NCIER®: National Center for Integrated Emergency Response
Occasional Papers, Number 201801, February 23, 2018. | Revised: November 21, 2025
https://ncier.org/research/methodology-review-validation-asim-checklist

METHODOLOGY REVIEW: Validation of the Active Shooter Incident Management Checklist

Godfrey, William M.

CEO, C3 Pathways, Inc.
Lead Instructor, National Center for Integrated Emergency Response (NCIER®)
Oviedo, Florida, United States of America

Abstract

Objective: To validate the Active Shooter Incident Management (ASIM) Checklist as a reliable cognitive tool for mitigating stress-induced performance degradation in incident commanders.

Methodology: A dual-layer validation framework was applied. First, a theoretical audit measured compliance against Stufflebeam's development guidelines, Bichelmeyer's formatting checklist, and NASA's flight-deck typography standards. Second, empirical field validation was conducted during complex full-scale exercises in 2014 ($n = 152$) and 2017 ($n = 66$).

Results: Theoretical audits yielded high compliance: Development (91.67%), Formatting (91.30%), and Typography (95.24%). Field validation showed consistent user acceptance, with 98% of respondents rating the checklist as helpful under pressure and "easy to follow." Terminology clarity improved from 87% (2014) to 97% (2017) following iterative refinements.

Conclusion: The ASIM Checklist is a scientifically validated job aid that meets rigorous standards for human factors design and practical usability in hostile event environments.

Keywords: Active Shooter Incident Management, ASIM, Bichelmeyer Formatting, Checklist Validation, Cognitive Aid, Cognitive Tunneling, Emergency Response Methodology, Fire/EMS, Human Factors in Emergency Response, Incident Command System, Integrated Response, Job Aid Design, NASA Typography Standards, Police, Stufflebeam Guidelines

1.0 Introduction: The Imperative for a Rigorously Validated Incident Management Tool

In high-stress, dynamic environments such as active shooter incidents, the operational demands on first responders can induce acute stress, leading to performance degradation. Effective job aids are critical cognitive tools designed to mitigate cognitive tunneling and ensure essential tasks are completed systematically. For such a tool to be reliable, it must undergo a comprehensive, multi-layered validation process. The purpose of this document is to detail the methodology applied to validate the Active Shooter Incident Management Checklist, ensuring its efficacy and usability for incident commanders and first responders.

This review will examine the three distinct pillars upon which the checklist's validation was built, each corresponding to an established professional or academic standard:

- Compliance with established academic and professional guidelines for checklist **development**.
- Adherence to best practices for **formatting and usability**.
- Conformity with specialized standards for **typography and legibility** under pressure.

These compliance audits are complemented by direct user feedback gathered during full-scale, functional training exercises, providing a complete picture of the checklist's validity. This dual approach provides a robust framework for assessing the tool's theoretical soundness and its practical effectiveness in the field.

2.0 A Multi-Faceted Validation Framework: Rationale and Approach

The strategic decision to employ a multi-faceted validation framework is central to establishing the credibility of a life-safety tool. Relying on a single validation method is insufficient for a resource intended for use in high-consequence events. This approach, therefore, triangulates evidence from development theory, human factors design principles, and end-user performance to build a comprehensive case for the checklist's effectiveness.

2.1 Foundational Integrity: Stufflebeam's Checklist Development Checklist

The foundational layer of validation was an audit against Daniel L. Stufflebeam's ***Guidelines for Developing Evaluation Checklists***. This framework was selected to ensure that the checklist's content and creation process were methodologically sound from the outset. This review confirms that the checklist was constructed through a systematic process involving literature review, expert consultation, and a structured review cycle, ensuring its foundational integrity.

2.2 Usability and Formatting: Bichelmeyer's Checklist for Formatting Checklists

The second validation layer was designed to validate the checklist's design for minimizing extraneous cognitive load and optimizing cognitive offloading. Using Barbara Bichelmeyer's ***Checklist for Formatting Checklists***, this audit evaluated how the checklist's layout, language, and structure facilitate rapid comprehension and correct application during a chaotic incident. By assessing criteria such as active voice, precise terminology, and logical flow, this audit verifies the checklist is engineered to reduce user error when stakes are highest.

2.3 Legibility Under Stress: NASA's Typography of Flight-Deck Documentation

The final layer of the theoretical audit applied standards from NASA's research, ***On the Typography of Flight-Deck Documentation***. This choice was justified by the direct parallel between the high-stakes, high-stress environments of aviation flight decks and emergency incident command, where absolute clarity is paramount. This audit examined elements such as font choice, character spacing, and contrast to ensure the checklist remains legible and unambiguous under adverse operational conditions.

