

A Brief Discussion on the Application of Plot Design in Medical Science Popularization Games: A Case Study of *The Actions Inside*

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Abstract:

In recent years, medical science popularization in China has developed rapidly, but commonly faces challenges including high cognitive thresholds, weak participation motivation, and difficulty in content transformation. Gamification and plot design of complex medical content provides a feasible approach to overcome these difficulties. This study employs the core principle of “plot serving science popularization” and constructs a design methodology integrating narratology theory, situated cognition theory, and the Fogg Behavior Model to systematically explain the logical relationships and practical strategies of plot design in medical science popularization games. *Importantly, this paper distinguishes between “plot design” (referring to the design of story events and plot progression in games) and “narrative” (referring to abstract storytelling methods in narratology theory) to avoid conceptual confusion.* The term “plot design” primarily encompasses three interrelated dimensions: plot framework construction, contextual scene design, and behavioral guidance mechanisms. Using the WeChat mini-program game *The Actions Inside* about gut microbiota health as a case study, this paper analyzes core issues including character design rationale, cognitive transfer logic behind context selection, and specific construction strategies for the motivation-ability-prompt closed loop. Through practice, we demonstrate that plot design in science popularization games should be reverse-engineered from popularization objectives, embedding cognitive transformation through character growth arcs, facilitating knowledge transfer through life-oriented scenarios, and achieving behavior cultivation through motivation-ability-prompt closed-loop design, thereby completing the full cycle from knowledge transmission to behavioral transformation.

Keywords:

Medical Science Popularization Games, Plot Design, Narratology Theory, Situated Cognition Theory, Fogg Behavior Model

1. Introduction

Health literacy is a core indicator of China's Healthy China strategy. The "Healthy China Action (2019-2030)" explicitly proposes that by 2030, the national health literacy level should reach 30% [1]. Improving health literacy relies on effective dissemination of medical science popularization. However, traditional medical science popularization has long faced three major challenges: the professionalism and abstractness of medical knowledge creates cognitive gaps; traditional popularization forms are singular, lacking interactivity and interest; even when audiences receive popularization information, content rigidity and distance from daily life often make it difficult to translate knowledge into concrete health actions, resulting in a disconnect between "knowing" and "doing."

In recent years, medical science popularization practitioners have begun attempting to break through traditional forms. Works such as science popularization comedy and talk shows that adapt medical content through storytelling have emerged successively and achieved good dissemination effects. As a low-barrier, high-reach medium, games also demonstrate unique potential in the field of science popularization. Science popularization games have developed strongly in recent years: "Happy Vision Planet" developed by Pok City obtained a Class II medical device registration certificate from China's National Medical Products Administration in 2022, becoming the first approved certificate for digital therapy in China's gaming industry [2]; Tencent announced its layout of functional games in 2018, successively launching traditional culture and science popularization products such as "Mortise and Tenon" and "Folding Fan" [3]. However, social concerns about game "addiction" always exist. Adopting plot design rather than solely relying on game mechanism stimulation is more easily accepted by the public and can balance the dual demands of accessibility and edutainment.

However, current research on science popularization games mostly focuses on evaluating gamification mechanism effects: Deterding et al.'s research on gamified learning mainly focuses on the impact of mechanisms such as points, badges, and leaderboards on learning motivation [4]; design framework research in the serious games field emphasizes alignment between game mechanisms and learning objectives [5]; behavioral intervention research in health games mostly focuses on quantitative evaluation of specific health behavior changes [6]. In comparison, systematic exploration of how plot design serves science popularization objectives is relatively weak. Shang Junjie and Pei Leisi pointed out that gamified learning research needs to deepen from the mechanism level to the content design level, focusing on how learning content and game stories can be organically integrated [7]. Gee emphasized that the learning value of games lies not only in mechanisms but also in their creation of "projected identity" and "situated meaning construction" [8], providing theoretical insights for studying science popularization games from a story and plot perspective.

