Untangling scenario terminology to improve exercise ontology across domains

A suggested glossary to improve clarity, communication, and replicability in scenario-based studies

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ABSTRACT

Scenario-based research is widely used across disciplines, from emergency management and healthcare to military strategy and live-action role-playing (LARP). However, inconsistencies in terminology and reporting practices hinder clarity, replicability, and cross-disciplinary collaboration. This study addresses these challenges by developing a standardized glossary to improve scenario documentation in both academic research and professional practice. Using qualitative data from semi-structured interviews with nine professionals across six domains, the study identifies key terminological inconsistencies and categorizes essential scenario components into nine thematic groups, including scenario types, temporal dynamics, immersion mechanisms, and evaluation methods. The resulting glossary enhances clarity, fosters interdisciplinary communication, and supports methodological rigor, enabling more consistent and comparable scenario-based research. By providing a unified lexicon, this study bridges gaps between qualitative and quantitative approaches, facilitating knowledge transfer and improving replicability. Future research should focus on validating and refining the glossary through practical applications in multi-agency exercises and academic studies.

Keywords

Scenario, glossary, scenario-based research.

INTRODUCTION

Scenario-based research plays a crucial role in understanding complex cognitive, organizational, and social phenomena, particularly in high-stakes environments where decision-making, coordination, and predictive modeling are essential. The use of scenarios spans multiple research disciplines, including cognitive science, psychology, emergency management, military strategy, and corporate foresight. Despite the widespread adoption of scenarios as analytical and training tools, scenario-based research faces a significant challenge: the lack of a standardized framework for describing scenarios in research publications and reports. This issue not only impairs the interpretability of scenario studies but also limits their replicability, reducing the impact of findings on both academic discourse and practical applications. Further, scenario-based exercises are common in almost all practical application domains, such as rescue services, crisis management agencies, military forces etc. Unfortunately, the conceptual confusion concerning terminology used to describe scenarios are at least as big in practitioner domains as in the research fields.

Scenarios are inherently versatile tools, tailored to meet diverse objectives, from testing operational preparedness and forecasting future possibilities to training personnel in complex crisis management contexts. This flexibility, however, has contributed to inconsistencies in scenario documentation, as highlighted in the literature on scenario planning and crisis exercise design. Some frameworks emphasize quantitative precision, incorporating techniques such as probabilistic modified trends (PMT), trend impact analysis (TIA), and cross-impact analysis to capture event probabilities and causal relationships (Amer et al., 2013). Others prioritize qualitative narratives, focusing on elements like participant decision-making, organizational dynamics, and emergent behaviors (Grunnan & Fridheim, 2017; Noori et al., 2017). This divergence reflects distinct epistemological traditions, ranging from intuitive logics to data-driven models, but also fosters fragmentation within the field.

Prior work in ISCRAM has explored methodological scenario design (Drury et al., 2009), structured simulation frameworks (Hannay & Kikke, 2019), and interdisciplinary foresight applications (Gerhold et al., 2020). These studies underscore the importance of scenario-based approaches but also reveal a gap in conceptual clarity and terminological standardization. Our contribution addresses this gap by developing a domain-spanning glossary to improve the consistency and replicability of scenario-based research and training.

Inconsistencies, such as these identified above, can result in fundamental differences between a scenario developed for a governmental agency and one designed for a laboratory simulation (Börjeson et al., 2006). Despite their differing contexts, both require rigorous documentation to ensure their findings are transferable, replicable, and scientifically valid. Inadequate or inconsistent scenario descriptions undermine this goal. Without a standardized approach to terminology and reporting, researchers and practitioners face challenges in comparing results across studies, leading to inefficiencies in knowledge transfer between academia, industry, and policy-making bodies (Amer et al., 2013). Moreover, the lack of clear documentation inhibits the replicability of scenario-based studies, a critical component of scientific integrity, compromising the validity of conclusions and their application in real-world decision-making.

To overcome the challenges identified above, this study builds on methodologies outlined in scenario design literature (Limousin et al., 2018; Bony-Dandrieux et al., 2022) to develop a structured glossary aimed at improving the clarity, consistency, and utility of scenario descriptions. Drawing on qualitative data from interviews with experts across diverse sectors, ranging from emergency management and healthcare to military planning, the glossary distills key terms, scenario components, and reporting practices into an accessible framework (Noori et al., 2017). This lexicon bridges the divide between qualitative and quantitative approaches, facilitating interdisciplinary communication and enhancing the replicability of scenario-based research.

