the task, this behaviour might change:

"When I first started clinical clerkships, I was especially focused on feedback on the relevant skills to perform my tasks, but after a while there was a gradual shift towards gaining in-depth knowledge." (P10)

Feedback about generic competencies, such as communication skills and professional behaviour, was usually sought from other students in the clinical workplace:

"…for example, when I have to present my work to peers and supervisors, a task I don't like, I ask one or two peers whom I trust to observe me and give feedback on my communication and presentation skills. This information makes it possible for me to improve." (P1)

Timing of feedback-seeking behaviour

Based on their context-dependent assessment of potential risks and benefits, students determined the appropriate moment for seeking feedback (e.g. during or immediately after performing a specific clinical task or at a later, more appropriate time). Students were particularly likely to postpone the seeking of feedback when they were worried about costs to their image or ego:

"In general I am uncertain about my performance and especially when there are other students around I would not ask for feedback about my performance, because I do not want my peers to think negatively about my performance. In that case I will postpone asking for feedback until I am alone with my supervisor." (P7)

Frequency of feedback-seeking behaviour

The frequency with which students sought feedback appeared to depend on the outcome of the context-dependent assessment of potential risks and benefits, and therefore varied

for different clinical tasks. For example, when a student was learning goal-orientated, motivated by her supervisor to seek feedback, and interested in the topic behind the specific clinical task, she would increase the frequency of asking for feedback. By contrast, when a performance goal-oriented student was confronted with a situation in which his self-image was at stake, his frequency of active feedback seeking would probably decline:

> *"When my supervisor gives me the impression that the questions I am asking are stupid, that restrains me from asking for feedback." (P5)*

Types of feedback-seeking behaviour

Students used two main strategies to obtain feedback: they monitored the behaviour of other students, supervisors and others, and they explicitly asked for feedback from a specific source. When students were concerned that the latter strategy might make them look incompetent (i.e. it might incur ego and image costs), they tended to monitor others and not to use the inquiry strategy:

> *"Regarding a subject in which I am not interested or for which I am not well prepared, I am more likely to monitor my peers and the supervising clinician than to actually ask for feedback." (P5)*

Discussion

We conducted a qualitative study to gain insight into students' feedback-seeking behaviour in the clinical workplace. Based on our research questions, we have gained insight into three interrelated categories of, respectively, personal and interpersonal factors, influencing factors, and feedback-seeking behaviours. Personal and interpersonal factors might result in different types of behaviour depending on the influence of the student's context-dependent assessment of the potential risks and benefits of feedback-related factors. Students used different behavioural strategies and feedback sources to obtain specific types of feedback. We discuss this process and relate aspects of it to the literature.

Students described two broad goals that influenced their feedback-seeking behaviour: a learning goal orientation, and a performance goal orientation. We were able to distinguish two categories of students subject to the latter orientation: students who are motivated to seek feedback because they want to demonstrate their clinical competence and receive positive judgements, and students who are motivated to avoid potentially negative effects of feedback, such as negative judgements and demonstrations of their clinical competence as inferior to that of others. Students with a learning goal orientation focused on improving

their knowledge and skills and on reducing uncertainty with the aim of developing their clinical competence and growing as a professional. These findings about goal orientation are consistent with research on feedback-seeking behaviour within the domain of organisational psychology.[19,20]

In addition to goal orientation, we propose two other personal factors and one interpersonal factor: characteristics of the feedback provider, characteristics of the feedback seeker, and the relationship between the feedback seeker and provider. As far as we are aware, no other studies within human or veterinary medical education research have investigated the influence of the nature of the relationship between the feedback seeker and provider on feedback-seeking behaviour. Therefore, our results extend the current literature, and faculty staff and students should be aware of these relational factors, which influence active feedback-seeking behaviour and as a consequence may enhance learning. People involved with clerkships should be aware that contextual differences (i.e. clinical rotation versus residency training) influence the dynamic between learner and supervisor.

The (inter)personal factors we propose interact continuously and students' feedback-seeking behaviour is influenced by the factors they perceive to be the most salient in a certain situation, depending on the outcome of a cost–benefit analysis of various aspects. This interaction between these (inter)personal factors is under-explored within the current literature. Because students take account of earlier experiences with specific feedback-seeking behaviours in subsequent assessments, there is an ongoing interaction between (inter-) personal factors, cost–benefit analysis and feedback-seeking behaviours. Our results suggest that the outcome of students' cost–benefit analyses is determined by three categories of factors: perceived costs and benefits to the ego; perceived costs and benefits to image, and perceived feedback profit. These categories appear to be in line with three main motives for seeking feedback identified in other studies: an instrumental motive (i.e. to use feedback as an instrument for achieving a goal); an ego-based motive, and an image-based motive.[12,21,22,36] Goffman pointed out that individuals perceive feedback as a valuable resource with which to maintain a particular self-presentation.[37] Feedback-seeking behaviour can potentially expose uncertainty or incompetence in the learner seeking feedback. The need to maintain a positive self-presentation was recognised by students seeking feedback during clinical clerkships, who mentioned that their perceptions of image-threatening situations as potentially incurring of significant costs decreased the frequency with which they sought feedback.

Based on our analysis, we propose five elements that characterise students' feedback-seeking behaviour in clinical clerkships: source, topic, timing, frequency, and method. Similar categories were described by Ashford et al.[22] in a review of the organisational and social psychology literature on feedback.

Strengths and limitations

This qualitative study is a first exploration of undergraduate veterinary medicine students' feedback-seeking behaviour within the complex setting of the veterinary medicine clinical workplace. By using an exploratory approach with thematic analysis and building on previous findings and theories derived from other research domains, we were able to shed some light on this behaviour, thereby laying a foundation for further research.

A potential limitation of this study may be that it was conducted in one setting in veterinary medical education. Clinical learning environments in veterinary medical education are in many respects very similar to those in medical education in that students engage in contacts with patients or clients under supervision in an authentic clinical setting. We therefore assume that the present results will be relevant to other medical settings. However, an interesting distinction between veterinary and human medical education is that in the former, students are on occasion alone with their supervisor and an animal patient.

Although the conducting of interviews is an entirely appropriate method of capturing students' perceptions of their own feedback-seeking behaviour, students' perceptions may not wholly mirror their actual feedback-seeking behaviours. However, this possibility is inherent to the interpretive approach of the study. It is difficult to judge when theoretical saturation has been reached when using an inductive method for data analysis. Each new interview might potentially offer new data and might throw up a new conceptual perspective.

Suggestions for future research

In this study we investigated veterinary medicine students' feedback-seeking behaviour in the clinical workplace. Although our analysis resulted in a comprehensive picture of feedback-seeking behaviour, further studies are required to investigate, for example, the mechanisms of the ways in which individual students weigh different factors in the cost–benefit appraisal for different clinical tasks.

Further research should also investigate the intentions of the feedback seeker, which seem to have an important impact on student behaviour within clinical clerkships and may therefore play a role in students' clinical performance.

Because the relationship between feedback provider and feedback seeker appears to be quite an important determinant of feedback-seeking behaviour and because this aspect has not been examined in other studies, further ethnographic studies may result in valuable insights into the influence of this relationship on students' feedback-seeking behaviour in the clinical workplace.

Implications for practice

The results of this study indicate that students' feedback-seeking behaviour develops as students adjust their behaviour to consecutive experiences of feedback. It is therefore essential that feedback should meet specific requirements that stimulate students to actively seek feedback. As feedback-seeking behaviour increased when the student felt him or herself to be recognised as a member of the clinical team and to be given responsibilities in patient care, it seems advisable that teachers should develop strategies to make the student feel accepted as a member of the clinical team. Furthermore, as supervisors' behaviour within the clinical setting influenced students' feedback-seeking behaviour, we propose to incorporate factors that influence students' feedback-seeking behaviour in the clinical workplace into feedback training for supervisors and students.

The results showed that the learning climate also promotes or deters students' feedback-seeking behaviour. Developers and facilitators of clinical clerkship programmes should be aware of this and strive to create an environment that facilitates the use of active feedback-seeking strategies by students.

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CHAPTER 6

Feedback-giving behaviour in performance evaluations: A trainer's perspective

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Under review

Abstract

Context

Narrative feedback documented in performance evaluations by the trainer, i.e. the clinical supervisor, is generally accepted to be essential for workplace learning. Many studies have examined factors of influence on the usage of mini-clinical evaluation exercise (mini-CEX) instruments and provision of feedback, but little is known about how these factors influence trainers' feedback-giving behaviour. In this study, we investigated trainers' use of mini-CEX in performance evaluations to provide narrative feedback in undergraduate clinical training.

Methods

We designed an explorative qualitative study using an interpretive approach. Focusing on the usage of mini-CEX instruments in clinical training, we conducted semi-structured interviews to explore trainers' perceptions. Between February and June 2013, we conducted interviews with 14 clinicians participating as trainers during undergraduate clinical clerkships. Informed by concepts from the literature, we coded interview transcripts and iteratively reduced and displayed data using template analysis.

Results

We identified three main themes of interrelated factors that influenced trainers' practice with regard to mini-CEX instruments: trainer related factors; trainer-trainee interaction related factors, and trainer-context interaction related factors. Four issues (direct observation, relationship between trainer and trainee, verbal vs. written feedback, formative vs. summative purposes) that are pertinent to workplace-based performance evaluations were presented to clarify how different factors interact with each other and influence trainers' feedback-giving behaviour. Embedding performance observation in clinical practice and establishing trustworthy trainer-trainee relationships in more longitudinal clinical clerkships were considered important in creating a learning environment that supports and facilitates the feedback exchange.

Conclusions

Trainers' feedback-giving behaviour within the clinical context results from the interaction between personal, interpersonal and contextual factors. Increasing insight into how trainers use mini-CEX instruments in daily practice may offer strategies for creating a professional learning culture in which feedback giving and seeking would be enhanced.

Introduction

In clinical training programmes, performance evaluations through workplace-based assessments like the mini-clinical evaluation exercise (mini-CEX), are aimed at helping trainees improve their clinical performance.[1] It allows the trainer, i.e. the clinical supervisor, to provide meaningful feedback directly following observation of a performance. For feedback in performance evaluations to be effective, trainers have the demanding task of shifting between assessment for summative purposes and formative assessment (i.e. providing meaningful feedback).[2] Trainers are supposed to continuously acquire, organise, and interpret relevant performance information to arrive at judgements about performance.[3] Since trainers vary in the behaviour they observe, how they assess and integrate these observations into a judgement and how they provide feedback to the trainee, large variations in feedback-giving behaviour is common.[4,5] This is problematic because research has also shown that this is related to significant variations in the quality of narrative feedback in formative workplace-based assessments.[6-8]

In the present study we focus on factors influencing trainers' feedback-giving behaviour in performance evaluations. A recent study by Pelgrim et al. showed that specific personal characteristics of feedback givers, such as task perception and level of neuroticism, influence their feedback-giving behaviour. The authors concluded that being concerned about patient safety during consultations with trainees resulted in more frequent observations and higher feedback quality.[9] Scholarly evidence from human resource management as well as medical education has acknowledged the importance of high-quality written narrative feedback in performance development.[10,11] However, Govaerts et al. found evidence that especially written feedback lacked information that could help trainees to improve their clinical performance.[2] As a possible explanation the authors stated that giving meaningful and effective written narrative comments places high demands (i.e. this takes more time and requires more cognitive effort) on trainers' feedback skills.[2] In a study across three cultures of professional training (music, teacher training and medicine), Watling et al. found evidence that a longstanding trainer-trainee relationship could improve feedback quality in terms of credibility and constructiveness.[12] Recent research reported that the feedback seeker and the relationship between feedback seeker and feedback giver accounts for a substantial portion of the variance in feedback-giving behaviour.[9,13]

Because performance evaluations are often performed within a complex clinical workplace, in addition to personal characteristics of trainer, trainee, and their relationship, contextual and organisational factors have also been proved to influence trainers' feedback-giving behaviour.[9,14-16] For example, Kogan et al. found evidence that the process of direct observation seemed to be influenced by factors related to the clinical and educational

system (e.g. organisation of the clinical unit and institutional educational culture).[17] In line with these findings, Watling et al. reported that trainers' engagement in the process of in-training evaluation of residents may be compromised by elements such as time constraints, inconsistency in approach to in-training evaluation, and lack of continuity between educational assignments.[16] Despite recent scientific attention on different factors influencing feedback-giving behaviour, not much is known about how these factors influence trainers' feedback-giving behaviour in performance evaluations.

To illuminate feedback-giving behaviour further, we aimed to understand how different personal, contextual and organisational factors affect trainers' practice with regard to performance evaluations. More specifically, this study investigated factors and their relationships that influence trainers' usage of mini-CEX instruments to provide narrative feedback in undergraduate clinical training. To this end, we conducted an exploratory study using semi-structured interviews with trainers.

Methods

Study design

We designed an explorative qualitative study using an interpretive approach.[18,19] Our aim was to contribute to the understanding of factors influencing trainers' feedback-giving behaviour related to mini-CEX instruments applied in a clinical learning environment.

Setting

The study was conducted among clinicians (residents and specialists) participating as trainers (i.e. clinical supervisors) in the clinical phase (years 4, 5 and 6) of the six-year undergraduate curriculum at the Faculty of Veterinary Medicine, Utrecht University (FVMU), The Netherlands. In this phase, clinicians work side-by-side with students. Students work in different clinical departments depending on their chosen animal species track (Equine Health, Small Animal Health or Farm Animal Health). In September 2010 the FVMU implemented a programme of assessment in the clinical phase that focused on the integration of learning and assessment.[8] Within this new programme of assessment, students were motivated and supported to arrange for mini-CEXs that provide feedback on their competency development. Narrative feedback documented in the mini-CEX instrument needed to be explicitly related to short observations of specific clinical tasks. These low-stakes, workplace-based assessments were documented in a digital portfolio structured around predefined competencies.[20] To reach a reliable and valid judgement of a trainee's competency development, low-stakes assessments (from multiple observers and multiple cases) were aggregated over a prolonged period of time (six months to one year).

