THE CR-IMRaD 3.1

MASTER SPECIFICATION

A Unified Standard for High-Fidelity Knowledge Distillation

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Simple Summary

CR-IMRaD 3.1 is a writing standard that converts dense technical knowledge into documents anyone can read. It forces authors to open with a physical metaphor before introducing technical terms, compress their thesis into a bolded skimmable path, and place citations on the same page as their references. The standard defines sentence length limits, visual integration rules, and a three-tier automation framework (GREEN/AMBER/RED) for building conversion tools. It has been tested on three papers from three different domains and confirmed as domain-independent.

0.0 APPLICABILITY & SCOPE

Where This Standard Operates — and Where It Must Not

0.1 Authorized Domains

CR-IMRaD 3.1 governs writing that translates complex or abstract technical concepts into highly accessible formats. It is optimized for:

- Explanatory documents
- Instructional guides
- Troubleshooting manuals
- Technical primers
- Articles of understanding

Its purpose is to convert high-friction knowledge into low-friction comprehension without sacrificing scientific fidelity.

0.2 Excluded Domains

This standard must NOT be applied to:

- **Crisis Protocols (YOU ARE HERE):** Emergency text requires somatic, ultra-brief directives. The hourglass narrative introduces unacceptable cognitive load during amygdala hijack.
- **Raw Mathematical Notation (Forge Math):** Mathematical structures rely on compressed topological notation. Plain-language constraints degrade structural integrity.
- **Creative or Narrative Fiction:** CR-IMRaD's brevity, objectivity, and anti-passive-voice rules conflict with the aesthetic and emotional goals of literature.

1.0 GENERAL PRINCIPLES

The Cognitive-Resonant Philosophy

CR-IMRaD 3.1 is built on Cognitive Load Theory (CLT). Human working memory processes only 4-7 new chunks at once. The standard:

- **Reduces** extraneous load (jargon, abstraction, complex grammar)
- **Increases** germane load (deep processing through metaphor)
- **Preserves** intrinsic load (the actual complexity of the concept)

The goal is to create cognitive gems: information faceted for immediate comprehension by removing extraneous load, preserving intrinsic rigor, and establishing a skimmable path for accelerated reading.

2.0 MACRO-ARCHITECTURE

The Metaphoric Hourglass

CR-IMRaD adapts the IMRaD hourglass into a metaphor-driven structure that forces translation from abstract to accessible.

2.1 Introduction — The Universal Metaphor

You may NOT introduce a technical concept using technical terms. You must begin with an accessible, universally understood physical metaphor. This leverages elaborative rehearsal: connecting new information to familiar experiences.

2.2 Methods — The Technical Mechanism

The narrow neck of the hourglass. Here you map the metaphor to the scientific reality with explicit, mathematically defensible correspondences.

2.3 Results & Discussion — The Resolution

Resolve the metaphor's problem using the technical truth. The reader should finish the document feeling satiated by the density of the data or the questions posed by the authors.

3.0 MICRO-ARCHITECTURE

Syntax, Brevity, and Lexical Constraints

3.1 Sentence & Paragraph Constraints

- Instructional sentences: 20 words maximum
- Descriptive sentences: 25 words maximum
- One topic per paragraph
- Paragraphs: 6-8 lines maximum

3.2 Active Voice Mandate

- Use active voice exclusively
- Replace 'to be' verbs with strong action verbs
- Remove weasel words (slightly, mostly, seems, somewhat, arguably)
- Be extremely clear and concise

3.3 The Simple Concept Test

Every concept must be drawable as a box beginning with 'a' or 'an.' If it cannot be expressed as a concrete noun with a simple English relationship, it must be rewritten.

- **The 'A or An' Test:** Every defined concept must be expressible as 'a [noun]' or 'an [noun]' (e.g., 'a molecule,' 'a person,' 'a pair of integers').
- **Relationship Test:** Relationships between concepts must form valid, readable English sentences (e.g., 'a person has a molecular mass').
- **Action Mandate:** If a concept cannot pass these tests, it must be rewritten.

4.0 VISUAL-TEXTUAL INTEGRATION

The Anti-Split-Attention Protocol

4.1 Spatial Contiguity

Explanatory text must be physically integrated into diagrams. No separated figures and legends.

4.2 Glyphs & Transmogrification

Use multidimensional glyphs (shape, color, size) to encode complex data. Map abstract systems onto concrete spatial metaphors (e.g., subway maps for networks).

