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When the Strands Disagree: Using Divergence in Mixed-Methods Joint Displays to Refine Practical Frameworks

A Methodological Procedure with a Worked Example from Expatriate Educator Retention

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Abstract: Joint displays, which set quantitative and qualitative findings side by side, have become a standard device for integrating results in mixed-methods research. In practice, researchers tend to report convergence and to explain away divergence by attributing it to a weakness in one strand. This methodological paper argues that divergence is frequently the most informative product of a joint display and shows how it can be used to refine a practical framework. The argument is developed through a worked example from a mixed-methods study of expatriate educator retention in international high schools in Guangzhou, China, in which a survey of 52 educators was integrated with written interviews with 11. Ten domains were classified as convergent, complementary, divergent or qualitative only: five converged, three were complementary, one diverged and one emerged only in the interviews. The divergent domain, workload, illustrates the argument. Survey items on working hours and personal time were rated favourably and showed no clear association with turnover intention, whereas seven of eleven interview participants described workload as a serious problem. Systematic interrogation indicated that the strands captured different dimensions of the same construct: the survey measured the quantity of work relative to personal time, while the interviews described its composition, in which teaching was displaced by administration. The resolution changed a framework component from burnout prevention to workload governance. Building on existing strategies for handling discordant findings, the paper proposes a four-step procedure of locate, interrogate, resolve and act, six interrogation lenses and a short reporting checklist, and argues that frameworks derived from mixed-methods research are better specified when divergence is reported and used.

Keywords: *Mixed Methods; Joint Display; Integration; Divergence; Meta-Inference; Framework Development; Expatriate Educators; Research Methods.*

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I. INTRODUCTION

Mixed-methods research rests on the claim that combining quantitative and qualitative evidence produces understanding that neither could produce alone [1], [2]. That claim is realised, or not, at the point of integration, where the results of the two strands are brought together and interpreted jointly [3], [4]. Fetters, Curry and Creswell [3] described integration at the levels of design, methods and interpretation, and identified the joint display as a key technique at the interpretive level. Guetterman, Fetters and Creswell [5] subsequently showed how joint displays can be constructed

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and read, and a later methodological review documented the variety of visual forms they now take [6]. Joint displays have become a familiar feature of mixed-methods reports.

The same literature describes the possible outcomes of integration. Findings may confirm one another, when the strands lead to the same conclusion; they may expand one another, when the strands address different aspects of a phenomenon; or they may be discordant, when the strands point in different directions [3]. Greene [7] urged researchers to treat dissonance as a source of unanticipated insight, and her earlier work with colleagues identified *initiation*, the deliberate search for paradox and contradiction, as a legitimate purpose for mixing methods [8]. The empirical record suggests that this advice is seldom followed. Reviews have found that opportunities to explore apparently discrepant findings are often not taken [9] and that few published studies examine divergence in any detail [10]. Where discordance is reported, it is frequently attributed to a limitation of one strand, the qualitative strand because of its small sample or the quantitative strand because of its blunt measures, and then set aside.

This paper argues for a different stance. Divergence between strands is often the most informative result that integration produces, because it can signal that the strands are capturing different aspects of a phenomenon, that a measure is not measuring what was assumed, or that the phenomenon is more complex than the research model allowed [11]. The paper makes three contributions. First, it shows, through a fully worked example, how a single divergent domain in a joint display can be traced to its source. Second, it consolidates existing strategies for handling discordant findings [10], [12] into a four-step procedure (locate, interrogate, resolve and act) with six interrogation lenses, including a statistical lens that is often overlooked when a quantitative null result is set against qualitative accounts. Third, it argues that the final step, acting on the resolution, is what distinguishes *using* divergence from explaining it away, and demonstrates the point by showing how the resolution changed a component of a practical retention framework.

The remainder of the paper is organised as follows. Section II reviews how integration outcomes have been classified and how divergence has been handled. Section III describes the worked example and the integration profile it produced. Section IV presents the divergent domain, and Section V applies the procedure to it. Section VI generalises the procedure, Section VII discusses its implications, and Sections VIII and IX set out limitations and conclusions.

II. CLASSIFYING INTEGRATED FINDINGS AND HANDLING DIVERGENCE

➢ *Integration Outcomes*

Several schemes have been proposed for classifying the relationship between quantitative and qualitative findings. Farmer and colleagues [13] developed a triangulation protocol in which findings are coded for agreement, partial agreement, silence or dissonance, and O'Cathain, Murphy and Nicholl [14] recommended the protocol as one of three practical techniques for integrating data. Fetters, Curry and Creswell [3] described the outcomes of integration as confirmation, expansion and discordance. The worked example in this paper uses four categories adapted from these sources.

