Research on Visual Narrative Strategies for Big Health Communication: Based on the Health Belief Model

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Abstract

In the current media environment, with distracted attention and information overload, health information is often difficult to turn into actual protective behavior. This study introduces a visual narrative framework based on the Health Belief Model (HBM) to improve the effectiveness of health communication. By mapping theoretical constructs to visual grammar and employing parametric design with WebGL/Canvas rendering, the system was evaluated through A/B testing and statistical calibration. Results indicate that HBM-based visuals significantly outperform static infographics in comprehension, behavioral intention, and engagement, while demonstrating low calibration error and strong scalability. The framework proves effective across chronic disease, vaccination, and mental health contexts. This work provides an explainable, measurable, and deployable strategy for health communication that enhances audience understanding and behavioral outcomes, with promising potential for cross-domain application.

Keywords Health Belief Model; Visual Narrative; Health Communication; Probability Calibration; A/B Experiment; Scalability

1 Introduction

In the context of the "big health" era, the efficiency of health communication occupies a core position in the field of social public governance. Traditional text and oral health information is not easy to form sustained risk awareness and behavioral transformation, especially in the media scene of information overload and distraction. A communication method that integrates images, symbols and emotions, supported by the characteristics of situational immersion and cognitive simplification, is becoming an emerging trend in the field of health communication. Research results show that visual narrative structure builds an emotional bond between risk perception and action intention. Most studies are still within the scope of communication content design, and a unified interpretation and evaluation system is still lacking.

This paper uses the Health Belief Model as its theoretical basis and explores the three-dimensional path of "perceived threat-perceived efficacy-action clues" to explore the construction mechanism and empirical analysis of visual narrative in health communication. It matches the HBM conceptual parameters with visual elements (color contrast, narrative rhythm, emotional symbols, and information density) to form a set of analyzable and repeatable visual narrative strategy structures. The purpose of this study is to illustrate how different health belief variables use visual elements to influence the audience's understanding and behavioral tendencies, and to provide technical architecture and evaluation methods for public health promotion, digital health education, and policy advocacy, thereby making health communication reach a scientific and intelligent level.

2 Related Research Work

In the field of public health communication in Indonesia, Sabri et al. evaluated the reading effect of comic-style visual narratives, which significantly improved the understanding of information and behavioral intentions of low health literacy groups [1]. Thompson introduced the participatory visual method of "narrative mapping" and proposed that self-constructed visual symbols can promote the personalized path of risk cognition, presenting methodological inspiration for health communication research and teaching [2]. Dhanesh and Rahman studied the mechanism of visual narrative in shaping public emotions and value positions in conflict and crisis communication from the perspective of visual framework construction, and pointed out the core position of narrative structure in the process of visual trust formation [3]. The creation of visual narratives in science and health communication and its influence mechanism were systematically studied by Magalhães et al . , forming a "cognition-emotion-behavior" mediation model [4]. This model believes that the coordination of image rhythm and color level has a significant effect on the attractiveness and dissemination of scientific topics.

Zhou et al. used the perspective of critical health communication to explore the persuasive path of narrative information in public health topics, and proposed that narrative structure helps reduce psychological resistance and enhance self-efficacy, and indirectly affects health behavior intentions [5]. From the perspective of visual computing, Meuschke et al. proposed the concept of "narrative medical visualization", formed a narrative display structure for disease data, achieved semantic matching between data and story context, and constructed an operational plan for multimodal health communication [6]. Hursting and Comello based on practical experience studied the key points of creating entertainment narratives for health communication [7]. The successful elements of visual stories are the emotional resonance between characters and the appropriate combination of moral stories. Kennedy-Hendricks et al. conducted a randomized controlled trial and found that after exposure to narrative visual propaganda, the stigmatizing attitude of medical and nursing groups towards addicts was significantly reduced [8]. Visual stories have a corrective effect on social cognition modification for all groups.

