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# Focal-Relative Epistemic Functions in Engineering Design: Reconfiguring Knowledge Across Interconnected Design Contexts

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## Abstract

Designing for transitions involves reorganizing activities while considering what should be preserved. The same engineering activity can support different judgments within one person's or organization's work or across stakeholders. The methodological challenge is to identify what to retain, adjust, or investigate, and which judgments require reconsideration. Recording only an accepted plan may omit why it supports a particular judgment, while retaining all information can obscure the relevant grounds. This paper develops a non-reductive approach based on focal-relative epistemic functions: contributions of models, information, and activities to inquiry and judgment from a specified standpoint and purpose. Three linked operations identify native models and functional relations to formulate tasks, compose and assess a joint activity plan, and use results or changed conditions to specify focal model revisions and subsequent tasks. A constructed medical drone-delivery case and a secondary application to published industrial practice examine this process. The analysis motivates four conditional requirements for its application: clarify epistemic functions and their grounds at each focus; preserve their distinct meanings and evaluation grounds across foci; justify adjustments and their review scope through functional dependencies; and maintain focal revision histories that distinguish completion from changes to purposes, methods, or assessment conditions. The process and requirements together specify how to examine proposed adjustments while retaining the original models' concepts, relationships, and evaluation methods. The contribution is this methodological specification, not exclusive access to candidate designs. Incremental practical benefit requires independent evaluation.


## 1 Introduction

Design for transitions concerns how to transform technical systems and collective activities while preserving valued capabilities and resources. Creative preservation treats preservation as a design problem rather than the simple retention of existing solutions (Le Masson et al. 2026). The Problem/Product, Social and Institutional spaces (PSI) network model likewise treats products and the social and institutional arrangements involved in their development as simultaneous design concerns (Reich and Subrahmanian 2025). These perspectives motivate a practical question: how can we identify what to retain or change in an activity in relation to the different purposes it is intended to support?

Such activities are understood and evaluated through models serving different purposes. Wynn and Clarkson (2018) locate understanding of design and development in a body of models and their relationships rather than one comprehensive model. Parker (2020) relates a model's adequacy for purpose to its target, user, methodology, and circumstances. In such model-mediated work, the same engineering activity can support different business, technical, and operational judgments, within one person's or organization's work as well as across stakeholders. Changing how that activity is performed may affect these judgments differently: what provides adequate support for one judgment may not do so for another.

Existing research provides capabilities for examining such changes. Wynn and Maier (2022) connect feedback with goal seeking, learning, and emergence, including revision of goals, situation models, and decision heuristics. Brinkmann and Wynn (2025a) assess information maturity relative to context and consumer, including understanding the gap to a sufficient state and the problems to solve in reaching it. Building on these capabilities, the methodological question is how to combine the design and inquiry work needed for adjustments into one joint activity plan and identify which inquiries and judgments in the original models require reconsideration. This includes distinguishing the part directly adjusted from other work and judgments that depend on it.

Reconsidering these adjustments when results or conditions change also requires access to their reasons. Recording only an accepted plan need not preserve why an activity was expected to support a particular judgment. Retaining all available information, however, can obscure the material relevant to subsequent decisions (Ahmed-Kristensen and Vianello 2015). The accompanying question is therefore which relations among activities, purposes, conditions, evidence, and decisions need to remain accessible, directly or through source references, to support later reconsideration of these adjustments and their implications.

These considerations lead to three research questions.

**RQ1**

How can we identify what to retain or change in an engineering activity in relation to the different purposes and judgments it is intended to support?

**RQ2**

How can the design and inquiry work needed for these adjustments be combined into one joint activity plan, while identifying which inquiries and judgments in the original models require reconsideration?

**RQ3**

Which relations among activities, purposes, conditions, evidence, and decisions need to remain accessible to support later reconsideration of these adjustments and their implications?

To address these questions, this paper develops a non-reductive procedure based on Epistemic Function Diagnosis (EFD), introduced in an earlier preprint (Matsuhashi 2026). An epistemic function is the contribution a model, information record, or activity makes to inquiry and judgment in a specified context (Boon and Knuuttila 2009; Eckert and Hillerbrand 2018). A focus identifies what is being examined, from whose standpoint, and for what purpose. Where needed, the analysis can change the target or standpoint while retaining the relation to the earlier inquiry and judgment. Models used within particular practices are termed native models and are considered together with their concepts, represented relationships, assumptions, and evaluation conventions. The analysis retains these models in their own contexts rather than replacing them with one common representation.

The procedure links three operations. It identifies the native models and focal contexts, examines what supports each inquiry or judgment, and specifies contributions to retain, matters to reconsider, and the required design or inquiry tasks. It combines these tasks into a joint activity plan assessed from the relevant foci. Planned activities provide results when carried out under the required authorizations and conditions; planning findings and changed conditions can also prompt reconsideration before implementation. The procedure then compares these inputs with the plan and its assumptions, records reasoned retention, revision proposals, or unresolved judgments in the original model contexts, and specifies subsequent tasks. These accounts support the next cycle without requiring every model to be reconstructed.

The process is examined using a constructed medical drone-delivery case, analytical contrasts, and a secondary application to published industrial practice. In the constructed case, observation procedures can be adjusted while retaining the engineering department's route from field records to design revisions; changes to support allocation instead reopen dependent duties, resources, and judgments. The analysis motivates four conditional requirements for applying the process: clarity of focal epistemic functions and grounds; non-reductive preservation across foci; function-based justification of adjustments and their review scope; and focal revision histories distinguishing completion from change. The contribution is the process together with these requirements: a specification of the work to perform and the distinctions needed to examine its reasoning. Incremental practical benefit requires independent evaluation.

Section 2 positions the approach; Section 3 explains the study design; and Section 4 specifies the method. Section 5 follows the constructed case from its initial situation to model-specific revision proposals. Section 6 first examines those proposals and then applies the method to a published industrial example before answering RQ1–RQ3. Sections <link rid="Sec28">7</link>–8 discuss the research implications and conclude.

## 2 Theoretical positioning

# 2.1 Models, epistemic functions, and focal contexts

Model adequacy depends on the target, user, methodology, and circumstances of use (Parker 2020). The present method asks how a model contributes to a specified inquiry or judgment and what further design work is required to act on its results. A

useful engineering result can leave that subsequent work unresolved.

Information maturity and epistemic function provide overlapping, complementary questions. Brinkmann and Wynn (2025a) assess maturity relative to context and consumer, including understanding the gap to a sufficient state, whether that state may change, and the problems to solve in reaching it. Their practical approach also supports assessment and communication of preliminary information (Brinkmann and Wynn 2025b). Maturity is therefore not limited to completeness for a fixed use. Functional diagnosis asks what an activity must provide for a judgment and what design or inquiry is needed where that contribution is unsupported. Assigning information a different role does not make its content more certain; maturity assessment can inform this diagnosis without being replaced by it.

The earlier EFD proposal distinguishes the contribution of a method within a project from the reasoning performed inside that method; diagnosis can examine records directly or use an established framework (Matsuhashi 2026). This study develops that focal-relative diagnosis into a process linking native-model identification and task formulation, joint work planning, and reasoned model revisions and subsequent tasks.

Here, the models' own concepts, relationships, assumptions, records, and evaluation methods remain available when their focal contributions are examined. A focal record identifies the contribution, its grounds, and the original judgment receiving subsequent results; it does not reconstruct the model. Native denotes the context of use, not a file format or an assurance of validity. A model may support several foci, and a focus may draw on several models; neither exclusive ownership nor unchanged content is implied. Section 4 explains the diagnostic concepts and operations needed here without requiring a separate classification vocabulary. The preprint is neither required reading nor independently validated evidence for the present method.

## 2.2 Preservation and the formulation of design tasks

Concept–knowledge (C-K) theory addresses exploration through the interplay of concept and knowledge spaces (Hatchuel and Weil 2009). A task formulated through functional diagnosis may call for such exploration, but specifying its required output and the judgment that will use it does not replace that exploration or demonstrate the generation of a new concept.

Creative preservation distinguishes preserving a capability from retaining its current realization, and includes inquiry into what is to be preserved (Le Masson et al. 2026). Retention can therefore require new methods or support conditions. This motivates examining what an activity must continue to provide and what needs redesign; the present study neither fixes all purposes in advance nor verifies the formal C-K/Topos account.

## 2.3 Coordination without methodological uniformity

The PSI network model treats problem/product, social, and institutional spaces as interdependent, including recursive contexts and the return of project knowledge to organizations (Reich and Subrahmanian 2025). It supports considering participation and responsibilities together with technical design. Here, part–whole relations, organizational authority, and dependence of a judgment on a model or activity are distinguished: examining participation from another focus does not subordinate that actor's purposes to the initiating project.

Cooperation can preserve different meanings and interests rather than require complete agreement (Star and Griesemer 1989; Donnellon et al. 1986; Kellogg et al. 2006). Common terminology alone does not resolve those differences (Carlile 2004). The question here is which operational details must be settled for a particular joint activity, which interpretations can coexist, and how unresolved or unrepresented concerns can be reconsidered.

The aspect of agency considered here concerns the extent to which participants can maintain or revise their inquiry and practice at a particular focus in accordance with their own intentions, while relying on others' knowledge, work, and support. This scope need not be uniform across the foci of the same person or organization. The procedure is intended to support those inquiries and return results to the participants' own judgments, not merely describe their standpoints.

## 2.4 Adjacent methods and the contribution boundary

Questions, Options, and Criteria (QOC) supports the articulation of design spaces and can lead from options to further questions (MacLean et al. 1991). Enhanced function-means modeling (EF-M) supports alternative realizations and design space exploration (Müller et al. 2019). Soft systems methodology and multimethodology make multiple perspectives and methods resources for inquiry (Checkland and Poulter 2010; Mingers and Brocklesby 1997). Asking another question, separating function and realization, or combining methods is therefore not an isolated novelty claimed here.

Concise rationale capture already raises the problem of retaining evidence needed for future decisions (Mirabito et al. 2024). The present study therefore does not claim to originate rationale retention; it examines which retained relations connect a proposed activity adjustment to different judgments and subsequent work.

Change-propagation analysis connects design domains, assesses impacts, generates responses, and supports change decisions (Brahma and Wynn 2023). Ahmad et al. (2013) also connect requirements, functions, components, and the redesign process through dynamic checklists. These capabilities extend beyond tracing physical effects or affected parts and can already supply relations between a proposed response, its grounds, and further redesign.