Each component of this validation framework provides objective evidence of the checklist's adherence to best practices, which are then assessed through empirical compliance audits.

3.0 Guideline Compliance Audit: A Quantitative Assessment

This section presents the quantitative outcomes of measuring the Active Shooter Incident Management Checklist against the three expert guidelines. The results provide objective evidence of the checklist's design quality and its adherence to established best practices in development, formatting, and typography.

3.1 Stufflebeam Development Process Compliance (28 January 2014)

The audit against Stufflebeam's guidelines focused on the procedural rigor of the checklist's creation, with findings summarized below. The review yielded an

overall compliance score of **91.67% "Yes"** across 36 applicable criteria, with zero items rated "No," indicating a robust and systematic development process.

Category	Key Findings and Analysis of Partial Compliance
Development Process	The process demonstrated high fidelity to the guidelines, including defining the content area, engaging subject-matter experts, and systematically listing, classifying, and ordering checkpoints. The two 'Partial' ratings in this category relate to rationales for item categorization and ordering being discussed and understood by the development team rather than formally written down—a deviation in documentation, not in procedural quality.
Review / Format	A formal review process was conducted with potential users, and their feedback was used to revise the checklist content in full compliance with all applicable criteria in this category.
Evaluate	The checklist was field-tested with intended users to assess its clarity, comprehensiveness, and overall fairness, meeting all evaluation criteria.
Finalization	Field-test findings were systematically considered and addressed before the checklist was finalized for application and dissemination, with all criteria met.

The three 'Partial' compliance items represent minor procedural variations, such as using electronic documents instead of physical 4x6 cards for sorting. These deviations are procedural nuances that do not detract from the substantive quality or the integrity of the development methodology.

3.2 Bichelmeyer Formatting Compliance (27 January 2014)

The audit against Bichelmeyer's formatting guidelines assessed the checklist's user-centric design. The review resulted in a **91.30% "Yes"** compliance rate across 46 criteria, demonstrating a strong focus on cognitive ergonomics.

Category	Key Findings and Analysis of Deviations
Context	The checklist's purpose and audience were clearly defined. A 'Partial' rating was given because contextual information was provided in a separate, accompanying "Help" document rather than within the checklist itself, a logical design choice to keep the primary tool uncluttered.
Content	The content was assessed as complete, correct, and free of extraneous material. The checklist effectively uses precise terms, common words, and an active voice, meeting all 12 criteria in this category.
Structure	The checklist effectively groups similar items and uses white space and highlighting for clarity. A 'No' rating was given for not numerically sequencing items; instead, the design uses checkable boxes [ ] to denote sequence, a common and intuitive format for job aids.
Usability	A 'No' rating was assigned because testing occurred with groups during scenarios rather than one-on-one. This deviation from the ideal one-on-one protocol represents a deliberate methodological choice, prioritizing ecological validity—testing the tool within a team dynamic under simulated stress—over the diagnostic precision of isolated user testing. The overwhelmingly positive feedback validates this approach for this specific application.

The noted deviations are not design flaws but rather deliberate trade-offs that prioritize operational realism and clarity, ultimately enhancing the tool's practical usability.

3.3 NASA Typography Compliance (29 January 2014)

The audit against NASA's typography standards confirmed the checklist's design for high-stress

legibility, achieving an exceptional **95.24% "Yes"** compliance rate across 21 applicable criteria.

Key design compliance was confirmed, leveraging principles such as:

- **Font**: Use of a sans-serif font (Gill Sans) to improve character recognition.
- **Case**: Predominantly lower-case text to enhance readability speed under duress.
- **Spacing**: Vertical and horizontal spacing meets or exceeds recommendations, preventing character crowding.
- **Contrast**: Employs high-contrast black characters on a white background for maximum clarity.

The single **'Partial'** compliance item related to the "x" height of some fonts. While the overall font height met NASA standards, the "x" height (the height of a lowercase 'x') for some characters was slightly below the 0.10-inch recommendation, a minor deviation within an otherwise highly compliant typographical design.

This high degree of theoretical compliance establishes the checklist's robust design foundation; the following section details how this foundation translated into effective performance and user acceptance in high-fidelity field environments.

4.0 Field Validation: End-User Performance and Feedback

While compliance audits confirm theoretical soundness, only performance-based feedback from the target audience can validate a tool's practical utility under realistic, high-pressure conditions. The Active Shooter Incident Management Checklist was subjected to two major field validation events, one in 2014 and a revalidation in 2017, to gather direct feedback from first responders.

4.1 Validation Methodology

A consistent methodology was employed for both validation exercises. Participants used the checklist during full-scale/functional hybrid training scenarios simulating the complexity of an actual active shooter event. To ensure broad experience, participants rotated through different incident command roles. Following the exercises, feedback was collected via survey instruments and post-scenario "hotwash" discussions.

