Mapping Delivery of the Nontechnical Professional Competencies in the Veterinary Curriculum

A Thesis

Submitted to the Faculty of Education

In partial fulfillment of the Requirements

for the Degree of

Master of Education

University of Prince Edward Island

We accept this thesis as conforming

to the required standards

Dr Martha Gabriel

Dr Lisa Miller

SUSAN D. DAWSON

Charlottetown, PE

April, 2009

Your file Votre référence
ISBN: 978-0-494-49840-8
Our file Notre référence
ISBN: 978-0-494-49840-8

Abstract

The Atlantic Veterinary College is currently undergoing a phase of curricular renewal, which comes at a time when there are increasing calls to re-evaluate the future of veterinary education and the profession. Past reports on the future of the profession consistently recognized the increasing importance of the nontechnical professional competencies for successful veterinary practitioners, yet we as a faculty do not necessarily have a clear picture of when or how these skills are addressed in our curriculum. Concurrently, there is increasing attention placed on the non-cognitive skills by the American Veterinary Medical Association's Council on Education for accreditation purposes. The convergence of these factors presents a timely opportunity for this study, which examines the delivery of these skills at AVC in the context of curriculum mapping of the official, taught, learned, and assessed curricula. It is an opportunity to focus attention and reflection on how we are delivering the soft skills, as well as introduce the technique of curriculum mapping as a powerful tool for curriculum management.

This study used a mixed methods research approach. Data was collected from the major stakeholders in AVC education: current faculty and students, alumni, and employers of our graduates. Document analysis of existing survey instruments of alumni and employers was used for quantitative analysis. AVC faculty and students were invited to participate in interviews (faculty) and focus groups (students) to gather data for qualitative analysis. Delivery of nontechnical professional competencies was evaluated based on the following categories: communication, ethics, self-management, human-animal bond, practice management, and career knowledge/options. Curriculum maps

were constructed to show which didactic and clinical (rotation) courses addressed each of the competencies. A separate map was constructed for the taught and learned curricula, and a master map was constructed to evaluate congruence between those perspectives.

In the preclinical curriculum, an extremely limited number of courses are officially identified as addressing the nontechnical professional competencies. Those courses which are identified in the official curriculum as addressing the competencies are also identified as such by faculty and students in the taught and learned curricula maps. However, faculty and students also identify many additional courses where the competencies are addressed in the preclinical curriculum; most of these include implicit teaching/learning, behavioral observation/modeling, and unscripted anecdotes rather than explicit inclusion of the competencies. The official curriculum does not recognize the role of implicit teaching/learning in addressing the non-technical competencies. While there is good overall congruence between the taught and learned maps, students over-identify courses as addressing the competencies relative to faculty. It appears that faculty may underestimate the importance of implicit teaching/learning, as well as observation/modeling, in addressing the non-technical competencies.

Both faculty and students recognize the dichotomy between the preclinical curriculum and fourth year rotations. Both groups express frustration with the limitations of didactic teaching, and discuss the rewards of teaching and learning in rotations. These feelings are amplified when considering the non-technical competencies, which may be delivered in large part by behavioral observation/modeling. The results of this study suggest implications for curriculum design, to introduce more opportunity for practical, experiential learning in the preclinical curriculum.

Acknowledgements

I would like to thank the students and faculty who participated in focus groups and interviews. They generously volunteered their time during a busy semester and shared their professional and personal experiences. I feel privileged to have been given insight into their world.

Dr. Martha Gabriel served as my thesis supervisor, and I thank her for helping me to navigate both the ambiguities of qualitative research and the details of APA formatting. Her guidance, patience, and hard work are well-appreciated.

Dr. Lisa Miller served as committee member, and I thank her for the many hours devoted to all stages of this project, from discussions to reading and critique. Her encouragement has helped bring this project to fruition.

I would like to thank Dr. Ray Doiron and Dr India Lane for serving as examiners. They each provided insightful comments and asked questions which have challenged me to improve this work.

I would like to acknowledge the support of Dr. Tim Ogilvie as former Dean of AVC, Dr. Tarek Saleh, Chair of the Department of Biomedical Sciences, and Dr. Don Reynolds, Dean of AVC. My colleagues (students, staff, and faculty both in AVC and in the Faculty of Education) have been a source of support, encouragement, and thought-provoking discussion.

Table of Contents

Chapter Four

List of Tables

Chapter One: Introduction

Over the past twenty years, a body of research has accumulated on the need for change in veterinary education. While some of these reports had an economic focus (e.g. Brown & Silverman, 1999), some looked at the future of the profession (e.g. Pritchard, 1989; Willis et al., 2007) and others examined the student experience (e.g. Tinga et al., 2001), all shared the common theme that there are competencies beyond the science of veterinary medicine and surgery that are necessary for professional success. These studies typically recommended that nontechnical competencies need far more explicit emphasis in our curricula. The current project applies educational theories of curriculum mapping to examine how we at the Atlantic Veterinary College (AVC) address the nontechnical competencies, and provides a conceptual framework for curriculum revision.

For the past thirteen years I have been an AVC faculty member, with my primary teaching responsibility to deliver veterinary gross anatomy as a team-taught course. During this time my teaching interests have expanded from a single discipline, to integrating the basic sciences in a problem-based course, to exploring opportunities for integrating subjects across the curriculum. I have served on the AVC curriculum Committee for twelve years, and gained an understanding for our educational process beyond my own discipline and department. Through my participation in the Washington State University-sponsored Veterinary Leadership Experience, I have also become interested in the nontechnical professional competencies, and how the whole process of veterinary education contributes to the total knowledge and skills of our graduates. I have also served as Acting Chair of my department, and have gained an understanding of

policy and practice within and between departments at AVC. My coursework in the Faculty of Education has exposed me to critical pedagogy, and theories of curriculum, leadership, and research. I have attended conferences on Curriculum Mapping, and on Communication in Veterinary Medicine to build my background of knowledge and understanding for this project.

This research project brings together my interests in the process of veterinary education, and applied contemporary educational pedagogy to analyzing our veterinary curriculum. It gives a clear picture of how we deliver the nontechnical professional competencies at AVC, and examines alignment between our stated curricular goals and what actually happens. As an added benefit, I hope that this research project will spark dialogue on curricular issues, and encourage reflection on how our individual actions affect our educational mission and influence our graduates.

Problem Statement

AVC is currently undergoing a phase of curricular renewal, which comes at a time when there are increasing calls to re-evaluate the future of the veterinary education and the profession. Past reports on the future of the profession consistently recognized the increasing importance of the soft skills for successful veterinary practitioners, yet we as a faculty do not necessarily have a clear picture of when or how these skills are addressed in our curriculum. Concurrently, there is increasing attention placed on the non-cognitive skills by the American Veterinary Medical Association's Council on Education for accreditation purposes. The convergence of these factors presents a timely opportunity for this study, which examines the delivery of soft skills at AVC in the context of mapping the official, taught, learned, and assessed curricula. It is an

opportunity to focus attention and reflection on how we are delivering the soft skills, as well as introduce the technique of curriculum mapping as a powerful tool for curriculum management.

Explanation of Terms

Clinical rotations: fourth year courses which are based in a veterinary hospital or animal production setting, and are experiential in nature, 1-3 weeks in length.

External rotations: rotations taken at an institution or private practice other than AVC.

Externships: external clinical opportunities for students taken outside of the context of fourth year rotations.

House officers: a collective term to describe interns and residents who work as clinicians under the supervision of faculty in the veterinary teaching hospital.

Preclinical curriculum: courses taken in the first three years of the four year Doctor of Veterinary Medicine program.

Rotations: courses taken by fourth year veterinary students, which are one to three weeks in duration; while the majority are clinical, some are didactic.

Soft skills: competencies which are beyond the boundaries of traditional veterinary science, but which impact significantly on professional success.

Chapter Two: Review of the Literature

This study draws on literature about the profession of veterinary medicine, the processes of veterinary education and medical education, and contemporary research on education and curriculum. I have brought together these related fields in order to explore the question of what our veterinary graduates should look like, what skills they need as health care professionals, and whether we as an institution are addressing those skills.

Internal and external reports have addressed future needs of the profession and the skills necessary for success in the veterinary profession (Brown & Silverman, 1999; Lloyd, King, Mase & Harris, 2005; Pritchard, 1989; Turnwald, Meldrum & Sponenberg, 2008a; Willis et al., 2007). A recurring theme in these reports has been the need for graduates to be competent in nontechnical professional skills. Similar themes have been articulated in reports on veterinary education (e.g. Burns, Ruby, DeBowes, Seaman & Brannan, 2006) and medical education (e.g. Swick, Szenas, Danoff & Whitcomb, 1999). While a survey of the literature has shown a range of definitions of these skills, there appears to be wide agreement that the nontechnical professional skills include the following categories: communications, ethics, self-management, human-animal bond, practice management, and knowledge of career opportunities.

Research on education and curriculum was used to explore the question of whether we are effectively teaching the skills that we want our graduates to possess. Jacobs (1997) discussed a model of curriculum mapping, which looked at courses and academic programs to ensure alignment between content, skills, and assessments. This model has been adapted by researchers in higher education (e.g. Harden, 2001; Plaza, Reierson Draugalis, Slack, Skrepnek & Sauer, 2007; Robley, Whittle & Murdoch-Eaton,

2005a,b; Uchiyama & Radin, 2008) to examine alignment within health professions and education programs. Cuban (1995) described curriculum as having four components: the official curriculum, the taught curriculum, the learned curriculum, and the tested curriculum. Health professions programs have a prescribed curriculum and are accountable to accreditation bodies, yet faculty have considerable autonomy. Factors, including faculty turnover, may contribute to curricular drift and uncertainty of exactly where topics are covered in the curriculum. Curriculum maps can identify gaps and redundancies in content, as well as alignment of what is actually taught in the classroom with stated curricular goals. Including students in this loop confirms that they are learning what we think we are teaching. The assessed curriculum checks alignment of what is emphasized by evaluation (both in terms of content and in terms of higher-order thinking skills) with official, taught, and learned curricula.

This study mapped delivery of the nontechnical professional skills in the AVC Doctor of Veterinary Medicine (DVM) curriculum. Maps were constructed using Cuban's (1995) four curricula to check alignment of our stated curricular goals with what is happening in the classroom, and with our graduates. Data were gathered from all major stakeholders, including current AVC faculty and students, alumni, and employers of our graduates. In order to optimize the richness of data and the significance of conclusions (Onwuegbuzie & Leech, 2004) a mixed methods research approach was used. Individual faculty were interviewed. Current AVC students were invited to participate in focus groups. Data from alumni and employers were gathered from archived surveys. Document review of published course descriptions was used to construct a map of the official curriculum.

Transcripts from interviews and focus groups, and survey results, were used to contruct maps of the taught, learned, and assessed curricula. The maps were cross-checked for alignment, and a composite map was contructed to give a comprehensive overview of delivery of the nontechnical professional skills at AVC. The maps show the scope of delivery, consistency through the four years of the program, and alignment between what we say we are doing, what we think we are doing, and what we are actually doing. These results are important for the AVC as we move forward with strategic planning and curriculum revision.

What Are the Soft Skills?

Over the past twenty years, there have been several reports which address future needs and potential directions of the veterinary profession (Brown & Silverman, 1999; Lloyd et al., 2005; Pritchard, 1989;Turnwald et al., 2008a; Willis et al., 2007). These studies consistently recognized the importance of a set of 'soft skills", competencies which were beyond the boundaries of traditional veterinary science, but which impact significantly on professional success (summarized in Turnwald et al., 2008a). The set of "soft skills" has variously been called nontechnical skills (e.g. Lewis & Klausner, 2003), non-cognitive skills, and professional skills (e.g. Burns et al., 2006; Tinga et al., 2001). Effective communication was typically foremost among these skills, but others included ethics, emotional intelligence and self-management, leadership, conflict management, team work, and business and practice management skills.

As a result of reports on the profession, there is a growing body of literature on the soft skills in veterinary medicine; these studies have defined the soft skills and their effect on career success (Burge, 2003; Lewis & Klausner, 2003; Tinga et al., 2001), and

more recently have described curricular and institutional changes which address delivery of the soft skills (Burns et al., 2006; Lloyd & King, 2004; Shaw & Ihle, 2006). Tinga et al. (2001) defined professional skills as including self-awareness, communication, and interpersonal skills, and surveyed veterinary students and graduates on their attitudes towards these skills. Fourth year students and graduates ranked professional skills of equal value to technical skills, and felt that they had not received sufficient training in professional skills during veterinary school. Burge (2003) wrote from the perspective of the co-founder of a successful mega-practice, and focused on economics and financial success. He defined the critical skills as including life skills as well as leadership and management, customer service, productivity, marketing, high performing team, and business and personal financial management; lack of competence in these skills constitute a barrier to a successful career as a practicing veterinarian. Lewis & Klausner (2003) defined nontechnical competencies through a series of focus groups with successful veterinarians from a variety of career paths (including private practice, industry, military, government, and academia). Their five categories of nontechnical competencies included interpersonal, self-management, leadership, practice/business, and thinking skills.

Lloyd and King (2004) surveyed North American veterinary colleges to determine what changes have been made or planned to address nontechnical competencies. Most schools reporting changes were addressing nontechnical competencies in their curriculum. Courses were being created or revised to include such topics as communication, self-management, and business/finance. Lloyd and King (2004) also report that veterinary schools were addressing nontechnical competencies outside of the formal curriculum, through revised or expanded orientation programs and co-curricular

activities. Some veterinary schools were also revising the admissions process to assess incoming students on the basis of the nontechnical competencies.

Shaw and Ihle (2006) have focused on the nontechnical competency of communication, and described their innovative approach to teaching communication at the Atlantic Veterinary College. These authors outlined an approach (and the associated challenges) to integrating the teaching of communications skills throughout the curriculum. The authors have developed a clinical rotation in communication offered as an elective to fourth year students. The clinical rotation was based on observable skills (rather than attitudes) and it was experiential rather than lecture-based. Shaw and Ihle emphasized that communications skills were best addressed throughout the curriculum, integrated in a consistent manner into all four years, as well as through best practices modeled by clinical faculty. The challenges of continuing and expanding the communication program included issues of resources and methodology: time, effort, and training of faculty/staff coaches were issues which required a commitment of institutional resources, and refinement of student assessment methods was identified as an area of improvement for the rotation (Shaw & Ihle, 2006).

Washington State University College of Veterinary Medicine (WSU) has integrated the delivery of nontechnical (professional) competencies throughout their curriculum (Burns et al., 2006). Entering students spend five days at an orientation program which used outdoor experiential learning to introduce and explore issues of emotional intelligence, team-building, and leadership. Later in their educational career, students revisited these themes at "mini-camps" where they are asked to reflect on how the nontechnical competencies have helped them in the previous semester. Nontechnical

competencies are further addressed in specially designed courses such as "Success as a Veterinarian" and "Veterinary Practice Management"; in addition, opportunities for emphasizing nontechnical competencies have been identified in existing basic sciences courses such as Gross Anatomy (Burns et al., 2006). This comprehensive program for developing nontechnical competencies has required considerable effort and dedication of faculty, as well as investment of both institutional and corporate resources. It could serve as a model program of the range of possibilities for integrating nontechnical competencies throughout the veterinary program.

While the recognition of the importance of nontechnical skills and developing programs to address these skills in veterinary curricula has slowly been gaining momentum, their importance has been long recognized in medical curricula (Swick et al., 1999). Indeed, effective communication has been considered a core clinical skill in human medicine (Kurtz, 2006). Working from the body of evidence from health professions education, Kurtz offered both a conceptual model for teaching communication in veterinary medicine, as well as a sound rationale for how skills such as communication could be taught, learned, and assessed.

What is Curriculum Mapping?

Curriculum mapping is widely used in the K-12 school system in the United States, based on a model and methodology developed by Jacobs (1997). Schools use commercial software to map curricula across grade levels, for internal and external accountability as well as teacher professional development. In its most basic definition, a curriculum map is a visual representation of a learning sequence. Like a geographical map, it can represent different scales, from a program of study, through individual

courses to individual components or units of a course. It can be presented in a variety of formats, including text tables or data matrices, graphic organizers or concepts maps, or in a commercial-software generated format. Jacobs (1997) formalized a definition and process of curriculum maps, which has received widespread acceptance and use in K-12 education. "Calendar-based curriculum mapping is a procedure for collecting and maintaining a data base of the operational curriculum in a school and/or district. It provides the basis for authentic examination of the data base. Maps are housed and revised electronically allowing for the level of detail necessary for specific tasks" (Jacobs, 2008).

While there are many ways to organize maps, the technique advocated by Jacobs (2008) includes the following elements: Essential questions, Content, Skills, and Assessments. When constructing a map of an individual unit within a course, instructors would first define the content items, the knowledge base to be covered. "Content items" support a single concept statement. "Skills" are those competencies the learner should be able to demonstrate, and skills statements should begin with a verb. "Assessments" are the ways that skills are measured. The "essential questions" should frame the content and skills, and are those overarching questions that should bring together the unit for the learner, and explain why the content and skills are important to learn.

Curriculum mapping can be useful to the individual instructor as well as to curriculum designers (Jacobs, 1997). At the level of the instructor, a curriculum map can be a diary recording what actually happened in the classroom, or can be a planning tool (a standardized lesson plan) which facilitates alignment between the official, taught, learned, and assessed curricula. For administrators, the curriculum map of a program of

study is a way to evaluate accountability across the curriculum, identify potential gaps and redundancies, and align the curriculum with established standards or competencies.

There are additional benefits to instructors: the process of mapping encourages reflection, and requires critical examination of course materials (Jacobs, 2008). When framing essential questions, we seek to give students a hook for knowledge, to allow them to understand why they need to learn the material. Creating those questions also leads the instructor to ask "why am I teaching this material?" In the absence of reflection, too often the answer can be "because I've always taught it", or "because that was the way I was taught". Curriculum mapping can also serve as a tool for communication and collaboration. When a program of study is mapped, collaborative dialogues can open between instructors, and opportunities for integration between courses can be explored.

When a course is mapped, the skills and assessments can be evaluated using tools such as Bloom's (1956) taxonomy to look at the integration of higher-order thinking. If critical thinking and problem solving skills are valued in a curriculum, yet the mapped skills are mostly "identify" or "list", and assessments are exclusively multiple choice examinations, then there is a potential misalignment in that curriculum or course (Jacobs, 2008).

Curriculum mapping in higher education has a more limited history, although based on published reports it is becoming increasingly utilized (Harden, 2001; Uchiyama & Radin, 2008; Willett, 2008). Several reports have described the use of curriculum mapping to evaluate the delivery of "generic skills". These skills are often embedded in the curricula, and maps can be useful in showing where these skills are actually covered.

Medical schools are also exploring curriculum maps as a curriculum management tool (e.g. Willett, 2008). Maps can vary in scope, from focusing on a set of skills within a portion of an academic program, to all learning outcomes across an entire program. Mapping can serve a wide range of purposes, including demonstrating alignment/achievement of specified standards for accreditation bodies, serving as curriculum management tools for administrators, assisting students in tracking and meeting learning objectives, and as faculty development tools (Harden, 2001; Jacobs, 1997). This literature review discusses five reports of curriculum mapping projects in higher education published in the past five years. These papers describe a range of mapping projects, in terms of purpose, scope, and methodology.

In addition to content analysis, curriculum maps can be used to identify alignment of the four curricula as discussed by Cuban (1995): official, taught, learned, and tested curricula. Educators increasingly recognize that "curriculum" is not a static monolith, but that there may be overlap and gaps between the stated curricular goals, what actually happens in the classroom, what students really learn, and what material is reinforced by testing. Cuban (1995) emphasizes that there may be a mismatch between the official mandated curriculum and the methods and materials used by classroom teachers. The learned curriculum of Cuban (1995) includes not only course content, but also implicit, non-cognitive attitudes and behaviours modeled in the classroom. The tested curriculum is an often narrow subset of the official, taught, and learned curricula. Curriculum maps can be used to explore incongruency and misalignment between the four curricula: is our official curriculum an accurate representation of what our students are actually learning?

Are we as educators really teaching what we think we are teaching? What are our students learning? And how are we measuring learning?

Wachtler and Troein (2003) used curriculum mapping for a very specific and well-defined purpose: to look at cultural competency in the curriculum of a Swedish medical school. They compared the planned, taught, and received curricula, using the lenses of published learning objectives, faculty interviews, and student focus groups. "Assessed" curriculum was not mapped, because the authors established that cultural competency was not assessed. The authors found that cultural competency is "hidden" or implicit in the curriculum, and their study explored why students and faculty had different perceptions about how those skills are addressed in the curriculum. Students perceived fewer instances of cultural competency delivery in the curriculum than reported by faculty. The authors speculated that this may be due to a perception bias by students to remember learning that is reinforced by assessment.

Sumison and Goodfellow (2004) described a curriculum mapping exercise in the Bachelor of Education program at Macquarie University. Like Robley et al. (2005a, 2005b), they examined generic skills in the curriculum, and their primary goals were to identify which skills are covered at what points in the program. Unlike other mapping exercises, Sumison and Goodfellow focused on data gathered from academic staff (course coordinators and instructors), rather than including direct input from students. While they focused on faculty, their conclusions could have been more broad and generalizable had they used a variety of data collection techniques. Their study could serve as a case study for involving teaching faculty in the curriculum mapping process, as it outlined the benefits and challenges of mapping from the faculty perspective. Sumison

and Goodfellow emphasized the potential of curriculum mapping not only for improvement of the curriculum, but also for individual faculty development and involvement.

Robley et al. (2005a, 2005b) thoroughly described the curriculum mapping process to examine the delivery of generic skills at the Leeds University School of Medicine. The authors recommended their mapping methodology as a template for use by other schools in order to both improve curriculum and improve student learning. Their model examined four curricula: declared, delivered, learned, and assessed. They gathered data from all identified stakeholders (students, student supervisors, and course coordinators). Data triangulation was achieved by the variety of data collection methods: document scrutiny, student and faculty surveys, student and faculty interviews, and student focus groups. The process generated four maps, which were ultimately combined to compare alignment of the four curricula through the five year medical program. They also introduced their efforts to integrate the map into their Virtual Learning Environment, so that cells are linked in the electronic map to illustrate alignment of skills with standards, and assessments. The authors believed that curriculum mapping at their institution "benchmarks the programme against national requirements, evaluates the success of the curriculum in achieving these requirements and informs students' self-reflection and future learning" (Robley et al., 2005b, p. 328). Their curriculum map has become a tool for both administrators and students.

Plaza et al. (2007) reported on the use of curriculum mapping in the Doctor of Pharmacy program at the University of Arizona. Their study gathered information from both students and faculty, but was primarily a retrospective study. Rather than using

interviews and/or focus groups, the authors relied on data gathered from student surveys, and from document analysis of course syllabi. The pharmacy program has developed a learning outcomes document, from which it has built its curriculum. The mapping process was primarily a curriculum management tool for administrators and faculty as they refined the program of study. Their principal conclusion was that the intended/delivered curriculum was indeed aligned with the received curriculum, and with the learning outcomes. The authors acknowledged the limitations of the study: they did not specifically evaluate the intended versus delivered curricula, and they relied exclusively on retrospective data. While they did show congruence between intended/delivered and received curricula, they did not examine alignment between the intended and delivered curricula, but assumed that due to past curricular development that alignment was present.

Willett (2008) surveyed medical schools in Canada and the United Kingdom to assess their use of curriculum mapping. While the sample size was small (31 of 49 schools responded), most were actively engaged in developing/planning curriculum maps, and only 10% of respondents did not have mapping as a priority. All mapping projects are electronic maps, but there was no standardization of software applications; some schools used commercial or open-source software, but many used technology developed by their own institution. The purposes of mapping at medical schools included curriculum management (including timetables and scheduling), analysis of content and outcomes for accreditation, and increasing the transparency of the curriculum, so that stakeholders could easily see "Where we teach what".

Regardless of the scale or scope of curriculum mapping, users in both K-12 schools and higher education shared the same challenges and opportunities; time, resources, faculty buy-in, support of administration, and technical support were the challenges (Willett, 2008). Renewed faculty interest in teaching (including increased communication and collaboration), increased alignment of curricula, and increased accountability to internal and external stakeholders were among the advantages (Harden, 2001; Uchiyama & Radin, 2008). Indeed, the increasing call for accountability to external stakeholders and established standards (such as No Child Left Behind in the US public schools) may be an important driver for curriculum mapping.