Feedback System Function Structure ($FS^2$) relates goal seeking, learning, and emergence, including revision of goals, situation models, and decision heuristics (Wynn and Maier 2022). It identifies interpreting functions in specific situations and developing a structured application process as opportunities for further work. The present operations are not derived from $FS^2$ and do not assume a one-to-one correspondence with its functions.

The unit examined here comprises a proposal to change or preserve a shared activity, the inquiries and judgments it must support in each native model, their grounds, and the further work whose results would inform them. The contribution is a process and requirements for examining these relations, not exclusive representational capacity. Section 6.1 compares the resulting judgments with equally informed rationale analysis. Existing methods that already make the relevant functions, grounds, adjustments, and revisions explicit need not add a duplicate record.

## 3 Research approach

# 3.1 Design of the conceptual study

This study combines method construction, a constructed case, analytical contrasts, and tabulated calculations. Its unit is a linked episode: identifying native models and their focal functions; forming adjustment and inquiry tasks; planning joint work; and using the available results or changed conditions to specify model revisions and further tasks. The analysis asks whether unsettled judgments can be connected to specified tasks, expected outputs, and the decisions that would use them. It reports no new field study or controlled user comparison.

The medical drone-delivery setting, five participant-specific native models, the shared trial agreement and plans, initial outcome, and alternative branches are author-constructed premises, not practitioner-supplied records or elicited accounts. Section 5.1 introduces the setting before analysis; Section 5.5 separately introduces the capability and support assumptions used for the conditional comparison.

Truog et al. (2020, Sections 3.3–3.5 and 4.2) inform attention to staff workload, turnover, and local participation. Martin and Kadura (2019, pp. 6–8 and 12–14) inform distinctions between capacity building, handover, clinical schedules, and flight conditions. Dzisi Jr et al. (2026, abstract) inform the boundary between logistical benefits and sustainability. These sources do not report the expert interventions or capability outcomes constructed below.

Supplied premises, functional interpretations, proposed tasks and revisions, additional assumptions, and calculated consequences are kept distinct. Missing purposes, supporting arrangements, or results are not invented to complete an account, and known options are not counted as discoveries. The same-material comparison uses identical premises, assumptions, and candidates. Method, case, and comparison were developed iteratively by the same analyst; their correspondence is not independent validation.

The exposition first specifies the three operations, then examines their use in the case and argues for four requirements in Section 6.2. The operations identify the work and its connections; the requirements concern distinctions that must remain examinable when that work is performed. For each consequential judgment, the analysis states the premises, identifies what cannot be concluded from them alone, and shows which distinction or relationship is needed to justify the interpretation, adjustment, or revision. The normative step is explicit: a method intended to support such reasoning should preserve those distinctions and grounds. This is an analytical argument about the stated class of design and revision episodes, not inductive generalization from sampled projects. The process, requirements, and case were developed iteratively; their correspondence is neither independent validation nor proof of a uniquely minimal set.

Section 6.3 applies the operations to testing practice reported by Tahera et al. (2019). Reported practice constrains this reconstruction; interpretations and proposed work are identified separately. This adds material not constructed for the method, but neither new fieldwork nor an independent practitioner evaluation.

## 3.2 Evidence and evaluation boundaries

Table 1 relates each material to the claim it can support (Frey et al. 2010). The conditional calculations check the consequences of stipulated capabilities, role conditions, and support policies; they do not establish those premises or the reliability of functional diagnosis. The four requirements are argued from distinctions needed to examine the case's interpretations, adjustments, and revisions, not inferred from calculation counts.

Table 1
Materials, analytical roles, and warranted inferences

| Material | Analytical role | Inference boundary |
|---|---|---|
| Constructed case premises; five participant-specific native models and the shared trial agreement | Trace the original records and proposed changes to their model relations. | Synthetic premises and analyst-created models, not participant testimony. |
| Capability, role, and support assumptions in Section 5.5 | Specify a conditional comparison of three support policies under three stipulated task situations. | Assumed capabilities, role boundaries, and support conditions, not measured performance, an established task classification, or field approval. |
| Worked sequence of the proposed operations and matched QOC analysis | Examine source interpretation, joint planning, and revision proposals for original model decisions. | Same analyst; no demonstrated performance advantage. |
| Planning and conditional-reasoning tables | Expose the declared task and support conditions and their conditional consequences. | Not diagnostic reliability, physical validation, or authorization. |
| Published engine-testing account | Apply the operations to reported practices after the constructed analysis. | Reported practice constrains the comparison brief; it supplies neither missing technical criteria nor independent evaluation of the method. |

Sections 4–6 provide the definitions, premises, results, and reasoning needed for the main argument. Section 5.5 states the task and support assumptions for Table 8 and develops subsequent inquiries; Section 5.6 shows the model revision proposals and the work they carry forward. Source locations for the published application are given in Section 6.3.

## 3.3 Generative-AI assistance and scope of reproducibility

ChatGPT assisted the iterative construction of the synthetic case and analytical records, critical examination of the method, drafting, translation, and computational preparation. Stakeholder descriptions generated by artificial intelligence (AI) were treated as hypotheses within the constructed case, not as elicited participant accounts or independent assessments. Suggested interpretations and designs were revised against the declared case premises. The exact model backend and sampling settings were not recorded; therefore, these dialogues are not reported as a reproducible experiment on large language model performance.

Functional interpretations, tasks, dependency meanings, and model revisions are analyst-supplied, not automatically generated by the conditional calculations. The consequences in Table 8 can be checked against the capability, role, intervention-order, and response-availability assumptions stated in Section 5.5. Checking those consequences does not reproduce or validate the interpretive work of the whole method.

## 4 A non-reductive process for diagnosis, planning, and model revision

Section 4.1 defines focal contexts and functional diagnosis. Sections 4.2–4.4 specify diagnosis and task formulation (O1), joint activity planning (O2), and focal model revisions and subsequent tasks (O3). Identification of native models and functional relations is part of O1; reasoned retention, revision proposals, and unresolved judgments are outcomes of O3. Figure 1 locates practical implementation and result collection in relation to these analytical operations, and Table 2 summarizes their inputs and outputs. Section 5 applies the process, and Section 6.2 develops requirements on the reasoning involved in its use.

# 4.1 Focal contexts and functional diagnosis

A focal context specifies a target of inquiry or design, a stakeholder standpoint, the purpose of the inquiry, an analytical boundary, and the relevant conditions and time. This purpose states what is to be understood or achieved; it need not be a fixed corporate objective. A focal context may also be jointly held by several participants with respect to an agreed activity and its conditions, while each participant retains other foci with distinct purposes and evaluation grounds. A person or organization may have several foci; identifying that person or organization, or stating a purpose alone, does not specify the focal context. Where the inquiry requires a different target or standpoint, refocusing retains a traceable relation to the previous inquiry and its model. Such reconsideration can occur within O1; changing focus is not a prerequisite for every task. These contexts may be nested, overlap, or connect because participants share an activity or use the same model for different judgments; they need not share a hierarchy or a single interpretation. An activity can itself become a design target without changing the stakeholder; alternatively, a participant's involvement can be examined from the standpoint of that participant's own work without subordinating its purposes to the initiating activity. Changing focus is not merely describing the same task at a finer granularity.

An activity supporting a broader objective can itself become a design target. Clarifying what that activity must accomplish does not change the broader objective; a proposal to change the latter must be recorded separately. The original relation remains available for assessing the redesigned activity.

An epistemic function is what a model, record, requirement, activity, or instrument contributes, or is expected to contribute, to the inquiry or judgment at a focal context. Its content and evidential status remain distinct from that contribution; attributing a different function does not create new evidence (Brinkmann and Wynn 2025a). Functional diagnosis examines that contribution in relation to its purpose, supporting reasons and arrangements, concrete realization, and the evidence used to assess it. Operational contributions are examined in relation to the inquiries and judgments they enable or constrain, and to the grounds their conditions and results provide; practical completion alone does not establish support for every relevant judgment.

The same activity can perform different functions at different foci. A contribution may remain needed even when its current implementation is reconsidered, and an expected contribution need not have been achieved. Interpretations may be multiple, provisional, or unresolved; they are tied to the particular inquiry and its dependencies, not assigned permanently from the artifact's name.

Functional diagnosis is an argued interpretation, not automatic classification. For an interpretation affecting a design or revision decision, retain the source wording and original relationships, state the intended contribution and available evidence of actual use, consider a competing interpretation, and identify the evidence or responsible actor's judgment that could distinguish them. Mandatory acts constrain alternatives; silence does not establish replaceability. Conflicting or absent

support remains unresolved. Initial interpretations and proposed arrangements are kept separate. The analysis does not fill gaps with invented purposes or results, reconstruct unspoken knowledge, or require exhaustive description of every possible function.

Diagnosis distinguishes the part directly adjusted from dependent work and judgments requiring review. An implementation method may change while the required contribution and its supporting grounds remain intact. Changing the capability, allocation, or rationale on which that contribution depends instead reopens its implementations; changing evaluation grounds may require different observations. This is conditional on the focal dependencies, not a fixed hierarchy. A local result can challenge a purpose or supporting assumption, and an adjustment local to one focus can affect a necessary condition at another. Review need not result in revision.

A non-reductive description supplements the original models rather than replacing their concepts, relationships, or evaluation methods. The same model, record, or activity can be interpreted differently at different foci, and uncertainty in those interpretations remains visible. A dependency during execution, a reason supporting a claim, and a relation through which evaluation prompts revision are not the same causal link. Explicit representation does not exhaust the knowing enacted in practice (Tsoukas and Vladimirou 2001). Functional diagnosis neither reconstructs another person's tacit knowledge nor requires participants to verbalize all their understanding or consciously deliberate on every aspect of their practice. Figure 1 includes this diagnosis within O1 and the reasoned treatment of original model judgments within O3.

A return specifies how a result, changed condition, or planning finding bears on a judgment in an original model. It names the relevant model and record and states what is retained, proposed for revision, or left unresolved, with reasons. It is not a reconstruction of that model from a focal summary: the original model and its reasoning remain available throughout. A relationship in that model can remain unchanged while its use as a basis for a particular judgment is reconsidered. A concise focal record can refer to the original entry, version, and rationale rather than copying them; an unavailable reference must remain a visible gap.

A focal implication record links one candidate plan and version to each affected judgment, its purpose and grounds, the proposed adjustment, and the original decision receiving its results. It distinguishes the direct adjustment from the dependent work and judgments requiring review. Section 4.4 and Table 2 specify how to record this reasoning.

