

Review Article

NEEDS, MODES OF LIFE, AND WELFARE-ORIENTED FORMATION IN VETERINARY AND ANIMAL SCIENCES: A MARXIST AND ACTIVITY-THEORETICAL FRAMEWORK FOR ROLES ACROSS THE TRAINING–WORK–RESEARCH CONTINUUM

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ABSTRACT

Veterinary and animal sciences (including animal husbandry) intervene directly in modes of life: the historically developed patterns through which humans and animals reproduce existence, organize cooperation, and sustain welfare at the human–animal–ecosystem interface. This article proposes a Marxist and cultural-historical activity theory (CHAT) framework for conceptualizing (i) the chain of satisfaction through which needs become motives and activities, (ii) three interdependent dimensions of needs (material, psychological, spiritual), and (iii) the differentiated formation and social function of undergraduate and graduate students, practicing professionals, and researchers. The argument is anchored in welfare as a public and democratic good: veterinary and animal science work is legitimate insofar as it enlarges the real capacities of communities—human and nonhuman—to live well, with accountable attention to equity, participation, and ecological limits. We translate the framework into implications for competence-oriented curricula and research training, emphasizing communication, production, and decision-making as core competency dimensions, and positioning learners as progressively responsible contributors to community welfare infrastructures rather than merely recipients of technical content.

Keywords: Cultural-Historical Activity Theory, Marxism, Needs, Motivation, One Health, One Welfare, Veterinary Education, Competence, Community Orientation, Democratic Professionalism

INTRODUCTION

Veterinary and animal sciences occupy a distinctive locus in contemporary welfare challenges: zoonotic risk, antimicrobial resistance, food systems, companion animal–owner life, livestock production, wildlife stewardship, and ecological integrity. The Quadripartite definition of One Health frames these as interdependent problems requiring cross-sectoral and community-level coordination [World Health Organization et al. \(2021\)](#). The One Health Joint Plan of Action (2022–2026) explicitly calls for integrated

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tools, participation, and capacity building across the human–animal–plant–environment interface [Food and Agriculture Organization of the United Nations et al. \(2022\)](#). In parallel, One Welfare articulates the linkages among animal welfare, human well-being, and the environment, underscoring that professional action is ethically incomplete if it treats any one domain in isolation [García et al. \(2016\)](#).

Within this landscape, the veterinary zootechnician (Médico Veterinario Zootecnista) is not only a clinician or technician; they are a designer and administrator of modes of life: for pets and owners, for productive domestic animals and associated communities, and—through surveillance, policy, and stewardship—even for wildlife and ecosystems. Such work is intrinsically cultural, because it reorganizes social practices, institutions, and expectations, and it is intrinsically political, because it distributes risks, protections, and capacities. Therefore, formation cannot be reduced to knowledge transmission. It must develop persons—students, professionals, and researchers—as ethical, competent, and democratically accountable subjects of activity.

This article contributes a philosophical and educational framework grounded in (i) Marxist premises about modes of life as historically produced life-processes [Marx \(1867\)](#), [Marx and Engels \(1845\)](#) and (ii) CHAT premises about needs, objects, motives, mediation, and development in collective activity [Engeström and Sannino \(2010\)](#), [Leontiev \(1978\)](#). It synthesizes these into a model that can guide competence-oriented curricula and research formation across undergraduate, graduate, professional, and scientific roles.

CONCEPTUAL FRAMEWORK

MODES OF LIFE, NEEDS, OBJECTS, MOTIVES, AND ACTIVITY

A Marxist starting point is that “life-process” is socially organized: the way a society produces and reproduces its means of subsistence is also the way it produces social relations, institutions, and persons [Marx and Engels \(1845\)](#). The labor process is simultaneously material and mediational: humans regulate their “metabolism” with nature through purposive action on materials using instruments and cooperation [Foster \(1999\)](#). Consequently, needs are not mere private lacks: they are historically formed orientations emerging from concrete modes of life.