Participants and procedure

Participants were sampled by maximum variation sampling to ensure variety in the trainers' levels of expertise, animal species track and specialty. This sampling procedure provided us with information-rich cases for in-depth study.[21] The principal researcher conducted interviews between February and June 2013. In total, 14 supervisors were invited and all agreed to participate. Each interview was conducted by the principal researcher at FVMU, lasted between 30-45 minutes and was audiotaped and transcribed verbatim. Data collection and analysis were performed iteratively for emerging issues that would be identified in subsequent interviews.

Interview development

Semi-structured face-to-face interviews, based on concepts from the literature, were conducted to gain in-depth information and motivate clinicians to share their views.[21] It was based on the research questions and on a theoretical framework derived from literature on the provision of feedback and the utility of workplace-based assessments (figure 1).[9,12,13,14,17] The interviewer asked open-ended questions and relevant emerging issues were further explored. Two pilot interviews resulted in some minor adjustments to the wording of the interview guide, but not to its content. The interview guide consisted of the following questions:

» How do you apply mini-CEX instruments in daily clinical practice?

» Why do you apply mini-CEX instruments in a certain way?

» Which factors are of influence on how you apply mini-CEX instruments?

Data analysis

The transcriptions were analysed using template analysis.[22] This technique involved an iterative process of qualitative data reduction and display. We created a template that consists of coded themes representing the most important issues in the data and the relationships between them. Based on existing theory[9,12,13,14,17] and initial coding of parts of the dataset, the principal researcher created an 'initial template'. Subsequent iterative collection and analysis of the data modified this template.

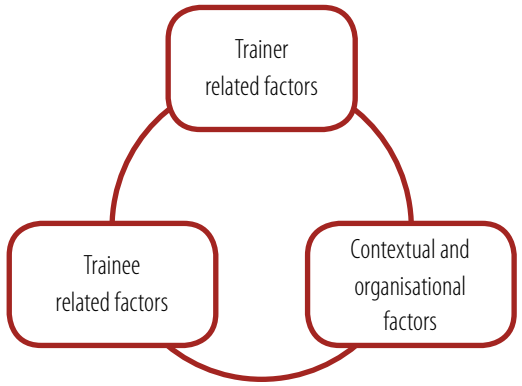
The principal researcher (HGJB) was responsible for coding the data and constructing themes, resulting in further development of the template. After interviews 4, 10 and 12, the template's evolution, including the identified themes, was discussed with the research group in order to prevent narrowing of ideas. Using open coding, two researchers (PWT and ADCJ) analysed the sixth transcript, which was compared with the template generated by HGJB. Discrepancies between analyses were discussed, which resulted in minor template

adjustments. After 12 transcripts were coded, theoretical saturation was reached, i.e. no new themes emerged. The principal researcher, ADCJ, PvB, CPMvdV and PWT discussed and agreed on the final analysis of the data. Two additional interviews were conducted; their transcripts were analysed and confirmed the final template.

Confidentiality and ethical considerations

Participants participated voluntarily and were assured of confidentiality. Prior to the interviews, written informed consent was obtained. The ethical review board of the Netherlands Association for Medical Education approved the study (case number 233).

Figure 1: Frame of reference based on current literature for factors influencing trainers' feedback-giving behaviour in performance evaluations.



Results

Fourteen clinicians participated. They worked in the three main animal species tracks and had different specialties and levels of expertise. Their characteristics are listed in Table 1.

Table 1: Characteristics of participants.

	N (male)	Age (range)	Experience as supervisor in years (range)
Small animal medicine	6 (2)	39.2 (34-47)	10.5 (2-20)
Large animal medicine	3 (2)	43.0 (34-55)	14.0 (5-25)
Equine medicine	5 (2)	41.6 (31-52)	14.2 (5-26)
Total	14 (6)	41.3 (31-55)	12.9 (2-26)

The analysis revealed three main themes of factors, albeit interrelated, that influenced trainers' practice with regard to mini-CEX instruments: trainer related factors, trainer-trainee interaction related factors, and trainer-context interaction related factors. We will first define the three main themes that emerged from the data. Four issues that are pertinent to workplace-based performance evaluations will then be presented to exemplify how different factors interact with each other, illustrated by quotes from the interviews.

Trainer related factors

A substantial amount of variation in trainers' feedback-giving behaviour with regard to mini-CEX instruments could be explained by trainer related factors. Trainers' personal educational goals and beliefs influenced their affinity towards workplace-based assessment. When their natural approach to education related to the ideas underpinning workplace-based assessments (e.g. promoting self-directed and reflective behaviour), mini-CEX instruments were more easily incorporated into trainers' daily work.

Within the programme of assessment, mini-CEX instruments were intended to be formative, which required trainees to feel safe in asking for feedback directly following a performance observation. Being a credible and supportive trainer with adequate communication skills contributed to creating a safe learning environment.

Trainers' levels of experience in their task domains and in performance evaluations also seemed to influence the provision and quality of feedback. Due to a lack of task-related experience and the need to get their work done within certain time limits, the more inexperienced trainers felt unable to use mini-CEX instruments to provide high-quality feedback.

Trainers' own physical and mental well-being influenced their engagement towards workplace-based assessment and their ability to create an optimal learning environment. When they were physically or mentally exhausted (due to personal or work-related reasons), other professional tasks, like patient care or research activities, were given a relatively higher priority than education.

Trainer-trainee interaction related factors

The trainees and the trainer-trainee relationship influenced trainers' feedback-giving behaviour. Trainers tended to give more clinical responsibilities to thoroughly prepared, more experienced, and highly motivated trainees who displayed active learning behaviour.

The nature and duration of the relationship between trainee and trainer influenced both trainers' feedback-giving behaviour and trainees' feedback-seeking behaviour. Trying to create a trustworthy relationship between trainer and trainee was generally agreed to be

an important influencing factor in creating opportunities to provide formative feedback. Building professional relationships in which trainees felt comfortable participating as team members, felt a sense of responsibility for patient care and were confident enough to seek and ask for feedback on their behaviour, would enhance the use of mini-CEX instruments in the intended way. Clear trainer-trainee agreements prior to the workplace learning (e.g. by explicitly stating that it is all right to make mistakes and ask for feedback) seemed to enhance trainees' feedback-seeking behaviour.

Trainer-context interaction related factors

Alongside factors related to the trainer and the trainee, the educational programme (curriculum) and the clinical organisation were identified as important factors influencing the way trainers applied mini-CEX instruments. As mini-CEXs were intended to be formative, the focus was on collecting meaningful written narrative feedback. However, because mini-CEX instruments had become part of the assessment programme and minimum numbers of completed mini-CEXs were required, trainees changed their feedback-seeking behaviour towards completing the required number of mini-CEXs. As a consequence, the trainer provided less qualitative information (i.e. narrative feedback).

Trainers' affinity towards workplace-based assessments, as mentioned under the heading 'trainer related factors', was also influenced by their colleagues' opinions. Trainers who felt that their peers recognised the value of workplace-based assessments voiced fewer negative feelings about the implementation of mini-CEX instruments.

Finally, the clinical environment influenced the use of mini-CEXs. As good quality feedback requires (some) time and cognitive effort, the high workload of the unstructured clinical environment was seen as a barrier to using the mini-CEX instrument. Trainers working in a clinical environment that included time for assessment considered the mini-CEX easier to perform. Furthermore, the increasingly important organisational focus on preventing financial losses meant that not every client (patient owner) was perceived to be suitable for educational purposes.

Trainers' application of mini-CEX instruments in the clinical workplace

The next four issues illustrate how the factors from the three main themes interact with each other, resulting in variety of behaviour related to the application of mini-CEX instruments in clinical practice. The issues direct observation in performance evaluations, duration of performance observations and the relationship between trainer and trainee, verbal and written narrative feedback in performance evaluations, and performance evaluations for both formative and summative purposes, were selected because these were recurrent issues in workplace-based assessment literature.

Direct observation in performance evaluations

Direct observation is crucial to providing effective feedback in performance evaluations because it supports the trainer in acquiring relevant information about the trainee. Furthermore, trainee observations also give the trainer information about the curriculum.

> *"Because I observe my trainees I now have better insight into how our educational programme is working out. Do we achieve our learning goals and what are issues for improvement?" (P6)*

The intended procedure for using the mini-CEX was to briefly observe a trainee performing a task, directly followed by giving narrative feedback. However, as an example of how interaction between the trainer and context influence the use of mini-CEX, due to the highly demanding tasks of clinical practice, the trainer often had limited time immediately after the observation to discuss the feedback with the trainee. Therefore, some trainers made notes about a trainee's performance during the observation and later used them as a mnemonic during the feedback discussion and the subsequent completion of the mini-CEX.

Besides having little time to discuss and deliver the feedback using a mini-CEX, trainers also struggled to find space and time for observing trainees.

> *"During my daily work I have my ward rounds, I have to fulfil numerous administrative tasks, and, furthermore, I also have a research agenda." (P1)*

Incorporating opportunities for performance evaluations into the daily programme was found to be a worthwhile effort in order to achieve more performance observations. In line with this finding, making clear agreements on what trainees themselves would like to accomplish through performance evaluations (e.g. receiving feedback on a specific topic and how many times feedback should be given) and what a trainee could expect from their trainer contributed positively to achieving more, and more meaningful, completed mini-CEX instruments. The next quote is an example of how the interaction between trainer and trainee influence the use of mini-CEX:

> *"My trainees know that I always use the first patient of the day for performance evaluations." (P3)*

Interview analysis showed that trainers recognised that trainees feel anxious about being observed. When a trainer observed a trainee's patient encounter, a disadvantage of observation was that both the client and the trainee usually alter their behaviour and focus on the trainer. This influenced the trainee's task performance and subsequently affected the provided feedback.

"Some trainees behave differently and are nervous when I observe them. Therefore, when I am sure that patient safety is not at issue, I prefer to give the responsibility to the trainee and discuss their findings afterwards." (P6)

Duration of performance observations and the relationship between trainer and trainee

Trainers using the mini-CEX instrument as intended (i.e. explicitly related to a specific task and over a short period of time) mentioned that the documented feedback resembled the discussed feedback. The short observation of a patient encounter allowed the trainer to focus on a specific task and provide specific written narrative feedback. In contrast, trainers observing trainees over a prolonged period of time (a day or even a week) reported that they used the mini-CEX instrument differently. When feedback was given over a longer period of time, trainers felt more able to provide feedback on a variety of relevant competencies, including the more generic ones (e.g. collaboration skills, personal development). When they restrained their observation to a certain clinical task, trainers felt that their feedback was mostly limited to the technical competencies.

"I am working together with my students during a week. I observe them on numerous occasions and when appropriate I directly provide specific task-related feedback verbally. At the end of the week I use the mini-CEX form to document their performance during the entire week. Therefore, this feedback is much more generally formulated and not so task-related." (P11)

Within the clinical workplace, trainers wanted to support and guide trainees' learning by increasing their independence and gradually giving them more responsibilities. They provided feedback to challenge and motivate their trainees and to teach them to be self-reflective. This required working together over a longer period of time in a safe learning environment. Furthermore, trainers felt a sense of urgency in building more longitudinal relationships with trainees in order to see improvements in their performance and to follow up on the previously provided feedback. This allowed trainers to follow up with the trainees and to see whether they developed from, reflected on and reacted to the provided feedback. As a consequence, it allowed them to better judge trainees' progress over a certain period of time.

"Working together over a longer period of time enables me to build a professional relationship with the trainee, which allows me to provide better, more reliable and more constructive feedback… I also noticed that students get more active and confident over time and feel more confident in seeking and asking for feedback." (P12)

Verbal and written narrative feedback in performance evaluations

By design, the trainer should be the person who documented the narrative feedback in the mini-CEX. However, discussing the feedback, writing it down and validating it together with

the trainee required time and effort. Due to their high workloads, some trainers asked the trainees to write down the verbally discussed feedback themselves.

"I ask my trainees to fill in the feedback I verbally provided. Because the corresponding mini-CEX form is uploaded in my digital portfolio, at an appropriate time, usually in the evening, I can adjust and approve it." (P1)

However, participants also mentioned some negative results from letting trainees write down feedback about themselves. Sometimes the mini-CEX became more of a self-evaluation report instead of containing meaningful feedback that included clues for improvement. Furthermore, documentation of feedback by the trainer was acknowledged to stimulate trainers to really think more about how to formulate their comments in a meaningful way.

"Especially when I need to formulate and write down comments for improvement, this requires time and effort." (P7)

Trainers' feedback-giving behaviour was also influenced by the trainee's actual or perceived reaction towards negative feedback. In most cases, negative feedback was provided verbally and not documented in the mini-CEX. Trainers were reluctant to document negative feedback because they wanted to focus on motivating trainees, were afraid of damaging the trainee or experienced ego damage themselves when providing negative feedback. Also, they preferred to provide negative feedback privately due to the risk of perceived ego or image damage to the trainee.

Performance evaluations for both formative and summative purposes

The design of the assessment programme had a major impact on trainers' feedback-giving behaviour. The information documented in the mini-CEXs was collected in a digital portfolio. When a sufficient amount of data was filed in the portfolio, the information was aggregated into a high-stakes, summative judgement by a portfolio review committee. Notwithstanding the fact that the purpose of the mini-CEX was to collect meaningful narrative written feedback, the focus of both trainers and trainees shifted towards completing the required number of performance evaluations. Due to this summative aspect, trainees changed their feedback-seeking strategies.

