

TECHNICAL FINDINGS REPORT

ABAD Adaptive ZD30 v4.1

Quire-Level Modular Accumulation Protocol

Date	15 August 2026
Decision	PASS — 2 OF 3 TESTS
Hypothesis	Separately coherent production blocks assembled into one manuscript
Sample	223 pages; 22,209 eligible transitions
Boundary	Structural evidence only; no dating, authorship, or decryption claim

Executive finding

Outcome: The modular-accumulation hypothesis passes its preregistered structural rule. Quires retain distinct, internally coherent final-glyph behavior after controlling for page geometry and hand, and pages within the same quire have more similar rule profiles than matched pages in different quires.

This is positive evidence that the surviving codex contains coherent production blocks rather than one uniform page-by-page sequence. It is compatible with sections being produced separately and later assembled or added. It does not distinguish later addition from ordinary batch production, rebinding, replacement, or loss.

Test	Question	Effect	p	Decision
A — residual coherence	Do quires retain distinct strength after controls?	$\eta^2 = 0.15657$	0.01990	PASS
B — rule profiles	Are pages in one quire mechanically more alike?	distance gap 0.05576	0.00498	PASS
C — boundaries	Are visible quire boundaries abrupt?	distance gap 0.06202	0.21393	FAIL

Simply put

- Yes: the manuscript behaves as if it contains internally coherent sections.
- The sections share the same basic ending-based mechanism, but use it differently.
- The result supports modular construction; it does not yet show which section came first or which was added later.

Your model: One contributor may establish one part of the system, stop, and another contributor may inherit the framework while adding or completing a different part—like one working 1+1 and 1×1, followed by another working 1–1. That predicts a shared core plus block-specific operations, not a smooth chronological drift.

1. Why v4.1 replaced the linear-order test

v4.0 tested a neutral Hand 1→5 ordering. That test narrowly failed and depended on a chronology the surviving manuscript does not guarantee. Folios may have been assembled in batches, rebound, removed, replaced, or inserted. v4.1 therefore treats the physical quire—not current page number or hand number—as the production unit.

Frozen hypothesis: The codex is a modular assembly of internally coherent production blocks. No direction or date of addition is assumed.

Frozen component	Operational rule
Production block	IVTFF \$Q quire code
Mechanism	Exact v4.0/v2.3 final EVA glyph → next broad ABAD class
Eligibility	Same frozen prefix inventory, token-length rule, and within-line transitions
Baseline control	Whole-page held-out geometry + hand ridge model
Profile distance	Hellinger distance between smoothed page glyph×next-class distributions
Null	Shuffle quire labels within hand × geometry strata and repeat all statistics
Replicates	200 per test
Global decision	At least two of three one-sided empirical p-values below 0.05

2. Test A — quire residual coherence

The analysis first predicted every page's final-glyph gain using geometry and hand identity on other pages only. It then asked how much of the remaining weighted variance separated the quires.

Result: Seventeen eligible quires covering 221 pages explained 15.66% of residual variation ($\eta^2 = 0.15657$). Matched label-shuffle $p = 0.01990$.

This means quire membership carries information not reducible to who wrote the page or how dense its layout is. The effect may include section-specific exemplars, production stages, page functions, or local scribal practice.

3. Test B — within-quire rule-profile coherence

Pair type	Pairs	Mean Hellinger distance
Same quire	1,093	0.28270
Different quire, hand/geometry matched	5,064	0.33845
Between-minus-within gap	—	0.05576

Result: Pages in the same quire are mechanically more similar. The 0.05576 distance advantage survives quire-label rediscovery nulls ($p = 0.00498$).

This is the strongest result in v4.1 because it examines the rule distributions themselves, not only a single strength score. It supports quire-local structural consistency under one manuscript-wide final-glyph mechanism.

4. Test C — physical-boundary discontinuity

Adjacent pair type	Boundaries	Mean profile distance
Within a quire	201	0.28926
Across a quire boundary	14	0.35128
Cross-minus-within gap	—	0.06202

Result: The observed boundary jump is in the predicted direction, but only 14 cross-quire boundaries were available and the null p-value was 0.21393. This test fails.

The failure does not erase Tests A and B. It says that present-day adjacent boundaries do not provide enough evidence for abrupt production changes—possibly because adjoining blocks share practices, the sample is small, or surviving order has been altered.

5. What the pass means

Supported by v4.1	Still unresolved
Quires are structurally coherent production blocks.	Which quire or section was produced first.
Quire effects remain after geometry and hand controls.	Whether any block was added after an original completion.
The same broad mechanism varies locally by block.	Whether folios were replaced because of wear or damage.
Current linear page order is an inadequate lineage model.	Whether blocks represent authors, exemplars, workshops, or functions.

Best interpretation: Your modular-addition idea is now structurally supported in its cautious form: the manuscript contains distinct but related blocks. The stronger historical claim—later additions or replacements—requires independent physical evidence.

6. What must be added to determine sequence

- Collation reconstruction: nested bifolia, quire signatures, sewing stations, guards, stubs, and misplaced leaves.
- Material continuity: parchment thickness, hair/flesh orientation, edge wear, stains, wormholes, and trimming patterns.
- Transfer evidence: pigment or ink offsets that can establish which surfaces once touched.
- Historical layers: original versus later foliation, corrections, retouching, and replaced or missing leaves.
- Only after that evidence is frozen should structural block relationships be directed into an earlier→later graph.

7. Next decisive protocol

Recommended v4.2: Test a shared-core + innovation model. Learn the manuscript-wide final-glyph rules on training blocks, measure which rules each quire preserves, and identify significant quire-specific additions on untouched pages. Then compare nested rule inventories to construct an undirected inheritance network. Direction may be assigned only where physical evidence—offsets, sewing, wear, foliation, or parchment continuity—supports it.

A match between the structural network and the physical collation would support shared exemplars or staged accumulation. A mismatch would suggest that the final-glyph differences follow function or content organization instead of production history.

Integrity

Receipt item	Value
Parent v4.0 receipt	998af4bc065dea7835d32bf7819e97732017059e381d5d7e495bec69996ad0c2
v4.1 specification	2175af19a5e03f0f3c219995195e5ccb8558bff8f61ff2cb7ca413356d96771f

Analyzed dataset	8fd9d023c7c18cfb85fb9e5824387a52b08022f28378098b91b1642f9e631ed7
Terminal receipt	137f9c902ee936e11345c931be9c5a8ec643886b119fae491ab4913ad702de66