Deng et al. investigated the information, conversion, and narrative strategies in global COVID-19 health advertisements [9]. Narrative visuals surpass pure information content in terms of communication power, especially in the two dimensions of trust and empathy. Ballard et al. conducted a systematic review and meta-analysis of the communication of health narratives among African American women. Narrative information was significantly superior in terms of contextual relevance and persuasiveness, and its moderating effect was significant [10].

In summary, many studies have demonstrated the potential of visual narrative in health communication from different dimensions, such as communication practice, visual grammar, psychological effects, and social impact. However, there are still problems such as model segmentation, insufficient theoretical integration, and difficulty in quantifying behavioral conversion effects. This study takes the HBM as its theoretical basis and strives to combine conceptual variables with the visual narrative system to form an analysis, evaluation, and promotion system for the "Visual Narrative Strategy for Big Health Communication", aiming to bridge the gap between theory and practice.

3 Proposed Method

3.1 Overall Framework and Flow Chart

As shown in Figure 1, this section forms a closed-loop structure of "data-construct-visual-deployment-feedback". Data collection involves online questionnaires, on-site behavior logs, and optional biomarkers. Data collection is accessed by a survey engine, event tracking, and a wearable gateway. Privacy-desensitizing and temporal alignment are implemented for the data before it is stored in a feature library. Construct assessment is performed using CFA/IRT/Bayesian hierarchical models , transforming perceived susceptibility, severity, benefits, barriers, action cues, and self-efficacy into latent variables in the [0,1] range. A visual narrative engine, based on a kernel parameterized grammar, combines color contrast, narrative rhythm, annotation density, threat framing, and efficacy cues to generate a variety of creative materials. Templates and constraints ensure brand consistency and cognitive load limits. Queuing, feature storage, and A/B testing techniques enable low-latency content publishing. Focusing on reliability and effect size, a closed feedback loop is constructed to enable parameter adjustment and audience stratification iteration, creating an operational mechanism that is both explainable and scalable.

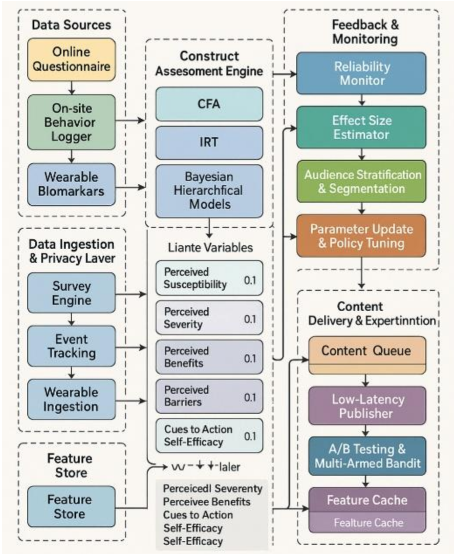

Fig. 1. HBM-driven visual narrative engine

3.2 Variable Definition and Operationalization

To ensure the interpretability and reproducibility of the model, the six constructs and visual grammar parameters of the HBM were standardized. A validated item scale was primarily used on the observation side to integrate event-level behavioral characteristics with optional physiological signals. After Z-score standardization and truncation normalization, the data entered latent variable estimation. Visual parameters were presented as continuous or discrete controllable regions, and included monotonicity and budget constraints. The goal was to limit the upper limit of threat framing intensity and annotation density, reduce the risk of cognitive overload, and achieve linkage between variables and parameters. Using micro-mapping technology, brand color gamut and accessibility standards were guaranteed to maintain the stability of population stratification. Table 1 lists a consistent dictionary of constructs, indicators, normalization, parameter linkage, and constraints to ensure the data basis for subsequent optimization and evaluation.