- *Convergence*. Both strands address the domain and point in the same direction. Convergence increases confidence in a finding.
- *Complementarity.* Both strands address the domain but illuminate different aspects of it, without contradiction. Complementarity adds depth or explanation.
- *Divergence.* Both strands address the domain but support conflicting conclusions about the same question. Divergence calls for explanation.
- *Single-strand findings.* Only one strand addresses the domain, usually because the issue was not anticipated when the other strand was designed. Single-strand findings indicate the limits of the original model.

The categories are applied to *domains* rather than to individual results, so that a single joint display can show the profile of agreement and disagreement across a whole study. Reporting this profile, rather than a selection of convergent highlights, makes the extent of divergence visible to readers and allows the resulting meta-inferences [15] to be judged against the full body of evidence.

➢ *Existing Strategies for Divergence*

Two contributions are especially relevant. Moffatt and colleagues [12], faced with a trial in which quantitative outcomes showed little effect of welfare rights advice while qualitative data suggested wide-ranging impacts, set out six ways of exploring the discrepancy: treating the methods as fundamentally different, examining the rigour of each component, examining the comparability of the datasets, collecting further data, exploring the process of the intervention, and asking whether the outcomes measured by the two components actually match. Pluye and colleagues [10] reviewed the literature and identified four strategies: *reconciliation*, in which a plausible interpretation accounts for both results; *initiation*, in which the divergence prompts new questions and new data; *bracketing*, in which irreconcilable results are treated as the bounds of a plausible range; and *exclusion*, in which one set of results is set aside as invalid. Erzberger and Kelle [16] had earlier shown that contradictory results can lead to productive theoretical revision, and Slonim-Nevo and Nevo [17] illustrated how apparently conflicting findings in an Israeli study of immigration could be explained rather than dismissed.

➢ *The Gap Addressed*

These strategies explain how divergence may be interpreted, but they say less about two practical matters. The first is how to move systematically from a divergent cell in a joint display to a candidate explanation, particularly when one strand offers a statistical null result whose precision is rarely examined. The second is what researchers should do with the resolution once they have it. In applied fields such as management and education, mixed-methods studies frequently culminate in a practical framework, and the value of a resolution lies in whether it changes that framework. The

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procedure proposed here addresses both matters. In the terms used by Pluye and colleagues [10], the worked example is a case of reconciliation; Section VI explains how it can be carried forward as initiation.

A. The Worked Example

➢ *The Parent Study*

The parent study examined why expatriate educators in international high schools in Guangzhou stay or leave, and developed a strategic employee retention framework [18]. A survey of 52 educators measured job satisfaction with twelve items covering six facets, organisational commitment with nine items covering the affective, continuance and normative components [19], and turnover intention with three items, all on a six-point agreement scale. Eleven educators, who volunteered from the survey sample, answered fifteen open-ended questions in writing. Thematic analysis of these written interviews produced eight themes, labelled T1 to T8 below. Relationships within the survey strand were examined with correlation and multiple regression; standardised regression coefficients are reported as β.

➢ *Building and Classifying the Joint Display*

The two strands were integrated in a joint display organised by domain. For each domain, the display recorded the principal quantitative result, the corresponding qualitative theme with the number of participants who contributed to it, and a classification into one of the four categories defined in Section II. A domain was classified as convergent when both strands addressed it and supported the same substantive conclusion; complementary when both addressed it and one strand explained or elaborated a pattern in the other without contradicting it; divergent when both addressed it and supported conflicting conclusions about the same question; and single-strand when only one strand addressed it. Table 1 presents the joint display in summary, with an integrated inference for each domain, and Fig. 1 shows the resulting profile.

