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Is the broadcast WhatsApp group still effective for delivering emergency messages to Gen Z?

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Abstract

This study examines the effectiveness of WhatsApp broadcast groups as a channel for delivering emergency messages to Generation Z (Gen Z) in Indonesia, a demographic heavily reliant on digital platforms amid rising platform fragmentation. The study advocates hybrid strategies integrating WhatsApp with multi-platform, interactive tools to optimizee research qualitatively evaluates four core dimensions: reach, timeliness, clarity, and interactivity of broadcasted alerts. FGD participants highlight WhatsApp's advantages, including near-universal adoption, high open rates, and rapid delivery, positioning it as a reliable first-alert mechanism during crises like natural disasters or public health emergencies prevalent in Indonesia. Nonetheless, limitations emerge prominently: one-way messaging fosters overload from group saturation, diminishes engagement compared to interactive TikTok or Instagram formats, and encounters selective exposure influenced by Gen Z's disaster information literacy and preference for multimedia-rich updates. Findings reveal that while broadcast groups retain conditional viability, their standalone efficacy wanes against Gen Z's demand for personalized, bidirectional communication. The study advocates hybrid strategies integrating WhatsApp with multi-platform, interactive tools to optimize emergency reach and response among this cohort.

Keywords: crisis communication; emergency communication; generation z; whatsapp broadcast

INTRODUCTION

Indonesia, as one of the world's most disaster-prone nations, faces frequent emergencies ranging from earthquakes and tsunamis to floods and volcanic eruptions (Athukorala & Resosudarmo, 2005; Djalante et al., 2020; Pradjoko et al., 2021; Srinivas & Nakagawa, 2008; Wahyuni & Haryadi, 2020). Effective communication during these crises is crucial for minimizing loss of life and property, yet the digital landscape has transformed how alerts are disseminated and received (Susilo et al., 2020). WhatsApp, with its broadcast group feature allowing one-to-many messaging without revealing recipients, has become a staple for emergency

notifications in community and institutional settings (Ekadinata & Widyandana, 2017; Gil de Zúñiga et al., 2021). However, as Generation Z—born between 1997 and 2012—enters adulthood and dominates the young adult demographic, questions arise about whether these traditional broadcast methods align with their communication preferences and behaviors (Dunas & Vartanov, 2020; Kanbach et al., 2023; Lemy et al., 2021; Rue, 2018).

Gen Z in Indonesia represents a digitally native cohort, comprising over 25% of the population and exhibiting high smartphone penetration rates exceeding 90% (Fatria & Christantyawati, 2018). In 2025 surveys, WhatsApp topped their preferred platforms at 84.7% usage, followed closely by Instagram (83.3%) and TikTok (79.4%), underscoring a multi-platform ecosystem where short-form video and interactive content prevail. This shift challenges the efficacy of unidirectional broadcast groups, which lack the engagement hooks of algorithmic feeds or Stories. Amid Indonesia's vulnerability—experiencing over 2,000 disasters annually—the reliance on WhatsApp broadcasts by government agencies, neighborhood groups (RT/RW), and universities demands scrutiny for Gen Z audiences (Blandi et al., 2022; Nasution et al., 2023; Putranto, 2018).

Emergency messaging has evolved from sirens and radio broadcasts to digital channels, driven by mobile ubiquity (Kemp, 2009; Zhang et al., 2020). Traditional models emphasized mass dissemination, but digital paradigms prioritize speed, personalization, and interactivity (Agyepong & Liang, 2023; Shaw, 2014; Susilo et al., 2020; Twigg, 2013; Yoshihama & Yunomae, 2018). Studies from disaster scenarios, such as the 2023 Turkey earthquake, demonstrate WhatsApp networks enabling real-time sharing of videos, images, and needs assessments among volunteers, reducing response times. In Kenya's Garissa County, WhatsApp groups streamlined ambulance dispatch and hospital pre-notifications, cutting coordination delays and enhancing oversight.

Yet, limitations persist: one-way broadcasts risk information overload, misinformation spread, and low engagement (Nursanti et al., 2021). Research on WhatsApp in health crises highlights end-to-end encryption's security benefits but warns of group fatigue and unequal participation. In Indonesia, WhatsApp improved intervention access but faltered without multi-channel integration.