"A lot of times, I only provide positive feedback instead of meaningful feedback on issues for improvement. Trainees only ask for a mini-CEX when they are confident about their task performance." (P8)

This is an example of how the interaction between the educational programme (context) and trainer could influence trainers' feedback-giving behaviour.

Because of the portfolio review process, trainers were sometimes reluctant to include negative narrative feedback in the mini-CEX. They felt that their comments were not important enough to be included into a high-stakes assessment procedure.

> *"…Usually I only see a trainee for a couple of hours. Of course, I could observe that person and provide that person with feedback, but for me it doesn't feel right that this judgement could also have summative implications. Maybe we need some time to get used to each other or maybe the trainee experiences a bad day." (P2)*

The fact that the mini-CEX instrument that was intended to be formative was, in the long run, part of a longitudinal high-stakes assessment protocol apparently corrupted its original intentions.

Discussion

In this qualitative exploratory study, we focused on how trainers use mini-CEX instruments to gain insight into how different factors impact trainers' feedback-giving behaviour in performance evaluations in clinical practice. Three themes of interrelated factors were distinguished: trainer related factors, trainer-trainee interaction related factors, and trainer-context interaction related factors.

Comparison with the literature

The usage of mini-CEX instruments in performance evaluations appeared to be influenced by trainers' personal educational goals and beliefs. When these ideas align with the intended ideas underpinning formative workplace-based assessment, they were more frequently used in the intended way. This is in line with literature on the influence of assessors' self-theories on performance evaluations, which state that assessors' beliefs affect their judgements and expectations of trainees' future behaviour.[23,24] Furthermore, this finding is consistent with a study exploring effects of innovations in postgraduate medical education as perceived by the user, suggesting that trainers' beliefs influence their behaviour in dealing with workplace-based assessments.[15]

Trainers' levels of experience appeared particularly relevant to how they used performance evaluations. More experienced trainers reported fewer difficulties in providing negative feedback. This may have affected the quality of written narrative feedback in terms of

meaningfulness and specificity. This finding relates to previous work done by Govaerts et al., who discussed that providing meaningful feedback and assessing a trainee's performance required a certain level of expertise in performance assessment and demanded task-related experience.[25,26] To anticipate and deal with effects such as a decrease in feedback quality, inexperienced trainers should receive long-term support, additional allocated time for performance evaluations, and on-the-job training and supervision.[2]

Creating longitudinal trainer-trainee relationships in a safe learning environment facilitated feedback-giving behaviour. Such trustworthy relationships created more possibilities for the trainer to observe the trainee, and allow the trainer to see improvements in the trainee's clinical performance and to follow up on the previously provided feedback. This is in line with a study by Watling et al., which stated that investments in trainer-trainee relationships could increase feedback quality within medicine's professional culture.[12] More active feedback-seeking behaviour occurs in a professional learning culture where trainees feel comfortable participating. This active behaviour by trainees has a stimulating effect on trainers' feedback-giving behaviour, resulting in a more frequent use of mini-CEX instruments. As a supportive and credible trainer enhances trainees' feedback-seeking behaviour, these factors interact continuously. These effects emphasize the importance of building trustworthy relationships to decrease potential costs associated with both feedback-giving and feedback-seeking behaviour. This finding is in line with other studies reporting about feedback-seeking behaviour in medical education.[13,27,28] When departments or individual clinicians succeeded in incorporating performance evaluations into their schedules, this had a positive influence on feedback-giving behaviour and indicates that adapting the organisation and subsequent professional learning culture could contribute to accomplishing the intended goals of the mini-CEX. This is in line with research by Mastenbroek et al. stating that a supportive environment can motivate and engage people.[29]

Workplace-based assessment instruments are usually intended to be formative with the focus on collecting meaningful written narrative feedback. Incorporating mini-CEXs in a longitudinal high-stakes assessment protocol apparently hinders these original intentions. Literature provides evidence that when workplace-based assessment methods, designed to provide feedback, were perceived to be summative, trainees' feedback-seeking behaviour decreased.[2,8,13,30] To respond to this problem, recent research stated that decisions about promotion should not be taken on the basis of a single assessment but rather after careful consideration of information collected from a variety of sources and over a prolonged period of time.[31] However, the fact that all individual assessments ultimately contributed to the final summative decisions caused trainees to perceive all individual assessments as summative rather than formative. The summative judgement was just postponed until the data points from the assessments were aggregated.[8] This influenced trainees' feedback-seeking

behaviour as they made a context-dependent assessment of the potential risks and benefits of seeking feedback.[13]

Strengths and limitations

To increase insight into factors influencing trainers' feedback-giving behaviour related to mini-CEX instruments, we conducted an explorative qualitative study based on existing theory. Template analysis enabled the researchers to build on previous findings and theories derived from other research domains, without being restricted by them.

A potential limitation is the single-institute research design that focus on specific elements of the curriculum (i.e. the usage of mini-CEX instruments as part of the assessment programme). However, the veterinary clinical learning environment very much resembles that of medical education in that trainees have patient encounters under the supervision of a clinical supervisor. Therefore, we assume our results are relevant to other medical settings.

Data acquired from the interviews are inherently limited because they only provide trainers' perspectives about the factors that influence their feedback-giving behaviour in performance evaluations. These perceptions may not wholly mirror their actual behaviour and factors of influence. However, this possibility is inherent to the interpretive approach of the study and each new interview might potentially suggest a new conceptual perspective.

Future research

Future research should increase insight into how trainers' goals and beliefs influence their feedback-giving behaviour in performance evaluations. Further studies, for example ethnographic, could also investigate the effects of facilitating a more longstanding relationship between trainer and trainee on both trainers' feedback-giving behaviour and trainees' feedback-seeking behaviour in the clinical workplace, especially in large-scale undergraduate medical education. In addition, design-based research strategies could reveal valuable insights into how the veterinary and medical professional learning culture can be enhanced to stimulate learning by creating opportunities for high-quality feedback. Furthermore, our findings call for more research into the relationship between formative and summative assessment purposes of performance evaluations.

Implications for practice

There were some common factors that could promote trainers' feedback-giving behaviour in performance evaluations in clinical practice. Some departments succeed to incorporate time for observations and feedback in their schedules by allocating time for performance observations in the daily clinical programme. Embedding observations in clinical practice creates opportunities for trainers to provide narrative meaningful and task-related feedback

directly following performance observations. Simultaneously, this makes it easier for trainees to ask their trainers for a performance evaluation. However, the increasingly important organisational focus on preventing financial losses interferes with the evaluation process due to a focus on more efficient workflows and protocols that leaves less time for observations and feedback related to performance evaluations.

To enhance the provision of effective feedback, both trainers and trainees should invest in establishing a professional relationship and strive to create a safe learning environment that supports and facilitates the feedback exchange. Investing in more longitudinal clinical clerkships allows trusting trainer-trainee relationships to develop, which is important for documenting competency development. This could also have potential positive effects on helping clinicians identify themselves as trainers with tasks in guiding and supporting trainees. By incorporating trainees as members of the clinical team with subsequent responsibilities, trainees will demonstrate more active feedback-seeking behaviour and trainers' feedback-giving behaviour will be influenced positively.[32] Furthermore, as trainers' feedback-giving behaviour within the clinical setting is influenced by interrelated factors (trainer, trainer-trainee interaction, and trainer-context interaction), we propose incorporating those factors that enhance trainers' feedback-giving behaviour into faculty development programmes.

To stimulate the usage of formative mini-CEX instruments, we propose to adjust workplace-based assessment protocols and include instruments that are truly formative and not integrated into a final high-stakes judgement. This allows both trainers and trainees to give and seek feedback in a safe learning climate without perceiving costs or consequential negative effects from provided or sought feedback. For example, mini-CEX instruments can be used for strictly formatively assessments of short observations of patient encounters allowing the trainer to focus on the task and provide meaningful and constructive feedback, supplemented by workplace-based assessments evaluating performance over a prolonged period of time. This allows the trainer to carefully consider the trainee's clinical development, reflections and feedback follow-up on all aspects of clinical competence in a more high-stakes evaluation. More experience and research are needed to create more insight into this important issue in undergraduate and postgraduate medical training.

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CHAPTER 7

Believing is seeing: How people's beliefs influence goals, emotions and behaviour

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Abstract

Introduction

Health care professionals work and learn in complex environments. Some are able to continue learning from their practice and the challenges it presents, whereas others refrain from investing more effort when faced with setbacks. This paper discusses a social cognitive model of motivation that helps to explain the different kinds of behaviour that emerge when individuals are confronted with challenges.

Self-theories

Self-theories (people's theories on what competence is and means for the self) play a major role in establishing the goals people set for themselves, the emotions they experience and the meanings they attach to situations. These self-views are often not explicitly articulated and are therefore called 'implicit' ('self-') theories. Social cognitive research suggests there are two distinct ways of thinking about one's personal attributes: entity theorists view a trait as a fixed, concrete internal entity, whereas incremental theorists instead believe a trait to be something malleable that can be developed or cultivated through effort. Holding an entity theory leads one to set performance goals and to harbour concerns about performing well and making a good impression. Holding an incremental theory tends to lead one to set learning goals, and to focus less on performance and more on spending time and effort in determining which strategies work.

Discussion

The current literature on self-theories is used to explore the relevance of these theories in medical education in three contexts:

(i) it is argued that, in order to support lifelong learning, both individual and organisational efforts fit best with an incremental outlook on professional development;

(ii) if it is to move forward in the domain of feedback-seeking behaviour, medical education might benefit from a better understanding of the interactions among self-theories, feedback behaviour, and the pervading role of organisational culture, and

(iii) the impact of self-theories on assessors' evaluations of performance.

Introduction

The practice of medicine is challenging: doctors make decisions in highly complex situations, basing these decisions on different sources of often-contested information, with limited evidence as to how their actions will affect individual patients, in contexts in which the stakes are high and may be potentially life-changing or even life-ending. Not surprisingly, learning to become a doctor is just as challenging. In facing difficult situations, from taking a history for the first time to performing complex surgery or learning how to be a supervisor, some learners thrive; they persist and appear to be highly motivated to succeed. Other learners give up after failure. They refrain from investing further effort and may appear unmotivated.[1,2] In an attempt to better understand such variability, this paper discusses a social cognitive model of motivation that helps to explain this divergence in behaviour and explores the potential this model holds for the advancement of medical education.

Self-theories

Based on research on students' reactions to failure, Dweck noted two patterns of behaviour, which were, respectively, helpless and mastery-oriented.[3] Children with a helpless response to challenging situations tended to 'denigrate their abilities and blame their intelligence for failures, saying things like "I guess I'm not very smart" […] and "I'm no good at things like this"'.[3] By contrast, those with a mastery-oriented response did not blame anything because they did not seem to experience failure. Instead, these learners 'engaged in some form of self-instruction or self-monitoring designed to aid their performance' and remained confident about their ability to succeed.[3] In trying to explain these findings, Dweck and other scholars developed the idea that these responses resulted from different ways of thinking about one's personal attributes, such as intelligence.[3] Labelled 'self-views', these ways of thinking are often not explicitly articulated and are therefore called 'implicit' (or 'self-') theories.[4] Linked to a helpless response pattern is entity theory, which holds that an individual views a trait as a fixed, concrete internal entity. One either has the ability to perform successfully in a certain task or one doesn't. Incremental theorists, by contrast, believe a trait to be malleable and to be something that can be developed or cultivated through effort. Notwithstanding the roughly 20% of individuals who fit partially into both groups, most research finds that individuals are equally divided into either entity or incremental theorists.[4] This is not to say that individuals hold the same implicit theory with regard to all of their attributes. Just as with expertise in medicine, implicit theories are domain-specific, so that, for example, a person can hold an entity theory on personality and an incremental theory on intelligence.[5]

From self-theories to goals

This theory posits that the goals students have in a specific situation form the link between their self-theory and their helpless or mastery-oriented behaviour. Holding an entity theory,

a fixed view on personal attributes, leads students to be overly concerned with performing well and making a good impression. This approach to performance is said to be part of a performance goal orientation. Several studies have shown that if participants believe 'they had a fixed amount of intelligence […] they had better demonstrate that they had a lot of it'.[4] A performance goal is about winning positive and avoiding negative judgements of one's competence. Individuals with such an orientation 'minimise their effort expenditure, give up easily when faced with challenges or drawbacks, and generally avoid tasks they might have difficulties mastering'.[6] By contrast, those with an incremental theory place less focus on performance, but are more concerned with gaining new knowledge and skills (i.e. with learning).[7,8] By trying to increase their competence, they espouse a learning goal orientation and are willing to spend time and effort in finding out which strategies work. In doing so, they persist and overcome sometimes inevitable setbacks.[6,9] These two goal orientations align with Van Dijk and Kluger's description of prevention or promotion focus as an explanation for motivation, which forms part of self-regulation theory.[10] Several studies have linked goal orientation to behaviour in settings ranging from sports to music and academia. For instance, Dupeyrat and Mariné applied Dweck's concepts of goal orientations to French adults returning to school.[6] They found that learning goals were related to the use of deep processing strategies and effort. Performance goals led to more shallow processing strategies.