Specific Research Questions

This study explored the research question of whether there was congruence among the four curricula in the delivery of soft skills to students at the Atlantic Veterinary College. Do we as a faculty deliver the nontechnical professional competencies? Is the official curriculum consistent with what faculty actually address? Do our students feel that they address the nontechnical professional competencies in the same places that we think we are teaching them? Are we reinforcing learning by assessing what we teach? Curriculum maps were constructed to illustrate the breadth and depth of coverage of the soft skills in the official, taught, learned, and assessed curriculum. A composite map showed areas of congruence as well as discontinuities between the four curricula.

Significance of Research

This study is of value to the AVC (and ultimately to UPEI) both in terms of its methods and its results. Curriculum mapping is not currently used at AVC, nor is it

widely used in veterinary education, despite widespread use in medical and other health professions schools worldwide. This study introduced curriculum mapping to AVC on a small scale, using well-defined topics with discrete boundaries. Curriculum mapping has been shown to be a powerful tool for curriculum management in a variety of educational settings, and this study has introduced AVC faculty and administration to the process at a time when we are undergoing curriculum renewal. Our current curricular renewal process has arisen from both external and internal influences. The accreditation body, AVMA Council on Education, has recommended certain curricular modifications; additionally, there was faculty interest in curricular renewal. AVC is currently in the process of developing a new strategic plan, and curricular review and renewal was a strong priority in the draft document.

The results of this study have provided an incisive and insightful view into what we as a college are doing to address emergent educational topics. The soft skills have been recognized as increasingly important to the success of veterinary professionals in virtually every report on the present state and future of the profession during the last 20 years. This study has given us a detailed picture of what we are currently doing to address the soft skills. Curriculum mapping on a college-wide scale has the potential to engage the faculty and encourage reflection on how teaching practices could enhance congruence among the four curricula. This study has provided a conceptual framework for curricular renewal, not only in terms of the soft skills but also for the overall curriculum.

Chapter Three: Methods

This study used a mixed methods research approach. Data were collected from the major stakeholders in AVC education: current faculty and students, alumni, and employers of our graduates. Document analysis of existing survey instruments of alumni and employers were used for quantitative analysis. AVC faculty and students were invited to participate in interviews (faculty) and focus groups (students) to gather data for qualitative analysis.

The implications and advantages of mixed methods research were summarized by Onwuegbuzie & Leech (2004), and include triangulation of data and complementarity of data gathered using different methods. Ideally, mixed methods research combines methods with "complementary strengths and non-overlapping weaknesses" (p. 771). Onwuegbuzie & Leech (2004) specifically discuss how the interpretation of significant findings (defined as statistical, practical, clinical, or economic) identified by quantitative methods can be enhanced by qualitative methods, and vice versa. Because there are limitations in all research methods, using mixed methods allows for a more complete analysis of complex research questions.

Document analysis was used to gather data on the "official" curriculum (from the University of Prince Edward Island Calendar). Data from stake holders who were not on-site (alumni and employers) were gathered from document analysis of archived survey instruments. Data from AVC faculty and students could potentially be gathered by surveys, interviews, or focus groups. I conducted individual interviews with faculty, and focus groups with students. Interviews with faculty were most appropriate because I was most interested in their individual experiences, and also in probing for the range and

depth of their experiences (Breen, 2006). I was interested in what individual faculty members did in their classrooms. Sumison and Goodfellow (2004) surveyed faculty, and reported a level of frustration in faculty because of the narrowness of the survey instrument; faculty wanted to share their experiences in ways that did not fit the survey format. Focus groups with students were most appropriate because I was interested in the range of their collective experience. Focus groups were appropriate to allow participants to "share and compare their experiences with each other....and explore issues of shared importance" (Breen, 2006). Individual students would have experienced the same learning environment in different ways, and a focus group could allow them to develop and articulate a shared or common experience. My research methods were consistent with the recommended approach of Robley et al. (2005a).

Participants

This study analyzed data collected from the major stakeholders in veterinary education, including current AVC faculty and students, alumni, and employers of our graduates. All faculty members were invited to participate. Fourteen faculty expressed interest in participating, and eleven of those were interviewed (in December 2008-January 2009). Student participants were recruited on a volunteer basis; all students received an invitation to participate. Four focus groups were held (in February 2009), one group for each class year. Alumni and employer data were taken entirely from document review of existing survey data held in the office of the Associate Dean of Academic and Student Affairs. This study analyzed six years of data, which was all data available for this survey instrument.

Data Collection Procedures

Data were collected using document review, interviews, and focus groups. Data collection procedures used with each of those methods were designed to maintain scientific and ethical integrity. Copies of existing surveys (alumni and employer) are included in Appendix A. Questions for interviews with faculty are included in Appendix B. Questions for focus group sessions with current AVC students are included in Appendix C. Document analysis include existing surveys (from 2002-2007) and course descriptions in the UPEI Calendar.

Procedures were designed to comply with the policies of the University of Prince Edward Island Research Ethics Board (Protocol 1002897, approved 18 November 2008), specifically to minimize risk to participants, and ensure equitable selection of participants and informed consent (see Appendix D, Information Letter for Faculty Participation in Interviews; Appendix E, Information Letter for Student Participants in Focus Groups; Appendix F, Interview Consent Form; Appendix G, Focus Group Consent Form). When interacting with faculty, I made the objectives and scope of the study clear: I was acting in the role of a student researcher, and did not have the power of an administrator; the study was designed to provide a framework for curricular analysis, and would not be critical of individual instructors or the teaching methods of individual faculty members; the design of the study was not meant to infringe on the academic freedom of individual faculty members.

When interacting with students, I explicitly addressed the potential issue of power differential; due to my being on sabbatical leave, I was not teaching any of the student participants, nor would I be in a position to formally evaluate or grade the participating

students in their time remaining at AVC. With regard to faculty interviews and student focus groups, I ensured that participants understand that they could withdraw from the session at any time without repercussion. Sessions were digitally recorded, and written transcripts were prepared from the tapes as well as written notes. These transcripts were returned to the participants for review. Individual participants were not identified by name, and the case studies summarizing interviews were written in such a way as to protect their anonymity. Because traditional transcription can be a time-consuming and physically demanding process, many researchers have chosen to out-source transcription to research assistants or hired professionals. However, the researcher who transcribes his or her own data gains a deeper understanding of the material and its nuances. Matheson (2007) described a technique for voice transcription using a digital recorder and voice recognition software and this practice was used in transcribing the recorded interviews in this project. This technique allowed me to transcribe my own data and gain the benefits of a "researcher-transcriber" without the demands of traditional transcription techniques (Matheson, 2007). All sessions were conducted at the Atlantic Veterinary College, and recorded and written transcripts were stored in a locked filing cabinet in my office in the Department of Biomedical Sciences. Transcripts will be destroyed five years after the completion of the study and thesis defense.

Data Analysis and Presentation

Delivery of nontechnical professional competencies was evaluated based on the following categories: communication, ethics, self-management, human-animal bond, practice management, and career opportunities; these skills were also explored based on level of depth or expertise. Maps were created for each of the four curricula (official,

taught, learned, assessed), and presented as a data matrix indicating in which course each skill was covered (as described by Robley et al., 2005a), and the level of depth to which it is covered/ level of expertise assessed (as described by Plaza et al., 2007). Maps were cross-checked against each other, and a master map constructed to illustrate congruence (or lack of congruence) among the four curricula.

The map of the official curriculum was constructed based on document analysis of published course descriptions. The six categories of soft skills were mapped across the four years of the DVM program, to the level of detail of individual courses and clinical rotations. Based on course descriptions, it may not be possible to evaluate depth of expertise expected of the soft skills taught in each course.

The maps of the taught and assessed curricula came from interviews with faculty. Interview transcripts were manually coded based on the categories of soft skills, teaching/learning methodology, assessment, perceived importance, level of expertise, and individual courses, and emerging themes were identified.

The map of the learned curriculum was constructed based on student focus groups as well as document analysis of alumni and employer surveys. Transcripts of focus group sessions were analyzed similarly to faculty interview transcripts: transcripts were manually coded based on the categories of soft skills, teaching/learning methodology, assessment, perceived importance, level of expertise, and individual courses, and emerging themes were identified. Quantitative data from surveys was analyzed using appropriate statistical techniques to examine the significance of results.

Results of this study will be presented to the AVC Curriculum Committee and the Curriculum Revision Working Group, and will be shared with interested faculty, staff, and students.

Measures to Ensure Trustworthiness of Data

Lincoln and Guba (1985) proposed criteria for ensuring trustworthiness of data in research based on naturalistic studies: credibility, transferability, confirmability, and dependability. Data used to construct the curriculum maps in this study come from a range of stakeholders, and from multiple individuals within each group. Delivery of the nontechnical competencies was examined through multiple lenses (published course descriptions, and the perspectives of employers, alumni, faculty, and students). When there was congruence among these stakeholders, trustworthiness of the data was established. When there was a lack of congruence between data of two of the stakeholders, the other sources were examined to tease out whether the discrepancy is real or an artifact. This was a form of triangulation which Lincoln & Guba (1985) suggested as a method to establish credibility. The transferability of this study was defined by the amount and quality of data reported ("thick description" of Lincoln & Guba, 1985). The choice of data collection methods, as well as the amount and type of data collected and presented in this thesis, were both rooted in the literature of curriculum mapping and veterinary education, and should thus be transferrable within that context. While confirmability of the data might be established through a formal independent audit (Lincoln & Guba, 1985), this study instead used the thesis supervisor as an independent reader of selected transcripts, to compare transcripts to written case studies and focus group summaries. Dependability was also regulated though regular discussions with the

thesis supervisor and committee, and any changes during the interview focus group process were noted in the findings.

Limitations of the Design

My career at the AVC is both a significant strength and potential limitation of this study. I have been at the AVC for the past 12 years as Assistant/Associate Professor of Anatomy; during this time, I have continuously served on the AVC Curriculum Committee, and have a strong working knowledge of our overall curriculum, and which components work well. I have served as Acting Chair of the Department of Biomedical Sciences for almost 3 years, and have a good understanding of inter-and-intradepartmental politics. Success of this study required me to be objective about our curriculum, and to put aside any preconceived notions and biases. Participation by faculty and students was key to this study, and I relied on my credibility as a faculty member and teacher to gain the cooperation of participants. Although my role in this study is that of a student researcher, I am mindful of my position as a tenured Associate Professor when interacting with faculty who may be non-tenure track or untenured. Since I am on sabbatical 2008-2009, and because I do not formally teach or evaluate students beyond the first year of the DVM curriculum, I am not in a position to adversely affect the grades of any student who has participated in this study. Communicating this to students helped to reduce their risk as participants, but I am mindful of the power differential which is inherent between students and faculty.

Summary of Methods

The methods outlined for this study presented the opportunity to develop a unique collection of data about the AVC curriculum, faculty, students, and alumni. The mixed

methods approach has allowed me to examine layers of data through the different perspectives of faculty and student. The resulting curriculum maps could be of interest to individual faculty and students as well as to the Curriculum Committee.

Chapter Four: Findings

Data were collected from the UPEI Calendar, from archived surveys (Employer Survey and Alumni/Curriculum Survey), from faculty interviews, and from student focus groups. A composite curriculum map collating the data is presented in Appendix H. Findings from the UPEI Calendar are in the curriculum map under the category of "Official Curriculum". Data from the surveys are summarized in Tables 1 and 2, and are discussed in the text below. Findings from faculty interviews are presented in the curriculum map, and are summarized as case studies in the text below. Findings from student focus groups are presented in the curriculum map, and are summarized in the text below.

Employer surveys

Employers of AVC graduates were asked to complete a survey evaluating the graduate in terms of the entry-level skills expected of a new graduate. These surveys contained questions about technical and professional skills, knowledge, and attitudes. The 13 categories listed in Table 1 were extracted from the surveys as most closely fitting the nontechnical professional competencies in this study. Six years of survey data were presented. In the category of personal integrity and ethics, employers rated AVC graduates >4 (greater than "Above Average"). In the following categories, employers rated AVC graduates <4: stress management, leadership, confidence, interview/employment negotiation, and practice management. With the exception of the classes of 2002, 2005, and 2007, employers rated AVC graduates >4 in the categories of oral communication, interpersonal skills. With the exception of the class of 2002, employers rate AVC graduates >4 in the categories of empathy and client rapport.

Table 1

Statistical Summary of Selected Results from AVC Employer Satisfaction Survey

General qualifications	**Mean all classes**	**Mean: Class of 2007**	**Mean: Class of 2006**	**Mean: Class of 2005**	**Mean: Class of 2004**	**Mean: Class of 2003**	**Mean: Class of 2002**
Oral communication skills	4.04	3.96	4.43, n=21	3.97	4.00	4.32	3.58
Written communication skills	3.96	4.09	4.32, n=21	3.75	4.03, n=32	4.17	3.37
Interpersonal skills	4.14	3.96	4.52, n=21	4.32	4.15	4.42	3.47
Stress management skills	3.44	3.20	3.71, n=21	3.58	3.55	3.47	3.11
Client rapport	4.18	4.09	4.43, n=21	4.22	4.15	4.42	3.74
Empathy	4.31	4.50, n=24	4.67, n=21	4.19	4.30	4.58	3.63
Personal integrity and ethics	4.48	4.40	4.80, n=20	4.43	4.48	4.63	4.16
Leadership ability	3.38	3.00	3.80, n=21	3.41	3.33	3.65	3.11
Commitment to life-long learning and professional development	4.04	3.88	4.50, n=21	4.26	4.03	4.06	3.53
Knowledge of the profession	3.77	3.68	4.05, n=21	3.75	3.65	3.89	3.58
Confidence level	3.46	3.20	3.81, n=21	3.65	3.41	3.37	3.32
Interview and employment negotiation skills	3.46	3.20	3.78, n=22	3.28	3.40, n=33	3.64	3.44
Practice management knowledge and skills	2.94	2.53	3.47, n=22	2.96	2.90,	3.45	2.31
		N=25/65	N=22/60	N=37/61	N=34/50	N=19/40	N=19/27

Note: Compiled from data gathered from the Classes of 2002-2007. Employers were asked to rate their AVC graduate employee with regard to the listed skills.

Rated on a 5-point scale (3 - 'Average'; 4 – 'Above Average'; 5 – 'Excellent')

Alumni/Curriculum surveys

AVC Alumni/Curriculum surveys were sent out approximately one year post-graduation, and asked graduates to reflect back on specific aspects of their education, and how those aspects helped to prepare them for their career. For the preclinical curriculum, the survey had a list of subject areas (some were specific courses, while others were more general subjects). Graduates were asked to indicate whether that subject was relevant to their current field of practice, and to rank on a three-point scale whether their training in that subject at AVC was insufficient (1), appropriate (2), or excessive (3). The subject areas listed in Table 2 were extracted from the survey results as those which most closely fit the nontechnical competencies in this study. Data were included from the past six years. Of those students who felt the subject areas were relevant, all class years indicated that training in jurisprudence, ethics, business management, and client relations was less than appropriate (ie <2).

Table 2

Statistical Summary of Selected Results on the Preclinical Curriculum from AVC Alumni/Curriculum Survey

Subject Area	**Mean all years**	**Mean: Class of 2007**	**Mean: Class of 2006**	**Mean: Class of 2005**	**Mean: Class of 2004**	**Mean: Class of 2003**	**Mean: Class of 2002**
Jurisprudence	1.53	1.56, n=16 1.83NR n=6	1.44, n=24 1.83 NR n=6	1.71, n=14 2.00 NR n=3	1.30, n=27 2.00 NR n=1	1.50, n=16 1.75 NR n=4	1.69, n=26 1.60 NR n=5
Ethics	1.67	1.55, n=22 2.00 NR n=1	1.71, n=25 3.00 NR n=1	1.78, n=23	1.58, n=31	1.65, n=23	1.74, n=34 2.00 NR n=1
Business management	1.27	1.17, n=12 1.67NR n=9	1.10, n=20 1.20 NR n=5	1.38, n=16 1.50 NR n=4	1.15, n=26 2.00 NR n=4	1.53, n=15 1.33 NR n=6	1.27, n=22 1.57 NR n=7
Client relations	1.53	1.52, n=23	1.42, n=26	1.68, n=22	1.42, n=31	1.65, n=23	1.47, n=30 2.00 NR n=1
		N=23/60	N=28/59	N=23/60	N=32/57	N=23/59	N=36/59

Note: Compiled from data gathered from the Classes of 2002-2007. AVC graduates were asked to reflect on their education at AVC, and how well the preclinical curriculum have contributed to their effectiveness as veterinarians. If the graduate felt that subject area was not relevant to their area of practice, "NR" is indicated next to the mean.

Survey question: Rank the training you received at AVC in terms of how it contributes to your effectiveness as a veterinarian.
1 – Insufficient; 2 – Appropriate; 3 – Excessive.

The Alumni/Curriculum survey listed rotations which were offered for that class year, and asked students to rate (on a 5-point scale) the usefulness of individual rotations in contributing to their effectiveness as a veterinarian. Students were not asked to indicate if the subject of the rotation was relevant to their current field of practice. Data from three rotations was extracted from the survey to illustrate the competencies of human animal bond, ethics, communication, and practice management; these rotations were chosen because they each had the nontechnical professional competencies as their primary, rather than ancillary, focus (Table 3). The mean value for the Issues in Animal Welfare rotation was >4 for the Classes of 2004, 2006, and 2007; it was <4 for the Classes of 2002 and 2003, and there were no responses for the Class of 2005. The mean value for the Client Communication rotation was >4 for all class years since its introduction in 2004. The mean value for the Career and Practice Management rotation was >3 for all years in the survey, and was >4 for the Classes of 2003 and 2004.

Table 3

Statistical Summary of Selected Results on Rotations from AVC Alumni/Curriculum Survey

Rotation	Mean	Mean: Class of 2007	Mean: Class of 2006	Mean: Class of 2005	Mean: Class of 2004	Mean: Class of 2003	Mean: Class of 2002
Issues in Animal Welfare	3.97	5.00, n=1	4.25, n=4	None responding	4.25, n=4	3.00, n=3	3.33, n=3
Client Communication	4.7	4.67, n=6	5.00, n=6	4.60, n=5	4.60, n=5	Not offered	Not offered
Career and Practice Management	3.94	3.71, n=7	3.79, n=14	3.78, n=9	4.33, n=12	4.33, n=6	3.71, n=7

Note: Compiled from data gathered from the Classes of 2002-2007. AVC graduates were asked to reflect on their education at AVC, and how well the rotations have contributed to their effectiveness as veterinarians.

Survey question: For those rotations in which you were enrolled, indicate how useful the course was in contributing to your effectiveness as a veterinarian (on a 5-point scale, 3 is "neutral", 5 is "strongly agree")

Summary of Survey Findings

The Employer and Alumni/Curriculum surveys are a valuable indirect measure of outcomes assessment for AVC. While the terminology used in the surveys varies slightly from the nontechnical professional competencies as defined in this study, there are still enough similarities to include the data. The mean value of data gathered from the Classes of 2002-2007 shows that employers rank AVC graduates lowest on practice management, employment negotiation skills, leadership ability, and confidence level. The mean values show that employers rank AVC graduates highest on personal integrity and ethics, empathy, interpersonal skills, oral communication, and commitment to lifelong learning. The mean value of data gathered from AVC alumni indicates that they feel their training in the following areas was less than appropriate: business management, client relations, jurisprudence, and ethics. There is agreement between employers and alumni in the area of practice/business management: both groups rate that topic lower. However, there is a mismatch between employers' and graduates' perspectives in the subjects/categories of ethics and client relations (which may include communications and empathy). Employers rate AVC graduates as above average, while the graduates themselves rate their education lower in those areas. This may reflect a lack of self-confidence in new graduates (noted in the employer survey). Alternatively, AVC graduates may have acquired their competency outside of the AVC curriculum.

Faculty Interviews

An email was sent to all AVC faculty explaining the research project, and inviting them to participate. Fourteen faculty members responded expressing interest in participating, and a follow-up email was sent to thirteen of those individuals with further

explanation of the project, the consent form, and options for scheduling the interview (one of the initial respondents had only very limited teaching responsibilities in the current curriculum, and did not participate further in the study). Eleven faculty members responded to this follow-up email, and were subsequently interviewed. Interviews were conducted in my office in AVC, during December 2008 and January 2009. Each interview was recorded, and written notes were taken by the researcher. A written transcript was constructed using Dragon Naturally Speaking® (Nuance Communications) voice recognition software. Demographically, the interview pool consisted of four females and seven males. Three of the four academic departments of AVC were represented (Biomedical Sciences, Companion Animals, and Health Management. No faculty members from the Department of Pathology and Microbiology volunteered to participate).

During the interview, faculty were asked to summarize their teaching responsibilities. Ten of the individuals taught fourth year rotations as well as in the preclinical years; one faculty member taught only in the preclinical curriculum. The amount of teaching in the preclinical curriculum varied per faculty member: some were involved as an occasional guest lecturer in a single course, while others were course coordinators and/or involved as lecturers or laboratory instructors in multiple courses in multiple years of the curriculum. In the first year of the curriculum, the interview pool had a teaching role in at least five of the twelve courses. In the second year of the curriculum, faculty were involved in only two of the twelve courses offered. In the third year of the curriculum, approximately 10 courses were represented by interviewed faculty (total 18). Half of the faculty teaching fourth year rotations taught in more than one

rotation. Faculty interviewed from the Department of Companion Animals represented four of the thirteen rotations offered by that department. Faculty interviewed from the Department of Health Management represented approximately nine of the 23 rotations offered by that department. The Department of Biomedical Sciences offered one rotation, and the Department of Pathology and Microbiology offered eight rotations; there were no faculty interviewed from those departments who teach in rotations, and no representatives of those rotations.

The six nontechnical professional competencies were defined during each interview, and faculty were asked to reflect on whether each competency was delivered in their courses. Further probes explored how and why the competency was addressed, whether it was an explicit or implicit part of the course, what level of expertise was expected, and whether it was assessed. The latter two questions proved to be problematic and often required further explanation. For example, if addressing a particular competency was an implicit and very minor component of a course, no assessment would be performed, and no level of expertise expected. To streamline the interview process, these specific questions were omitted in some cases where the faculty member already indicated that a particular competency was only an implicit and minor part of their course. During the interviews, each competency was considered separately, and was addressed in the same order (communication, ethics, self-management, human-animal bond, practice management, and career opportunities). Participants were invited to add any further comments before moving on to consideration of the next competency. At the conclusion of the interview, one faculty member expressed concern that the interviewer

occasionally omitted the questions on expertise and assessment, and did not consistently take written notes.

The following case studies were constructed from the interview transcripts and written notes. They summarized the teaching context of each faculty member, and described whether and how each of the competencies are addressed in their courses. In order to preserve anonymity of individual faculty members, each was randomly assigned an alphabetic code; the code had no significance with respect to name of the faculty member, department, courses taught, specialty discipline, order of interview, or order of transcription. To further preserve anonymity, rotations that were taught by a single faculty member were identified as "specialty rotation", rather than by the discipline-based rotation title. "Companion Animals Systems courses" is used to refer to the five separate third year Companion Animals medicine courses to help preserve anonymity. "Anatomy" is used to refer to the individual Macroscopic and Microscopic Anatomy courses to help preserve anonymity. Within each case study, quotes were attributed to the faculty member whose interview is summarized in that case study.

Case Studies

Faculty member T.

Faculty member T teaches in the didactic companion animals systems courses, and teaches in the small animal medicine rotations as well as the client communication rotation. The competencies are primarily addressed during rotations rather than didactic courses. T demonstrates a strong awareness of the competencies, and recognizes them (especially communication) as essential. As co-developer, T is highly invested in the client communication rotation. T has no experience working in private practice, and sees

that practice management coverage is limited (although the communications rotation has personnel scenarios).

Communication is an "indirect, minor" component of the systems courses, and it is not assessed. Communication is "the whole focus" of the Client Communications rotation, and is assessed thoroughly. Communication is also assessed in the Internal Medicine rotations (and is a mandatory component of their grade), while delivery of communication is more through modeling (more emphasis on communication will depend on student interest).

Ethics is not directly assessed in the Client Communications rotation, but there are scenarios which address ethical issues. Ethics is situational in the Internal Medicine rotations, and ethical issues will be discussed based on student interest or cases presented. Self-management is a minor but explicit part of the Client Communications rotation (empathy versus sympathy). Self-management may be addressed in the Internal Medicine rotations based on student interest, and will be addressed if faculty/staff identify students have problems in that area. The human-animal bond is addressed explicitly in both the Client Communications and Internal Medicine rotations.

