

Co-constructive Veterinary Simulation: A Novel Approach to Enhancing Clinical Communication and Reflection Skills

Annemarie Spruijt ■ Cecil C. Prins-Aardema ■ Marco Antonio de Carvalho-Filho ■ Debbie Jaarsma ■ Andrés Martin

ABSTRACT

Interpersonal communication is critical in training, licensing, and post-graduate maintenance of certification in veterinary medicine. Simulation has a vital role in advancing these skills, but even sophisticated simulation models have pedagogic limitations. Specifically, with learning goals and case scenarios designed by instructors, interaction with simulated participants (SPs) can become performative or circumscribed to evaluative assessments. This article describes co-constructive veterinary simulation (CCVS), an adaptation of a novel approach to participatory simulation that centers on learner-driven goals and individually tailored scenarios. CCVS involves a first phase of scriptwriting, in which a learner collaborates with a facilitator and a professional actor in developing a client–patient case scenario. In a second phase, fellow learners have a blinded interaction with the SP-in-role, unaware of the underlying clinical situation. In the final part, all learners come together for a debriefing session centered on reflective practice. The authors provide guidelines for learners to gain maximal benefit from their participation in CCVS sessions and describe thematic possibilities to incorporate into the model, with specific case examples drawn from routine veterinary practice. Finally, the authors outline challenges and future directions toward implementing CCVS in veterinary medical education toward the ultimate goal of professional growth and co-evolution as veterinary practitioners.

Key words: simulation model, communication skills, professional development, educational methods

BACKGROUND

Skills in communicating with clients are critical in veterinary medicine. As aptly noted by Kurtz almost 20 years ago, such skills “can and should be taught and learned with as much rigor as other aspects of clinical competence. Veterinary programs at all levels should include the teaching of communication.”^{1(p.10)} There has since been a solid response to that call, as reflected by several international guidelines, including those set forth by the Royal College of Veterinary Surgeons (RCVS),² the accrediting organization for UK veterinary schools; the Argus Institute at Colorado State University,³ a program specifically established to enhance veterinarian–client communication; and the formation in the UK and Ireland of the National Unit for the Advancement of Veterinary Communication Skills (NUVACS). In the United States, the American Veterinary Medical Association (AVMA)⁴ and the Association of American Veterinary Medical Colleges (AAVMC),⁵ responsible for the oversight of veterinary schools, now require training in communication skills as a core element for curricula approval. Reflecting the importance of interpersonal engagement as a precondition toward graduation, the Objective Structured Clinical Veterinary Examination (OSCE) includes communication in the training requirements for graduation—indeed, as 1 of 20 summative stations.^{6–8} Communication skills are similarly crucial in safe clinical care, licensing,⁹ and post-graduate certification maintenance.⁷

The traditional approach to teaching, practicing, and refining interpersonal communication skills in veterinary medicine has

been based on theoretical background, practical guidelines, and classroom-based exercises, at times complemented by role-playing among fellow learners. Human simulation, a pedagogy in which professional actors serve the role of clients with whom veterinarians interact in clinical practice, has served an important role advancing and standardizing this critically important skill set.¹⁰ Over the past 2 decades, approaches to developing, exercising, and refining competencies in communication have been adapted to address the unique needs and challenges faced by veterinarians—including interaction with client–patient dyads. The Calgary–Cambridge guide and the curriculum from the University of Calgary have been particularly influential in setting high standards and best practices for veterinary communication training.^{11–14}

Even the more sophisticated models of human simulation designed for highly complex skills in human health care communication have limitations that carry over to adjustments in veterinary medicine. Specifically, learning goals are instructor-driven, and in most cases, supervisors design case scenarios. Under these pedagogic givens, simulation can become evaluation-centered in its goals or performative in its outcomes. Simulation routinely fails to incorporate just-in-time challenges encountered during learners’ routine daily practice. In addition, simulation scenarios dictated by faculty run the risk of reifying the paternalistic interaction style from which veterinary medicine is moving away.¹² Finally, classic simulation can relegate learners to a circumscribed role in which they function as viewers or distant participants