In medicine, in which performance influences a patient's well-being, there are arguably many situations in which seeing something solely as a learning opportunity is unacceptable and having a performance goal is not necessarily negative, although research on for whom and under what circumstances it may have positive effects is contradictory.[11] The problem with a performance goal orientation arises when the focus on showing ability becomes so important that it eliminates learning goals.[3] Thus, in medicine, holding either a performance or learning goal orientation exclusively can be problematic given that tasks in this field of endeavour are dynamic and complex, professionals are required to perform well for the good of their patients and at the same time to learn new skills on a continuous basis, and (student) doctors must be able to transfer skills to new tasks.[12]

In the domain of research on feedback-seeking behaviour, VandeWalle and others further developed the concepts of goal orientation in laboratory experiments and field studies.[13,14] For someone with a learning goal, feedback is useful information that helps to correct errors and achieve mastery.[13,14] However, for those with a performance goal, feedback is a judgement about the self and potentially indicates inadequate ability, especially when the judgement is negative.[15] VandeWalle recognised that a performance goal has two sub-dimensions. One of these, he argued, is 'a proving goal orientation consisting of an individual's desire to demonstrate competence and to gain favourable judgements about it', whereas the other

is 'an avoiding goal orientation consisting of an individual's desire to avoid negation of one's competency and to avoid negative judgements about it'.[16,17]

From goals to behaviour, emotions, meaning and learning

Goal orientations affect behaviour in challenging situations and will influence the meaning attached to situations. This outlook fits within a constructivist perspective on learning that acknowledges that learning entails creating an idiosyncratic version of reality. One's reality will converge with that of others on many counts, but it may also be significantly divergent as a result of differences in previous experiences, differences in interpretation, and variable ways in which previous experiences impact future behaviour.[18] What self-theories do, mediated by the goals they instil, is influence how the outcomes of a situation are perceived, which emotions are elicited and what people will take with them into new situations.[4] In an entity theory framework, a setback is an indicator of incompetence. In an incremental theory framework, a setback indicates which strategy doesn't work. An example of the influence of self-theories on emotions comes from the research conducted by Robins and Pals among undergraduate students at the University of California at Berkeley.[19] They performed six assessments of students over a 4-year period. Among the 363 students who provided complete data, path analysis showed that entity theorists, who usually adopted performance goals, declined in self-esteem during college, whereas incremental theorists, who usually adopted learning goals, increased in self-esteem.[19] Compared with incremental theorists, entity theorists were more likely to feel distressed, ashamed and upset about their academic performance. Incremental theorists were more likely to feel determined, enthusiastic, excited, inspired and strong. With respect to study outcomes, Robins and Pals found that the entity theorists in their sample had greater academic ability, but that this did not translate to higher academic achievement.[19] The studies that have found a link from self-theory to goals to grades indicate that students with a learning goal orientation tend to use deeper learning strategies and engage in active self-regulation of their motivations and emotions.[4,20] This demonstrates how, over time, self-theories and goal orientation can influence a person's meaning system in such a way that it affects how he or she feels, what he or she does and how he or she develops. The theoretical concepts of self-theories and the body of research in this field might facilitate a better understanding of some of medical education's biggest challenges, such as keeping students motivated and helping them to develop into intrinsically motivated lifelong learners, a status that requires an incremental outlook on learning.[21] The risk for propagating, knowingly or unknowingly, an entity theory-based outlook on learning as a medical community has been illustrated clearly by Papadakis et al.[22] They found that doctors subjected to disciplinary action by medical boards were strongly associated with two types of unprofessional behaviour in medical school, namely, behaving irresponsibly or demonstrating a diminished ability for self-improvement.[22] Examples of this second type of behaviour were 'failure to accept constructive criticism, argumentativeness, and display of a poor attitude'.[22]

Relevance of self-theories in medical education

To explore how the concept of self-theories might shed new light on current issues in medical education, we highlight three areas of current focus in which the concepts of self-theories and goal orientations have either been applied or seem especially relevant. These domains refer to: the supporting of lifelong learning; feedback-seeking behaviour, and the influence of self-theory on assessors' evaluations of performance.

Supporting lifelong learning

Within the medical domain it is clear that a 'central component of physician competence is professionalism, which requires lifelong learning that leads to improved performance in practice'.[23] How lifelong learning can be developed and supported is, however, not so clear. Although programmes of continuing medical education (CME) aim to help doctors stay informed about the latest knowledge and techniques, actual performance in practice depends more on practice-based learning than on transfer from formal CME-based activities.[21] Doctors encounter problems daily that require their expertise and sometimes need innovative solutions.[24] However, research shows that just practising medicine a lot is not sufficient[25] because professionals only continue to learn from experience if they succeed in recognizing areas in which they need to improve, formulate learning goals and obtain accurate feedback on their performance.[21,26]

The literature on lifelong learning in medicine focuses on self-assessment as the starting point for learning.[26,27] Doctors need to recognise a need to change their behaviour, knowledge base or skills. According to Duffy and Holmboe, self-assessment 'requires that the physician develops a judgement about his or her grade of performance' and can therefore be more accurately described as self-evaluation.[23] Many papers on self-assessment, self-evaluation and their pitfalls have been published.[27] Most conceptualise the issue as the judging of performance against some standard in order to assess whether or not the performance is good enough.[28] This way of problematizing the starting point for learning fits with an entity-based outlook; it carries the message that learning is not a lifelong enterprise, but, rather, is something one is compelled to consider when problems arise.

The concepts of self-theories and their associated goals and behaviours offer different ways to approach the issue of supporting lifelong learning. Research on the effects of learning and performance goals has demonstrated that learning goals are related to greater effort expenditure and persistence and to the use of deep learning strategies.[6,29] Specifically, when the tasks are complex, learning goals lead to better performance and more effective problem-solving strategies than performance goals.[30] Overall, performance goals seem to be related to the use of shallow processing strategies and are not associated with effort

and persistence.[6,31] These goals can also be linked to work avoidance, which amounts to attempting to complete one's work with a minimal amount of effort.[6,32] This begs the question of whether or not one can be moved from one self-theory to another. As self-theories have an important impact on an individual's meaning system, changing that person's beliefs about the malleability of intelligence may have substantial effect. Indeed, several studies on this issue show that relatively modest interventions that boost students' valuation 'of learning and improvement, and their belief in the efficacy of their efforts' can lead to marked changes.[7,33] Good et al. performed a field study in which they taught high school adolescents an incremental outlook on learning.[34] The intervention required all the students in the study to be given a college student mentor who conveyed an incremental theory of intelligence as part of a computer course. Students created their own web pages, on which they 'advocated, in their own words and pictures, the experimental messages [they] were learning from their mentors'.[34] The results of these students on a standardised, state-wide reading and mathematics achievement test were compared with those of a group of students who were also mentored and who also created web pages, but, in the latter case, about the dangers of drug use. The incremental theory groups scored significantly higher on both outcome measures than the control group.[34] In an experiment with African American college students, Aronson et al. showed that students who supposedly participated in a pen pal programme in which they wrote letters to middle school students about the malleability of intelligence and participated in similar 'attitude change techniques designed to teach them, help them internalise, and make cognitively available the notion that intelligence is expandable' found that the process led 'to greater enjoyment of the academic process, greater academic engagement, and higher grade point averages' compared with students in a control group.[35] Thus, an incremental theory and learning goals can be fostered.

With respect to doctors' lifelong learning behaviour, instilling a learning goal orientation rather than focusing on the level of performance as an indication for the need to learn should lead to better long-term outcomes in the health care system. Students and doctors tend to be socialised towards believing that expertise is about mastering efficient modes of working (performance goal) instead of (also) being enabled to continue to learn from everyday practice.[24,36] Nonetheless, their dominant goal orientation may still be influenced to incorporate more learning goals into their practice.[4]

That said, to effectively support lifelong learning, focusing on the goals of individual practitioners is likely to be insufficient. The culture of health care systems needs to make reflection and continuous learning from practice the norm. Over 10 years ago, Frankford et al.[37] recognised the need to establish institutions of reflective practice in which professionals are helped to take time to recognise the potential for improvement in their own practice, to share their successes and challenges with colleagues, and to learn from their own and

one another's outcomes. They state: '…if the organisation makes this process overt, it has enormous power to promote the lifelong development of the medical professionals who work within it.'[37] A decade later, we still struggle to move beyond our perception of lifelong learning as an individual endeavour.[38,39] What happens when an organisational climate fosters predominantly performance goals? Here, also, psychological research offers some interesting leads. The characteristics of a performance-oriented environment lead to poor affective outcomes among performance-oriented individuals, even when they have worked hard enough to show they have the ability they require to succeed, and demotivate those with a learning goal from investing effort in learning.[40,41] For instance, El-Alayli and Baumgardner combined concepts about implicit theories and motivational climate to study the effects of a simulated context that emphasized only performance goals.[41] They built their hypothesis on the idea that a person with an entity theory might actually do well in a climate in which performance goals were emphasized because these goals give an individual the opportunity to demonstrate his or her abilities.[3] Indeed, they found that entity theorists worked harder than incremental theorists.[41] Because such an environment does not cater to the wishes of the incremental theorist to be able to learn, such an individual will disengage. Interestingly, however, research has also shown that under such conditions entity theorists experienced worse affect than incremental theorists in that, for instance, they felt greater self-doubt and dissatisfaction, perhaps as a result of a perceived lack of control over the situation.[40,41] This illustrates how important and difficult it is to create an environment that promotes lifelong learning.

In summary, lifelong learning and research on how best to support this hallmark of professionalism could benefit from insights provided by research on implicit theories. The potential benefits of such insights might extend in impact from the level of understanding individual motives to the level of the organisational culture that promotes or hinders this kind of behaviour.

Self-theories and learners' feedback-seeking behaviour

Feedback is important, not only for lifelong learning behaviour, but for learning at any moment in the medical continuum.[42] It encourages students and doctors to evaluate their performance and aims to reduce discrepancies between actual and desired performance.[43,44] Clinical workplaces in particular are settings in which the active seeking of feedback is of crucial importance given the complexity of the environment, the dominant focus on patient issues, and the infrequency with which good, systematic data on performance are spontaneously made available. Although research within medical education is starting to look into the role of practitioners as active seekers of feedback, this issue is still under-explored. The concept of self-theories may be instrumental in furthering understanding of this topic.

In the past 30 years, practitioners in the fields of social and organisational psychology have been conceptualising learners as active agents in feedback seeking.[45] The term 'feedback-seeking behaviour' refers to 'processes involved in inviting feedback' based on three primary motivators: the desire for useful information (the instrumental motive); the desire to defend or enhance one's ego (the ego-based motive), and the desire to protect or enhance the impressions others hold of one's image (the image-based motive).[46] Empirical research has led to further development of a model that clarifies the processes and outcomes of feedback-seeking behaviour.[12] This research revealed an important mediating role of an individual's analysis of the perceived benefits or costs to his or her ego and image on the potential informational value of feedback.[47] The outcome of a cost–benefit analysis will influence specific feedback-seeking behaviour characterised by the following five elements: source; topic; timing; frequency, and method.[48] In line with the discussion presented in this paper, several studies have found that the perceived values and costs of feedback seeking are influenced by a person's goal orientations because various studies have found that self-theories and their associated goal orientations have strong impact on feedback-seeking behaviour.[46,48] For instance, in a study of employees in five organisations (e.g. employees of a local newspaper), Klich and Feldman found that performance-oriented individuals showed a negative relationship with the seeking of feedback from expert sources.[49] This effect arises from the link between a person's dominant belief about the extent to which certain attributes are malleable and the context-dependent goals that person sets for him or herself. Individuals have generally been found to seek feedback more frequently and to perceive it to have more potential benefits than costs when the perceived informational value increases (instrumental value).[50,51] This assessment of the potential information value is influenced by goal orientation.[46] Performance-oriented individuals tend to perceive feedback as a judgement of the self, and may suffer ego or image costs when hearing about their lack of skills. Ashford and Fedor et al. both reported field studies indicating a negative relationship between the frequency of feedback-seeking behaviour and perceived self-presentation costs.[52,53] Feedback-seeking behaviour is perceived by entity theorists as potentially able to reveal uncertainty and to draw attention to one's incompetence. By contrast, performance-oriented individuals tend to seek feedback when it has potential value to their ego or image.[54]

In recent years, medical educators have begun to focus attention on feedback-seeking behaviour and its relation to self-theories. In a field study conducted among 170 medical residents Janssen and Prins studied how goal orientations influenced residents in the way they sought information.[55] They found that, depending on their goal orientation, residents had either a positive or a negative attitude towards seeking self-improvement and self-validation information. Surprisingly, in this study a performance-avoidance goal orientation turned out to be positively related to seeking self-improvement information, possibly because 'the fear of performing worse than others encourages performance-avoidance-

oriented employees to seek feedback information … for improving their achievements'.[55] In a study carried out by survey, Teunissen et al. found that residents' feedback-seeking behaviour was influenced by the attending doctor's supervisory style and the resident's goal orientation.[56] These two variables influenced the perceived benefits and perceived negative effects of feedback and thereby affected the way in which residents actively sought task or self-relevant information. Bok et al. performed a qualitative exploration of factors influencing feedback-seeking behaviour in undergraduate clinical rotations.[57] In line with the findings of other research, goal orientations and their underlying self-theories appeared to be important motivators of feedback-seeking behaviour within the clinical workplace.[47,48,57]

To conclude, understanding the motivations and goals of learners who seek self-relevant information is paramount to the improvement of learning in the medical domain. Research indicates that the concepts of self-theories and their associated goal orientations play an important role in learners' feedback-seeking behaviour, but many unexplained phenomena persist.[48] To move forward in this area, medical education might benefit from a better understanding of the interactions among self-theories, feedback-related behaviour and the pervading role of organisational culture.

Self-theories and assessors' evaluations of performance

In clinical settings, professional competence is usually assessed through observations, which can be formalized by using workplace-based assessment (WBA) instruments. Such assessment is integrated in clinical learning and working processes, targeting the upper levels of Miller's pyramid.[58] In recent years, assessment approaches have changed so that assessment is no longer viewed simply as an evaluation of learning, but the assessment process is regarded as part of an educational context that aims to stimulate learning and self-directed development.[59] Recent studies have shown that the quality of those performance evaluations, in terms of providing constructive feedback to learners, varies significantly and is determined by the assessor to a greater extent than by the instrument that is being used.[60] Which individual characteristics influence performance evaluations by clinical assessors is unclear.[61] Here, again, the literature on self-theories provides some interesting leads for further research.