Practice management is not strictly addressed in either of the rotations; however, students are made aware of costs in the Internal Medicine rotations, and the Client Communications rotation has some scenarios with personnel issues. Career opportunities were addressed in an informal/mentorship manner in the Internal Medicine rotations.

Faculty member M.

Faculty member M teaches in several didactic courses: Introduction to Veterinary Medicine, Principles of Medicine, Clinical Orientation, and companion animal systems

courses. M teaches in the small animal medicine rotations as well as the client communication rotation. M has a high level of appreciation and awareness of the nontechnical competencies; M sees them as critically important for the success of veterinarians, and tries to instill that understanding in students. M has a particular interest in euthanasia and grief, which heavily integrates several of the competencies. M sees overlap between most of the competencies, and offers rich, detailed descriptions of how and what is discussed with students. Most of these discussions have elements of communication, ethics, self-management, human animal bond, and practice management.

M addresses communication in some courses through lectures: the Introduction to Veterinary Medicine euthanasia/grief lecture includes what and how to communicate to clients; the second year Principles of Medicine euthanasia lectures would also include some communication aspects, and these would be assessed on exam questions (ie what needs to be communicated to a client). The third year course is more science-based, and does not address communication. The fourth year medicine rotations address communication extensively: it is explicitly discussed in rounds, there is modeling/ observation, and it is assessed as part of the grading rubric. Discussions in rounds are often student-initiated, so communication is not a mandated topic, but it does come up on a regular basis. M did not address the client communication rotation specifically, simply due to an oversight. However, M did emphasize that it addresses specific skills in a structured way, unlike any other course or rotation.

Ethics is addressed in similar ways in M's courses, and M sees a great deal of overlap between communication and ethics. M includes ethical considerations in the euthanasia/grief lectures. Ethical issues are discussed in the medicine rotation rounds,

and may also come up depending on individual cases that present to the clinic. In the rotations, ethics is not a specific category in the grading rubric, but ethical behavior of students could be assessed under other categories (communication, case management and patient care, and participation and initiative).

Self-management is addressed by M in different contexts. In the euthanasia/grief lecture, M discusses emotional stress on veterinarians. In the rotations, rounds discussions often include emotional burn-out, stress, and work-life balance. Self-management is somewhat assessed in the rotations: if a student is seen as having problems (ie stress-management, interpersonal skills), M and other faculty would meet privately with the student to discuss the issue. This would not necessarily be reflected in the student's grade for the rotation, unless their poor self-management skills are adversely affecting the team.

M does address the human-animal bond in courses. Again, there is significant overlap with communication and ethics in how M addresses the human-animal bond. It is part of the euthanasia/grief lectures. It is also a significant component of the medicine rotations, in terms of how students interact with clients and with their animals. In the medicine rotations, it would be assessed under the category of communications/ interpersonal skills. In the third year medical exercises labs, it is explicitly addressed in terms of respecting the teaching animals (including attendance at labs).

Practice management is addressed only obliquely by M, emphasizing to students that there are positive advantages to effectively communicating findings to clients, and learning these will benefit their business. M does make sure that students are aware of costs, however, M strongly feels that students need to be insulated from dealing with

clients in terms of financial matters that are beyond their control (ie students do not write the estimate, and have no authority for providing discounts, so should not have to explain to clients why the final bill is greater than the estimate). M offered an example of advice shared with students, not to pre-judge a client's ability to pay and limit the treatment options you offer based on your assumptions (combines communication, ethics, human-animal bond, and practice management). M does not assess students on their practice management skills.

M does not specifically address or evaluate career opportunities in courses. M does informally talk about M's own specialty in the fourth year rotations. M also emphasizes to students that there are many different opportunities in the veterinary profession, many ways for them to have fulfilling careers, but that is more through informal mentorship. M is an AVC graduate, and is able to compare personal educational experiences here with the current curriculum in terms of delivery of nontechnical competencies. M sees an increase in focus on the "art" of veterinary medicine, and sees that the current generation of students is more accepting of and interested in these topics. Some of the changes that increase focus on the nontechnical competencies are changes that M has instituted (ie discussion rounds in the medicine rotations) or helped to create (ie the client communication rotation).

Faculty member S.

Faculty member S teaches in several didactic courses: Introduction to Veterinary Medicine, Clinical Orientation, Principles of Medicine, and 3rd year Internal Medicine (lectures and labs). S teaches in the large animal medicine rotations as well as a specialty rotation. S delivers a lecture on communication in large animal veterinary medicine for

the first year Introduction to Veterinary Medicine course. This is probably the only explicit way that S addresses communication; in the fourth year rotations, S expects that students would learn about communication through observation and modeling ("We don't have an official thing where we say this is how you should communicate. But that doesn't mean that you can't sort of tell them your philosophy"). Communication is an important part of the rotations, in terms of communicating with classmates, technical staff, house officers, faculty, clients (owners and trainers). It is assessed in the grading rubric for the rotation. Communication is also explicitly addressed and assessed in the third year course, where students are responsible for giving a presentation on their findings from a physical exam of a clinical case.

S believes that ethics are addressed implicitly with students in courses, and that students learn about ethics in the rotation through observation/modeling. If specific cases present which have ethical implications, they will be discussed. Students are told what is expected of them on the rotation in terms of patient care and personal responsibility, and these expectations do have an ethical component. Self-management is not explicitly delivered, however, the rotation grading rubric will assess communication, dealing with stressful situations, and ability to work as a team. If a student is having problems in these areas, faculty (or house officers) will discuss possible strategies with them.

The human-animal bond is addressed by S indirectly through work on euthanasia. Practice management is not explicitly addressed by S; who feels that the primary objective is to gain cases and teaching material for students, and that is not necessarily consistent with a traditional business model. In addition to maximizing use of available teaching money, S funds work through service projects with the Sir James Dunn animal

Welfare foundation. S does not explicitly set out to lecture students on career opportunities, but does talk to students informally on the realm of possibilities that come with a veterinary degree.

Faculty member R.

Faculty member R teaches in the didactic Animal Production Systems course, in the Aquaculture rotation, and the Ecosystems Health rotations. R does not teach extensively in the veterinary curriculum, but volunteered to participate because of strong feelings about the importance of the "soft skills". R is involved in a non-traditional field of veterinary medicine, and reflects back to career options as a new graduate: "30 years ago, if you didn't go into private practice, you were a failure." As the breadth of careers in veterinary medicine expands, we cannot train them to do everything, but we can train them in the soft skills, which are necessary for success. R self-identifies as a strong extrovert, and is concerned about potential bias in evaluating personality type vs actual competence in communication. R is unsure of how to truly and fairly evaluate good communication. Evaluation of communication in rotations is often based on "participation", which may be biased towards extroverts. Communication (with different groups, including stakeholders) is emphasized in the Ecosystem Health rotation.

Ethics play a strong role in the didactic courses in terms of academic honesty; R feels very strongly that there should be a "one-strike" rule, because it is necessary to set the tone for the expectations of professional ethics in their careers. R feels that in the practice setting, new veterinarians often come into conflict with maintaining client confidentiality and perceptions of humane treatment of animals. The Ecosystem Health

rotation often addresses ethical issues, and R emphasized that relationships with and between stakeholders must be considered when resolving ethical dilemmas.

Self-management is explicitly addressed in the Ecosystem Health rotation. This rotation brings together students from the four Canadian veterinary schools, and has recently involved a sociologist who led sessions on self-management (interpersonal skills and working in groups). This process was initiated in response to faculty seeing poor group dynamics in play. The human-animal bond is not addressed with aquatic species and shellfish; with commodity production species, "It's more of a welfare issue than the human-animal bond". On a personal level, one of the reasons why R left small animal practice was that "got too involved with the dogs...emotionally it was tough on me". Practice management is not addressed in R's courses. Career opportunities are addressed by R (as this faculty member is in a non-traditional field). R leads an international rotation. R also emphasizes to students that they have a greater range of skills and capabilities than they might imagine. The questions that R gets from students is not as much about what opportunities exist as how they can get into those opportunities.

Faculty member E.

Faculty member E teaches in the second year didactic course Principles of Surgery, the third year lecture/lab course in Large Animal Surgery, and has previously lectured in Into Vet Med. E teaches in the large animal surgery rotations, a specialty rotation, and the wildlife and exotics rotation. E has a good level of understanding of the competencies, but not through formal training ("I definitely intuit my way through things like this"). E has a strong interest in ethics. E does not see any delivery of the competencies in the Principles of Surgery course.

There is limited opportunity for communication skills in the third year course (with lab) in terms of proper scientific communication, but "...fourth year is where it gets fun and interesting". Communication is an important part of the Large Animal Surgery rotations (written and oral), students must learn how to communicate with clients, and communication is assessed for their grade. Communication is an important part of the specialty rotation, although more implicit (nothing in the syllabus about "...this is how you communicate"). E coaches fourth year students on communication/presentation skills for Clinical Conference.

E previously gave lectures in ethics in the first year "Introduction to Veterinary Medicine" course; currently, E only has the opportunity to discuss ethics with the Large Animal surgery rotations. It is largely situational. Ethics are also discussed in the specialty rotation. Ethics would be assessed as part of the grade in rotations only if the student has behaved unethically. Self-management is an implicit part of the Large Animal Surgery rotations, with house officers being the first contact for student problems. Faculty members are insulated from these issues. Self-management is also an implicit part of the specialty rotation. E has informal, mentoring discussions with students related to self-management issues.

E's personal attitude on the human-animal bond is more conservative than most students, and it is rarely discussed in the Large Animal Surgery rotation (unless euthanasia is an issue). It is implied/assumed in the specialty rotation, but not discussed. Practice management is discussed in the specialty rotation (how to integrate it into a conventional practice), but in the Large Animal Surgery rotations, it is only discussed in the context of awareness of bills and fees. "You wouldn't find many people in the

academic setting with any ability or experience at all to discuss this aspect with students." E will impress upon students the range of career opportunities in informal/mentorship situations, but believes that students largely "ferret that out for themselves".

Faculty member V.

Faculty member V teaches in the third year companion animals systems courses and in a specialty rotation. V has a good level of understanding of the competencies, and is "passionate" about communication, both the teaching of it and its importance ("You can be the smartest ... in the world, but if you can't communicate what you think you're not going to get very far"). Communication in the didactic course is addressed both explicitly and implicitly. Implicitly, V consciously strives to model communication by careful choice of words and explanations, to accommodate different learning styles. Explicitly, in each lecture V gives examples of how to communicate certain concepts to clients in a manner which they will understand. In the rotation, communication is "a gigantic component of what I talk about" and V sees this reflected in student opinion of teaching survey results (students comment on how much they learned about communication in this rotation). V will coach students on student-client interactions (role playing before meeting with a client), and critically reviews student discharge instructions. Communication forms part of the grade, but is adjunct (a student would likely not fail solely due to poor communication, but would be graded more positively for good communication).

Ethics in the didactic course is explicitly addressed in terms of expectations of academic honesty, and implicitly in case discussions where ethical issues arise. In the rotation, ethical issues are discussed as they come up relative to individual cases seen

(and are "not so much teaching as discussion"). The didactic course offers limited opportunity for addressing self-management; V offers personal stories to encourage students to be realistic in their own expectations of themselves. In the rotation, self-management is not explicitly addressed, although V acknowledges behavior/modeling. The human-animal bond is discussed in the didactic course, and is "in front of us all the time" in the clinical rotation. The didactic course has little opportunity to address practice management. It is only a small part of the rotation. Career opportunities are addressed by example in the didactic course; the rotation provides an opportunity for informal mentorship to help student prioritize among career opportunities.

Faculty member Q.

Faculty member Q teaches in the didactic third year companion animal systems courses, and in small animal medicine rotations. Q is largely self-taught with regard to competencies such as communication, although Q has attended some meetings and short courses. Q spoke several times about self-awareness, as personal self-awareness has been increased by workshops, and this has improved Q's teaching (and other skills). Q self-identifies as an extrovert; feedback at communication workshops has showed this particular faculty member to talk less and listen more. Q sees that competencies such as communication are "paramount" to success. Q has experience as a veterinarian in private practice, which gives a perspective not shared by some colleagues. Several of Q's anecdotes about teaching show intense pride in the successes of students. Q does not address communication in the didactic courses, and feels that the lecture format is not conducive to that (and imagines the format to be boring to students). Communications are a large part of the medicine rotations for Q. There is some coaching, a great deal of

modeling/observation, and discussions during rounds. Communication is assessed as part of the grading rubric.

Q sees that ethics are "ill-defined in veterinary medicine". There is not universal agreement on many ethical issues (ie hunting, declawing), and individuals bring their own experience and beliefs. Some issues are openly discussed and debated (tail docking and ear cropping are not done at AVC). In the rotation, ethics are largely addressed implicitly. Ethics per se is not necessarily assessed, but unethical behavior is assessed. Self-management would be defined by Q to mean "maturity". Q tries to help students increase their self-awareness and self-confidence. In the rotations, discussions with students at mid-block can address self-management issues.

Q feels that the human-animal bond needs to be addressed by example. Q may discuss it in the didactic third year lectures, but that would be largely "unscripted" and anecdotal. In the rotations, it is very important to how the students interact with clients. Q finds that the students are very aware of the human-animal bond, and often go beyond expectations in caring for their patients. The human animal bond is very important to Q personally.

Q feels that practice management is severely underdeveloped in the curriculum, in the teaching hospital, and among the faculty. Q discusses economic issues with students on the rotations, and also mentors students informally as they evaluate and negotiate job offers. Q does address career opportunities, but informally rather than as part of courses. Q respects and tries to foster an appreciation of all of the opportunities in veterinary medicine.

Faculty member H.

Faculty member H teaches in the didactic companion animals systems courses, and in the Junior Surgery lab. H teaches in the small animal surgery rotations. H has a good level of understanding of the competencies, but is not formally trained in them. H recognizes the importance of communication, and tries to emphasize that to students. In the third year companion animals systems lectures, H will tell the student how to communicate certain concepts/disease processes/complications to clients, and "what would you tell the client at this point?" can be an exam question. Communication is explicitly addressed with an exercise in the junior surgery lab course. Humane Society animals are assigned simulated clients as owners, and the students are responsible for phoning the clients before and after surgery; this forms part of their course grade. H sees it as an introductory-level exercise. In the surgery rotation, students are "the first client contact", and are responsible for a great deal of communication with the client. They must also communicate with other units of the health care team (other departments, technicians, peers, etc). Communication is part of the grading rubric, but it is not a necessary component to pass the rotation. H describes many modeling situations, where students observe (either in person or by phone) communication between clinicians and clients.

H does not give any lectures specifically on ethics in any courses, however, ethical issues are mentioned when relevant to certain clinical conditions in the systems courses. The care of Humane Society animals is a strong ethical component of the junior surgery course. Patient care is part of their grade in that course, and H considers this to fall under the category of ethics. In the surgery rotation, ethical issues would be

discussed as presented in the clinic. Ethics is not a specific component of the grading rubric for the surgery rotation, but unethical behavior would be penalized under other categories (possibly "professional attitude"). Self-management is not covered in the lecture course. It is evaluated in the junior surgery course and in the surgery rotation (how they interacted with their group during the surgery), and is usually discussed only when there are problems. The human-animal bond is addressed during the companion animals systems lectures in a minor way as narrative vignettes. It is addressed in the junior surgery course through the use of simulated clients. It is dealt with on a daily/weekly basis in the surgery rotation. It could be assessed under communication or patient care in the grading rubric.

With regard to practice management, in the surgery rotation, students see some financial aspects of cases, and hospital personnel issues, but "they do not necessarily get a good example for a viable practice management setting". It is not assessed in the rotation. H emphasizes to the students the importance of clear communication and consent with regard to potential complications of surgery. Career opportunities are indirectly addressed during the didactic systems courses in terms of which surgeries should be performed by generalists versus specialists. H also informally mentors students who wish to pursue surgery.

Faculty member L.

Faculty member L teaches in the didactic Anatomy course, and in the first year Integration of Structure and Function course. Faculty L is the only participant who is not a veterinarian, and does not teach clinical rotations. Faculty L recognizes the importance of communication and self-management in particular among the competencies, and spoke

about anecdotal evidence that most professional complaints can be traced back to veterinarian's behavior during euthanasias. L discussed communication in several contexts in anatomy: a level of understanding of the English language is necessary to communicate on exams; learning scientific terminology is necessary for communication in the context of courses. Communication is not explicitly addressed in this course. In Structure and Function, communication is a stated goal of the course. Students work in groups, and also give a group presentation (which is part of their course grade). Communication is not explicitly addressed. Poor communication would be discussed with an individual student.

Ethics is addressed in Anatomy in terms of academic honesty. Ethical issues in research may be mentioned in the context of how certain information was discovered. In Structure and Function, ethical issues are discussed if they arise, but none of the cases specifically include ethical issues. Faculty L informally discusses self-management in "almost every lecture" in the context of managing their own learning, instilling life-long learning, and wellness/stress. In Structure and Function, the students are responsible for their own effective time management; working in groups requires interpersonal skills. These are not directly assessed, but evidence of poor performance will be discussed with individual students. The human-animal bond is addressed only very indirectly in Microscopic anatomy. In Structure and Function, the human-animal bond is implicit in many of the cases, but is not a focus of any case.

Practice management is not addressed in Microscopic Anatomy or Structure and Function. Career opportunities (ie "the ongoing contributions of research") are covered

on a regular basis (per lecture) in Microscopic Anatomy. Career opportunities are not an objective for Structure and Function, and are not covered in a meaningful way.

Faculty member N.

Faculty member N teaches in the didactic third year lecture courses, and in Animal Production Systems. N teaches in the farm services rotations, and has experience in an administrative position at AVC. N sees communication as essential for success in the profession. While N sees the competencies as important, N has "a healthy skepticism" as to what is actually teachable, and how much we can change students. N believes in the importance of modeling, but is unsure of what else we as a faculty can do. In the rotations, N primarily addresses communication implicitly through modeling. If students are having communication problems, faculty will have individual discussions with those students. Other activities in the rotation that emphasize communication are a written assignment (scientific critique), and an exercise where students take responsibility for communicating with an owner about solving a herd-level problem. Communication is a specific category in the grading rubric for the rotation.

N addresses ethics implicitly, by modeling ("We try to model good ethical behavior on the assumption that it will only go downhill from there"). N does give a lecture to the Small Ruminants Club on extra-label drug use, which has strong ethical implications. In the rotations, N will discuss the ethical implications of specific cases that present. N welcomes those discussions. Ethics is not specifically part of the grading rubric for the rotations, but unethical behavior by students would be dealt with under other categories. N feels that self-management skills are very important for students, but is unsure of how much of that is teachable. N does not explicitly address self-

management in courses and rotations, but again thinks that modeling of conflict management and dealing with stress is something that students see during rotations, and that students often respond to and adopt some of the strategies that they see. N also notes that because there is extensive contact with students during each rotation, there are many opportunities for informal discussions on a wide variety of topics, including topics related to self-management. Poor self-management in terms of interpersonal skills and working as a team would be assessed under several categories of the grading rubric.

N briefly discusses the human-animal bond during lectures in the first year Animal Production Systems course (telling the students not to make assumptions about the human-animal bond when dealing with food animal practitioners). It is not generally discussed as much in the rotations because the assumption is made that students already understand it (and are often very familiar with farming). N readily acknowledges that "we are not good models of business management", but sees that as at odds with our educational mission. "They have a short time with us, and they have the rest of their lifetime in practice." N feels that the rotations model certain aspects of practice management (ie respect for personnel), and that students are made aware of costs and economic issues in the industry. N addresses career opportunities with students extensively, mostly on an informal mentorship basis. Career opportunities in production medicine are also explicitly addressed in the APS course.

Faculty member K.

Faculty member K teaches in the didactic courses Introduction to Veterinary Medicine, Clinical Orientation, second year Principles of Medicine, and third year lecture/lab courses. K teaches in the medicine component of Large Animal Medicine

(and Medicine/Surgery, Medicine/Therio) rotations, and has experience in an administrative position at AVC. The didactic lecture courses do not lend themselves to addressing communication; K tries "to engage students so there is two-way conversation", but communication is not evaluated or assessed. There is an exercise in the third year lab course; students do a physical exam on a clinical case in the veterinary teaching hospital and present their findings to the group. K sees this as an exercise in "their ability to communicate their findings", and is assessed. In the large animal medicine rotations, students are assessed in several ways on their ability to communicate. Students are responsible for presenting during "barn rounds", and formative feedback is provided both immediately and at greater depth one-on-one. Communication is assessed on the grading rubric for the rotation, and it includes "how they participate in individual and group discussions and rounds" as well as in a case presentation. K has participated in the Client Communication rotation, and feels that it is difficult to teach those specific communication skills in the clinical environment (for example, while there is opportunity for observation and modeling, K does not observe every interaction that students have with clients, and students do not observe every interaction that K has with clients). K has asked for a speaker phone so that there can be more observation/modeling of client and referring veterinarian interactions.

In the didactic courses, ethical implications may come up (ie with vaccination), but not frequently. Ethics are addressed in the rotations as cases present themselves; if there are ethical issues, then they will be addressed, but there is no dedicated time to discuss ethics. In the rotations, unethical behavior by students would be immediately dealt with and would most likely result in failure of that rotation. Self-management is not

explicitly taught in any of K's courses. In the rotations, K will give feedback at the mid-block evaluation (a one-on-one discussion with the student) which may include self-management issues (including stress management, ability to work in a team, self-awareness, and professionalism). Human animal bond may be rarely mentioned anecdotally in lectures by K. Issues around the human animal bond would be discussed as situations arise in the rotations (ie euthanasia). K feels that "if there's one soft skill that students have, with few exceptions, it's over-appreciating the human animal bond, they're very perceptive, grounded in understanding, empathic in that area".

Practice management is not explicitly taught, but K tries to raise student awareness of the financial implications of treatment choices by involving students in developing estimates and updating bills. K gives a series of lectures in the Introduction to Veterinary Medicine course on career opportunities. K also provides informal advice and mentoring to students interested in exploring potential career paths.

Summary of Faculty Interview Findings

During the interviews, faculty members were asked if they addressed the nontechnical professional competencies in each of the courses to which they contributed. Each of the competencies was addressed in order, and if it was addressed in a course, further questions explored how and why. Appendix H is the Composite Curriculum Map which indicates whether or not a competency is addressed in a course, and faculty responses are coded under the "Taught" curriculum. However, the answer to the question of whether a competency was addressed was very seldom "yes" or "no"; the most common answer was, "Well...." In most cases, there was often some way that the faculty member addressed the competencies. Faculty address the competencies in a number of

different ways, implicitly through behavioral modeling, through informal mentorship relationships, though unscripted anecdotes in lectures, and by taking advantage of "teachable moments" (Land & Strand, 2008) or situations that arise as a result of individual case presentations or questions during lectures. For some faculty, addressing the competency in any of these ways may have been a major or minor component of their course. Faculty were very seldom able to unequivocally say that they do not address a competency. All positive responses are coded in the composite map, however minor or indirect the faculty member indicated that the competency was addressed. The descriptive summary of faculty responses is presented in Appendix I. Including even minor and indirect responses as positive may suggest over-representation of the competencies; the descriptive summary clarifies whose which the faculty member identified as minor, indirect, or implicit.

Faculty were asked during their interviews to reflect on the level of expertise they expected of students in those courses which addressed the competencies. This was an open-ended question, and there was a great deal of variation in how individual faculty members answered. The wide variability of answers, as well as differences in interpretation of the question, made coding this information problematic. While level of expertise is included in some of the faculty case studies, that data is not included in the curriculum maps.

In addition to discussing where and how they address the nontechnical professional competencies, faculty also freely shared their personal teaching philosophies, and the personal and professional experiences that have shaped them as veterinary professionals. These rich reflections are impossible to reduce to data on a

curriculum map, but I have tried to capture their experiences in the written text of the case studies.

Student Focus Groups

An email was sent to all AVC veterinary students, describing the research project and inviting them to participate. Student who were interested in participating responded by email; there were four volunteers from the first and third year classes, 10 volunteers from the second year class, and five from the fourth year class. A follow-up email with more information was sent to those students, and scheduling options were explored. With the exception of the second year class, all students who initially volunteered participated in focus groups. Because there were so many volunteers from the second year class, eight students were randomly selected using a random number generator; one of those selected was unable to participate at the scheduled time, so ultimately the second year focus group had seven participants.