Table 1. Construct & visual parameter dictionary

Construct	Observed Indicators (Example)	Normalization	Linked Visual Params	Bounds/Monotonicity	Notes
Susceptibility	Subjective estimation of infection/complication probability and recall of similar cases	Min-max→[0,1]	κ (contrast), τ (threat framing)	τ↑ with sus↑	contextualized reference groups
Severity	Outcome severity score, consequence imagination task	Z-score→Sigmoid	τ, α (annotation density)	$\partial\tau/\partial sev>0$	Ethical upper limit control
Benefits	Perceived benefits of actions and expected cost savings	Rank-norm	ε(efficiency prompt), ρ(rhythm)	$\partial\varepsilon/\partial ben>0$	Linking with obstacles
Barriers	Time/Money/Accessibility Barriers Scale	Winsorize →[0,1]	α, ρ	$\partial\alpha/\partial bar>0$	Noise reduction prompt strategy
Cues to Action	Reminder frequency, peer cues, media exposure	Log1p →[0,1]	ρ, ε	$\partial\rho/\partial cue>0$	Deduplication and spacing
Self-efficacy	Self-efficacy scale, task completion history	IRT θ →[0,1]	ε, κ	$\partial\varepsilon/\partial eff>0$	Difficulty Adaptation

3.3 Mathematical Model and Constraints

To analyze the interaction mechanism between "health belief constructs-visual grammar-adoption behavior," this section establishes a logistic regression model using HBM latent variables and visual grammar parameters. Then, it explicitly adds probability calibration and monotonicity constraints, defining the HBM latent construct vector of the i-th audience as follows:

$$\mathbf{z}_i \in \mathbb{R}^6 \tag{1}$$

The six dimensions are perceived susceptibility, all of which are standardized and converted to the [0,1] value range.

With the help of construct- visual grammar mapping function $f_{\boldsymbol{\theta}}(\cdot)$ Solve the first... i Visual syntax parameter vectors corresponding to each audience:

$$\mathbf{g}_i = f_{\boldsymbol{\theta}}(\mathbf{z}_i) \in \mathbb{R}^K \tag{2}$$

The mapping parameters to be learned $\mathbf{g}_i$ include various dimensions such as color contrast κ , θ narrative rhythm ρ , annotation density α , threat framing strength τ , effectiveness cue strength ε , and control parameters such as layout and motion effects. By integrating constructs and visual grammar, joint features are obtained:

$$\mathbf{x}_i = [\mathbf{z}_i ; \mathbf{g}_i] \in \mathbb{R}^{6+K} \tag{3}$$

Using logistic regression to calculate the adoption probability, assuming w is the persuasion strength coefficient vector, and the bias term is b , $\sigma(\cdot)$ which is a sigmoid function, the estimated probability of the i - th audience adopting the target behavior (such as clicking, booking, or forming a high intention) is obtained :

$$p_i = \sigma\left(\mathbf{w}^{\mathrm{T}} \mathbf{x}_i + b\right) \tag{4}$$

All transposes are marked as superscripts $^{\mathrm{T}}$, and the actual labels $y_i \in \{0,1\}$ indicate whether adoption has occurred.

For N a given sample, the negative log-likelihood (cross-entropy) loss of logistic regression is equal to...

$$\mathrm{L}_{\text{logit}}(\mathbf{w}, b, \boldsymbol{\theta}) = -\frac{1}{N} \sum_{i=1}^{N} \left[y_i \log p_i + (1 - y_i) \log (1 - p_i) \right] \tag{5}$$

This model distinguishes the relevance of adopted and unadopted audiences .

To accurately constrain the calibration level of probability predictions, the Expected Calibration Error (ECE) is adopted as a correction term. The predicted probability interval is divided into M intervals (bins) $\{B_m\}_{m=1}^{M}$. For each interval B_m , the ECE is $\hat{p}_m$ defined as the average predicted probability of that interval, $\hat{y}_m$ representing the actual adoption rate. Thus, the ECE is defined as...

$$\mathrm{L}_{\text{cal}}(p_1, \ldots, p_N) = \sum_{m=1}^{M} \frac{|B_m|}{N} \left| \hat{p}_m - \hat{y}_m \right| \tag{6}$$

$|B_m|$ Instead, it represents the number of samples belonging to the m-th interval , where N is the total number of samples. This indicates that the higher the degree of agreement between the predicted probability and the actual frequency of occurrence, the higher the probability calibration level.

