



Logic, Rhetoric, And Persuasive Media as a Philosophical Foundation for Activity-Theory-Oriented Educational Models in Veterinary and Animal Sciences

Heriberto Rodríguez Frausto¹, Federico de la Colina Flores², Tzitzí de la Colina García³, Paul Alexis de la Colina García⁴

¹Universidad Autónoma de Zacatecas, México. <https://orcid.org/0000-0001-9608-5843>

²Universidad Autónoma de Zacatecas, México. <https://orcid.org/0000-0002-8890-2863>

³Colegio Edison A.C. Guadalupe, Zac. México. <https://orcid.org/0000-0001-8502-3903>

⁴Colegio Edison A.C. Guadalupe, Zac. México. <https://orcid.org/0009-0000-1666-1469>

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ABSTRACT

Cultural-historical activity theory (CHAT) offers veterinary and animal-science educators a powerful way to design learning as collective, tool-mediated transformation of practice rather than as individual acquisition of decontextualized knowledge. Yet CHAT's "rules" component often remains a descriptive category (codes, policies, conventions) rather than a designable mechanism that can be deliberately cultivated through pedagogy. This essay argues that logic and rhetoric can be integrated into a coherent philosophical component—*mediated practical reason*—that strengthens activity-theory-oriented educational models applied to veterinary and animal sciences. The integration proceeds through argumentation theory: logic contributes inferential accountability (warrants, rebuttals, standards of evidence), rhetoric contributes audience-orientation, value articulation, and trust-building required for coordinated action, and dialectical norms constrain persuasion ethically. On that basis, the essay proposes a principled re-specification of the activity system: substitute the "rules" node with **persuasive media**, understood as the material-semiotic infrastructures (genres, protocols, dashboards, rubrics, narratives, deliberative formats) through which norms are articulated, negotiated, and legitimated. The substitution does not deny the existence of laws or professional standards; it makes explicit how those standards enter practice and become actionable. Finally, the essay derives design principles and examples aligned to competency-based veterinary education and workplace learning: assessing argument quality within entrustable professional activities, designing boundary objects for One Health collaboration, and teaching rhetorical ethics as an explicit professional competency.

Corresponding Author:
Heriberto Rodríguez Frausto

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INTRODUCTION

Veterinary and animal-science education faces an intensifying demand: graduates must act accountably in situations where evidence is incomplete, values conflict, and coordination spans multiple communities. Competency-based frameworks and workplace learning emphasize that reasoning and communication are inseparable from professional action (Cate, 2005; Salisbury et al., 2020; AAVMC Council on Outcomes-based Veterinary Education et al., 2025). Yet educators still need conceptual tools for

designing curricula and assessments that make this accountable coordination teachable and assessable.

Cultural-historical activity theory (CHAT) provides such a tool by conceptualizing learning as the collective, tool-mediated transformation of activity systems oriented to shared objects (Vygotsky, 1978; Leontiev, 1978; Engeström, 2001, 2015). In veterinary contexts, CHAT helps map how diagnostic and intervention work is distributed across people, artefacts, and institutions. A persistent difficulty, however, is that the "rules" component is often reduced to an inventory of codes and policies, leaving under-explained how norms

become actionable in practice, especially across boundary crossings and One Health collaborations (Akkerman & Bakker, 2011; Frankson et al., 2016; Tucker et al., 2024).

This essay responds by proposing a philosophical component for activity-theory-oriented educational models: mediated practical reason, grounded in argumentation theory. Logic contributes inferential accountability - warrants, evidential standards, and rebuttals - while rhetoric contributes audience orientation, value articulation, and trust building, and dialectical norms constrain persuasion ethically (Aristotle, n.d.; Perelman & Olbrechts-Tyteca, 1969; Perelman, 1982; Habermas, 1984; Eemeren & Grootendorst, 2004; Toulmin, 2003; Walton et al., 2008).

On this basis, we re-specify the activity system by replacing the "rules" node with persuasive media: the material-semiotic infrastructures (genres, protocols, dashboards, rubrics, narratives, and deliberative formats) through which norms are articulated, negotiated, and legitimized. After motivating the problem (Section 1) and reviewing relevant CHAT concepts (Section 2), the essay develops the logic-rhetoric synthesis (Section 3), elaborates the re-specification (Section 4), and derives design principles and examples aligned to competency-based veterinary education, EPAs, workplace learning, and boundary-crossing One Health work (Sections 5-7), concluding with implications for educational design.

