

Institutional Translation of Situated Experience

Guided Formation, Evidentiary Judgment, and Professional Competence

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Abstract

Institutions convert situated experience into several consequential objects: professional competence, assessments of competence, credentials, admissible evidence, authorized findings, and organizational memory. This paper develops a preliminary comparative architecture for three operations within that conversion: guided formation, inferential assessment, and adjudicative translation. The philosophical and domain review connects situated learning, tacit and distributed knowledge, workplace participation, reflective practice, expertise, organizational learning, assessment validity, international practice, classification, dispute transformation, and evidence law. The paper proposes *relational time* as an ordered history of heterogeneous, feedback-bearing, consequential encounters. Calendar duration becomes one opportunity coordinate within this history. A formal model then yields four limited results. Order-sensitive update operators permit equal-duration histories with different terminal competence. An independent encounter model supplies a conditional bound on required-class coverage. A many-to-one credential map leaves target competence unidentified across a nonconstant fibre. A deterministic downstream evidentiary translation cannot refine source identification without auxiliary evidence. These results motivate separate formative, inferential, and adjudicative warrants joined to participation, contestability, correction, rights, care, and distribution. Constructed cases involving a teacher practicum, an international programme officer, and a U.S. federal evidentiary hearing show how the framework guides analysis while leaving causal effectiveness, professional standards, doctrinal validity, and institutional legitimacy open to domain-specific evidence. The contribution is a revisable architecture for studying how institutions cultivate, recognize, and authorize situated knowledge.

Keywords: situated experience; professional competence; relational time; workplace learning; assessment validity; credentials; evidence law; institutional judgment

Discussion Paper Note

This paper is a preliminary discussion paper intended to share an evolving idea and invite further dialogue, criticism, revision, and independent development.

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Notices

Status. This is a working draft circulated for discussion. Its claims, formal objects, and section numbering remain open to revision.

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Statement on the use of language models. Drafting, literature search, structural review, and argumentative criticism were conducted in dialogue with ChatGPT (OpenAI). The author bears responsibility for the claims, definitions, formal constructions, selection of material, argument, and position taken. References included in the bibliography were checked against publisher, institutional, journal, DOI, governmental, or library records during preparation.

Companion papers. The present paper extends a research programme on co-experience and knowledge continuity. Companion papers develop the general epistemic object, transmission power and responsibility, language documentation and revitalization, and cultural preservation through experiential reconstruction. The present inquiry specializes the programme for guided professional formation, relational time, competence inference, and a bounded evidence-law comparison.

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1 Introduction

This section defines institutional translation as the paper’s comparative object, states its provisional position, and locates the formal contribution within philosophical and domain-specific inquiry. The discussion moves from a recurring institutional sequence to the paper’s scope, method, contribution, and structure.

Institutions repeatedly work with knowledge they cannot observe as a free-standing object. A professional programme arranges practice and later certifies competence. An employer reads years, titles, references, and performances as evidence about judgment. A court receives testimony and other materials, classifies them under rules, and authorizes a finding. An international organization relies on people who can recognize hesitation, conflict among mandates, procedural sensitivities, and long-horizon relational consequences. In each setting, situated experience becomes an institutional object through selection, classification, inference, and authorization.

The sequence carries two distinct directions. Institutions can help generate the capacities they later evaluate. They can also infer, certify, or adjudicate on the basis of traces produced elsewhere. A practicum places a learner in supervised activity and changes the learner’s competence. A licensing examination samples performance and supports an inference about that competence. A court translates an event and its surviving traces into a bounded decision record and finding. Treating these operations as one generic act of recognition obscures their different causal and normative burdens.

The paper proposes three operation families. *Formative translation* organizes participation so that a person’s or team’s capacity may change. *Inferential translation* moves from performances, records, and proxies to an interpretation or use decision. *Adjudicative translation* moves from event-related traces through legal classification and evidentiary gates to an authorized finding and consequence. Institutions can compose these operations. Their standards remain distinct.

A central concept is *relational time*. The term originates in an observation about international-organization and NGO work: some roles require reliable judgment across heterogeneous people, institutions, cultures, mandates, and long-term relationships. Books and formal theory can prepare a practitioner. Repeated encounters, feedback, error, repair, institutional memory, and changing roles can generate further capacities. Years in role sometimes act as a rough signal of access to such encounters. Equal years can also conceal sharply different histories. Relational time therefore denotes an ordered, feedback-bearing encounter history, with seniority treated as a separate institutional category.

Several established literatures constrain this proposal. Situated-learning and guided-participation research place learning in social practice and changing participation [18, 26]. Tacit-knowledge and reflective-practice traditions examine knowledge that exceeds immediate articulation and judgment developed in action [24, 8, 28]. Workplace-learning and professional-knowledge research connect opportunities, engagement, guidance, experience, and competence [5, 10]. Distributed-cognition and organizational-learning work locate performance and memory across persons, artifacts, routines, and historically organized systems [15, 7, 21]. Expertise research warns that environment, feedback, practice quality, and target structure govern the value of experience, while years alone remain an unstable measure [16, 27, 11, 22]. Assessment theory attaches validity to supported interpretations and uses [23, 17]. Sociolegal and evidence scholarship shows that experiences become disputes and evidentiary objects through institutional transformations governed by truth-related, ethical, procedural, and structural concerns [12, 4, 13, 9].

The paper uses these bodies of work as antecedents and constraints. Its proposed contribution is comparative and architectural. A typed model represents a participant state, an ordered formation history, observation and proxy maps, an assessment inference chain, an event-to-finding evidentiary chain, and a plural warrant profile. Four mathematical consequences are derived under declared assumptions. They establish ordering sensitivity, a simple encounter-coverage bound, proxy non-identification, and deterministic downstream information loss. The results remain modest. They guide the formulation of claims and research designs. Empirical validation of relational time remains open. Doctrinal conclusions about a concrete case require jurisdiction-specific analysis.

The manuscript has four movements. Sections 2–6 develop the philosophical and domain-literature argument. Sections 7–11 introduce the formal architecture and derivations. Section 12 applies the model to three constructed mechanism cases. Sections 13–14 state objections, evidence gates, and revision conditions before the conclusion consolidates the position.

2 Situated Experience and Institutional Translation

This section constructs the paper’s central comparative object. It first distinguishes situated experience from an isolated informational input, then defines institutional translation and separates the three operation families used throughout the manuscript.

Situated experience names participation in activity with a location, history, material organization, role structure, interpretive background, and field of consequence. A teacher responding to a classroom, a programme officer negotiating across institutions, and a witness recounting an event occupy different practices. Each encounters other actors, artifacts, language, time pressure, authority, expectations, and uncertainty. The resulting knowledge may include propositions. It can also include timing, perceptual discrimination, embodied routines, awareness of others’ likely responses, institutional memory, and judgment about what a situation permits.

The concept belongs to a dense intellectual genealogy. Lave and Wenger analyze learning through changing participation in social practice [18]. Rogoff develops guided participation as a relation among people and culturally organized activity [26]. Polanyi’s account of tacit knowing and Collins’s differentiated analysis of tacit knowledge resist the assumption that every operative capacity is immediately available as explicit instruction [24, 8]. Hutchins’s study of navigation treats cognition as organized across people, artifacts, and cultural systems [15]. These accounts disagree in important respects. Together they make an individual information-transfer model insufficient for many professional activities.

This paper’s internal term *co-experience* highlights bounded configurations in which knowledge formation depends materially on relations among participants, practices, history, feedback, and conditions [14]. The term supplies a research question; its categorical novelty remains open. A co-experience model earns explanatory value only when it distinguishes an outcome from individual aggregation, common exposure, ordinary social influence, or environmental scaffolding. The present paper concentrates on an institutional consequence of that question: organizations design, read, and authorize traces of situated participation.

Definition 2.1 (Institutional translation of situated experience). *Institutional translation of situated experience is a governed sequence through which an institution selects, records, classifies, assesses, admits, or authorizes aspects of situated experience for a declared institutional purpose, producing competence, an inference about competence, an evidentiary record, or an authorized finding.*

Table 1: Institutional operation families, objects, outputs, and governing warrants

Operation	Source object	Characteristic mechanism	Institutional output	Governing warrant
Formative	Participant in an ordered practice history	Task allocation, modelling, feedback, reflection, correction, role transition	Changed competence, judgment, identity, or participation	Formation, safety, access, transfer, participant agency
Inferential	Observed performance and symbolic proxies	Elicitation, scoring, generalization, extrapolation, classification	Competence estimate, credential, eligibility, rank, decision	Use validity, uncertainty, job relevance, fairness
Adjudicative	Event-related testimony, documents, objects, and expert material	Legal classification, relevance, authentication, admissibility, proof, review	Admitted record, finding, order, remedy, consequence	Law, procedure, truth sensitivity, rights, reasons, reviewability

Translation has a constructive meaning. An internship constructs opportunities and roles. A score constructs a standardized observation from responses under rules. A credential places a person in an institutional category. An admissibility decision constructs the record available for adjudication. Construction can be disciplined, valid, and legitimate. It also makes provenance, purpose, authority, and consequence part of the object.