© American Association of Veterinary Medical Colleges (AAVMC), 2023. For their own personal use, users may read, download, print, search, or link to the full text. Manuscripts published in the *Journal of Veterinary Medical Education* are copyrighted to the American Association of Veterinary Medical Colleges. Requests for permission to reproduce this article should be made to the University of Toronto Press using the Permission Request Form: <https://www.utpjournals.press/about/permissions> or by email: journal.permissions@utpress.utoronto.ca.

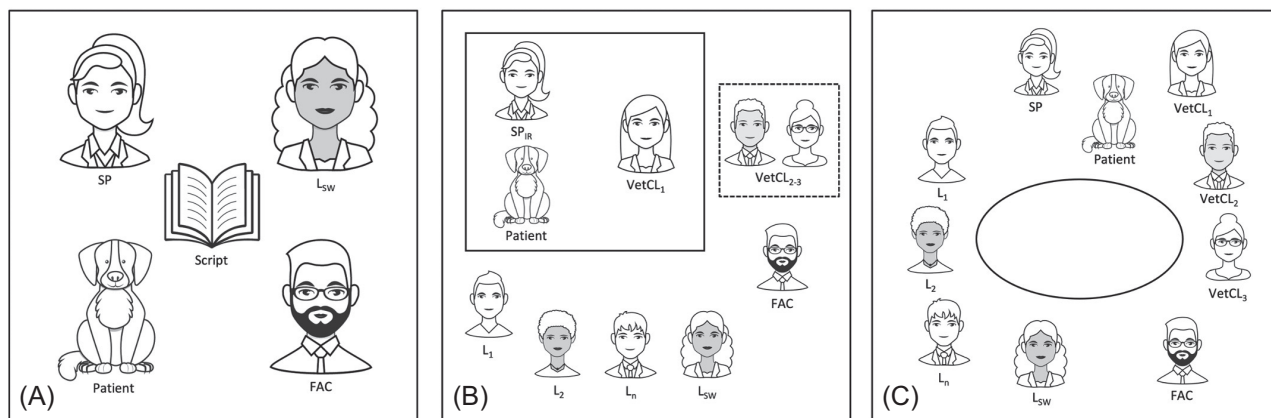


Figure 1: Co-constructive veterinary simulation (CCVS) phases

From left: (A) scenario preparation, including learner/scriptwriter (L_{sw}), simulated participant (SP) with their animal (Patient), and facilitator acquainted with the CCVS model (FAC); (B) blinded interaction, in which three different clinicians ($VetCL_{1-3}$) take turns sequentially engaging with the standardized participant-in-role as client (SP_{iR}) as fellow learners observe (L_{1-n}); (C) moderated debriefing, where FAC invites reflective discussion and constructive feedback that involves all participants.

in another’s set piece. Under such conditions, simulation often misses an opportunity to maximize relevant learning opportunities toward a “more mutualistic, relationship-centered” approach^{15(p.14)} that can benefit the participant and contribute to the development of a veterinary community of practice.^{16–18}

Several of these shortcomings can be overcome through a novel and participatory approach to simulation that centers on learner-tailored goals and bespoke scenarios toward the ultimate goal of veterinary practitioners’ sharing of professional growth and co-evolution.¹⁹

THE CO-CONSTRUCTIVE VETERINARY SIMULATION MODEL

Co-constructive veterinary simulation (CCVS) is an adaptation to veterinary medical education of co-constructive patient simulation, a novel interaction-based approach to human simulation in which a learner/scriptwriter, an actor, and a facilitator jointly develop learning objectives and case scenarios.²⁰ CCVS is most fruitfully applied to learners in advanced clinical stages of education, including those approaching graduation, those in post-graduate fellowship training, those who are part of veterinary medical education initiatives, or those seeking to refine complex interpersonal skills once in clinical practice.