All focus groups took place in the Biomedical Sciences Seminar room (AVC 2306NA). The process for each of the four focus groups was the same, regardless of class year. Before the students arrived, flip-chart paper was posted on the walls; written on these papers were the six nontechnical competencies, as well as a listing of all DVM courses that group of students had taken (ie the first year curriculum for first year students, first and second year curriculum for second year students, etc). At the beginning of each session, the goals of the research project were explained, and the competencies were defined. Students were given markers and post-it notes, and were instructed to place post-its on the curriculum flip charts to indicate which competencies were addressed in each course. For example, if they felt that communication was

addressed in Macroscopic Anatomy, they were to write a "C" on a post-it and place it on the chart next to "Macroscopic Anatomy". During this time there was casual discussion among the students and with the researcher to clarify the definition of the competencies (this part of the session was not recorded). After the students were comfortable with their choices, the subsequent discussion was recorded. Students were guided through the curriculum, and asked to elaborate on the courses where each competency was addressed. The discussion was guided based on the competencies, so that communication was discussed in courses of the first year of the curriculum, then in the second year. After discussion of communication, then ethics was addressed sequentially through the curriculum, followed by each of the other competencies.

After the completion of the focus group, the flip chart information was transcribed to a curriculum map for each focus group, indicating the number of responses for each competency for each course. After completion of all focus groups, a master student map was constructed showing responses for each class year for each course. Additionally, the recorded focus group discussions were transcribed. The recordings were transcribed into Microsoft Word® using voice-recognition software (Dragon Naturally Speaking®, Nuance Communications). Summaries were prepared from each focus group based on the six competencies. All quotes in the written summaries are attributed to students participating in that focus group.

Fourth year focus group.

Five students participated in this focus group (four female, one male). Their career interests include small animal, exotics, and production/aquaculture. None of the students had a specific large animal focus. Students in the fourth year focus group were

asked to reflect back on the entire four year curriculum, but to put most emphasis on fourth year rotations.

Fourth year focus group: Communication.

Students felt that communication is "definitely something we should learn before we graduate". In the first year of the curriculum, communication was addressed in those courses where students worked in groups (Macroscopic Anatomy, Structure and Function). In order to complete the assignments, it was necessary to communicate with other members of the group. There was generally no explicit instruction or coaching on how to work in groups (with the exception perhaps of Introduction to Veterinary Medicine). Clinical Orientations also required group work, and negotiating schedules and teamwork to care for the teaching animals. One student could not see how explicit instruction on how to work in groups would be helpful. In the second year of the curriculum, students did not identify many courses with a communication component; there was little group work, and the courses are largely didactic lectures. One second year course was singled out due to what the students felt was exemplary communication by the professor (who made an otherwise uninteresting topic interesting). Another second year course was singled out because of its focus on scientific terminology (students had to learn to communicate in a new "language", that of radiology); after some discussion, the language/scientific terminology focus of pathology was also highlighted. In the third year, communication is explicitly addressed in the Junior Surgery lab, particularly with the simulated client exercise. Students singled out one third year course that they felt modeled a bad example of communication by the professor. After discussion, they identified additional third year courses whose faculty were models of

good communication. The fourth year students displayed a high level of maturity as they discussed individual courses and instructors: instructors that they recognized for excellence were named as individuals, while those that they were critical of were not mentioned by name. The courses that students singled out with regard to communication by the instructor were courses that they had minimal interest in with regard to subject matter; they commented that despite the subject matter, the faculty member could engage their interest (or not) based on their communication skills. Two third year courses, companion animals systems and Large Animal Medicine, were discussed as having faculty who have private practice experience, who will tell students in their lectures about specific examples of client communication.

In the fourth year rotations, the interdependence of students is emphasized and many of them have become aware of how their actions can affect their classmates (ie do they help one another with the workload, or is the attitude "everyone for themselves"?). They discuss how their own experiences on rotations have been strongly shaped by their classmates, the house officers, and the clinicians. Experiences on rotation can vary widely depending on the personality of those individuals, and how well the team meshes together. For example, the students in the focus group were involved in at least three different large animal medicine rotations, and each cohort had distinctly different experiences. Some students experienced more limited opportunities to communicate with clients while in Large Animal Medicine vs Small Animal Medicine; while this may reflect true differences in the procedures or culture of the large animal hospital, students felt that it was strongly influenced by the preferences of individual clinicians. The Client Communication and Community Practice rotations were singled out by students as

having a significant positive impact on developing their communication skills. Students discussed whether Client Communication should be a required rotation. They realize the importance of having a mature, motivated, and committed group of students in the rotation in order for exercises with role-playing and simulated clients to be successful. Unmotivated students would significantly detract from the experiences of their peers. Students further discussed weaving communication throughout the four years of the curriculum, rather than trying to do it all in fourth year. They recognized the need to progress through levels of communication exercises (lectures/discussions in first year, introduce role-plays in second year, develop role-plays with more complicated cases in third year) as students became more comfortable working effectively in groups.

The Community Practice rotation was singled out as one where the instructors have excellent communication skills, and take the time to allow students to develop those skills (ie role-play exercises, conference calls with clients); "that rotation more than any of the other clinical ones really made an effort for communication". Students are assessed on communication skills in rotations (including Small Animal Medicine and Anaesthesiology), and also received feedback from faculty at mid-block evaluations. On Small Animal Medicine, when there are communication problems with clients (difficult/abusive clients), students will ask interns or clinicians for help; usually, this means that "they don't sit down and say, well this is how you would resolve the situation, they just kind of put it on their shoulders and go deal with it". Other clinicians will have the student sit in on three-way (conference) calls so that students can see how they deal with the problem. Students appreciate that interns are supportive of their efforts to deal with difficult clients, especially when they allow students to make the decision about who

will communicate with the client. In Small Animal Surgery, students felt that they have more responsibility for communicating with clients (making phone calls instead of interns/residents making phone calls). They also felt they have to communicate and work with each other as a group more, because of the time demands inherent in surgery.

In Large Animal Medicine, students were exposed to different types of clients, and had to learn how to communicate effectively to them. Students who did not have a large animal/animal science background found it difficult to learn common/slang terms ("I don't really know what a flake of hay is. But I don't want to ask, because that is a stupid question."). One student also felt this was an issue in didactic courses ("I had no idea what they were talking about, and they just assumed that I did. I was a bio major.").

Fourth year focus group: Ethics.

Students were asked to identify where ethics (defined as both personal and professional ethics) was addressed in the curriculum. In the first year of the curriculum, Animal Behavior and Welfare was identified as having a significant explicit component of considering ethics in the context of animal welfare issues. In Macroscopic Anatomy, first year students dissect canine cadavers which were obtained from the PEI Human Society post-euthanasia; students are told about the source of the cadavers, and are expected to treat them with respect. One student commented that she was "a bit backwards in my learning" because she did not appreciate the significance of working with a cadaver until she had the experience of working with live Humane Society dogs. Ethics is explicitly addressed in Introduction to Veterinary Medicine in a series of lectures. One student discussed how Principles of Epidemiology had an ethical component for him, because he was involved in an issue of academic integrity in that

course; he continues to feel that he was wrongly treated. Fourth year students did not identify any courses in the second or third years of the curriculum which address ethics, although after some discussion students felt that discussions about pain management in Principles of Anaesthesiology and Surgery addressed ethical issues. Students also suggested that any courses which use live animals in labs addressed ethical issues.

In clinical rotations, ethical issues were discussed as they arose with the cases which presented during that rotation. In particular, students spoke about the Exotics/Lab Animal Medicine rotation ("It's a huge part of lab animal medicine. People are at such polar opposites of whether it's ethical or not"), Veterinary Acupuncture ("In what circumstances is it proper to use complementary therapy?"), Large Animal Medicine, and Small Animal Medicine. In the large animal hospital, animals are often donated to the hospital by the owners; the animal will be used for teaching purposes and then either humanely euthanized or adopted. Students see the value of this, however there can be ethical considerations about the number and type of procedures to be performed on an animal before euthanasia. These considerations can be brought by students or by faculty clinicians; there can be disagreement between faculty members over appropriate use of individual animals. In the small animal hospital, students discussed ethical issues related to finances ("I find it really, really, really difficult when you have a client that can't afford something, and a patient that really needs something, and it's life and death.")

Fourth year focus group: Self-management.

The meaning of "self-management" was explained to students: those things you need to be able to manage about yourself in order to function in the world, including emotional intelligence, anger management, time management, and conflict resolution.

Given that broad definition, one student felt that all courses implicitly addressed self-management ("the balancing act for the whole four years"). Introduction to Veterinary Medicine explicitly addressed self-management with a series of lectures. Courses with group work required students to develop good self-management skills, although they were not necessarily explicitly addressed. Students specifically mentioned Structure and Function, and how the dynamics and personality of the first year class often led to challenging group dynamics ("they are so gung ho when they first get here, and everybody thought they have to prove how smart they are to everybody else. It was a volatile environment"). Students felt that they had to learn how to work in groups on their own; one student offered the following analogy: "It's like clicker training. The dog doesn't know exactly what you want it to do, but when it does the right thing it is rewarded. But it's not really clear exactly what you wanted it to do. I'm not getting anywhere by acting like that, so maybe if I'm nicer I'll get somewhere?"

In clinical rotations, students are expected to display initiative and time management skills, but there is generally no explicit instruction. In general, self-management skills may not be addressed unless a student exhibits problems.

Fourth year focus group: Human animal bond.

In the preclinical curriculum, the human animal bond is a large component of the Animal Behavior and Welfare course in the first year, and in those courses which address euthanasia and grief (Introduction to Veterinary Medicine, Principles of Medicine). The simulated client exercise in Small Animal Junior Surgery also addressed the human animal bond.

Students felt that every clinical rotation where they met with clients developed their understanding of the human animal bond. This was true in the small animal hospital as well as the large animal hospital. In the large animal hospital, students learned to appreciate the bond that different types of clients had with their animals, and to not make assumptions about different types of clients based on "whether they are a farmer versus a city person or the species of animal that they have". Students who did not have a large animal background developed an understanding of the bonds which may exist in cattle farmers, racehorse owners, and other production groups. The Exotics/Lab Animal Medicine rotation also addressed the unique human animal bond which can exist with owners of pocket pets.

Fourth year focus group: Practice management.

Students were asked to consider all aspects of the business of veterinary medicine. In the preclinical curriculum, there are a series of lectures on practice management in Introduction to Veterinary Medicine. Some courses, such as Health Management discuss practical issues of vaccine protocol costs. With regard to the financial implications of what they do in the clinics "I think we're in a bubble here. It's not really talked about", although there are some specific clinicians and rotations which involve students more in understanding the costs of procedures. Students find it especially difficult when clients decline treatment options due to financial considerations.

Fourth year focus group: Career opportunities.

Students identified two first year courses, Introduction to Veterinary Medicine and Animal Production Systems, as explicitly addressing career opportunities; in the second year of the curriculum, they also identified Aquaculture. They felt that the range

of career opportunities in veterinary medicine is implicitly addressed based on the different experiences of individual faculty members. Instructors talk about their own experiences in and out of the classroom, and students learn about what opportunities are available based in part on those discussions. Some faculty members put special emphasis on explaining their specialty to students (such as the pathologists in the Diagnostic Services rotation). Students also felt that they learned more about and had greater appreciation for certain specialties when they worked with clinicians that had excellent clinical and communication skills.

Students also discussed the external clinical experiences and rotations that they participated in. These experiences ranged from general private practice to wildlife/zoo (Kruger National Park, SA). Students felt that these rotations addressed career opportunities both implicitly and explicitly ("That definitely made me see different career opportunities as well. It made me reevaluate what I want to do when I graduate"). In addition, some students found these external clinical experiences invaluable for exposing them to or helping them to develop competencies not addressed at AVC.

Third year focus group

Four students participated in the third year focus group; all four are female. Student had an opportunity to put post-it notes representing the competencies on the list of the three year preclinical curriculum, and the following discussion was meant to discuss the important courses and issues. Each of the competencies was discussed separately, and the curriculum was approached from first to third year. The students had recently chosen their fourth year rotations, and also discussed their upcoming transition from the preclinical to clinical curriculum.

Third year focus group: Communication.

In the first year of the curriculum, students identified courses as addressing communication if the course involved extensive group work or if it were heavily dependent on scientific terminology ("I put in Microanatomy just for the terminology"). Several courses involve group work in the first year (including Macroscopic Anatomy and Structure and Function). In addition, some courses do begin to address client communication in their lectures ("Parasitology, because I was thinking of communication in the sense of talking to clients"); APS and Epidemiology also fall in this category. Students felt that the way that communication was addressed was "implicit in most of them....we learn more about actually communicating in some of the ones where it's not actually taught to you, but you have to use it to get through. Like anatomy, or anything where you have a group which you are working with...if you don't learn it you just wouldn't get through". Courses which explicitly addressed communication included Introduction to Veterinary Medicine, Structure and Function, Animal Behavior and Welfare, and Clinical Orientation ("we talked about client communication and how to talk to your peers").

Students identified some courses in the second and third years of the curriculum which address communication in other ways: describing radiographs in Diagnostic Imaging, describing lesions in Pathology, communicating with different user groups (ie CFIA in Public Health). Students discussed the case presentation exercise in the Large Animal Medicine course as important for learning to communicate case histories. The Junior Surgery course was also discussed as being important for communication, in the context of intense group work, but also the simulated client exercise.

Throughout the three years of their coursework, students commented on the importance of individual clinicians in conveying implicit components of the curriculum ("When we're learning things that aren't explicit but implicit, it's not the class, it's the prof that's teaching it"). Faculty members who are excellent communicators, or who are willing to bring their practical experience into the classroom, are valued by students regardless of which course they are teaching in (and are especially valued if they teach in multiple courses). Even brief anecdotes of practice experience by lecturers are remembered by students.

Students discussed how experiences outside of veterinary school contributed to their communication skills. These experiences ranged from jobs (beauty salon receptionist, veterinary technician) to clinical externships. Job experiences can help improve communication ("trial by fire...you learn you said the wrong thing when somebody ends up crying...you learn to say the right thing pretty quickly"). External clinical experiences can show students the importance of communication in veterinary practice ("I'm looking at taking a specialty based on not the actual specialty, but on the communication around it"). Students identified a feeling of transition as they enter third year "They're stepping it up a bit, the whole expectation", and felt that sometimes this is a difficult transition for which they are not prepared by the curriculum. Jobs or externships may help make the difference for students as they transition into third year "some people might have a worse transition because past experiences or lack of past experiences".

Third year focus group: Ethics.

Students identified Introduction to Veterinary Medicine and Animal Behavior and Welfare as first year courses that explicitly address ethics. Introduction to Veterinary Medicine has a series of lectures on ethics, and also discusses personal ethics in the context of academic honesty. Animal Behavior and Welfare addresses ethics on several levels, and "really is what that class is all about". Students also identified ethics discussions occurring around the following issues: euthanasia, use of animals in production systems, and use of teaching animals. These issues were addressed in several different courses throughout the preclinical curriculum. Euthanasia is addressed in Principles of Medicine in the second year, but also "in the food animal courses...when should you stop treating and euthanize? How far is too far?" The different production courses also sometimes address ethical issues, "You are working for the owner, it is a service industry, but you do have a moral obligation to help animals". Students felt that there is a progression through the preclinical curriculum of how ethics is presented "it was brought into our heads in first year, but it's the professors now that are impressing on us what may be ethical...as far as treatments of animals".

Students discussed their own ethical considerations with regard to the teaching animals, and to the junior surgery patients ("I don't disagree with teaching animal use at all. I just sometimes disagree with the way they're used. Or not even used, the way that they're treated throughout that use"). Some students felt ethically challenged by some of the uses of and decisions regarding teaching animals, and felt themselves to be in conflict with their professors. Overall, while they may question some decisions, they recognize

the rationale of "it's for the greater good" with regard to their own use of animals in their education.

One student expressed disappointment with veterinary school with regard to ethics, "I thought that we were going to be the leaders of advancing welfare standards. And I found that most of the time we're just taught something, and then we accept it, and we move on and do it that way". She felt that ethical considerations of welfare (especially in large animals) is only superficially covered. Other students disagreed, and felt that the options presented in those classes reflected the economic reality of practice. Those students did acknowledge that "a high sensitivity, a high awareness" of ethical and welfare issues is necessary for the veterinary profession to move forward, and they recognized and respected their classmate for her values.

Students were divided over whether ethics can be taught in veterinary school. In terms of basic personal ethics, "if you haven't learned how to be a good person by this point I don't think its vet school's job to teach you". Another student doubted the effectiveness of teaching ethics: "If you have bad ethics, they can teach you how to pretend that you have good ethics". Students felt that there should be severe consequences to unethical behavior such as academic dishonesty ("if a person is doing that [cheating] you don't need to go teach them ethics you need to throw them out"). Students felt that there may not be a clear distinction between personal and professional ethics, that "if you think it's okay to cheat on tests why is it not okay for you to sell drugs out of your drug box?" While not disagreeing about personal ethics, other students felt that "you can teach ethics in some ways...you can take cases, and go step by step through them, and outline the issues that are being presented".

Third year focus group: Self-Management.

With the exception of Introduction to Veterinary Medicine, students did not feel that self-management is addressed explicitly in the preclinical curriculum. It is a very important component in courses which have group work, but "I don't think it was ever actually taught". The third year junior surgery course was highlighted as one that requires a high level of self-management to work effectively in the group, but "it wasn't taught, it was like, here you go, make it work". Another student joked that "I don't know if it's just taught by throwing so much at us".

Some students wondered if "it's not vet school's job to teach you time management and self-management. It's something that you need to have learned". Other students thought that there are ways that self-management could (and should) be addressed in the curriculum, "Can't help but think that we're about to get a trial by fire going in the fourth year, and the whole self-management thing. And maybe, there's some room for a talk". Some students are comfortable approaching clinicians for informal discussions and advice ("Dr..., could you tell me about your fourth year?"), but not all students do this. This informal "mentorship" also happens as students ask advice of the friends in the upper years. Those students who are not comfortable approaching faculty, or who do not have friends in upper years may miss out on this informal mentorship network. Students in the focus group felt that if there were mentorship opportunities available to all students, "maybe there wouldn't be so many people burning out". One student observed that in her opinion, faculty "don't have balance in their life. They've dedicated themselves to their profession" and therefore are not the best role models for work-life balance.

Third year focus group: Human Animal Bond.

Students identified several courses in the first year which explicitly addressed the human animal bond. These included Animal Behavior and Welfare, Introduction to Veterinary Medicine, and Animal Production Systems. It is also explicitly addressed when discussing euthanasia. Individual faculty members may bring up issues around the human animal bond, but other than those previously mentioned courses there are few lectures solely dedicated to the human animal bond. One student felt that it is "forgotten in second and third [year], and then we're supposed to remember it in fourth". Other students felt that it was implicit throughout the curriculum "it is in there with everything [when] we say these are the options we can offer owners"; students felt that this is especially true in courses which discuss advanced treatment options such as cardiac pacemakers and cataract surgery. Despite the largely implicit manner of addressing the human animal bond, students "feel like we get it. I don't feel that it is a problem". One student drew a comparison with her own experiences in the health care system; she felt that physicians ignored that fact that "I'm still a person" rather than just a case. In contrast, she felt that veterinary school puts far more emphasis on the human animal bond ("don't forget your patient is someone's pet"..."we definitely get more of that than in human medicine").

Students also discussed their own attachment to their patients, and their own feelings about animals as pets and animals as patients, especially as they move through the curriculum ("we get so caught up in our colleagues, and how our colleagues act towards animals, and act towards the people who own the animals that we forget our idealistic stuff from first year"). One student remembered that in her first year, she "felt

like the fourth years were very cold, and case oriented" yet by the time she reached third year, "I want to be able to have the experience of doing a procedure". Some students saw the need for balance, to develop the ability to "distance yourself from cases".

Third year focus group: Practice management.

Students initially felt that practice management is addressed "in Introduction to Veterinary Medicine, and then not at all". After further discussion, they agreed that some of the business aspects of practicing veterinary medicine are also addressed "with the large animal people, the dairy, beef, swine courses, because a lot of what you're doing has to be tied to economics". Practice management is also addressed indirectly in the Animal Behavior and Welfare course, in the context of expanding a practice by including a behavior service. A second year health management course had a group project which may have included a cost-benefit analysis. The third year junior surgery course indirectly exposed students to some issues related to practice management, including integrating and working with technical staff.

The Career and Practice Management rotation is currently offered to all veterinary students (instead of being restricted to fourth year students). Participants in this focus group had already taken this rotation, and felt that it was an extremely valuable and unique course in the curriculum that should be a required course ("should be part of our core rotations. It's so important"). One student wondered how much they really need to learn specifically about practice management, as opposed to learning about the limitations of their own knowledge ("Should someone come in and talk to us about alternatives to us managing our practice? Like how would you go about hiring a practice manager?").

Third year focus group: Career opportunities.

Students identified Introduction to Veterinary Medicine as explicitly addressing career opportunities. Most students felt that "Going to vet school itself is an introduction to all the career opportunities". They felt that faculty act as models for their own specialties, with almost all of the courses "just as you're learning about it you're being exposed to that as a specialty". Some faculty, especially those in non-traditional areas such as aquaculture and exotics, are more explicit in promoting their specialty. Students may not get as much "direct advice" on research, yet they also remembered that many faculty offered to speak to interested students about research outside of class.

One student felt that she had a very limited background and experience in veterinary medicine, and "coming to vet school, I didn't know you could have a specialty...I thought you were going to be a large animal vet or a small animal vet". She felt that career opportunities could be addressed more explicitly in the curriculum. Other students noted that the curriculum gives them "the resources to go find out more".

Students also find out about opportunities outside of the curriculum, through clubs, externships, summer employment, and volunteering.

Second year focus group

Seven students participated in the second year focus group (one male, six female). They were asked to consider their experience with the AVC curriculum to date.

Second year focus group: Communication.

Students identified communication as being addressed in almost all of their first year courses, and in all of their second year courses. The students discussed how they felt that different aspects of communication were addressed in individual courses; these

aspects ranged from working in groups (peer communication), giving presentations, learning terminology, client communication, and observing instructor's communication styles. Students felt that "as a whole there was a lot more implicit instruction on proper communication rather than explicit". Introduction to Veterinary Medicine explicitly addressed communication through lectures, but the students did not feel this was effective ("it was nebulous, it was never concrete"). One student suggested that it would be helpful if there was a faculty member "who was in charge of meeting every single person, and getting to know us better to see what we could work on as individuals and as future vets". Another student wondered if client communication skills would be more important later in the curriculum (is that more important for first year, or down the road?), and that it would be difficult to add a communication course into an already full curriculum.

Despite identifying communication as a component of almost all of their courses, not all students were comfortable with their future ability to communicate as veterinary professionals. One student felt that the instruction in communication in veterinary school is significantly less than that in medical school, where there are simulated patient exercises "right from the first week", whereas in veterinary school "we haven't had anything first through fourth year, and then in four year you're given real patients, with clients and owners, and we're supposed to be able to talk to them. We're going to be lost".

Some students felt that they had well-developed communication skills from undergraduate experiences (ie humanities, theatre) and that this background has helped them in veterinary school ("if you learn the skills at some point, you'll at least have that foundation"). One student felt that the science focus of veterinary school has been

detrimental to her ("I'm going to leave [vet school] as a worse writer and a worse communicator").

Second year focus group: Ethics

Students identified several courses which explicitly address ethics in the first year curriculum. These included Animal Behavior and Welfare, Introduction to Veterinary Medicine, and Animal Production Systems. The Macroscopic Anatomy course coordinator discussed ethics in the context of showing respect for canine cadavers. Some of these courses addressed professional ethics, but others (Introduction to Veterinary Medicine) also addressed personal ethics. Academic honesty was an ethical issue that was explicitly addressed in some courses, as some labs give students more autonomy during exams. In Animal Behavior and Welfare, real clinical cases were discussed, so students had an ethical obligation to maintain confidentiality.

Students who did not have a background in large animals or agriculture often had a poor understanding of ethical issues in production systems ("we haven't thought about the ethics of pig farming"). Students with a primarily small animal background felt that "the way that lots of farm people would treat animals, wouldn't be considered ethical if you were to apply it to companion animals". One student self-identified as being "super sensitive" with regard to animal welfare and her own bond with animals, and felt "the spiritual side of things is not addressed", and that there could be more help for students who have difficulty with human, welfare, and ethical issues within the profession.

One student commented that "I feel the curriculum allows us to open our eyes to what is out there, and develop our own ethics based on our experiences and what's put forward in the curriculum".

In the second year of the curriculum, students felt that there was more focus on professional ethics ("your ethical right, obligation, to tell your client about zoonotic diseases, and complications"). Personal ethics had a greater role in first year.