5.0 PROCEDURAL SYNTAX

The STE Protocol

- One action per sentence
- Use vertical lists for multi-step procedures
- Begin safety instructions with a command or condition

6.0 MODULARITY & TRANSCLUSION

Dynamic Assembly and Single-Source Truth

Manual embedding of prerequisite steps creates duplication and maintenance failures. CR-IMRaD 3.1 mandates transclusion.

6.1 Single-Source Truth

Each prerequisite procedure exists as a single standalone module in a CMS or DITA/XML system.

6.2 Dynamic Assembly

Writers insert a programmatic callout. The publishing platform automatically renders the prerequisite steps in place, producing a seamless single-page experience.

6.3 Zero Page-Flipping

Users never navigate away. Writers maintain only one master version.

7.0 TYPOGRAPHY & ACCESSIBILITY

The Legibility Protocol

7.1 Font Selection

Writers must choose typefaces based on legibility for the output medium, not family. Accessibility and comfort of reading are paramount. Both serif and sans-serif are acceptable.

7.2 CRAP Principles

Contrast, Repetition, Alignment, Proximity govern layout.

7.3 Contrast Requirements

Use size and weight contrast to distinguish headings from body text. Example: bold 16-18pt headers with 10-12pt body text.

7.4 Negative Space

Generous white space reduces intimidation and improves readability.

7.5 Skimmability & Key Concept Highlighting

Use bolding exclusively to create a visual scaffold and skimmable path that enables instant comprehension. The reader should be able to scan only the bolded text and immediately absorb the main concept.

- Limit bolding to 1-3 critical concepts or keywords per paragraph

- Bolded words must form a grammatically sensible summary when read in sequence (the 'skimmable path')
- Do NOT bold non-essential words, as this reintroduces cognitive friction

7.6 Page Geometry

- Margins: 1.0 inch (2.54 cm) on all sides
- Pagination: Numeric, upper right-hand corner. Title Page = Page 0; numbering begins at Page 1

7.7 Header Architecture

- Font Size: 8-10pt
- Content: Author(s) names right aligned, tab, then page number
- Delimiter: Space | Space
- Example: Author A | Author B | Author C

7.8 Footer and Same-Page Reference Architecture

This update redefines citation placement to eliminate formatting issues associated with the physical document footer, maintaining the same-page, zero-flipping rule.

7.8.1 Page Reference Block (The Zero-Flipping Zone)

- **Location:** Must be a distinct, unpaginated section created at the bottom of the main content area of the page, separated from the body text by a thin horizontal rule.
- **Font Size:** 8-10pt
- **Alignment:** Left-aligned, single-column format.
- **Content:** The full, detailed citation corresponding to the in-text glyphs on that page. Each citation is separated by a line break, **not** a pipe delimiter, to improve readability.
- **Example:**

1 Sweller, J. (**2024**). Cognitive Load Theory. This study establishes the intrinsic load limit for technical instruction.
2 Redish, J. (2023). Letting go of the perfect: Writing for comprehension.

7.8.2 Footer Architecture (Static Content)

- **Font Size:** 8-10pt
- **Alignment:** Left-aligned or centered, as required for boilerplate.
- **Content:** Standard document boilerplate, licensing, and general document identifiers (e.g., Copyright, License, Document Version, Date).
- **Example:** DodecaGone Systems | dodecagone.net | CC BY-SA 4.0 | 2026-04-04

7.9 Visual-Textual Flow (The Spatial Rule)

Diagram Orientation	Textual Strategy	Logic
Highly Vertical	Two-column layout or vertical text block adjacent	Prevents long eye-travel distances
Highly Horizontal	Full-width blocks above and below	Maintains natural downward reading flow
Complex/Circular	Callout lines from text to image parts	Eliminates need for separate legend

8.0 MODULAR PAGINATION

The Structured Chain

- Each page must function as a verifiable, robust link in a conceptual chain, contributing a single discrete unit of knowledge
- Complex arguments may span multiple pages but must maintain clear conceptual continuity
- No widowed headings
- No orphan sentences
- If a concept is relational, define it by its connections, not by being a box itself

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9.0 VISUAL POINT-OF-VIEW SCALING

First-Person Framing

- Use first-person POV images for physical tasks
- Zoom in for detail, but never so far that context is lost