1. THE PROBLEM: NORMATIVITY, COORDINATION, AND ACCOUNTABILITY IN VETERINARY EDUCATIONAL ACTIVITY

Veterinary and animal science education prepares learners for accountable action in settings where scientific uncertainty, ethical pluralism, and institutional constraints are normal conditions of work. A clinician must justify diagnostic and therapeutic decisions to owners with different risk preferences, budgets, and cultural commitments. An animal production specialist must negotiate welfare requirements, biosecurity practices, and productivity targets with producers, veterinarians, regulators, and supply-chain actors. One Health initiatives require coordination across medicine, veterinary medicine, ecology, public health, and policy, often with no single sovereign authority to impose a “correct” path (Frankson et al., 2016; Tucker et al., 2024).

These realities explain why contemporary veterinary education increasingly emphasizes workplace-based learning and competency-based frameworks. Entrustable professional activities (EPAs) and related approaches aim to anchor assessment in integrative professional work rather than in isolated knowledge checks (Cate, 2005; Salisbury et al., 2020). The AAVMC CBVE 2.0 framework similarly stresses clinical reasoning, communication, collaboration, and public health as core domains that must be developed longitudinally through feedback-rich curricula (AAVMC Council on Outcomes-based Veterinary Education et al., 2025).

Sociocultural analyses of veterinary workplace learning further underline that professional formation is relational and discursive: learners must learn how practice is organized, how standards are negotiated, and how identity and competence are recognized within communities (Routh et al., 2022; Scholz et al., 2013).

Cultural-historical activity theory is well suited to this terrain. By framing learning as the transformation of collective activity systems around shared objects, CHAT makes visible the mediational role of tools, the distributed character of work, and the tensions (contradictions) that drive innovation (Engeström, 2001, 2015). However, when veterinary educators adopt activity-system models, one element frequently remains under-specified: **rules**. In practice, “rules” is often populated with lists—professional codes, institutional policies, ethical principles, safety procedures, assessment requirements—without a clear account of how learners come to understand, interpret, contest, and enact those norms in real contexts. This is a critical gap, because veterinary practice is saturated with normatively loaded decisions that cannot be reduced to rule-following. Students must learn not only *what* the standards are, but *how* to make standards actionable: how to reason with them, communicate them, and secure legitimate commitments around them.

The user’s constraint makes this gap explicit: in the activity system, the rules element must be substituted by the media, understood as the tools to persuade people. The immediate risk is that “persuasion” could be read as manipulation, and “media” as mere communication channels. The central argument of this essay is that the substitution can be philosophically coherent and educationally productive if (and only if) it is grounded in a theory of **argumentation** that integrates logic and rhetoric under ethical constraints. When that condition is met, “rules → persuasive media” becomes a principled re-specification: normativity is treated as mediated, negotiated, and stabilized through material-semiotic infrastructures that can be designed, taught, and assessed.

2. ACTIVITY THEORY, MEDIATION, AND THE DESIGN PROBLEM OF “RULES”

2.1 CHAT fundamentals relevant to veterinary and animal sciences

CHAT develops from Vygotsky’s account of mediated action: higher psychological functions are formed through culturally available tools and signs that reorganize activity (Vygotsky, 1978). Leontiev extended this to an object-oriented theory in which activity is driven by motives, realized through actions, and implemented via operations shaped by conditions; crucially, activities are historically developed and socially distributed (Leontiev, 1978). Engeström’s formulation foregrounds collective mediation by representing activity systems with components that

include subject, object, tools/artifacts, community, division of labor, and rules (Engeström, 2015). His later work emphasizes contradictions as sources of expansive learning: when existing forms of activity fail to resolve persistent tensions, participants can reconceptualize the object and transform practice (Engeström, 2001).