The literature on the influence of assessors' self-theories on evaluations of performance indicates that assessors' (implicit) beliefs impact their judgements and their expectations of the performer's future behaviour.[62–64] In two studies by Erdley and Dweck, schoolchildren were presented with a case portraying a boy who displayed negative behaviour and were subsequently asked to rate how well different personality traits described the boy they had observed.[65] The researchers found that children with entity-based beliefs made more generalised negative trait evaluations (e.g. bad, mean), judged behaviour as more

consistent over time, showed less empathy and recommended more punishment. However, children with dominant incremental beliefs gave more lenient judgements and took positive information into account when rating negative behaviour.[65] These results suggest a relationship between assessors' implicit theory, performance evaluations and expectations of future behaviour. Extending these findings to undergraduate college students, Chiu et al. conducted five studies to explore the relationships between people's self-theories and inferences based on observation of behaviour implying certain traits.[62] They found that entity theorists 'used traits or trait-relevant information to make stronger future behavioural predictions and made stronger trait inferences from behaviour' than incremental theorists.[62] Based on limited behavioural information, entity theorists felt confident to project their observations on individuals' general behaviour. In line with this, Gervey et al. conducted three studies with undergraduate students in which they showed that entity theorists are more confident in predicting long-term behaviour and attach greater predictive value to inferences related to personal characteristics than do incremental theorists, who take more situational information into account.[66] Hong et al. showed that incremental theorists, believing that personal attributes are malleable, will not assign strong predictive value based on a single observation of traits, but tend to focus on aspects that might have mediated performance, such as goals, expectancies and psychological conditions.[63]

This difference in perspective when making an assessment aligns well with, for example, the debate on how to evaluate professionalism in medicine. In their overview of the literature on assessment of professionalism in 2000, Ginsburg et al.[67] called for a focus on context and understanding of conflict in making relevant and valid evaluations of professionalism; discussion on how to do this is ongoing.[68] The literature on assessors' self-theories may add to this discussion and the future development of models of assessment for learning in general.[58] A number of questions arise concerning the way in which assessors' implicit self-theories may influence their evaluations of performance. Arguably, those with dominant incremental beliefs might be more likely to provide supportive feedback, including advice on how to bridge the gap between an observed and a desired level of performance. When assessors believe that personal abilities are fixed, investing time and effort in helping the learner change seems less worthwhile. This latter notion does not fit well with assessment for learning, which is based on the belief that individuals have the potential to develop their abilities and improve their performance. These hypotheses lead to some interesting research questions. What are the effects of assessors' implicit theories on the evaluative feedback they provide in assessment for learning programmes? Will entity theorists formulate less specific, more negative and more trait-oriented feedback, in comparison with incremental theorists? Will entity theorists feel more confident in judging the future performance of individual students based on a single observation?

Conclusions

This paper has reviewed current insights on implicit self-theories and their effects on goals, behaviour and learning processes. Using current models from the field of social cognition, we have discussed the relevance of self-theory concepts for supporting lifelong learning in the medical domain, understanding learners' feedback-seeking behaviour, and elucidating the influence of self-theory on assessors' evaluations of performance. The effects of either a learning or a performance goal orientation on behaviour and developmental processes are complex and seldom unequivocal. The domain-specific nature of these beliefs, task characteristics, and organisational and cultural influences all affect this process. What seems evident is that health professionals and trainees will need to balance the delivery of high-quality practice with the requirement to continuously learn from practice. In our opinion, medical education could make more use of the literature on self-theory in research and education to support practitioners in this balancing act.

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CHAPTER 8

General Discussion

Background

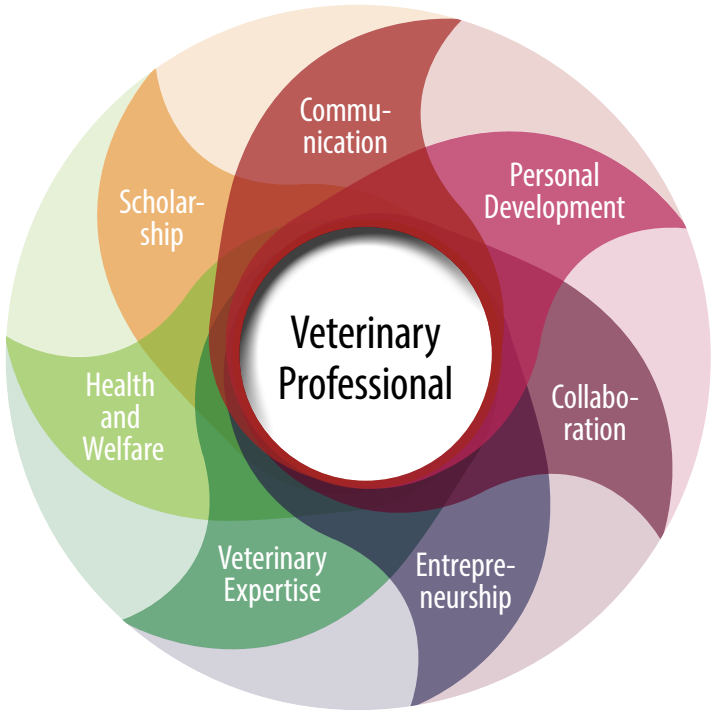
The aim of this thesis was to enhance our understanding of using an integrative approach to learning and assessment to foster competency development in undergraduate veterinary education. As explained in chapter 1, this led to a number of studies investigating three pillars on which such a curriculum should be founded. In chapters 2 and 3 we investigated what overarching competency structure provides a solid foundation for competency-based education in veterinary medicine. Chapter 4 investigated how theory interacted with practice when implementing a competency-based assessment programme in undergraduate veterinary education. Chapters 5, 6, and 7 dealt with the question of which underlying mechanisms affected the exchange of performance-relevant information in competency-based workplace learning and assessment. We start this chapter by reviewing how each of these chapters contributed to our understanding of learning and assessment integrated into competency-based undergraduate veterinary education.

Overarching competency structure for competency-based education in veterinary medicine

The development and validation of a competency framework for the veterinary profession in the Netherlands is described in chapter 2. This study resulted in an integrated competency framework for veterinary professionals (VetPro), containing sixteen competencies organised around seven domains: Veterinary Expertise, Communication, Collaboration, Entrepreneurship, Health and Welfare, Scholarship, and Personal Development. The competencies considered within the domain Veterinary Expertise described the technical abilities, i.e. specific veterinary knowledge and skills, required by veterinary graduates. For example, the ability to perform adequately a physical examination was considered an important element within this domain. The competencies described within the other six domains related to more non-technical, generic abilities. An example of such a competency is having the ability to collaborate effectively with colleagues and other professionals within one's professional work environment. Both veterinarians and animal owners considered both technical and non-technical competencies to be of crucial importance for veterinary professionals. This competency framework adds to existing competency frameworks in veterinary and human medical education.[1-6] It is an integrative, holistic approach that focuses on the ability to combine different competencies while performing complex professional tasks. As a result the veterinary professional is placed at the heart of the framework, as illustrated in figure 1. To perform successfully in the complex clinical environment of the veterinary profession, veterinary professionals continuously need to integrate knowledge, skills, and attitudes that are described within the competency domains. This is not just important for current performance, but also for future career success according to research from the medical domain that emphasizes the importance of non-technical competencies.[7-9]

The domains Personal Development and Entrepreneurship also differentiate the VetPro competency framework from other existing frameworks. Personal Development focuses on individual professional effectiveness; asking for and dealing with feedback and the ability to reflect in order to continuously learn and develop. Entrepreneurship focuses on business administration, innovation, and quality assurance. Although organisation, management, and quality assurance are also described in medical competency frameworks, the VetPro framework differs from other frameworks in its stronger emphasis on business administration.

Figure 1: The VetPro competency framework.



Chapter 3 elaborated on the empirical study in chapter 2 to explore whether the VetPro competency framework, described for the Dutch veterinary profession, was deemed relevant internationally. We found a high degree of international consensus on what could be expected from a veterinary professional in the full range and diversity of the veterinary profession, and what should be taught in veterinary education. However, the results also illustrated that there were some substantial variations from country to country with respect to the perceived importance of the described competencies for professional practice and

veterinary education. This is in line with previous literature stating that competencies are context- and time-dependent.[5]

The agreed integrative competency framework provides a foundation and structure for designing competency-based veterinary curricula. The framework is developed to serve as a guide in the selection of educational strategies (teaching, learning and assessment activities), and in the alignment between these curriculum components in order to support optimally students' competency development. The framework stresses the fact that the selection of educational strategies should focus on (the integration of) all competency domains relevant for the veterinary professional, expanding the educational scope beyond Veterinary Expertise.

When theory meets practice: implementing a competency-based assessment programme in undergraduate veterinary education

In chapter 4 of this thesis, we described the implementation of a competency-based assessment programme in undergraduate veterinary education. The design of this programme was based on a theoretical model describing an integrative, programmatic approach to learning and assessment.[10] The theoretical model proposes a way to aggregate individual assessments, with an important focus on providing meaningful feedback, of different learning activities and from different assessors, in order to support, evaluate and to make rigorous decisions on students' competency development. The model combines assessment for learning and assessment of learning.

In evaluating its implementation, in the clinical phase of the undergraduate veterinary curriculum at the Faculty of Veterinary Medicine, Utrecht University (FVMU), we aimed at answering the following research questions: 1) Can data from multiple individual assessments be used to combine formative and summative functions of assessment? 2) Can information from individual assessment data points be aggregated meaningfully? 3) Can assessment drive desirable learning? and 4) How can the assessment programme promote reflective and self-directed learning activities? The answers to these questions pointed out two main repetitive challenges for the implementation of an integrative competency-based approach to learning and assessment, namely (a) using formative assessments to enhance maximally students' competency development, and (b) including performance-relevant information from formative assessment instruments in high-stakes assessment procedures.

With respect to the first challenge, the provision of high-quality, meaningful feedback, provided after observing students' performance within the complex clinical environment, turned out to be one of the main challenges in implementing the assessment programme. Students reported that documented feedback in formative assessments was often of low

quality and not based on direct observation. This is problematic since low-quality feedback and feedback that is not perceived as credible is not taken seriously and often disregarded by learners.[11] Teachers, on the other hand, noted that due to a high workload, they experienced a lack of time to document their feedback in workplace-based assessment forms. These findings are in line with research describing problems with respect to the use of formative assessment tools to document feedback in the clinical workplace.[12-14] Students explicitly mentioned the need for meaningful formative feedback on their clinical performance and acknowledged the importance of documented feedback to guide their reflections and self-directed learning strategies as these contributed to the development of their competencies. Peer feedback, as one of the components of the assessment programme, was highly valued by students and experienced as formative and a good monitor of their competency development.

Problems with the provision of high-quality feedback in the clinical workplace have been well described in literature[15,16] and these findings have also been corroborated by our research results. Our study focused on the quality of feedback as a major prerequisite for reflective, self-directed competency development and one of the fundamental principles of an integrative, programmatic approach to learning and assessment. When high-quality feedback is lacking, it is not only the development of students' competencies that becomes problematic, but also the aggregation of performance-relevant information from formative assessment instruments in high-stakes assessment procedures becomes more difficult. This is particularly the case when the feedback documented in the formative assessment instruments lacks richness and meaningfulness.

The second main challenge we experienced in relation to the implementation of an assessment programme is the inclusion of information from formative assessment instruments in high-stakes assessment procedures. Documented feedback was intended to serve as individual low-stakes "diagnostic" assessment information that could be aggregated in a high-stakes assessment.[10] Students, however, mentioned that formative assessments, intended to be part of a high-stakes assessment protocol, made them feel reluctant to seek feedback on their performance. As a consequence, this perception of formative assessments negatively influenced the exchange and documentation of performance-relevant information. Students reported that they perceived the formative workplace-based assessments as primarily an assessment of learning, rather than an opportunity to collect information on their journey to develop competence, i.e. assessment for learning. Other researchers have explored the potential conflict between the combination of formative and summative functions and stated that student observation and feedback is infrequently given and of low quality.[15-17] Furthermore, in evaluating students' performance, teachers vary in the behaviour they observe, how they assess and integrate these observations into a judgement and how they provide feedback to the student.[18,19] Our study contributed some additional observations

to the existing literature, notably that there are difficulties related to assessing aggregated information (in our programme displayed by means of a portfolio), such as the issues related to benchmark competence at different levels of training performance and with respect to the tracking of students' progress based on the evidence collected in the portfolio.

Exchange of performance-relevant information in the clinical workplace

Before refining the design and redesigning elements of the assessment programme, we felt the necessity to deepen our understanding of the underlying mechanisms that are at play when considering the challenges of providing rich and meaningful feedback and the problems related to the combination of formative and summative assessments. We therefore conducted the studies as reported on in chapters 5 and 6.

We identified three main categories of interrelated factors that influenced students' feedback-seeking and teachers' feedback-giving behaviour in the veterinary clinical workplace, namely personal factors, interpersonal factors, and contextual factors. Influenced by the balance between expected negative effects and potential benefits, these factors gave rise to specific behaviour.