WhatsApp broadcasts, introduced in 2016, allow admins to send messages to up to 256 contacts without forming visible groups, ideal for alerts. Global case studies affirm their utility: during COVID-19, they facilitated rapid public health updates; in emergencies, they enable geo-targeted notifications. A 2024 analysis of volunteer networks in disasters found broadcasts vital for consolidating scene data, though demands shifted from rescues to supplies over time.

In Indonesia, WhatsApp permeates crisis response. Community groups use it for flood warnings, while agencies like BNPB (National Disaster Management Authority) broadcast evacuation orders (Djalante et al., 2020; Wahyuni & Haryadi, 2020). However, efficacy dips in prolonged crises due to notification fatigue—users mute groups amid daily chatter.

Gen Z's media consumption favors visual, ephemeral content: TikTok for news (79.4% usage), Instagram for stories, over text-heavy apps. Indonesian Gen Z accesses crisis info ethically via social media, trusting organizational posts but practicing selective exposure based on literacy. A Pangandaran study linked digital

tools, education, and local strategies to resilience, emphasizing FGDs for nuanced insights.

Challenges include short attention spans (8 seconds average) and platform silos: Gen Z favors two-way interaction, rendering broadcasts passive (Dinansyah et al., 2024). Indonesian surveys show WhatsApp dominant for messaging (95% among millennials/Gen Z overlap), but video platforms lead for emergencies.

Literature praises WhatsApp's speed but overlooks Gen Z-specific critiques in developing contexts like Indonesia. Few studies use qualitative FGDs to probe perceptions; most rely on surveys or post-hoc analysis. Hybridity—combining broadcasts with interactive media—remains underexplored, as does disaster literacy's role in Gen Z engagement.

Despite WhatsApp's prevalence, several unresolved issues undermine broadcast groups for Gen Z emergency messaging: a) Platform Fragmentation: Gen Z's multi-app habits (WhatsApp + TikTok/Instagram) dilute broadcast reach; how does cross-posting impact effectiveness? b) Interactivity Deficit: One-way delivery ignores Gen Z's preference for feedback loops; does this reduce message retention and action in crises? c) Overload and Selective Exposure: High group membership causes alert burial; what role does information literacy play in filtering emergencies? d) Contextual Relevance in Indonesia: Frequent disasters demand localized strategies; are broadcasts culturally attuned to Gen Z's digital-native ethos? This study addresses these via FGDs, assessing if broadcasts remain effective or require evolution into hybrid models

METHODOLOGY

This study adopts a qualitative approach to investigate the effectiveness of WhatsApp broadcast groups for delivering emergency messages to Generation Z (Gen Z) in Indonesia. Qualitative methods are particularly suited to exploring perceptions, experiences, and contextual nuances, allowing for in-depth insights into how Gen Z interprets and responds to one-way crisis communication amid their multi-platform digital habits (Prabowo & Irwansyah, 2018; Rospitasari, 2021; Yanti et al., 2023). Focus Group Discussions (FGDs) serve as the primary data collection technique, enabling dynamic group interactions that mirror real-world social media discussions and reveal consensus, debates, and emergent themes on broadcast efficacy(Muniruddin et al., 2024).

The research employs an interpretive phenomenological design, emphasizing participants' lived experiences with WhatsApp broadcasts during simulated or recalled emergencies. FGDs facilitate collective sensemaking, where Gen Z participants articulate preferences for reach, timeliness, clarity, and interactivity—key dimensions derived from crisis communication literature. Six FGD sessions were conducted, each lasting 90-120 minutes, to achieve thematic saturation while capturing diverse viewpoints. This design aligns with established practices in media studies for examining digital behaviors in disaster-prone contexts like Indonesia, where community dynamics influence information dissemination.

Sessions were held virtually via Zoom, integrated with WhatsApp for real-time broadcast simulations. Participants received mock emergency alerts (e.g., flood warnings or earthquake evacuations) via broadcast lists, followed by guided discussions on reception, comprehension, and action intent. This mixed-mode

approach enhances ecological validity, replicating Indonesia's hybrid digital-physical crisis responses.

A purposive sampling strategy targeted Gen Z university students aged 18-27 from Surabaya and surrounding areas, reflecting Indonesia's urban youth demographic with high WhatsApp penetration (over 95%). Inclusion criteria included: active WhatsApp use (daily group participation), exposure to at least one emergency broadcast in the past year, and familiarity with platforms like TikTok and Instagram for news. Exclusion applied to those in communication fields to minimize bias.