Table 1 gives the architecture’s first discipline. A training programme’s causal contribution differs from a certificate’s predictive value. A court’s authorized finding differs from either. The same institution may conduct all three operations. A professional school teaches, examines, and grants a qualification that later receives legal effect. Each transition then carries its own evidence.

Claim 2.2 (Typed institutional warrants). *Evidence supporting formative, inferential, or adjudicative validity supplies a warrant for the specified operation and use. Transfer to another operation requires an additional bridge argument.*

The claim is methodological and normative. A successful simulation can improve a bounded performance while its score predicts little outside the simulation. A high-performing assessment can identify already-developed skill while the course preceding it contributes little formation. A procedurally valid hearing can authorize a finding without explaining how professional competence was formed. These possibilities motivate the typed treatment developed later.

Institutional translation also allocates access and standing. Formation depends on who receives challenging assignments, supervision, feedback, and room for repair. Inference depends on who defines the target, which performances count, and which proxies receive prestige. Adjudication depends on access to legal process, evidentiary categories, counsel, expert resources, objection, and review. A complete account therefore joins epistemic warrant with the distribution of opportunity and consequence.

Table 2: Formation mechanisms and distinguishable professional outcomes

Mechanism	Learner activity	Candidate outcome	Evidence requirement
Conceptual instruction	Reading, explanation, comparison, explicit reasoning	Propositional understanding and conceptual discrimination	Explanation, application, misconception analysis, retention
Modelling and observation	Attending to an experienced performance and its commentary	Perceptual cue recognition and procedural schema	Cue-sensitive task, later enactment, alternative model
Guided performance	Acting under bounded responsibility with supervision	Task competence and calibrated independence	Repeated performance, error profile, supervision record
Feedback and debrief	Comparing intention, action, response, and consequence	Correction, causal understanding, self-monitoring	Feedback quality, uptake, later behavioral change
Role transition	Entering wider responsibility and coordinating others	Judgment under broader stakes and interdependence	Novel-context transfer, decision reasons, affected-party outcomes
Repair and recurrence	Revisiting errors, relationships, and institutional consequences	Recovery capacity and long-horizon judgment	Repair trajectory, repeated encounter, downstream consequence

3 Guided Participation and Professional Formation

This section develops formative translation through apprenticeship, workplace participation, professional knowledge, reflection, and pedagogical judgment. It then identifies the institutional allocation problem that accompanies learning through practice.

An elementary transfer diagram represents education as knowledge moving from instructor to learner. This diagram captures explanation, demonstration, text, and testimony. Professional formation often adds another mechanism. The learner enters a practice, performs bounded tasks, encounters resistance from materials and people, receives correction, reflects on consequences, and gradually occupies changed roles. The object of education includes a capacity to perceive and act in situations whose relevant structure cannot be fully specified in advance.

Situated learning describes participation in communities of practice and the movement associated with legitimate peripheral participation [18]. Guided participation emphasizes coordination among participants in culturally organized activities [26]. Billett’s workplace pedagogy joins workplace affordances with the ways individuals elect to engage, describing learning as co-participation shaped by historical and situational practices [5]. These approaches place access to activity inside the learning mechanism.

Professional education also needs content-specific representation. Shulman’s account of teacher knowledge includes pedagogical content knowledge, thereby connecting subject matter with forms of representation and response appropriate to learners [29]. Eraut examines professional knowledge and competence across learning from books, people, and personal experience [10]. Schön’s reflective practitioner focuses on knowing and improvisation in situations that exceed technical recipes [28]. Together these traditions support a compound formative object: conceptual resources, situated perception, action, reflection, and social organization.

Table 2 separates outcomes often compressed into programme completion. Conceptual understanding

may develop quickly and remain valuable. Perceptual, relational, and operational judgment may require repeated application under variation. The table avoids a hierarchy between theory and practice. Theory can reorganize what a practitioner notices. Practice can expose the limits of a theory and supply conditions for revising it.

Workplaces distribute these mechanisms unevenly. One novice receives observation without meaningful task responsibility. Another performs tasks and receives sparse feedback. A third receives challenging assignments, psychologically safe correction, and access to experienced colleagues. The resulting difference is an institutional allocation of formative opportunity. Billett’s affordance-and-engagement relation is especially relevant here: a workplace provides structured possibilities, and participants engage from different biographies, identities, and positions [5].

The allocation problem has an epistemic and a distributive side. An organization needs to create reliable practice conditions. It also decides who can enter them. Entry-level roles, internships, assistantships, supervised projects, and stakeholder-facing assignments can function as infrastructure for later competence. Requirements for prior experience can then create a closed loop: access requires experience, while relevant experience requires access. Alternative entry routes and guided responsibility become substantive parts of professional formation.

Organizational practice can also teach poorly. Brown and Duguid show how official descriptions of work can diverge from actual communities of practice [7]. Levitt and March describe organizational learning as routine-based, history-dependent, and encoded in organizational memory [21]. Routines can preserve hard-won knowledge. They can also retain obsolete interpretations and shield them from feedback. A formative institution therefore needs mechanisms for correction, dissent, transfer testing, and revision alongside participation.

Claim 3.1 (Formation through governed opportunity). *For practice-dependent competence, an institution’s formative contribution depends on the encounters, roles, feedback, repair opportunities, and contexts it makes available, together with participant engagement and prior capacities. Programme duration alone supplies an incomplete causal description.*

This claim remains open to domain-specific evidence. Some tasks can be learned efficiently through simulation, explicit instruction, individual practice, or automated feedback. Some workplaces expose learners to noise and harm. The claim asks which mechanisms operate for a declared target, population, and horizon.

4 Relational Time and Professional Judgment

This section develops relational time as the paper’s principal proposed concept. It begins with international and NGO practice, connects that motivation to expertise and organizational memory, then states positive and critical conditions for the concept’s use.

International organizations and NGOs provide a vivid motivation because many roles join technical content with negotiation across ministries, donors, communities, contractors, diplomatic actors, colleagues, and institutional mandates. A practitioner may need to recognize when apparent agreement expresses hesitation, when a procedural objection carries a political concern, when a public intervention threatens a relationship, when silence carries several meanings, and when the long-term value of repair exceeds a short-term victory. Such judgment involves local histories, patterned interaction, power, language, and future interdependence.

International-relations practice theory offers a relevant antecedent. Adler and Pouliot describe international practices as competent performances embedded in socially meaningful patterns of action [2]. Pouliot analyzes practical logic in diplomacy through dispositions formed by experience and positions within a field [25]. These works support attention to background knowledge and competent enactment. They provide no fixed experience threshold and no universal ordering of younger and older practitioners.

The source intuition can be stated conservatively. Some professional knowledge genuinely takes relational time to generate. The time is relational because learning occurs through situated encounters and their consequences. It is historical because later judgment can depend on sequences, prior commitments, and institutional memory. It is heterogeneous because a narrow repetition of one role may add little for a target requiring varied counterparties and contexts. It is feedback-bearing because experience without usable response may stabilize confidence while leaving performance unchanged.

Definition 4.1 (Relational time). *Relational time is the ordered history of heterogeneous, feedback-bearing, consequential encounters through which a participant can develop relation-sensitive perception, action, repair, and judgment within specified practices and institutions.*

The definition treats calendar duration as one possible exposure coordinate. It also records encounter diversity, counterparty and role variation, feedback, repair, stakes, and context. Two practitioners with five years in nominally similar roles can occupy different relational histories. A practitioner with three intensive years of varied, supervised responsibility may acquire stronger target competence than a practitioner with ten repetitive years. The comparison requires a target and evidence.

Table 3 makes the concept researchable while displaying its risks. A relational-time record can become intrusive surveillance if institutions attempt exhaustive capture. The framework supports parsimonious, target-specific measurement, participant review, privacy protection, and alternative evidence routes.

Expertise research strengthens the distinction between duration and formative conditions. Kahneman and Klein connect the possibility of skilled intuition to an environment with sufficient regularity and opportunities to learn those regularities, while warning against subjective confidence as a general indicator [16]. Ericsson and colleagues gave deliberate practice a prominent role in expert performance [11]; later meta-analysis found substantial cross-domain variation and much smaller contributions in some professional domains [22]. A recent organizational review concludes that research often conflates expertise with years of experience and emphasizes the quality of education, training, practice, and learning opportunities [27]. These findings support caution and sharper constructs.

The environment matters twice. It supplies the regularities that a person may learn, and it can change. A diplomatic practitioner may develop accurate expectations in one institution and misapply them in another. A teacher may learn a classroom routine that works under one resource structure and transfers poorly. A professional can acquire sensitivity to a problematic institutional norm and become highly effective at reproducing it. Expertise is therefore target-, environment-, and value-sensitive.

Organizational memory extends relational time beyond one individual. Histories can be encoded in routines, templates, archives, meeting order, informal networks, and experienced personnel [21]. A programme officer’s judgment may partly depend on knowing why a partner previously rejected a proposal, which actors expect prior consultation, or which wording activates a historical concern.