Table 1 The Joint Display in Summary: Ten Domains, Their Evidence and the Integrated Inference

Domain	Quantitative strand (n = 52)	Qualitative strand (n = 11)	Integrated inference
Convergence (5 domains)			
Leadership	Strongest unique facet predictor of affective commitment (β = 0.39)	T2 Leadership as the hinge of attachment (10 of 11)	Leadership quality is the main route to affective attachment.
Career progression	Lowest-rated item (*M* = 3.67); strongest satisfaction-item correlate of intention (*r* = −0.37)	T3 Growth and a visible next step (8 of 11)	The absence of a visible next step is a principal push factor.
Affective commitment	Only commitment component with a unique effect on intention	T1 Attachment runs through people (10 of 11)	Attachment formed through people is the commitment that retains.
Continuance commitment	Independent negative association with intention; visa and family item *r* = −0.41	T8 Staying by necessity (7 of 11)	Some educators stay because leaving is costly, not because they are attached.
Tenure	Intention highest in years 3 to 5 (*M* = 4.21)	Accounts of attachment fading after the first years	Retention risk is concentrated in the middle years of service.
Complementarity (3 domains)			
Meaningful work	Highest-rated facet (*M* = 4.66); weak association with intention	T1 and T5 Meaning drawn from students, threatened by workload	Meaning is high but does not by itself retain, and is eroded by workload.
Compensation	Facet *M* = 4.15; package adequacy *r* = −0.28 with intention	T4 A package that holds, then stalls (7 of 11)	Pay attracts and initially holds, but weakens as a lever over time.
Normative commitment	Predicted by satisfaction (β = 0.68); no unique effect on intention	T7 Reciprocity that must be earned (9 of 11)	Obligation is conditional on fair treatment and is withdrawn after breach.
Divergence (1 domain)			
Workload	Work–life items rated favourably (77% agreement); *r* = +0.10 and +0.09 with intention	T5 The unseen weight of workload (7 of 11)	Hours are acceptable; the composition of work is the problem (Section V).
Qualitative only (1 domain)			
Institutional change	Not measured	T6 “A school, not a money factory” (5 of 11)	Commercialisation is a retention risk that the survey did not anticipate.

Note. *M* = mean on the six-point scale; *r* = Pearson correlation with turnover intention; β = standardised regression coefficient; T1 to T8 = qualitative themes, with the number of the eleven participants contributing to each theme in parentheses. With $n = 52$, $|r| \geq 0.27$ is significant at $p < 0.05$ (two-tailed). *Source:* Author’s analysis of parent-study data [18].

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➢ *The Profile of Integration*

Ten domains were classified. Five converged. Leadership, for example, was the satisfaction facet with the strongest unique relationship with affective commitment in the survey (β = 0.39) and was described as the hinge of attachment in ten of eleven interview accounts. Three domains were complementary, with the interviews explaining patterns that the survey revealed: meaningful work, compensation and normative commitment. Normative commitment illustrates the category. The survey showed that it was strongly predicted by satisfaction (β = 0.68) but had no unique relationship with turnover intention; the interviews explained why, describing obligation as conditional, earned by the school's treatment of staff and withdrawn after a perceived breach. One domain, workload, diverged. One domain, institutional change and the commercial character of schools, emerged only in the interviews, raised by five participants who described ownership changes and schools that placed profit ahead of education.