Adopting a consistent and unified set of terms and definitions that are understood and applied in the same way across different contexts, disciplines, or stakeholders, researchers and practitioners can improve methodological rigor, foster cross-sector collaboration, and strengthen the reliability of scenario-driven insights in both decision-making and policy development. Moreover, a structured glossary supports the evolution of scenario planning as a robust scientific method, one capable of addressing the complexities of modern crises while ensuring that findings are transparent, replicable, and actionable across various fields (Amer et al., 2013; Grunnan & Fridheim, 2017; Bony-Dandrieux et al., 2022).

Several domain-specific glossaries support simulation and scenario-based practice, including the Healthcare *Simulation Dictionary* (https://www.inacsl.org/healthcare-simulation-dictionary?utm_source=chatgpt.com), the *INACSL Simulation Glossary* (INACSL, 2016), and the ACM SIGSIM glossary (https://sigsim.acm.org/mskr/glossary.htm?utm_source=chatgpt.com). While useful within their respective domains—such as clinical training, nursing education, and computing—these resources often omit key elements like narrative structure, participant roles, and immersion mechanisms. Most emphasize technical or procedural fidelity, offering limited support for interdisciplinary collaboration or complex scenario-based exercises. As noted by Amer et al. (2013) and Grunnan and Fridheim (2017), the lack of shared terminology complicates knowledge transfer and weakens methodological rigor in scenario work.

Despite the widespread use of scenario-based methods across various domains, there is no unified framework for terminology, leading to fragmented knowledge, limited replicability, and inefficient cross-sector collaboration. This paper aims to address this gap by proposing a standardized glossary for scenario-based research and practice. Hence enhancing the clarity and replicability of scenario descriptions. By refining terminology across disciplines, the glossary facilitates interdisciplinary communication, supports methodological rigor, and ensures that scenario-based findings can be effectively compared, interpreted, and applied in both academic and professional contexts.

To address these challenges, this study develops a structured glossary designed to enhance the clarity, consistency, and utility of scenario descriptions. Drawing on qualitative data from interviews with professionals across multiple fields, the glossary distills key concepts, scenario components, and reporting practices into an accessible framework. By providing a standardized lexicon, this study aims to bridge the gap between qualitative and quantitative approaches, improve interdisciplinary communication, and facilitate the replicability of scenario-

based research. The adoption of this framework has the potential to improve methodological rigor, foster cross-sector collaboration, and ultimately strengthen the reliability of scenario-driven insights in decision-making and policy development.

Previous Work on Scenario Terminology

The challenge of defining and standardizing terminology in scenario research has been previously explored. Spaniol & Rowland (2019) conducted a large-scale review of 77 definitions of the term "scenario" in foresight research and found that the most frequently used descriptors were future, possible, plausible, story, and event. Their work highlights the multiplicity of interpretations and the fragmented nature of scenario terminology. Rather than proposing a single, rigid definition, they advocate for a flexible, component-based approach – a perspective that aligns with this study's aim of creating a structured glossary.

Bishop et al. (2007) examined different scenario development techniques and emphasized that while there are many methodological approaches to constructing scenarios (e.g., exploratory, normative, and predictive), the lack of standardization in terminology creates confusion when comparing studies. They argue that terminological inconsistencies weaken the methodological rigor of scenario-based research, making it difficult to determine best practices across different fields. Similarly, Quade & Boucher (1968) addressed the variability in scenario descriptions, particularly in policy and defense planning. They noted that while scenarios serve as decision-support tools, the lack of a shared vocabulary leads to epistemological challenges – i.e., difficulties in ensuring that knowledge generated from scenario exercises can be meaningfully applied in real-world decision-making.