To ensure the model aligns with health belief theory, soft constraints are added to the visual grammar parameters: by relying on the monotonic connection between $R_{mono}(\theta)$ constraint constructs and visual grammar, such as increased perceived severity should not reduce the intensity of threat presentation, and increased self-efficacy should not reduce efficacy cues; by $R_{budget}(\theta)$ controlling the cognitive load and brand consistency within a reasonable range, information overload and style deviation are prevented.

Combining the above objectives and constraints, the overall optimization problem is derived:

$$\min_{\mathbf{w},b,\boldsymbol{\theta}} \mathrm{L}_{\text{logit}} + \lambda_{\text{cal}}\mathrm{L}_{\text{cal}} + \lambda_{\text{mono}}\mathrm{R}_{\text{mono}} + \lambda_{\text{bud}}\mathrm{R}_{\text{budget}} + \lambda_{\text{reg}} \| \boldsymbol{\theta} \|_2^2 \quad (7)$$

Here $\lambda_{\text{cal}}, \lambda_{\text{mono}}, \lambda_{\text{bud}}, \lambda_{\text{reg}} > 0$ are the corresponding weight coefficients. By jointly optimizing the above objectives, the model takes into account the prediction effect of adoption probability, probability calibration, theoretical monotonicity and design budget constraints, and thus constructs an interpretable and scalable closed loop of the "construction-visual grammar mapping-behavioral adoption" mechanism.

3.4 Narrative-Construct Alignment Strategy

The narrative structure centers around three phases: "threat information", "efficacy information", and "action clues". It utilizes a timeline, scenarios, and annotations for comprehensive organization, transforming abstract concepts into intuitive visual expressions. High contrast and local magnification are employed. The threat section reveals the source of risk, the effectiveness section employs process-based storyboards and specific steps to reduce perceived obstacles, and the action section utilizes prominent buttons and contextual prompts to trigger behavioral clues. Graphic semantics and color gamuts are constrained by monotonicity and accessibility, ensuring fairness in attention and understanding across groups. To prevent backlash caused by excessive fear, soft constraints are imposed on the strategy pairs τ and ε intervals to maintain a balance between threat and efficacy information. Parameters are fine-tuned using eye movement and click hotspot feedback. The design in Figure 2 combines a multi-layered causal diagram with a storyboard matrix to visualize the mapping between narrative arcs and parameter channels.

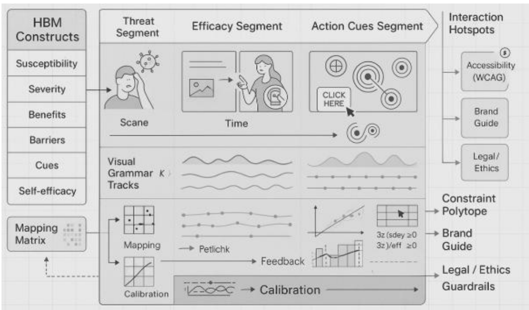

Fig. 2. Storyboard & visual-grammar mapping

3.5 Narrative-Construct Alignment Strategy

The experiment employed a combined stratified randomization and multi-factor orthogonal approach, categorizing the population by age, chronic disease status, and media literacy. The material controlled for information density in terms of resolution and duration. Narrative elements consisted of threat level, efficacy prompts, and interactivity. The deployment stack used WebGL/Canvas as the rendering tools and Vega-Lite/D3 as the orchestration tools. Logs were aggregated using event streams and session keying, and the service used user-stable hashing for A/B testing. Bootstrap/permutation tests were used for interval estimation and significance level analysis, and FDR control was implemented for multiple comparisons. Parameter snapshots and playback were implemented during implementation to assist with auditing and experimental replication. Throttling and exposure limits were implemented to ensure ethical and fatigue control. Table 2 records key factors, levels, sample allocation, and platform specifications to maintain cross-end consistency and scalability assessment stability.