Students' personal goals and motives towards competency development influenced their feedback-seeking behaviour. For example, students who were eager to master a specific clinical task were likely to let expected benefits from feedback, e.g. meaningful feedback from a credible feedback provider, prevail over expected costs, e.g. a loss of confidence as a result of negative feedback. These considerations may relate to a person's dominant belief about the extent to which certain attributes are malleable, and the context-dependent goals that an individual sets for him or herself.[20] A clearly stated motive by students was that they seek feedback out of a sense of responsibility towards patients and clients. The fact that they were responsible for a patient's well-being stimulated the students' need to optimise task performance and led the benefits of seeking information on their clinical performance prevail over the perceived costs. Similarly, the extent to which students felt that they were part of a clinical team and involved in patient care stimulated them to seek feedback. On the contrary, students who were motivated to avoid potentially negative effects of feedback, i.e. to prevent negative emotions or potential damage to their image, refrained from seeking feedback.

In relation to teachers' feedback-giving behaviour in the clinical workplace, also their personal educational goals and beliefs influenced affinity towards the provision of narrative feedback. Teachers who believed that promoting self-directed and reflective behaviour is an important part of clinical learning more easily incorporated the provision and documentation of (narrative) feedback into their daily work. As described in chapter 7, this is in line with literature concerned with the influence of assessors' self-theories on performance evaluations, which

state that assessors' beliefs affect their judgements and expectations of students' future behaviour.[21-23] Furthermore, clinical teachers emphasized the importance of creating a safe learning environment in order to support students' competency development. Being a credible, supportive supervisor with adequate communication skills and sufficient levels of experience in their task domains and in performance evaluations was noticed to influence positively the provision and quality of feedback. Due to a lack of task-related experience and the need to get their work done within certain time limits, the more inexperienced clinical teachers felt unable to provide meaningful feedback.

This brings us to our next finding, namely that the student-teacher relationship is of major influence on both feedback-seeking and feedback-giving behaviour. Trying to create a trustworthy relationship over a longer period of time between student and teacher turned out to be an important influencing factor in creating opportunities for exchanging performance-relevant information. Students were more inclined to seek meaningful feedback on their task performance, and teachers were enabled to assess whether a student has followed up on the previous feedback. This is in line with a study by Watling et al., which stated that investments in student-teacher relationships could increase feedback quality within medicine's professional culture.[24]

Creating opportunities within the context of daily clinical practice to exchange performance-relevant information, such as providing feedback after observation, was also found to be of importance. The high workload in the clinical environment was seen by clinical teachers as a barrier to provide high-quality meaningful, feedback as this requires (some) time and cognitive effort. Furthermore, teachers' inclination to provide feedback turned out to be influenced by their clinical departments' feedback culture. This finding is in line with previous literature describing the positive influence of a supportive learning culture in motivating and engaging people in a clinical environment.[25] When teachers experienced that giving and seeking feedback was positively valued in their department, they were more inclined to provide feedback and have an open learning dialogue with their students.

Advancing educational concepts

The studies reported on in this thesis are part of a design-based research approach that aims at contributing towards conceptual refinement on the one hand, and improvement of educational practice on the other hand.[26] In the next section we aim to advance both educational concepts underpinning competency-based education and practice related to an integrative approach to learning and assessment, by exploring the concepts of longitudinal professional relationships.

Longitudinal professional relationships in the veterinary clinical workplace

In chapters 5 and 6, the importance of building professional relationships between students, teachers, and other members of the clinical team was stressed. Discontinuity of these relationships, caused by short-term clinical rotations, for example negatively influenced students' feedback-seeking and teachers' feedback-giving behaviour. Competency-based education is characterised by a longitudinal, spiral development of competence that requires constructive alignment between learning and assessment activities.[27] Therefore, learning activities need to be sequenced, with increasing complexity and responsibilities, over a longer period of time to allow for competency development based on the provision of meaningful feedback.[28] As described by Van der Zwet, "continuity provided opportunities for both students and doctors to get to know each other, to reconsider first impressions, to allow their personal frameworks to be stretched, and to practice or enact their identity-in-development".[29] However, in many veterinary and medical curricula, clinical clerkships have typical short-term block structures.[30] Creating longitudinal student-teacher relationships in a safe learning environment enhances students' active participation, and as a consequence, creates more possibilities for the teacher to observe the student and assess if (s)he has followed up on the previous feedback. This continuous interaction between students' active participation in the clinical workplace and supportive supervision by the teacher emphasizes the importance of building trustworthy relationships to decrease potential perceived costs in workplace learning. By establishing longitudinal professional relationships aimed at initiating a learning dialogue between students and teachers, students could perceive the provided feedback as more formative, more meaningful and credible in order to enhance their learning.[31] Continuity in supervision may also enable teachers to provide better feedback on the non-technical competencies. Increasing the duration of clinical clerkships especially allows teachers to provide feedback on individual professional effectiveness that relates to students' reflective and self-directed learning skills and is explicated in the Personal Development domain in the VetPro competency framework.

The results of our studies reported on in chapters 4, 5 and 6 pointed out that creating a professional learning culture in which giving and seeking feedback is part of normal daily practice will positively influence the exchange of performance-relevant information. Incorporating time for observations and feedback by allocating time in daily work schedules creates opportunities to seek and provide narrative meaningful and task-related feedback, while reducing perceived costs by students and teachers and increasing acceptability. At the same time, embedding observations in the authentic clinical workplace provides validity as assessment becomes aligned with the actual core activities of the profession.[28] By investing in longitudinal clerkships with supervisory continuity, students and teachers are able to establish professional relationships in a safe learning environment that enhances feedback exchange. Establishing trusting student-teacher relationships could also help

clinicians to consider themselves as teachers with tasks in guiding and supporting students in their competency development.[29] In addition, educational impact could be increased by incorporating students as valued members of the clinical team.[32,33] By making learning a team effort, both students' feedback-seeking behaviour and teachers' feedback-giving behaviour could be positively influenced.

The concepts of longitudinal professional relationships in clerkships[32,34-36] give direction, in our opinion, to improve educational practice in relation to programmatic assessment within competency-based education.

Implications for educational practice

To inform a redesign of the veterinary undergraduate curriculum and its assessment programme, as described in chapter 4, and to further enhance other programmes of assessment in competency-based curricula, suggestions to direct educational practice are made and presented at four levels: 1) curriculum/clinical organisation; 2) technical elements of assessment programme; 3) teachers/clinicians; 4) students.

Curriculum/clinical organisation

As the programmatic approach to assessment and competency-based education are novel approaches in veterinary education, this requires a cultural shift of both the educational and the clinical organisation that takes time and perseverance. Competency-based education requires an educational philosophy in which student-centeredness, the exchange of feedback, and active student participation are principle guidelines. The following adjustments to educational practice could help create a professional learning climate that maximally enhances students' learning:

» Investments could be made that allow the development of longitudinal professional relationships between the students and their peers, teachers and other members of the clinical team. Suggestions to do so may be to reorganise short or sub-disciplinary clinical rotations into more longitudinal clerkships, i.e. clinical placements lasting at least more than two weeks. In addition, by increasing the number of long-lasting extramural placements in primary veterinary care, students are challenged with authentic clinical tasks and have the opportunity to develop relevant competencies. An important precondition to develop trustworthy relationships is supervisory continuity.[34] This may account for both the supervisor supporting the student in the clinical workplace as well as for the mentor guiding the student during his or her years in veterinary training.

» Curriculum designers, the clinical organisation, and teachers may strive to embed students' observations in daily clinical practice. This creates opportunities to provide and seek narrative, high-quality, and task-related feedback. Incorporating students as members of the clinical team within a safe learning environment could create more opportunities for students to be observed and receive relevant feedback on their performance.

» The curriculum, i.e. learning content, educational strategies, teaching methods and assessment strategies, needs to be aligned and based on an agreed competency framework.[37] We suggest to evaluate critically the educational programme to see if there is sufficient attention for all relevant competencies, especially those formulated in the non-technical domains. In addition, it is advisable to invest in communicating clear guidelines towards faculty and the clinical organisation that clarifies the importance of the integrative aspect of the competency framework, the need for feedback on all relevant competencies, and the purpose of using low-stakes assessment instruments (which instrument, how and when).

Technical elements of assessment programme

In order to make individual formative assessments maximally meaningful for learning, i.e. providing high-quality feedback, and enhance the use of narrative meaningful feedback in longitudinal high-stakes assessments, we propose to advance the assessment programme with the following suggestions:

» It could be advisable to review critically the application of formative assessment instruments. In addition to high-quality feedback on students' performance documented in low-stakes or intermediate-stakes assessments integrated in high-stakes assessment procedures, the opportunity to document meaningful feedback that is truly formative could enable both students and teachers to focus on the task and provide meaningful and constructive feedback on all relevant competencies.

» Defining which core activities are the constituting elements of the profession, provides the opportunity to embed the competency domains in the clinical setting.[38-40] Juxtaposing the competency domains to these activities could provide a blueprint for feedback and assessment that ensures that all core professional activities are identified while embracing all relevant competency domains for the veterinary professional.

» To benchmark competence at different levels of training clearly stated standards are required.[10] These performance standards could provide students with a basis for reflective and self-directed learning behaviour, and provide teachers and assessors with guidelines to evaluate students' competency development.

» To enhance the quality and documentation of feedback and making 'life as a clinical teacher' easier, it may be a worthwhile endeavour to explore strategies to use modern technology, e.g. mobile devices, to record feedback in the clinical workplace.

Teachers/clinicians

Providing meaningful and effective written narrative feedback after observing students' performance places high demands on teachers' feedback skills.[19] Therefore, faculty development programmes to support the development of teachers' observation and feedback skills are of crucial importance in mitigating the challenges of competency-based education in the veterinary clinical workplace.[41] These faculty development programmes may focus on the following topics:

» Increase knowledge on factors influencing teachers' feedback-giving behaviour in performance evaluations.

» The provision of high-quality, meaningful feedback on all relevant competency domains by using the appropriate assessment instrument. By investing in the development of longitudinal relationships, clinical teachers could be able to follow-up on their previous feedback and evaluate students' development.[29]

» Learn about how to organise and build a clinical team in which students receive increased responsibilities and are motivated to participate actively.[42]

» Clinicians working within the clinical environment are veterinary professionals themselves. Therefore, faculty development programmes could be founded upon the same competencies in which students need to develop. In addition, we suggest that clinical teachers invest in creating a culture in which they are used to seek and provide feedback on their own competency development.

Students

In addition to an increased focus on the provided feedback quality, increased attention could be paid to the important self-directed role students have in their own education.[43] Therefore, students also need to be trained in how to optimise their performance in the clinical workplace.

» Students need to be aware of the factors and the cost-benefit analysis influencing their feedback-seeking behaviour in the clinical workplace. In addition, they need to be skilled in how to seek and provide feedback. As students are working in clinical teams, peer feedback is an important aspect of daily practice. This is also an important ability of the veterinary professional, as is described within the domain Personal Development.

» It cannot be overemphasized that in order to learn during clinical clerkships and develop into competent professionals, credible, high-quality feedback embedded in the normal routine of health care practice is of the utmost importance. This feedback needs to be focused on clinical tasks in which the integration of competencies is required. In accordance, we suggest that students are made aware of the fact that reflective and self-directed behaviour, active participation and increased responsibilities are essential aspects for making a smooth transition into practice. Students therefore need to be empowered to keep asking for feedback that helps them to achieve their learning goals.

Strengths and limitations

The strengths of this thesis are strongly associated with its methodological approach that contributes towards both testing and refinement of theories as well as improvement of educational practice. By using a design-based research approach we focused this thesis' research on increasing our understanding of complex problems about the nature of learning in an authentic learning environment. Evaluating the implementation of a theory-based design in educational practice led to new insights, based on which the design can be further improved. When studying the complex interaction in the actual learning environment we closely collaborated with designers, clinical teachers, and other researchers in order to create ownership and commitment from teachers and students. As improving workplace learning and assessment not only requires the introduction of new educational strategies but also demands a cultural change, including commitment from all participants in the clinical workplace, design-based research is a valuable approach to enhance both our understanding of an integrative approach to learning and assessment and to improve educational practice further.

The multi-method approach to design and validate the VetPro competency framework adds to the scientific rigour of this thesis. Qualitative research methods, i.e. focus groups and a modified Delphi-procedure, were used to support the validity and reliability of the framework, using a representative sample that reflects the breadth and diversity of the veterinary profession in the Netherlands and using animal owners as a valuable source of opinions about needed competencies. International perspectives on the competencies described in the VetPro competency framework were further explored by way of conducting a quantitative survey study across ten countries worldwide. Furthermore, both quantitative and qualitative data was collected to inform the findings of this thesis. Taken together, the outcomes of this work can serve to redesign competency-based education, as an important step in the design-based research approach.

Apart from the limitations of each individual study that were described in more detail in the individual chapters, the overall limitations of this thesis relate to the chosen design-based research approach. First of all, as the studies are conducted in a local learning context, the transferability of the results to other contexts could be discussed. Then again, as the design was grounded on existing theories, and our findings were related to existing scholarly evidence, our results may have a broader relevance than the local veterinary clinical workplace. Another limitation is the possible bias created by the involvement of the principal researcher in developing the design. This could have resulted in a less critical evaluation of the design, because, on the one hand, the researcher is involved in the development of the design and has to convince others about its usefulness, and, on the other hand, he has to evaluate the design critically. Using a mixed-method approach, different data sources, and researchers being reflective on their pre-existing assumptions and expectations are therefore of crucial importance. To conclude, the fact that the studies described in this thesis are limited to one cycle of design and evaluation is a limitation. As design-based research is complicated and time-consuming, the adjustments made to the design could not be re-evaluated within the timeframe of this research project.

Implications for further research

The findings described in this thesis reveal a plethora of opportunities for further research. As the conducted design-based research approach is limited to one cycle of design and evaluation, a long-lasting research line on this topic is required in which researchers and practitioners work closely together in different studies that are built upon each other. By doing so, design-based research could be used to test and refine theory continuously and, at the same time, continue to improve educational practice.