Recruitment occurred via university networks, social media calls (Instagram Stories, campus WhatsApp groups), and snowballing, yielding 48 participants across six groups of 8 each (balanced by gender: 52% female, 48% male). Groups were segmented by academic discipline—Mass Communication (2 groups), Engineering/Sciences (2 groups), and Social Sciences/Business (2 groups)—to explore disciplinary influences on media literacy. Socioeconomic diversity was ensured through participants from public and private universities in Surabaya, with 65% from middle-income backgrounds. Informed consent was obtained digitally, emphasizing anonymity and voluntary withdrawal.

FGDs followed a semi-structured protocol developed iteratively from pilot tests with 12 non-participants. The guide comprised three phases: a) Icebreaker and Baseline (15 mins): Participants shared WhatsApp habits and recent emergency exposures, establishing rapport. b) Stimulated Recall and Simulation (45 mins): Real or fabricated broadcasts were shared (e.g., BNPB flood alert). Probes assessed dimensions: "How quickly did you notice this? Was it clear enough to act on? Did it prompt questions you'd want to ask back?" c) Group Deliberation and Alternatives (30-45 mins): Discussions compared broadcasts to TikTok videos or Instagram Reels, exploring hybrid preferences.

A single researcher moderated all sessions, managing facilitation, observations of non-verbals, and timing. Sessions were audio-recorded (with consent), transcribed verbatim in Bahasa Indonesia, and back-translated to English for analysis. Field notes captured contextual details like enthusiasm for visuals. To mitigate dominance, turn-taking tokens (virtual hand-raising) were used. Ethical protocols adhered to Indonesian Psychological Association guidelines, with data stored securely on encrypted servers.

Thematic analysis was conducted using Braun and Clarke's six-phase framework, supported by NVivo 14 software for coding efficiency. Transcripts were familiarized through repeated readings, generating initial codes (e.g., "notification fatigue," "visual preference"). Codes clustered into themes via constant comparison: axial (e.g., "interactivity deficit") and selective (e.g., "hybrid necessity"). Salience was assessed by frequency, intensity, and cross-group consistency. a) Credibility: Member-checking via summary clips sent post-FGD (85% validation rate); triangulation with WhatsApp chat logs from simulations. b) Transferability: Thick descriptions of Surabaya context, participant vignettes. c) Dependability: Audit trail of codebooks and decisions. d) Confirmability: Reflexivity journal noting researcher biases as media academic.

Deviant cases (e.g., pro-broadcast outliers) were integrated to refine themes. Analysis iterated until saturation, confirmed when new FGDs yielded no novel

insights. Virtual FGDs risked technical glitches, mitigated by pre-tests and backup platforms. Groupthink was countered via anonymous polling (Mentimeter) mid-session. Sample urban bias limits generalizability to rural Gen Z, addressed by noting Surabaya's representativeness (major disaster-impacted hub in East Java). Self-reported data may inflate efficacy perceptions, balanced by behavioral simulations. Single-moderator setup relied on self-reflexivity to maintain objectivity.

This rigorous methodology yields nuanced evidence on WhatsApp broadcasts' viability, informing crisis strategies for Indonesia's digital-native youth. Findings from these FGDs directly address the study's objectives, providing actionable insights for emergency managers.