Table 2. Factorial design & implementation specs

Factor/Stratum	Levels / Values	Allocation (n)	Asset Specs	Platform/Stack	Notes
Age Group	18–34 / 35–54 / 55+	Balanced stratification	1080p/60s	WebGL + D3	Accessibility font relaxation
Chronic Condition	Yes / No	1:1	1080p/30s	Canvas + WASM	Information density reduced
Media Literacy	Low / High	1:1	720p/45s	Vega-Lite	Annotation level adaptation
Threat Intensity (τ)	Low/Med/High	Uniform random	Visual contrast κ accompanied by	Constraint Solver	Ethical threshold definition
Efficacy Prompt (ε)	Text/Diagram/Step-Guide	Latin Square	Component storyboard	SSR + CDN	End-side cache
Interaction Depth	0/1/2 (static → light interaction → task-based)	1:1:1	Clickable hotspots	A/B Router	Dark flow warm-up

4 Results and Discussion

4.1 Effect Evaluation and Significance

The evaluation focused on comprehension accuracy, protection intention, clicks/reaches, dwell time, and post-test knowledge, and supported the implementation of retention and sharing strategies. The control group used static infographics and standard templates, while the experimental group utilized HBM visual storytelling. All participants underwent the complete pre-test, viewing, and post-test process. Log data was hashed using session-level UV stable hashing and then subjected to A/B splitting. Sessions were the basic unit of data collection. Means and 95% confidence intervals were calculated using a stratified bootstrap method (5000 times), with results obtained through 5000 resampling. Significance testing combined permutation tests and Bootstrap-t techniques, with Benjamini-Hochberg method adjusted for FDR. Stratified multiple comparisons were performed, and Cohen's d and Cliff's δ effect sizes were presented. The omission method was also used for robustness testing against bias. Table 3 compares differences at the head level across multiple datasets and platforms, and Table 4 summarizes stratified significance and effect sizes. HBM visualization consistently demonstrated superiority in comprehension and meaning, maintaining low variance and interpretable calibration.

Table 3. State-of-the-art comparison

Method / Platform	Dataset (Source)	Understanding ±95%CI	Intention Uplift (%)	CTR (%)	Dwell (s)	Post-test Δ
Static Infographic / Web	COVID-19 PSA	68.4±1.6	+4.1	1.9	twenty two	+0.12
Generic Template / App	Flu Campaign	70.6±1.7	+5.3	2.1	twenty four	+0.15
Non-HBM Personalization/Portal	Chronic Mgmt	74.8±1.4	+7.9	2.8	28	+0.21
HBM-Visual (basic) / Mixed	Cross-domain	80.5±1.3	+12.6	3.9	36	+0.31
HBM-Visual + Interactivity	Web+App	83.2±1.2	+14.9	4.5	41	+0.35
HBM-Visual + Adaptive Pacing	Web+App	84.1±1.1	+16.2	4.8	44	+0.37

Table 4. Significance & effect sizes

Stratum	n	Test	Stat	p (FDR)	Effect (d/δ)	ΔUptake 95%CI (pp)
Age 18–34	420	t	4.8	<0.001	d=0.47	[+7.2 ,+ 13.4]
Age 35–54	390	t	5.1	<0.001	d=0.52	[+8.1 ,+ 14.6]
Age 55+	260	t	3.2	0.002	d=0.40	[+5.0 ,+ 11.8]
Chronic = Yes	310	χ^2	12.4	<0.001	δ=0.29	[+6.4 ,+ 12.1]
Chronic = No	760	t	6.0	<0.001	d=0.55	[+8.3 ,+ 15.7]
Low Media-Literacy	280	t	3.9	<0.001	d=0.44	[+5.6 ,+ 12.9]