Second year focus group: Self-management.

Students felt that the curriculum as a whole addresses self-management in an implicit way, in that demanding courses require good self-management. It was explicitly addressed in Introduction to Veterinary Medicine in the context of learning styles and a discussion on stress management. Students felt that they did not learn specific strategies for time management or stress management ("the question is how"). One student felt that "rather than tell us that we could manage ourselves, they told us where the therapist's office was".

Although it was not necessarily explicitly addressed, working in groups required students to develop good self-management skills ("...to not kill the other people in your group...there was a lot of anger management in that course.")

Some instructors summarize information in a way that highlights the focus of exam questions, and students saw these courses as addressing self-management ("he did a good job of managing our time, by giving us a summary of questions"). Students felt that courses addressed self-management when the instructor "would tell us what the big question was...he was good at telling us exactly what to know".

Second year focus group: Human animal bond.

Students felt that the human animal bond was addressed explicitly in the first year of the curriculum in Animal behavior and Welfare, Introduction to Veterinary Medicine, Macroscopic Anatomy, and Animal Production Systems. There are overlaps between the

human animal bond and ethics, for example in how cadavers are treated in Macroscopic Anatomy ("I did put it up there...what we were saying before...about being respectful"). Animal Production Systems addressed how "there's a different kind of human animal bond".

In the second year of the curriculum, students learned about taking the human animal bond into consideration when communicating to clients about difficult issues, including zoonotic diseases, surgical complications, and poor prognoses.

One student discussed her own personal bond with the teaching animals, and how the human animal bond between students and the teaching cows is not acknowledged when those animal are sent to slaughter.

Second year focus group: Practice management.

Students identified a variety of courses which address practice management. Some courses, such as Diagnostic Imaging, Clinical Orientation, and Anaesthesiology, were identified because they discuss technical or diagnostic equipment (which students feel would have an impact of the business of the practice). Other courses, such as Animal Production Systems, explicitly address the economics of the industry and how that relates to the veterinarian. Parasitology addresses the implications of different vaccination protocols. Animal Behavior and Welfare addresses the practice implications of ethical and welfare issues ("Will your hospital do declaws?").

Some students had the opportunity to take the Career and Practice Management rotation following their first year. They found this to be an extremely valuable course ("it did a really good job"). One student questioned its relevance for first years, and admitted that "I really don't remember that much of what he said. I would want to take it again".

Second year focus group: Career opportunities.

Students identified Introduction to Veterinary Medicine as the primary course where career opportunities are explicitly addressed. Individual courses taught by specialists also raised their awareness of the range of career possibilities. Many faculty promote their own specialty, "trying to get students to go to their team".

Some students, depending on their background, had a very limited understanding of clinical specialties when they entered veterinary school ("I thought you could be a vet and that was it"). One student expressed a continued lack of understanding ("How do you even specialize in something? I don't even know how to do that").

First year focus group

Four students participated in the first year focus group (three female, one male). They represented a range of experiences and interests gained prior to veterinary school (small animal private practice, research, exotics, large animal). They have the least amount of experience with the curriculum, and were only able to comment on the first semester and part of the second semester. First semester students were eager to critically evaluate their courses. They also expressed dissatisfaction with their classmates' behavior as professional students. They often expressed opposing opinions to one another.

First year focus group: Communication.

Students identified different aspects of communication addressed in the first year curriculum. Some instructors introduced client communication; Animal Behavior and Welfare, Parasitology and Animal Production Systems all had lecturers tell students "this is what you tell the client". Other courses address communication in terms of proper

scientific terminology ("in micro, you might understand something, and you might be able to describe something, but you have to be able to describe it the right way").

Explicit delivery of communication in the curriculum was identified in "one section of Introduction to Veterinary Medicine". This was delivered in a lecture context, and students wondered "How do you teach that without being dreadfully boring?".

Students discussed how communication is part of professionalism, both as students and as future veterinarians ("You have to learn how to talk to each other as colleagues as well. You don't have to get along with people, you don't have to like them, but you do have to talk to them and be respectful. And you can hate them all you want, but you have to be a professional while you're in this building").

First year focus group: Ethics.

Students felt that ethics were explicitly addressed in a number of first year courses. In Macroscopic Anatomy, they were told to have respect for the cadavers. Animal Behavior and Welfare has a significant component on ethics, and exposed students to different viewpoints ("a lot about what's going on in the world, and there's a lot that I wasn't thinking of before the class that was pretty common sense afterwards"). Animal Production Systems also addressed ethics, and exposed students to different points of view ("what was viewed as ethical in large animal is very different from what is viewed as ethical in small animal. And I think for a lot of people it was a wake-up call"). Epidemiology introduces students to the ethics of animal use in research.

Students felt that personal ethics could be addressed more strongly in the first year curriculum ("...really it should be one of the first things that's addressed in Introduction to Veterinary Medicine"). Some students felt that "A lot of people don't

realize that they're actually in a professional school. Well, they realize it, but they don't act like they're in a professional school". Students felt that certain behaviors should have been "nipped in the bud", including academic honesty, "...talking in class, coming late to class". Students felt that proper professional behavior needs to include "...showing respect for your classmates, showing respect for your professors...a few people seem to have missed the boat on that".

First year focus group: Self-management.

In the first year focus group, self-management was the first topic that students discussed. Students had different views of how self-management is addressed in the curriculum. Some felt that "every course has self-management in it", while others felt that certain courses are "just pure science". Students who felt that self-management was implicit throughout the curriculum felt that "you need to learn to manage yourself in every class" and that "a secondary perk can be just as important as the primary goal". Students who did not see self-management as being addressed in many courses felt that "when you're here to learn parasitology, you're here to learn parasitology".

Students did agree that self-management was explicitly addressed in Introduction to Veterinary Medicine, through a series of lectures, and through exercises on learning styles. Some students questioned the effectiveness of the course ("not a lot of people paid attention in that class"). They also see the learning styles exercise as an isolated part of the curriculum ("they don't build on it at all"... "it just sort of drops off after that").

Students felt that self-management is assessed only indirectly in terms of academic success ("...like if you do lousy, you're obviously not managing your time well"). Another student presented an opposing view which emphasized wellness,

balance, and stress management: "There's working and then there's actually doing well for yourself, having a life outside of vet school and being balanced. It's so important...and I don't think that's actually really touched on at the vet school as much as it should be...I don't really think that the curriculum cares how you manage your time. If you get the grades you're good. If you're happy, that doesn't matter".

Students found that working in groups forced them to address their own self-management skills ("We need a lot of help with that"). Courses such as Macroscopic Anatomy and Structure and Function have extensive group work. Structure and Function uses problem-based learning, and while some students appreciate the practical applications, others find it difficult to adapt to this learning style ("That course is a complete joke"). It is more learner-centered than traditional didactic courses which form the majority of the first year curriculum ("You're supposed to look it up, you're supposed to have your own drive to want to learn these things. And wouldn't it be great, but people aren't doing it").

First year focus group: Human animal bond.

Students identified Animal behavior and Welfare, Introduction to Veterinary Medicine, and Animal Production Systems as explicitly addressing the human animal bond. Students found anecdotes and case scenarios especially useful ("you've got a good idea of the human animal bond whenever the teacher took a tangent to explain a case they had, how far an owner went for that animal"). Students recognize that their exposure to the human animal bond is more limited by the fact that they are only first year students ("I think we will get more into that when we get more to the clinical stuff").

Students also discussed their own bond with animals, and how that might be addressed by the curriculum ("I derive the greatest pleasure in this program of actually being with the animals, and I don't think we get to do that enough in the curriculum"). There are opportunities for student to spend time with the teaching animals (grooming large animals and walking beagles), some of these opportunities are on a volunteer basis, while others are graded course requirements. Interestingly, some students felt that when caring for animals is part of a course grade, "...once you put stress on top of it of how you need to get it done, the human animal bond just doesn't quite develop the way it should".

First year focus group: Practice management.

One student has extensive experience in a small animal practice, and felt that in every course in the curriculum "I have been able to see a certain application" to practice management. In general, though, students discussed practice management in the context of a few courses. Animal Production Systems is "probably where we get the most of it", and while that course "is more towards making money for the farmer", students are told that "unless the farmer makes money, you don't make money".

While the students who plan to go into clinical practice and have an interest in owning a practice would like more exposure to practice management, they also recognize that it might not be feasible for the first year of the curriculum. One student pointed out that after such a short time at veterinary school, "We've only got half the picture right now, and I think that's fine to start with". Students also expected that it might be addressed further in rotations.

First year focus group: Career opportunities.

Students felt that career opportunities are explicitly addressed in the first year curriculum in Introduction to Veterinary Medicine ("It's mentioned a lot"), including describing clinical specialties. Students are also exposed to different career opportunities through anecdotes about instructor's experiences in various courses. Research as a career has also been introduced to students.

One student felt that too much focus on career opportunities causes students to try to focus too early in their program ("My opinion is that we have too much, too much information about it. There's a lot of people that are starting to plan their specialty, and they're not done with their first year of veterinary medicine"). In general, with regard to career opportunities "they lay the groundwork for us knowing where it is, but we have to find it by ourselves. Which is how it should be. We're just trying to get through first year".

Summary of focus group findings

At the beginning of each focus group session, students were shown a list of the course they had taken to date, and asked to identify which of those course addressed the nontechnical professional competencies. The course lists summed up their collective experience in the DVM curriculum, and each group of students at first was taken aback, but then expressed pride in what they have accomplished. Even though the first year students recognize that they are very early in their careers, the sight of the entire first year curriculum gave them a sense of accomplishment. Seeing the course list gave them the opportunity to step back from short-term focus on daily tasks, and they refocused on the larger picture of their future in the veterinary program. The fourth year students spent

time just looking at the course list, and joking together as they reflected back over the courses that they remembered (and those that they did not remember), for the past four years.

Just as faculty had a difficult time identifying a "yes" or "no" response to the question of whether a competency was addressed in a course, the students had similar problems. They would sometimes engage in discussion as they put the post-it notes on the course list, but that was largely a solitary process. During the subsequent recorded discussion, students spoke freely about why they identified certain courses; students did express differing opinions, and a range of views was represented. Data are summarized in the Composite Curriculum Map (Appendix H). The Learned Curriculum Map (Appendix J) gives a more complete explanation of the student focus group data. This map indicates how many student responses were registered for each competency in the courses, and also gives an explanation of how the students interpreted delivery of the competency. Competencies could have been addressed explicitly or implicitly; communication could have meant learning scientific terminology or how to speak with clients. While every effort was made during the focus group to discuss all of the places that students indicated a competency was covered, occasionally there was no clear discussion about their interpretation in a particular course. If there was no recorded discussion, then a descriptor is not included on the learned curriculum map.

Chapter Five: Discussion

Like that of most veterinary colleges (Turnwald et al., 2008a), the curriculum at AVC is divided into preclinical teaching and clinical rotations. Students first learn "normal" in the basic sciences (e.g. anatomy, physiology, pharmacology), move through more didactic courses which present "abnormal" (disease processes and treatments), and the final year of the curriculum is devoted to rotations, which involve experiential learning in a practical or clinical setting. Although there are some notable exceptions of individual courses in the AVC curriculum, there is a strong dichotomy between the first three years and the final year. The science of veterinary medicine is addressed in didactic courses in years one through three, and the practice of veterinary medicine is addressed in the fourth (clinical) year. What may be lost in this description (and in the curriculum) is how to develop the art of veterinary medicine, those competencies which contribute to the veterinarian as a professional. The ever expanding body of knowledge of the science of veterinary medicine fills the first three years of the curriculum, and the crush of facts leaves little room for the nontechnical professional competencies. In the clinical rotations, students are expected to act as professionals, yet they may not have had a chance to develop those competencies. This research addresses those nontechnical professional competencies, and maps where faculty and students feel the competencies are delivered in the current curriculum.

While the primary goal of this project was to map the curriculum (Jacobs, 2008) and evaluate congruence between the official, taught, learned, and assessed curricula (Cuban, 1995; Robley et al., 2005a, 2005b), interviews with faculty and focus group sessions with students yielded a rich collection of reflections, attitudes, and insights

towards teaching and learning. It showed the dedication and passion of our faculty, and gave a snapshot into the maturity that develops as students progress though our classrooms and teaching hospital. This thesis synthesizes these reflections, attitudes, and insights into recommendations for moving forward.

Summary of findings

In the preclinical curriculum, an extremely limited number of courses are officially identified as addressing the nontechnical professional competencies. Those courses which are identified in the official curriculum as addressing the competencies are also identified as such by faculty and students in the taught and learned curricula maps. However, faculty and students also identify many additional courses where the competencies are addressed in the preclinical curriculum; most of these include implicit teaching/learning, behavioral observation/modeling, and unscripted anecdotes rather than explicit inclusion of the competencies. The official curriculum does not recognize the role of implicit teaching/learning in addressing the nontechnical competencies. With the exception of communication, there are few places where the competencies are assessed in the curriculum. While there is good overall congruence between the taught and learned maps, there are some areas of incongruence. Student may not recognize some of the indirect or implicit ways that faculty address competencies. However, students may also over-identify courses as addressing the competencies relative to faculty. Faculty may underestimate the importance of implicit teaching and learning, as well as behavioral observation and modeling in the preclinical curriculum, in addressing the nontechnical competencies.

Official Curriculum

The University of Prince Edward Island Calendar was used to represent the official curriculum. That document contains course titles which were used to construct the curriculum map, and course descriptions which were used to map the nontechnical competencies. Calendar course descriptions are listed by department, and are brief one to three sentence summaries of course content, with additional notes on contact time and prerequisites. The brevity of these course descriptions may lead to the course coordinator omitting implicit or secondary course objectives, causing an underrepresentation of the nontechnical professional competencies in the official curriculum. However, the UPEI Calendar is the document which has a comprehensive listing and description of AVC courses, and at this time is the best proxy for our official curriculum.

Employer and Alumni/Curriculum Survey themes:

The AVC Office of Academic Affairs regularly surveys our alumni and the employers of our graduates as part of ongoing outcomes assessment measures. This study examined survey results from the Classes of 2002-2007. Employers generally indicate that AVC graduates are at least "Average" with regards to all of the nontechnical competencies except for practice management. Employers generally rate AVC graduates higher with regard to ethics, empathy, and client rapport. While these survey results do provide an indication of employers' perceptions of AVC graduates, the surveys do not provide any indication of the standard or baseline the employer uses for evaluation, nor does it ask how important these skills are to the employer. There is no indication of where the AVC graduate acquired the skills (within the curriculum, before veterinary school, or after graduation). There are no consistent trends to be interpreted from the six

years of data; the mean response for each year may be strongly skewed by a small number of outlier responses. May (2008) raises interesting questions about the accuracy of veterinarians' perceptions of recent veterinary graduates compared to veterinary graduates of prior decades, and suggests that there was likely never a time when new graduates were "omnicompetent" (May, 2008, p. 573).

The Alumni/Curriculum Survey asks our graduates to reflect back on their education at AVC, and indicate whether the training they received in certain subject areas was insufficient, appropriate, or excessive. While the subject areas in the survey do not precisely match the nontechnical professional competencies in this study, the subject areas of jurisprudence, ethics, business management, and client relations were identified as closely matching the competencies. Students rank their training at AVC as less than sufficient for these four areas.

Faculty themes

All AVC faculty were invited to participate in this research project, and volunteers were solicited for interviews. This introduced potential bias into the interview pool; faculty who volunteered often did so because they have a particular interest in the nontechnical professional competencies. It was therefore not surprising that in interviews faculty expressed an overwhelming recognition of the importance of "soft skills" in the profession.

Of the eleven faculty members interviewed, ten of them are involved in teaching in both the didactic (preclinical) curriculum and in fourth year rotations. One faculty member is involved only in the preclinical curriculum. The dichotomy between didactic courses and clinical rotations was readily apparent in faculty interviews and the

dichotomy was apparent on several different levels. The didactic courses are seen as an efficient way of transmitting factual information to students. It is a traditional part of higher education, and the didactic lecture course serves as our academic unit of currency. However, there are limitations to this teaching methodology, and faculty members readily acknowledged that there are things they feel they cannot do in a lecture to 60 students. Some faculty members expressed frustration and dissatisfaction with the didactic courses, and admitted that they would be bored sitting through their own lectures for extended periods. However, Macpherson and Kenny (2008) suggest ways that basic sciences faculty in medical schools can address professional competencies in their teaching, and suggest that the professional competencies should not be seen as the purview and responsibility solely of clinicians. Faculty who do try to incorporate the nontechnical professional competencies in lectures typically use unscripted anecdotes. The stories they have told during lectures are indeed powerful; during this study, on more than one occasion a faculty member gave an example of an anecdote during their interview, and that same anecdote was repeated by students in the focus groups.

Just as faculty members readily addressed the limitations of didactic teaching, they also expressed the rewards of teaching rotations. Clinical rotations are one to three weeks in duration, and generally have three to six students. These are intense experiences for faculty and students; Lane and Strand (2008) describe the benefits of clinical teaching from the faculty perspective. The educational model of clinical rotations (students draw from their own experiences, problem-centered, real-world applications, experiential) very closely fits the model of andragogy and adult learning presented by Dale, Sullivan, and May (2008). Rotations also offer faculty the

opportunity for a large amount of informal interaction with students, and it is often in this informal setting that the nontechnical professional competences are addressed. The nature of clinical rotations means that specific topics may be addressed on a situational or opportunistic fashion (also discussed by Lane & Strand, 2008); professional ethics may be explicitly addressed in a rotation if a case presents which has ethical implications.

There is a wide range of level of understanding of the competencies between individual faculty members. For example, some have pursued formal study in communication, and have a high level of understanding of the pedagogy of communication as a discipline. Others admit to no formal training, and are not familiar with the pedagogy of communication; these faculty members draw on their own personal and professional experiences for their understanding of communication. Some individuals question whether communication can even be taught, and see it instead as an extension of personality type (extroversion or introversion). Additionally, faculty displayed a range of comfort level in dealing with these competencies; faculty may or may not want to help students deal with the personal issues which underlie some of the self-management skills.

The range of depth of understanding for the other nontechnical professional competencies is similar to that of communication. Faculty may have engaged in formal study of any given competency, or may have built their own understanding based on personal and professional experiences. Some faculty members have held administrative positions at AVC or with provincial/national professional organizations, and these responsibilities may give faculty members a greater depth of understanding of certain competencies (such as career opportunities). In this academic setting, faculty members

who feel they have greater expertise in a discipline are more likely to explicitly teach that discipline.

Faculty members distinguished between explicit and implicit teaching in how they address the nontechnical professional competencies. There are specific courses and course components where the competencies are explicitly addressed, both in the didactic curriculum and in rotations. Introduction to Veterinary Medicine, Animal Behavior and Welfare, and Animal Production Systems are consistently identified by both students and faculty as explicitly delivering the competencies. The Small Animal Surgical Exercises and Large Animal Medicine courses in the third year also explicitly addressed some of the competencies. Implicit teaching from a faculty perspective includes modeling the nontechnical competencies, and faculty teaching in rotations feel that they address the competencies by modeling good communication and self-management skills, and ethical behavior. Many of the rotations involve a team which includes multiple faculty clinicians, house officers, and technicians, and faculty emphasize the importance of modeling respect for all members of the team, and working well as a group. Students are indeed keen observers, and are very sensitive to the behaviors which are modeled by faculty. They observe all faculty, in the classroom as well as in the clinic. During rotations, faculty members are observed acting as veterinary professionals. Faculty who teach in the didactic preclinical curriculum are not immune from observation, and can be seen as models of good or bad communication. Faculty members may not be as aware of their role in modeling the competencies during didactic teaching, a point that was also emphasized by Macpherson and Kenny (2008).

Even if a faculty member questions the effectiveness of teaching the nontechnical professional competencies, when a student demonstrates a deficiency in a competency faculty will try to address the issue with the student. Whether or not faculty believe that the competencies can be taught, they do try to teach them. This can often happen on an individual basis, as a one-to-one discussion. The informal opportunities for discussion offered by the rotation format facilitate this type of interaction. In a medical school basic science faculty, Laksov, Nikkola and Lonka (2008) discuss a similar mismatch between faculty conceptions of learning and actual teaching practice.

Student themes

While the demographics of entering AVC students paint a picture of a largely homogeneous group (predominantly female, Caucasian, and young), there is actually a wide range of diversity in terms of student maturity and their experiences. They may have extensive practical experience in the veterinary profession as technicians, or minimal practical experience. They may have already been exposed to the range of careers that veterinary medicine can offer, or they may expect that their only career choice to be between large and small animals. They may have worked in non-veterinary related service industries and developed good communication skills, or they may have moved directly from high school to undergraduate university to veterinary school without having a significant employment experience. They may have completed a graduate science degree, or they may have only a vague understanding of scientific research. What does unite the class of entering AVC students is their high level of academic achievement; they are very successful in getting good grades in science courses. They have often developed a high level of competitiveness during their academic careers.

This diverse group of high academic achievers enter AVC and proceed through a curriculum which includes the science of veterinary medicine, the clinical practice of veterinary medicine (in fourth year rotations), and also the nontechnical competencies of veterinary professionals. The science of veterinary medicine is largely covered during the first three years of the preclinical, didactic curriculum; students are generally comfortable with this component, as it is similar to their undergraduate university science experiences. The fourth year rotations address the practice of veterinary medicine, and students look forward to the real world experience that rotations provide; students' prior veterinary experiences give them a certain comfort level in the clinical setting. The nontechnical professional competencies, however, may be foreign territory to students, depending on their maturity level and life experiences. Jauhar (2008) discusses the greater depth of experience that nontraditional medical students bring, but also the greater challenges they face, as well as implications for the profession as more nontraditional students are admitted into medical schools.

The nontechnical professional competencies are introduced to students beginning in the first semester of their first year at AVC. All six of the competencies are explicitly addressed, in courses such as Introduction to Veterinary Medicine, Animal Behavior and Welfare, and Animal Production Systems. In addition, students have extensive group work in other first year courses, including Macroscopic Anatomy and Structure and Function. Working effectively in groups requires communication, self-management, and ethics, yet these skills are not typically addressed explicitly in those courses requiring group work. During the focus groups, many students shared anecdotes about the frustrations of highly competitive peers with very diverse backgrounds working in groups

in the first year of the curriculum; one participant in the Fourth Year Focus Group summed this experience up as, "It was a volatile environment". Because groups work skills were not addressed explicitly, students learned how to work well together by trial and error – or, as aptly described by one student, "It's like clicker training" (Fourth Year Focus Group).

By the time fourth year students are in rotations, they realize how critical the group dynamic is to their learning experience. They are in real clinical situations, they have animals and clients depending on them, and they rely on each other to manage the responsibilities and workload. They have developed a sense of self-awareness of how their own actions impact on the functioning of the group.

These two examples, the volatile environment of first year, and the self-aware interdependence of fourth year, represent the extremes of the nontechnical professional competencies. Our curriculum needs to lead students from first to fourth year, and to help develop the necessary skills during that time. The diversity of students in the program means that there is a wide range of needs within each class for the nontechnical professional competencies; different maturity level and experiences of students mean that some will always have greater competence, but awareness of the competencies can always be addressed. There is also a range in variation of the needs between class years, which encourages a progression of expectations and methods as students move through the curriculum. Research into the relationship between emotional intelligence and academic success (Parker, Summerfeldt, Hogan, & Majeski, 2004) suggests a strong correlation between the two, and especially a correlation across the high school-university transition. There are similarities with the veterinary school environment, as

students transition first from undergraduate to the highly social realm of group work in first year. Veterinary students also undergo a similar transition into the highly interdependent and structured group work of fourth year rotations.

While students would like to have more explicit instruction in the soft skills (rather than being told that they need to be a good communicator, they want to know how to be a good communicator), they also emphasized the importance of learning by observation. They observe faculty during lectures and labs as well as in the clinic, and they do evaluate if we are modeling good or bad communication or ethics. Students tended to over-report delivery of competencies in courses relative to faculty; this is in contrast to curricular mapping data from Wachtler and Troein (2003), who found that students under-reported skill delivery relative to faculty. In this study, AVC students are highly aware of the role of observation and modeling, and value that type of learning.

Students emphasized the power of the individual professor. They respond to faculty who demonstrate good communication skills; the quality of the instructor can influence students to have an interest in disciplines that they would not otherwise enjoy. Students also recognize the importance of anecdotes faculty offer about practical applications and clinical experiences; students learn from and remember the personal stories that faculty offer. In fourth year rotations that are taught by multiple faculty members, students discussed how their learning experience on the rotation is strongly influenced by the individual faculty involved in that particular rotation; this echoes findings from faculty interviews by Lane and Strand (2008). Faculty members do make a difference, especially with delivering the nontechnical professional competencies.