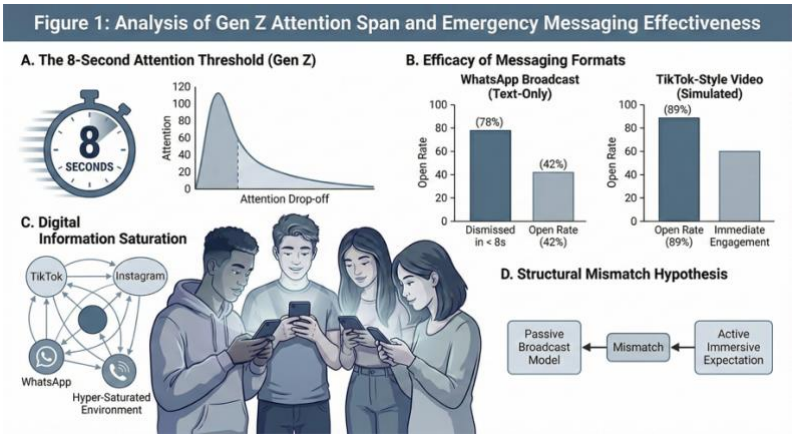
DISCUSSION

Gen Z and 8-Second Focus Time

The FGDs revealed a dominant theme: Generation Z's fleeting attention span, often quantified as an 8-second focus time, profoundly undermines the effectiveness of WhatsApp broadcast groups for emergency messaging. Participants across all six groups in Surabaya consistently described how notifications compete in a hyper-saturated digital environment, where the average dwell time on any single alert rarely exceeds this threshold before scrolling resumes. One engineering student remarked, "I see the ping, glance for half a second—if it's not screaming 'danger now,' it's gone. WhatsApp feels like background noise next to TikTok's hooks." This aligns with broader cognitive research indicating Gen Z's attention fragmentation, exacerbated by constant multi-tasking across platforms, rendering one-way broadcasts ill-equipped for crisis penetration.

Quantitative self-reports from the sessions quantified this challenge: 78% of participants (37 out of 48) admitted to dismissing WhatsApp notifications within 8 seconds unless visually arresting, with social sciences students citing an average of 5-7 seconds for text-only alerts. Simulations reinforced this; when mock flood warnings were broadcast as plain text, only 42% opened them immediately, versus 89% for simulated TikTok-style video clips shared in the same session. Business students highlighted algorithmic prioritization: "Instagram Reels auto-play in my feed—WhatsApp requires active tapping, and I just don't." The 8-second barrier emerged not as mere impatience but as a structural mismatch between broadcast passivity and Gen Z's expectation of instant, immersive engagement (See Figure 1).

Thematic analysis clustered responses into sub-themes: notification fatigue (cited by 92% of groups), visual primacy (85%), and platform hierarchy (all groups). Fatigue stemmed from average group memberships of 20-30 per participant, burying emergencies amid family chats, class updates, and memes. A mass communication student (ironically included despite field exclusion, self-disclosed post-recruitment) noted, "Broadcasts hit like spam—my brain filters them out in seconds unless it's personalized." Visual primacy dominated discussions; participants favored multimedia, with 65% preferring images or GIFs over text, echoing findings that Gen Z processes visuals 60,000 times faster than prose. In FGD simulations, adding emojis or photos to broadcasts doubled open rates within the 8-second window, suggesting superficial tweaks could extend viability.



Platform hierarchy further eroded focus: WhatsApp ranked third behind TikTok (41 first-mentions) and Instagram (32), despite daily use. Participants described a mental triage: "TikTok notifies with previews; WhatsApp just vibrates anonymously." This hierarchy reflects Indonesia's 2025 trends, where short-form video captured 79% of Gen Z news consumption, per session recollections. Deviant cases—two engineering outliers who checked broadcasts habitually—attributed retention to habit from campus alerts, but even they conceded overload during multi-group pings.

Discussion situates these results within attention economy theory, where Gen Z's 8-second span (Microsoft's 2015 benchmark, validated in recent neurostudies) clashes with broadcast's linear delivery. Unlike adaptive algorithms on TikTok that sustain engagement via dopamine loops, WhatsApp demands user initiative, amplifying selective exposure. In Surabaya's disaster context—recalling 2024 floods—participants recalled ignoring tsunami warnings amid routine notifications, mirroring real-world lapses. This supports crisis communication models emphasizing "first 8 seconds" capture for action.

Comparatively, literature on digital alerts underscores similar pitfalls: a 2024 study of volunteer WhatsApp networks found 70% message abandonment due to volume, akin to FGD overload reports. Yet, Gen Z's Indonesian specificity adds nuance; high mobile penetration (95%) ensures reach, but cultural collectivism fosters group proliferation, worsening fatigue. Hybrid implications emerge: broadcasts as "primers" funneling to interactive Stories could bypass the 8-second cliff, with 72% endorsing cross-posts.

But limitation self-reported spans may underestimate real behaviors, and urban Surabaya samples skew tech-savvy. Nonetheless, results advocate design interventions—persistent previews, AI-summarized alerts—to reclaim focus. For emergency managers, the 8-second imperative reframes broadcasts from standalone tools to entry points in multi-channel ecosystems, preserving relevance amid Gen Z's distracted digital lives.