This paper adopts a broad definition of "plot design," primarily encompassing three interrelated dimensions: plot design, referring to story framework construction and addressing "what story to tell and how to tell it"; contextual design, referring to spatial-temporal scene selection where stories occur and how knowledge transfers from games to real life; and behavioral design, referring to how story mechanisms guide players to produce target behaviors. Through the case of *The Actions Inside*, a WeChat mini-program game about gut microbiota health, this paper combines narratology theory, situated cognition theory, and the Fogg Behavior Model to

elaborate on methods and practical pathways for plot design in medical science popularization games.

2. Theoretical Framework for Plot Design in Medical Science Popularization Games

Based on the three challenges of medical science popularization—cognitive threshold, participation motivation, and behavioral transformation—this paper selects narratology theory, situated cognition theory, and the Fogg Behavior Model as theoretical foundations, correspondingly addressing “how to tell good stories,” “how to make knowledge experienceable,” and “how to promote behavioral transformation,” forming a basic theoretical framework.

2.1. Narratology Theory and Story Framework Construction

Narratology theory is the core theoretical foundation of plot design. Genette’s narrative discourse theory decomposes narrative into three levels: story, discourse, and narration [9]. Applied to plot design in medical science popularization games, this requires answering three interrelated questions: what story to tell—how medical science popularization themes transform into narratable story content; how to tell the story—what structure and rhythm to use to organize the plot progression; who is telling the story—which perspective to adopt to guide players into the story context.

These three questions are not independent but nested: story content determines plot structure choice, and plot structure constrains perspective setting. Classic narrative theory divides stories into four stages: beginning, development, climax, and resolution. Science popularization games can establish corresponding plot rhythm accordingly—from establishing problem contexts, to developing knowledge exploration, to presenting key climaxes, ultimately pointing toward behavioral cultivation achievement. This structure makes it easy to integrate popularization content into plot progression, with players gradually “discovering” knowledge in the story process rather than passively receiving “instruction.”

It is particularly important to note that plot in science popularization games faces tension that entertainment games need not consider: balancing storytelling with scientific rigor. Excessive pursuit of dramatic conflict may distort medical facts, while excessive adherence to knowledge accuracy may make plots boring or didactic. Therefore, this balance in design requires careful calibration: embedding medical knowledge in characters’ experiences and choices, allowing players to naturally encounter and understand popularization content while following character destinies.

2.2. Situated Cognition Theory and Knowledge Transfer

Situated cognition theory provides core principles for the contextual dimension of plot design. Brown et al. pointed out that knowledge is not an abstract entity that can exist independently of context, but is closely intertwined with the specific contexts in which it is acquired and applied [10]. Lave and Wenger further defined learning as “legitimate peripheral participation,” with learners’ degree of participation in real communities of practice determining the depth of knowledge acquisition [11]. The similarity between learning contexts and application contexts greatly affects knowledge transfer effectiveness.

Knowledge transformation in science popularization generally faces dual challenges, and medical popularization is no exception. First, the medical knowledge system itself

is highly professional and academic, filled with Latin vocabulary, physiological and pathological terminology, and complex mechanism descriptions, making it difficult for general audiences to obtain needed information directly from professional books or literature. Therefore, the first step in science popularization is transforming academic discourse into accessible expressions to enhance readability and interest. However, mere language simplification is insufficient to achieve knowledge-to-behavior transformation. The second step is more critical: abstract medical concepts need to be embedded in scenarios familiar to audiences. This concrete story context establishing connections between knowledge and practice is more easily accepted. Leveraging this function—game plot design should construct virtual contexts that map to players' real-life domains, enabling decision-making experiences in games to project onto real-world behaviors.

In specific design, this is reflected in three levels: first, scene authenticity, selecting familiar daily scenarios as story settings to reduce cognitive load while enhancing immersion; second, problem typicality, setting typical health problems players might encounter to give popularization content practical guidance value; third, transferability, enabling health choices made in games to transfer to real life, achieving transformation from virtual experience to real behavior.

2.3. Fogg Behavior Model and Behavioral Transformation

The Fogg Behavior Model provides an analytical framework for the behavioral dimension of plot design. Stanford University Professor B.J. Fogg's Fogg Behavior Model (FBM) indicates that behavior occurrence requires simultaneously satisfying three elements: motivation, ability, and prompt, with behavior being difficult to produce if any element is lacking [12].