CCVS is divided into three interlocking phases, as depicted in Figure 1. In the first phase, *scenario preparation*, a learner (hereafter scriptwriter) develops the case script to undergird the interpersonal clinical interaction. The scriptwriter starts by creating an initial draft script based on a previous challenging experience with a patient or a composite of several. Scriptwriters are encouraged to create scenarios based on emotionally challenging past experiences in their veterinary practice. They are provided with a sample scenario that can serve as a rubric. The script they write does not have to be elaborate or long but does have to provide sufficient backstory for the actor to interpret the character realistically and place the interaction into context. The script is then shared with a facilitator, typically a faculty member acquainted with the CCVS model, and with an actor, preferably professionally trained and experienced in enacting medical simulation roles and adhering to extant guidelines.²¹ The scriptwriter and the actor, now playing the client’s role, rehearse and refine the interaction to ensure its accuracy and affective resonance.

The actual simulated encounter occurs 1 or 2 weeks later, during a *blinded interaction*. The time interval between the rehearsal and interaction stages allows the actor to ask the scriptwriter clarifying questions and conduct further preparation toward embodying the client. This behind-the-scenes preparatory work is crucial to embedding as much of the client’s and patient’s relevant history—and of the learner’s emotions or challenges in dealing with them. During this second phase, fellow learners at the same educational level as the scriptwriter—and blind to the content of the scripted scenario—take successive turns interacting with the actor’s embodiment of the crafted persona, optimally accompanied by a real animal. Considering that a complex or specialist veterinary visit typically lasts 30–60 minutes, an optimal blinded interaction is 30–45 minutes in duration, during which two or three different learners take turns engaging with the client’s avatar. The learners in the “hot seat” form part of a continuous flow: they do not reintroduce themselves or ask for information they have already witnessed; they seamlessly pick up at the point when their preceding colleague leaves the action. During the blinded phase, other learners do not actively intervene; they participate as observers of the witnessed interactions.

A *moderated debriefing* phase that involves all participants follows the blinded interaction. The flow of discussion follows a set order: first, participants in the hot seat share their thoughts and emotions; second, the other learners who witnessed the interaction become actively engaged as they share their own emotional and cognitive reactions; next, the learner who served as scriptwriter shares how similarly or differently the case resonated with their prior experience and actions; and finally, the actor shares their complex and dual reactions—initially while still in role, before revealing themselves as the person they are in real life. The facilitator/faculty guides the debriefing session using standard guidelines.^{14,22–24} They ensure a safe and supportive learning environment by leading with a light touch that does not interfere with or monopolize the natural flow of discussion yet ensures optimal use of the precious time allotted.

PREPARING LEARNERS TO BENEFIT FROM THE INTERACTIVE CCVS SESSION

Before the blinded interaction starts, the facilitator establishes ground rules and provides instructions to all participants for