10.0 AUDIENCE CALIBRATION

The Hallway Test

- Reading level = writing level
- Hand the draft to a novice
- Every 'I don't know what this means' requires revision or consideration
- Spell out acronyms on first use
- Provide inline definitions or a glossary for unavoidable technical terms
- Embed feedback mechanisms in digital modules

11.0 SIMPLEST SUMMARY

The Anti-Abstract

The traditional abstract is replaced with a structured, concrete Simplest Summary. It must be:

- Positioned in the bottom third of the first page, under Title, Subtitle, and visual aid
- Accompanied by a summarizing visual aid centered on page 1 (if able), with descriptive text immediately below
- The most accessible section of the entire document
- Non-technical yet rigorous
- A plain-language summary of the entire document
- A paragraph in length, minimum 3 full sentences, maximum 200 words

12.0 DIGITAL MULTIMEDIA INTEGRATION

Breaking Free of Static Print

12.1 Descriptive Captions

Every visual element must include a descriptive caption placed directly adjacent.

12.2 Audio Narration

Use audio buttons to leverage the modality effect: simultaneous auditory + visual channels reduce cognitive load.

12.3 GIFs & Short Video

Embed short (30 seconds maximum) targeted clips to demonstrate motion or change.

12.4 User-Controlled Animation

Animations must include: play, pause, rewind, fast-forward, and speed control. Interactive control dramatically improves comprehension.

13.0 THE HIGH-FIDELITY CITATION STANDARD

Zero-Friction Knowledge Attribution

This citation style maintains scientific fidelity while adhering to the Anti-Split-Attention Protocol. It combines the best of Chicago, APA, and MLA into a format optimized for skimmable technical primers.

13.1 In-Text Protocol: The Discrete Glyph

Use superscript numeric glyphs placed after terminal punctuation. Keep the skimmable path free of citation clutter.

Example: *'The human working memory can only process 4-7 new chunks of data at once*[1]*.'*

13.2 Same-Page Reference Block: Single-Source Truth

The full citation text must exist on the same page as its reference, now located in the **Page Reference Block (7.8.1)**. This ensures Zero page-flipping and is managed within the main document flow, not the physical footer.

- **Structure:** Author Name (**Year**). Title of Work. (Simple Concept Summary).
- **Example:** *1 Sweller, J. (**2024**). Cognitive Load Theory. This study establishes the intrinsic load limit for technical instruction.*

13.3 Visual-Textual Integration

If a source supports a diagram or glyph, the citation must be physically integrated into the descriptive caption, not relegated to a separate list.

13.4 Simple Concept Test for Citations

Every citation must pass the 'A or An' test: Can I identify this source as a specific study or an expert voice? If the source is too abstract, it must be rewritten to a verifiable, concrete link.

13.5 Citation Rules Summary

Feature	Requirement	Logic
In-Text Marker	Superscript number	Minimizes visual noise
Placement	Same-page footer	Zero page-flipping
Date Priority	Bolded after author	Instant fidelity/relevance check
Summary	1-sentence plain-language takeaway	Converts citation into unit of knowledge
Bolding	Applied to key findings only	Creates skimmable path for sources

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14.0 KNOWLEDGE AIDS

Diagrams, Cartoons, Tables, and Visual Elements

14.1 Definition and Scope

A knowledge aid is any non-prose visual element intended to accelerate comprehension: diagrams, flowcharts, cartoons, infographics, tables, glyphs, annotated photographs, and spatial metaphor maps. It does NOT include decorative images, stock photography, or visual elements that carry no informational load.

If removing the visual would not reduce the reader's comprehension, it does not belong in the document.

14.2 Mandatory Elements

- **Figure number:** Sequential. Format: 'Fig X.Y' where X = section number, Y = sequence within section.
- **Descriptive caption:** Placed directly adjacent (below for horizontal, beside for vertical). Must describe what the reader is seeing AND what conclusion to draw.
- **Source attribution:** Integrated into caption per Citation Standard. If original, state: 'Original.'
- **Alt text:** For digital output, screen-reader-accessible text conveying equivalent informational content. A blind reader must receive equivalent comprehension.

14.3 Quality Gates

- **The Replacement Test:** Could this visual be replaced by a single sentence without loss? If yes, use the sentence.
- **The Standalone Test:** Can a reader understand the visual from figure, caption, and labels alone? If not, the visual is incomplete.