## 4.2 O1: Functional diagnosis and formulation of design or inquiry tasks

O1 comprises three connected activities: identify the native models and focal contexts, model their epistemic functions and dependencies, and clarify what to retain or reconsider as design or inquiry tasks. It begins with available models, records, or activities and a reason for examination, such as a changed condition, an unsupported judgment, or a proposed alternative. The analyst identifies the relevant entries, versions, purposes, and evaluation conventions, together with the original judgments to which later findings will return. A concise account may refer to these sources; it does not replace their concepts or reasoning.

Functional modeling makes explicit what information, activity, or capability supports which inquiry or judgment, under what grounds and conditions. It distinguishes each focus's purpose, supporting pathway and means, and implementation methods. Supporting pathways and means describe how a purpose is expected to be served and the capabilities and arrangements on which that expectation depends; implementation methods specify how those means are put into practice. O1 examines both, including dependencies on other foci. Expected contributions remain distinct from established results, and conflicting or absent support remains visible. The relations may be expressed in the native records or in a concise linked description; no separate classification scheme or complete reconstruction of the models is required.

To clarify possible adjustments, the analyst can ask what required contribution would be lost if a current implementation method or artifact were changed or provisionally removed, for which focus, and on what grounds. This is a reasoning prompt, not an instruction to remove a functioning component. It identifies contributions to retain, implementations to reconsider, and conditions or dependencies needing inquiry; it does not establish that the proposed change is feasible or authorized.

Mandatory acts and refused permission constrain the alternatives. A proposed change to such a requirement is recorded for the responsible actor's decision, not treated as an available design freedom.

The current focus may suffice. Where a different target or standpoint is needed, O1 can treat an existing activity as a design target or examine participation in relation to a participant's own work, retaining the relation to the earlier inquiry. This does not automatically change the broader objective or confer authority over another participant. Section 5 examines how the agreed trial should be designed while retaining its relations to the shared agreement and the participant-specific accounts. Hypothesized standpoints remain distinct from documented or elicited commitments.

O1 outputs a source-linked account of focal functions, contributions to retain, possible adjustment targets, and unresolved conditions, together with proposed design or inquiry tasks. Each task states the work needed, its expected output, and the original judgment that would use it. Retaining or locally repairing the current method remains possible. O2 composes and assesses concrete arrangements; identifying an adjustment target in O1 does not establish that any particular arrangement will suffice. Neither these prompts nor the functional account exhaust possible designs or select a specialist method automatically.

## 4.3 O2: Composition of a joint activity plan

O2 asks whether the proposed design and inquiry tasks can be carried out through one joint activity plan. Proposals acceptable from separate standpoints may assume different technical configurations, time windows, or participants. O2 therefore specifies activities, timing, outputs, and responsibilities as one shared candidate plan for assessment. Purposes and evaluation methods may still differ; a common worldview is not required. Let D be the current set of complete candidate activity plans, F the set of foci relevant to the joint activity, and Af(d) the assessment of the same plan d against the provisional requirements associated with focus f. The distinction is:

$$(\forall\, f \in F, \exists\, d \in D : A_f(d) = Y) \not\Rightarrow (\exists\, d \in D, \forall\, f \in F : A_f(d) = Y)$$

1

The existence of a suitable plan for each focus does not entail one plan suitable for all foci; Y means that only the represented requirements are satisfied.

Equation (1) concerns the same plan, including its configuration, timing, resources, and handovers. For example, {α,β}, {β,γ}, and {α,γ} intersect pairwise but have no common member. O2 yields a plan satisfying the represented conditions, an incompatibility requiring redesign, or an unresolved condition requiring inquiry. Unknown conditions are not satisfied. Identify who would perform the work and which judgments would use its outputs; unrepresented standpoints require examination rather than assumed agreement.

Satisfaction of planning conditions is distinct from authorization to implement: the latter requires the responsible actors' permissions and acceptance and the relevant technical evidence. Including an evaluation in a plan does not establish its result. A refusal remains a refusal, not a low-weight preference. Participants must be able to correct the analyst's account of their purposes or reject a proposal without that response being treated as method failure.

If no candidate satisfies the represented requirements of the different foci, O2 does not automatically demand compromise or declare the project impossible. The set D can be expanded by designing a different activity plan—for example, separating or combining activities, reallocating functions among people and artifacts, or changing how information is obtained. The reasons supporting each focus's requirements guide what the new plan needs to achieve. If the requirements themselves are reconsidered, the proposed change is recorded separately for decision by the responsible actor. Joint assessment is restricted to the present activity and provisional commitments; it is not a demand to satisfy every actor's entire set of aspirations. Section 5 illustrates such alternatives through expert-supported delivery, support reduction, and assessment exercises separate from actual delivery work.

A bounded calculation may support a particular task without becoming an exhaustive model of the project. Its results support only judgments warranted by its assumptions. The focal record retains the relevant purposes, interpretations, and receiving decisions when that calculation is reconsidered; non-reduction does not prohibit task-specific abstraction.

O2 passes forward the candidate plan or planning assessment, its assumptions, intended observations, and unresolved conditions. Where the required authorizations, participation, and resources are secured, planned activities can be carried out in practice or through simulation, with the results and their conditions recorded for O3. This includes delivery, observation, testing, or analysis as appropriate to the plan; it is not a fourth analytical operation. Simulation outputs remain conditional on their model assumptions and are not observations of physical implementation. Planning findings or changed conditions may also enter O3 without new activity execution.

## 4.4 O3: Specification of focal model revisions and subsequent tasks

O3 takes the plan, focal functional relations, assumptions, intended checks, and unresolved judgments from O1–O2, together with available results, changed conditions, or objections. It compares what was expected with what is supported, including differences in implementation conditions and observations that were not obtained. Even an expected result need not support every focal judgment. Functional dependencies identify the inquiries and judgments to review and the native-model entries to which the response should return.

O3 records a reasoned response in the shared plan or relevant native-model account: retain the account, specify a revision proposal, or hold the judgment unresolved. It makes the correspondence between earlier and proposed accounts traceable, including their grounds and conditions, and distinguishes completion from changes to purposes, supporting means, implementation methods, or evaluation conditions. These responses are outcomes of O3, not a subsequent operation. Specifying a revision does not establish its adoption by the responsible participants or its implementation. Where grounds remain missing, O3 also identifies the subsequent work, expected output, and judgment to be informed.

Recorded dependencies identify judgments to check, not mandatory revisions; checking a dependency does not require rewriting every linked model. An absent link means an influence is unrepresented unless its absence has been examined; cyclic dependencies and contested interpretations may remain unresolved. Missing criteria call for inquiry rather than invented thresholds.

When further inquiry is needed, O3's retained accounts, revision proposals, and unresolved tasks return to O1. The next cycle reuses the original models and examines the affected functions rather than restarting every diagnosis. Planning incompatibilities as well as new results can motivate this return. Figure 1 shows these principal handoffs, not every possible sequence of work. An episode may close provisionally when its model responses, any next work and receiving judgments, and outstanding implementation or evaluation conditions are examinable, with no further reconsideration justified for the present decision. This is not a convergence guarantee: new results or previously unrepresented perspectives can reopen the inquiry.

Table 2
Inputs and outputs of the three operations

| Operation | Input | Output |
|---|---|---|
| O1: diagnose functions and formulate tasks | Available native models, records or activities; relevant participants and context; a reason for examination or unresolved tasks from O3. | Identified native-model references and foci; functional relations and grounds; contributions to retain; possible adjustment targets and unresolved conditions; tasks, expected outputs, and receiving judgments. |
| O2: compose and assess a joint activity plan | O1's focal accounts and tasks; candidate activities, timing, responsibilities and resources; criteria and conditions for the relevant judgments. | One plan or candidate assessment with assumptions, planned checks and their uses; represented conditions satisfied, incompatible or unresolved; outstanding work. Authorization to implement remains distinct. |
| O3: specify focal model revisions and subsequent tasks | O1–O2 accounts, plan, assumptions, expected observations and open judgments; available results with their conditions, planning findings, changed conditions or objections. | Reasons for retention, revision proposals or holds in the shared plan and native models; traceable before-and-proposed-after accounts; subsequent tasks and expected outputs; conditions for review and return to O1. |

Table 2 specifies the process inputs and outputs. Section 6.2 uses the case to argue for requirements on how epistemic functions, adjustments, and revisions are treated when carrying out that process. The requirements are not additional process stages or compulsory record fields.

Throughout the cycle, distinguish action differences that must be resolved for the shared plan from interpretations that can coexist. Keep a route for unrepresented concerns to be raised. The focal record supplements native artifacts and does not supply authority, specialist evidence, or participants' judgments.

# 5 A worked example: from a business task to trial design and model revision

## 5.1 Case background, participants, and the initial design situation

The setting is a region where roads and other transport infrastructure are underdeveloped, and reliable access to medical supplies is a local healthcare problem. An international aid organization funds a project to examine whether delivery drones can address this problem while developing local capabilities and creating employment. Five participant-specific standpoints are distinguished: the drone manufacturer's engineering department, the drone manufacturer's business department, local healthcare personnel, the international aid organization, and local staff. Both departments belong to the same manufacturer. Local staff are adults undertaking paid training and delivery work. Existing stocks and transport remain available. All agree to trial drone deliveries alongside local training, with the engineering department's experts intervening in exceptions.

The engineering department seeks improvements to aircraft, systems, interfaces, and support procedures. The business department seeks evidence for deployment without a resident expert at every location. Local healthcare personnel need supply during the trial. The international aid organization seeks to assess the combined contribution to supply, local capabilities and employment, and to decide subsequent support and funding allocation. Local staff seek skills and remuneration without accepting all unfamiliar exception responsibilities. Their native accounts are a development plan, a deployment hypothesis, supply procedures, a funding and outcome-assessment plan, and work and participation conditions.

Initial funding covers the supported trial and paid local training and delivery work. The amount, allocation by cost category, additional funding, and post-trial payers are unspecified. Agreement to participate does not establish identical purposes, outcome judgments, or consent to every future duty. The initial outcome is supplied in Section 5.4; Sections 5.2–5.3 form candidates using only earlier purposes and conditions.

## 5.2 Initial O1: diagnosing focal functions and forming trial-design tasks

O1 first identifies the five native accounts described in Section 5.1 and the shared trial agreement as its sources and return points. The agreement establishes a project-level focus jointly held by the participants: carrying out drone deliveries alongside local training under the agreed expert-intervention arrangement. Table 3 places this shared focus before the five participant-specific foci. Its reference and revision target are the shared trial agreement and plan, not a sixth participant or a replacement for the five native accounts.