This is directly applicable to veterinary and animal sciences. Typical objects of activity—“treat the individual patient,” “improve herd health,” “control an outbreak,” “increase reproductive efficiency,” “reduce antimicrobial use,” “improve welfare,” “manage zoonotic risk”—are multi-voiced, shaped by different stakeholders and institutional logics. Tools include not only instruments and diagnostics but also protocols, databases, statistical models, clinical decision-support systems, and documentation practices. Communities span clients, technicians, farmers, laboratories, regulators, and interdisciplinary collaborators. Divisions of labor are pronounced and often contested: who owns the decision, who communicates risk, who documents, who bears liability.

2.2 Why “rules” becomes a theoretical placeholder

In Engeström’s triangle, “rules” generally refer to the explicit and implicit norms that regulate relations between subject and community. That characterization is correct, but it can become a placeholder in design work for at least four reasons:

1. **Rules are interpretive achievements, not self-applying constraints.** Veterinary cases and production systems are variable and context-dependent. Welfare requirements, antimicrobial stewardship guidance, and biosecurity rules require situational interpretation and prioritization.
2. **Rules are enacted through artifacts and genres.** Norms do not enter activity as pure imperatives. They are materialized in checklists, case documentation templates, audit forms, SOPs, signage, dashboards, consent documents, and assessment rubrics. These artifacts do not only *represent* norms; they select what counts as relevant, shape what counts as evidence, and structure how accountability is distributed.
3. **Rules are often negotiated across boundaries.** Veterinary education depends heavily on boundary crossing: university clinics to private practices, farms to laboratories, and professional silos to One Health collaborations. Boundary-crossing learning frequently involves misalignment of norms (“how we do things here”) and requires coordination and transformation mediated by boundary objects (Akkerman & Bakker, 2011).
4. **Rules have a persuasive dimension.** Even when rules are backed by formal authority, compliance and adoption are typically secured through persuasion: explaining rationales, building trust, aligning values, and demonstrating benefits. In

client-facing and producer-facing contexts, persuasion is not optional; it is the mechanism by which decisions become jointly owned and enacted.

These points suggest a design opportunity: rather than treat rules as background constraints, one can treat the *means by which norms are made actionable* as primary. That is the core intuition behind substituting rules with persuasive media.

3. INTEGRATING LOGIC AND RHETORIC: ARGUMENTATION AS MEDIATED PRACTICAL REASON

3.1 Logic for practice: inferential accountability under uncertainty

In veterinary and animal sciences, “logic” is rarely the manipulation of formal symbols; it is the disciplined practice of drawing responsible conclusions from incomplete evidence. Diagnosis involves defeasible inference: observations, tests, epidemiological context, and prior probabilities support hypotheses that remain open to revision. Treatment planning involves tradeoffs and uncertainty statements. Herd interventions involve causal claims about management changes with probabilistic outcomes.

Toulmin’s model is valuable precisely because it formalizes practical argumentation as a structure that connects *data* to a *claim* via a *warrant*, supported by *backing*, constrained by *qualifiers*, and challenged by *rebuttals* (Toulmin, 2003). This structure closely matches veterinary reasoning: for example, “Given these clinical signs and test results (data), the most likely diagnosis is X (claim), because in this species and context these signs are typically produced by mechanism Y (warrant), supported by literature and guidelines (backing), with moderate confidence (qualifier), unless condition Z or alternative disease W is present (rebuttal).”

Argumentation-scheme approaches generalize Toulmin’s insight by cataloguing common patterns of defeasible reasoning and pairing them with critical questions that test reliability (Walton et al., 2008). This provides a teachable and assessable way to strengthen clinical reasoning. Learners can be asked to identify which scheme they are using (expert opinion, cause-to-effect, correlation-to-cause, argument from consequences, analogy) and to answer the relevant critical questions (expert credibility, evidence quality, alternative explanations, counterexamples, boundary conditions).

3.2 Rhetoric for practice: audience, values, and ethical persuasion

Rhetoric is often caricatured as manipulation, but in professional life it names the unavoidable fact that reasons must be *communicable* and *acceptable* to relevant audiences. Aristotle’s classic account treats rhetoric as finding the available means of persuasion in a given case, integrating *logos* (reason), *ethos* (character and credibility), and *pathos*

(emotion) (Aristotle, n.d.). In veterinary practice, this triad is practically diagnostic:

- *Logos*: the evidence and inferential structure of the case.
- *Ethos*: trustworthiness, professional identity, transparency, and respect.
- *Pathos*: the emotional and value-laden context of owners, farmers, and communities (fear, grief, attachment, economic anxiety, moral concern).