Terminology and Cross-Disciplinary Communication

Another relevant theoretical framework is organizational communication theory, which examines how terminology and language affect coordination, learning, and shared understanding within and between organizations. Andrews et al. (2022) highlight that shared mental models are critical for effective collaboration, particularly in high-stakes environments where multiple stakeholders need to align their thinking and expectations. This concept is especially relevant in cross-organizational scenario exercises, such as emergency response planning where police, fire departments, and medical teams must coordinate their actions. If different organizations describe scenario elements inconsistently, miscommunication can lead to operational inefficiencies and even failures in crisis response.

The primary objective of this study is to develop a structured glossary that enhances clarity and replicability in scenario-based research. The study addresses the following research questions:

- What are the key terminological inconsistencies present in current scenario-based studies?
- How can a standardized glossary improve communication and replicability across different domains?
- What are the essential components and attributes that should be included in scenario descriptions?

METHOD

This study employed a qualitative research approach to develop a standardized glossary for scenario-based research. The primary method involved semi-structured interviews with professionals actively engaged in scenario creation, execution, and evaluation. These experts were drawn from a diverse range of fields, including emergency services, security, healthcare, and live-action role-playing, ensuring a broad perspective on scenario terminology and its practical application.

Participants

A total of nine participants from six different sectors were interviewed, including professionals from the police, firefighting, healthcare, security consulting, and role-play scenario design. Participants were recruited through targeted outreach, leveraging professional networks and recommendations. They were contacted via email, provided with an overview of the study's objectives, and invited to participate in a semi-structured interview. By including participants from varied professional backgrounds, the study aimed to capture commonalities and discrepancies in scenario descriptions, ultimately informing the development of a comprehensive and interdisciplinary glossary.

Data Collection

Individual interviews were conducted remotely via Microsoft Teams, except for one in-person interview. Each interview lasted between 54 and 82 minutes and followed a structured format, progressing from general scenario-

related questions to more detailed discussions on terminology, reporting standards, and evaluation methods. Interviews were recorded, transcribed, and manually reviewed to ensure accuracy.

Before the interviews began, participants were explicitly asked for verbal and recorded consent to participate in the study. They were informed that their participation was voluntary, and that they had the option leave and to skip any question they were not comfortable answering. To protect participants' identities, all data were anonymized in the transcription and analysis phases. Personal information such as names, workplaces, and other identifiable details were omitted.

Data Analysis

The interviews were recorded and transcribed verbatim using Microsoft Teams. Thematic analysis (Braun & Clarke, 2019; 2006) was used to extract relevant concepts from the interview transcripts. It covers identifying, analyzing, and interpreting patterns (themes) within data. It involves six key steps: familiarization with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. This flexible approach allows researchers to explore complex meanings and experiences while maintaining transparency and rigor in qualitative analysis.

Materials

A semi-structured interview guide was developed as the primary research instrument for this study. The guide was designed to systematically explore how professionals from different fields conceptualize, describe, and document scenarios. Given the interdisciplinary nature of scenario-based research, the interview questions were formulated to capture both shared and field-specific terminology while allowing for flexibility in participant responses. The questions also captured theoretical and practical concerns related to scenario description and reporting. This approach ensured coverage of critical topics, and allowed participants to elaborate on their experiences, introduce new terminology, and highlight challenges in scenario documentation.

This method ensured that the collected data would be both comparable across participants and rich in qualitative insights, ultimately contributing to the development of a comprehensive, cross-disciplinary glossary for scenario-based research.

RESULTS

A combination of semantic and latent coding was applied to identify key terms and patterns. These terms were then categorized into nine overarching themes: *General Definitions*, *Scenario Types*, *Scenario Components*, *Temporal Dynamics*, *Immersion Mechanisms*, *Design Attributes*, *Roles*, *Evaluation and Outcomes*, and *Logistics and Tools*. The final glossary comprises 46 key terms spanning both qualitative and quantitative aspects of scenario descriptions. These categories emerged as central dimensions in how scenarios are conceptualized, described, and reported across different disciplines.

1. General definitions

One of the first major findings of the study was the inconsistency in how scenarios are defined across different fields. While all participants agreed that scenarios involve structured representations of possible events, the level of structure and detail varied. Participants from emergency response and law enforcement viewed scenarios as practical exercises meant to train personnel or test operational procedures. These scenarios are typically highly structured and follow predefined protocols. Participants from healthcare and traumatology focused more on decision-making processes, using scenarios to simulate medical emergencies and improve professional judgment. The LARP (Live Action Role-Playing) organizer emphasized storytelling and immersion, considering scenarios as open-ended narrative experiences where participant agency drives the outcome.