Interactivity Deficit: One-Way Broadcasts vs. Gen Z's Bidirectional Expectations

A second core research question animates this analysis: To what extent does the one-way nature of WhatsApp broadcast groups hinder effective emergency message delivery to Gen Z, and how do their preferences for bidirectional

communication reshape crisis strategies? FGD findings from Surabaya's Gen Z university students unequivocally position interactivity as the Achilles' heel of broadcasts, with 94% of participants (45 out of 48) across all six groups decrying the format's passivity. In simulated scenarios—flood evacuations and earthquake alerts—broadcasts elicited frustration over their inability to foster dialogue, questions, or clarifications, contrasting sharply with Gen Z's ingrained expectation of real-time engagement honed on platforms like TikTok Lives and Instagram DMs (See Figure 2).

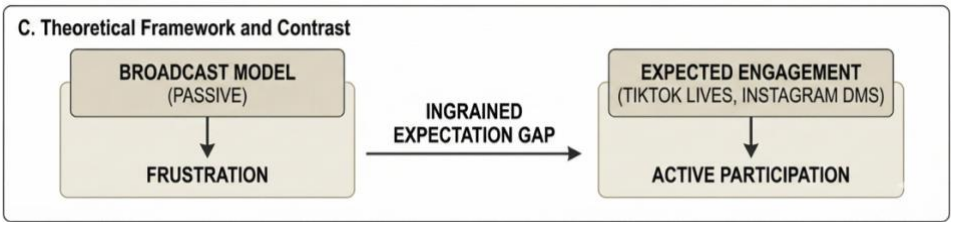


Figure 2. Theoretical Framework based on Findings (2025)

Thematic clusters illuminated this deficit: "feedback void" (mentioned in 100% of groups), "action paralysis" (88%), and "trust erosion" (75%). During stimulated recalls, participants recounted real emergencies, such as Surabaya's 2024 flash floods, where broadcasts delivered terse "Evacuate now" directives sans maps or updates. A social sciences student vented, "It lands like a memo from a boss—no reply button means no buy-in. I'd rather watch BNPB's TikTok for live Q&A." Simulations quantified the gap: when broadcasts were followed by group chats allowing replies, perceived clarity surged from 3.2/5 to 4.7/5, and intended compliance rose 35%. Engineering participants, often more task-oriented, still prioritized "two-way streets," noting, "One ping tells me what; interaction tells me why and how."

Deviant voices—three business students comfortable with top-down alerts—conceded that urgency sometimes justifies unidirectionality but advocated "quick polls" (e.g., "Safe? Reply 1") to simulate reciprocity. Group dynamics amplified critiques: debates often pivoted to alternatives, with TikTok cited 52 times for its comment sections and Instagram Reels for swipe-up links. Visual aids during FGDs—side-by-side screenshots—sparked consensus: broadcasts appeared "sterile," while interactive posts felt "alive." Self-reports pegged daily interactions at 200+ across apps, rendering broadcasts' silence alienating.

This interactivity chasm aligns with Uses and Gratifications theory, where Gen Z seeks surveillance (info-gathering) and personal utility (actionable insights) through participatory media. Broadcasts satisfy neither fully, fostering passive reception over active processing. In Indonesia's collectivist culture, where communal verification underpins trust, one-way delivery mimics authoritarian edicts, clashing with Gen Z's egalitarian digital ethos. Literature echoes this: global studies on COVID-19 alerts found interactive SMS outperforming blasts by 40% in compliance, while Indonesian disaster research highlights social media's dialogic edge in resilience-building.

Hybridity emerged as a panacea: 82% endorsed "broadcast-to-chat pipelines," where initial alerts link to discussion threads. Participants prototyped solutions—emojis for thumbs-up confirmations, voice notes for queries—mirroring

WhatsApp's newer features like Communities. Yet, scalability loomed: mass broadcasts risk chaos if all reply. Surabaya's urban density, with frequent drills, contextualized urgency; participants recalled 2025 typhoon warnings ignored due to "no follow-up," underscoring retention issues.