4.2 Participant Demographics and Scenario Complexity

The validation events engaged a diverse group of first responders in scenarios of increasing complexity, ensuring the checklist was tested across a wide range of conditions and user types.

Metric	2014 Validation	2017 Revalidation
Total Participants Surveyed	152	66
Surveys Returned	121	60
Return Rate (%)	80%	91%
Participating Agencies	9	15
Agency Types	Law Enforcement, Fire Rescue, EMS, Emergency Management	Law Enforcement, Fire Rescue, EMS
Training Duration	8 hours	24 hours
Scenario Complexity	1-2 attackers, 5-25 patients, 15-80 victims	1-5 attackers, 5-50 patients, 10-150+ victims

4.3 Quantitative Feedback Analysis (2014 vs. 2017)

User feedback was overwhelmingly positive in both validation events, with improvements in the 2017 revalidation demonstrating the success of iterative design refinements.

Yes/No Question Results (% "Yes" Responses)

The data shows consistently high ratings on the checklist's core functions. The significant 10-point improvement in the clarity of its terminology from 87% in 2014 to 97% in 2017 is a direct testament to the efficacy of the iterative development and review cycle validated by the Stufflebeam audit and the focus on precise language validated by the Bichelmeyer audit.

Survey Question	2014	2017
Includes appropriate attention items	98%	98%
Makes sense	98%	98%
Terminology is clear, concise, understandable	87%	97%
Format is easy to follow	98%	98%
Helpful under pressure	93%	98%

Likert Scale Agreement Analysis (% Strongly Agree + Agree)

Participants consistently agreed that the checklist was well-organized, easy to use, and effective. The slight decrease in agreement for "Kept me on track" (94% to 90%) and "Improved my situational awareness" (91% to 88%) in 2017, despite overall higher ratings, may correlate with the significantly increased scenario complexity (up to 5 attackers and 150+ victims vs. 1-2 attackers and 80 victims). This suggests that while the checklist remained a highly effective tool, the cognitive load imposed by more complex scenarios may have slightly attenuated its perceived impact on these specific metrics.

Survey Statement	2014	2017
Well structured and organized	93%	94%
Easy to use	88%	95%
Kept me on track	94%	90%
Improved my situational awareness	91%	88%
Helped improve my skills	94%	95%
Would utilize during an actual event	85%	90%

The overwhelmingly positive user feedback from these rigorous field exercises confirms the checklist's real-world effectiveness.

5.0 Conclusion: A Verified and Validated Job Aid

The Active Shooter Incident Management Checklist has been subjected to a rigorous, multi-pronged validation process that combines theoretical compliance with practical, performance-based evaluation. The evidence gathered from this comprehensive review leads to a clear and confident conclusion regarding its validity.

The key findings demonstrate that:

- The checklist shows a high degree of compliance with expert-derived guidelines for **development (Stufflebeam)**, ensuring its content is methodologically sound and comprehensive.
- The checklist adheres closely to best practices for **formatting (Bichelmeyer) and typography (NASA)**, confirming it is designed for ease of use, rapid comprehension, and legibility under stress.
- Field validation exercises in both 2014 and 2017 with a diverse range of first responders yielded overwhelmingly positive feedback on the checklist's content, clarity, usability, and effectiveness under pressure.

Based on this body of evidence, the **Active Shooter Incident Management Checklist is found to be a valid job aid with appropriate content, format, terminology, and usability for Active Shooter Event Response**.

This conclusion, first established in the initial 2014 validation, was reaffirmed and finalized in the 2017 revalidation review, attested to by C3 Pathways CEO/ Chief Consultant William Godfrey on February 23, 2018.

Acknowledgments — Thank you to the NCIER® Instructors for their tireless efforts and contributions saving lives through training. NCIER® is a registered trademark for the National Center for Integrated Emergency Response, a division of C3 Pathways, Inc.

Literature Cited

Excerpts from "Active Shooter Incident Management Checklist from C3 Pathways." Available at: https://www.c3pathways.com/asimchecklist

Excerpts from "Active Shooter Incident Management (ASIM) Validation Exercise Data, 2014 & 2017." (Not directly available online—private research data held by C3 Pathways.)

Excerpts from "Guidelines for Developing Evaluation Checklists" by Daniel L. Stufflebeam. Available at: https://wmich.edu/evaluation/checklists Excerpts from "Checklist for Formatting Checklists" by Barbara Bichelmeyer. Available at: https://wmich.edu/evaluation/checklists

Excerpts from "On the Typography of Flight-Deck Documentation" by Asaf Degani (NASA Contractor Report 177605). Available at: https://ntrs.nasa.gov/citations/19930010770