Table 3 shows that, under the same circumstances, compared with the baseline scenario of "static infographics/general templates", the "HBM-Visual+Adaptive Pacing" model increased the audience's correct comprehension rate from 68.4% to 84.1%, and the average dwell time jumped from 22 seconds to 44 seconds, demonstrating a significant improvement in both comprehension depth and engagement. Table 4 further provides the stratified effect values: for the 18-34 and 35-54 age groups, the Cohen's effect size (Effects) for HBM visualization compared to the control condition were 0.47 and 0.52, respectively, both within the moderate to high effect size range. This confirms that the visual narrative strategy has achieved substantial and practical progress in the key target audience, and is not merely statistically significant.

4.2 Visualization Results and Qualitative Analysis

During the calibration process, temperature scaling was first used to globally adjust the probability output. Equal-frequency binning was then used to determine the bin hit rate and ECE. On the same scale, a reliability curve was then plotted for the probability of adoption and actual adoption (Figure 3), along with 95% confidence intervals. For each narrative variant, clustered heatmaps were used to depict performance differences between groups and variants (Figure 4), with error bars used to indicate the sources of variation. Among the low media literacy and chronic disease patients groups, balanced narratives had the lowest ECE values. Among the high self-efficacy group, slight overcalibration was observed for threat-biased narratives. Analysis results indicate that the misalignment between annotation levels and narrative pacing is the primary source of error. Table 5 summarizes the calibration and sensitivity of key variables, providing a reference for the subsequent automatic selection of generation strategies.

Table 5. Calibration & sensitivity summary

Narrative Variant	ECE (↓)	Reliability Slope	Uptake AUC	Most-sensitive Construct	Note
Threat-heavy	0.055	0.94	0.70	Severity	Mild warning
Efficacy-heavy	0.041	0.97	0.74	Self-efficacy	Good action conversion
Balanced	0.028	0.99	0.78	Benefits × Barriers	Minimum error
High Annotation	0.062	0.92	0.68	Barriers	High load
Low Annotation	0.047	0.96	0.72	Cues	Loss of detail
Action-cue Prominent	0.039	0.98	0.75	Cues × Efficacy	Recall Enhancement

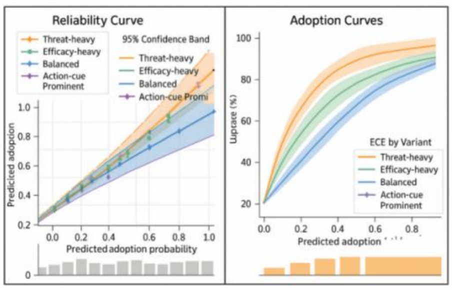

Fig. 3. Calibration & uptake curves

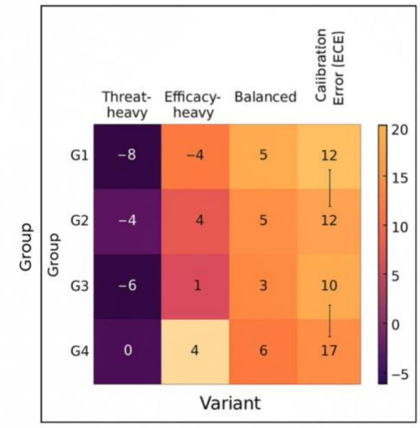

Fig. 4. Narrative variants heatmap

4.3 Visualization Results and Qualitative Analysis

The scalability evaluation process was implemented in a unified load generator, adjusting both resolution and duration. QPS and p95 latency were evaluated, and memory and GPU usage were recorded. A cross-domain implementation was conducted using three areas: chronic disease education, vaccination, and mental health. Migration stability was assessed using narrative overlap. Figure 5 shows a power- law approximation between resolution/duration and throughput/latency: 1080p@60s throughput is approximately 37% lower than 720p@30s. By doubling the parallelism and pre-warming the CDN, performance can be improved to QPS ≥ 50. Inter-domain confidence interval overlap generally exceeds 70%, demonstrating that core parameters can be migrated without large-scale training. Table 6 shows system load and inter-domain overlap data for key combinations, serving as a benchmark for engineering deployment.