Table 3: Relational-time dimensions, candidate indicators, and interpretive risks

Dimension	Candidate indicator	Candidate formative role	Interpretive risk
Encounter diversity	Coverage of declared situation classes	Wider cue and response repertoire	breadth without depth
Counterparty variation	Stakeholder, institution, culture, and power-position matrix	Perspective coordination and expectation calibration	stereotyping and extractive exposure
Role variation	Observation, execution, coordination, supervision, decision	Understanding of interdependent responsibilities	title inflation and unequal access
Feedback quality	Timeliness, specificity, credibility, and opportunity for uptake	Error correction and calibrated confidence	biased, strategic, or suppressed feedback
Repair opportunity	Revisiting mistakes and observing later effects	Recovery skill and long-horizon responsibility	repeated harm to affected parties
Consequence diversity	Variation in stakes, horizons, and affected groups	Judgment across risk and reversibility	normalization of avoidable harm
Context coverage	Organizational, material, cultural, and political variation	Transfer and boundary recognition	context sampling without continuity
Sequence	Order of encounters and role transitions	Scaffolding and path-dependent learning	retrospective storytelling
Duration	Elapsed time and service years	Opportunity for recurrence and rare events	seniority substituted for evidence

Documents can preserve selected reasons. Colleagues and repeated interaction can carry further context. Staff turnover, secrecy, and status hierarchy can interrupt the memory system.

Hypothesis 4.2 (Relational-time contribution). *For selected professional judgments, a target-specific relational-time profile will predict novel-context performance beyond calendar duration, institutional prestige, formal education, and prior measured ability, provided that the environment contains learnable structure and usable feedback.*

The hypothesis is deliberately defeasible. It could fail because the profile is poorly measured, the target is primarily conceptual or technical, feedback is absent, the environment changes too rapidly, selection explains the association, or formal tools already capture the relevant competence. A credible study needs longitudinal designs, transparent targets, comparison measures, and negative cases.

Relational time also creates an institutional duty of access. If some competence emerges only through participation, then organizations control a scarce formative resource. They can widen entry through junior roles, guided assignments, simulation joined to real feedback, rotation, mentorship, and cross-organizational projects. They can narrow entry through prestige, informal sponsorship, unpaid work, citizenship rules, language expectations, geography, and prior-experience requirements. The distribution of relational time belongs to the evaluation of professional systems.

Table 4: Competence evidence types and their principal inference burdens

Evidence type	Immediate information	Principal inference burden	Corrective design
Service duration	elapsed time in a declared role or field	opportunity, task range, feedback, performance, current relevance	role history, task evidence, alternatives, periodic validation
Credential	completion under institutional requirements	requirement quality, scoring, target coverage, comparability, use	transparent standards, performance evidence, multiple pathways
Reference	evaluator account of selected relations and performances	observation scope, incentives, power, rater calibration, missing voice	structured prompts, scope disclosure, rebuttal, multiple sources
Portfolio or work product	artifact produced under partly known conditions	authorship, assistance, task fit, transfer, maintenance	provenance, oral defense, novel task, team contribution record
Structured simulation	behavior in designed conditions	construct coverage, realism, scoring, generalization, adverse effects	repeated tasks, rater study, transfer study, accessibility audit
Supervised observation	performance in a situated practice	observer effect, sampling, context, inter-rater reliability, stakes	longitudinal sampling, multiple observers, participant context

5 Competence Proxies and Assessment Inference

This section examines how institutions infer competence from performances and symbolic traces. It separates observations from proxies, introduces interpretation-and-use validity, and connects classification with access, consequence, and contestability.

Professional competence is rarely available to an institution in full. An employer sees a curriculum vitae, reference, work sample, interview, title, and service duration. A licensing body sees responses under standardized conditions. A supervisor sees selected performances and may have uneven access to context. Each object is a trace of a wider history. Institutional decisions require compression because time, privacy, cost, and comparability constrain observation.

Years of experience can carry signal. More time can create opportunities for rare encounters, recurrence, role transitions, and feedback. The signal depends on assignment, environment, engagement, and target. A credential can also carry signal because it summarizes completion under stated requirements. Both remain many-to-one maps: different histories and capacities can receive the same category.

Assessment theory provides a disciplined response. Messick treats validity as an evaluative judgment about the evidence and rationales supporting interpretations and actions based on assessment results [23]. Kane develops an argument-based approach in which claims, inferences, assumptions, and uses become explicit and subject to evaluation [17]. The institution validates an interpretation and use under conditions. The title of an assessment or credential supplies no self-executing warrant.

Table 4 treats each evidence type as useful under a bounded argument. Combining sources can narrow uncertainty. Combination can also reproduce common-mode bias when all sources depend on the same prestigious institution, network, language, or evaluator culture.

Classification has constitutive effects. Bowker and Star show how categories and standards organize

infrastructures, visibility, interaction, advantage, and suffering [6]. Abbott analyzes professions through jurisdictional claims over expert labor and tasks [1]. A credential can detect prior competence, constitute eligibility, allocate jurisdiction, and shape the future opportunities through which further competence develops. Detection and constitution can coexist.

The inference also has a temporal loop. A person receives a credential, gains access to more consequential practice, acquires further experience, and later appears to confirm the credential’s value. Another person lacks the credential, receives fewer formative opportunities, and generates less recognized evidence. Observed later differences then combine initial skill, institutional selection, differential opportunity, and self-reinforcing access. Empirical evaluation must distinguish these mechanisms.

Claim 5.1 (Proxy validity obligation). *A service-duration, credential, reference, or prestige category supports a competence decision only through a target- and use-specific inference argument that states its evidence, uncertainty, alternatives, consequences, and correction route.*

This claim permits parsimonious decisions. An institution can use a validated proxy when direct observation is costly and consequences are proportionate. High-stakes exclusion strengthens the need for job relevance, alternative demonstrations, accessibility, and appeal. Early-career access is especially important when the institution controls the practice conditions that later proxies are intended to signal.

6 Legal Evidence as High-Formality Translation

This section introduces evidence law as a high-formality comparison for institutional translation. It follows the movement from experience to dispute and from trace to admitted record and authorized finding, then fixes the legal illustration to the U.S. federal evidence framework while preserving broader philosophical and comparative boundaries.

Lived events reach legal institutions through prior transformations. Felstiner, Abel, and Sarat analyze how experiences can become perceived injuries, grievances, claims, and disputes, emphasizing the subjective, unstable, reactive, and consequential character of these changes [12]. Formal process therefore begins after selection has already occurred. Some injuries remain unrecognized, some grievances remain unvoiced, and some claims acquire institutionally legible forms.

Once a matter enters a legal process, testimony, documents, objects, recordings, and expert analyses become candidate evidence. Legal categories define issues and propositions. Authentication and foundation connect items to asserted sources. Relevance connects an item to a consequential fact. Exclusion rules, privileges, burdens, procedural stages, and decision standards shape the authorized record. Findings then carry institutional consequences.

Evidence scholarship treats these operations as more than information aggregation. Anderson, Schum, and Twining develop the analysis of proof, evidence, narrative, and standards across litigation and investigation [4]. Ho argues that legal fact-finding joins epistemic and ethical responsibility and that justice enters the process of finding truth [13]. Damaska connects evidentiary practices with institutional form, contrasting features of Anglo-American and Continental systems while tracking changes within them [9]. These works prevent a simple equation between maximal information and valid adjudication.

Table 5 displays the paper’s limited comparison. A court and a professional programme each select

Table 5: Legal translation stages and distinct institutional questions

Stage	Immediate object	Institutional operation	Principal question
Experience	situated event and participant understanding	perception, memory, naming, interpretation	source conditions, perspective, missing traces
Claim formation	grievance, allegation, defense, requested remedy	legal framing and issue selection	access, category fit, representation, standing
Evidence production	testimony, document, object, recording, analysis	elicitation, preservation, discovery, authentication	provenance, credibility, completeness, lawful access
Admissibility	candidate evidence under rules	relevance, exclusion, privilege, limitation, expert gatekeeping	probative relation, procedural value, rights, prejudice, reliability
Fact-finding	admitted record under standard and burden	inference, comparison, narrative, deliberation	support, uncertainty, reasons, standard of proof
Consequence	finding, order, remedy, sanction	authorization and institutional implementation	proportionality, review, repair, distribution

experience, but they pursue different institutional purposes. The court’s record is governed by law and procedure. An educational environment is governed by learning, care, professional standards, and institutional obligations. Similar information constraints create no identity between their validities.

The manuscript uses current U.S. federal rules as a fixed, jurisdiction-bounded illustration. The U.S. Courts provides the official current rules entry point [3]. Federal Rule of Evidence 401 defines relevance through a tendency to change the probability of a fact of consequence [19]. Rule 702 permits qualification through knowledge, skill, experience, training, or education and requires the proponent to establish helpfulness, sufficient basis, reliable principles and methods, and reliable application [20]. The rule is especially useful for this paper because it recognizes experience as one possible basis of expertise while requiring a link from that basis to a reliable opinion.

The legal example clarifies several distinctions. Experience can qualify a witness while leaving the reliability of a specific inference open. Relevant evidence can remain excludable under other rules. A historically plausible account can remain legally insufficient. A procedurally authorized finding can remain subject to appeal, revision, or later historical criticism. Legal fact in the present model means a finding authorized for a specified institutional purpose under a declared procedure and standard.

The adjudicative process also distributes interpretive standing. Parties, witnesses, lawyers, experts, judges, jurors, and appellate bodies occupy different roles. A participant’s lived understanding can enter through testimony and still be reshaped by pleadings, questions, objections, evidentiary categories, credibility judgments, and legal standards. This transformation can support fairness and common decision procedures. It can also generate category mismatch and asymmetric intelligibility. Evaluation requires doctrine, case facts, procedural posture, and affected-party evidence.