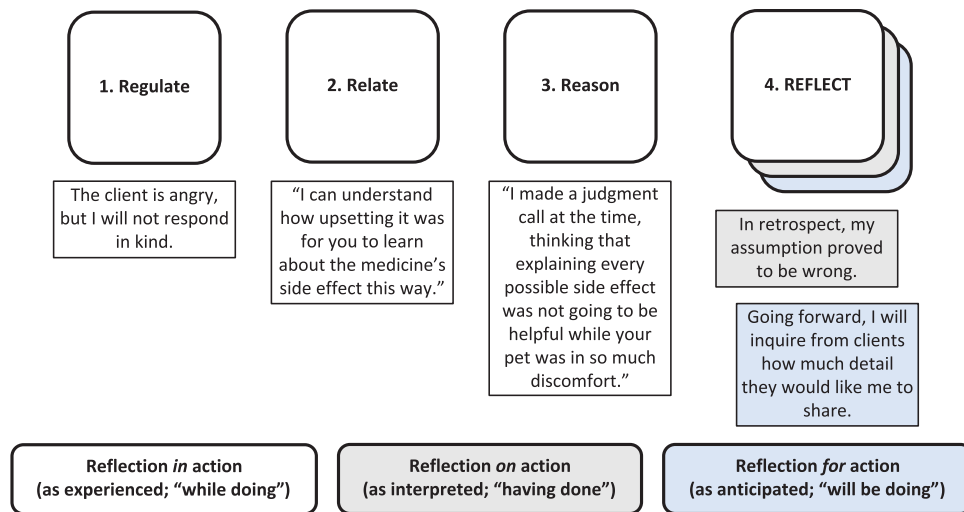


Figure 2: A simplified 4R approach to reflection, which in turn rests on the three stages described by Donald Schön in *The Reflective Practitioner*²⁵
Adapted from Martin et al. (2021)²⁶

what will be an admittedly unconventional learning experience. Such guidance, necessary for learners to make optimal use of the designated time, addresses seven essential points:

1. The session's goal is not to solve a riddle but rather to engage in a reflective exercise that can help refine interpersonal communication skills, particularly those required during challenging clinical situations.
2. The focus needs to be away from *technical* skills, including physical exams, diagnostic inquiry, and treatment interventions. In a fundamental sense, learners are asked to leave their veterinary identities outside the room and to rely instead on their interpersonal skills, which may or may not have been informed by personal experience or prior education, such as undergraduate coursework in clinical psychology. Learners are asked to attend not just to the interaction but, of equal importance, to their own internal experience.
3. The learners' focus needs to be on themselves as persons instead of as veterinary professionals with a vast armamentarium of knowledge and skills at their disposal. Stated alternatively, they need to *rely on themselves as the instrument*, as the means toward change during challenging interactions. This alternative mind-set embraces uncertainty and ambiguity as opportunities for growth.
4. Learners are invited to *listen generously and contribute constructively*, to "take some and give some." Monopolizing, self-centering, or withdrawing from the conversation can limit the usefulness of the reflective exercise. At the same time, no one is *required* to speak or share. Instead, the facilitator can redirect the former participants and gently encourage the latter toward an optimal balance of the shared experience. Finally, learners are invited to *critique but not criticize* and focus on the actions and reflections of the person rather than on the person as an individual; the facilitator needs to curb any *ad hominem* comments immediately.
5. Learners should strive to distill the internal experience elicited by the session to inform their future practice and that of their colleagues. Learners' reflections should center not only on the others' actions but also on their own reactions. Learners can be most comfortable offering superficial praise, a polite response that does not lead to growth, either their own or that of their fellow learners.

6. Donald Schön's work provides a helpful theoretical framework to understand opaque interpersonal complexity that can move practitioners away from their natural comfort zones. In Schön's model,²⁵ reflective clinical practice can be construed as consisting of three separate yet interrelated stages: (a) reflection *in action* or *while doing*, (b) reflection *on action* or after *having done*, and (c) reflection *for action* or *toward doing* in the future. This reflective frame is relevant not only to learners in the hot seat but to all fellow learners bearing witness to the action and experiencing their reactions to it.
7. Blended with Schön's conceptualization, a simplified 4R approach can provide practical scaffolding to approach challenging interpersonal encounters, as depicted in Figure 2. The model starts with *regulation* of affect—that of the other, as well as one's own: *the first pulse to take should be your own*, paraphrasing Samuel Shem's medical initiation classic, *The House of God*.²⁷ The second step is to *relate* through empathy and the affective joining with the other—an interpersonal task not feasible in the context of un-defused affect. Finally, *reasoning*, during which exchange of information can take place, is not possible or is seriously hampered whenever the first two Rs are not addressed. The cycle continues as learners *reflect* on their practice toward future improvement.