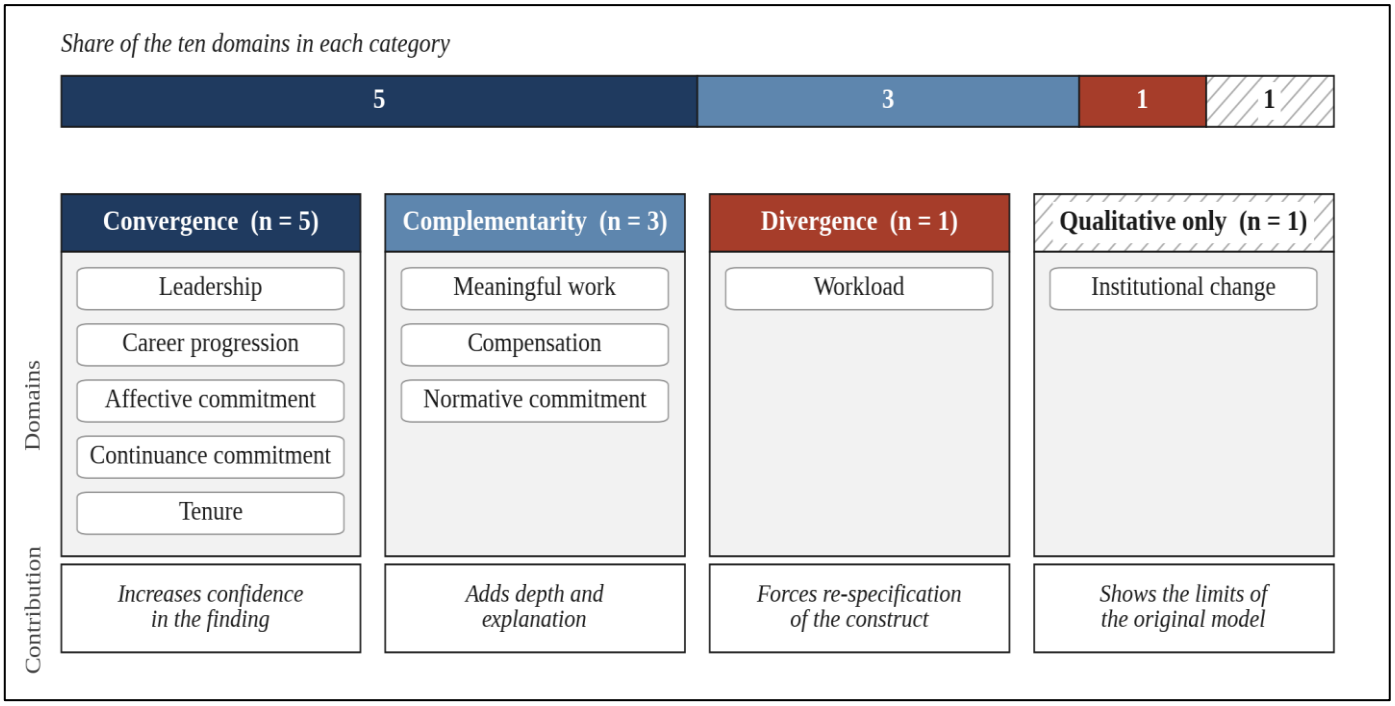


Fig 1 Integration Profile of the Joint Display

The bar shows the share of the ten domains in each category; the panels list the domains and the contribution each category of result makes to the study's conclusions.

B. The Divergent Domain: Workload

➢ *What the Survey Showed*

The survey included two items on work–life balance: "My workload is manageable within contracted hours" (B10) and "The school respects my personal and family time" (B11). Responses were favourable: 73% and 81% of educators agreed with the two items respectively, and 77% agreed across the facet as a whole (Fig. 2a). Neither item was clearly associated with turnover intention; the correlations were close to zero and slightly positive (r = +0.10 and r = +0.09; Fig. 2b). Taken alone, the survey would suggest that workload was not a problem for these educators and had no bearing on whether they intended to leave.

➢ *What the Interviews Showed*

The interviews told a different story. Seven of the eleven participants described workload as a serious problem. They wrote of tasks that were "never ending", of a "data craze" of documentation and reporting, of understaffing that loaded extra duties onto those who remained, and of administrative work that took away time to build relationships with students. Taken alone, the interviews would suggest that workload was a central source of dissatisfaction and a plausible reason for leaving.

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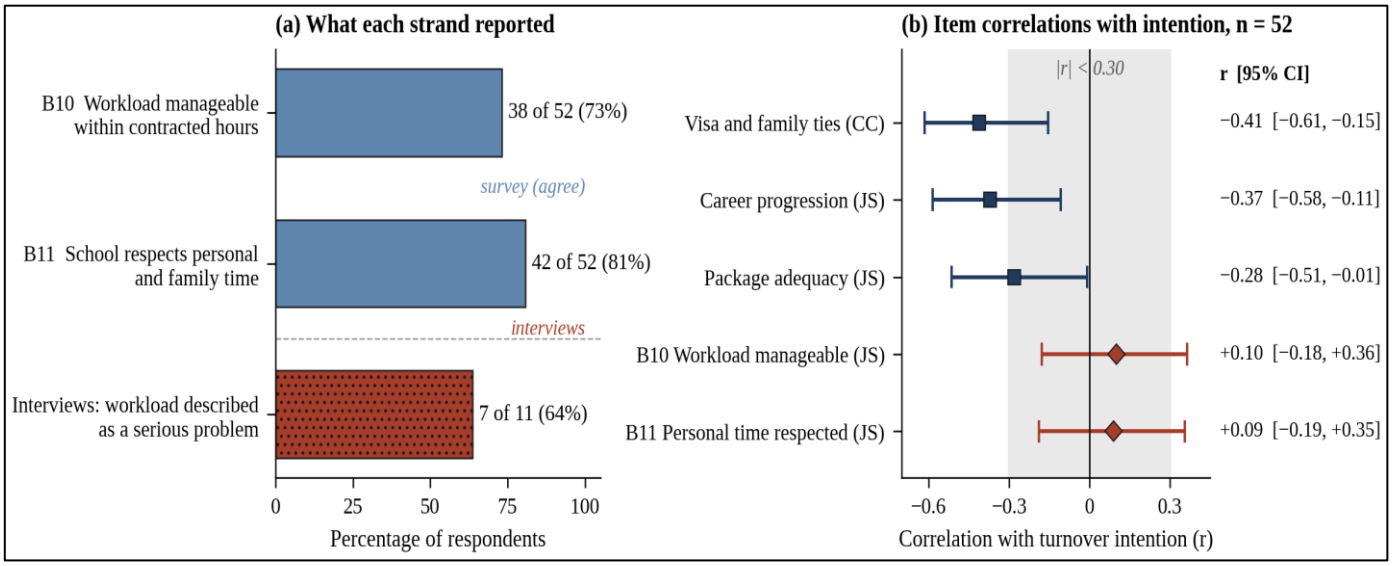