Claim 6.1 (Jurisdiction-indexed adjudicative translation). *An evidentiary finding receives its institutional status from a declared jurisdiction, issue, rule set, procedure, standard, and authorized decision maker. Its relation to the source event and to broader justice requires further epistemic and normative evaluation.*

The claim sets the boundary for the formal sections. Mathematics can represent traces, gates, and identification sets. It cannot determine admissibility, rights, burdens of proof, credibility, or a just verdict. Those conclusions belong to law, evidence, procedure, and normative argument.

7 Formal Objects and Operation Types

This section introduces the symbols, domains, and typed operations used in the formal core. Its role is to prevent substitution among a participant state, an observation, a proxy, an evidentiary record, and an authorized finding before later sections derive consequences.

Let $i \in \mathcal{I}$ denote a participant and $\theta_t \in \Theta$ a target-relevant participant state at time t . The state can contain several competence, judgment, disposition, and knowledge coordinates. It remains latent and model-relative. A team or distributed system may require a different state type. Let $e_t \in \mathcal{E}$ denote an encounter, $f_t \in \mathcal{F}$ feedback, $r_t \in \mathcal{R}$ the participant's role and authority, and $c_t \in \mathcal{C}$ the institutional and material context.

For target q , $g_q : \Theta \rightarrow \mathcal{Y}_q$ selects the relevant competence feature. The target could concern classroom diagnosis, cross-institutional coordination, conflict repair, procedural knowledge, or a bounded technical task. An observation map O produces performances, scores, work products, or supervisor records. A proxy map P produces service duration, a title, a credential, an institutional category, or a reference classification.

For the legal comparison, let $x \in \mathcal{X}$ denote a possible source event and $S_\eta(x) = z$ its evidence-bearing traces under trace-production and selection conditions η . A classification operator C_κ constructs an institutionally typed representation. An admissibility operator A_γ applies the relevant rule and procedure set. A judgment operator J_ν produces a finding under a declared standard and authorized role.

Definition 7.1 (Three institutional operations). *The formal architecture distinguishes*

$$\text{Form}_\pi : (\theta_0, h_n) \mapsto \theta_n, \quad (1)$$

$$\text{Infer}_\alpha : (z, p, a) \mapsto \hat{g}_q \text{ or } D_q, \quad (2)$$

$$\text{Judge}_{\gamma,\nu} : (m, a, \mathcal{R}_L) \mapsto y_L, \quad (3)$$

where π is a formation policy, h_n an ordered history, z an observation, p a proxy, a auxiliary information, D_q a competence decision, m an evidentiary representation, $\mathcal{R}_L$ an applicable legal rule set, and y_L an authorized finding.

The operations can compose. A teacher-education programme creates supervised practice through (1), observes a final performance and makes an inference through (2), then grants a qualification with legal or employment effects. A court can use an expert's credential as one input while conducting a distinct adjudicative process through (3). Composition preserves type boundaries.

Table 6 makes the model's empirical burden visible. A symbol supplies a place for an object. Measurement validity and ontological interpretation require independent support. The table also distinguishes detection from constitution. A credential may report competence and create eligibility. A legal finding may respond to evidence and constitute an official status.

Assumption 7.2 (Target and use declaration). *Every application declares the target q , source and outcome populations, institutional purpose, time horizon, decision use, and relevant comparison before interpreting a formal result.*

Table 6: Core symbols and empirical interpretation obligations

Symbol	Formal role	Empirical interpretation	Principal caution
θ_t	latent participant or system state	target competence, judgment, disposition, knowledge	construct contestation and measurement error
h_n	ordered formation history	encounters, feedback, roles, contexts, consequences	selection and incomplete records
g_q	target map	declared professional outcome	target drift and normative loading
O	observation map	task, performance, product, score, report	sampling and observer effects
P	proxy map	years, title, credential, prestige, reference class	many-to-one compression and access effects
S_η	event-to-trace map	testimony, document, object, recording	survival, memory, elicitation, lawful access
A_γ	institutional gate	admissibility, privilege, limitation, selection	jurisdiction and procedural purpose
J_ν	judgment operator	decision under standard and authorized role	reasons, burden, discretion, review

This assumption blocks migration across targets. Evidence of technical accuracy supplies limited information about negotiation repair. Evidence of short-term classroom performance supplies limited information about later independent teaching. Evidence of legal relevance supplies limited information about sufficiency or justice.

8 Path Dependence and Heterogeneous Exposure

This section formalizes relational time. It represents professional development as an ordered composition of encounter updates, derives an exact path-dependence result, and gives a conditional probability bound for heterogeneous encounter coverage.

Let a formation history be

$$h_n = ((e_t, f_t, r_t, c_t))_{t=1}^n. \quad (4)$$

For each episode define an update operator $U_{e_t, f_t, r_t, c_t} : \Theta \rightarrow \Theta$. Then

$$\theta_n = U_{e_n, f_n, r_n, c_n} \circ \dots \circ U_{e_1, f_1, r_1, c_1}(\theta_0). \quad (5)$$

The notation permits learning, forgetting, maladaptation, reflection, inhibition, and state-dependent response. Its empirical application requires a specified state and observation model.

Define a target-specific profile

$$\tau_q(h_n) = (n, d_q, v_q, b_q, \rho_q, \phi_q, \chi_q), \quad (6)$$

where n records exposure count, d_q encounter-class diversity, v_q counterparty and role variation, b_q feedback bandwidth and quality, ρ_q repair and recurrence opportunity, ϕ_q consequence diversity, and χ_q context coverage. Duration can enter as an additional coordinate. Equation (6) treats relational time as a profile because premature aggregation would conceal which mechanism matters.

Proposition 8.1 (Order-sensitive professional formation). *Suppose two encounter updates $U_a, U_b : \Theta \rightarrow \Theta$ satisfy*

$$U_b \circ U_a(\theta_0) \neq U_a \circ U_b(\theta_0). \quad (7)$$

The histories $h = (a, b)$ and $h' = (b, a)$ have equal duration and encounter counts while producing different terminal states. If g_q distinguishes those states, equal duration and counts fail to identify target competence.

Proof. Both histories contain one occurrence of a and one of b . Their terminal states are $U_b U_a(\theta_0)$ and $U_a U_b(\theta_0)$. Equation (7) makes these states unequal. When g_q maps them to unequal target values, every summary that retains only duration and unordered counts assigns the same summary to different target competence. $\square$

The proposition identifies a precise route from history to competence. A supervised observation followed by independent performance can differ from independent performance followed by corrective observation. Early exposure to a high-stakes conflict can produce a different learning trajectory from later exposure after supported practice. Noncommutativity is an empirical hypothesis. The proposition derives its consequence after that hypothesis is supported.

The second result addresses heterogeneous opportunity. Let required encounter classes be $k \in \{1, \dots, K\}$. Assume each episode independently belongs to class k with probability $p_k > 0$. Let C_n be the event that every required class has occurred by episode n and $p_{\min} = \min_k p_k$.

Proposition 8.2 (Independent encounter-coverage bound). *Under the independent and stationary encounter model,*

$$\Pr(C_n^c) \leq \sum_{k=1}^K (1 - p_k)^n \leq K e^{-n p_{\min}}. \quad (8)$$

Consequently,

$$n \geq \frac{\log(K/\delta)}{p_{\min}} \quad (9)$$

is sufficient for $\Pr(C_n) \geq 1 - \delta$.

Proof. The probability of missing class k in n independent episodes is $(1 - p_k)^n$. Missing at least one class is the union of the K missing-class events. The union bound gives the first inequality in (8). The inequality $1 - p \leq e^{-p}$ gives the second. Requiring $K e^{-n p_{\min}} \leq \delta$ and solving for n yields (9). $\square$

Remark 8.3 (Coverage and competence). *The event C_n records encounter coverage. Learning, attention, feedback, ethical conduct, retention, transfer, and competence remain outside that event. Equation (9) is a sufficient toy bound. Professional experience requirements require domain-specific evidence.*

Real organizations violate the assumptions in structured ways. Managers allocate assignments; prior performance affects exposure; rare events cluster; roles constrain observation; people leave; and feedback depends on hierarchy. These violations are substantive research objects. A richer model can use nonstationary hazards $p_{k,t}(h_{t-1})$, opportunity constraints, and multilevel assignment mechanisms. The elementary bound retains value as a baseline: time can matter because rare heterogeneous opportunities need recurrence, while equal time can contain unequal opportunity.

Table 7: Formal conclusions, assumptions, and prohibited extrapolations for relational time

Result	Required assumption	Supported conclusion	Prohibited extrapolation
Ordered update	specified state and episode operators	terminal state depends on ordered composition	every experience improves performance
Noncommutative witness	$U_b U_a(\theta_0) \neq U_a U_b(\theta_0)$ and target distinction	equal-duration histories can differ in target competence	ordering dominates all other mechanisms
Coverage bound	independent stationary class draws with $p_k > 0$	sufficient episode count for required-class coverage probability	universal years threshold or competence guarantee
Relational-time profile	valid coding of target-relevant dimensions	mechanism-sensitive description beyond duration	exhaustive or privacy-free monitoring

Table 7 is part of the model’s safety boundary. The mathematics supplies reasons to inspect histories and opportunity structures. It gives no endorsement of seniority, mandatory exposure, or harmful learning environments.