Table 3
Shared-project and participant-specific foci, and the design tasks they open

| Focus | Purpose | Supporting pathway and means | Design or inquiry opened by O1 |
|---|---|---|---|
| Project as a whole: the jointly agreed trial | Carry out a trial combining drone delivery and local training. | Combine expert-supported drone delivery with paid local training and work so that supply and learning can be pursued together under the initial agreement. | Design a trial plan combining delivery, training, response, and observation, with compatible duties, timing, and resources across foci. |
| Drone manufacturer's engineering department | Improve the aircraft/system, interface, and support procedures. | Use field observations as grounds for candidate design changes, and rechecking to assess those candidates before treating them as improvements. | Design observations and comparisons distinguishing system state, staff response, and expert intervention under matched versions and conditions, to assess equipment, procedures, or role boundaries. |
| Drone manufacturer's business department | Develop a continuing delivery service and obtain grounds for deployment decisions. | Use supported-trial evidence to examine provision without resident experts through a combination of transferable local work and continuing specialist support. Work allocation, recurring costs, and payers remain unresolved. | Distinguish non-residence from no expert response; design a provision pathway linking local duties, support, and costs, and the assessment needed to judge it. |
| Local healthcare personnel | Maintain the supply needed for care during the trial. | Protect required supply by combining drone delivery with existing stocks and transport and specialist exception response. | Design observation of staff's first response with supply protected; identify when this is possible within delivery and when assessment exercises separate from delivery work are needed. |
| International aid organization | Assess whether healthcare contribution, local capability building, and employment can be combined; judge subsequent support. | Use funded drone introduction and paid work to examine supply, capability building, and employment together. Relate evidence of these contributions and recurring burdens to subsequent-support judgments. | Specify outcome checks, evidence-producing activities, and funding allocation needed to assess the combined aims. |
| Local staff | Gain skills and pay with acceptable duties and time. | Combine paid work with expert-supported learning within acceptable duties and escalation boundaries. Initial participation does not settle acceptance of future exception duties. | Specify paid opportunities for first judgment, response support, duties, remuneration, time, and personal participation conditions. |

Table 3 identifies each focus's purpose and the pathway and means expected to support it. To form tasks, O1 examines those means together with their current implementation methods, including how expert support is provided. Expert response is a supporting means for protecting supply; acting before local staff can respond is an implementation method that can limit capability assessment. Retaining response capability therefore need not fix intervention order. Nor does intervention alone establish that local staff would have failed. These distinctions identify contributions to retain, adjustment targets, and tasks for designing observation, support, and duties.

For engineering, changing intervention order adjusts an implementation method for obtaining observations while retaining the supporting means of using field evidence to develop design changes and recheck them. Healthcare must nevertheless check whether that timing preserves the expert response on which its supply-protection means depend. Removing the responder is different: the means of protecting supply and allocating exception work would themselves need redesign, followed by review of the procedures and resources that implement them. The same activity change thus has different review scopes at different foci.

At the shared project focus, observation and support changes must be reconciled in the trial plan; they depend on funded work and local participation. Paid time and expert capacity must be allocated to the evidence needed by engineering, business, healthcare, and aid judgments; local staff must be able to assess the associated duties, pay, time, and escalation support. Neither free time, additional funding, nor willingness to undertake new duties follows from capability evidence.

O1 therefore opens three connected tasks: specify transferable duties, support, and costs; design observation that protects supply; and determine what the results must establish for each judgment. These are inputs to the shared trial-design task, not six separate activities. O2 combines the work into one plan while retaining the judgments served at each focus.

## 5.3 Initial O2: composing and checking the first trial plan

Table 4
Three candidate joint activities

| Candidate | Activity outline | Conditions and limitations |
|---|---|---|
| Integrated supported trial | Experts handle exceptions promptly, and local staff perform routine work and learn alongside them. | Supports supply and developmental learning and provides limited evidence of independent exception handling. A staff-first variant retains expert responses, subject to the observations and supply conditions below. |
| Early support reduction | A candidate without resident expertise or a responding expert service, in which local processing or escalation is observed. | Capability for the exception-handling work and the response pathway remain unresolved. Assessed only in non-clinical replay here. |
| Supported delivery with assessment exercises separate from delivery work | Supply support is retained while paid exercises distinct from actual delivery provide tasks in which local staff respond first and escalate to an expert when needed. | Requires tasks representative of the work being assessed and feasible allocation of paid time and expert capacity across delivery and exercises. |

Table 4 outlines candidate implementation arrangements. Table 5 relates them to the purposes and supporting pathways and means in Table 3, distinguishing changes to how the retained means are implemented from proposals that reconsider the means themselves. It also identifies the dependent conditions and judgments requiring review. Available time, expert capacity, funding, and participation remain to be assessed. The comparison concerns suitability for inquiry, not deployment approval.

Table 5
Adjustments and review scope for the same candidate activities

| Focus | Integrated supported trial | Early support reduction | Supported delivery with assessment exercises separate from delivery work |
|---|---|---|---|
| Project as a whole: the jointly agreed trial | Retain the delivery-and-training purpose and means combining paid local work with expert response. A staff-first variant adjusts intervention timing; check supply protection and response availability in the shared plan. | Retain the trial purpose, but removing the responder changes part of its agreed supporting means. Redesign response and duties before live use; unsupported replay is not the agreed operational trial. | Retain delivery and training through expert-supported paid work. Reorganize supply and assessment activities as their implementation, reconciling paid time, expert capacity, duties, and funding; adoption remains unresolved. |
| Drone manufacturer's engineering department | Retain the improvement purpose and observation–design-change–recheck means. Adjust observation and intervention as implementation methods to record local first responses with supply protected; compare equipment, procedure, and role explanations. | Retain the improvement purpose and observation-based inquiry. Restrict unsupported observation to non-clinical replay; removing the responder establishes neither supply protection nor the adequacy of this implementation method. | Retain the purpose and observation–design-change–recheck means. Design staff-first exercises and records as implementation methods; check representative tasks and expert time before using the comparison. |
| Drone manufacturer's business department | Retain continuing provision as the purpose and supported-trial evidence as a means of examining it. Specify assessment of transferable duties and residual support; completed delivery alone cannot justify non-resident deployment. | Retain continuing provision as the purpose. Removing response leaves exception duties unassigned, requiring redesign of the provision means. Its implementation requires defined duties, response procedures, and costs before deployment review. | Retain the purpose; use assessment to specify local work with specialist response as candidate provision means. Review duties, response coverage, staffing, and costs needed to implement them; deployment remains undecided. |
| Local healthcare personnel | Retain the supply purpose and protective means combining specialist response with existing replenishment. Check whether the changed observation timing, as an implementation method, preserves the required exception response. | Retain the supply purpose. Restore or redesign response and fallback means before live use; existing stocks and transport alone do not establish coverage of the removed response. | Retain supply and its protective means. Adjust assessment timing and staffing as implementation methods without double-booking; check proposed role changes before they enter service. |
| International aid organization | Retain the combined aims and funded supply and paid-work contributions. Add capability, continuing-duty, and cost checks to the assessment methods before judging feasibility or further support. | Retain the combined aims; cost reduction alone does not support them. Reconsider the supporting combination of paid work and expert response, and the expenditure needed to examine supply, capabilities, and employment together. | Retain the combined aims. Relate paid exercises and continuing-role/cost inquiry to the funding plan; assess reallocation or further support separately. Continuing employment remains unconfirmed. |
| Local staff | Retain the skills-and-pay purpose, agreed work, and support. Consider paid first-response practice as an implementation method; initial participation does not assign all future exception duties. | Retain skills, pay, and acceptable work as purposes. Removing expert response removes a supporting means for learning and completion. Specify available support and bounded duties before proposing unfamiliar work; independent attempts establish neither capability nor consent. | Retain skills, pay, and acceptable work as purposes, with expert-supported paid learning as the means. Specify staff-first exercises, duties, response procedures, and time as implementation methods for personal review; exercises inform role choice, not consent. |

Within the constructed story, the integrated supported trial is initially selected within existing funding to maintain supply and support design learning. The initial selection retains the prompt expert intervention described in Table 4; the staff-first variant

remains a proposal rather than an implemented adjustment. This is the first plan selected through O2, not evidence of deployment readiness, combined feasibility, or acceptance of future local duties. The fictional outcome of carrying out that plan is introduced in Section 5.4; Table 5 identifies the questions that remain open when the plan is selected.

Two arrangements are distinguished for observing local staff's judgment and response: observation during actual medical-supply delivery, and assessment exercises conducted separately from that delivery work. In the latter arrangement, supported delivery maintains the required supply while a distinct activity within the same project provides tasks for observing staff's first responses, escalation, and subsequent expert assistance. Separating the assessment activity does not mean removing expert response.

Adjusting the intervention procedure during live delivery may suffice where the required supply and expert response can be maintained and the work being assessed can be observed. Assessment exercises separate from delivery become a candidate where live delivery cannot accommodate waiting for a staff response, waiting for situations requiring recovery judgment or expert escalation would not provide the needed observation opportunities, or comparable tasks and conditions cannot be arranged during delivery. The former primarily adjusts the implementation methods for intervention and observation; the latter also redesigns the combination of supply and assessment activities.

Adding assessment exercises requires coordinating duties and schedules so that experts and local staff are not assigned to incompatible tasks at the same time. Whether representative tasks, paid time, funding, and participation can be secured remains unresolved; expenditure may require reallocation or further support, and activities may require rescheduling. In this first O2, the agreed delivery-and-training purpose and the five participants' purposes are retained; the candidates either adjust implementation methods while retaining the supporting means, or reconsider those means as well. Section 5.5 reconsiders the next plan, including a proposed change to the business inquiry's purpose; Section 5.6 records its implications without assuming adoption.

Table 6 starts from the unresolved judgments at each focus in Tables 3 and 5. Its checks examine whether candidate implementation methods preserve the contributions expected from the supporting means, or what must be established before revised means can support a judgment. For each judgment, it specifies planned observations, comparisons, or implementation-condition checks, together with matters requiring later inquiry. Information may serve several foci, but each use and its limits are retained separately. The table specifies assessment work for the current planning episode; it does not establish that every focal purpose can be evaluated or achieved through the first trial.