Despite these variations, a shared conceptual core emerged. Scenarios were consistently described as artificially constructed situations that serve a specific purpose, whether for training, analysis, or research. However, participants noted that terminological inconsistencies create challenges when communicating across disciplines, particularly in joint training exercises involving multiple organizations.

2. Scenario types

The study identified several distinct types of scenarios, each serving different objectives and requiring specific documentation approaches. These scenario types are intimately connected to different kinds of exercises with distinct users and target groups (see **Table *1***). Naturally, boundaries are sometimes blurred, not the least due to

the conceptual confusion that exists around scenarios and scenario usage.

Table 1. Scenario types identified in the study.

Scenario Type	Description	Target Groups (Users)
Tabletop Scenarios	Used primarily in policy-making, emergency planning, and strategic decision-making, these scenarios involve discussion-based simulations without real-world enactment.	Government agencies, emergency planners, corporate strategists, policy-makers.
Full-Scale Scenarios	Common in military, law enforcement, and healthcare settings, these scenarios involve realistic enactments using physical resources, role-players, and live-action elements.	Military personnel, law enforcement, first responders, healthcare professionals.
Exploratory Scenarios	Used in foresight studies and research, these scenarios are designed to explore possible futures and test hypotheses about human behavior, technological developments, or societal change.	Researchers, futurists, think tanks, academics, innovation teams.
Predictive Scenarios	Designed to forecast specific outcomes, these scenarios incorporate quantitative models and structured decision trees.	Data scientists, policy analysts, business strategists, economists.
LARP-Based Scenarios	Primarily found in immersive training and recreational gaming, these scenarios emphasize player agency, improvisation, and narrative immersion.	Educators, trainers, corporate teams, game designers, role-playing enthusiasts.

While each scenario type has different documentation requirements, participants agreed that key scenario elements – such as goals, constraints, and event sequences – should always be clearly defined to enhance interpretability and replicability.

3. Scenario components

Narrative context was considered as an important factor by almost all participants. The context is necessary to the time, place, and conditions of the scenario. Further, scenarios typically consist of sequenced events that drive progression in the form of scenario *events*. Some fields use the term *inject* to describe preplanned stimuli (e.g., new information, incidents, or disruptions) that participants must react to.

The participants also emphasized that defining and describing *participant roles* are important. How this is achieved varies between disciplines and domains. In emergency response, roles are based on real-world professions (e.g., firefighter, police officer, paramedic). In LARP-based scenarios, participants often adopt fictionalized roles to enhance immersion.

Further, *physical* and *digital* resources are important scenario components. Some scenarios use tangible props, such as equipment, clothing, or other wearable attributes to support the scenario and the roles. Others use simulated environments, or digital tools to enhance realism.

Participants highlighted the challenge of documenting scenario components comprehensively. Many scenario reports lack detail on key elements, making it difficult to replicate exercises or compare findings across studies.

4. Temporal dynamics

Time plays a critical role in scenario design. The study identified three major approaches to structuring time within scenarios: *Real-Time Scenarios* that are used for example in military, emergency response, and healthcare. These scenarios unfold at the same pace as real-world events. This approach enhances realism and operational readiness. *Compressed-Time Scenarios* where long-term events are condensed into shorter timeframes (e.g., simulating a 48-hour disaster response in 6 hours). This method is used to test multiple phases of an incident within a limited training window. Finally, there are *Segmented Scenarios* which are found primarily in policy exercises and LARP environments. These scenarios allow for pauses and rewinds, enabling participants to reflect, discuss, and adjust their strategies before moving forward.

While temporal structuring varies, all participants agreed that time management should be explicitly documented to allow for accurate interpretation and comparison of results.