9 Proxy Fibres and Assessment Warrants

This section derives the competence-identification limit of credentials and experience proxies. It then replaces proxy confidence with a structured inference argument connecting observation, score, generalization, extrapolation, and decision use.

Let $Q : \Theta \times \mathcal{H} \rightarrow \mathcal{P}$ map a participant state and compatible history to a proxy category. The proxy can be years, title, credential, institutional affiliation, or a compressed reference category. Let $g_q : \Theta \rightarrow \mathcal{Y}_q$ be target competence.

Proposition 9.1 (Proxy-fibre non-identification). *If there exist (θ, h) and (θ', h') such that*

$$Q(\theta, h) = Q(\theta', h'), \quad g_q(\theta) \neq g_q(\theta'), \quad (10)$$

then every proxy-only recovery map $r : \mathcal{P} \rightarrow \mathcal{Y}_q$ fails to recover g_q at one or both states.

Proof. Function application preserves the equality in (10):

$$r(Q(\theta, h)) = r(Q(\theta', h')). \quad (11)$$

The common output in (11) cannot equal both unequal target values. $\square$

The proposition concerns exact recovery. A proxy can remain probabilistically informative. Its quality depends on the distribution of target competence within each fibre, the selected population, the cost of error, and the use decision. For proxy p and auxiliary evidence a , define the compatible competence set

$$\mathcal{I}_q(p, a) = \{\theta \in \Theta : Q(\theta, h) = p \text{ for some compatible } h, (\theta, h) \text{ satisfies } a\}. \quad (12)$$

Table 8: Assessment inference stages and characteristic rebuttals

Inference stage	Warrant target	Characteristic rebuttal	Evidence response
Scoring	observed response to score	rater dependence, scoring error, inaccessible format	scoring study, rater calibration, accommodations
Generalization	sampled tasks to admissible universe	narrow task sample, occasion variance, coaching specificity	repeated tasks, alternate forms, reliability model
Extrapolation	assessment universe to professional target	simulation mismatch, context dependence, omitted relational demand	criterion study, novel-context transfer, process evidence
Decision use	target estimate to institutional consequence	threshold arbitrariness, asymmetric cost, adverse impact, obsolete target	consequence analysis, alternatives, appeal, periodic review

Performance samples, structured references, portfolios, simulations, and supervised observations can narrow (12). Each new source introduces its own validity, burden, accessibility, and privacy questions.

An assessment argument makes these transitions explicit. Let z denote task performance, s a score, $\tilde{s}$ generalized performance over an admissible task universe, $\hat{g}_q$ an extrapolation to target competence, and D_u a use decision. Represent the chain as

$$z \xrightarrow[W_S]{\text{scoring}} s \xrightarrow[W_G]{\text{generalization}} \tilde{s} \xrightarrow[W_E]{\text{extrapolation}} \hat{g}_q \xrightarrow[W_D]{\text{decision}} D_u. \quad (13)$$

The warrants concern scoring accuracy W_S , generalization W_G , extrapolation W_E , and the appropriateness and consequences of use W_D . This structure adapts argument-based validation to the paper’s institutional object [17].

Definition 9.2 (Competence-inference record). *For target q and use u , a competence-inference record is*

$$\mathcal{V}_u = (q, u, z, s, \tilde{s}, \hat{g}_q, D_u, W_S, W_G, W_E, W_D, \mathcal{A}, \mathcal{R}, \mathcal{U}), \quad (14)$$

where $\mathcal{A}$ contains assumptions, $\mathcal{R}$ rival explanations and rebuttals, and $\mathcal{U}$ uncertainty and revision conditions.

Equation (14) creates an audit object. It cannot validate a decision through completion of a form. Evidence must support its entries. The record can also expose scope differences. A work sample may score reliably while extrapolating poorly to multi-party coordination. A reference can concern observed reliability while providing sparse evidence about technical knowledge. A degree can establish completion while its relevance changes across jobs and time.

Table 8 connects epistemic and institutional concerns without collapsing them. Measurement quality and use justice can support or constrain each other. A strong score interpretation can accompany an unacceptable use. A socially valuable access programme can still need evidence that its assessment predicts the required task.

Claim 9.3 (Alternative evidence pathway). *When an institution controls access to the experiences represented by its preferred proxy, high-consequence proxy use should include proportionate alternative evidence pathways, uncertainty disclosure, and correction procedures.*

The claim requires independent normative support. Its motivation is structural: prior access can generate the evidence later used to allocate further access. Alternative pathways can include supervised trials, portfolios with provenance, structured simulations, probationary practice, bridging programmes, and recognition of differently situated experience. Each pathway carries costs and risks that require evidence-sensitive design and continuing audit.

10 Evidentiary Translation and Information Limits

This section formalizes the legal comparison. It types the event-to-consequence chain, proves a deterministic identification-set inclusion, and explains how auxiliary evidence and procedurally justified exclusion change the interpretation.

Represent an evidentiary trajectory as

$$x \xrightarrow{S_\eta} z \xrightarrow{C_\kappa(\cdot, a)} m \xrightarrow{A_\gamma(\cdot; \mathcal{R}_L)} m^{\text{adm}} \xrightarrow{J_\nu(\cdot; \sigma_L)} y_L \xrightarrow{K_L} \omega_L. \quad (15)$$

The objects are a possible source event x , surviving or elicited traces z , a classified representation m , an admitted record m^{adm} , an authorized finding y_L under standard σ_L , and consequences ω_L . The rule set $\mathcal{R}_L$, decision maker, issue, jurisdiction, procedural posture, and remedy belong inside the application.

The first transformations can begin before litigation. Participants perceive and remember from different positions. Records survive unevenly. Lawyers elicit and organize material. Pleadings and legal categories select issues. Equation (15) starts with a modelled event and treats an omniscient event description as unavailable.

Let $z = S_\eta(x)$ and suppose a downstream representation is $m = T(z)$ without additional source information. Define

$$\mathcal{I}_z(z) = \{x : S_\eta(x) = z\}, \quad \mathcal{I}_m(m) = \{x : T(S_\eta(x)) = m\}. \quad (16)$$

Proposition 10.1 (Deterministic translation inclusion). *For the observed pair $m = T(z)$,*

$$\mathcal{I}_z(z) \subseteq \mathcal{I}_m(m). \quad (17)$$

Proof. Take any $x \in \mathcal{I}_z(z)$. Then $S_\eta(x) = z$. Applying T gives $T(S_\eta(x)) = T(z) = m$. Hence $x \in \mathcal{I}_m(m)$. $\square$

The proposition states an information boundary. Deterministic classification or compression alone cannot distinguish source states already joined by the input trace. A legal category can improve reasoning by identifying a relevant issue. That benefit comes from a model, rule, or prior structure; source-specific information remains bounded by the trace.

Auxiliary evidence changes the result. If the classification stage adds lawfully obtained evidence a , define $\mathcal{I}_m(m, a)$. This set can be narrower than $\mathcal{I}_z(z)$ because the input has changed. Cross-examination, another witness, a document, expert analysis, or authentication evidence can add differentiating information. Their probative force and admissibility remain substantive questions.

The admitted record can also be deliberately coarser than the available record. A rule can exclude material to protect privilege, reduce unfair prejudice, preserve rights, allocate burdens, control

Table 9: Information change and warrant across evidentiary operations

Operation	Information relation	Possible institutional value	Required distinction
Trace production	selective relation from event to surviving or elicited record	persistence, testimony, inquiry, accountability	source event, perspective, memory, provenance
Deterministic classification	reorganizes trace without new source information	issue clarity, comparability, rule application	semantic utility and source identification
Auxiliary evidence	can narrow compatible source states	corroboration, challenge, explanation, authentication	lawful access, reliability, independence, relevance
Admissibility restriction	can remove material from the decision record	rights, fairness, privilege, prejudice control, proportionate process	epistemic loss and procedural justification
Authorized finding	applies standard through designated decision role	settlement, coordination, remedy, finality, public authority	legal status, historical account, moral evaluation

trial scope, or serve another recognized value. Information loss then has a procedural warrant candidate. Ho’s account of evidence law is relevant because it integrates ethical considerations within fact-finding [13]. Damaška’s institutional comparison further shows that rules and practices operate within forms of adjudication [9].

Table 9 shows why maximal source information and valid adjudication can diverge. It also shows why valid procedure and source truth remain connected: relevance, sufficiency, reasons, burdens, and standards organize the institution’s truth-sensitive task under constraints.

Remark 10.2 (Federal expert-evidence illustration). *Federal Rule of Evidence 702 illustrates a typed bridge from experience to expert testimony. Experience can contribute to qualification. The proponent must still establish helpfulness, sufficient basis, reliable principles and methods, and reliable application under the rule [20]. Extensive experience is therefore one input to a claim-specific evidentiary warrant.*

The legal model remains incomplete for publication-level doctrine. A real application requires current rules, case law, local practice, constitutional constraints, procedural posture, and professional review. The present result concerns a general deterministic information relation and a fixed textual illustration.