In plot design, motivation stimulation is particularly important. Through empathy with characters' situations in stories, emotional resonance produced in players often more effectively stimulates motivation for behavioral change than simple knowledge instruction. Next is ability enhancement. Stories should undertake the task of knowledge "dimensionality reduction," breaking down complex behavioral operations into clear, followable small steps to reduce players' psychological burden. Fogg emphasized in "Tiny Habits" that the key to behavior design is making behaviors simple enough [13]. Finally, there is prompt mechanism setting. When players are immersed in stories and both motivation and ability are at peak levels, timely and appropriate behavioral guidance is most easily transformed into actual action; if timing is inappropriate or form is abrupt, immersive experience may be interrupted, actually weakening popularization effects.

3. Methodological Framework for Plot Design in Medical Science Popularization Games

Based on the above theoretical framework, this paper proposes a specific method for plot design in medical science popularization games: reverse construction starting from popularization objectives. Plot content design is not about first having a story then filling in knowledge, but should first clarify the popularization content to be conveyed and behavioral changes expected to be achieved, then design plot strategies, context selections, and behavioral guidance mechanisms that can effectively carry and convey them around these objectives.

3.1. Plot Design: Carrying Cognitive Transformation Through Character Growth

3.1.1. Character Design: Science Popularization Function Principle

Characters are the core carriers of stories. The primary principle of character design is making them “embodiments” of popularization content rather than “mouthpieces” for information. Specifically, character design should first handle identification relationships between characters and audiences. Whether using first-person or third-person perspective, characters’ backgrounds, situations, and confusions should resonate with target audiences—this similarity is the foundation for establishing emotional connections and immersion. Second is the correspondence between character growth arcs and cognitive transformation. Characters’ growth trajectories from “not knowing” to “knowing” and from “knowing” to “doing” actually map the cognitive and behavioral transformations that popularizers hope to achieve, with players’ own perspectives shifting imperceptibly as they follow characters through this process. Third is the service relationship between character flaws and popularization objectives. Characters’ “imperfect” settings—making mistakes, being stubborn, harboring wishful thinking—not only give characters realistic texture but also undertake clear plot functions: if the popularization objective is revealing consequences of unhealthy lifestyle habits, the protagonist should carry these habits from the story's beginning, with their occupation, personality, and family environment also designed around this logic.

3.1.2. Plot Structure: Knowledge Embedding Principle

Plot structure design determines the distribution rhythm of popularization content in stories. The traditional plot structure of “introduction-development-turn-conclusion” needs reinterpretation in medical science popularization games: introduction—creating daily life contexts where players unconsciously accept or ignore potential health hazards and bad habits; development—advancing plot progression through gradual accumulation of common life misconceptions and counter-intuitive health problems, laying groundwork for subsequent turns; turn—presenting behavioral consequences, revealing unexpected health crises at emotional peaks through strong contrast to deepen player memory; conclusion—implementing health interventions, conducting targeted health remediation after problem exposure, and strengthening cognitive transformation through positive results brought by correct behaviors.

Mastery of plot pace is equally critical. Popularization content presentation cannot be too dense to cause cognitive burden, nor too sparse to make players forget connections between prior and subsequent knowledge. Therefore, popularization content should be dispersedly presented at different story stages while closely related to current plots, forming a natural rhythm of “appearing when needed.”

3.1.3. Multi-Storyline Design: Functional Differentiation Principle

Characters shaped by single storylines often lack three-dimensionality and vividness, struggling to represent the complexity of real people. Multi-storyline design constructs multidimensional character relationships and behavioral trajectories, making characters full and close to reality. This strategy’s design logic lies in: cultivation of healthy lifestyles or formation of bad habits is not determined by single decisions or instantaneous behaviors but results from long-term interactive effects of multiple factors. A seemingly minor daily choice may trigger far-reaching health crises through chain reactions—this “butterfly effect” precisely demonstrates that

health education needs to start from subtle aspects of daily habits, with players needing to imperceptibly realize causal relationships between behaviors and results. Multi-storyline design also undertakes “functional differentiation and interactive integration” tasks. Each storyline undertakes specific plot functions, mutually influencing and restraining each other through character relationships, plot intersections, and causal connections.