Fig 2 Anatomy of the Workload Divergence

(a) Agreement with the two survey work–life items alongside the proportion of interview participants describing workload as a serious problem; the bars measure different things, and their juxtaposition is the divergence to be explained. (b) Item-level correlations with turnover intention and 95% confidence intervals (Fisher z transformation). CC = continuance commitment item; JS = job satisfaction item.

III. WORKING WITH THE DIVERGENCE

The divergence was addressed in four steps, which are generalised in Section VI.

➢ *Locate*

The first step was to state precisely where the strands disagreed. They did not disagree about whether educators were busy, nor about whether educators valued their personal time. They disagreed on two narrower claims: whether workload was a problem, and whether it was related to intentions to leave. Stating the divergence this precisely matters, because each claim invites different explanations.

➢ *Interrogate*

The second step was to ask why the strands disagreed. Six lenses guided the interrogation. They are described below and summarised in Table 2, together with the evidence examined and the judgement reached.

- *Construct: Were the Strands Measuring the Same Thing?*

The survey items asked about working hours and personal time. The interview accounts described the content of work: teaching displaced by administration, documentation that served no evident educational purpose, and duties absorbed from departed colleagues. These are different aspects of workload. In the language of measurement validity, the items may have represented one systematised version of the concept, workload as hours, while omitting the part of the broader concept that mattered most to participants [20]. An educator can work reasonable hours and still feel that too much of those hours is spent on the wrong things.

- *Sample: Were the People Different?*

The interview participants were volunteers drawn from the survey sample. Volunteers may have been more dissatisfied than non-volunteers, and this possibility cannot be excluded. However, several interview participants who described heavy workloads also expressed attachment to their schools, which suggests that the workload accounts were not simply an expression of general dissatisfaction.

- *Elicitation Format: Did the Question Shape the Answer?*

The survey asked participants to rate statements; the interviews asked them, among other things, what frustrated them. Open questions about frustration are likely to elicit whatever is most salient, and administrative burden may be salient without being the most consequential problem.

- *Analysis: was a Relationship Hidden by the Analysis?*

The items were examined individually and as part of a facet score. Near-zero correlations could reflect the fact that the items measured the wrong aspect of workload, rather than that workload as a whole was unrelated to intention.

- *Statistical Precision: was the Null Result Informative?*

With 52 respondents, the 95% confidence intervals for the two correlations ran from about −0.18 to +0.36 and from −0.19 to +0.35 (Fig. 2b). Because agreement indicates a *more* manageable workload, a workload effect on leaving would appear as a negative correlation. The intervals exclude negative correlations stronger than about −0.19, so the data are reasonably informative against a moderate effect of hours-based workload, although they cannot exclude a small one. The study's power to detect a correlation of 0.30 at the 5% level was only about 58% [21], which is why this lens should always be applied. Here, however, it shows that the survey result cannot be dismissed as an artefact of sample size, which strengthens the case that the two strands were describing different things.

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- *Theory: Does Theory Predict that the Strands Would Differ?*

Research on job design distinguishes the quantity of work from its meaningfulness [22], and the job demands–resources model distinguishes the demands that exhaust employees from the resources that sustain engagement [23]. Administrative tasks that do not contribute to the core task can reduce the meaningfulness of work without necessarily increasing its quantity. Teachers are motivated by the core task of teaching [24], so the displacement of teaching by administration may be particularly damaging, and it would not be detected by items about hours.