Table 6
Assessment work for unresolved judgments at each focus

| Focus | Judgment carried forward from Tables 3 and 5 | Checks to include in the plan | Remaining judgments and conditions |
|---|---|---|---|
| Project as a whole: the jointly agreed trial | Can the required observation and assessment work be incorporated while maintaining delivery and local training? | Before implementation, check compatibility of duties, timing, expert response, funding, and participation across delivery, training, and assessment. After implementation, retain which activities were performed under which support conditions. | Delivery completion does not establish completion of training or the whole project. Agreement to new activity arrangements and the provision of resources remain unresolved until confirmed. |
| Drone manufacturer's engineering department | Which equipment, procedure, or role-boundary adjustments warrant investigation on the basis of the observations? | Identify tasks, versions, and conditions; relate system state and displayed information to local responses and expert intervention. Specify comparisons needed to distinguish candidate changes. | Intervention records alone neither establish a unique cause nor verify improvement. Comparison and rechecking remain necessary. |
| Drone manufacturer's business department | Which work can be transferred locally, which specialist support must remain, and can the resulting provision arrangement be assessed? | Record first-response opportunities, responses, escalation, and who completed the work; relate these to duties and remaining support. Examine required staffing, time, recurring costs, and payers separately. | Supported delivery alone does not settle deployment without resident experts. Hold the deployment judgment while support coverage and continuation conditions remain unresolved. |
| Local healthcare personnel | Can required supply be maintained when the observation method is changed to allow local staff to respond first? | Relate delivery, arrival, and handover to expert response and fallback supply. Check proposed intervention timing and staffing against the supply and response conditions to be retained. | Do not treat supply protection as established while required conditions or response arrangements remain unconfirmed. Distinguish delivery completion from clinical outcomes. |
| International aid organization | Under which conditions can healthcare-supply contributions, local capability building, and paid work be combined, and what remains missing for subsequent-support judgments? | Distinguish delivery and support outcomes, judgment and learning opportunities, demonstrated task performance, paid duties, and continuing work and costs; return them to the funding and outcome-assessment plan. | Training participation or performance at one point does not establish capability development or retention. Leave methods for assessing these, continuing-employment conditions, and grounds for judging the combined contribution as further inquiry where they remain unspecified. |
| Local staff | Are there opportunities to gain skills and pay, and are the proposed duties, time, and support acceptable to the staff themselves? | Relate judgment and learning opportunities, actual duties, time, remuneration, and specialist support to staff's own accounts and assessments. Distinguish trial participation from judgments about proposed continuing work. | Do not infer skill improvement or retention from task completion. Paid participation or demonstrated performance does not replace consent to future duties. |

The rows relate each focal question to planned checks and outstanding assessment needs, rather than defining six general assessment categories. The same staff-response and intervention records may inform engineering changes, business role allocation, and healthcare supply checks without being collected separately for each. Their uses and evaluation grounds remain distinct; where observations cannot be obtained or necessary assessment methods remain unspecified, the corresponding judgments remain unresolved for O3.

## 5.4 Initial O3: interpreting trial results and specifying focal updates

The constructed case now supplies an outcome for the integrated supported trial selected in Section 5.3. Scheduled drone deliveries were completed, but experts repeatedly intervened in exceptions, leaving local staff limited opportunities for independent judgment. Intervention records yielded candidates for improving the aircraft/system, interface, and support

procedures. These events belong to the constructed story; they are not observations from the cited projects. O3 compares these supplied results and their support conditions with the selected plan and the intended checks in Table 6. It distinguishes reasons to retain or reconsider the supporting means from proposed changes to their implementation methods, and records which judgments remain unresolved in the shared plan and native accounts (Table 7). Unperformed checks and unspecified assessment methods are not treated as completed evidence.

Table 7
Initial-outcome judgments addressing the focal questions in Table 6

| Focus | Interpretation of initial results and retained content | Record to update or matter to reconsider |
|---|---|---|
| Project as a whole: the jointly agreed trial | Scheduled deliveries were completed with expert response. Completion of training or the whole project is not established. | Retain the delivery-and-training purpose and expert-supported work as the means. Reconsider staff-first observation within delivery or separate exercises as implementation methods, coordinating timing, duties, and support in the shared plan. |
| Drone manufacturer's engineering department | Intervention records support candidate improvements, not verified improvement or a unique explanation of difficulty. | Retain the improvement purpose and observation–design-change–recheck means; revise implementation methods by adding observations and comparisons of equipment, procedures, and support allocation to the development plan. |
| Drone manufacturer's business department | Supply was achieved with the stated support; transferable local work and the division of specialist duties remain unestablished. Deployment without resident experts remains unanswered. | Retain continuing provision as the purpose; the workable local-work/support means remain to be specified. Design assessment of transferable duties and the location, amount, and scope of remaining support as the inquiry's implementation methods. |
| Local healthcare personnel | Expert response supported supply during the trial. | Retain the supply purpose and response/fallback means. Check whether changed intervention timing and staffing preserve those means when adding assessment, and whether observations can be obtained during delivery. |
| International aid organization | Supply and paid participation are retained results; sustained capabilities, employment, and combined feasibility remain unconfirmed. | Retain the combined aims; add capability-assessment opportunities, continuing-duty inquiry, and cost checks to the funding and outcome-assessment plan. Hold further-support judgments. |
| Local staff | Participation and experience are retained; limited observation does not establish incapability or the boundary of locally transferable work. Acceptance of future duties remains unestablished. | Retain skills, pay, and acceptable work as purposes; reconsider paid first-response opportunities, escalation support, and bounded duties through personal participation judgments. |

O3 retains completion of the supported deliveries but leaves the scope of transferable work unresolved. Pre-emptive expert intervention limited opportunities to observe what local staff could decide independently; it therefore establishes neither incapability nor a stable division between local and specialist work. The next O1 reuses the original accounts and takes this gap, the retained records, and the focal purposes as its starting point. Section 5.5 uses explicit capability and role assumptions to examine support alternatives, rather than treating those assumptions as classifications established by the initial trial.

## 5.5 Next O1 and O2: conditional comparison, task clarification, and replanning

The next O1 asks which work might be undertaken locally, which support must remain, and what further observation or capability development should be examined. To clarify these questions, Table 8 compares support policies under explicitly stipulated task, capability, and role conditions. These situations are analytical assumptions motivated by the unresolved judgments in Table 7, not categories established from the limited observations of independent performance. Capability and

role assumptions are held constant across the policies so that the consequences of intervention order and expert-response availability can be distinguished.

The illustrative situations are: routine work with independent completion assumed; a task in which staff recognize an anomaly but cannot settle the recovery decision; and a task outside the stipulated local role that can be appropriately escalated. Appropriate escalation is possible in the latter two situations, and an available expert is assumed able to complete work that staff cannot complete independently. These capability and role conditions are assumed, not estimated from the initial trial or verified by a replay experiment. The comparison concerns a non-clinical ground or interface replay scenario; supply is protected separately, so unfinished replay is not an undelivered medical consignment.

Table 8
Conditional comparison of support policies under stipulated capability and role conditions

| **Stipulated task situation** | **Integrated-support replay** | **Early-reduction replay** | **Staff-first replay with expert response** |
|---|---|---|---|
| Routine work with independent completion assumed | Local staff complete. | Local staff complete. | Local staff complete. |
| Task with an unresolved recovery decision | Expert acts first; independent judgment unassessed. | Recovery choice remains unresolved; stop. | Observe local staff response; then, escalate for expert completion; not independent completion. |
| Task outside the stipulated local role | Expert handles it; local staff's escalation capability unassessed. | Local staff escalate, but no responder is available; task not completed. | Local staff escalate appropriately; expert completes. Bounded-role escalation can be assessed. |

These situations do not define permanent competence levels or role boundaries. Applying them to particular work requires evidence about task conditions, opportunities for staff to respond, and the duties under consideration. Learning, changes to information or procedures, and revised work allocation may alter the relevant assumptions, but no improvement or reassignment is assumed here. Capability development and acceptance of additional duties remain separate questions; their implications for local work and residual expert support require further inquiry.

Under these premises, waiting for the local response while retaining expert assistance changes what can be assessed, not the stipulated capability or role. Expert completion remains distinct from independent completion. The consequences follow from intervention order and response availability, not from locating assessment in an exercise rather than delivery; Section 5.3 supplies the conditions for choosing between those arrangements. O1 relates the comparison to the retained focal accounts and specifies observation, capability-development, and support-allocation inquiries. O2 then composes this work into the next joint plan. The following develops supported delivery with separate assessment exercises as a candidate, not the only or an already executable option.

The stipulated unresolved recovery decision opens comparison of interface information, recovery options, procedure, and practice. This inquiry also asks which judgments might be targets for local learning, what support they would need, and what observations could assess acquisition; no learning effect is presumed. Engineering retains the improvement purpose and the supporting means in Table 3: observations inform candidate changes, and rechecking assesses them. It proposes different implementation methods for obtaining and comparing those observations. The comparison identifies neither a unique cause nor a verified improvement; insufficient evidence from the present observation method does not by itself require abandoning the supporting means.

For business, Table 3 leaves unresolved how local work and remaining support can sustain provision without resident experts. Combining local routine work with remote specialist response specifies a candidate supporting pathway and means; it is not merely a different observation procedure. Assessing and implementing that allocation requires review of duties, escalation procedures, response coverage, connectivity, staffing, and costs. Which duties are transferable after further learning remains open; demonstrated capability would not itself establish an agreed role. The business department also proposes changing the next trial's closing output: from an assessment sufficient for judging deployment without resident experts to an assessed

account of transferable duties and remaining support. This is a further change to the purpose of that inquiry, distinct from specifying its means or implementation methods. The longer-term service purpose is retained, and completing the revised inquiry would not answer deployment readiness.

At the shared project focus, O2 reconsiders how these observation, assessment, and support proposals fit into the next trial plan. Healthcare retains the supply-protection purpose and checks response and fallback arrangements; the aid organization retains the combined-feasibility purpose and separately judges funding; local staff assess duties, paid time, and response support. Reconciliation of activities, expert capacity, resources, and participation remains necessary. The proposed change to the business inquiry's purpose does not revise the shared agreement by itself, and none of these proposals establishes deployment readiness or further funding.