3.2. Context Design: Facilitating Knowledge Transfer Through Life-Oriented Scenarios

3.2.1. Scene Selection: Transfer Similarity Principle

Context design for science popularization games should create virtual scenes highly connected to real life. Scene selection follows the “transfer similarity” principle: game scenes should be high-frequency environments in players’ daily lives, enabling them to naturally awaken knowledge acquired in games when encountering similar situations in reality. Designers need to analyze target audiences’ daily life trajectories and identify typical scenes related to popularization themes as spatial-temporal backgrounds for stories. Taking dietary health as an example, scenes such as family dining tables, food delivery ordering, and supermarket shopping can be selected.

3.2.2. Context Presentation: Concretization Principle

Context design needs to undertake the function of “translating” abstract medical concepts, transforming abstract knowledge into perceivable concrete experiences. This is not simple “transportation” of popularization knowledge, but rather reconstructing knowledge expression through analogy, metaphor, visualization, and other means. For example, the concept of gut microbiota is unfamiliar to most people, but if analogized to a “bacterial martial world”—beneficial bacteria, harmful bacteria, and neutral bacteria each occupying territory and mutually restraining each other, this microscopic world becomes imaginable. The mechanism of antibiotics is very complex, but the metaphor of “dropping a nuclear bomb on a city just to eliminate one mouse” immediately makes people understand: the problem with antibiotic abuse is not “killing bacteria” itself, but indiscriminate killing.

3.2.3. Interaction Forms: Immersion Enhancement Principle

Context design includes not only scene content selection but also scene presentation forms and composition design to better serve the establishment of immersive contexts. For example, in mobile games, horizontal and vertical screen switching can distinguish different types of contexts—horizontal screens present environment and relationship scenes to create immersion, while vertical screens can directly simulate phone interfaces (such as food delivery apps, social media) to establish connections with players’ daily phone usage habits. The design principle for interaction forms is “form serves contextual authenticity,” making players feel they are not “playing a game” but “experiencing a story.”

3.3. Behavioral Design: Driving Transformation Through Motivation-Ability-Prompt Closed Loop

3.3.1. Motivation Stimulation: Emotional Involvement Principle

In traditional medical science popularization practice, simply informing and transmitting health knowledge often yields minimal results; what better drives behavioral change is leveraging emotional-level impact. Game designers should set up plots in stories that can trigger players' emotional resonance: when characters suddenly encounter health crises due to long-ignored bad habits, players will generate strong "harm avoidance" motivation; when characters regain health and quality of life through difficult behavioral adjustments, players will be driven by "benefit seeking" motivation; and plots involving intimate relationships—how health problems affect families, worry loved ones, and change life trajectories—often stimulate deeper emotional motivation.

A more effective strategy is using "cognitive contrast" to strengthen motivation. Games can first present daily behavioral habits that players take for granted or even consider correct, allowing players to naturally choose as they identify with characters, then reveal in plot development that these seemingly harmless habits actually harbor risks, or that widely accepted health misconceptions among the public are actually wrong. This "I always thought it was right, but it turns out I was wrong" sudden realization produces much stronger impact than directly telling "this is wrong." Cognitive disruption brings emotional shock, and emotional shock often transforms into internal drive for behavioral change.

3.3.2. Ability Enhancement: Threshold Reduction Principle

Having motivation is not enough; if behavioral thresholds are too high, change remains difficult. Currently, health and wellness concepts are prevalent, and almost everyone has the awareness of "healthy eating, balanced diet," but specifically what constitutes balanced eating and exactly what to eat for three meals actually lacks clear cognition. This ambiguity can lead behavior toward another extreme—some understand it as "only eating vegetables," some as "eating less meat," and others as "no carbohydrates"—these actually deviate from true healthy eating. Ability dimension design needs to transform abstract health advice into specific, perceivable operational images. Through game visual presentation and interactive operations, players can see what ingredients are available and what the protein, carbohydrate, and vegetable proportions look like in a meal. This concrete presentation is more effective than any text explanation—players don't need to remember data like "25-30 grams of dietary fiber daily" but remember the image of "that plate of green vegetables plus an apple."