Table 2 Six Interrogation Lenses Applied to the Workload Divergence

Lens	Guiding question	Evidence examined in the worked example	Judgement
Construct	Are both strands measuring the same aspect of the construct?	Survey items concern hours and personal time; interview accounts concern what the hours are spent on	**Primary explanation**
Sample	Do the strands draw on different people?	Interviewees were volunteers from the survey sample; several heavy-workload accounts came from attached participants	Cannot be excluded; unlikely to be sufficient
Elicitation format	Did the form of the question shape the answer?	Rating of statements versus open questions about frustration	Contributory: raises the salience of administrative burden
Analysis	Could the analysis have hidden a relationship?	Items examined singly and within a facet score; no items on the composition of work	Plausible; consistent with the construct explanation
Statistical precision	Is the quantitative null result informative?	95% CIs about −0.19 to +0.36; power to detect r = 0.30 about 58%	Null is informative against a moderate hours effect; does not explain the divergence
Theory	Does theory predict that the strands would differ?	Job design and job demands–resources theory distinguish the quantity of work from its meaningfulness	Supports the construct explanation

Note. CI = confidence interval. Judgements are those of the author and are open to challenge; reporting them in this form allows readers to do so.

➢ *Resolve*

The third step was to formulate a resolution that accounted for both strands. The resolution was that the strands were measuring different dimensions of workload (Fig. 3a). The survey captured the *quantity* of work relative to personal time, which educators found acceptable. The interviews captured the *composition* of work, the displacement of teaching by administration, which educators found frustrating. Both findings can be true at once, and the divergence is evidence that workload has at least two dimensions with potentially different consequences. The integrated evidence places many of these educators in a quadrant that neither strand could identify alone: acceptable hours combined with misdirected effort.

➢ *Act*

The fourth step was to ask what the resolution changed. In the parent study, the retention framework had included a workload component framed as burnout prevention, an approach that would focus on hours, rest and wellbeing. The resolution reframed the component as *workload governance*: an annual audit of documentation and administrative tasks, removal of duplication, protection of planning time, and a principle that new administrative demands require the removal of existing ones (Fig. 3b). This was a substantive change. Without the divergence, the framework would have addressed a problem that the survey suggested did not exist, in a form that the interviews suggested would miss the point.

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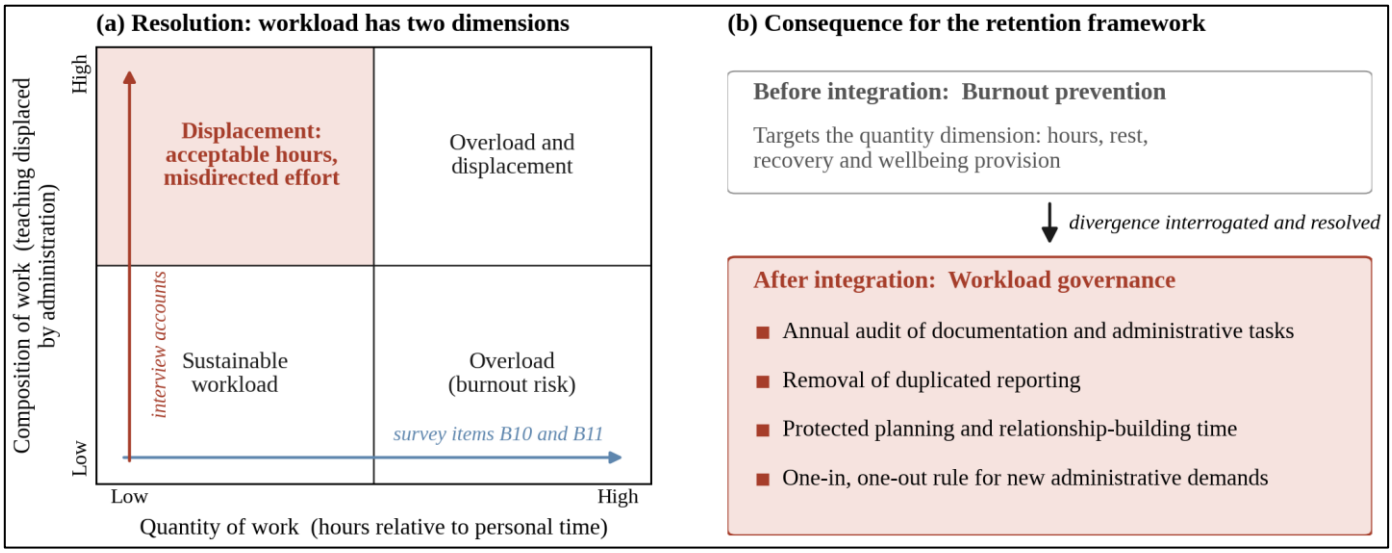


Fig 3 Resolving the Workload Divergence and Acting on the Resolution

(a) Conceptual two-dimensional model of workload, showing the dimension captured by each strand; the shaded quadrant is the pattern indicated by the integrated evidence. (b) The resulting change to the framework component.