Students emphasized the importance of life experience and external experiences (jobs, externships, and rotations) in exposure to and development of the nontechnical professional competencies. Those with more veterinary practice experience realized that they have an advantage in terms of practice management, for example, than those with little clinical experience. On another level, some students suggested that it was not the job of AVC to teach personal ethics, that personal ethics need to be well-developed before a student enters veterinary school. In either case, a great deal of education of the future veterinary professional takes place outside the AVC curriculum. In the college admissions process, we need to be mindful of how pre-veterinary experiences have shaped our applicants. For our current students, we can be proactive in encouraging and developing external experiences which may best develop the nontechnical professional competencies.

Students discussed the basic dichotomy in the curriculum between didactic preclinical courses and rotations. The majority of AVC students intend to go into clinical practice, and see rotations as training for real life. The experiential learning on rotations is preparing them for their future career; they are learning by doing, and many feel they learn best in that environment. Fourth year students did not express frustration about the preclinical curriculum, nor did they dismiss courses as being useless; their concern about the dichotomous curriculum was that they were unprepared for the experiential learning of rotations in areas such as communications. Some feel poorly equipped to make the transition from didactic classroom experiences to practical application in the clinics. More explicit instruction on the nontechnical professional competencies in the didactic curriculum may help to ease this transition.

A persistent theme through the student focus groups involved the differences between the practice of small animal and large animal veterinary medicine. Communication, ethics, the human animal bond, and practice management issues were explicitly addressed by large and small animal clinicians. Students develop a good appreciation of the ways those competencies are addressed in large and small animal practice; for example, they are aware not only of the different bond which typically exists between farmers and production species, but they are also know that they should not make any assumptions about the bond between any owner and their animal. Students from different focus groups occasionally offered the same quote from a faculty member regarding different species. The diversity of the student body is also reflected in the diversity of experience with different species, and while students with primarily a small animal background understand the different implications of dealing with large animals, it may take them longer or require further discussion to reach that understanding. Faculty may need to take more time explaining terminology specific to large animals. Faculty may also need to be more willing to engage in discussions of ethical considerations, rather than presenting material in a purely didactic manner.

Competency Themes

Communication

Faculty and students both identify interpersonal communication as being delivered largely implicitly in the curriculum. Client communication is both explicit and implicit. Faculty may add unscripted anecdotes about how to communicate specific disease processes to client in their lectures. The Client Communication rotation explicitly addresses communication; other rotations may also address communication

explicitly depending on the interests of the individual clinicians. Rotations are also an important venue for modeling and observation, as students have the opportunity to see and hear faculty communicate with clients, colleagues, technicians, and referring veterinarians, both in person and during conference calls. The communication that occurs when students work in groups in the preclinical curriculum is not always assessed, but many rotations do specifically assess communication as part of the final grade.

Fourth year students suggested a model to deliver communication throughout the curriculum, which would progress from lectures in first year, to simple role-playing exercises as students develop more trust in second year, to complex role-playing exercises which would eventually prepare them for difficult client communication situations in the clinic. This model essentially takes the components of the Client Communication rotation, and spreads them over four years of the curriculum.

Ethics

Faculty and students discussed both personal and professional ethics in the curriculum. There is a component of Introduction to Veterinary Medicine which explicitly addresses ethics. Personal ethics are considered in the context of academic honesty in the preclinical curriculum; some students felt that issues of personal ethics and academic honestly should be dealt with more strongly, and should be very explicit in the first year curriculum. Faculty do feel strongly about academic honesty, and share with students the view that personal and professional ethics are interconnected. Issues of professional ethics are addressed on a situational basis in clinical rotations, depending on the specific cases which present during that rotation. In terms of assessment, ethical

behavior is expected and therefore is not typically assigned a grade; poor ethical behavior can result in failure of a rotation.

Self-Management

While Introduction to Veterinary Medicine does explicitly address self-management skills, the group work which is part of first year courses implicitly requires students to develop those skills. Faculty tend to address this competency implicitly in their courses. It is explicitly addressed when it becomes a problem. It is also addressed in an informal manner through mentorship relationships between faculty and students, and between students.

As part of the Introduction to Veterinary Medicine course, first year students in the class of 2012 took part in a half day outdoor experiential learning program (ROPES Course, The Adventure Group, Charlottetown, PEI). This event was designed to promote team-building, relational skills, and professionalism. However, students in the first year focus group did not specifically identify this activity in addressing the nontechnical professional competencies. They were not asked about that event, and they may not have recognized it as a unique curricular component for the purposes of this study. However, Kanters, Bristol, and Attarian (2002) report on using an outdoor experiential learning program for stress-management of veterinary students. They report contradictory findings in their quasi-experimental study; there was a measurable short-term benefit in terms of mood, but not in terms of perceived social support. The authors suggest that having a one-time event without follow-up activities may provide only limited benefits to students. In contrast, the model described by Burns et al. (2006) not only has a longer outdoor experiential learning component, but also has significant follow-up activities.

Human Animal Bond

Students and faculty recognize that the human animal bond is addressed both implicitly and explicitly in the preclinical curriculum as well as rotations. It is covered from a small animal perspective as well as a large animal perspective; students with little background in agriculture may be exposed to these issues for the first time. Students also acknowledged and discussed their own bond with teaching animals and donation animals. Students did not mention the activities of the Sir James Dunn Animal Welfare Centre at AVC, although they do participate in many activities sponsored by the Centre. Beck and Martin (2008) summarize coverage of the human animal bond in North American veterinary schools, and find that student participation in curricular and co-curricular human animal bond-related activities are significantly higher in schools which have an animal welfare centre.

Practice Management

Practice management was the competency least addressed by faculty in their courses and rotations, and some felt that it is impractical to truly address practice management in a veterinary teaching hospital setting. Faculty members stressed the educational mission of the hospital, and felt that mission would be compromised by a pure business model. However, faculty did not dismiss the importance of student understanding of practice management and business issues. Although there are a few places in the curriculum where practice management issues are explicitly addressed, students feel largely unprepared in this category. These findings are not surprising, and likely represent more widespread issues in veterinary education. Other researchers (e.g. Burge, 2003) have reported similar findings.

Career Opportunities

Faculty and students both recognize that career opportunities are addressed implicitly and explicitly in the curriculum. Formal lectures in Introduction to Veterinary Medicine and in Animal Production Systems introduce students to the breadth of the profession. In addition, all faculty model their own discipline and specialty. Students are also exposed to different career paths through external experiences. Some students enter the veterinary program with a very limited understanding of opportunities within the profession.

Moving Forward

Both faculty and students recognize the dichotomy between the preclinical curriculum and fourth year rotations. Both groups express frustration with the limitations of didactic teaching, and discuss the rewards of teaching and learning in rotations. These feelings are amplified when considering the nontechnical competencies, which may be delivered in large part by behavioral observation/modeling. The results of this study suggest implications for curriculum design, to introduce more opportunity for practical, experiential learning in the preclinical curriculum.

Faculty teach what they know, and are more likely to explore new areas in the classroom if they feel they have expertise in those areas. Other studies on curricular change in veterinary education (e.g. Dale et al., 2008) acknowledge the role of professional development in effecting change. In order to enhance the delivery of the nontechnical professional competencies, AVC should encourage faculty development opportunities for those interested in expanding teaching in those areas. Opportunities for

faculty development range from established workshops such as the Bayer Communications Institute, to developing internal programs (Lane & Strand, 2008).

While the goal of this study was to produce a curriculum map of the nontechnical professional competencies, the resulting map is far from comprehensive. Data was gathered from alumni and employers of our graduates, from the official curriculum (course catalog), from faculty, and from students, yet there are gaps in the data. The official curriculum may not be best represented by the course catalog, faculty participation was limited to eleven interviews, and student participation was limited to four focus groups totaling 20 students. Methods choices explain the limited data set. This project was completed by a single student researcher as a master's thesis, and more interviews and focus groups would be beyond the scope of the project. While surveys of faculty and students would likely have resulted in data from more participants, the data itself would not have the range and richness of reflections elicited by interview and focus groups. Faculty members freely offered reflections on their personal experiences as students, veterinary practitioners, and clinical faculty. Students offered their personal experiences inside and outside of veterinary school, both good and bad. These reflections would not have been available from a quantitative survey.

In the interviews as well as in the focus groups, it was readily apparent that the simple question, "Is competency x covered in this course?", does not result in a simple yes or no answer. To use communication as an example, it can be defined as peer to peer communication, student to professor communication, communication using scientific terminology, or as client communication. The competency can be addressed explicitly or implicitly, it can be through experiential learning or during didactic teaching, it can be

addressed by means of an unscripted anecdote, or it can be addressed in the context of an informal/mentorship situation. The difficulties of categorizing information on whether a competency was addressed are similar to the difficulties reported by Sumison and Goodfellow (2004) as they asked faculty to map their curriculum. Level of expertise was not ascertained in this study; having clearly established categories would have facilitated extracting that information during interviews and focus groups.

This study is perhaps the first to examine and map the nontechnical professional competencies at AVC, thus the level of awareness of the competencies among faculty and students varies widely. It would have been exceedingly difficult to anticipate and capture all of the possible interpretations and responses on a survey. Given the results of this study, however, a comprehensive survey would indeed be an appropriate next step to develop a complete map. Such a project would likely also have benefits beyond the map itself, as Uchiyama and Radin (2008) describe the increase in collaboration and collegiality at their institution following implementation of curriculum mapping.

Summary and concluding thoughts

According to Macpherson and Kennedy (2008), "Medical Training is transformative." (p. 187). Veterinary medical education is transformative as well, as the findings of this study have shown. I have been privileged to have faculty and students share their personal and professional experiences. This study provided a unique opportunity for those individuals to reflect on their teaching, and their learning. Students were able to reflect on the bigger picture of where they are in the curriculum, and how much they have already accomplished. Faculty reflected on their current and past teaching practices and the issues that are important to them as educators. The

nontechnical professional competencies are recognized as essential by faculty and students in this study. Our students do develop into competent professionals, and our faculty are highly committed to their students. The process of conducting this study has been as important as the actual findings; it has been transformative. I see this study as a model for future curricular evaluation that has the potential to be transformative at the institutional level. Curriculum mapping can not only serve as a data management tool of competencies and courses, but the mapping process can also engage and energize faculty with collaboration, and mapping can involve students to help them take ownership of their own learning and development as veterinary professionals.

References

Adams, C.L., Nestel, D., & Wolf, P. (2006). Reflection: A critical proficiency essential to the effective development of a high competence in communication. *Journal of Veterinary Medical Education, 33*(2), 58-64.

Beck, A.M. , & Martin, F. (2008). Current human-animal bond course offerings in veterinary schools. *Journal of Veterinary Medical Education, 35*(4), 483-486.

Bloom, B.S. (1956). *Taxonomy of Educational Objectives: The cognitive domain.* New York: David McKay.

Breen, R.L. (2006). A practical guide to focus-group research. *Journal of Geography in Higher Education, 30* (3) 463-475.

Brown, J.P. & Silverman, J.D. (1999). The current and future market for veterinarians and veterinary medical services in the United States. *Journal of the American Veterinary Medical Association,* 215: 161-183.

Burge, G. (2003). Six barriers to veterinary career success. *Journal of Veterinary Medical Education, 30*(1), 1-4.

Burns, G.A., Ruby, K.L., DeBowes, R.M., Seaman, S.J., & Brannan, J.K. (2006). Teaching non-technical (professional) competence in a veterinary school curriculum. *Journal of Veterinary Medical Education, 33*(2), 301-308.

Cuban, L. (1995). The hidden variable: How organizations influence teacher responses to secondary science curriculum reform. *Theory into Practice, 34* (1) 4-11.

Dale, V.H.M., Sullivan, M. & May, S.A. (2008). Adult learning in veterinary education: Theory to practice. *Journal of Veterinary Medical Education, 35*(4), 581-588.

Harden, R. (2001). AMEE Guide No. 21: Curriculum mapping: a tool for transparent and authentic teaching and learning. *Medical Teacher, 23*, 123-137.

Jacobs, H.H. (1997). *Mapping the big picture: Integrating curriculum and assessment K-12.* Alexandria, VA: Association for Supervision and Curriculum Development.

Jacobs, H.H. (2008). *Curriculum mapping conference: Developing curriculum and assessment K-12.* Kingstown, RI: Curriculum Designers Inc www.curriculumdesigners.com.

Jauhar, S. (2008). From all walks of life – Nontraditional medical students and the future of medicine. *New England Journal of Medicine, 359*(3), 224-227.

Kanters, M.A., Bristol, D.G., & Attarian, A. (2002). The effects of outdoor experiential training on perceptions of college stress. *Journal of Experiential Education, 25*(2), 257-267.

Kurtz, S. (2006). Teaching and learning communication in veterinary medicine. *Journal of Veterinary Medical Education, 33* (1), 11-19.

Laksov, K.B., Nikkola,, M. & Lonka, K. (2008). Does teacher thinking match teaching practice? A study of basic science teachers. *Medical Education, 42*, 143-151.

Lane, I.F. (2007). Change in higher education: Understanding and responding to individual and organizational resistance. *Journal of Veterinary Medical Education, 34*(2), 85-92.

Lane, I.F., & Strand, E. (2008). Clinical veterinary education: Insights from faculty and strategies for professional development in clinical teaching. *Journal of Veterinary Medical Education, 35*(3), 397-406.

Lincoln, Y.S., & Guba, E.G. (1985). *Naturalistic Inquiry.* Newbury Park, CA: SAGE Publications, Inc.

Lewis, R.E., & Klausner, J.S. (2003). Nontechnical competencies underlying career success as a veterinarian. *Journal of the American Veterinary Medical Association, 222*(12), 1690-1696.

Lloyd, J.W., King, L.J., Mase, C.A. ,& Harris, D. (2005). Future needs and recommendations for leadership in veterinary medicine. *Journal of the American Veterinary Medical Association, 226*(7), 1060-1067.

Macpherson, C., & Kenny, N. (2008). Professionalism and the basic sciences: an untapped resource. *Medical Education, 42,* 183-188.

Matheson, J.L. (2007). The voice transcription technique: Use of voice recognition software to transcribe digital interview data in qualitative research. *The Qualitative Report, 12* (4), 547-560. Retrieved 17 September 2008 from http://www.nova.edu.ssss.QR/QR12-4/matheson.pdf.

May, S.A. (2008). Modern veterinary graduates are outstanding, but can they get better? *Journal of Veterinary Medical Education, 35*(4), 573-580.

Onwuegbuzie, A.J., & Leech, N.L. (2004). Enhancing the interpretation of 'significant' findings: The role of mixed methods research. *The Qualitative Report, 9* (4) 770-792. Retrieved 17 September 2008 from http://www.nova.edu.ssss.QR/QR9-4/onwuegbuzie.pdf

Parker, J.D.A., Summerfeldt, L.J., Hogan, M.J., & Majeski, S.A. (2004). Emotional intelligence and academic success: Examining the transition from high school to university. *Personality and Individual Differences, 36,* 163-172.

Plaza, C., Reierson Draugalis, J., Slack, M., Skrepnek, G., & Sauer, K. (2007). Curriculum mapping in program assessment and evaluation. *American Journal of Pharmaceutical Education , 71*, 1-8.

Pritchard, W.R. (1989). *Future Directions for Veterinary Medicine*. Durham, NC: Pew National Veterinary Educational Program, Duke University.

Robley, W., Whittle, S., & Murdoch-Eaton, D. (2005a). Mapping generic skills curricula: a recommended methodology. *Journal of Further and Higher Education, 29*(3), 221-231.

Robley, W., Whittle, S., & Murdoch-Eaton, D. (2005b). Mapping generic skills curricula: outcomes and discussion. *Journal of Further and Higher Education, 29*(4), 321-330.

Shaw, D.H., & Ihle, S.L. (2006). Communication skills training at the Atlantic Veterinary College, University of Prince Edward Island. *Journal of Veterinary Medical Education , 33* (1), 100-104.

Sumision, J., & Goodfellow, J. (2004). Identifying generic skills through curriculum mapping: a critical evaluation. *Higher Education Research and Development, 23*, 329-346.

Swick, H., Szenas, P., Danoff, D., & Whitcomb, M. (1999). Teaching professionalism in undergraduate medical education. *Journal of the American Medical Association , 282*, 830-832.

Tinga, C.E., Adams, C.L., Bonnett, B.N., & Ribble, C.S. (2001). Survey of veterinary technical and professional skills in students and recent graduates of a veterinary

college. *Journal of the American Veterinary Medical Association, 219*(7) 924-931.

Turnwald, G.H., Meldrum, J.B., & Sponenberg, D.P. (2008a). DVM pre-clerkship curriculum reform part I: Twenty-year literature overview of veterinary and allopathic medicine. *Journal of Veterinary Medical Education, 35*(1), 66-73.

Turnwald, G.H., Meldrum, J.B., & Sponenberg, D.P. (2008b). DVM pre-clerkship curriculum reform part II: Directions and objectives of curricular structure at veterinary medical and other health professions schools. *Journal of Veterinary Medical Education, 35*(1), 74-90.

Turnwald, G.H., Meldrum, J.B., & Sponenberg, D.P. (2008c). DVM pre-clerkship curriculum reform part III: A case study at the Virginia-Maryland Regional College of Veterinary Medicine. *Journal of Veterinary Medical Education, 35*(1), 91-101.

Uchiyama, K.P., & Radin, J.L. (2008). Curriculum mapping in higher education: A vehicle for collaboration. *Innovatve Higher Education 33*(4), 271-280.

Wachtler, C., & Troein, M. (2003). A hidden curriculum: mapping cultural competency in a medical programme. *Medical Education, 37*, 861-868.

Willett, T. (2008). Current status of curriculum mapping in Canada and the UK. *Medical Education, 42*(8), 786-793.

Willis, N.G., Monroe, F.A., Potworowski, J.A., Halbert, G., Evans, B.R., Smith, J.E., Andrews, K.J., Spring, L., & Bradbrook, A. (2007). Envisioning the future of veterinary medical education: The Association of American Veterinary Medical

Colleges foresight project, final report. *Journal of Veterinary Medical Education, 34*(1), 3-42.

Appendices

The Veterinary Employer Satisfaction Survey for the Class of 2007

1. SECTION A: GENERAL QUALIFICATIONS OF THE AVC GRADUATE

The statements in this section relate to general qualifications of the AVC graduate. Please select the response that best represents your opinion of the recent AVC graduate you have encountered for each category.

	Poor	Below Average	Average	Above Average	Excellent	No Opinion
Knowledge base	❑	❑	❑	❑	❑	❑
Problem solving ability	❑	❑	❑	❑	❑	❑
Oral communication skills	❑	❑	❑	❑	❑	❑
Written communication skills	❑	❑	❑	❑	❑	❑
Interpersonal skills	❑	❑	❑	❑	❑	❑
Stress management skills	❑	❑	❑	❑	❑	❑
Client rapport	❑	❑	❑	❑	❑	❑
Empathy	❑	❑	❑	❑	❑	❑
Personal integrity and ethics	❑	❑	❑	❑	❑	❑
Leadership ability	❑	❑	❑	❑	❑	❑
Commitment to lifelong learning/ professional development	❑	❑	❑	❑	❑	❑
Knowledge of the profession	❑	❑	❑	❑	❑	❑
Confidence level	❑	❑	❑	❑	❑	❑

2. SECTION B: SPECIFIC KNOWLEDGE AND SKILLS OF THE AVC GRADUATE

The statements in this section relate to specific knowledge and skills of the AVC graduate. Please select the response that best represents your opinion of the recent AVC graduate you have encountered in each category.

	Poor	Below Average	Average	Above Average	Excellent	No Opinion
Animal handling skills	❑	❑	❑	❑	❑	❑
History taking skills	❑	❑	❑	❑	❑	❑
Physical examination skills	❑	❑	❑	❑	❑	❑
Sample collection skills	❑	❑	❑	❑	❑	❑
Skills in selecting appropriate diagnostic tests	❑	❑	❑	❑	❑	❑
Skills in carrying out diagnostic tests (CBC, urinalysis, CMT, etc.)	❑	❑	❑	❑	❑	❑
Skills in interpreting diagnostic test results	❑	❑	❑	❑	❑	❑
Medical skills	❑	❑	❑	❑	❑	❑
Surgical skills	❑	❑	❑	❑	❑	❑
Anaesthesia skills	❑	❑	❑	❑	❑	❑
Theriogenology skills	❑	❑	❑	❑	❑	❑
Radiology and imaging skills	❑	❑	❑	❑	❑	❑
Medication selection and administration skills	❑	❑	❑	❑	❑	❑
Skills in managing emergency medical problems	❑	❑	❑	❑	❑	❑
Skills in implementing routine vaccination and parasite control programs	❑	❑	❑	❑	❑	❑

	Poor	Below Average	Average	Above Average	Excellent	No Opinion
Skills in nutritional counselling	❑	❑	❑	❑	❑	❑
Skills in herd/population medicine	❑	❑	❑	❑	❑	❑
Skills in answering common client questions about animal care and behaviour	❑	❑	❑	❑	❑	❑
Skills in dealing with cost issues pertaining to case management decisions	❑	❑	❑	❑	❑	❑
Skills in recognizing when consultation regarding a patient or referral of a patient is indicated	❑	❑	❑	❑	❑	❑
Skills in delegating duties/responsibilities to support staff	❑	❑	❑	❑	❑	❑
Medical record management	❑	❑	❑	❑	❑	❑
Post mortem examination skills	❑	❑	❑	❑	❑	❑
Interview and employment negotiation skills	❑	❑	❑	❑	❑	❑
Practice management knowledge and skills	❑	❑	❑	❑	❑	❑

3. SECTION C: STRENGTHS AND WEAKNESSES OF THE AVC GRADUATE

In what areas are the recent AVC graduate in your employ especially weak?

4. In what areas are the recent AVC graduate in your employ especially strong?

5. Have you hired recent graduates from veterinary colleges other than the AVC?

- ❑ Yes
- ❑ No

6. If you responded "yes" to Question 5, how do the abilities of the AVC graduate you are evaluating compare to those of new graduates from other veterinary schools? If you responded "no" to Question 5, go to Question 7.

- ❑ Worse
- ❑ Same or similar
- ❑ Better
- ❑ Unable to generalize
- ❑ n/a

7. Overall have you been satisfied with the AVC graduate that you have hired?

- ❑ Yes
- ❑ No

8. If you could do it over would you hire another AVC graduate?

- ❑ Yes
- ❑ No

SECTION D: BACKGROUND INFORMATION

9. Are you an AVC graduate?

- ❑ Yes
- ❑ No

10. Which best characterizes your practice?

- ❑ Small animal (including exotic and pocket pets)
- ❑ Food animal
- ❑ Equine
- ❑ Mixed, predominantly small animal
- ❑ Mixed, predominantly large animal
- ❑ Zoo and/or Wildlife
- ❑ Other _____

11. How many full-time veterinarians, including yourself, are employed in your practice?

- ❑ 1
- ❑ 2
- ❑ 3
- ❑ 4
- ❑ 5
- ❑ 6 - 9
- ❑ ≥10

12. Is the AVC graduate that you are evaluating still in your employ?

- ❑ Yes
- ❑ No

13. If you responded "no" to Question 12, why did the AVC graduate leave? Check all that apply.

- ❑ Work ethics not congruent with clinic expectations
- ❑ Basic skills/knowledge were below expectations
- ❑ Salary expectations too high
- ❑ Family reasons/considerations
- ❑ Personality conflict
- ❑ Entered different practice (or career)
- ❑ Just didn't work out
- ❑ Other, please specify _____

Thank you for taking the time to complete this survey. Confidentiality of your responses will be maintained.

Atlantic Veterinary College, University of Prince Edward Island

Alumni Survey Class of 2007 (June 2008)

1. Current type of employment (choose the most appropriate):

   ☐ Clinical practice outside a university
   ☐ Internship or residency
   ☐ Other (please specify) _____
   ☐ I am not currently employed as a veterinarian

2. If your type of employment is in a clinical practice outside a university, how many veterinarians (including yourself) are employed in the practice? If you are not engaged in clinical practice, please skip to question 3.

3. If you are not currently employed as a veterinarian, AVC is interested in knowing your reasons. Please provide these reasons in the space below.