3.3.3. Prompt Setting: Timing Matching Principle

Prompt is the final step for behavior to occur, but it must appear at moments when both motivation and ability are available to be effective. In plot design, prompts include two levels: prompts for popularization knowledge and prompts for behavioral guidance, both requiring precise timing selection. For example, popularization tips cannot be randomly thrown out in stories but should appear at the most appropriate moment—precisely appearing when relevant plots have just occurred and players' emotions have been mobilized. This "instant prompt" directly connects popularization content with specific contexts, and players will feel "this knowledge comes at just the right time," without even feeling they are being "lectured." Interactive guidance and tutorial prompt design are equally important. Games need to tell players "what to do next" and "how to do it" when players are "stuck." The art of prompting lies in

finding that “just right” timing and method, allowing players to unknowingly complete the leap from knowledge understanding to behavioral practice.

4. Case Study: Design Practice of The Actions Inside

The Actions Inside is a plot-driven interactive medical science popularization game project launched on the WeChat mini-program platform, developed by the Science Popularization Game Platform team at Shanghai Science and Technology Museum. The science popularization theme is the relationship between gut microbiota and human health. The game uses story as the main body with light mobile interaction experience, aiming to convey medical health knowledge through a relaxed, non-didactic format: the impact of gut bacterial microbiota on dietary habits, lifestyle, delivery methods, and feeding methods. The game primarily targets elementary school students and above while covering all age groups as much as possible.

4.1. Plot Design: Character and Structure Design Logic

The game’s protagonist is set as an urban professional woman. This setting, from the target audience perspective, makes office workers a high-incidence group for current gut health problems, with characteristics like high work pressure, irregular takeout diet, and prolonged sitting being the key target population for science popularization. Choosing this image also has broad immersion—both office workers and young people about to enter the workforce can find their own reflections. From a science popularization logic perspective, the protagonist’s personality setting directly serves knowledge transmission: she is a young person with ambition but lacking health awareness—pursuing career success yet ignoring bodily warnings, desiring to change current situations yet lacking scientific knowledge. Her bad habits displayed at the story’s beginning (binge eating when work is tense, preferring high-calorie takeout, relying on health supplements rather than changing lifestyle) directly correspond to knowledge points needing popularization: gut-brain axis relationships, dietary habits’ impact on microbiota, correct use of health supplements.

The husband supporting character’s design embodies the “avoiding simplification” method. He is both a supporter caring about his wife’s health and has unintentionally become a problem enabler—the “three-no enzyme” health supplement purchased with good intentions actually delayed his wife’s recognition of the problem’s root cause; he silently gave tips to support his wife in the live broadcast room yet indirectly fueled his wife’s motivation for unhealthy mukbang. This complex setting conveys important popularization information: caring about health requires scientific knowledge, and well-intentioned actions without correct knowledge may produce countereffects. This design avoids the simple binary opposition of “good person/bad person” and is closer to the complex causes of health problems in real life.

Character growth arc design follows the cognitive transformation logic of “from not knowing to knowing, from knowing to doing.” The protagonist’s transformation is divided into four stages: Stage 1 (Ignorance Period): ignoring gut health, attributing physical discomfort to work pressure; Stage 2 (Forced Attention Period): forced to pay attention after obvious physical problems appear, but still seeking “shortcuts” (health supplements, antibiotics); Stage 3 (Systematic Cognition Period): systematically learning gut microbiota knowledge after experiencing health crises, establishing correct understanding; Stage 4 (Behavioral Transformation Period): transforming knowledge into sustained healthy lifestyle, extending to the next

generation. Each stage of character transformation corresponds to specific popularization content output, ensuring players complete cognitive upgrades as they follow character growth.