CHAT articulates the movement from need to activity through the object. In Leontiev’s formulation, the object is that which gives activity its direction. A need becomes psychologically effective as a motive when it is “coupled” to an object that can satisfy it [Leontiev \(1978\)](#). For veterinary and animal sciences, “the object” is rarely a single thing. It is typically a configured object: an animal’s health in a household system; a herd’s productivity under welfare constraints; a community’s biosecurity; a conservation program, or a food chain’s safety practices.

THE CHAIN OF SATISFACTION

To operationalize these premises for formation, we adopt the following chain as a curricular organizer:

Table 1

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Step	Working definition	Educational implication in veterinary and animal sciences
Mode of life	Historically organized pattern of reproduction (human/animal/ecological)	Learn to <i>read</i> systems (households, farms, clinics, landscapes) as developmental histories
Need	Tension/requirement within a mode of life that demands resolution	Learn to identify multi-stakeholder needs, including animal needs and community needs
Object	A candidate target that can satisfy the need through action	Learn to define <i>objects</i> precisely (case definition, herd objective, welfare target)
Want	The subject’s anticipatory orientation toward the object (desire/plan preference)	Learn to negotiate wants ethically (clients, institutions, public) without collapsing welfare
Motive	Stabilized coupling of need and object that energizes action	Learn to articulate and test motives (why this plan?) against evidence and ethics
Activity	Collective, mediated transformation oriented to the object	Learn to design, enact, evaluate, and redesign activity systems over time

This chain emphasizes that professional formation is not merely “skills acquisition”. It is the progressive ability to reconstruct the chain in real settings: to diagnose modes of life, frame needs, define objects, align motives, and conduct activities that improve welfare while remaining accountable.

THREE DIMENSIONS OF NEEDS: MATERIAL, PSYCHOLOGICAL, SPIRITUAL

To interpret needs systematically, we treat them as arranged in a three-dimensional coordinate system:

- 1) **The material dimension**, to sustain existence, enable communication, and provide protection.
- 2) **the psychological dimension**, to show affection, impart knowledge, and grant power, and
- 3) **the spiritual dimension**, to develop a culture, inspire hope, foresee significance, and sense transcendence.

The dimensions are analytically distinct but practically inseparable. For example: a livestock welfare intervention fails if it improves biological markers—existence—while undermining community trust—communication—increasing perceived coercion—power—or eroding the sense that the work is meaningful—significance. In One Health/One Welfare terms, robust solutions are those that satisfy configurations of needs across humans, animals, and institutions rather than optimizing a single metric [García et al. \(2016\)](#), [World Health Organization et al. \(2021\)](#).

DEVELOPMENT AS TRANSFORMATION OF SUBJECTS, ACTIVITIES, AND INSTITUTIONS

CHAT's principle of development is not limited to individual learning trajectories. Development also concerns the evolution of activity systems and the institutions that host them. Engeström's theory of expansive learning treats contradictions within and between activity systems as drivers for re-objectification: the emergence of new objects, new mediations, and new divisions of labor [Engeström and Sannino \(2010\)](#). In welfare-oriented veterinary practice, contradictions are ubiquitous: productivity versus welfare, short-term cost versus long-term resilience, private preferences versus public health, and ecological constraints versus growth imperatives. A developmental curriculum should not hide these contradictions; it should make them teachable as objects of analysis and redesign.

FORMATION AND ROLES ACROSS FOUR POSITIONS: UNDERGRADUATES, GRADUATES, PROFESSIONALS, AND RESEARCHERS

This section specifies what it means—within the needs framework—to “form” (i) undergraduates, (ii) graduate students, (iii) professionals, and (iv) researchers as distinct but linked subject positions contributing to welfare.

UNDERGRADUATE STUDENTS: BECOMING ACCOUNTABLE PARTICIPANTS IN WELFARE ACTIVITY SYSTEMS

Primary developmental task: move from student-as-recipient to student-as-accountable participant in a community of practice.

Undergraduate formation begins with legitimate peripheral participation: students learn the genres, tools, and ethical constraints of the profession by participating in authentic object-work under supervision [Lave and Wenger \(1991\)](#), [Wenger \(1998\)](#). In veterinary and animal sciences, this requires early and repeated engagement with real objects: animals, clients, farms, laboratories, and public health institutions.