## 5.6 Next O3: native-model revision proposals and subsequent inquiry

The next O3 returns the planning findings and proposals developed through O1 and O2 in Section 5.5 to the shared plan and participant-specific native models. No second delivery trial is assumed. The initial constructed outcome, the conditional consequences in Table 8, and proposed arrangements retain their different evidential status. Table 9 records reasoned retention, revision proposals, unresolved judgments, and subsequent work, distinguishing purposes and supporting means from implementation methods. Engineering retains its observation–change–recheck means while revising observation work; business proposes a support allocation and a revised closing purpose for the next inquiry, while deployment remains held. If role analysis were merely a subtask and the original readiness assessment still defined completion, no purpose change would follow. The proposed change is therefore recorded separately from achievement of the original purpose, renewed project agreement, and authorization of support.

Table 9
Working accounts carried into the next inquiry

| Focus | Retained results and judgment status | Proposed revision and subsequent work |
|---|---|---|
| Project as a whole: the jointly agreed trial | Retain the agreed trial purpose, supported-delivery result, and outstanding assessment questions as distinct states. | Return observation, assessment, and support-allocation proposals to the shared plan. Specify activities, resources, duties, and conditions requiring renewed agreement. |
| Drone manufacturer's engineering department | Retain the improvement purpose, observation–design-change–recheck means, and useful records. Recovery remains unresolved under the Table 8 assumptions, not as an established capability limit. | Revise observation and comparison as implementation methods: compare information, recovery options, procedure, and practice under matched tasks; specify learning targets and evidence needed to assess acquisition. No improvement is verified. |
| Drone manufacturer's business department | Retain the continuing-service purpose. Supported supply holds within the story; transferable work, specialist-role boundaries, and non-resident deployment remain undecided. | Record the next inquiry's proposed purpose change from deployment assessment to an assessed account of transferable duties and residual support. Examine local work with specialist response as provision means; specify coverage, connectivity, staffing, procedures, and costs for their implementation. |
| Local healthcare personnel | Retain the supply purpose and the protective means combining specialist judgment with existing replenishment. | Check whether proposed assessment timing and staffing preserve response and fallback provision. Define checks before an assessed role change enters service. |
| International aid organization | Retain combined healthcare, capability, and employment aims. Bounded-task performance does not establish continuing duties and costs. | Relate supply, capability, employment, and payer evidence to support allocation and outcome checks. Reallocation or further funding is not automatically approved. |
| Local staff | Retain choice and acceptable-work conditions. Task and escalation capabilities in Table 8 are stipulated, not established competence levels or consent to additional duties. | Review paid first-response and learning opportunities, remuneration, time, duties, and response support. Assess any capability development separately from acceptance of continuing duties. |

The following before-and-proposed-after excerpts are author-created entries in the reconstructed native models. They distinguish the fictional delivery outcome from the stipulated replay responses. Neither excerpt is a practitioner-supplied record or an implemented organizational change.

**Engineering development-plan entry.** Before — Use trial observations and expert-intervention records to identify aircraft/system, interface, and support-procedure improvements, and assess proposed changes before treating them as improvements.

**Proposed after —** Retain the initial intervention records as grounds for candidate improvements, not as a completed classification of staff capability. Under Table 8's assumptions, a recovery decision remains unresolved; the comparison does not establish whether information, practice, or role boundaries explain it. Add a comparison under matched task and version conditions, recording local responses before intervention and the assistance subsequently required. Specify which judgments are learning targets and what observations would assess acquisition. Use the comparison to decide which design or procedure change to propose, or which question requires further inquiry. Change status: comparison proposed; no improvement or capability development verified.

**Business deployment hypothesis entry.** Before — Examine provision without a resident expert at each location. Use the trial to inform deployment; transferable duties, remaining support, recurring costs, and payers are unresolved.

**Proposed after —** Develop the candidate of local routine work with specialist response to appropriate escalation. The proposed closing output of the next inquiry is an assessed account of transferable duties and residual support; the original deployment judgment remains unresolved. Supported delivery is established only within the constructed story; the replay assumptions do not establish that non-resident provision is ready. Keep the transferability of duties and the specialist-role boundary open to evidence about task conditions and capability development. Specify response coverage, connectivity, staffing, and costs before assessing that candidate. Do not assign all exception work to local staff or treat paid trial participation as acceptance of continuing duties. Deployment judgment: held pending evidence about the proposed arrangement; cost responsibility and further funding remain undecided.

The entries preserve distinct native reasoning—observations, comparisons, and design-change status for engineering; duties, residual support, costs, and deployment judgment for business. The engineering entry changes the implementation of comparison while retaining its evidential pathway; the business entry develops a provision arrangement and records the proposed inquiry-purpose change with deployment held. Their before-and-proposed-after correspondence makes the retained grounds, changed work, and unresolved judgments traceable without replacing either model.

A conditional continuation shows why those distinctions matter. Retain "local staff escalated appropriately; expert response completed the task" with the replay task, version, and intervention conditions. If the responding service becomes unavailable, this does not by itself refute the earlier escalation account. A supporting means on which completion depended has been lost; changing intervention timing alone cannot restore it. This reopens business's response coverage, duties, and costs, healthcare's protection and fallback arrangements, and the shared trial plan's provision for exception response. The next work is to specify and assess alternative response provision before revising the work allocation. "The exception was completed" alone would not identify that dependency or those receiving judgments. Detailed records must remain retrievable where the subsequent assessment needs them.

## 6 Analytical comparison and checks

# 6.1 Rationale reconstruction and literature-based contrast

The comparison applies Questions, Options, and Criteria (QOC) to the same declared synthetic source records, support arrangements, and conditional replay of local staff responses as the focal analysis. The same analyst lists the integrated supported trial, early support reduction, and supported delivery with assessment exercises separate from delivery work and considers supply protection, design learning, staff capability, paid work, resources, and the decisions that use results. Source

references, uncertainties, responsible actors, and change history are equally available. The comparison concerns the questions and relations specified, not measured time, accuracy, or creativity.

In the same-material QOC reconstruction, the supported-trial benefits and both conditional candidates can be represented and examined: a staff-first procedure within delivery, where its conditions can be met, and supported delivery with assessment exercises separate from delivery work. Table 10 compares the reasoning and resulting records; it is not an independent replication.

The work item “conduct a trial” in the deployment hypothesis becomes a design target because completing delivery through pre-emptive expert intervention would not establish which work can be transferred without resident expertise. O1 identifies the native accounts and shared agreement, models the functions and dependencies of their purposes, supporting pathways and means, and implementation methods, and formulates tasks to observe local judgment, protect supply, and specify remaining support. O2 assesses a common candidate from the shared project focus and the five participant-specific foci, and specifies observations, comparisons, and implementation-condition checks for their open judgments, while retaining unspecified assessment needs (Table 6). The constructed implementation outcome is supplied to O3 together with the selected plan and its assumptions; O3 records supported delivery and unresolved judgments. The unresolved capability and role judgments motivate the stipulated comparison in Table 8, rather than being resolved by a classification from the trial. In the next cycle, the comparison informs O1’s observation, learning, and support inquiries and O2’s plan reconsideration: engineering retains its evidential means while proposing different observation implementation methods, whereas business specifies provision means and proposes a different closing output for the next inquiry (Section 5.5). O3 records these as proposed revisions, with no verified improvement or deployment readiness (Section 5.6). The shared plan receives activity and resource proposals, not assumed renewed agreement. This same path can be retained in the QOC reconstruction. The contribution is the process and requirements for examining its reasoning, not exclusive access to the candidate design.

Where the adjustment, its retained grounds, review scope, and receiving decisions are already explicit, reuse the existing rationale. The comparison shows no exclusive solution reachability or demonstrated benefit from duplicate documentation. Independent analysts’ interpretations, effort, and performance over repeated revisions remain unevaluated.

Table 10
Same-material comparison: shared judgments and their procedural specification

| **Analytical step** | **Same-material QOC/native reconstruction** | **Process and requirements: specification / overlap** |
|---|---|---|
| Interpret expert support | Distinguish the expert response capability needed to protect the supply from resident placement and expert-first intervention; retain uncertainty about alternatives. | O1 identifies native sources and foci, models the functions of support, and links adjustment tasks to the judgments requiring them. The underlying distinction is shared by both. |
| Compose the trial plan | Assess the three support arrangements and the conditional staff-first integrated variant against supply, learning, role, and resource conditions; keep implementation and participation unresolved where necessary. | O2 retains one plan identity across the shared-project and participant-specific assessments. The candidates, procedural variant, and conditional comparison are equally available. |
| Respond to the initial result | Retain supply and design learning; distinguish the benefits from evidence of independent capability, continuing employment, and deployment readiness. | O3 compares the constructed result with the plan and its assumptions, records focal retention or unresolved judgments, and specifies further tasks. The same conditional assessment candidates are available. |
| Specify model revisions | Retain questions, reasons, and cross-model links for the proposed changes. | O3 specifies model-specific retention, revision proposals or holds and subsequent tasks, linking them to functions, adjustment grounds and review scope. These relations may already be present in native rationale; another record is then redundant. |

The literature-based comparison has the same boundary. The change and feedback capabilities reviewed in Section 2.4, information maturity in Section 2.1, and the testing practice examined in Section 6.3 already address revising purposes,

evaluating evidence, and planning further work. Here, their intersection is made concrete by specifying the affected inquiry, its required output, and the original judgment receiving that output: a changed trial question leaves deployment unanswered; retained intervention records lead to a comparison rather than a verified improvement; and the same results yield different native-model revisions. This specifies an operational connection, not a claim that the original methods lack these capabilities or were executed in a comparative experiment.

## 6.2 Conditional requirements for applying the process

The operations specify what work to perform and how its outputs enter subsequent work. Their use in Section 5 also exposes distinctions without which that work would not support the intended judgments. Following Section 3.1, the arguments below identify the case premises, an inference those premises do not warrant, and the requirement needed to make the reasoning examinable. The four requirements concern the treatment of epistemic functions within the process, not another sequence of operations.