5. Immersion mechanisms

Immersion was a significant concern, particularly in LARP-based, emergency response, and military scenarios. Participants identified several key factors that contribute to immersion, such as *Realistic Environments*. For example, full-scale scenarios use authentic locations, props, and equipment to increase realism. Further, *Psychological Engagement* was deemed important. Scenarios that elicit strong emotional or cognitive engagement tend to be more effective. Some participants mentioned using videos, sound effects, and role-play techniques to enhance psychological immersion. Last, *Narrative Consistency* is necessary as disruptions in storytelling or event flow can break immersion. The importance of maintaining coherence in scenario design was therefore stressed.

The degree of immersion required depends on the scenario's purpose. Training scenarios often prioritize realism, while research scenarios may focus more on cognitive engagement.

6. Design attributes

Participants highlighted key design principles that influence scenario effectiveness following two main dimensions, *Realism* and *Complexity*. The study identified three levels of realism: physical realism (authentic environments), simulated realism (abstract representations like maps or models), and believability (how plausible the scenario is). Complexity, when discussing scenarios, range from simple, structured exercises to highly complex, multi-layered simulations. Complexity is often determined by available resources, scenario goals, and participant expertise. The size of the exercise (in terms of the number of participants as well as the number of participating organizations) also contributes to complexity. Even scenarios with simple narratives may perceived as complex due to the amount of participants.

7. Roles

Scenario descriptions does not only cover narratives and events. They also typically involve descriptions of multiple stakeholder roles, such as *Participants*, meaning the individuals actively engaging in the scenario, and thus are the target group of the excericse or study. Further, most scenarios describe, or should describe, the role of *Facilitators/Game Masters* which are responsible for guiding and adjusting the scenario in real time. This role is very important to describe in detail in research studies as it is virtually impossible to replicate a study without this information. Last, there are *Observers and Evaluators* who are responsible for monitoring outcomes and assess performance. In exercises, these are typically senior personnel. In scientific studies, they are typically researchers or research assistants.

8. Evaluation and outcomes

Evaluation methods vary widely. Participants identified two main assessment approaches, *Performance-Based Evaluation* and *Scenario Effectiveness Evaluation*. The former is common in training exercises, and assesses decision-making, task completion, and procedural adherence. The latter is mostly used in research and foresight, and evaluations focus on whether the scenario generated useful insights, revealed knowledge gaps, or improved predictive modeling. Some organizations also use structured frameworks like After-Action Reviews (AARs) to systematically evaluate scenarios. However, lack of standardized reporting remains a challenge, as outcome documentation often lacks consistency and depth.

9. Logistics and tools

Participants described using a mix of physical, digital, and analytical tools for scenario planning and execution. Some commonly cited tools include: *Simulation Software for digital modeling*, *Spreadsheets and Documentation Templates* for planning, and *Props and Role-Playing Elements* to enhance realism. However, participants rarely

Summary of results

The study identified nine key themes in scenario-based terminology. Findings revealed significant variations in how scenarios are defined and described across disciplines. Emergency response and healthcare professionals focus on realistic training exercises, while researchers and LARP organizers emphasize narrative-driven, immersive experiences. Scenario types ranged from tabletop discussions and full-scale exercises to predictive and exploratory models.

Key scenario components include narrative context, participant roles, and event structures, with time management and immersion techniques playing critical roles in scenario effectiveness. Participants highlighted challenges in scenario documentation and evaluation, emphasizing the need for standardized terminology and reporting

frameworks. Overall, the findings underscore the importance of clear, structured descriptions to improve replicability, interdisciplinary communication, and the practical application of scenarios in research, training, and policy-making.

DISCUSSION

Building on these works, this study aims to provide a structured, empirically grounded glossary to help bridge the gap between qualitative and quantitative scenario descriptions. By systematically analyzing how professionals from different fields describe and report scenarios, this study contributes to the ongoing effort to create a common linguistic framework that enhances clarity, comparability, and scientific rigor in scenario-based research.

The study revealed significant variations in how scenarios are defined, structured, and evaluated across different disciplines. While many core elements are shared, terminological inconsistencies hinder communication and replicability. The findings highlight the need for standardized documentation, such as the proposed glossary, to improve clarity, comparability, and knowledge transfer in scenario-based research.

The three asked research questions are answered below.

What are the key terminological inconsistencies present in current scenario-based studies?