Competence orientation: A competence-oriented curriculum should treat competency not as a checklist detached from meaning, but as the stabilized capacity to transform objects responsibly under constraints. A concrete anchor is the WOA “Day 1” competencies for new graduates, which emphasize service quality and professional readiness [World Organisation for Animal Health. \(2012\)](#). In this article's framing, Day 1 competence is necessary but insufficient: it establishes baseline capability, but democratic welfare work demands additional formation in participation, communication, and institutional responsibility.

NEEDS LENS FOR UNDERGRADUATE FORMATION.

- **Material:** learn to secure conditions for safe practice by guaranteeing biosecurity, mastering handling, and providing documentation.
- **Psychological:** develop affect regulation under stress, epistemic humility, and cooperative agency.
- **Spiritual:** enter the culture of welfare practice, cultivate hope as capacity for iterative improvement, and sustain meaning beyond compliance.

Graduate students: advancing conceptual tools and redesign capacity

Primary developmental task: become designers of knowledge and practice, not only consumers of it.

Graduate formation—specialization, master's, and doctorate—intensifies epistemic responsibility. In needs terms, it expands the knowledge and power components of the psychological dimension: advanced students are expected to generate explanations, design interventions, and justify decisions under uncertainty. They should be trained explicitly in knowledge as orientation: the capacity to build models that guide action and can be communicated to diverse stakeholders.

Boundary work and transdisciplinarity: One Health and the One Health Joint Plan foreground cross-sector coordination, including community engagement and inclusive participation [Food and Agriculture Organization of the United Nations et al. \(2022\)](#). Graduate formation should therefore include boundary competencies: translating between clinical realities, production systems, ecological science, and community priorities. This is not an “extra”; it is central to the professional’s role in global cultural development through modes of life.

Graduate ethics and welfare: Graduate students must be formed to recognize that research objects are embedded in modes of life—farm systems, wildlife governance, or household care. This entails democratic reflexivity: research is legitimate insofar as it enlarges collective capacities and avoids extracting value while externalizing harms.

PROFESSIONALS: ADMINISTERING MODES OF LIFE AND MAINTAINING WELFARE INFRASTRUCTURES

Primary developmental task: sustain and improve welfare infrastructures through accountable practice.

Professionals are the institutionalized continuity of welfare activity systems: clinics, farms, food safety systems, surveillance networks, laboratory services, and advisory institutions. Their responsibility extends beyond the individual case to the stability and improvement of the institutional means through which welfare is reproduced.

Global responsibility as cultural development: Because modes of life are culturally patterned and historically transformed, veterinary work inevitably reshapes culture: it normalizes standards of care, redefines acceptable suffering, reorganizes household practices, changes farm routines, and influences policy. One Health emphasizes multi-level governance and coordination; professionals therefore function as mediators between local activity and broader institutional orders [Food and Agriculture Organization of the United Nations et al. \(2022\)](#), [World Health Organization et al. \(2021\)](#).

Democratic stance and community orientation. Democratic professionalism here means:

- 1) treating community members as co-authors of welfare solutions, within the constraints of animal welfare and public health;
- 2) making reasoning transparent and contestable, and
- 3) designing communication not to manipulate but to enable informed participation.

RESEARCHERS: EXPANDING THE SPACE OF POSSIBLE WELFARE

Primary developmental task: expand the horizon of feasible objects, tools, and institutions for welfare.

Researchers contribute at the level of transcendence (spiritual dimension): producing knowledge and artifacts that outlast individual cases and reorganize future practice. In activity terms, researchers participate in re-objectification: reframing what counts as a solvable problem, what tools exist, what standards are legitimate, and how institutions can be redesigned.

Constraints and contradictions as research objects: Expansive learning directs attention to contradictions that practitioners experience but cannot resolve alone [Engeström and Sannino \(2010\)](#). Researchers should be formed to select objects that (i) matter to welfare and (ii) are structurally blocked by current mediations—e.g., incentive structures that undermine welfare, communication failures in biosecurity, or technologies that increase production while externalizing ecological harms.