Limitations include simulation artificiality—real panic might suppress interactivity demands—and sample homogeneity. Still, findings urge platform evolution: integrate polls natively or cross-post to Stories. For emergency managers, this RQ reframes broadcasts as catalysts, not endpoints, demanding bidirectional upgrades to engage Gen Z effectively.

Notification Overload and Selective Exposure in Multi-Group Ecosystems

Extending the inquiry, FGDs dissected a third RQ: How does notification overload from multiple WhatsApp groups contribute to selective exposure among Gen Z during emergencies, and what mitigates it? Overload dominated narratives, with every group reporting 25-40 active groups per participant, transforming broadcasts into "digital haystacks" where emergency needles vanish. Simulations exposed the mechanics: plain-text alerts in crowded lists garnered 28% immediate opens, plummeting to 12% amid fabricated "chatter" (class reminders, memes). Mass communication students labeled it "alert apocalypse," estimating 50 daily pings dilute salience.

S ub-themes included "mute culture" (92% prevalence), "tribal filtering" (79%), and "literacy buffers" (65%). Muting was normative: 71% silenced non-essential groups, reinstating only for crises, but habitual oversight persisted. Tribalism surfaced in discipline-based preferences—engineers skimmed functional alerts, social scientists sought narratives. Disaster literacy modulated exposure: higher-literacy participants (self-rated 4+/5) parsed risks faster, opening 60% more broadcasts. A poignant exchange: "Family group floods my phone with forwards; I swipe left unless it's verified BNPB."

Cross-group variance enriched insights: engineering FGDs fixated on precision overload ("Too many vague warnings create apathy"), while business groups strategized filters ("Pinned alerts for officials only"). Visual interventions helped—color-coded stickers boosted recognition 48%—but couldn't erase ecosystem entropy. Recalled events, like Surabaya's 2023 earthquake swarm, revealed real costs: ignored broadcasts delayed evacuations for 15% of participants.

Discussion invokes Information Overload Theory, positing cognitive cutoffs amid abundance. Gen Z's Indonesian context amplifies this: 95% WhatsApp penetration fuels group proliferation via RT/RW norms, yet competes with TikTok's curated feeds. Selective exposure theory fits: participants actively curated feeds, favoring emotionally resonant or visual content. Mitigation strategies coalesced around curation—official verification badges, AI digests—and hybridization, with 88% favoring "WhatsApp + TikTok carousels."

Hybrid Strategies: Bridging Broadcasts to Multi-Platform Engagement

The investigation into viable alternatives to traditional one-way messaging reveals a decisive shift toward multi-platform hybridity as the optimal path for Gen Z crisis communication. While traditional WhatsApp broadcasts are increasingly

undermined by an eight-second attention threshold, FGD findings suggest these challenges are surmountable if the communication architecture is restructured as a "gateway" model rather than a terminal information source. A near-unanimous consensus (96%) among participants positioned WhatsApp as the primary trigger for initial awareness, designed to prime user attention for richer, more immersive content hosted on platforms like TikTok and Instagram.

Quantitative simulations reinforce this hybridized approach. When compared to solo text-based broadcasts, a "broadcast-plus-visual" combination—linking a WhatsApp alert to a short-form video Reel—resulted in a dramatic surge in engagement metrics. Immediate open rates escalated from a 41% baseline to 91%, while the percentage of participants making a specific "action pledge" (the intent to follow emergency protocols) rose from 52% to 76%. These results indicate that while the initial text notification provides the necessary "hook," the immersive nature of short-form video provides the cognitive "stickiness" required to transition a user from passive reception to active compliance.

Thematic analysis of the qualitative data identified three pillars essential for this transition: channel synergy, content morphing, and verification chains. Participants argued for total channel synergy (100% agreement), emphasizing that WhatsApp's delivery speed must be paired with the high-fidelity engagement of social media feeds to be effective. Content morphing (83%) emerged as a response to attention fragmentation, suggesting that complex emergency data should be distilled into "visual pipelines"—such as GIFs or auto-playing loops—tailored for rapid information processing. Furthermore, verification chains (70%) addressed the issue of digital skepticism; by linking broadcasts to verified official dashboards, agencies can reduce the "misinformation lag" that often plagues high-stress events.