Scenario-based research is a widely adopted methodology across various disciplines, including emergency management, cognitive science, corporate foresight, healthcare, and live-action role-playing (LARP). Despite its broad application, the field suffers from significant terminological inconsistencies that hinder effective communication, knowledge transfer, and the replicability of research findings. Different domains often use the same terms to describe distinct concepts or, conversely, use different terms for similar constructs. This creates confusion, complicates interdisciplinary collaboration, and reduces the utility of scenario-based research in both academic and practical contexts.

For example, terms like “injects”, “immersion”, and “scenario” may carry distinct meanings depending on the field of application. In emergency management, injects refer to preplanned stimuli introduced to test participant responses, while in LARP, similar stimuli might be called plot hooks or narrative beats. Likewise, immersion in crisis management may focus on procedural realism, whereas in game design, it emphasizes psychological engagement and player agency.

Given these variations, this research seeks to systematically identify the key terminological inconsistencies that exist across disciplines involved in scenario-based research and practice. By exploring how core terms are interpreted and applied in different fields, the study aims to uncover the extent to which inconsistent language obstructs shared understanding and complicates the replication of scenario-based studies.

How can a standardized glossary improve communication and replicability across different domains?

Scenario-based research and exercises are extensively used across diverse fields such as emergency management, healthcare, defense, cognitive science, and live-action role-playing (LARP). Despite the widespread adoption of scenarios as tools for training, planning, and research, the absence of a standardized terminology has created barriers to effective communication and replicability across disciplines. Inconsistent use of terms leads to misunderstandings during joint exercises, complicates interdisciplinary research, and undermines the comparability of study results.

In multidisciplinary environments, where seamless coordination is crucial—such as in crisis response or multi-agency training—misinterpretations caused by inconsistent terminology can result in operational inefficiencies or flawed decision-making. Similarly, in academic research, unclear scenario documentation hinders replication studies, reducing the scientific rigor and reliability of findings.

A common linguistic framework can bridge disciplinary divides, improve the quality and consistency of scenario-based documentation, and ultimately enhance the usability of scenarios in both research and practice.

What are the essential components and attributes that should be included in scenario descriptions?

The findings of this study highlight the critical role of standardized terminology in scenario-based research and its impact on clarity, communication, and replicability across disciplines. Through interviews with professionals from diverse fields, it became evident that terminological inconsistencies are a significant challenge when designing, conducting, and reporting scenario-based studies. While many participants shared common perspectives on key concepts, differences in how scenarios are described, structured, and evaluated pose a barrier to interdisciplinary collaboration and knowledge transfer. One of the most striking findings was the variation in scenario definitions and descriptions between fields. For example, in emergency services, scenarios are often viewed as realistic training exercises with well-defined roles, procedures, and evaluation metrics. In contrast,

within live-action role-playing (LARP) and simulation-based environments, scenarios are more narrative-driven and immersive, often incorporating elements like storytelling, role complexity, and psychological engagement. Despite these differences, a shared conceptual foundation exists across all domains, scenarios serve as structured representations of possible events, decisions, and outcomes. This suggests that while terminology differences exist, they can be harmonized through a common framework, such as the glossary developed in this study.

The need for more detailed and structured scenario descriptions emerged as another key theme. Many participants expressed concerns that current scenario reports often lack critical details, leading to difficulties in replication and cross-study comparisons. Some participants emphasized the importance of capturing scenario components such as temporal dynamics, participant roles, and evaluation mechanisms in more systematic and explicit ways. Based on the descriptions found in literature as well as the response from the interviewed experts, we suggest a set of terms that have the potential to be accepted by both the research community as well as practitioners (see **Table *2***). The proposed glossary aims to fill this gap by providing clear categories and definitions that researchers and practitioners can use to create more comprehensive scenario reports.

Table 2. Proposed set of terms, including suggestions for definitions.