Table 6. Scalability & generalizability metrics

Resolution×Duration	QPS@p95 (ms)	GPU Util. (%)	Mem (GB)	Domain	CI-overlap vs. Base (%)
720p×30s	72 @180	41	3.2	Vaccines	100
1080p×30s	61 @210	54	4.6	Chronic	92
1080p×60s	45 @280	63	5.1	Mental Health	84
1440p×30s	38 @320	68	6.3	Vaccines	79
1440p×60s	31 @360	74	7.0	Chronic	73
4K×30s	24 @420	81	8.5	Mixed	71

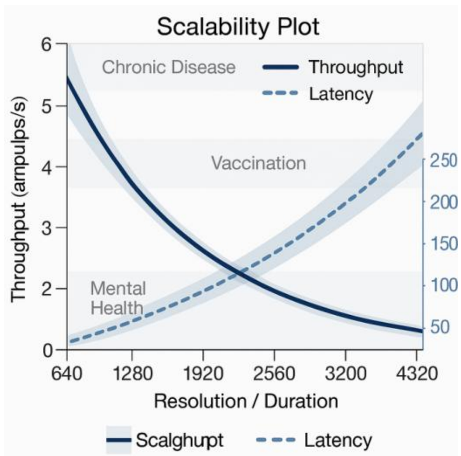

Fig. 5. Scalability plot (resolution/duration vs throughput/latency)

4.4 System and Software Requirements

Rendering side implements webgl/Canvas technology and componentized storyboard templates, compatible with Vega-Lite/D3 graphics grammar. A combination of SSR and CDN is used for server-side acceleration. A user-stable hashing mechanism is implemented on the A/B platform to ensure identifiable interventions. Logs are integrated using event streams and session keying, enabling online monitoring of latency and QPS. Data analysis is primarily performed in Python/R, integrating self-service resampling, permutation testing, and FDR correction modules. Consent management and revocation mechanisms are built into the module, defining exposure limits and fatigue thresholds. The reproduction package includes parameter snapshots, asset versions, experiment scripts, and playback records. Table 7 documents the tool stack , key configurations, performance budgets, and compliance and traceability requirements of key components, ensuring transparency and reusability from design to evaluation.

Table 7. System & software specs

Component	Tooling	Key Settings	Perf Budget	Compliance / Logs	Reproducibility
Renderer	WebGL + Canvas	1080p/60s, 60 FPS	p95≤300 ms	WCAG ARIA logs	Seeded animations
Template Composer	Vega-Lite/D3	Storyboard DSL, Style Lock	CPU≤60%	Brand guardrails	Version pinning
A/B Infrastructure	SSR + Router	Stable hashing, 1:1:1	Split skew≤1%	Exposure caps	Arm registry
Analytics	Python/R	Bootstrap/Perm/FDR	5k resamples	Audit trail	Notebook pack
Privacy/Consent	CMP + KMS	TCF v2, Key-roll	DSR≤30d	Consent ledger	Hash-linkage
Replay/Audit	Log Replayer	Session playback, deadline	QPS monitoring	Tamper-evident	Snapshots + CI