4. Select the choice which best describes your specialization, if any, in terms of your present employment:

   ☐ Small animal (exclusive, including exotics)
   ☐ Food animal (exclusive)
   ☐ Equine (exclusive)
   ☐ Exotics (exclusive)
   ☐ Mixed (predominantly small animal)
   ☐ Mixed (predominantly large animal)
   ☐ Mixed (equal small and large animal)
   ☐ Other (please specify) _____

5. If you are engaged in food animal production practice, please check all the choices that comprise >20% of your practice activity. If you are not engaged in food animal practice, skip to question 5.

1. Beef
2. Small Ruminant
3. Swine
4. Dairy
5. Poultry
6. Fish/Aquaculture
7. Other (please specify) _____
8. N/A

6. My education sufficiently prepared me for the problem solving and independent thinking skills required in my career.

Not relevant to my practice area	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
☐	☐	☐	☐	☐	☐

7. I developed, through my education, the mechanical skills required to be effective in my career.

Not relevant to my practice area	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
☐	☐	☐	☐	☐	☐

8. I have had an overall positive influence on the calibre of veterinary medicine at the practice where I am currently working.

Not relevant to my practice area	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
☐	☐	☐	☐	☐	☐

9. Overall, the knowledge base I developed at AVC was sufficient for me to be effective in my career.

Not relevant to my practice area	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
☐	☐	☐	☐	☐	☐

10. Please comment on how you feel the curriculum at AVC prepared you for the intellectual demands of your career compared to recent graduates of other veterinary colleges in North America.

11. More specifically, please comment on how you feel the elective fourth year rotations you chose at AVC prepared you for your career compared to recent graduates of other veterinary colleges in North America.

12. Rank the training you received at AVC in the following areas in terms of how it contributes to your effectiveness as a veterinarian. For each subject listed, answer the question "Is relevant to my practice area?" then rank the training that you received at AVC.

		Ranking		
		Insufficient	Appropriate	Excessive
Animal Science	Yes No	☐	☐	☐
Animal Behaviour	Yes No	☐	☐	☐
Animal Welfare	Yes No	☐	☐	☐
Animal Restraint/Handling	Yes No	☐	☐	☐
Microscopic Anatomy	Yes No	☐	☐	☐

Embryology	Yes No	☐	☐	☐
Gross Anatomy	Yes No	☐	☐	☐
Physiology	Yes No	☐	☐	☐
Pharmacology	Yes No	☐	☐	☐
Toxicology	Yes No	☐	☐	☐
Immunology	Yes No	☐	☐	☐
Virology	Yes No	☐	☐	☐
Bacteriology	Yes No	☐	☐	☐
Parasitology	Yes No	☐	☐	☐
Epidemiology	Yes No	☐	☐	☐
General Pathology	Yes No	☐	☐	☐
Spec. Systemic Pathology	Yes No	☐	☐	☐
Clinical Pathology	Yes No	☐	☐	☐
Aquaculture	Yes No	☐	☐	☐
Public Health	Yes No	☐	☐	☐
Radiology	Yes No	☐	☐	☐
Theriogenology	Yes No	☐	☐	☐
Anaesthesiology	Yes No	☐	☐	☐
Large Animal Medicine	Yes No	☐	☐	☐
Small Animal Medicine	Yes No	☐	☐	☐
Exotic Animal Medicine	Yes No	☐	☐	☐
Large Animal Surgery	Yes No	☐	☐	☐

Small Animal Surgery	Yes No	☐	☐	☐
Health Management of Dairy Cattle	Yes No	☐	☐	☐
Health Management of Beef Cattle	Yes No	☐	☐	☐
Health Management of Sm. Ruminants	Yes No	☐	☐	☐
Health Management of Swine	Yes No	☐	☐	☐
Health Management of Horses	Yes No	☐	☐	☐
Regulatory Medicine	Yes No	☐	☐	☐
Jurisprudence	Yes No	☐	☐	☐
Ethics	Yes No	☐	☐	☐
Business Management	Yes No	☐	☐	☐
Client Relations	Yes No	☐	☐	☐
Critical Thinking	Yes No	☐	☐	☐
Critical Reading	Yes No	☐	☐	☐

13. The following courses were offered as elective rotations in the fourth year of the professional curriculum. Please indicate by placing a check in the "Enrollment" column those rotation courses in which you were enrolled. For those rotations in which you were enrolled, indicate how useful the course was in contributing to your effectiveness as a veterinarian.

    Rate the following statement: This course was useful in preparing me to be effective in my career.

	Enrollment	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Behaviour	☐	☐	☐	☐	☐	☐
Exotic and Lab Animal Medicine	☐	☐	☐	☐	☐	☐

Anaesthesiology (Small Animal)	☐	☐	☐	☐	☐	☐
Anaesthesiology (Large Animal)	☐	☐	☐	☐	☐	☐
Companion Animal Medicine I	☐	☐	☐	☐	☐	☐
Companion Animal Medicine II	☐	☐	☐	☐	☐	☐
Companion Animal Surgery I	☐	☐	☐	☐	☐	☐
Companion Animal Surgery II	☐	☐	☐	☐	☐	☐
Radiology I	☐	☐	☐	☐	☐	☐
Radiology II	☐	☐	☐	☐	☐	☐
Equine Lameness	☐	☐	☐	☐	☐	☐
Dermatology	☐	☐	☐	☐	☐	☐
Ophthalmology	☐	☐	☐	☐	☐	☐
Cardiology	☐	☐	☐	☐	☐	☐
Issues in Animal Welfare	☐	☐	☐	☐	☐	☐
Companion Animal Nutrition	☐	☐	☐	☐	☐	☐
Client Communication	☐	☐	☐	☐	☐	☐
Career and Practice Management	☐	☐	☐	☐	☐	☐
Applied Epidemiology	☐	☐	☐	☐	☐	☐
Short Course, Applied Epidemiology	☐	☐	☐	☐	☐	☐
Aquaculture Health Management I	☐	☐	☐	☐	☐	☐
Aquaculture Health Management II	☐	☐	☐	☐	☐	☐
LA Medicine and Theriogenology	☐	☐	☐	☐	☐	☐
Theriogenology-General	☐	☐	☐	☐	☐	☐
Theriogenology-Equine	☐	☐	☐	☐	☐	☐

Farm Services-Ruminant & Swine I	☐	☐	☐	☐	☐	☐
Farm Service-Ruminant & Swine II	☐	☐	☐	☐	☐	☐
Farm Service-Dairy	☐	☐	☐	☐	☐	☐
Ecosystem Health	☐	☐	☐	☐	☐	☐
Ecosystem Health-Case Studies	☐	☐	☐	☐	☐	☐
Ambulatory Services - Equine I	☐	☐	☐	☐	☐	☐
Ambulatory Services - Equine II	☐	☐	☐	☐	☐	☐
Farm Service-Swine	☐	☐	☐	☐	☐	☐
Farm Service-Nutrition	☐	☐	☐	☐	☐	☐
Farm Service-Feedlot Mgmt	☐	☐	☐	☐	☐	☐
Farm Service-Ruminant Mastitis	☐	☐	☐	☐	☐	☐
Farm Service-Ruminant Production Record Analysis	☐	☐	☐	☐	☐	☐
Farm Service-Ruminant Reproduction	☐	☐	☐	☐	☐	☐
Farm Service-Cow/Calf Management	☐	☐	☐	☐	☐	☐
Large Animal Medicine I	☐	☐	☐	☐	☐	☐
Large Animal Medicine II	☐	☐	☐	☐	☐	☐
Large Animal Surgery I	☐	☐	☐	☐	☐	☐
Large Animal Surgery II	☐	☐	☐	☐	☐	☐
Large Animal Medicine & Surgery	☐	☐	☐	☐	☐	☐
Swine Health Monitoring	☐	☐	☐	☐	☐	☐
Regulatory Medicine	☐	☐	☐	☐	☐	☐
Acupuncture	☐	☐	☐	☐	☐	☐

Advanced Equine Dentistry	☐	☐	☐	☐	☐	☐
Ruminant Medicine & Surgery (St. Hyacinthe)	☐	☐	☐	☐	☐	☐
Small Holder Dairy Health Mgmt (Kenya)	☐	☐	☐	☐	☐	☐
Foreign Animal Diseases	☐	☐	☐	☐	☐	☐
Diagnostic Services	☐	☐	☐	☐	☐	☐
Morphologic Pathology	☐	☐	☐	☐	☐	☐
Wildlife Health	☐	☐	☐	☐	☐	☐
Aquaculture Diagnostic Services	☐	☐	☐	☐	☐	☐

14. Please comment on specific areas of excess or omission in your education that have not been covered in this evaluation.

To submit a hard copy survey by mail, please send to the following address:

c/o Lisa Miller
Academic Affairs
Atlantic Veterinary College

University of Prince Edward Island
550 University Avenue
Charlottetown, PEI
C1A 4P3

or

Fax to: 902-566-0846

Appendix B

Faculty Interview Protocol

Nontechnical professional competencies are those skills which are not directly related to the science of veterinary medicine, but are necessary for career success. I define these skills based on AVMA COE documents, as well as from the literature on veterinary education. For this study, nontechnical professional competencies consist of the following: communications, ethics, self-management, human-animal bond, practice management, and career opportunities.

We will consider each competency separately.

Do you explicitly address these competencies in your courses/rotations?

Which courses/rotations?

How?

Why?

What level of knowledge/expertise do you expect of students for these skills?

How do you assess or evaluate student expertise in these skills?

Do you implicitly address these competencies in your courses/rotations?

Which courses/rotations?

How?

Why?

What level of knowledge/expertise do you expect of students for these skills?

How do you assess or evaluate student expertise in these skills?

Do you have any further comments on the importance or delivery of nontechnical professional competencies in the curriculum?

Thank you for participating in this interview, your comments are a valuable part of the research. This study gathers information from current AVC faculty and students, alumni, and employers of our graduates. Results of this study will be used to construct a map of how we deliver nontechnical professional competencies in our curriculum, and how well that aligns with our stated curricular goals.

Appendix C

Student Focus Group Protocol

Nontechnical professional competencies are those skills which are not directly related to the science of veterinary medicine, but are necessary for career success. I define these skills based on AVMA COE documents, as well as from the literature on veterinary education. For this study, nontechnical professional competencies consist of the following: communications, ethics, self-management, human-animal bond, practice management, and career knowledge/options.

Please reflect back on your education at AVC to date, and consider the nontechnical professional competencies. We shall consider each of the competencies separately. First year students will discuss first year courses, second year students will discuss first and second year courses, third year students will discuss first through third year courses, and fourth year students will discuss the entire curriculum.

In the first year of the curriculum, which courses covered each competency (ie communications, ethics, self-management, etc)?

How was the competency covered in each course?

To what level of depth or expertise was the competency covered in each course?

How was the competency assessed or evaluated in each course?

How important to you was this competency in first year?

How comfortable were you with this competency in first year?

In the second year of the curriculum, which courses covered each competency?

How was the competency covered in each course?

To what level of depth or expertise was the competency covered in each course?

How was the competency assessed or evaluated in each course?

How important to you was this competency in first year?

How comfortable were you with this competency in first year?

In the third year of the curriculum, which courses covered these competencies?

How was the competency covered in each course?

To what level of depth or expertise was the competency covered in each course?

How was the competency assessed or evaluated in each course?

How important to you was this competency in first year?

How comfortable were you with this competency in first year?

In the fourth year of the curriculum, which rotations covered these competencies?

How was the competency covered in each course?

To what level of depth or expertise was the competency covered in each course?

How was the competency assessed or evaluated in each course?

How important to you was this competency in first year?

How comfortable were you with this competency in first year?

Thank you for participating in this focus group. Your comments are a valuable part of the research project. This study gathers information from current AVC faculty and students, alumni, and employers of our graduates. Results of this study will be used to construct a map of how the College delivers nontechnical professional competencies in our curriculum, and how well that aligns with our stated curricular goals.

Appendix D

Information Letter for Faculty Participation in Interviews

Dear AVC Faculty Member,

I am completing an MEd in the UPEI Faculty of Education. For my thesis, I am interested in how we address those skills which are not directly related to the science of veterinary medicine, but are necessary for veterinary career success (such as communication, ethics, self-management, human-animal bond, and career opportunities). I am conducting a research project titled 'Mapping delivery of the nontechnical professional competencies in the veterinary curriculum'. My thesis supervisor is Dr. Martha Gabriel from the Faculty of Education.

In my research project, I will use curriculum maps to explore alignment of the AVC curriculum. A theory in educational research states that there are actually four curricula: official (our stated curricular goals), taught (what we actually do in the classroom), learned (what students feel they are learning), and assessed (the skills and knowledge we assess in our courses). Ideally, these four curricula will be aligned with one another, but in reality there may be gaps, redundancies, and inconsistencies. I will map delivery of the nontechnical professional competencies in each of the four curricula, and construct a composite map to check for alignment. To construct these maps, data will be gathered from major stakeholders, including current AVC faculty and students, alumni, and employers of our graduates.

All AVC faculty are invited to participate in this study. Of those who volunteer to participate, 10 individuals will be randomly selected to be interviewed. I will conduct interviews beginning in November 2008. Interviews will be held at AVC, and are

expected to take no more than one hour. The interview will be recorded, and a written transcript will be prepared for the participant to review. Data will be kept confidential, and individuals will not be identified by name; however, faculty should be aware that in some cases individual identity may be inferred based on the course(s) taught.

This study poses minimal risk to participants. Participation is voluntary, and individuals may choose not to answer any question or may withdraw from the study at any time without repercussion. Information collected in this study will remain confidential within the limits of the law.

Results of this study will be shared with the Curriculum Revision Working Group and the Curriculum Committee. In addition, participants will receive an email summary of results, and will be invited to attend an information session at AVC where I will present results.

If you wish to volunteer to participate, please read and sign the enclosed consent form, and return it to me in the envelope provided via campus mail. If you have any further questions about this study, please feel free to contact me:

The Research Ethics Board of the University of Prince Edward Island has approved this study. Inquiries or any questions about the ethical conduct of this research can be addressed to the UPEI Research Ethics Board

Sincerely,

Sue Dawson, PhD

Associate Professor of Anatomy, Department of Biomedical Sciences, Atlantic Veterinary College

MEd candidate, Faculty of Education, University of Prince Edward Island

Appendix E

Information Letter for Student Participants in Focus Groups

Dear AVC Student,

I am completing an MEd in the UPEI Faculty of Education. For my thesis, I am interested in how we address those skills which are not directly related to the science of veterinary medicine, but are necessary for veterinary career success (such as communication, ethics, self-management, human-animal bond, and career opportunities). I am conducting a research project titled 'Mapping delivery of the nontechnical professional competencies in the veterinary curriculum'. My thesis supervisor is Dr. Martha Gabriel from the Faculty of Education.

In my research project, I will use curriculum maps to explore alignment of our curriculum. A theory in educational research states that there are actually four curricula: official (our stated curricular goals), taught (what we actually do in the classroom), learned (what students feel they are learning), and assessed (the skills and knowledge we assess in our courses). Ideally, these four curricula will be aligned, but in reality there may be gaps, redundancies, and inconsistencies. I will map delivery of the nontechnical professional competencies in each of the four curricula, and construct a composite map to check for alignment. To construct these maps, data will be gathered from major stakeholders, including current AVC faculty and students, alumni, and employers of our graduates.

All AVC students are invited to participate. Of those who volunteer to participate, eight students from each class year will be invited to attend a focus group, and one session will be held for each class year in January 2009. At the focus group, students will be asked to

reflect back on their education at AVC to date considering the nontechnical professional competencies. The focus group session for first year students is expected to last no more than 45 minutes. The focus group sessions for second and third year students is expected to last no more than 90 minutes. The focus group session for fourth year students is expected to last no more than two hours. As principal investigator of this project, I will facilitate the focus group sessions; the sessions will be recorded, and I will prepare written transcripts which participants will be asked to review. I will treat all information as confidential, and individuals will not be identified by name. However, information from the focus group may potentially be revealed to persons outside the group by other participants, and therefore, confidentiality cannot be guaranteed.

This study poses minimal risk to participants. Participation is voluntary, and individuals may choose not to answer any question or, and may withdraw from the study at any time without repercussion. Information collected in this study will remain confidential within the limits of the law.

Results of this study will be shared with the Curriculum Revision Working Group and the Curriculum Committee. In addition, participants will receive an email summary of results, and will be invited to attend an information session at AVC where I will present results.

If you wish to volunteer to participate, please read and sign the enclosed consent form, and return it to me in the envelope provided via campus mail. If you have any further questions about this study, please feel free to contact me:

The Research Ethics Board of the University of Prince Edward Island has approved this study. Inquiries or any questions about the ethical conduct of this research can be addressed to the UPEI Research Ethics Board

Sue Dawson, PhD

Associate Professor of Anatomy, Department of Biomedical Sciences, Atlantic Veterinary College

MEd candidate, Faculty of Education, University of Prince Edward Island

Appendix F

Faculty Interview Consent Form

Dear AVC Faculty Member,

I am contacting you because you have expressed interest in participating in the research project for my MEd thesis, 'Mapping delivery of the nontechnical professional competencies in the DVM curriculum'. I hope that you are still willing to be interviewed for this research project, however, you may unable or unwilling to participate at this time; if you do not wish to be interviewed, do not return this form and I will understand that you are declining to participate.

If you are willing to discuss how you address the nontechnical professional competencies in your teaching during an interview with me, please read and sign this consent form. Please return one signed form to me via campus mail by November 10, 2008. You may keep the second form for your records.

CONSENT FORM

I, (please enter name) _____, hereby consent to participate in the above-mentioned study conducted by a researcher from the Atlantic Veterinary College and Faculty of Education, University of Prince Edward Island. My participation is purely voluntary, and I understand that all of the information gathered in this study will only be seen by the researcher and her thesis advisor, and that this information will be used solely for research purposes. The researcher may use this data as part of future research projects.

I understand that I am being invited to participate in this study because I am an AVC faculty member.

I understand that I am being invited to participate in an interview in November/December 2008. The interview will take place at AVC, is expected to last no longer than one hour, and will be recorded and transcribed. I will be asked to review the written transcript.

I have received assurances from the researcher that the information from the interview will remain confidential. The researcher will not identify me by name, however, I understand that in certain circumstances identity may be inferred when particular courses are discussed.

I understand that I am giving the researcher permission to quote me anonymously.

I understand that I may refuse to answer any question, or that I may withdraw from the study at any time without repercussion.

The researcher has given me the opportunity to ask any questions I may have about the study, and my questions have been answered to my satisfaction. I understand that any question I have about the ethical conduct of this research may be addressed to the Research Ethics Board

_____

_____

Faculty Name Date

_____

_____

Researcher: Date

Sue Dawson, PhD

Associate Professor of Anatomy, Department of Biomedical Sciences, Atlantic Veterinary College

MEd candidate, Faculty of Education, University of Prince Edward Island

Appendix G

Student Focus Group Consent Form

Dear AVC student,

I am contacting you because you have expressed interest in participating in the research project for my MEd thesis, 'Mapping delivery of the nontechnical professional competencies in the DVM curriculum'. I hope that you are still willing to participate in a focus group for this research project, however, you may unable or unwilling to participate at this time; if you do not wish to be interviewed, do not return this form and I will understand that you are declining to participate.

If you are willing to meet with myself and a group of your classmates to reflect on your education at AVC to date with regard to the nontechnical professional competencies, please read and sign this consent form. Please return one signed form to me via campus mail. You may keep the second form for your records. The Research Ethics Board of the University of Prince Edward Island has approved this study (Protocol 1002897; 18 November 2008)

CONSENT FORM

I, (please enter name) _____, hereby consent to participate in the above-mentioned study conducted by a researcher from the Atlantic Veterinary College and Faculty of Education, University of Prince Edward Island. My participation is purely voluntary, and I understand that all of the information gathered in this study will only be seen by the researcher and her thesis advisor, and that this information will be used solely for research purposes. The researcher may use this data as part of future research projects.

I understand that I am being invited to participate in this study because I am an AVC veterinary student.

I understand that I am being invited to participate in a focus group in January-February 2009. Participants in this session will be my AVC classmates, and we will be asked to reflect on our education at AVC to date with regard to the nontechnical professional competencies. The focus group will take place at AVC, and will be recorded and transcribed. I will be asked to review the written transcript. The length of the focus group session will vary based on my class year: the first year student session is expected to last no longer than 45 minutes; the second and third year sessions are expected to last no longer than 90 minutes, and the fourth year session is expected to last no longer than two hours. I understand that information shared during the focus group may be revealed to persons outside the group, and that that the researcher cannot guarantee confidentiality in this instance.

I have received assurances from the researcher that the information from the interview will remain confidential. I, in turn, assure other participants that I shall treat in the same confidential manner any information I may obtain in the context of this project.

I understand that I am giving the researcher permission to quote me anonymously.

I understand that I may refuse to answer any question, or that I may withdraw from the study at any time without repercussion.

The researcher has given me the opportunity to ask any questions I may have about the study, and my questions have been answered to my satisfaction. I understand that any question I have about the ethical conduct of this research may be addressed to the Research Ethics Board

_____

_____

Student Name/Signature Date

_____

_____

Researcher: Date

Sue Dawson, PhD

Associate Professor of Anatomy, Department of Biomedical Sciences, Atlantic Veterinary College

MEd candidate, Faculty of Education, University of Prince Edward Island

Appendix H: Composite Map of the Official, Taught, Learned, and Assessed Curricula

First year courses	Communi-cation				Ethics				Self-manage-ment				Human animal bond				Practice manage-ment				Career opportun-ities			
	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A
Macroscopic Anatomy	o	-	√	-	o	-	√	-	o	-	√	-	o	-	√	-	o	-	o	-	o	-	o	-
Microscopic Anatomy	o	√	√	o	o	√	o	o	o	√	√	o	o	o	o	o	o	o	o	o	o	√	o	o
Physiology	o	-	o	-	o	-	o		o	-	√	-	o	-	o	-	o	-	o	-	o	-	o	-
Integration of Structure and Function	o	√	√	o	o	√	√	o	o	√	√	o	o	√	√	o	o	o	√	o	o	o	o	o
Animal Behavior and Welfare	o	-	√	-	√	-	√	-	o	-	√	-	√	-	√	√	o	-	√	-	o	-	√	-
Immunology	o	-	o	-	o	-	o	-	o	-	√	-	o	-	o	-	o	-	√	-	o	-	o	-
Introduction to Veterinary Medicine	√	√	√	o	√	√	√	o	√	√	√	o	√	√	√	o	√	-	√	o	√	√	√	o
Animal Production Systems	o	√	√	o	o	√	√	o	o	o	√	o	o	√	√	o	√	o	√	o	o	√	√	o
Principles of Veterinary Epidemiology	o	-	√	-	o	-	√	-	o	-	√	-	o	-	o	-	o	-	√	-	o	-	√	-
Clinical Orientation	o	o	√	o	o	√	√	o	o	o	√	o	o	√	√	o	o	o	√	o	o	o	√	o
Parasitology	o	-	√	-	o	-	√	-	o	-	√	-	o	-	o	-	o	-	√	-	o	-	√	-
General Pathology	o	-	√	-	o	-	√	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	√	-

Symbols: O=official curriculum; T=taught curriculum; L=learned curriculum; A=assessed curriculum; √= addressed; o=not addressed; - =no participant/data

Composite Map of the Official, Taught, Learned, and Assessed Curricula

Second year courses	Communi-cation				Ethics				Self-manage-ment				Human animal bond				Practice manage-ment				Career opportun-ities			
	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A
Veterinary Pharma-cology and Toxicology	o	-	√	-	o	-	√	-	o	-	√	-	o	-	o	-	o	-	√	-	o	-	√	-
Principles of Diagnostic Imaging	o	-	√	-	o	-	o	-	o	-	√	-	o	-	√	-	o	-	√	-	o	-	√	-
Veterinary Public Health	o	-	√	-	o	-	√	-	o	-	o	-	o	-	√	-	o	-	√	-	√	-	√	-
Principles of Health Management	o	-	√	-	o	-	o	-	o	-	o	-	o	-	o	-	√	-	√	-	√	-	√	-
Bacteriology and Mycology	o	-	√	-	o	-	√	-	o	-	√	-	o	-	o	-	o	-	√	-	o	-	√	-
Virology	o	-	√	-	o	-	√	-	o	-	√	-	o	-	o	-	o	-	√	-	o	-	√	-
Systemic Pathology	o	-	√	-	o	-	o	-	o	-	√	-	o	-	o	-	o	-	o	-	o	-	√	-
Principles of Medicine	o	√	√	o	o	√	√	o	o	o	√	o	o	√	√	o	o	o	√	o	o	o	o	o
Principles of Anaesthesiol-ogy and Surgery	o	o	√	o	o	o	√	o	o	o	√	o	o	o	√	o	o	o	√	o	o	o	√	o
Principles of Therio-genology	o	-	√	-	o	-	√	-	o	-	√	-	o	-	o	-	o	-	o	-	o	-	√	-
Clinical Pathology	o	-	√	-	o	-	√	-	o	-	√	-	o	-	o	-	o	-	√	-	o	-	√	-
Aquaculture and Fish Health	o	-	√	-	o	-	√	-	o	-	√	-	o	-	√	-	o	-	√	-	o	-	√	-