IV. A GENERAL PROCEDURE FOR WORKING WITH DIVERGENCE

The example suggests a general procedure, shown in Fig. 4 and summarised in Table 3. Each step produces a written output, so that the reasoning behind a resolution can be reported and scrutinised rather than asserted.

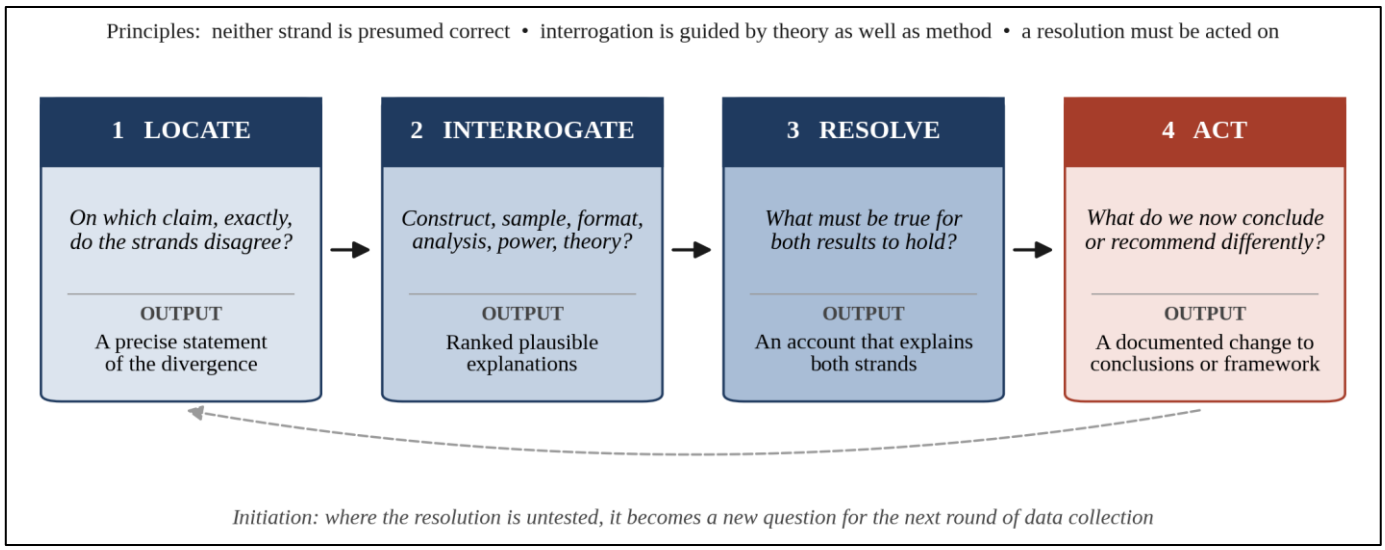


Fig 4 The Locate–Interrogate–Resolve–Act Procedure for Divergent Findings in a Joint Display

Each step yields an output that should be reported. The dashed arrow indicates that an untested resolution becomes the starting point for further data collection.

Three principles underlie the procedure. First, neither strand is presumed correct. Divergence is not resolved by deciding which strand to believe, but by finding an account that explains both; exclusion, in the typology of Pluye and colleagues [10], should be a last resort reserved for a strand with demonstrable validity problems. Second, the interrogation should be guided by theory as well as by method: the question is not only "what went wrong with the data?" but also "what does this tell us about the phenomenon?". Third, the resolution should be acted on. A divergence that changes nothing has been explained away rather than used.

The procedure is intended to complement, not replace, existing strategies. The construct, sample and format lenses overlap with the checks on rigour, dataset comparability and outcome matching proposed by Moffatt and colleagues [12]. The additions are the explicit statistical-precision lens, the requirement to record an output at each step, and the act step, which ties the methodological work to the substantive product of the study. Where the resolution remains untested, as it does here, the procedure points towards initiation [8], [10]: the resolution becomes a hypothesis for the next round of data collection.