INCORPORATING CO-CONSTRUCTION INTO VETERINARY EDUCATION

A wide range of clinical situations can lend themselves to CCVS-based training. Table 1 outlines thematic possibilities for interpersonal communication challenges and specific examples from routine veterinary practice. As a proof-of-concept experience, in the fall of 2021, we successfully conducted a CCVS session with 20 participants at the University of Utrecht's Faculty of Veterinary Medicine. The case was based on a mix of the first of the ethical boundary and overwhelming responsibility / abandonment scenarios listed in the table.

CCVS can enable practice and refinement of interpersonal skills in a safe and supportive environment. It is well poised to enhance individual veterinarians' communication skills and those of their peers and colleagues. Its educational returns are bidirectional: one-on-many, where the colleague in the hot seat contributes to the learning of their observing peers, as well as many-on-one,

Table 1: Common interpersonal communication challenges in veterinary practice

Clinical challenge	Sample scenarios
Anger / threat of litigation	On learning of their horse's newly diagnosed laminitis, an owner lashes out at the veterinarian. The client claims that detailed information about the risks of steroid use had been minimized and threatens to bring on a malpractice lawsuit. A dairy farmer accuses a veterinarian of not treating the herd prophylactically with antibiotics against salmonellosis before confirming diagnosis through feces examination.
Ethical boundaries	Confronted with repeated noise complaints by the neighbors, a client demands a cordectomy for their dog's devocalization. Three months after a cat's diagnosis of diabetes, an owner presses for euthanizing the patient.
Dismissiveness / belittling / racism ²⁸	An owner snickers over a diet recommendation to prevent further kidney problems or bladder stones: "I wonder what product you will try to sell me next?" Upset over the appointment's price, a caretaker undervalues the veterinarian by stating, "Is that really the price for a vaccination and 15-minute visit?" A veterinarian from an underrepresented demographic wears a white coat with a name tag indicating DVM, yet a client refers to them as the doctor's administrative assistant.
Grief / loss / bereavement	A family deeply attached to their horse struggles to accept the inevitability of its imminent demise—and how to communicate the news to their younger children. Three months after their dog's death, a client comes in for their cat's routine visit. The pet owner has lost weight, shares having disrupted sleep, and cries during much of the appointment.
Overwhelming responsibility / abandonment	A client states "not having signed up" for the care of a chronically ill dog and threatens to leave it for "your office" to arrange for adoption or rehoming. A client is overwhelmed when learning of the post-operative time commitment and costs after their cat's accident.

where fellow learners contribute through their observations and personal reflections to the growth of their interviewing colleague. In asking learners to leave their technical and veterinary-specific skills behind, CCVS can be construed as a gym that isolates and provides an opportunity to exercise the muscles necessary to move interpersonal communication challenges forward. The CCVS learning environment creates a supportive and democratic setting conducive for learners to explore meaning-making and their sense of purpose, to focus on their challenges, to welcome clinical serendipity, and to search for new insights—in short, to learn not only about clinical challenges but about themselves, their profession, and their identity development within it.

Veterinary practice offers unique educational circumstances to adapt to co-construction. For example, its focus is on a human-animal dyad in which the animal is the identified patient but where there can be a blurring of boundaries regarding who the patient is. A veterinarian's clinical attention often swivels from one component of the dyad to the other. A patient can become the screen for a client's projection of complex feelings and inner needs, akin to the communication patterns between (human) pediatric clinicians and the adults caring for their nonverbal newborns, infants, or young children. In not seeing themselves as psychologists or experts in human communication, veterinarians can be particularly receptive to CCVS as a learning opportunity and benefit from its embodied, practical, and clinically relevant approach. Unlike the mental health professionals with whom the model was initially developed, veterinarians are primarily focused on their animal patients and thus not likely to hold themselves to unreasonably high standards regarding complex human interactions.