Perelman and Olbrechts-Tyteca’s “new rhetoric” further clarifies that many professional arguments cannot be demonstrated in the way mathematics can; they aim instead to secure reasonable adherence of an audience in contexts that require judgment (Perelman, 1982; Perelman & Olbrechts-Tyteca, 1969). This is highly relevant to animal welfare debates, antimicrobial stewardship, euthanasia decisions, and public-health interventions. A justification that ignores audience values can be technically correct yet practically ineffective; it fails to become action.

3.3 Ethical constraint: persuasion tethered to critique and accountability

The philosophical problem is not whether persuasion is present; it is whether persuasion is *legitimate*. Communicative rationality traditions emphasize that legitimacy depends on the possibility of public justification and critique: reasons must be shareable, contestable, and responsive to counterargument (Habermas, 1984). Pragm-dialectics operationalizes this by modeling argumentation as a regulated critical discussion oriented to resolving differences of opinion by reasonable means rather than by coercion (Eemeren & Grootendorst, 2004).

This constraint is central for educational design. If students are trained only in persuasive technique, the result can be strategic communication detached from epistemic responsibility. If students are trained only in technical reasoning without rhetorical awareness, the result can be “correct but unadopted” decisions. A coherent component must integrate both while binding them to dialectical norms.

3.4 The synthesis: mediated practical reason

The integrated component proposed here can be stated compactly:

Mediated practical reason is the culturally and materially mediated practice of giving and asking for reasons in order to coordinate action around shared objects, under norms of critique and accountability.

This is a coherent philosophical component because it specifies:

- **A theory of rationality in practice** (defeasible, value-laden, accountable inference).
- **A theory of legitimacy** (persuasion constrained by openness to critique and reciprocity).

- **A theory of mediation** (artifacts and genres shape what counts as evidence, reasons, and responsible action).

It also aligns naturally with CHAT’s core commitment: human agency is mediated by historically developed tools and signs, and learning is the reorganization of activity through those mediational means (Engeström, 2015; Vygotsky, 1978).

4. SUBSTITUTING “RULES” WITH PERSUASIVE MEDIA IN THE ACTIVITY SYSTEM

4.1 Defining persuasive media as a CHAT element

The substitution “rules → persuasive media” is coherent if persuasive media are defined not as broadcast channels, but as **material-semiotic infrastructures that perform normative work**. These infrastructures include:

- **Genres**: recurrent forms of professional communication (SOAP notes, referral letters, outbreak reports, welfare assessments, extension bulletins, grant proposals).
- **Decision artifacts**: guidelines, checklists, algorithms, dashboards, and clinical pathways.
- **Accountability artifacts**: audit forms, incident reports, morbidity-and-mortality case formats, reflective portfolios.
- **Assessment and curriculum artifacts**: rubrics, EPA forms, competency maps, feedback templates (AAVMC Council on Outcomes-based Veterinary Education et al., 2025; Salisbury et al., 2020).
- **Deliberative formats**: structured case conferences, ethics rounds, peer-review protocols, stakeholder meetings.

These are “media” in the strong sense: they mediate relationships, distribute attention, select what counts as relevant, and stabilize shared commitments. They are “persuasive” because their function is not only to transmit information but to secure legitimate alignment and coordinated action.

4.2 Why genres are the key: norms are carried by recurrent social actions

Genre theory supports this re-specification. Genres are not merely forms; they are social actions that embody motives, expectations, and norms in recurrent situations (Miller, 1984). Bakhtin similarly emphasizes that speech genres are socially stabilized ways of speaking and writing that carry typical intentions and evaluative orientations (Bakhtin, 1986). In veterinary practice, genres are the vehicles through which “rules” become concrete: a welfare inspection checklist operationalizes a welfare code; a consent script operationalizes ethical obligations; a herd health plan operationalizes standards and targets; an antimicrobial-use dashboard operationalizes stewardship norms.