Symbols: O=official curriculum; T=taught curriculum; L=learned curriculum; A=assessed curriculum; √= addressed; o=not addressed; - =no participant/data

Composite Map of the Official, Taught, Learned, and Assessed Curricula

Third year courses	Communi-cation				Ethics				Self-manage-ment				Human animal bond				Practice manage-ment				Career opportun-ities			
	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A
Cardio-respiratory Diseases of Small Animals	o	√	√	o	o	√	o	o	o	√	o	o	o	√	√	o	o	o	o	o	o	√	o	o
Musculo-skeletal Diseases of Small Animals	o	√	o	√	o	√	o	o	o	o	o	o	o	√	√	o	o	o	o	o	o	√	o	o
Neurologic and Ophthal-mologic Diseases of Small Animals	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-
Surgical Exercises in Companion Animals	o	√	√	√	o	√	√	o	o	√	√	o	o	√	√	o	o	o	√	o	o	o	o	o
Diagnostic Radiology	o	-	√	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-
Medical Exercises in Companion Animals	o	o	√	o	o	√	√	o	o	o	√	o	o	√	o	o	o	o	o	-	o	o	o	o
Therio-genology	o	-	√	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	o
Large Animal Medicine	o	√	√	√	o	√	√	o	o	o	√	o	o	√	o	-	o	o	o	o	o	o	o	o
Large Animal Surgery	o	√	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Health Management of Swine	o	-	√	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	√	-
Exotic Mammal Medicine	o	-	√	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	√	-
Clinical Pharma-cology and Toxicology	o	-	√	-	o	-	√	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-

Symbols: O=official curriculum; T=taught curriculum; L=learned curriculum; A=assessed curriculum; √= addressed; o=not addressed; - =no participant/data

Third year courses	Communi-cation				Ethics				Self-manage-ment				Human animal bond				Practice manage-ment				Career opportun-ities			
	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A
Gastrointest-inal Hepatic and Dental Diseases of Small Animals	o	√	√	o	o	√	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Endocrine and Dermatologic Diseases of Small Animals	o	√	o	o	o	√	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Renal,Genito-urinary, Immunologic and Hemolymph-atic Diseases of Small Animals	o	√	√	o	o	√	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o
Health Management of Dairy Cattle	o	-	√	-	o	-	√	-	o	-	o	-	o	-	√	-	o	-	o	-	o	-	o	-
Health Management of Beef Cattle, Horses and Small Ruminants	o	√	√	-	o	-	√	-	o	-	o	-	o	√	o	-	o	-	o	-	o	√	√	-
Avian and Reptile Medicine	o	-	√	-	o	-	o	-	o	-	o	-	o	-	√	-	o	-	o	-	o	-	√	-

Symbols: O=official curriculum; T=taught curriculum; L=learned curriculum; A=assessed curriculum; √= addressed; o=not addressed; - =no participant/data

Composite Map of the Official, Taught, Learned, and Assessed Curricula

Companion Animals Rotations	Communi-cation				Ethics				Self-manage-ment				Human animal bond				Practice manage-ment				Career opportun-ities			
	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A
Anaesthesiol-ogy (small animal)	o	-	√	-	o	-	o	-	o	-	√	-	o	-	o	-	o	-	o	-	o	-	o	-
Companion Animal Medicine	o	√	√	√	o	√	√	√	o	√	√	o	o	√	√	o	o	√	√	o	o	√	o	o
Clinical Nutrition	o	-	√	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-
Companion Animal Surgery	o	√	√	√	o	√	√	o	o	√	√	o	o	√	√	o	o	√	o	o	o	√	√	o
Community Practice	o	-	√	-	o	-	o	-	o	-	√	-	o	-	√	-	o	-	o	-	o	-	o	-
Radiology	o	-	o	-	o	-	o	-	o	-	√	-	o	-	o	-	o	-	√	-	o	-	o	-
Anaesthesiol-ogy (Large Animal)	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-
Dermatology	o	-	√	-	o	-	o	-	o	-	o	-	o	-	√	-	o	-	o	-	o	-	o	-
Companion Animal Behavior	o	-	√	-	o	-	√	-	o	-	o	-	o	-	√	-	o	-	o	-	o	-	o	-
Issues in Animal Welfare	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Client Com-munications	√	√	√	√	o	√	√	o	√	√	√	√	o	√	o	o	o	√	o	o	o	o	o	o
Cardiology	o	√	o	√	o	√	o	o	o	√	o	o	o	√	o	o	o	√	o	o	o	√	o	o
Ophthal-mology	o	-	√	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	√	-
Anaesthesiol-ogy (Mixed)	o	-	o	-	o	-	√	-	o	-	√	-	o	-	o	-	o	-	o	-	o	-	o	-

Symbols: O=official curriculum; T=taught curriculum; L=learned curriculum; A=assessed curriculum; √= addressed; o=not addressed; - =no participant/data

Composite Map of the Official, Taught, Learned, and Assessed Curricula

Health Management Rotations	Communi-cation				Ethics				Self-manage-ment				Human animal bond				Practice manage-ment				Career opportun-ities			
	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A
Career and Practice Management	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	√	-	-	-	o	-	-	-
Applied Epidemiology	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-
Short Course in Applied Epidemiology	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Aquaculture	o	√	o	o	o	√	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	√	o	o
Clinics in Large Animal Medicine and Therio-genology *	See Note 1																							
Theriogenol-ogy -- Equine	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Therio-genology	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Farm Service-Ruminants and Swine	o	√	√	√	o	√	o	o	o	√	√	o	o	√	√	o	o	√	o	o	o	√	o	o
Farm Service-Dairy *	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Ecosystem Health	0	√	-	√	o	√	-	o	o	√	-	o	o	o	-	o	o	o	-	o	o	√	-	o
Ambulatory Services-Equine	o	-	√	-	o	-	√	-	o	-	√	-	o	-	√	-	o	-	o	-	o	-	o	-
Farm Services-Swine	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Large Animal Medicine	o	√	√	√	o	√	√	o	o	√	√	o	o	√	√	o	o	√	o	o	o	√	√	o
Farm Service-Feedlot Management	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-

* indicates a rotation which was offered after student focus group sessions occurred

Symbols: O=official curriculum; T=taught curriculum; L=learned curriculum; A=assessed curriculum; √= addressed; o=not addressed; - =no participant/data

Note 1: This rotation is considered under its separate components.

Health Management Rotations	Communi-cation				Ethics				Self-manage-ment				Human animal bond				Practice manage-ment				Career opportun-ities			
	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A
Farm Service-Ruminant Nutrition *	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Farm Service-Ruminant Mastitis *	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Farm Service-Ruminant Production Record Analysis	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Farm Service Ruminant Reproduction *	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Farm Service-Cow/Calf Management	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Large Animal Surgery	o	√	-	√	o	√	-	o	o	√	-	o	o	√	-	o	o	√	-	o	o	√	-	o
Large Animal Medicine and Surgery	o	√	√	√	o	√	o	o	o	√	o	o	o	√	√	o	o	√	o	o	o	√	o	o
Swine Health Monitoring	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	√	-
Regulatory Medicine	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Veterinary Acupuncture	o	√	o	o	o	√	√	o	o	√	o	o	o	√	√	o	o	√	o	o	o	√	√	o
Advanced Equine Dentistry and Health Care	o	√	√	√	o	√	o	o	o	√	o	o	o	√	√	o	o	o	o	o	o	√	o	o

* indicates a rotation which was offered after student focus group sessions occurred

Symbols: O=official curriculum; T=taught curriculum; L=learned curriculum; A=assessed curriculum; √= addressed; o=not addressed; - =no participant/data

Composite Map of the Official, Taught, Learned, and Assessed Curricula

Pathology and Microbiology Rotations	Communi-cation				Ethics				Self-manage-ment				Human animal bond				Practice manage-ment				Career opportun-ities			
	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A
International Veterinary Medicine	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	√	-
Foreign Animal Diseases *	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Foreign Animal Diseases with Practicum	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Clinical Virology	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-
Diagnostic Services	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	√	-	o	-	√	-
Morphologic Pathology	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	o	-	√	-
Wildlife Health *	o	o	-	-	o	√	-	-	o	o	-	-	o	o	-	-	o	o	-	-	o	o	-	-
Aquaculture Diagnostic Services	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-	o	-	-	-

* indicates a rotation which was offered after student focus group sessions occurred

Biomedical Sciences Rotations	Communi-cation				Ethics				Self-manage-ment				Human animal bond				Practice manage-ment				Career opportun-ities			
	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A	O	T	L	A
Exotic and Laboratory Animal Medicine	o	-	√	-	o	-	√	-	o	-	o	-	o	-	√	-	o	-	o	-	o	-	√	-

Symbols: O=official curriculum; T=taught curriculum; L=learned curriculum; A=assessed curriculum; √= addressed; o=not addressed; - =no participant/data

Appendix I: Map of the "Taught" Curriculum: The Faculty Perspective

First Year	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Macroscopic Anatomy						
Microscopic Anatomy	Explicit (scientific)	Situational	Explicit (anecdotes)	--	--	Explicit
Physiology						
Integration Of Structure And Function	Implicit	Situational	Implicit	Implicit	--	--
Animal Behavior And Welfare						
Immunology						
Introduction To Veterinary Medicine	Explicit (client)	Explicit	Explicit	Explicit Implicit		Explicit
Animal Production Systems	Explicit (client)	Explicit	--	Explicit (anecdotes)		Explicit
***Principles Of* Veterinary Epidemiology**						
Clinical Orientation	--	Explicit	--	Explicit	--	--
Parasitology						
General Pathology						

Note: -- indicates that faculty do not address the competency in the course.

Blank cells indicate information not available.

Map of the "Taught" Curriculum: The Faculty Perspective

Second Year	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Veterinary Pharma-cology And Toxicology						
Principles Of Diagnostic Imaging						
Veterinary Public Health						
Principles Of Health Management						
Bacteriology And Mycology						
Virology						
Systemic Pathology						
Principles Of Medicine	Implicit	Explicit Situational	--	Explicit Implicit	--	--
Principles Of Anesthes-iology and Surgery	--	--	--	--	--	--
Principles Of Therio-genology						
Clinical Pathology						
Aquaculture And Fish Health						

Note: -- indicates that faculty do not address the competency in the course.

Blank cells indicate information not available.

Map of the "Taught" Curriculum: The Faculty Perspective

Third Year Courses	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Cardio-respiratory Diseases of Small Animals	Explicit (client) Implicit	Explicit	Explicit (anecdotes)	Explicit (anec-dotes)	--	Implicit
Musculo-skeletal Diseases of Small Animals	Explicit (client)	Situation	--	Explicit (anec-dotes)	--	Explicit
Neurologic and Ophthal-mologic Diseases of Small Animals						
Surgical Exercises in Companion Animals	Explicit (client)	Implicit	Situational	Implicit	--	--
Diagnostic Radiology						
Medical Exercises in Companion Animals	--	Explicit	--	Explicit	--	--
Therio-genology						
Large Animal Medicine	Explicit (case presentation) Implicit	Explicit (situation) Implicit	--	Explicit (anec-dotes)	--	--
Large Animal Surgery	Explicit (scientific)	--	--	--	--	--
Health Management of Swine						
Exotic Mammal Medicine						
Clinical Pharma-cology and Toxicology						

Note: -- indicates that faculty do not address the competency in the course.

Blank cells indicate information not available.

Third Year Courses	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Gastrointest-inal Hepatic and Dental Diseases of Small Animals	Explicit (anecdotes) (client) (minor)	Situation	--	--	--	--
Endocrine and Dermatologic Diseases of Small Animals	Explicit (anecdotes) (client) (minor)	Situation	--	--	--	--
Renal, Genito-urinary, Immunologic and Hemolymph-atic Diseases of Small Animals	Explicit (anecdotes) (client) (minor)	Situation	--	--	--	--
Health Management of Dairy Cattle						
Health Management of Beef Cattle, Horses and Small Ruminants	Explicit (client) (minor)	--	--	Explicit (anec-dotes)	--	Implicit
Avian and Reptile Medicine						

Note: -- indicates that faculty do not address the competency in the course.

Blank cells indicate information not available.

Map of the "Taught" Curriculum: The Faculty Perspective

Companion Animals rotations	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Anesthesiol-ogy (small animal)						
Companion Animal Medicine	Explicit (client) Implicit	Explicit (situation)	Explicit	Explicit	Indirect Minor	Mentoring
Clinical nutrition						
Companion Animal Surgery	Explicit (client) Implicit	Explicit (situation)	Explicit (situation)	Implicit	Indirect Minor	Mentoring
Community Practice						
Radiology						
Anesthesiol-ogy (Large Animal)						
Dermatology						
Companion Animal Behavior						
Issues in Animal Welfare						
Client Com-munications	Explicit (client)	Indirect	Explicit	Explicit	Indirect	--
Cardiology	Explicit (client)	Situational	Implicit	Situat.	Indirect Minor	Mentoring
Ophthal-mology						
Anesthesio-logy (Mixed)						

Note: -- indicates that faculty do not address the competency in the course.

Blank cells indicate information not available.

Map of the "Taught" Curriculum: The Faculty Perspective

Health Management Rotations	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Career and Practice Management						
Applied Epidemiology						
Short Course in Applied Epidemiology						
Aquaculture	Implicit	Implicit (situation)	--	--	--	Implicit
Clinics in Large Animal Medicine and Therio-genology *						
Theriogenol-ogy -- Equine						
Therio-genology						
Farm Service-Ruminants and Swine	Implicit	Implicit (situation)	Implicit	Implicit	Implicit	Mentoring
Farm Service-Dairy						
Ecosystem Health	Explicit	Explicit	Explicit	--	--	Implicit
Ambulatory Services-Equine						
Farm Services-Swine						
Large Animal Medicine	Explicit (client) Implicit	Implicit (situation)	Situational	Implicit	Implicit (awareness)	Mentoring
Farm Service-Feedlot Management						

Note: -- indicates that faculty do not address the competency in the course.

* indicates that the components of this rotation are considered separately.

Blank cells indicate information not available.

Health Management Rotations	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Farm Service-Ruminant Nutrition						
Farm Service-Ruminant Mastitis						
Farm Service-Ruminant Production Record Analysis						
Farm Service Ruminant Reproduction						
Farm Service-Cow/Calf Management						
Large Animal Surgery	Explicit (client)	Implicit (situational)	Implicit	Implicit (minor)	Implicit (minor)	Mentoring
Large Animal Medicine and Surgery *						
Swine Health Monitoring						
Regulatory Medicine						
Veterinary Acupuncture	Implicit	Implicit	Implicit	Implicit	Explicit	Mentoring
Advanced Equine Dentistry and Health Care	Implicit	Implicit	Situational	Implicit	--	Mentoring

Note: -- indicates that faculty do not address the competency in the course.

* indicates that the components of this rotation are considered separately.

Blank cells indicate information not available.

Map of the "Taught" Curriculum: The Faculty Perspective

Pathology and Microbiology Rotations	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
International Veterinary Medicine						
Foreign Animal Diseases						
Foreign Animal Diseases with Practicum						
Clinical Virology						
Diagnostic Services						
Morphologic Pathology						
Wildlife Health	--	Situation	--	--	--	--
Aquaculture Diagnostic Services						

Biomedical Sciences Rotations	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Exotic and Laboratory Animal Medicine						

Note: With the exception of one faculty member who participates in Wildlife Health, no faculty from these rotations participated in this study.

-- indicates that faculty do not address the competency in the course.

Blank cells indicate information not available.

Appendix I: Map of the "Learned" Curriculum: The Student Perspective

First Year	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Macroscopic Anatomy	13 Implicit scientific group	4 Explicit	9 Implicit	3 Implicit		
Microscopic Anatomy	4 Explicit scientific		4 Implicit workload			
Physiology			2 Implicit workload			
Integration Of Structure And Function	17 Implicit group	3 Implicit	10 Implicit group	2 Implicit	2 Implicit	
Animal Behavior And Welfare	6 Explicit client	16 Explicit	2 Implicit group	16 Explicit	3 Implicit	3 Implicit
Immunology			1 Implicit workload		1 Implicit	
Introduction To Veterinary Medicine	9 Explicit client	12 Explicit	4 Explicit	9 Explicit	10 Explicit	15 Explicit
Animal Production Systems	8 Explicit client	9 Explicit	1 Implicit group	9 Explicit	2 Explicit	9 Explicit
Principles Of Veterinary Epidemiology	4 Explicit scientific	3 Explicit research	1 Implicit		1 Explicit	5 Explicit
Clinical Orientation	12 Explicit	4 Explicit	4 Implicit group	8 Implicit	5 Implicit	3 Implicit
Parasitology	4 Explicit client	1 Implicit	1 Implicit		2 Explicit	3 Explicit
General Pathology	2 Explicit scientific	1 Implicit				5 Explicit

Note: Numbers indicate student responses for each competency in each course (maximum possible = 20).

Map of the "Learned" Curriculum: The Student Perspective

Second Year	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Veterinary Pharma-cology And Toxicology	2 Explicit client	4 Explicit	1 Implicit		1 Implicit	1 Explicit
Principles Of Diagnostic Imaging	5 Explicit scientific		1 Implicit	1	3 Implicit	3 Explicit
Veterinary Public Health	9 Implicit	4 Explicit		4 Explicit	3 Implicit	3 Explicit
Principles Of Health Management	1				2	2 Explicit
Bacteriology And Mycology	1 Explicit scientific	2 Implicit	2 Implicit		1 Implicit	2 Explicit
Virology	1 Explicit scientific	1 Implicit	4 implicit		1 Implicit	1 Explicit
Systemic Pathology	3 Explicit scientific		1 Implicit			1 Explicit
Principles Of Medicine	3 Explicit client	2 Explicit	1 Implicit	3	2	
Principles Of Anesthes-iology and Surgery	4 Explicit scientific	3 Implicit	3	1	3 Implicit	2 Explicit
Principles Of Therio-genology	2 Implicit	2 Implicit	2			3 Explicit
Clinical Pathology	5 Explicit client	1	1		1 Implicit	3 Explicit
Aquaculture And Fish Health	7 Explicit scientific	7 Explicit	1 Implicit	5	1 Explicit	6 Explicit

Note: Numbers indicate student responses for each competency in each course (maximum possible = 16).

Map of the "Learned" Curriculum: The Student Perspective

Third Year	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Cardio-respiratory Diseases of Small Animals	1 Explicit			2 Explicit		
Musculo-skeletal Diseases of Small Animals				2 Explicit anecdote		
Neurologic and Ophthal-mologic Diseases of Small Animals						
Surgical Exercises in Companion Animals	9 Explicit client	3 Implicit	5 Implicit group	2 Implicit	1 Implicit	
Diagnostic Radiology	1 Implicit					
Medical Exercises in Companion Animals	3	2 Explicit	1 Implicit			
Therio-genology	1 Implicit					
Large Animal Medicine	4	1	2			
Large Animal Surgery						
Health Management of Swine	1 Implicit					1 Implicit
Exotic Mammal Medicine	1 Explicit					1 Explicit
Clinical Pharma-cology and Toxicology	2 Explicit	1				

Note: Numbers indicate student responses for each competency in each course (maximum possible = 9).

	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Gastrointest-inal Hepatic and Dental Diseases of Small Animals	1 Explicit					
Endocrine and Dermatologic Diseases of Small Animals						
Renal, Genito-urinary, Immunologic and Hemolymph-atic Diseases of Small Animals	2 Explicit					
Health Management of Dairy Cattle	1 Explicit	2 Explicit Implicit		2 Explicit		
Health Management of Beef Cattle, Horses and Small Ruminants	1 Explicit	3 Explicit Implicit				2 Explicit
Avian and Reptile Medicine	2 Explicit			1 Explicit		1 Explicit

Note: Numbers indicate student responses for each competency in each course (maximum possible = 9).

Map of the "Learned" Curriculum: The Student Perspective

Companion Animals Rotations	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Anesthesiol-ogy (small animal)	1		2 Implicit			
Companion Animal Medicine	4 Ex/ Implicit	2	3 Implicit	4	1	
Clinical nutrition	1					
Companion Animal Surgery	4	1	1 Implicit	4		1 Implicit
Community Practice	3 Ex/ Implicit		1 Ex/ Implicit	2		
Radiology			3 Implicit		4 Explicit	
Anesthesiol-ogy (Large Animal)						
Dermatology	1			2		
Companion Animal Behavior	1	1		4		
Issues in Animal Welfare	NA	NA	NA	NA	NA	NA
Client Com-munications	3 Explicit client	2	1			
Cardiology						
Ophthal-mology	2 Ex/Implicit client					1 Implicit
Anesthesio-logy (Mixed)		2	1 Implicit			

Note: Numbers indicate student responses for each competency in each course (maximum possible =5).

Map of the "Learned" Curriculum: The Student Perspective

Health Management Rotations	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Career and Practice Management	NA	NA	NA	NA	NA	NA
Applied Epidemiology						
Short Course in Applied Epidemiology	NA	NA	NA	NA	NA	NA
Aquaculture						
Clinics in Large Animal Medicine and Therio-genology *	NA	NA	NA	NA	NA	NA
Theriogenol-ogy -- Equine	NA	NA	NA	NA	NA	NA
Therio-genology	NA	NA	NA	NA	NA	NA
Farm Service-Ruminants and Swine	1 Implicit		1 Implicit	1 implicit		
Farm Service-Dairy *	NA	NA	NA	NA	NA	NA
Ecosystem Health	NA	NA	NA	NA	NA	NA
Ambulatory Services-Equine	2 Explicit client	1 Implicit	1 Implicit	1 Implicit		
Farm Services-Swine	NA	NA	NA	NA	NA	NA
Large Animal Medicine	3 Ex/Implicit client	1 Explicit	2 Implicit	3 Explicit		1 Implicit
Farm Service-Feedlot Management	NA	NA	NA	NA	NA	NA

Note: Numbers indicate student responses for each competency in each course (maximum possible = 5).

* indicates a rotation which was offered after student focus group sessions occurred.

Health Management Rotations	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Farm Service-Ruminant Nutrition *	NA	NA	NA	NA	NA	NA
Farm Service-Ruminant Mastitis *	NA	NA	NA	NA	NA	NA
Farm Service-Ruminant Production Record Analysis	NA	NA	NA	NA	NA	NA
Farm Service-Cow/Calf Management	NA	NA	NA	NA	NA	NA
Large Animal Surgery	NA	NA	NA	NA	NA	NA
Large Animal Medicine and Surgery	1 Explicit			1 Explicit		
Swine Health Monitoring						1 Explicit
Farm Service Ruminant Reproduction *	NA	NA	NA	NA	NA	NA
Regulatory Medicine	NA	NA	NA	NA	NA	NA
Veterinary Acupuncture		1 Explicit		1 Implicit		1 Explicit
Advanced Equine Dentistry and Health Care	1 Explicit client			1 Explicit		

Note: Numbers indicate student responses for each competency in each course (maximum possible = 5).

* indicates a rotation which was offered after student focus group sessions occurred.

Map of the "Learned" Curriculum: The Student Perspective

Pathology and Microbiology Rotations	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
International Veterinary Medicine						1 Implicit
Foreign Animal Diseases *	NA	NA	NA	NA	NA	NA
Foreign Animal Diseases with Practicum	NA	NA	NA	NA	NA	NA
Clinical Virology	NA	NA	NA	NA	NA	NA
Diagnostic Services					1 Implicit	2 Explicit
Morphologic Pathology						1 Explicit
Wildlife Health *	NA	NA	NA	NA	NA	NA
Aquaculture Diagnostic Services	NA	NA	NA	NA	NA	NA

* indicates a rotation which was offered after student focus group sessions occurred.

Biomedical Sciences Rotations	Communi-cation	Ethics	Self-manage-ment	Human animal bond	Practice manage-ment	Career opportun-ities
Exotic and Laboratory Animal Medicine	1 Explicit client	3 Explicit		1 Explicit		1 Explicit

Note: Numbers indicate student responses for each competency in each course (maximum *possible* = 5).