1. 1. Make focal epistemic functions and their grounds explicit. At each focus, identify what a model, record, or activity is expected to contribute to inquiry or judgment, the relations and grounds supporting that expectation, and its current realization. Expert intervention can protect supply and yield design-learning records without revealing unaided judgment. Its presence alone establishes neither staff incapability nor the indispensability of residence or expert-first timing. The diagnostic account must therefore distinguish the needed contribution from the current activity, and an expected contribution from evidence of achievement. The same intervention has different functions in the supply, learning, and capability inquiries. Without identifying those functions and their grounds, the analyst cannot explain what must be retained or why the existing implementation may be reconsidered. An unsupported or contested interpretation remains explicit rather than being completed by assumption.
2. 2. Preserve epistemic functions non-reductively across foci. Retain each focus's functional meanings, purposes, evaluation grounds, and relations to its native model; do not substitute one focus's judgment for another's. In the initial trial, completed delivery supports a bounded supply judgment but does not establish deployment readiness, continuing employment, or acceptance of future duties. The jointly held project focus makes the agreed trial a shared object of judgment, not a substitute for these participant-specific evaluations. Section 5.6 returns the results to engineering's observation–comparison–change reasoning and business's duties–support–cost–deployment reasoning without making their conclusions interchangeable. Without this requirement, coordinated activity can be reported as common achievement, or one participant's evaluation can displace another's judgment. Non-reduction does not prevent local abstraction or resolution of incompatible actions; it preserves the distinct reasoning needed to evaluate them.
3. 3. Justify adjustments and their review scope through epistemic functions. Distinguish the contribution to retain from the part proposed for adjustment, and justify the associated review of work and judgments through dependencies within and across foci. Identifying different functions does not by itself establish which adjustment is sufficient. Table 3 identifies purposes and supporting pathways and means; Tables 4–5 distinguish adjustments to their implementation from reconsideration of the means themselves. In Sections 5.3–5.5, a staff-first observation method can retain engineering's observation–design-change–recheck means, provided required response and supply protection remain available. Reallocating specialist response instead changes how provision is supported and requires review of the duties, escalation procedures, connectivity, staffing, costs, and judgments that depend on it. A timing change for engineering may therefore affect a protection condition for healthcare and require adjustment of work allocation in the shared trial plan. Without this requirement, a local procedural change can be accepted despite a missing supporting capability, or a limited evidential problem can trigger unnecessary replacement of a supported arrangement. The scope follows the stated dependencies and conditions, not a fixed ranking of functions; review can justify retention, revision, or a hold.
4. 4. Maintain focal revision histories that distinguish completion from change. Make the before-and-after correspondence of functions, supporting relations, and judgments traceable, including what was established, retained, changed, or held under which conditions and grounds. In Sections 5.5–5.6, changing the business inquiry's proposed closing output for the next trial to transferable duties and residual support changes what would count as completing that inquiry; it does not answer deployment readiness. The original deployment judgment remains held, while the longer-term service purpose and the aid organization's purpose remain distinct. The shared trial agreement is not thereby revised. This differs from adding

a subtask under unchanged completion criteria. Likewise, later loss of specialist response does not negate earlier appropriate escalation: it changes the support on which completion depended. Without the functional history, a revised question can silently replace an unanswered one, or supported completion can be reinterpreted as independent capability. Retain consequential unresolved states and references to the original entries; this requires neither copying every event nor treating a revision proposal as an implemented change.

Table 11
Case-based grounds for requirements on applying the process

| Case basis | Inference not warranted | Requirement | Distinction made examinable |
|---|---|---|---|
| Expert intervention and retained records<br><br>Tables 4, 6 and 9 | Intervention proves neither staff incapability nor the necessity of residence; records alone establish no verified improvement. | 1. Clarify focal epistemic functions and their grounds. | Required response, design learning, and capability evidence are distinguished from current implementation and achieved results. |
| Different judgments from the trial<br><br>Tables 7 and 9; Section 5.6 | Delivery completion, paid work, or participation does not establish deployment, continuing employment, or shared acceptance. | 2. Preserve epistemic functions non-reductively across foci. | The shared project judgment and the five participants' purposes, evidence uses, and native reasoning remain distinct. |
| Observation versus support-allocation change<br><br>Sections 5.3–5.5 | Identifying a function does not establish that any implementation change is adequate or requires wholesale redesign. | 3. Justify adjustments and review scope through functional dependencies. | Supporting means retained or reconsidered, implementation methods adjusted, and dependent work and limiting conditions are specified for each focal judgment. |
| Next-trial question and response loss<br><br>Sections 5.5–5.6 | A changed closing output does not answer deployment readiness; later response loss does not negate earlier appropriate escalation. | 4. Maintain focal revision histories distinguishing completion from change. | Before-and-after functions, reasons, conditions, completed results, proposed changes, and held judgments remain traceable. |

Table 11 summarizes the arguments. The same-plan assessment and return to further inquiry are operations of the process (Table 2). The requirements identify what must be distinguished and justified in that work. They can be met through existing native records and prescribe neither a common format nor a separate record for every requirement.

## 6.3 Applying the method to reported engine-testing practice

A long physical test can inform more than the decision for which it was originally specified. Tahera et al. (2019) reported testing in the incremental development of complex products. Their diesel-engine example included a gross thermal cycling test, in which an engine was repeatedly exposed to demanding thermal conditions to assess the durability of the core components. The reported example required component procurement and engine assembly, a two-month stressed test for each of at least three extreme use cases, and post-processing. Parallel testing depends on available test beds and personnel; the example was reported to take six months overall (Sections 4.2.1 and 5.3, pp. 303–304 and 310). The test therefore combines technical assessment with substantial commitments of time and facilities.

In the surrounding discussion of lengthy tests, the authors report a difference of view. Some engineers value the learning obtained from long tests, whereas others consider whether more extreme conditions could provide similar insights sooner (Tahera et al. 2019, Section 5.3, p. 310). This is not a report of an implemented, equivalent accelerated replacement. It motivates a question for the present analysis: if the test were shortened or replaced, which durability judgments and design-learning opportunities would still need to be supported, and what work would be required before the change could be assessed? The record does not identify every participant's position or provide the company's complete testing and planning models. The following three foci are analytical reconstructions of the test's roles in reported practice, not invented company departments.

The proposed shortening first concerns exposure and duration within the test protocol, as implementation methods. Whether the supporting means—using thermal-load behavior as durability evidence and observations for design learning—are preserved must be examined at each focus. Additional observations or comparisons also reopen resource allocation. Table 12 traces O1–O3 for the same candidate rather than treating the three foci as separate plans.

The entries below are this paper's analytical proposals in reconstructed assessment, design-learning, and project-planning accounts, not the company's internal models or implemented changes. The publication supplies neither equivalence criteria nor a complete accelerated protocol; specifying comparison criteria and operating limits remains specialist work.

Table 12
Focal diagnosis, adjustment, and revision proposals for an engine-test change

| Focus | O1: functional diagnosis and task formulation | O2: adjustment and review of the same candidate | O3: return to focal accounts |
|---|---|---|---|
| Durability assessment | Distinguish thermal-load observations as grounds for judging durability from the current exposure and duration. Formulate a comparison of whether alternative tests could support the same judgment. | Check candidate exposure, duration, and observations against the required evidence. Specify comparison criteria and missing technical evidence; a shorter duration does not establish adequacy. | Retain the durability purpose and reported test conditions. Record equivalence as unresolved and propose the comparison work in the reconstructed assessment account. |
| Design learning | Identify what observations contribute to understanding behavior and reconsidering design choices. Ask which opportunities need to be retained if the protocol changes. | Examine the same candidate's retained and potentially missing observations. Include any additional observation or comparison work and its facility, staffing, and timing dependencies in the joint plan. | Return required observations and further inquiry to the design decisions using them. Do not substitute durability adequacy for comparable learning; retain the outstanding learning judgment. |
| Resource planning | Distinguish enabling the evidence and learning work from shortening elapsed test time. Specify the facilities, staff, and sequencing that require examination. | Review the same candidate's resources and sequence, including technical comparisons and observations. Make explicit how added work and unresolved technical judgments affect timing and allocation. | Return proposed comparison work and resource conditions to the reconstructed project plan. Hold executability where necessary work or capacity is unspecified; do not record the replacement as adopted. |

The durability, learning, and resource judgments remain distinct: evidence for one cannot settle the others. Where a change would remove a required observation, review expands from exposure and duration to the additional work and allocation needed to restore that contribution. O3 preserves the reported conditions, proposed changes, and unresolved judgments separately; specifying a comparison is neither completing the durability inquiry nor adopting a replacement. Retaining the existing test also requires reasons.

The application specifies the comparison task, dependent work, and focal revision proposals or holds needed to assess a proposed test change. It leaves test selection open and establishes neither accelerated-test equivalence nor practical benefit from the procedure.

## 6.4 Answers to the research questions

For RQ1, O1 identifies the native models and focal contexts, models the contribution required for each judgment separately from its current realization, and clarifies adjustment targets and tasks. Functional diagnosis makes the distinction between supporting means and implementation methods examinable, with their grounds; the adjustment argument identifies what can be retained and what needs redesign or investigation. Section 5.2 separates expert response from residence and intervention order; Section 6.3 similarly opens a test comparison without assuming the current duration is indispensable.

For RQ2, the process composes and assesses one plan's work, resources, timing, and expected outputs, specifies checks and remaining assessment needs for each open focal judgment (Table 6), and uses the plan and its assumptions alongside available results or changed conditions to specify retention, revision proposals, unresolved judgments, and subsequent work

(Table 7). Non-reductive treatment preserves each focus's evaluation, while function-based justification explains the adjustments and dependencies requiring review. The initial cycle leaves capability and role judgments open (Section 5.4); the next O1–O2 uses conditional comparison to clarify inquiry and replan, and the next O3 records the proposals without assuming another trial (Sections 5.5–5.6). These episodes distinguish adjustment of observation implementation methods while retaining engineering's supporting means, redesign of provision means that reopens dependent duties and costs, and change to the next business inquiry's purpose while its longer-term service purpose remains. Proposals return to the shared trial plan and the participant-specific native entries without treating a change in one inquiry as renewed project agreement, deployment readiness, or authorization.

For RQ3, the four requirements identify relations to retain: focal contributions and grounds, distinct meanings and evaluation criteria, the reasons linking an adjustment to its dependent review scope, and the before-and-after status of functions and judgments. These records preserve what has been completed, changed, or left unanswered at the shared and participant-specific foci, distinguishing an individual inquiry change from a revision of the shared agreement. The process uses them when returning results and formulating further inquiry. In Section 5.6, the retained distinction between staff escalation and expert completion locates the response dependency without negating the earlier escalation judgment.

# 7 Discussion

## 7.1 Analytical contribution and conditions for application

The contribution is the process together with requirements for its epistemically grounded use. The process specifies native-model identification and functional diagnosis within task formation, joint planning, and reasoned model responses and subsequent tasks based on planning findings, available results, or changed conditions. The requirements specify the focal functions, non-reductive relations, adjustment grounds, and revision histories needed to examine the reasoning involved. Neither the process alone nor an unconnected list of requirements supplies this worked specification.