Just like any major curriculum change, the implementation of a competency-based approach to learning and assessment in undergraduate veterinary education posed some major challenges. Therefore, further research could focus on developing effective implementation strategies. Investigations could continuously look at how the programme outcomes, i.e. competencies, are viewed over time, as they are time- and context-dependent. In addition, the international veterinary profession could aim at developing a shared understanding of the definition of a competent veterinary professional. This would provide direction for designing undergraduate and postgraduate veterinary curricula, and it would enable international and interdisciplinary collaboration.

Further research could specifically focus on investigating the role of formative assessments in high-stakes assessment procedures. Under which circumstances can formative assessments

be used as individual low-stakes data points in a longitudinal assessment programme without negatively influencing the exchange of performance-relevant information? More research is required on the question of how to use strictly formative assessments in clinical practice in order to enhance learning. How does this influence the final high-stakes assessment, and what kind of low/intermediate-stakes assessments can be used as informative data points within this procedure? Further research could also focus on how to aggregate narrative feedback collected over a prolonged period of time and on different tasks into a holistic judgement of students' performance. Furthermore, the influence of peer feedback on student learning and its potential role in an assessment programme deserve further study as well. To conclude, further research, for example by ethnographic studies, could investigate the mechanisms affecting both students' feedback-seeking behaviour and teachers' feedback-giving behaviour in the clinical workplace. Specifically, the effect of facilitating more longitudinal integrated clerkships with supervisory continuity is a topic to be further investigated. In addition, design-based research approaches could reveal valuable insights into enhancing the professional learning culture in the clinical workplace in order to stimulate students' learning maximally.

Conclusion

If society wants students to become competent veterinary professionals, students must be given opportunities to train and develop in a supportive environment with a focus on graduate outcomes. In this thesis, we aimed to enhance our understanding of using an integrative approach to learning and assessment to foster competency development in undergraduate veterinary education. We have designed and validated a competency framework that could serve as a foundation for curriculum development. In addition, we initiated an international discussion on the needs of the veterinary professional in the 21st century. By implementing a competency-based programme of assessment, we have pointed out important challenges of influence on students' competency development. Furthermore, we increased our understanding by studying these challenges in depth from both students' and teachers' perspectives, as well as through discussing research from other domains. We hope that this thesis will inspire people to develop competency-based veterinary curricula that allow each student to develop longitudinal professional relationships with all members of the clinical team, develop professionally in a safe and supportive clinical environment and become a competent veterinary professional for now and in the future.

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CHAPTERS |

Summary

Summary

When graduating from veterinary school, veterinary professionals must be ready to enter the complex veterinary profession. Therefore, one of the major responsibilities of any veterinary school is to develop training programmes that support students' competency development on the trajectory from novice student to veterinary professional. The integration of learning and assessment in the clinical workplace to foster this competency development in undergraduate veterinary education is the central topic of this thesis.

Chapter 1 describes the challenges and changes the veterinary profession has dealt with over the past decades and how this affected veterinary education. Competency-based education is introduced as an approach to prepare students for clinical practice oriented to outcome abilities and organised around competencies. Based on these competencies performance-related information can be provided to enhance and evaluate students' learning. A theory-based programmatic assessment model is introduced that could allow integration of learning and assessment in the clinical workplace. The need to enhance our understanding of how this integrative programmatic approach to learning and assessment interacts with practice leads up to the central research questions of this thesis. First, what overarching competency structure provides a solid foundation for competency-based education in veterinary medicine? Second, how does theory interact with practice when implementing a competency-based assessment programme in undergraduate veterinary education? And third, which underlying mechanisms affect the exchange of performance-relevant information in competency-based workplace learning and assessment? We used a design-based research approach to advance the interaction between theory and educational practice.

When using an integrative approach to learning and assessment to foster competency development in the clinical workplace, well-defined competencies are indispensable. **Chapter 2** describes a qualitative multi-method study to develop and validate an integrative veterinary competency framework to guide curriculum development. Focus group interviews with 54 veterinarians and animal owners were conducted and the findings of these interviews served as the basis of the conceptual framework. A Delphi procedure with a panel of 29 stakeholders, representing the full range and diversity of the veterinary profession, was used to validate the framework. The framework consists of 16 competencies organised into seven domains: Veterinary Expertise, Communication, Collaboration, Entrepreneurship, Health and Welfare, Scholarship, and Personal Development. At the heart of the framework is the veterinary professional that refers to the integrative aspect. Training veterinarians who are able to use and integrate the competencies described in the seven domains in their professional practice is an important challenge for veterinary schools. The Veterinary Professional competency framework (VetPro) provides a sound empirical basis to guide the

development of training and assessment programmes along the trajectory from novice student to practicing veterinarian.

In **Chapter 3** we further explore the VetPro competency framework by looking at international perspectives on the perceived importance of the competency domains for the veterinary profession and their implications for veterinary education. In a quantitative comparative study with 1137 veterinarians from 10 countries, we explored whether there was international consensus on what could be expected from a veterinary professional and what should be taught in veterinary education. The results illustrated that there was a high degree of international consensus on a conceptual level, i.e. on the importance of the described domains. We also found some substantial variations from country to country with respect to the perceived importance of competencies for professional practice and veterinary education. While the clinical functions of veterinarians are becoming increasingly homogenous throughout the developed world, there are still distinct differences in terms of educational expectations required for graduation. With this study we attempted to start an international discussion about the characterisation of a competent veterinary professional, which should allow us to identify commonly perceived important competencies and to empower international and interdisciplinary collaboration.

In **Chapter 4** we describe how, in an undergraduate curriculum that is based on the competencies described in the VetPro competency framework, current theories on programmatic assessment interacted with educational practice. In a developmental study, group interviews guided by quantitative evaluation data were conducted to explore experiences of students and clinical supervisors with the assessment programme. The competency-based programme mainly focused on the integration of learning and assessment by motivating and supporting students to seek and accumulate feedback. Within the programme all workplace-based assessment instruments were aligned, based on the VetPro competency domains. This enabled the aggregation of information in a structured and meaningful way. The results showed that combining assessment for learning (i.e. providing meaningful, performance-related feedback in low-stakes assessments) with summative, high-stakes assessment is not easy to put into practise. Students perceived the quality of their feedback as rather low, lacking richness through the use of narratives. Also, students perceived formative learning experiences increasingly as summative. Comprehensive attention for faculty development and training for students are thought to be key factors for the successful implementation of a competency-based assessment programme.

To enhance our understanding regarding different aspects that influence the exchange of performance-relevant information in the integrative, programmatic approach to learning and assessment in competency-based veterinary education, we conducted the studies

described in Chapters 5, 6 and 7. **Chapter 5** describes an explorative qualitative study using an interpretive approach that aims at contributing to the understanding of students' feedback-seeking behaviour in a clinical learning environment. We conducted 14 semi-structured interviews with fifth- and sixth-year students. The interviews were based on theoretical concepts of feedback-seeking behaviour. The participants were asked about their goals and motives for seeking feedback, the characteristics of their feedback-seeking behaviour, and factors influencing that behaviour. The data from the coded interview transcripts was iteratively reduced and displayed using template analysis, which showed that during clinical clerkships, students actively seek feedback according to personal and interpersonal factors. Motives relating to image and ego, and perceived feedback profit influenced the feedback-seeking behaviour. The balance between expected negative effects and potential benefits turned out to induce specific behaviour related to students' orientation towards particular sources of feedback, their orientation towards particular topics for and timing of feedback, and the frequency and method of feedback-seeking behaviour. The results of this study may be of use in optimising and developing meaningful learning opportunities during competency-based clinical clerkships.

Chapter 6 describes a study that investigated clinical teachers' use of workplace-based assessment instruments in a competency-based undergraduate clinical training programme. In an explorative qualitative study we focused on teachers' feedback-giving behaviour when using mini-CEX instruments. To explore teachers' perceptions we conducted 14 semi-structured interviews with clinicians participating as teachers during undergraduate clinical clerkships. The interview transcripts were analysed using template analysis. This revealed three main themes of factors, notably interrelated, that influenced teachers' practice with regard to mini-CEX instruments: teacher related factors, teacher-student interaction related factors, and teacher-context interaction related factors. To clarify how different factors interact with each other and influence teachers' feedback-giving behaviour in an integrative, programmatic and competency-based approach to assessment, four issues (direct observation, relationship between student and teacher, verbal vs. written feedback, formative vs. summative purposes) that are recurrent issues in workplace-based assessment literature were presented. Embedding performance observations in clinical practice and establishing trustworthy student-teacher relationships in more longitudinal clinical clerkships were considered important in creating a learning environment that supports and facilitates the feedback exchange. Increasing insight into teachers' usage of mini-CEX instruments in daily clinical practice may offer strategies for maximally enhancing students' competency development.

Chapter 7 reports on a study that reviewed the current literature on self-theories to explore the relevance of these theories in medical education. A social cognitive model of motivation

that helps to explain different kinds of behaviour that emerge when individuals are confronted with challenges was discussed. This model tries to explain why some individuals are able to continue learning from their practice and the challenges it presents, whereas others refrain from investing more effort when faced with setbacks. In establishing the goals people set for themselves, the emotions they experience and the meanings they attach to situations, people's theories on what competence is and means for the self (i.e. self-theories) play a major role. Social cognitive research suggests that one could see personal attributes as more fixed, concrete internal traits (entity theorists) or believe a trait to be something malleable that can be developed or cultivated through effort (incremental theorists). Holding different theories could lead to different learning strategies and subsequent behaviour in performance situations. In order to enhance students' learning in the clinical workplace, it is argued that medical education might benefit from a better understanding of the interactions among self-theories, feedback behaviour, assessors' evaluations of performance, and the pervading role of organisational culture.

Chapter 8, the concluding chapter, starts by reviewing how each of the chapters contributed to our understanding of learning and assessment integrated into competency-based undergraduate veterinary education by providing answers to the central research questions. Within competency-based veterinary education, educational strategies need to be aligned and based on an agreed competency framework. An overarching competency structure for competency-based education in veterinary medicine could be the VetPro-competency framework that consists of one technical, specific domain, i.e. Veterinary Expertise, and six generic non-technical domains, i.e. Communication, Collaboration, Entrepreneurship, Health and Welfare, Scholarship, and Personal Development. To perform adequately in the complex workplace of the veterinary profession, the ability to integrate all the competencies described within these domains is essential. On a conceptual level there was also a high degree of international consensus on the perceived importance of the described domains. The VetPro competency framework seems to provide a firm basis for reflective and developmental activities on all relevant competencies for the veterinary professional. The implementation and evaluation of the competency-based assessment programme, which aims both to support and evaluate students' competency development, highlighted a number of challenges. These challenges interfered with the two main objectives of the design, namely (a) using formative assessments to enhance maximally students' competency development and (b) including performance-relevant information from formative assessment instruments in high-stakes assessment procedures. One of the main challenges turned out to be the provision of high-quality, meaningful feedback on students' performance within the complex clinical environment. Furthermore, the objective of the theoretical model for programmatic assessment to use formative information in longitudinal high-stakes assessments seemed to corrupt the other main goal of providing and documenting meaningful feedback in order to

enhance maximally students' competency development. Finally, we explored the underlying mechanisms that affect the exchange of performance-relevant information, and identified three main categories of interrelated factors that influenced students' feedback-seeking behaviour and teachers' feedback-giving behaviour in the veterinary clinical workplace. In line with the design-based research approach of this thesis, we identified practical implications that are essential conditions to be met for a successful implementation, and made suggestions for refining the theoretical model on programmatic assessment. To conclude, this thesis ends by describing its strengths and limitations and implications for further research.

CHAPTER A

Appendix

Samenvatting

Na afronding van de opleiding Diergeneeskunde, dient een dierenarts in voldoende mate toegerust te zijn tot het verrichten van werkzaamheden binnen de complexe veterinaire professie. Dit brengt voor veterinaire opleidingen de verantwoordelijkheid met zich mee onderwijsprogramma's te ontwerpen die de ontwikkeling van relevante competenties van studenten ondersteunen. Competentieontwikkeling kan bij uitstek plaatsvinden op de klinische werkplek, waar studenten onder supervisie van een docent relevante professionele activiteiten verrichten en in contact komen met patiënten en hun eigenaren. De integratie van leren en beoordelen op de veterinaire klinische werkplek, met als doel de competentieontwikkeling van studenten te ondersteunen, is het centrale onderwerp van dit proefschrift.

Hoofdstuk 1 beschrijft de veranderingen en uitdagingen die hebben plaatsgevonden binnen de veterinaire professie en hoe dit het veterinair onderwijs heeft beïnvloed. Competentiegericht onderwijs wordt in dit hoofdstuk geïntroduceerd als een manier om studenten voor te bereiden op de beroepspraktijk. Het onderwijs is daarbij gericht op het verkrijgen van relevante professionele bekwaamheden, georganiseerd rondom competenties. Om het leren van de student, en het beoordelen daarvan, te ondersteunen is informatie over hun functioneren nodig. Een theoretisch model ten aanzien van het longitudinaal en op samenhangende wijze beoordelen van studenten zou het mogelijk kunnen maken om leren en beoordelen op de klinische werkplek nader te integreren. Het belang van het verkrijgen van meer inzicht in de werking van deze programmatische benadering tot leren en beoordelen in de dagelijkse onderwijspraktijk heeft geresulteerd in de centrale onderzoeksvragen van dit proefschrift. Ten eerste, welke overkoepelende competentiestructuur geeft een solide basis voor competentiegericht veterinair onderwijs? Ten tweede, hoe interacteert theorie met praktijk wanneer een competentiegericht programma van beoordelen wordt geïmplementeerd binnen een veterinair curriculum? En tot slot, welke onderliggende mechanismen beïnvloeden de uitwisseling van informatie over het functioneren van de student binnen competentiegericht leren en beoordelen op de klinische werkplek?