WELFARE AS THE NORMATIVE INTEGRATOR: ONE HEALTH, ONE WELFARE, AND “LIFE WORTH LIVING”

A welfare-oriented formation requires explicit normative integration. One Health provides the integrated problem-space and governance horizon [Food and Agriculture Organization of the United Nations et al. \(2022\)](#), [World Health Organization et al. \(2021\)](#). One Welfare complements this by linking animal welfare and human well-being within environmental contexts [García et al. \(2016\)](#). For animal welfare specifically, contemporary frameworks emphasize moving beyond minimal harm reduction toward positive welfare and quality of life—often framed as a “life worth living” [Mellor \(2020\)](#).

Within the needs framework, “welfare” is not reducible to a single dimension:

- **Material welfare** requires existence, communication, and protection infrastructures.
- **Psychological welfare** requires affective stability, knowledge for orientation, and power for agency.
- **Spiritual welfare** requires culture and belonging, hope and possibility, meaning in object-work, and transcendence through contribution to longer-term goods.

This supports a crucial pedagogical claim: veterinary and animal science education must teach students to make welfare judgments that are multi-dimensional, evidence-informed, and democratically accountable. This involves explicit training in trade-off reasoning and ethical justification—not as abstract “ethics modules,” but as practical competencies embedded in activity.

IMPLICATIONS FOR COMPETENCE-ORIENTED CURRICULA

A competence-oriented formation can be aligned to the needs framework through three competency dimensions:

1) Explicitation (communication): making objects, evidence, and justifications intelligible to others.

- **Examples:** consent conversations; herd health reporting; risk communication; welfare justification to community boards.

2) Transformation (production): producing and stabilizing welfare-relevant outcomes through mediated activity.

- **Examples:** treatment plans; farm redesign; biosecurity routines; enrichment protocols; surveillance workflows.

3) Evaluation (decision-making): judging outcomes and revising action under uncertainty and contradiction.

- **Examples:** differential diagnosis; welfare assessment; cost–benefit with equity; iterative monitoring and redesign.

These dimensions map to the chain of satisfaction: explicitation supports shared object construction; transformation realizes the object; evaluation re-couples need and object through feedback, sometimes redefining both.

DISCUSSION: DEMOCRATIC PROFESSIONALISM AS A WELFARE POLITICS OF MODES OF LIFE

The central claim is that veterinary and animal sciences are irreducibly concerned with modes of life. Therefore, formation is unavoidably political: it shapes who gets protection, whose voice counts, what suffering is acceptable, and what futures are considered feasible.

A democratic stance does not mean “anything the client wants.” Rather, it means that welfare action is justified through transparent reasons, participation where feasible, and solidarity with community capacities—while maintaining non-negotiable commitments to animal welfare and public health. On this view, the veterinary zootechnician’s responsibility in global cultural development is not rhetorical ornamentation; it is the practical implication of working at the junction of biological life, institutional governance, and cultural meaning.

CONCLUSION

This article offered a Marxist/CHAT framework that treats veterinary and animal science formation as developmental participation in welfare activity systems. The proposed chain of satisfaction (mode of life → need → object → want → motive → activity) and the three-dimensional needs model (material, psychological, spiritual) provide a conceptual scaffold for integrating undergraduate and graduate formation, professional responsibility, and research contribution. The welfare horizon supplied by One Health and One Welfare integrates these roles normatively and politically, positioning veterinary and animal sciences as democratic work: accountable design and administration of modes of life in the service of human and animal welfare within ecological limits.

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Federico de la C. Conceptualization, Formal Analysis, Investigation, Methodology, Supervision, Validation, Visualization, Writing – Original Draft Preparation

Heriberto RF: Conceptualization, Formal Analysis Validation, Visualization Writing, Original Draft Preparation, Writing– Review and Editing

Tzitzitzi de la C: Conceptualization, Investigation, Supervision, validation, Visualization

Paul de la C: Methodology, Investigation, Supervision, validation, Visualization

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