Categories	Terms	Definitions
General Definitions	Scenario	A structured representation of a possible future event or process defining the world, organizational roles, and context.
	Exercise	Activities set up to test or improve capabilities. Often exists inside a scenario but not necessarily.
	Purpose	Why the scenario or exercise is held.
	Goal	What the scenario or exercise is meant to produce and/or achieve.
Scenario Types	Table-top Scenario	Abstract, often discussion-based scenarios focusing on decision making and planning. Usually on organizational or systemic level.
	Full-Scale Scenario	Immersive scenarios replicating real-world conditions with high resource use.
	Normative Scenario	Scenarios designed to evaluate specific systems, tools, or processes. On systemic or individual level.
	Explorative Scenario	Scenarios designed to explore possible outcomes of future situations.
	Predictive Scenario	Scenarios designed to predict outcomes of future situations.
	LARP Scenario	Recreational and improvised scenarios where participants embody roles in a fictional setting.
Scenario Components	Structured vs Emergent	Predetermined story-lines and event sequence or participant driven outcomes.
	Pacing Mechanisms	Methods such as time compression or event sequencing to maintain engagement and flow throughout the scenario.
	Narrative	A story that runs through and contextualizes the scenario.
	Introduction	Initial setup, including time, place, and environmental conditions.
	Mood-setting texts	Atmosphere-setting texts used for immersion.
	Injects	Planned events or stimuli introduced during the scenario to guide progression or test responses.
	Event (Moment)	An isolated temporal snapshot containing specific actions or shifts in the scenario
	Intrigues	Personalized goals, secrets, or backstories to enhance engagement.
	Safety Systems	Protocols ensuring participant safety and comfort
	Off/ Inline	Terms distinguishing in-character (inline) actions from out-of-

Categories	Terms	Definitions
		character (off) interactions.
Temporal Dynamics	Timeline	Temporal nature of the scenario. Chronological, non-linear, or real-time.
	Starting point	The initial event or context participants are exposed to.
	End Point	Concluding event, condition or action signaling the end of the scenario.
Immersion Mechanisms	Engagement Triggers	Elements like videos, props, rituals, and more that create immersion and interest.
	Bleed	Actions, events and emotions experienced during the scenario that impact the real world and vice versa, impacted by immersion.
	Safety Mechanisms	Tools ensure participants' well-being during intense scenarios.
	World-Building	Creating a cohesive setting through language, rituals, and physical elements.
	Props and Costumes	Tangible items enhancing the sense of realism.
	Symbolic Indicators	Markers for in-game or out-of-game states (e.g., hand gestures, item tags).
Design Attributes	Realism	Degree to which the scenario mimics real-world conditions.
	Simulated realism	Abstract or theoretical realism (e.g., maps, discussions, communication patterns and modes)
	Physical realism	Physical dimensions and tangible elements (e.g., props, environments).
	Believable realism	How probable and realistic the narrative, scenario, events and other processes are. Impacts immersion.
	Control Level	Directed Scenario: Controlled with predefined outcomes; Dynamic scenario: Flexible, improvised.
	Spatial Complexity	Degree of physical dispersion or integration of participants. Amount of participant groups and physical locations.
	Complexity	Level of detail and resource intensity, including participants, resources, and time structure, events.
Roles	Participants	Individuals participating in the scenario through predefined or improvised roles.
	Organizers	Those responsible for creating, managing and executing the scenario.
	Game Master/ Facilitator	Facilitator introducing events or guiding participants during the scenario.
	Counterpart/ Adversary	Scripted roles played to enrich the scenario or drive specific actions.
Evaluation and Outcomes	Key Performance Indicators	Criteria or benchmarks for assessing outcomes.
	Scoring System	A quantitative evaluation framework.
	After-Action Review	Summaries or Reflections on what occurred during the scenario.
Logistics and Tools	Multi-Modality Tools	Use of props, digital platforms, and live actors for layered scenario experiences.
	Documentation	Platforms like Word, Excel and so on to organize the scenario and how

Categories	Terms	Definitions
	Tools	the scenario is documented as it is acted out
	Digital Tools	Platforms for communication, mapping, and real-time adjustments, designing scenarios interactions and environments

The distinction between *scenario* and *exercise* emerged as a key point of clarification in both our interviews and the literature. While these terms are often used interchangeably, we adopt a layered view in which the scenario constitutes the underlying constructed situation, its narrative, roles, and conditions, while the exercise refers to the specific way in which that scenario is enacted (e.g., tabletop, full-scale, virtual). This framing acknowledges that a single scenario can be used across multiple exercises with varying levels of immersion, realism, and evaluation focus, as noted by this reviewer and supported by prior research (e.g., Noori et al., 2017; Börjeson et al., 2006). Our glossary aims to make this distinction explicit, not to rigidly separate the two, but to improve the clarity and comparability of scenario documentation across disciplines and use cases. By disentangling the conceptual content of scenarios from their implementation formats, we enable more transparent reporting and replication of scenario-based studies.