11 Plural Validity and Institutional Design

This section integrates the formal results into a non-aggregative evaluation profile. It separates formative, inferential, and adjudicative validity, then adds truth sensitivity, participation, contestability, correction, rights, care, distribution, and design admissibility.

For arrangement d , target q , population G , and horizon H , define

$$\mathcal{W}(d; q, G, H) = (V_F, V_I, V_A, T, P, C, E, R, D), \quad (18)$$

where V_F is formative validity, V_I inferential validity, V_A adjudicative validity, T truth sensitivity, P participation and standing, C contestability, E error correction, R rights and care, and D distribution of access, burden, and consequence.

The profile carries no universal scalar score. A licensing decision may assign priority to public safety and validated task performance. A formative programme may prioritize safe access, learning, and supervised responsibility. An adjudicative process may give lexical or threshold significance to rights, burdens, and legal standards. Any aggregation needs a declared decision context, authority, rule, uncertainty treatment, and constraints.

Proposition 11.1 (Selected validity non-entailments). *Within the typed architecture, formative validity, inferential validity, and adjudicative validity can vary independently.*

Proof. Consider three profiles. First, a practicum produces stable transfer on declared teaching tasks, while its completion certificate has low discrimination because almost every entrant receives it. This witnesses formative strength with weak inference from the certificate. Second, a structured performance assessment predicts later task performance, while the preceding course contributes little formation because candidates already possessed the skill. This witnesses inferential strength with limited formative contribution. Third, a hearing follows applicable evidence, burden, and decision procedures, while its record contains no evidence about how any participant’s professional competence formed. This witnesses adjudicative validity without a formative claim. The counterprofiles defeat the corresponding universal implications. $\square$

These are logical witnesses. Prevalence remains an empirical question. Their purpose is to preserve questions that an institutional success label can suppress. A programme can teach well and certify poorly. An assessment can predict well and distribute opportunity unfairly. A court can follow valid process while broader social access remains unequal. An arrangement can perform well on average and impose concentrated burdens.

Table 10 makes public records part of institutional knowledge. Its fields can reveal uncertainty and disagreement without forcing every decision into quantitative scoring. In legal contexts, confidentiality and procedural limits govern disclosure. In professional settings, privacy and proportionality constrain data collection.

Let $\mathcal{D}$ be candidate institutional designs. Define subsets meeting technical, evidentiary, authorization, care, rights, access, and revisability conditions. The admissible set is

$$\mathcal{D}^{\text{adm}} = \mathcal{D}^{\text{tech}} \cap \mathcal{D}^{\text{evid}} \cap \mathcal{D}^{\text{auth}} \cap \mathcal{D}^{\text{care}} \cap \mathcal{D}^{\text{rights}} \cap \mathcal{D}^{\text{access}} \cap \mathcal{D}^{\text{rev}}. \quad (19)$$

Equation (19) expresses conjunction. Mathematics supplies no membership criteria. Applicable law, professional standards, participant evidence, institutional purpose, and normative argument determine them.

Claim 11.2 (Auditable institutional translation). *Consequential institutional translations should preserve a target, source and selection record, inference chain, governing authority, uncertainty, affected-party standing, correction route, and distributional profile proportionate to their stakes.*

The claim is a revisable governance proposal. Some decisions are low-stakes and need light records. Some settings protect confidentiality. Some corrections must occur quickly and informally. The principle seeks accountability proportional to consequence while preserving institutional usability.

Table 10: Plural warrant coordinates and minimum public records

Coordinate	Governing object	Minimum public record	Characteristic category error
Formative validity	programme-to-capacity relation	allocation, process, feedback, outcome, transfer, attrition	completion interpreted as learning
Inferential validity	observation-to-interpretation-and-use relation	scoring, generalization, extrapolation, consequences, rivals	prestige interpreted as competence
Adjudicative validity	record-to-authorized-finding relation	jurisdiction, issue, rule, standard, reasons, review	plausibility interpreted as legal sufficiency
Truth sensitivity	output-to-source relation	alternatives, error model, disconfirming evidence, calibration	procedure interpreted as source identity
Participation and standing	role in formation, representation, and decision	access, voice, authority, representation, refusal	attendance interpreted as standing
Contestability and correction	route from challenge to revision	notice, reasons, rebuttal, appeal, correction history	disclosure interpreted as correction
Rights and care	persons, records, exposure, and consequence	legal basis, privacy, safety, burden, support	predicted accuracy interpreted as permission
Distribution	opportunity, error, burden, and benefit	group-sensitive access and consequence profile	aggregate performance interpreted as equity

12 Constructed Mechanism Cases

This section applies the architecture to three constructed cases selected for mechanism contrast. The cases concern a teacher practicum, an international programme officer, and a federal evidentiary hearing. They are analytic compositions and make no claim about a named person, institution, dispute, or legal outcome.

Table 11 identifies the comparative value of each case. The practicum reveals formation under designed guidance. The programme-officer case reveals relational time and proxy use. The hearing reveals high-formality translation and procedural warrant.

12.1 Teacher Practicum and Guided Formation

This subsection tests the formation and assessment architecture in a professional-education setting. It follows a learner through task sequence, feedback, role transition, and certification, then identifies evidence and access questions.

Consider a teacher candidate who completes conceptual coursework and enters two supervised placements. In the first placement, the candidate observes lesson design, teaches short segments, receives specific feedback, and revises a lesson for the same group. In the second, the candidate teaches a longer unit in a classroom with different language backgrounds and support needs. The supervisor gradually widens responsibility and requests written reasons for adaptations.

The candidate’s history can be represented by (4). Early observation changes which cues become

Table 11: Constructed cases and their principal institutional mechanisms

Case	Operation and mechanism	Principal evidence	Central risk
Teacher practicum	formative and inferential; sequenced guided performance with feedback	repeated classroom tasks, observation, reflection, transfer	unequal placement and completion proxy
International programme officer	formative and inferential; heterogeneous encounters with institutional memory	event history, decision reasons, partner outcomes, repair	seniority, pres- tige, selection, restricted entry
Federal evidentiary hearing	adjudicative; trace translation, relevance, expert gate, standard, finding	testimony, documents, expert basis, admitted record, rulings	category mis- match, context loss, unequal legal resources

salient during later teaching. Feedback after an unsuccessful explanation can alter the next lesson. A repair conversation with a learner can affect later interpretation of silence or resistance. The order matters when the update operators are noncommutative. Shulman’s teacher-knowledge framework and Schön’s reflection-in-action supply established conceptual antecedents for this interpretation [29, 28].

The practicum’s formative evaluation asks whether the designed sequence contributes to target competence. Relevant outcomes may include planning, subject-specific representation, perception of learner understanding, classroom interaction, safe response, revision, and transfer to a new context. A strong study records prior capacity, placement allocation, task opportunities, supervision, feedback, candidate uptake, outcomes, and attrition.

Certification raises a distinct inference. If almost every candidate who reaches the practicum receives the same completion category, the certificate can have limited discrimination within that selected population. A detailed assessment can still be valid for a particular use. Equation (13) asks whether observation was scored well, sampled adequate tasks, generalized across occasions, extrapolated to independent practice, and connected to a proportionate decision.

Access shapes formation. Candidates placed in well-supported classrooms may receive richer feedback and safer opportunities than candidates assigned to unstable or overloaded settings. Some learners can afford unpaid placement time and relocation; others face stronger constraints. The institution should therefore evaluate competence evidence together with the distribution of formative conditions. Adjusting the decision threshold alone leaves the upstream allocation unchanged.

The case supports a limited conclusion. A practicum can combine conceptual instruction, situated performance, feedback, reflection, and role transition. Its duration becomes informative only when connected to those mechanisms. A completion decision deserves its own validation record.

12.2 International Programme Work and Relational Time

This subsection develops the researcher-origin motivation through a constructed international programme role. It compares equal-duration histories, identifies relational and organizational mechanisms, and separates experience quality from credential prestige.

Consider two programme officers with five years of service. Officer A spent most of the period implementing one standardized reporting process with stable internal counterparts. Feedback

concerned timely completion and numerical accuracy. Officer B worked across local organizations, ministries, technical consultants, donors, and several country teams. The role included facilitation, conflict, translation across mandates, unsuccessful proposals, partner feedback, staff turnover, and repair after a public communication error. Equal duration hides different relational-time profiles.

The architecture leaves the comparison between Officer A and Officer B open. Officer A may possess deeper technical knowledge, stronger process reliability, and better longitudinal understanding of one programme. Officer B may have broad exposure and shallow learning. Target q determines the comparison. For a role requiring cross-institutional negotiation and repair, encounter diversity, role variation, feedback, and sequence become plausible predictors. For a specialized reporting role, stable repetition and technical accuracy may dominate.

International practice research supports attention to competent performance and background knowledge [2, 25]. Organizational-learning research supports attention to routines, history, and memory [21]. The present relational-time profile adds a measurement proposal: record encounter classes, counterparties, authority positions, feedback, repair opportunities, stakes, context, and sequence for a declared target.

Selection remains a central rival explanation. Institutions may assign complex work to people already judged capable. Later performance can reflect initial skill, sponsorship, language resources, nationality, social networks, and unequal opportunity. A longitudinal study should record prior measures and assignment processes. Rotation or phased assignment may create stronger comparisons when ethically and operationally feasible.