Therefore, replacing rules with persuasive media is an analytically faithful way to represent how norms actually function in activity. It also produces direct design leverage: educators can decide which genres are central, how they progress, and how mastery is assessed.

4.3 A modified activity-system representation

The diagram below (see Figure 1) is an illustrative representation. It is not meant to erase the existence of regulations or conventions; rather, it makes explicit that normativity is enacted through a mediational layer

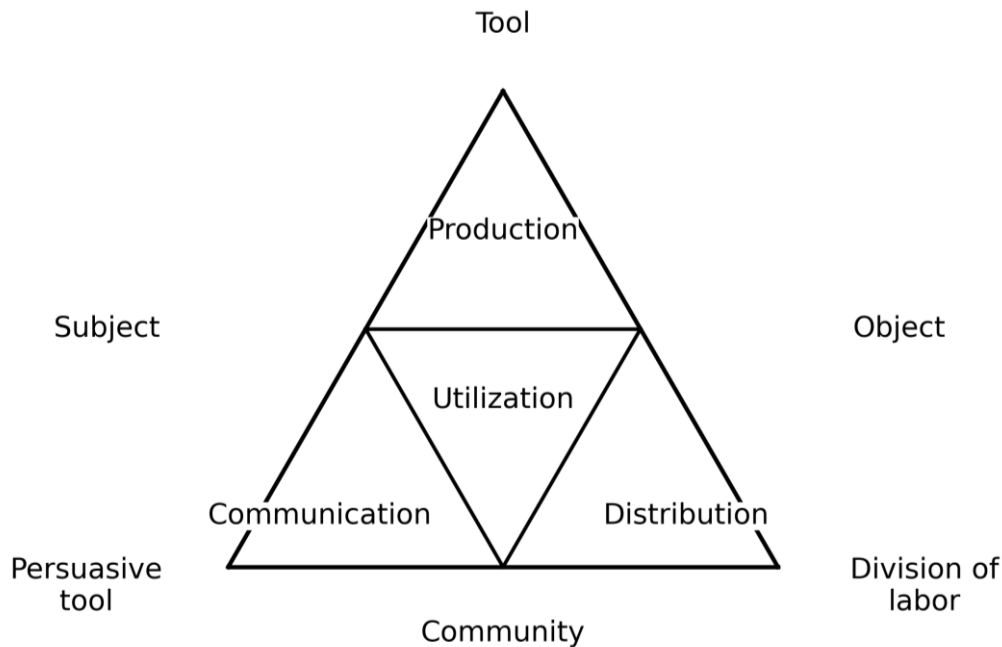


Figure 1: The activity system.

4.4 What is gained (and what must be protected)

Gains. Normativity becomes **designable**: educators can build, teach, and assess the mediational artifacts that carry standards. The “hidden curriculum” becomes **explicit**: learners see how credibility, justification, and accountability are produced through documentation and deliberation. This approach aligns with CBVE and EPAs because competency frameworks and EPA assessment instruments are themselves persuasive media that define “Day One” legitimacy (AAVMC Council on Outcomes-based Veterinary Education et al., 2025; Salisbury et al., 2020). Boundary crossing is supported because persuasive media can be designed as boundary objects that coordinate across sites and communities (Akkerman & Bakker, 2011).

Protections needed. Persuasion must be tethered to logical and dialectical norms to avoid strategic manipulation, and media must be treated as revisable artifacts subject to critique and improvement, not as bureaucratic burdens.

5. DESIGN PRINCIPLES FOR VETERINARY AND ANIMAL-SCIENCE EDUCATION GROUNDED IN MEDIATED PRACTICAL REASON

This section translates the philosophical component into concrete design principles compatible with workshop-based learning, simulation, clinic rotations, extension projects, and One Health collaborations.

5.1 Principle 1: Make argumentation the unit of learning and assessment

EPA-based assessment focuses on observable integrative tasks (Cate, 2005; Salisbury et al., 2020). A mediated-practical-reason layer adds a crucial dimension: assess not only whether learners perform the task, but whether they can justify it responsibly.