14.4 Spatial Integration

- **Proximity:** Visual must appear within one page of its first textual reference.
- **Orientation matching:** Vertical diagrams get vertical text adjacent. Horizontal get full-width blocks above/below. Complex/circular use callout lines.
- **No orphaned figures:** A knowledge aid must never appear on a page by itself with no accompanying text.
- **Flow preservation:** Reader's eye should never jump backward or laterally more than one column width after encountering a figure.

14.5 Cartoons and Illustrated Metaphors

- **Narrative function:** Must map directly to a technical concept. Visual form of the Universal Metaphor, not decoration.
- **Simplicity:** Maximum 3 concepts per cartoon panel.
- **Humor:** Permitted and encouraged when it serves comprehension. The joke serves the truth; the truth does not serve the joke.
- **Recurring visual language:** Establish consistent visual vocabulary and maintain throughout. No new visual language on every page.

14.6 Tables

- Maximum 6 columns. Beyond 6, split or restructure as diagram.
- Row headers must be clearly distinguished using weight or shading contrast.
- No empty cells. Use 'N/A' or 'Not measured.'
- Reading direction: left-to-right, top-to-bottom only.

15.0 RESOURCES SECTION

Acknowledgements, Funding, Affiliations

15.1 Acknowledgements

Recognizes entities that contributed but do not meet authorship threshold (substantive intellectual contributions to content, structure, or conclusions). Organized by type:

- **Intellectual Contributors:** Individuals or AI systems providing feedback, review, or domain expertise. Format: 'Name (Affiliation) provided [specific contribution].'
- **Technical Contributors:** Tools, platforms, or systems performing computation, synthesis, or formatting. Format: 'System (Platform) performed [specific function].'
- **Somatic Contributors:** Individuals whose presence or environmental management enabled the work. Format: 'Name provided [specific support function].'

Constraints: No marketing language. No superlatives. No unverifiable claims. Every acknowledgement must pass the Simple Concept Test.

15.2 Funding Source Disclosures

Disclosure is mandatory and exhaustive. Three categories:

- **Direct Funding:** Grants, salaries, stipends. If none: 'This work received no direct funding.'
- **In-Kind Support:** Platform subscriptions, hardware access, API credits, donated services.
- **Potential Conflicts:** Any financial relationship with entities discussed in the document. If none: 'The authors declare no conflicts of interest.'

Fidelity Rule: Omission of a material funding source constitutes a fidelity violation.

15.3 Affiliations

Each author's affiliation entry must include:

- Primary affiliation (organization, institution, or 'Independent researcher, unaffiliated')
- Role within that affiliation
- Location (city and country)
- Public-facing contact method (website, email, or institutional page)

Affiliations must accurately reflect context of production, not aspirational context. Do not fabricate or inflate.

AI contributors are listed in Acknowledgements, not Affiliations, unless the authorship framework explicitly defines them as co-authors.

16.0 TITLE PAGE TEMPLATE

The title page follows this structure:

- Title (large, bold, centered)
- Subtitle + Date (right-aligned or tabbed)
- Author name(s)
- Summarizing visual aid (centered, if able) with descriptive caption immediately below
- Simplest Summary (bottom third of page, 3+ sentences, 200 words max)

Title Page = Page 0. Numbering begins at Page 1.

17.0 AUTOMATION FRAMEWORK

GREEN / AMBER / RED Tiers for Tool Development

17.1 GREEN — Fully Automatable

The machine applies with confidence. No author review needed.

- Page geometry, margins, font sizing
- Header/footer architecture
- Citation superscript numbering and footer placement
- Figure numbering
- Sentence and paragraph length validation
- Empty cell detection, column count validation
- Orphan/widow detection
- Weasel word flagging
- Acronym expansion checking

17.2 AMBER — Machine Suggests, Author Confirms

- Speculative bolding (skimmable path)
- Suggested opening metaphor
- Suggested Simplest Summary draft
- Citation one-sentence summaries
- Alt text generation
- Descriptive caption drafts
- Active voice conversion suggestions

17.3 RED — Author Must Write or Decide

- Final bolding confirmation (skimmable path)
- Opening metaphor selection
- Simplest Summary final approval
- Humor judgment in cartoons (whether joke serves truth)
- Authorship threshold determination
- Conflict of interest assessment
- Affiliation accuracy verification