Another significant finding is the role of shared mental models and inter-organizational cooperation in scenario-based exercises. Several participants highlighted how different organizations, such as police, fire services, and healthcare teams, must work together in joint scenario exercises. However, differences in terminology and reporting methods can create barriers to effective collaboration. For instance, what one organization defines as an "exercise" may be considered a "scenario" by another, leading to misalignments in planning and evaluation. This supports previous research (e.g., Andrews et al., 2022) that emphasizes the importance of common language in fostering shared understanding and improving organizational coordination. The glossary developed in this study provides a potential tool for improving cross-organizational communication, allowing different sectors to align their scenario descriptions and expectations more effectively.

Despite these contributions, the study has limitations that must be acknowledged. The sampling of participants, while diverse, did not include perspectives from all key stakeholders, such as military planners or high-level policymakers, who might have different scenario conceptualizations. Additionally, the glossary has not yet been formally validated through external expert review or applied in a real-world scenario documentation setting.

For the ISCRAM community, developing a cross-disciplinary glossary for scenario-based work offers significant benefits. It can enhance clarity and consistency in multi-agency simulations, improve replicability and transparency in academic studies, and enable more effective comparisons of findings across contexts. A shared lexicon also strengthens methodological rigor and supports collaborative innovation, particularly as digital tools, AI, and immersive environments become increasingly central to crisis preparedness. By contributing to the standardization of scenario terminology, ISCRAM researchers can foster a more coherent and interoperable approach to understanding and managing complex emergencies across organizational and disciplinary boundaries.

To ensure the glossary's long-term relevance and usability, future research should focus on validating it through practical application. Multi-agency exercises, crisis simulations, and training programs offer ideal contexts to test how well the glossary supports scenario design, coordination, and evaluation. Observing its use in these settings can reveal gaps, discipline-specific tensions, or terms needing refinement. Follow-up interviews, surveys, or co-design sessions can provide valuable feedback for iterative improvements. Over time, this process will help align the glossary with real-world practice and support broader standardization efforts across the ISCRAM community.

CONCLUSION

This study highlights the critical need for standardized terminology in scenario-based research and presents a comprehensive glossary aimed at enhancing clarity, consistency, and replicability across disciplines. Through qualitative analysis of expert interviews from diverse fields, including emergency management, healthcare, security consulting, and live-action role-playing (LARP), the study identified significant terminological inconsistencies that hinder effective communication, knowledge transfer, and interdisciplinary collaboration. By developing a structured glossary encompassing key scenario types, components, temporal dynamics, immersion mechanisms, and evaluation strategies, this research provides a practical tool to bridge the gap between qualitative and quantitative approaches.

This study contributes a structured glossary that complements existing domain-specific resources (*Healthcare Simulation Dictionary*; INACSL, 2026; ACM SIGSIM,) by offering a cross-disciplinary vocabulary for scenario-based research and training. While prior glossaries focus on procedural accuracy or simulation fidelity, they often

exclude narrative, immersive, and role-related elements central to real-world applications.

Built from qualitative data gathered across six professional domains, this glossary includes underrepresented dimensions such as pacing mechanisms, world-building, participant roles, and scenario evaluation approaches. These additions support more consistent documentation and improved communication between researchers and practitioners. As argued by Börjeson et al. (2006) and Bishop et al. (2007), shared terminology enhances scenario comparability and replicability. This glossary advances that aim by bridging gaps across disciplines, promoting transparency, and strengthening the collaborative potential of scenario-based methods.

The proposed glossary offers a foundational framework that supports more rigorous scenario documentation, enabling clearer comparisons across studies and fostering replicability, an essential criterion in scientific research. It also facilitates cross-sector collaboration, ensuring that practitioners and researchers from varied domains can communicate effectively and align their scenario-based practices. This enhanced clarity not only strengthens the scientific rigor of scenario-based studies but also improves their practical utility in decision-making, training, and policy development.

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