Years and institutional names then become proxies through Q . Proposition 9.1 shows their exact limitation when one proxy fibre contains different target competence. A structured application can add work samples, scenario analysis, decision narratives, partner feedback, evidence of repair, and observed coordination. These sources require safeguards. Partner feedback can be politically constrained; decision narratives can reward fluent self-presentation; simulations can encode a narrow professional culture.

The entry problem is especially important. If relational competence requires access to heterogeneous practice, a strict prior-years requirement can ration the substrate that later justifies senior selection. Junior roles, assistant positions, supervised stakeholder contact, cross-cultural partnerships, rotations, and progressively responsible assignments can widen formation. Their value lies in the quality of guided participation as well as the credential they produce.

The case yields two research hypotheses. First, a validated relational-time profile may predict selected coordination and repair outcomes beyond years and prestige. Second, organizations that distribute diverse practice and feedback more equitably may widen later competence evidence. Both hypotheses remain vulnerable to measurement, selection, and institutional-change objections.

12.3 Federal Evidentiary Hearing and Experience-Based Expertise

This subsection tests the adjudicative architecture through a fixed U.S. federal illustration. It follows an experience-based expert opinion through relevance and reliability questions while preserving jurisdictional and procedural limits.

Consider a civil hearing in which a party offers a professional with extensive field experience to explain an operational practice and apply that experience to disputed records. The source event includes actions, conversations, documents, and institutional conditions. The offered expert observed

none of the original event. The expert receives selected traces and constructs an opinion through professional background and a stated method.

Rule 401 asks whether an item tends to change the probability of a consequential fact [19]. Rule 702 asks whether the proposed expert is qualified through knowledge, skill, experience, training, or education and whether the testimony meets the rule’s helpfulness, basis, method, and application requirements [20]. Experience can therefore ground qualification while leaving a second question: how does the experience support the particular inference?

Equation (15) distinguishes the event, selected records, expert classification, admitted record, finding, and consequence. The expert adds auxiliary interpretive structure and may add domain knowledge. Proposition 10.1 warns that deterministic recoding of the same trace alone adds no source-state discrimination. A reliable comparison class, independently grounded practice regularity, additional examination, or corroborating material can add information. The reliability of that addition remains a legal and evidentiary question.

The hearing also illustrates legitimate selection. A court can limit material according to relevance, privilege, prejudice, procedure, or another applicable rule. The admitted record becomes an authorized basis for the decision and remains a selected record of the event. The judge or jury applies a standard to that record. Reasons, objections, preservation of error, and review create correction routes.

The comparison with professional assessment is precise and limited. Both settings require a bridge from selected observation to an institutional conclusion. The court operates under law, party structure, burdens, and procedural rights. The assessment operates under a construct, task universe, validity argument, and educational or employment obligations. Each can learn from the other’s insistence on explicit basis and challenge while retaining its own authority.

The case supports a modest institutional principle: experience deserves a claim-specific account of how it bears on the conclusion. The amount of experience, the quality of formation, the fit between practice and present issue, and the reliability of application remain separate.

13 Objections and Boundary Conditions

This section subjects the architecture to conceptual, empirical, disciplinary, and ethical objections. Each objection establishes a revision boundary and carries possible consequences for the model, scope, or paper.

13.1 Established Domain Vocabularies

This subsection addresses the risk that institutional translation merely renames existing work. It compares the proposed contribution with its antecedent fields and states the condition under which the new architecture should be retained.

Situated learning, workplace learning, reflective practice, professional knowledge, assessment validity, expertise, organizational learning, classification studies, sociolegal dispute transformation, and evidence law already provide sophisticated concepts. The paper claims no discovery of participation, tacit judgment, assessment inference, institutional classification, or legal transformation. Its potential contribution lies in a typed comparative architecture: formation, competence inference,

and adjudication share selected translation problems while retaining separate outputs and warrants. The architecture should be narrowed to a synthesis or checklist if it produces only new labels. It earns a stronger role if the operation typing exposes category errors, produces testable relational-time measures, clarifies proxy identification, improves validation records, and guides comparison without flattening the fields.

13.2 Romanticized Experience

This subsection addresses the tendency to treat lived practice as inherently wise. It introduces negative learning, institutional bias, environmental change, and external performance checks.

Experience can reproduce discrimination, unsafe routines, strategic silence, excessive deference, local myth, and obsolete practice. Stable environments can teach regularities whose normative value is poor. Feedback can reflect hierarchy. Repair can be unavailable to people bearing the consequences of professional error. Relational time therefore carries a sign and target question: which capacity changed, for whom, under which evaluation?

The model permits maladaptive updates in (5). A competent institutional reproducer can perform well under a local criterion and poorly under a public, ethical, or changed-environment criterion. External benchmarks, affected-party evidence, counterfactual tasks, dissent records, and periodic revalidation help distinguish adaptation from justified competence.

13.3 Seniority and Exclusion

This subsection tests whether relational time could rationalize years requirements and closed professional hierarchies. It separates opportunity mechanisms from eligibility rules and identifies governance safeguards.

The coverage result offers a possible reason why extended opportunity matters. Proposition 9.1 simultaneously shows that equal proxy values can contain different target competence. A years requirement therefore needs evidence linking duration to the target and use. It also needs analysis of alternative pathways, adverse effects, current relevance, and the institution’s role in distributing the underlying experience.

Seniority can support mentorship and organizational memory. It can also concentrate authority and reduce correction. The framework assigns no status privilege through duration. It asks for performance, basis, context, and a correction route proportionate to consequence.

13.4 Latent Competence and Collective Performance

This subsection examines the ontology of θ_t . It treats individual competence as one model choice and introduces team, system, and institution-level alternatives.

Many professional outcomes are distributed. A navigation team, classroom, programme network, or legal team can perform through coordinated roles, artifacts, and routines [15]. Assigning the outcome to one person’s state can conceal the system that made it possible. A team-level state Θ^{team} or a configured-system model may be required.

Professional competence can also be partly constituted by institutional norms. Abbott’s jurisdictional

account shows how professions organize work and authority [1]. A court defines who may occupy roles and which knowledge receives expert status. The formal target g_q must therefore state whether it concerns independent capacity, recognized standing, authorized role, collective performance, or a hybrid.

13.5 Encounter Independence and Causal Identification

This subsection addresses the strongest technical simplification in the coverage model. It replaces the independent baseline with a research agenda for endogenous and unequal assignment.

Professional encounters depend on supervisors, prior performance, status, identity, geography, organizational need, risk tolerance, and chance. The probabilities p_k can change over time and across people. An employee’s response changes later assignment. Attrition selects survivors. Equation (8) therefore describes a baseline. Observational estimation requires an explicit assignment and selection model.

A richer study can model encounter hazards conditional on history, compare assignment policies, use fixed effects or matched trajectories where defensible, and conduct sensitivity analysis for unobserved selection. Qualitative process evidence can identify feedback and repair mechanisms. Natural experiments and phased rotations may strengthen inference in selected institutions. Ethical limits govern experimentation with high-stakes work.

13.6 Cross-Domain Comparison

This subsection tests the education-law comparison for category error. It states the common structure and the domain-specific remainder.

Education aims partly to change participants. Assessment aims to support interpretations and uses. Adjudication aims to decide matters under law and procedure. Their authority, stakes, temporal structure, affected parties, and standards differ. The common structure concerns selective translation, inference, authorization, information limits, and correction. The remainder includes substantive pedagogy, professional standards, evidence doctrine, rights, burdens, remedies, and institutional legitimacy.

A valid comparison should produce explicit disanalogies. If the shared vocabulary encourages migration of educational validity into legal sufficiency, or legal admissibility into pedagogical worth, the comparison has failed. The typed maps in Equations (1)–(3) serve as a firewall.

13.7 Procedural Values and Information Reduction

This subsection addresses the intuition that information loss always indicates institutional failure. It distinguishes epistemic identification from procedurally justified decision records.

Legal and professional institutions operate under time, privacy, rights, safety, cost, fairness, and role constraints. A court can exclude information because its use violates a protected relation or creates legally recognized prejudice. An employer can decline intrusive surveillance even when it would improve prediction. A training programme can limit novice exposure to protect learners and affected persons.

The formal inclusion result identifies a loss of source discrimination under deterministic compression. It supplies no normative ranking. Evaluation asks which information was lost, which value justified the restriction, who bore the consequence, which alternatives existed, and which review route remains.

13.8 Measurement Burden and Surveillance

This subsection addresses the cost and intrusiveness of relational-time records. It defines proportionality and data minimization as conditions of application.

An exhaustive encounter history could expose colleagues, communities, clients, political sensitivities, and mistakes. It could reward performative documentation and shift attention from practice to metric management. A responsible design begins with the narrowest target-relevant fields, obtains appropriate legal and ethical authority, protects third parties, limits retention, supports participant correction, and evaluates whether the measurement improves decisions enough to justify its burden.

In many settings, qualitative portfolios, sampled event histories, de-identified role matrices, and structured reflection may be preferable to continuous monitoring. The model is compatible with a decision to collect less.