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Table 3 Four Steps for Working with Divergence in a Joint Display

Step	Purpose	Guiding questions	Output to report	Worked example
Locate	State exactly where the strands disagree	On what claim do the strands point in different directions? On what do they still agree?	A one-sentence statement of the divergent claim	Strands agree that educators are busy; they disagree on whether workload is a problem and is linked to leaving
Interrogate	Identify and weigh plausible explanations	Same construct? Same people? Same question format? Hidden by analysis? Is the null informative? Theoretical explanation?	Explanations ranked by the evidence for each (as in Table 2)	Construct difference judged the primary explanation
Resolve	Formulate an account that explains both results	What would have to be true for both results to hold? What evidence supports that account?	A resolution statement, its evidential basis and its status	Workload has quantity and composition dimensions
Act	Change the conclusions, recommendations or framework	What would we have recommended without the divergence? What do we recommend now?	A documented before-and-after change	Burnout prevention reframed as workload governance

V. DISCUSSIONS AND IMPLICATIONS

➢ *For Reporting*

Mixed-methods reports should present the profile of integration across domains, including the number of divergent findings, and should describe how each divergence was interrogated and resolved. A report in which every domain converges may be accurate, but readers are entitled to wonder whether divergence was looked for. Table 4 proposes a minimum set of reporting items that can be completed in a paragraph or a supplementary table.

Table 4 Minimum Reporting Items for Divergent Findings in Joint Displays

Reporting item	What to report
1. Integration profile	The number of domains in each category, preferably shown graphically (as in Fig. 1)
2. Classification rules	How domains were assigned to categories, by whom, and any checks on agreement between analysts
3. Divergent claim	A precise statement of what the strands disagree about, and of what they still agree on
4. Interrogation	The lenses applied, the evidence examined and the judgement reached for each (as in Table 2)
5. Resolution	The account that explains both strands, and its status: supported, tentative or untested
6. Consequence	What changed in the conclusions, recommendations or framework as a result of the divergence

➢ *For Instrument Design*

The workload divergence arose partly because the survey measured only one dimension of workload. Researchers designing instruments for mixed-methods studies can anticipate divergence by including items that capture the composition as well as the quantity of work, such as the share of working time spent on tasks that do not contribute to teaching, and by piloting items with practitioners who can say whether they capture what matters. More generally, the design stage is the point at which pilot interviews or an earlier qualitative phase can be used to check that the concept behind each scale covers the concept that participants actually experience [20].

➢ *For Framework Development*

Frameworks derived from mixed-methods research are often presented as products of convergent evidence. The example suggests that they can be improved by divergence. A framework component that has survived the interrogation of a divergence is better specified than one supported only by agreement, because the interrogation has tested its assumptions. In the parent study, the one domain that diverged was the one that most changed the framework.

A. Limitations and Future Research

The example comes from a single study with a modest quantitative sample and a small qualitative strand of written, rather than conversational, interviews, which limited the scope for probing participants' accounts. Classification and interrogation were carried out by a single researcher, so the judgements in Tables 1 and 2 have not been checked by a second analyst. Alternative resolutions are possible; for example, the interview participants may have been more burdened than the survey sample as a whole. The resolution offered here is the one best supported by the available evidence, and it is presented as an illustration of a procedure rather than as a definitive finding about workload.

The resolution is also untested. A natural next step, consistent with the initiation strategy, would be to add items on the composition of work to the survey instrument and to test whether composition, rather than quantity, is associated with turnover intention in a larger sample; approximately 85 respondents would provide 80% power to detect a correlation of 0.30 [21]. More broadly, the procedure would benefit from application in other fields and from evaluation of whether

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independent analysts applying it to the same joint display reach similar resolutions.

VI. CONCLUSION

When the strands of a mixed-methods study disagree, the disagreement is evidence. In the worked example, the single domain in which the survey and the interviews diverged was the one that most changed the practical framework the study produced. The four-step procedure proposed here, locate, interrogate, resolve and act, supported by six interrogation lenses and a short reporting checklist, offers researchers a structured way to use divergence rather than explain it away, and in doing so to realise the promise of mixed methods to produce understanding that neither strand could produce alone.

DECLARATIONS

- *Relationship to Other Work.*

The worked example draws on the author's DBA thesis [18]. The four-step procedure, the interrogation lenses, the reporting checklist, the confidence-interval reanalysis and the methodological argument were developed for this paper.

- *Ethical Approval.*

Ethical approval for the parent study was granted by [name of approving committee, reference number], and all participants gave informed consent.

- *Data Availability.*

The aggregate results used in the worked example are reported in the parent thesis [18].

- *Funding.*

None.

- *Conflict of Interest.*

None declared.

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