CHALLENGES AND FUTURE DIRECTIONS

In this conceptual article, we have introduced the CCVS model and made a case for its promise as an educational tool in veterinary medicine. We conducted a first CCVS session, which was logistically feasible and well received by veterinary faculty and

graduate students. Although it is premature to provide a formal evaluation of the model, learners' informal comments included how (a) they have always found role play with professional actors more valuable than with colleagues playing client roles; (b) they found added value in being central to the co-construction of the case during CCVS; and (c) the model was nimble enough to provide just-in-time challenges by an actor not adhering strictly to a script but rather adapting in real time to the flow of the interaction. It remains to be seen if the approach can be replicated, adapted, and incorporated from its origins in medical and psychiatric practice and whether it can in fact enhance current best practices.

In considering the model's empirical testing in veterinary medical education, emphasis should be placed not only on feasibility but also on veterinary learners' unique needs and specific logistic challenges, such as involving larger animals (such as horses) in simulation sessions. Mixed simulation scenarios that incorporate animal dummies could be a natural adjustment. However, we advise against using haptic systems,²⁹ which can detract from a focus on interpersonal communication toward hiding behind technical skills. Veterinarians can harness the CCVS experience in their developmental progression as professionals, moving from refining procedural skills toward treating the whole case in a way that seamlessly integrates all of their abilities.⁸

Other challenges to consider toward implementing CCVS include that (a) recruiting actors with experience as SPs can be challenging, particularly outside of larger teaching institutions; (b) even as the cost to hire SPs is not prohibitive, it is not insignificant either; and (c) perhaps most pressing is finding time as a standard component of training or continuing veterinary education in an already stretched curriculum or busy clinical practice. And yet, educators routinely *make* time to *have* time. One alternative worth exploring is using CCVS in a demonstration or master class format: for example, as a participatory session at grand rounds or professional meetings, or on a smaller scale, as a case presentation at the farmside. We posit that even a single exposure to CCVS's robust suspension of disbelief can be helpful

at critical crossroads in a veterinarian's professional development. We encourage veterinary educators to consider giving CCVS a trial run: it may well end up as a one-off effort but may alternatively become an elective or even a core pedagogy at some institutions.

We consider empirical research using qualitative methods the next step to incorporate CCVS into veterinary medical education. This effort is eminently doable at a practical level: the first study on the clinical application of the model was based on a series of seven sessions in a child psychiatry context.^{26,30} But beyond its practical feasibility, we are confident that this participatory and mutualistic approach to simulation can help clinicians at all levels move *from learning veterinary medicine to becoming veterinarians*.

ACKNOWLEDGMENT

This research was supported by the Riva Ariella Ritvo Endowment at the Yale Child Study Center and by NIMH grant R25 MH077823, Research Education for Future Physician-Scientists in Child Psychiatry.