Implementation examples: - Require learners to submit a Toulmin-structured “case justification” for selected EPAs: claim (diagnosis/plan), data, warrants, backing, qualifier, rebuttals (Toulmin, 2003). - Use argumentation schemes and critical questions to score reasoning robustness (e.g., “argument from expert opinion”: credential relevance, consensus, evidence basis, bias) (Walton et al., 2008). - In assessments, separate *inferential quality* (logic) from *audience adequacy* (rhetoric) and *ethical constraint* (dialectical norms).

5.2 Principle 2: Teach genre mastery as professional competence

If persuasive media carries normativity, then mastery of professional genres is not “communication skills” in a narrow sense; it is competence in accountable action. Some implementation examples: Map key veterinary genres across the curriculum (SOAP notes, discharge summaries, client education handouts, welfare assessments, outbreak reports, extension bulletins, research posters). Teach how

each genre encodes standards (what must be documented, what counts as evidence, how uncertainty is expressed). Use iterative feedback and revision logs to make learning expansive: learners improve artifacts as practice improves.

5.3 Principle 3: Design persuasive media as boundary objects for workplace learning

Workplace learning in veterinary education is resource-intensive and variable across placements (Routh et al., 2022; Scholz et al., 2013). Boundary objects can stabilize expectations and support continuity across sites (Akkerman & Bakker, 2011).

Implementation examples:

- A standardized “placement case brief” that requires: case narrative, evidence summary, warrants, client constraints, ethical issues, and a learning question.
- A supervisor feedback template aligned to the brief, reducing assessment variability and making the rationale for feedback explicit.
- A shared “handover genre” that supports team-based practice and patient safety.

5.4 Principle 4: Teach rhetorical ethics as an explicit competency

CBVE frameworks include communication and professionalism domains; these are not merely interpersonal skills but ethical practices of persuasion under accountability (AAVMC Council on Outcomes-based Veterinary Education et al., 2025).

Implementation examples:

- Train learners to disclose uncertainty and alternatives in ways that maintain trust (ethos) without overconfidence.
- Use structured case debates where learners must argue for and against a plan, explicitly acknowledging rebuttals and stakeholder values.
- Include fallacy-awareness and “ethical persuasion checkpoints” grounded in critical discussion norms (Eemeren & Grootendorst, 2004).

5.5 Principle 5: Make reasoning social and dialogic

Reasoning is strengthened by critique, counterargument, and collective repair of warrants. One influential account frames human reasoning as adapted for argumentation in groups, highlighting the social function of reasons (Mercier & Sperber, 2011). CHAT similarly emphasizes collective activity and multi-voicedness.

Implementation examples: - Conduct “argument clinics” in which teams diagnose weaknesses in warrants and propose repairs. - Rotate roles (proponent, critic, summarizer, stakeholder advocate) to practice multi-voiced reasoning. - Treat disagreements as learning resources that can surface contradictions and drive expansive learning (Engeström, 2001).

6. WORKED EXAMPLE: REDESIGNING THE “RULES” LAYER IN A VETERINARY CLINICAL ROTATION

To make the proposal concrete, consider a common clinical-rotation contradiction: students follow protocols but struggle to justify deviations and to communicate uncertainty to clients. This manifests as either rigid compliance (“the guideline says so”) or ungrounded improvisation (“this feels right”), both of which weaken professional accountability.

Activity-system framing.

- *Object*: resolve patient problem and secure owner agreement on plan.
- *Tools*: diagnostics, formularies, clinical guidelines, EHR templates.
- *Community*: clinicians, students, technicians, owner.
- *Division of labor*: student gathers data and proposes plan; clinician supervises; technician executes.
- *Persuasive tool (substituted node)*: SOAP note genre, consent dialogue script, case conference format, EPA assessment form.

Design intervention.

1. **Case justification artifact (logic layer).** Students must produce a short Toulmin argument for the plan with an explicit qualifier and at least two rebuttals (Toulmin, 2003).
2. **Audience adaptation artifact (rhetoric layer).** Students translate the same justification into a client-facing explanation that foregrounds values and constraints, and documents a shared decision-making step.
3. **Critical discussion protocol (ethical constraint).** In case conference, peers ask scheme-specific critical questions (e.g., for “argument from consequences,” clarify which consequences, whose values, and what alternatives exist) (Walton et al., 2008).
4. **Assessment integration.** The EPA form includes explicit prompts: “State the warrant for your plan,” “Describe uncertainty,” “Document client values,” “Address rebuttals.” This aligns assessment with the philosophical component and with CBVE expectations (AAVMC Council on Outcomes-based Veterinary Education et al., 2025; Salisbury et al., 2020).