Om de competentieontwikkeling optimaal te kunnen ondersteunen dienen de relevante professionele competenties gedefinieerd te zijn. **Hoofdstuk 2** beschrijft een explorerend kwalitatief onderzoek om een veterinair competentieprofiel te ontwikkelen. Middels groepsinterviews met 54 dierenartsen en diereigenaren is een conceptprofiel samengesteld. Dit conceptprofiel is vervolgens door een panel van 29 experts, die het gehele spectrum van de veterinaire professie vertegenwoordigen, nader gevalideerd. Het competentieprofiel bestaat uit 16 competenties verdeeld over zeven domeinen: Veterinair Handelen, Communiceren, Samenwerken, Ondernemerschap, Gezondheid en Welzijn, Wetenschappelijk Handelen en Persoonlijke Ontwikkeling. Om als dierenarts goed te kunnen functioneren is het van belang

om de verschillende competenties beschreven binnen deze zeven domeinen geïntegreerd te kunnen toepassen. Het hierop voorbereiden van toekomstig dierenartsen is een belangrijke uitdaging voor veterinaire opleidingen. Het competentieprofiel voor de veterinair professional (VetPro) zorgt voor een wetenschappelijke basis voor het ontwikkelen van onderwijsprogramma's gedurende het traject van beginnende student tot ervaren dierenarts.

Hoofdstuk 3 rapporteert over een nadere exploratie van het VetPro-competentieprofiel binnen een internationale context. In deze studie is onderzocht hoe dierenartsen het belang van de competentiedomeinen voor de veterinaire professie en het veterinair onderwijs inschatten. Middels een vragenlijstonderzoek onder 1137 dierenartsen uit 10 verschillende landen, is vanuit internationaal perspectief gekeken naar de relevantie van de competenties voor een dierenarts en welke rol deze competenties zouden moeten spelen gedurende de veterinaire opleiding. De resultaten laten zien dat er sprake was van een hoge mate van internationale consensus met betrekking tot de beschreven competentiedomeinen. Tussen enkele landen was er echter ook sprake van een substantieel verschil in het ingeschatte belang van de competenties voor de professionele praktijk en voor het veterinair onderwijs. Ondanks dat de klinische taken van de veterinair professional internationaal in toenemende mate vergelijkbaar worden, bestaan er tussen landen verschillende verwachtingen met betrekking tot de eisen voor afstuderen. Door middel van deze studie hebben wij getracht een internationale discussie op gang te brengen over wat er verwacht wordt van een competente veterinair professional. Door competenties te identificeren die gezamenlijk als belangrijk worden bevonden, kan internationale en interdisciplinaire samenwerking worden gestimuleerd.

Hoofdstuk 4 doet verslag van een praktijkgerichte studie waarin gekeken wordt hoe bestaande theorieën omtrent een programmatische benadering van beoordelen interacteren met de onderwijspraktijk. Deze studie vond plaats binnen de masteropleiding van een veterinair curriculum. Deze masteropleiding is gestructureerd rondom de competenties beschreven in het VetPro-competentieprofiel. Door middel van groepsinterviews, waarin de onderwerpen voortkwamen uit verkregen kwantitatieve evaluatie data, werden de ervaringen van studenten en docenten met deze programmatische benadering nader in kaart gebracht. Het competentiegerichte programma beoogde vooral de integratie van leren en beoordelen te bevorderen. Dit door middel van het stimuleren en ondersteunen van studenten bij het zoeken en verzamelen van feedback. Binnen deze programmatische aanpak waren alle instrumenten om feedback te verzamelen gestructureerd rondom de VetPro-competentiedomeinen. Dit maakte het mogelijk de verzamelde informatie op een gestructureerde en betekenisvolle wijze samen te voegen. De resultaten laten zien dat het een uitdaging is om binnen de onderwijspraktijk het stimuleren van leren (bijv. door het verstrekken van betekenisvolle, prestatiegerichte feedback) te combineren met toetsing van competentie-

ontwikkeling. Door het ontbreken van rijke, betekenisvolle informatie ervoeren studenten de verkregen feedback niet als waardevol en informatief voor hun leren. Daarnaast ervoeren studenten de formatief bedoelde beoordelingsmomenten in veel gevallen als summatief. Uitgebreide training van studenten en docenten wordt aanbevolen voor een succesvolle implementatie van een competentiegerichte programmatische benadering van beoordelen.

Om nader inzicht te verkrijgen in de verschillende factoren die van invloed zijn op de uitwisseling van feedback binnen een programmatische benadering van leren en beoordelen in competentiegericht veterinair onderwijs zijn de onderzoeken beschreven in hoofdstuk 5, 6 en 7 uitgevoerd. **Hoofdstuk 5** beschrijft een explorerend kwalitatief onderzoek met als doel meer inzicht te verkrijgen in het feedback zoekgedrag van studenten op de klinische werkplek. In totaal zijn 14 semigestructureerde interviews afgenomen met vijfde- en zesdejaars studenten diergeneeskunde. De structuur van de interviews was gebaseerd op theoretische concepten omtrent feedback zoekgedrag. De participanten werden bevraagd over hun doelen en motieven voor het zoeken van feedback, de eigenschappen van hun feedback zoekgedrag en over factoren die op dit gedrag van invloed waren. Uit de data kwam naar voren dat de mate waarin studenten gedurende de klinische coschappen actief feedback zoeken beïnvloed werd door persoonlijke en interpersoonlijke factoren. Motieven gerelateerd aan de invloed op imago, ego en gepercipieerde feedbackopbrengst bleken van invloed op het feedback zoekgedrag. De balans tussen de verwachte negatieve effecten en de potentiele opbrengsten van het zoeken naar feedback bleek specifiek het gedrag van studenten op de klinische werkplek te beïnvloeden. Dit gebeurde met betrekking tot de keuze voor een feedbackbron, het onderwerp en de timing van de gezochte feedback en de frequentie en de methode van vragen naar feedback. De resultaten van deze studie kunnen bijdragen aan het ontwikkelen en optimaliseren van de leermogelijkheden van studenten in competentiegerichte klinische coschappen.

Hoofdstuk 6 beschrijft een studie waarin het gebruik van werkplekbeoordelingsinstrumenten door docenten binnen een competentiegericht veterinair onderwijsprogramma nader wordt onderzocht. In een explorerend, kwalitatief onderzoek is specifiek gefocust op het feedback geefgedrag van docenten middels korte praktijkbeoordelingsformulieren. Om de percepties van docenten nader te exploreren zijn 14 semigestructureerde interviews afgenomen met docenten die werkzaam zijn als clinicus binnen het coschaponderwijs. Uit de data werden een drietal thema's aan factoren gedestilleerd die in interactie met elkaar de wijze waarop docenten de beoordelingsformulieren gebruiken beïnvloeden: docent gerelateerde factoren, aspecten met betrekking tot de interactie tussen docent en student en factoren gerelateerd aan de context waarin de docent werkt. Om te illustreren hoe deze verschillende factoren met elkaar interacteerden en zodoende van invloed waren op het feedback geefgedrag van docenten, worden vier onderwerpen gepresenteerd, te weten: (1) directe

observatie, (2) de relatie tussen student en docent, (3) verbale vs. geschreven feedback, en (4) formatieve vs. summatieve perceptie van beoordeling. Het door docenten integreren van observaties van studenten binnen de dagelijkse klinische werkzaamheden werd zeer belangrijk gevonden. Daarnaast bleek het realiseren van gedegen professionele student-docent relaties in meer longitudinale coschappen essentieel om een leeromgeving te creëren die de uitwisseling van feedback ondersteunt en stimuleert. Het verdiepen van onze kennis ten aanzien van het gebruik van werkplekbeoordelingsformulieren door docenten in de onderwijspraktijk kan resulteren in het ontwikkelen van strategieën om de competentieontwikkeling van studenten optimaal te ondersteunen.

Hoofdstuk 7 rapporteert over een review van de huidige literatuur omtrent 'self-theories' waar de relevantie van deze theorie voor het medisch onderwijs nader wordt geëxploreerd. In dit hoofdstuk wordt een sociaal cognitief model met betrekking tot motivatie besproken. Dit model helpt te verklaren hoe verschillende gedragingen ontstaan wanneer individuen worden geconfronteerd met uitdagingen. Het model probeert te verklaren waarom bepaalde individuen in staat zijn om te blijven leren wanneer ze geconfronteerd worden met uitdagingen in de praktijk, terwijl anderen juist een meer passieve rol aannemen wanneer ze geconfronteerd worden met tegenslagen. Voor het bereiken van de doelen die een individu voor zichzelf formuleert, spelen de ervaren emoties, de waarde die gehecht wordt aan bepaalde situaties, en hoe iemand aankijkt tegen wat competentie is en betekent, een belangrijke rol. Sociaal cognitief onderzoek suggereert dat persoonlijke eigenschappen ervaren kunnen worden als meer gefixeerde, stabiele interne eigenschappen of als eigenschappen die verder ontwikkeld kunnen worden door inspanning te leveren. Deze verschillende zienswijzen kunnen leiden tot verschillende leerstrategieën en daaruit voortvloeiend gedrag. Om het leren van studenten op de klinische werkplek te stimuleren, wordt bediscussieerd dat het medisch onderwijs zou kunnen profiteren van een beter begrip van de interactie tussen 'self-theories', feedback zoekgedrag, beoordelingen door docenten en de belangrijke rol van de organisatiecultuur.

Hoofdstuk 8, het afsluitende hoofdstuk, beschrijft door middel van het bespreken van de drie centrale onderzoeksvragen hoe de afzonderlijke hoofdstukken bijdragen aan ons begrip van leren en beoordelen geïntegreerd in een competentiegerichte veterinaire opleiding. Binnen het competentiegericht opleiden is het van cruciaal belang dat de onderwijskundige strategieën gebaseerd zijn op een geaccepteerd competentieprofiel. Een overkoepelende structuur voor een dergelijk onderwijsprogramma binnen het veterinair curriculum is het VetPro-competentieraamwerk bestaande uit één technisch, specifiek domein, namelijk Veterinair Handelen, en zes generieke domeinen te weten Communicatie, Samenwerken, Ondernemerschap, Gezondheid en Welzijn, Wetenschappelijk Handelen en Persoonlijke Ontwikkeling. Om als veterinair professional adequaat te kunnen functioneren binnen de com-

plexe veterinaire professie is het van essentieel belang om in staat te zijn de competenties beschreven binnen deze domeinen te kunnen combineren. Ook internationaal blijkt er een hoge mate van consensus te bestaan ten aanzien van het belang van de beschreven competentiedomeinen. Het VetPro-competentieprofiel blijkt dus een solide basis te vormen voor reflectie en ontwikkeling van alle relevante competenties van de hedendaagse veterinair professional. De implementatie en evaluatie van de competentiegerichte programmatische benadering van beoordelen, bracht een aantal uitdagingen met zich mee. Deze uitdagingen interfereerden met de twee hoofddoelen van het programma, namelijk (a) het gebruik maken van formatieve beoordelingsmomenten die maximaal bijdragen aan de competentieontwikkeling van de student, en (b) het includeren van informatie over het functioneren van de student uit formatieve beoordelingsmomenten in summatieve beoordelingsprocedures. Een van de grootste knelpunten bleek het geven en verkrijgen van kwalitatief hoogstaande en betekenisvolle feedback ten aanzien van het presteren van de student binnen de complexe klinische werkplek. Tevens bleek het geven en documenteren van waardevolle feedback om de competentieontwikkeling van studenten maximaal te ondersteunen negatief te worden beïnvloed, doordat dezelfde feedback tevens werd gebuikt in summatieve beoordelingsprocedures. Vervolgens hebben we de onderliggende mechanismen die van invloed zijn op de uitwisseling van informatie over het functioneren van de student nader geëxploreerd. Dit heeft geresulteerd in de identificatie van een drietal thema's van factoren die van invloed zijn op het feedback zoekgedrag van studenten en het feedback geefgedrag van docenten. Ter afsluiting worden diverse praktische implicaties beschreven die van essentieel belang lijken te zijn voor een succesvolle implementatie. Tevens worden sterke en zwakke punten van dit werk benoemd en implicaties voor vervolgonderzoek beschreven.

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Curriculum Vitae

Harold Bok was born on March 25th 1980 in Gorinchem, the Netherlands. He attended high school at Scholengemeenschap Altena College in Sleeuwijk, which he completed in 1999. In the same year he started his veterinary training at Utrecht University, the Netherlands. During his studies and particularly when working as a teaching-assistant in veterinary anatomy, Harold developed his interest in teaching and education. He graduated with honours in November 2005. After working as a veterinarian in small animal clinical practice in 2006, he became a lecturer at the department of Pathobiology, Faculty of Veterinary Medicine at Utrecht University. In 2008 he obtained the University Teaching Qualification. In 2009 the veterinary students nominated him for the Utrecht University prize "Young Teacher Talent". Since 2009 Harold combined his teaching tasks with his PhD studentship at the chair Quality Improvement in Veterinary Education. At the moment Harold is chairman of the Quality Assessment Committee at the Faculty of Veterinary Medicine, as well as project leader in several educational projects on workplace-based assessment and faculty development, for which grants have been awarded. In 2014 he will attain his Senior University Teaching Qualification and complete the course "Educational Leadership" organised by the Centre of Excellence in University Teaching of the Utrecht University. He will continue working at the Faculty of Veterinary Medicine at Utrecht University, the Netherlands as an assistant professor within veterinary medical education at the chair Quality Improvement in Veterinary Education.

Harold is married to Carla Ruis. They live in Woudrichem together with their two sons and daughter, Thijs (2007), Jurre (2010) and Julie (2012).