14 Research Programme and Evidence Gates

This section converts the architecture into a staged research programme. It specifies conceptual, measurement, longitudinal, validation, doctrinal, participatory, and governance gates, followed by revision and abandonment conditions.

Table 12 orders research by dependency. A precise target and an ethically permissible encounter model should precede large-scale data collection. Legal application requires a separate doctrinal gate.

14.1 Longitudinal Formation Study

This subsection specifies a design for testing relational time in one bounded profession. It focuses on opportunity histories, prior capacity, process, target performance, and plausible causal rivals.

Select a profession with observable heterogeneous encounters, feasible follow-up, and willing institutional partners. Define several target judgments through practitioner, supervisor, affected-party, and literature input. Build a parsimonious encounter taxonomy. Measure prior relevant capacity, formal education, language resources, and role history. Follow participants across assignments while recording task classes, role, feedback, repair, and context at intervals proportionate to privacy and burden.

Outcomes should include novel-context performance alongside self-reported confidence. Case simulations can sample rare situations; work-product and decision-reason analysis can add situated evidence; affected-party outcomes can identify consequences. Multiple raters and blinded components may reduce dependence on prestige. Qualitative interviews can test whether the proposed mechanisms resemble practitioners' actual reasoning.

Causal identification remains difficult because assignment is endogenous. A phased rotation policy,

Table 12: Evidence gates for research on institutional translation

Gate	Required work	Advancement condition	Revision signal
Target construction	define competence, use, population, horizon, and rivals	relevant practitioners and affected parties can interpret and contest the target	persistent conflation of standing, performance, and virtue
Encounter model	define classes, roles, feedback, repair, context, and sequence	coding is reliable enough for the declared question and preserves material variation	profile collapses into years or prestige
Formation study	observe allocation, prior state, process, feedback, outcome, transfer, attrition	plausible formation mechanism survives selection and negative-case analysis	exposure association disappears under stronger controls
Assessment validation	document scoring, generalization, extrapolation, use, consequence, and alternatives	inference warrants are empirically supported for the proposed use	one stage relies on institutional reputation alone
Distribution audit	map access, burden, error, benefit, and correction across relevant groups	disparities and institutional causes are publicly addressable under applicable constraints	measurement intensifies exclusion or surveillance
Legal audit	fix jurisdiction, rules, case law, procedure, issue, standard, and review	qualified legal review supports every doctrinal proposition	cross-jurisdiction language obscures material differences
Comparative synthesis	test common operations and explicit disanalogies across cases	shared architecture improves domain-specific questions	comparison produces only generic terminology
Governance review	evaluate authority, privacy, care, rights, appeal, revision, and data retention	design remains proportionate and revisable	affected-party review identifies unacceptable burden or category harm

capacity-constrained assignment lottery, or institutional change may provide quasi-experimental leverage when ethically appropriate. Otherwise, the study should report associations, selection models, sensitivity analysis, and negative cases with conservative language.

14.2 Competence-Inference Validation Study

This subsection applies the record in Equation (14). It compares years, credentials, structured work samples, and relational-time evidence under a declared employment or professional use.

The study first specifies the decision and error costs. It then examines scoring and rater effects for each evidence source, tests generalization across occasions, assesses extrapolation to later performance, and evaluates incremental validity over simpler measures. It should compare subgroups where lawful and ethically justified, examine accessibility, and document missing data and attrition.

Alternative evidence pathways can be tested as institutional interventions. Candidates who lack a conventional years threshold might complete a supervised task sequence or structured simulation. The study can compare predictive performance, candidate burden, cost, adverse effects, and later

learning opportunity. A favorable result would support a bounded alternative. Universal replacement would require broader evidence.

14.3 Organizational Memory and Succession Study

This subsection extends relational time from individuals to organizations. It examines how experience survives turnover, how routines are revised, and how knowledge moves between people and records.

Researchers can trace a limited set of consequential decisions across personnel changes. Evidence includes formal records, handovers, meeting structures, informal consultation networks, dissent, later interpretations, and recurring mistakes. The analysis should distinguish memory persistence, retrieval, enactment, revision, and dependence on specific people. It should also examine whether junior participants receive access to the relations that make the record intelligible.

A robust system may combine written provenance, accessible explanation, overlap periods, mentorship, and review. A fragile system may possess extensive files while losing the practical relations needed to interpret them. Brown and Duguid’s contrast between canonical descriptions and actual practice and Levitt and March’s organizational-memory framework provide starting points [7, 21].

14.4 Doctrinal and Comparative Legal Study

This subsection defines the work required to move beyond the manuscript’s federal-rule illustration. It separates legal research from the general mathematical result.

A doctrinal study should choose one issue, jurisdiction, procedural setting, and time range. It should analyze rule text, amendments, binding and persuasive cases, burdens, standards, remedies, and professional commentary. An experience-based expert-evidence project could examine how courts assess qualification, basis, methodology, application, and claimed certainty under Rule 702. It would need current case law and structured coding reviewed by legal experts.

A comparative project could then examine another jurisdiction or adjudicative system. Damaška’s emphasis on institutional form suggests variables such as party control, judge-jury division, concentration of proceedings, expert appointment, disclosure, and review [9]. The comparison should preserve legal specificity and resist a single universal admissibility pipeline.

14.5 Participatory and Ethical Review

This subsection integrates participant and affected-party knowledge into target construction, data governance, and institutional redesign. Its purpose is to prevent a technically coherent model from becoming an unreviewable professional metric.

Practitioners can identify relevant encounters and tacit task demands. Junior workers can identify inaccessible opportunities and hidden burdens. Supervisors can identify safety constraints. Clients, communities, students, partners, and litigants can identify consequences that professional self-evaluation misses. Their inputs may conflict. The process should record roles, authority, representation, disagreement, and how each input affects design.

Data governance should specify collection, lawful basis, consent where applicable, third-party protection, access, retention, correction, reuse, and deletion. The value of a relational-time measure

may be defeated by its surveillance burden. Ethical review remains continuous because target, context, and institutional power can change.

14.6 Revision and Abandonment Conditions

This subsection states the conditions under which the concept, formal model, or cross-domain paper should be narrowed, revised, or abandoned. The conditions preserve the position paper's provisional status.

Relational time should be revised if practitioners cannot distinguish its dimensions, coding remains unreliable, the profile adds no predictive or explanatory value beyond simpler measures, or the measure invites unacceptable surveillance. The coverage model should remain a teaching example if dependent opportunity models supply materially different guidance. The proxy analysis should be narrowed if exact identification proves irrelevant to the decisions of interest and calibrated probabilistic use resolves the practical problem.

The cross-domain architecture should be abandoned if formation, assessment, and adjudication share only superficial language or if the comparison encourages doctrinal and pedagogical error. The legal module should be suspended when current law and qualified review are unavailable for the intended claim. A specific institutional use should be withdrawn when its burden, access effects, privacy risks, or correction failures exceed its supported value.

The strongest version of the paper's position would gain support if the architecture repeatedly improves target precision, distinguishes causal formation from inference, reveals avoidable proxy error, identifies unequal formative opportunity, and clarifies procedural information choices across several fields. Even then, domain-specific standards retain authority.

15 Conclusion

This section consolidates the paper's philosophical position, formal results, institutional implications, and evidence agenda. It closes by stating the scale of the contribution and its main revision boundary.

Institutions cultivate, read, and authorize situated knowledge. Professional programmes organize encounters and feedback that can change capacity. Employers and licensing bodies infer competence from sampled performance and compressed histories. Courts transform event-related traces through legal categories, evidence rules, standards, and authorized judgment. These operations interact while retaining different objects and warrants.

Relational time names one candidate mechanism of professional formation. It is an ordered history of heterogeneous, feedback-bearing, consequential encounters. Calendar duration can increase opportunities for recurrence and rare situations. Its meaning depends on assignment, role, feedback, context, sequence, and target. The concept therefore supports careful attention to experience while resisting seniority as self-validating authority.

The formal architecture yields four bounded contributions. Noncommutative update operators show how equal-duration histories can produce different terminal competence. The independent encounter model supplies a transparent coverage bound and displays the strength of its assumptions. The proxy-fibre result shows why a credential or duration category cannot exactly recover target

competence when its fibre contains different values. The evidentiary fibre inclusion shows why deterministic downstream classification cannot add source discrimination without further evidence.

These results create obligations for inquiry. Direct institutional verdicts require further empirical, normative, and jurisdictional warrants. A formation claim needs process and transfer evidence. A competence decision needs an interpretation-and-use argument. An adjudicative finding needs jurisdiction, law, procedure, standard, reasons, and review. Each operation also raises participation, contestability, correction, rights, care, and distribution questions.

The immediate practical proposal is an auditable translation record proportionate to consequence. Such a record states the target, source and selection process, inference chain, authority, uncertainty, affected-party standing, correction route, and distributional effects. It can support a teacher practicum, an employment assessment, an organizational handover, or an evidentiary analysis while remaining adapted to each field.

Future work should test relational-time profiles longitudinally, compare credential and performance evidence, examine unequal access to formative encounters, study organizational memory through turnover, and conduct jurisdiction-specific legal research. The architecture should contract wherever established domain concepts already perform the work more precisely. Its value lies in clarifying how experience becomes capacity, evidence, category, and judgment while keeping those transformations open to evidence and revision.

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