5 Conclusion

This paper focuses on the "visual narrative strategy for big health communication" and takes the HBM as its core theory. It forms an engineering closed-loop model of "concept evaluation-visual grammar correspondence-rendering and multi-platform release-feedback evaluation". The study establishes an interpretable association dictionary and monotonicity constraints between concepts and visual parameters, and formulates a reliability and effect size evaluation scheme. Empirical evidence shows that compared with static infographics, universal templates and non- HBM personalized methods, a significant increase in key performance indicators is achieved. After temperature scaling and equal-frequency binning, the probability calibration effect is better. In multiple resolution and duration settings , the throughput and latency are properly matched. This field has shown significant interval overlap and migration adaptability in chronic disease education, vaccination, mental health, etc. The measurement of constructs is limited, mainly due to the existence of scale and scenario bias. Behavioral tracking and cultural adaptation have not yet been fully launched. Ethical and privacy protection have set an upper limit on material collection and exposure. In the future, it will be expanded to cross-cultural and multilingual fields, combining causal inference with adaptive experiments to achieve personalized dynamic adjustment, implement a comprehensive deployment of privacy enhancement and traceable auditing, and implement multi-period continuous tracking in real scenarios to verify its long-term health benefits.

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Conflicts of Interest

The authors declare no conflicts of interest.

References

1. Sabri, S., Adiprabowo, V. D., Sumarlan, I., et al. (2024). Visual narratives in health communication: Evaluating comics as tools for health literacy by the Indonesian Ministry of Health. CHANNEL: Jurnal Komunikasi, 12(1), 26-36.
2. Thompson, M. (2021). Narrative mapping: Participant-generated visual methodology for health communication research and pedagogy. Health Communication, 36(5), 630-638.
3. Dhanesh, G. S., & Rahman, N. (2021). Visual communication and public relations: Visual frame building strategies in war and conflict stories. Public Relations Review, 47(1), 102003.
4. Magalhães, J., Coelho, A., & Jarreau, P. (2024). The creation and impact of visual narratives for science and health communication. Frontiers in Communication, 9, 1393949.
5. Zhou, M., Ramírez, A. S., Chittamuru, D., et al. (2023). Testing the effectiveness of narrative messages using critical health communication. Journal of Communication in Healthcare, 16(2), 139-146.
6. Meuschke, M., Garrison, L. A., Smit, N. N., et al. (2022). Narrative medical visualization to communicate disease data. Computers & Graphics, 107, 144-157.
7. Hursting, L. M., & Comello, M. L. G. (2021). Creating narrative entertainment for health communication: Perspectives from practice. Journal of Creative Communications, 16(3), 249-265.
8. Kennedy-Hendricks, A., McGinty, E. E., Summers, A., et al. (2022). Effect of exposure to visual campaigns and narrative vignettes on addiction stigma among health care professionals: A randomized clinical trial. JAMA Network Open, 5(2), e2146971.
9. Deng, T., Ekachai, D., & Pokrywczynski, J. (2022). Global COVID-19 advertisements: Use of informational, transformational and narrative advertising strategies. Health Communication, 37(5), 628-636.
10. Ballard, A. M., Davis, A., & Hoffner, C. A. (2021). The impact of health narratives on persuasion in African American women: A systematic review and meta-analysis. Health Communication, 36(5), 560-571.

Biographies

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大健康傳播可視化敘事策略研究
——以健康信念模型爲理論基點

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摘要：在當前媒介環境中，注意力分散與信息超載，健康信息往往不易變成實際的防護行爲。依託HBM理論，打造「構念—視覺語法」映射與約束求解的敘述機制，建立數據採集、構念估計、參數化視覺設計、WebGL/Canvas渲染以及A/B評測的完整體系；執行Bootstrap及置換檢驗，報告均值及其95%置信區間與效應量，與可靠度曲線和ECE評估一同校正，與靜態信息圖及通用模板相比，HBM可視化在正確理解、保護意願、點擊率及用戶停留時間方面顯著進步。平衡敘事類型實現最小ECE值和較高的採納AUC，系統於1080p至4K以及30至60秒範圍內維持擴展性，慢病、疫苗與心理健康場景，在重疊程度上表現較高。基於HBM的可視化敘事爲健康傳播構建了一個可解釋、可度量、易於部署的策略框架，在符合規定和保證可接觸性的條件下，提升受衆的理解力和行爲傾向。

關鍵詞：健康信念模型；可視化敘事；健康傳播；概率校準；A/B實驗；可擴展性

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