Expected outcomes.

- Students learn that guidelines are not commands but warrant resources, subject to context.
- Communication becomes accountable: uncertainty and alternatives are articulated rather than hidden.
- Supervisors can provide feedback on specific inferential moves, not only on outcomes.

This example shows how substituting rules with persuasive media yields concrete pedagogical levers and aligns with workplace learning demands.

7. ADDRESSING OBJECTIONS AND LIMITATIONS

7.1 “Is substituting rules with media a category error?”

It would be a category error if “media” were treated as mere channels and if “rules” were treated as purely external constraints. In CHAT terms, however, norms are mediated and enacted through artifacts and discourse. The substitution is a re-specification: it identifies the mediational infrastructure by which norms enter collective action. Formal regulations still exist; the point is that they become actionable through genres, protocols, and deliberative practices.

7.2 “Does this privilege persuasion over truth?”

The integration explicitly prevents that. Persuasion is tethered to inferential accountability (logic) and to norms of critique (dialectical constraint) (Eemeren & Grootendorst, 2004; Toulmin, 2003). The educational target is not persuasive success at any cost, but *legitimate alignment* around shared objects under contestable reasons.

7.3 “Is this too demanding for curricula?”

Veterinary programs already require students to document, present, and justify decisions; the difference is that these practices are often under-taught and inconsistently assessed. By making persuasive media explicit, educators can reduce hidden variability, align assessment with competence, and support students’ transition into workplace learning settings (Routh et al., 2022; Scholz et al., 2013).

7.4 Research agenda

Empirically, the proposal invites design-based research questions: Which persuasive media are most consequential in specific veterinary domains (companion animal practice, production systems, public health)? How do particular genres distribute accountability and shape decision quality? Which argumentation training sequences best improve clinical reasoning and client communication? CHAT provides a framework for analyzing contradictions; argumentation theory provides a framework for analyzing the mediational infrastructure that resolves or reproduces them (Engeström, 2001; Walton et al., 2008).

8. CONCLUSION

Logic and rhetoric can be integrated into a coherent philosophical component that supports activity-theory-oriented educational models in veterinary and animal sciences. The unifying concept is **mediated practical reason**: disciplined, audience-aware, ethically constrained argumentation through which communities coordinate action around shared objects. This synthesis is not an abstract overlay; it is the practical core of veterinary work, where decisions must be justified under uncertainty and enacted through negotiated commitments.

Substituting the “rules” element in the activity system with **persuasive media** makes this core explicit and designable. It relocates normativity from an undifferentiated constraint into the material-semiotic infrastructures—genres,

protocols, rubrics, dashboards, deliberative formats—through which standards are articulated, negotiated, and legitimated. For educators, the substitution yields concrete levers: teach and assess argument quality within EPAs, design boundary objects for workplace and One Health learning, and cultivate rhetorical ethics as a professional competency. In short, the integration of logic and rhetoric provides the philosophical foundation needed to operationalize activity-theory models in veterinary and animal-science education without reducing professional formation to either bureaucratic compliance or unaccountable persuasion.

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REFERENCES

1. AAVMC Council on Outcomes-based Veterinary Education, Chaney, K. P., Hodgson, J. L., Banse, H. E., Danielson, J. A., Foreman, J. H., Kedrowicz, A. A., Meekins, J. M., Read, E. K., Salisbury, S. K., Taylor, R. M., & Frost, J. S. (2025). Competency-based veterinary education: CBVE 2.0. American Association of Veterinary Medical Colleges. <https://www.aavmc.org/wp-content/uploads/2025/09/AAVMC-CBVE-2.0-2025-02.pdf>
2. Akkerman, S. F., & Bakker, A. (2011). Boundary crossing and boundary objects. *Review of Educational Research*, 81(2), 132–169. <https://doi.org/10.3102/0034654311404435>
3. Aristotle. (n.d.). *Rhetoric* (W. R. Roberts, Trans.). Online text. <http://classics.mit.edu/Aristotle/rhetoric.html>
4. Bakhtin, M. M. (1986). *Speech genres and other late essays* (M. Holquist, Ed.; V. W. McGee, Trans.). University of Texas Press.
5. Cate, O. ten. (2005). Entrustability of professional activities and competency-based training. *Medical Education*, 39(12), 1176–1177. <https://doi.org/10.1111/j.1365-2929.2005.02341.x>
6. Eemeren, F. H. van, & Grootendorst, R. (2004). *A systematic theory of argumentation: The pragma-dialectical approach*. Cambridge University Press.