REFERENCES

- Kurtz S. Communication: an essential veterinary professional attribute. *J Vet Med Educ*. 2006;33(1):10. <https://doi.org/10.3138/jvme.33.1.10>.
- Royal College of Veterinary Surgeons (RCVS). *Day One Competencies*. London: RCVS; 2014.
- Colorado State University (CSU) College of Veterinary Medicine & Biomedical Sciences. Argus Institute [Internet]. Fort Collins (CO): CSU; 2015 [cited 2022 Mar 21]. Available from: <http://csu-cvmb.colostate.edu/vth/diagnostic-and-support/argus/Pages/default.aspx>.
- American Veterinary Medical Association (AVMA). COE accreditation policies and procedures: requirements [Internet]. Schaumburg (IL): AVMA; 2015 [cited 2022 Mar 21]. Available from: <https://www.avma.org/ProfessionalDevelopment/Education/Accreditation/Colleges/Pages/coe-pp-requirements-of-accredited-college.aspx>.
- Molgaard L, Hodgson J, Bok H, Chaney K, Ilkiw J, Matthew S, et al. Competency-based veterinary education, part 1: the CBVE framework. Washington (DC): Association of American Veterinary Medical Colleges; 2018.
- Bark H, Shahar R. The use of the Objective Structured Clinical Examination (OSCE) in small-animal internal medicine and surgery. *J Vet Med Educ*. 2006;33(4):588–92. <https://doi.org/10.3138/jvme.33.4.588>. Medline:17220502
- Davis M, Ponnampereuma G, McAleer S, Dale V. The Objective Structured Clinical Examination (OSCE) as a determinant of veterinary clinical skills. *J Vet Med Educ*. 2006;33(4):78–87. <https://doi.org/10.3138/jvme.33.4.578>. Medline:17220501
- May SA, Head SD. Assessment of technical skills: best practices. *J Vet Med Educ*. 2010;37(3):258–65. <https://doi.org/10.3138/jvme.37.3.258>. Medline:20847335
- McDermott MP, Tischler VA, Cobb MA, Robbé IJ, Dean RS. Veterinarian–client communication skills: current state, relevance, and opportunities for improvement. *J Vet Med Educ*. 2015;42(4):305–14. <https://doi.org/10.3138/jvme.0115-006R>. Medline:26315212
- Adams CL, Ladner L. Implementing a simulated client program: bridging the gap between theory and practice. *J Vet Med Educ*. 2004;31(2):138–45. <https://doi.org/10.3138/jvme.31.2.138>. Medline:15181596
- Adams CL, Kurtz SM. Building on existing models from human medical education to develop a communication curriculum in veterinary medicine. *J Vet Med Educ*. 2006;33(1):28–37. <https://doi.org/10.3138/jvme.33.1.28>. Medline:16767635
- Shaw JR, Bonnett BN, Adams CL, Roter DL. Veterinarian–client–patient communication patterns used during clinical appointments in companion animal practice. *J Am Vet Med Assoc*. 2006;228(5):714–21. <https://doi.org/10.2460/javma.228.5.714>. Medline:16506932
- Adams C, Kurtz S. *Skills for communicating in veterinary medicine*. New York: Oxford & Dewpoint Publishing; 2017.
- Adams CL, Kurtz S. Coaching and feedback: enhancing communication teaching and learning in veterinary practice settings. *J Vet Med Educ*. 2012;39(3):217–28. <https://doi.org/10.3138/jvme.0512-038R>. Medline:22951457
- Bard AM, Main DCJ, Haase AM, Whay HR, Roe EJ, Reyher KK. The future of veterinary communication: partnership or persuasion? A qualitative investigation of veterinary communication in the pursuit of client behaviour change. *PLoS One*. 2017;12(3):1–17. <https://doi.org/10.1371/journal.pone.0171380>. Medline:28257511
- Cruess RL, Cruess SR, Steinert Y. Medicine as a community of practice: implications for medical education. *Acad Med*. 2018;93(2):185–91. <https://doi.org/10.1097/ACM.0000000000001826>. Medline:28746073
- de Carvalho-Filho MA, Tio RA, Steinert Y. Twelve tips for implementing a community of practice for faculty development. *Med Teach*. 2019;42(2):143–9. <https://doi.org/10.1080/0142159X.2018.1552782>. Medline:30707855
- Wenger E. *Communities of practice and social learning systems*. Organization. 2000;7(2):225–46. <https://doi.org/10.1177/135050840072002>.
- Sharmer C. *Theory U: leading from the future as it emerges*, 2nd ed. Oakland (CA): Berrett-Koehler Publishers; 2016.
- Martin A, Weller I, Amsalem D, Duvivier R, Jaarsma D, de Carvalho Filho MA. Co-constructive patient simulation. *Simul Healthc J Soc Simul Healthc*. 2020;16(6):129–35. <https://doi.org/10.1097/SIH.0000000000000528>. Medline:33273424
- Lewis KL, Bohnert CA, Gammon WL, Hölzer H, Lyman L, Smith C, et al. The Association of Standardized Patient Educators (ASPE) standards of best practice (SOBP). *Adv Simul*. 2017;2(10):1–8. <https://doi.org/10.1186/s41077-017-0043-4>. Medline:29450011
- Komal B. The PEARLS healthcare debriefing tool. *Acad Med*. 2018;93(2):336. <https://doi.org/10.1097/ACM.0000000000002035>. Medline:29381495
- Cheng A, Morse KJ, Rudolph J, Arab AA, Runnacles J, Eppich W. Learner-centered debriefing for health care simulation education: lessons for faculty development. *Simul Healthc*. 2016;11(1):32–40. <https://doi.org/10.1097/SIH.0000000000000136>. Medline:26836466
- Eppich W, Cheng A. Promoting excellence and reflective learning in simulation (PEARLS): development and rationale for a blended approach to health care simulation debriefing. *Simul Healthc*. 2015;10(2):106–15. <https://doi.org/10.1097/SIH.0000000000000072>. Medline:25710312
- Schön DA. *The reflective practitioner: how professionals think in action*. New York: Basic Books; 1983.
- Martin A, Weller I, Amsalem D, Adigun A, Jaarsma D, Duvivier R, et al. From learning psychiatry to becoming psychiatrists: a qualitative study of co-constructive patient simulation. *Front Psychiatry*. 2021;8(11):616239. <https://doi.org/10.3389/fpsy.2020.616239>. Medline:33488433
- Shem S. *The house of god*. New York: Richard Marek Books; 1978.
- Alvarez EE, Gilles WK, Lygo-Baker S, Chun R. Teaching cultural humility and implicit bias to veterinary medical students: a review and recommendation for best practices. *J Vet Med Educ*. 2020;47(1):2–7. <https://doi.org/10.3138/jvme.1117-173r1>. Medline:30920944
- Crandall R, Karadoğan E. Designing pedagogically effective haptic systems for learning: a review. *Appl Sci*. 2021;11(14):6245. <https://doi.org/10.3390/app11146245>.
- Martin A, Weller I, Amsalem D, Duvivier R, Jaarsma D, de Carvalho Filho MA. Co-constructive patient simulation: a