Relative to the earlier EFD proposal, focal relativity, preservation of native models, and the connection from diagnosis to intervention are inherited. The additions are explicit inputs and outputs for the process, worked proposals directed to particular native-model decisions, and case-based arguments for the requirements governing that reasoning. The underlying distinctions are not claimed as new discoveries. They can be expressed through existing rationale methods; the present analysis specifies how they support the connected work without requiring one common representation.

In the case, identifying response capability separately from intervention timing opens a bounded observation adjustment. Keeping healthcare, engineering, business, aid, and local-work judgments distinct prevents that adjustment from standing for common achievement. Functional dependencies distinguish adjustments to observation implementation methods, with the supporting means retained, from redesign of provision means and the resulting review of duties and costs. The next business inquiry's purpose is also reconsidered, while its revision history keeps the original deployment judgment held. The process carries these distinctions into a joint plan and subsequent work. This is a concrete specification of support also represented in the same-material QOC reconstruction, not evidence that functional diagnosis uniquely generates the candidate or improves performance.

The procedure is relevant when a proposal or its direct effects are known but the conclusions still warranted at each focus, and the further work required, remain unsettled. Stakeholder count or complexity alone does not justify another record. Existing rationale may already preserve the relevant purposes, grounds, and return paths; missing evidence or testimony may instead call for a targeted inquiry. These are proposed application conditions, not a measured ranking of effectiveness.

## 7.2 Preservation, plurality, and agency

Within design for transitions, the procedure makes preservation a question of work rather than unchanged solutions. Supply protection can remain while observation timing changes; preserving supported learning can require redesigned duties and response arrangements. This connects to creative preservation without verifying C-K/Topos (Le Masson et al. 2026). Neither

retention nor replacement is assumed to require no work, and the reasons for preserving a contribution can themselves be reconsidered. The result is a specified design or inquiry task, not evidence of new-concept generation.

Participants can jointly hold a bounded project focus while retaining distinct purposes and meanings at other foci. Consistent with the interdependent contexts of PSI (Reich and Subrahmanian 2025), Tables 7 and 9 return proposals both to the shared trial plan and to engineering, business, healthcare, aid, and local-staff judgments. Coordination of the agreed trial does not make these evaluations interchangeable. Incompatible actions must be addressed for that plan; compatible interpretations can remain different. An unrepresented standpoint is a gap to investigate, not evidence of accepted plurality.

In ongoing projects, the procedure is intended to support those whose inquiry and practice are examined at each focus, whether they analyze it themselves or with others. Making staff responses observable for capability assessment is not the same as enabling staff to use the results to maintain or revise their own work. Table 9 identifies that return to judgments about paid time, duties, and support. Agency need not exclude assistance: appropriate escalation can depend on specialist response. The procedure specifies support for such judgments; it does not establish its practical availability, participants' influence, or an increase in agency.

## 7.3 Evidence limits and research enabled by the requirements

The analyses establish different, bounded results. The constructed case exposes task formation, common-plan assessment, and distinct native-model revisions; the calculations check consequences of declared assumptions; and the four arguments identify distinctions needed to examine the stated revision judgments. None independently establishes diagnostic reliability, generality, implementation feasibility, or incremental benefit. Method, case, and comparator were developed in the same AI-assisted process. The published testing account adds external constraints, but its selection and reinterpretation by the author do not supply an independent evaluator, accelerated-test equivalence, or practitioner benefit. No compression-efficiency or longitudinal study was conducted, and an unknown future context may need information absent from the retained record.

Independent evaluation should distinguish the usefulness of the requirements from the additional value of their integration with the process. One comparison could examine competent native analysis, that analysis supplemented by the requirements, and the proposed process used with the requirements under comparable information and resource conditions. Evaluation should examine justified retention and adjustment, preservation of distinct focal judgments, traceable completion and revision, and the specificity of subsequent work—not field completion or agreement with the constructed answer. Equivalent results or excessive effort would limit the case for added support.

A handover followed by changed conditions would test whether the retained relations identify affected judgments and the next work, as illustrated conditionally in Section 5.6. With comparable source access, evaluation should consider overlooked or unnecessary reconsideration and the effort of creating, maintaining, and retrieving records. These are proposed tests of continued use, not completed evaluations.

# 8 Conclusion

The study specifies a process that identifies native models and focal functions to formulate tasks, composes joint work, and uses planning findings, results, or changed conditions to specify reasoned model responses and further inquiry. Case analysis argues for four requirements on its use: make focal epistemic functions and grounds explicit, preserve them non-reductively across foci, justify adjustments through functional dependencies, and maintain revision histories distinguishing completion from change. The constructed and published applications make the work and these distinctions concrete without treating revised questions, proposed comparisons, or planning conditions as achieved outcomes.

The contribution is the process–requirement specification for examining what to retain or adjust and which judgments require reconsideration. Existing models and rationale methods may already provide the same support; the method claims neither exclusive access to candidate designs nor automatic revision of linked models. Its incremental practical benefit and the balance between retained information and effort require independent evaluation.

## Declarations

# Funding.

No funding was received for conducting this study.

Data and analytical materials. The article's text and tables present the constructed premises, conditional results, and revision proposals needed to examine the argument. Section 5.5 states the assumptions for Table 8, and Section 6.3 identifies the published source passages used in the secondary application. No new participant or real-company dataset was collected. The author retains the working analytical records; they are not submitted as supplementary material, and the reported argument does not depend on access to them.

Research involving participants. This study used constructed records and a secondary analysis of published research; no participants were recruited, and no new personal research data were collected. AI-assisted development and its limitations are described in Section 3.3. Author-specific declarations are supplied separately with the title-page information.

# Author Contribution

Masahiko MATUHASHI : conceptualized the study, developed the methodology, performed the formal analysis, and wrote the original draft of the manuscript. Ryo HIGUCHI, Tomohiro YOKOZEKI : contributed to the conceptualization, participated in the critical review and editing of the manuscript, and provided supervision. All authors have read and agreed to the published version of the manuscript.

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## Figures

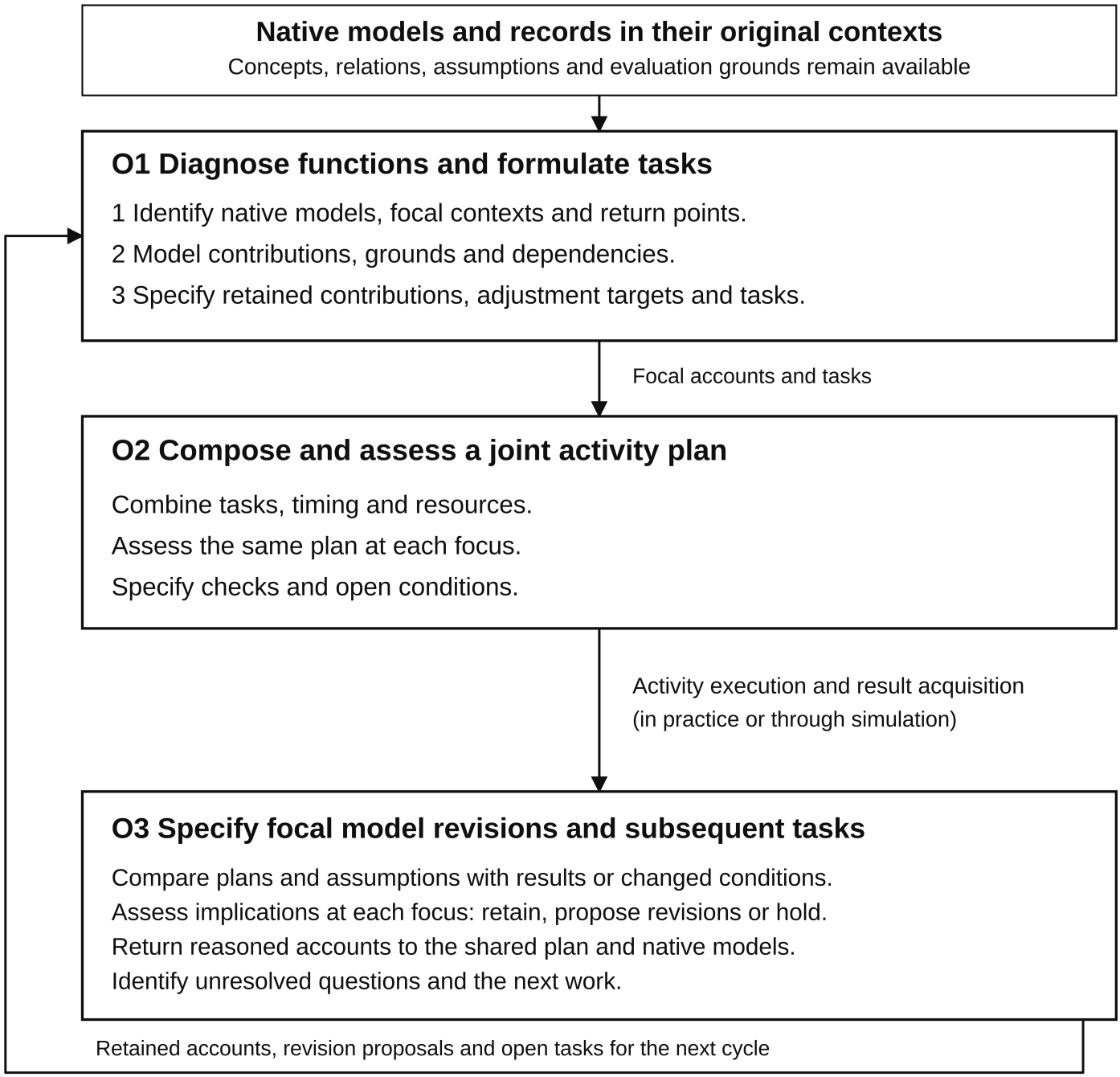



**Figure 1**

Process for focal diagnosis, joint planning, and model revision. O1 includes native-model identification, functional modeling, and task formulation; O2 composes and assesses a joint plan. The O2–O3 arrow carries the plan, assumptions, and open judgments. Where undertaken, activity execution in practice or through simulation also supplies results and their conditions; O3 can consider planning findings or changed conditions without new execution. O3 returns reasoned retention, revision proposals, or unresolved judgments to the original models and identifies subsequent tasks. The return arrow carries these accounts into another O1 when needed. Arrows show principal information handoffs, not authority or an exhaustive execution sequence. Native models remain available throughout.