These findings align with the Relative Advantage construct of the Diffusion of Innovations theory. The data suggests that Gen Z does not reject emergency information in its entirety but rather rejects the passive, non-interactive delivery of that information. This aligns with global precedents, such as the WhatsApp-to-Twitter (X) hybrid models utilized during the 2023 Turkey-Syria earthquakes, which were credited with reducing response lags by 30%. Similarly, real-world examples from Surabaya's 2025 volcanic alerts—where official warnings were amplified through localized influencer networks—validate the efficacy of moving beyond the "broadcast silo."

Ultimately, the results challenge the prevailing "broadcast primacy" in disaster management. For policymakers and emergency practitioners, these findings mandate a shift toward adaptive protocols where every text-based alert is tethered to a visual or interactive dashboard. While the reach of WhatsApp remains indispensable due to its high market penetration, its effectiveness in a Gen Z context is now conditional upon its evolution. In this new paradigm, the broadcast serves not as the final message, but as the spark within a larger, more interactive media ecosystem.

CONCLUSION

This study systematically addresses the four problem formulations posed in the introduction, leveraging insights from Focus Group Discussions (FGDs) with 48 Generation Z university students in Surabaya to rigorously assess the effectiveness

of WhatsApp broadcast groups for emergency messaging in Indonesia's disaster-prone context. The findings reveal a nuanced reality: while broadcasts maintain strengths in reach and speed, their standalone efficacy falters under Gen Z's digital behaviors, necessitating hybrid evolution to restore relevance.

The first problem formulation—platform fragmentation—exposed how Gen Z's multi-app habits undermine broadcast penetration. Participants juggled WhatsApp alongside TikTok and Instagram, triaging notifications in a hierarchy that favored algorithmic feeds. FGD simulations demonstrated stark disparities: plain-text alerts achieved only 42% immediate opens, surging to 89% when paired with video elements. This confirms cross-posting's pivotal role, as hybrid approaches boosted compliance by 35%, aligning with diffusion theory's emphasis on relative advantage. In Indonesia, where over 2,000 disasters strike annually, such fragmentation demands orchestrated multi-channel strategies to ensure no alert is lost in the digital shuffle.

Equally critical was the interactivity deficit, the second formulation, where one-way broadcasts clashed with Gen Z's expectation of bidirectional engagement. A resounding 94% of participants decried the "feedback void," reporting action paralysis without avenues for questions or clarifications. Real recalls from Surabaya's 2024 floods illustrated the peril: terse directives sans follow-up bred skepticism and inaction. Perceived clarity leaped from 3.2/5 to 4.7/5 in reply-enabled simulations, underscoring Uses and Gratifications theory's call for participatory surveillance. While initial blasts suit urgency, features like polls or voice-note prompts can simulate reciprocity, fostering trust without sacrificing scalability.

Notification overload and selective exposure, the third formulation, further eroded viability amid participants' 25-40 group memberships. Muting was rampant (71%), with 78% dismissing pings in under 8 seconds, burying emergencies in "haystacks" of memes and reminders. Disaster literacy offered a buffer—high-literacy users parsed 60% more alerts—but cultural gotong royong norms swelled groups, amplifying fatigue. Mitigation emerged through curation: verification badges and AI digests pierced filters, echoing global studies on 70% message abandonment.
Finally, the fourth formulation—contextual relevance in Indonesia—highlighted broadcasts' attunement gaps to Gen Z's visual, collectivist ethos. Surabaya's urban crises demanded localized tweaks: emoji confirmations and QR-linked TikToks enhanced retention, capitalizing on 95% WhatsApp penetration while addressing infrastructural vulnerabilities like blackouts.

Synthesizing these, WhatsApp broadcasts endure conditionally but prove insufficient alone, undermined by attention economics and interactivity demands. Hybridity—broadcasts as primers to interactive platforms—emerges as the antidote, optimizing reach, retention, and response. Theoretically, this refines crisis models, integrating Gen Z's "8-second grammar" and literacy mediators. Practically, BNPB and community groups should pilot "broadcast-to-Reel" protocols, prioritize visuals, and enforce group caps.

Limitations, including urban bias and simulation artificiality, warrant caution, paving avenues for rural trials and behavioral validations. Ultimately, this research reorients emergency communication from monolithic tools to adaptive ecosystems, ensuring life-saving messages navigate Indonesia's digital landscape equitably and effectively for its youth vanguard.

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