learner-centered method to enhance communication and reflection skills. *Simul Healthc.* 2021;16(6):e129–35. <https://10.1097/SIH.0000000000000528>. Medline:33273424

AUTHOR INFORMATION

Annemarie Spruijt, DVM, PhD, is Assistant Professor, Faculty of Veterinary Medicine, Utrecht University, Heidelberglaan 8, 3584 CS Utrecht, the Netherlands.

Cecil C. Prins-Aardema, MD, is affiliated with GGZ Drenthe (Geestelijke Gezondheids Zorg: Mental Health Care), Beilen, the Netherlands.

Marco Antonio de Carvalho-Filho, MD, is Associate Professor of Innovation and Research in Education, Faculty of Veterinary Medicine, Utrecht University, Heidelberglaan 8, 3584 CS Utrecht, the Netherlands, and Center for Educational Development and Research in Health Sciences (CEDAR), Lifelong Learning, Education and Assessment Research Network (LEARN), University Medical Center Groningen, Hanzeplein 1, 9713 GZ Groningen, the Netherlands.

Debbie Jaarsma, DVM, PhD, is Professor and Dean, Faculty of Veterinary Medicine, Utrecht University, Heidelberglaan 8, 3584 CS Utrecht, the Netherlands, and Center for Educational Development and Research in Health Sciences (CEDAR), Lifelong Learning, Education and Assessment Research Network (LEARN), University Medical Center Groningen, Hanzeplein 1, 9713 GZ Groningen, the Netherlands.

Andrés Martin, MD, MPH, is Riva Ariella Ritvo Professor, Child Study Center, Yale School of Medicine; and Director, Simulated Participant Program, Teaching and Learning Center, Yale School of Medicine, 230 South Frontage Road, New Haven, CT 06510 USA. He is also a doctoral candidate at the Research Institute SHARE and the Center for Educational Development and Research in Health Sciences (CEDAR), Lifelong Learning, Education and Assessment Research Network (LEARN), University Medical Center Groningen, Hanzeplein 1, 9713 GZ Groningen, the Netherlands. Email: andres.martin@yale.edu.