7. Engeström, Y. (2001). Expansive learning at work: Toward an activity theoretical reconceptualization. *Journal of Education and Work*, 14(1), 133–156. <https://doi.org/10.1080/13639080020028747>
8. Engeström, Y. (2015). *Learning by expanding: An activity-theoretical approach to developmental research* (Second). Cambridge University Press.
9. Frankson, R., Hueston, W., Christian, K., Olson, D., Lee, M., Valeri, L., & Hyatt, R. (2016). One health core competency domains. *Frontiers in Public Health*, 4, 192. <https://doi.org/10.3389/fpubh.2016.00192>
10. Habermas, J. (1984). *The theory of communicative action, volume 1: Reason and the rationalization of society* (T. McCarthy, Trans.). Beacon Press.
11. Leontiev, A. N. (1978). *Activity, consciousness, and personality*. Prentice-Hall. <https://www.marxists.org/archive/leontev/works/1978/activity-consciousness-personality.pdf>
12. Mercier, H., & Sperber, D. (2011). Why do humans reason? Arguments for an argumentative theory. *Behavioral and Brain Sciences*, 34(2), 57–74. <https://doi.org/10.1017/S0140525X10000968>
13. Miller, C. R. (1984). Genre as social action. *Quarterly Journal of Speech*, 70(2), 151–167. <https://doi.org/10.1080/00335638409383686>
14. Perelman, C. (1982). *The realm of rhetoric*. University of Notre Dame Press.
15. Perelman, C., & Olbrechts-Tyteca, L. (1969). *The new rhetoric: A treatise on argumentation* (J. Wilkinson & P. Weaver, Trans.). University of Notre Dame Press.
16. Routh, J., Paramasivam, S. J., Cockcroft, P., Nadarajah, V. D., & Jeevaratnam, K. (2022). Using learning theories to develop a veterinary student preparedness toolkit for workplace clinical training. *Frontiers in Veterinary Science*, 9, 833034. <https://doi.org/10.3389/fvets.2022.833034>
17. Salisbury, S. K., Rush, B. R., Ilkiw, J. E., Matthew, S. M., Chaney, K. P., Molgaard, L. K., May, S. A., Bok, H. G. J., Hodgson, J. L., Frost, J. S., & Read, E. K. (2020). Collaborative development of core entrustable professional activities for veterinary education. *Journal of Veterinary Medical Education*, 47(5), 607–618. <https://doi.org/10.3138/jvme.2019-0090>
18. Scholz, E., Trede, F., & Raidal, S. L. (2013). Workplace learning in veterinary education: A sociocultural perspective. *Journal of Veterinary Medical Education*, 40(4), 355–362. <https://doi.org/10.3138/jvme.0113-015R>
19. Toulmin, S. E. (2003). *The uses of argument*. Cambridge University Press.
20. Tucker, C., Keyel, J., Blue, A., Chun, R., Estrada, A., Khalili, H., Riles, A., Roopnarine, R., Sick, B., VandeWoude, S., Watson, B., Wisnieski, L., & Webb, T. (2024). The intersection of interprofessional education and one health: A qualitative study in human and veterinary medical institutions. *One Health*, 19, 100767. <https://doi.org/10.1016/j.onehlt.2024.100767>
21. Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (M. Cole, V. John-Steiner, S. Scribner, & E. Souberman, Eds.). Harvard University Press.
22. Walton, D., Reed, C., & Macagno, F. (2008). *Argumentation schemes*. Cambridge University Press.