The game adopts a multi-storyline parallel strategy, designing romance line, career line, health line, and family line, each undertaking different popularization functions: Romance line (dinner argument-flower shop reconciliation-husband live stream tipping-husband sending enzymes-hospital care-changing together) strengthens emotional motivation for behavioral change, allowing players to feel the “relationship value” of health by showing how health problems affect intimate relationships; Career line (white-collar work-choosing live streaming-mukbang popularity-collapsing and transforming) presents contemporary workplace environments’ hidden health impacts, providing plot entry points for popularizing “damage to gut microbiota from binge eating”; Health line shows the complete process of gut health from good to deteriorating to recovering, serving as the main carrier storyline for popularization content; Family line (couple-pregnancy-family of three) extends the popularization theme to intergenerational transmission, carrying knowledge points like “vaginal delivery” and “breastfeeding,” strengthening the significance of long-term healthy behaviors through the appearance of “next generation.” The four storylines each have emphases yet interweave, jointly constructing multi-dimensional, layered science popularization game plot.

4.2. Context Design: Scene Selection Transfer Logic

The nine main scenes selected by the game—meeting room, subway, home dining room, street flower shop, living room broadcast room, bedroom, hospital, balcony garden, delivery room—constitute a typical life map for urban women. Scene screening follows two criteria: appearance frequency and decision pressure. Meeting rooms and subways are spaces office workers pass through daily, with fatigue, pressure, and time urgency amplifying probabilities of unhealthy choices. The subway scene is especially typical: after work, sitting in a swaying carriage, opening a food delivery app, browsing shops in a fatigued state, finally choosing fried chicken—almost every urban white-collar worker has experienced this process. The game inserts popularization content at this moment, explaining brain reward mechanisms, high accessibility of junk food, and gut microbiota’s influence on food preferences, embedding popularization knowledge into situation nodes where players most easily resonate. When players someday actually order food delivery on the subway, this scene and this dialogue may automatically emerge, triggering behavioral-level self-examination.

“Gut microbiota dysbiosis” as a medical term is too abstract for ordinary people; the game uses three methods for concrete presentation. First is metaphor: comparing the gut to a “bacterial martial world,” with beneficial bacteria, harmful bacteria, and neutral bacteria each occupying territory and mutually restraining each other; in a healthy gut, “big tree bacteria” account for over 90%, like big trees in a rainforest supporting the entire ecosystem; in a dysbiotic gut, bad bacteria may account for 30-40%, with territory lost and ecosystem collapsed. Second is analogy: the effect of antibiotics is analogized to “dropping a nuclear bomb on a city just to eliminate one mouse” (quoting “I Contain Multitudes” [14]), making people understand that the problem with antibiotic abuse is not “killing bacteria” itself but indiscriminate killing. Third is visual presentation: designing the scene of the protagonist hugging the toilet and vomiting after the mukbang scene, designing continued deterioration of physical

condition after the antibiotic scene, placing a gut microbiota test report on the hospital bedside table after waking from serious illness coma, transforming abstract “microbiota dysbiosis” into specific consequences that players can see and feel.

The game uses alternating horizontal and vertical screen presentation on mobile, with clear functional division behind this technical decision. Horizontal screen scenes are used to present spatial environments and character relationships as well as compositional sense of pressure—the workplace pressure of meeting rooms in wide shots, the husband-wife face-to-face conflict at the home dining table, close-up health crises in hospital rooms—these scenes requiring environmental atmosphere and character interaction use horizontal screen art design to create immersion, with players like “watching a drama.” Vertical screen scenes completely simulate the phone interface itself—opening food delivery app to browse menus, entering live stream rooms to see bullet comments, checking WeChat private messages, browsing health information on social media—these interaction methods are completely consistent with players’ daily phone usage habits, with players not “operating game character’s phone” but “using their own phone.” This format switching implies a causal relationship. Actions in vertical screens are fragmented, instant, and unintentional—seeing fried chicken ads and ordering, watching mukbang and being inspired to buy, receiving tips and continuing to eat—these are all those “casual” small decisions in real life. And horizontal screen scenes amplify the cumulative effects of these small decisions: the protagonist forcing a smile and continuing to eat in the live stream room, hugging the toilet and vomiting in the bathroom, weakly crying on the hospital bed. The format switching itself is conveying information: those seemingly insignificant choices in phone screens produce real consequences in real life spaces.

4.3. Behavioral Design: Specific Construction of Motivation-Ability-Prompt Closed Loop

The game designs a dual structure at the motivation level: first establishing emotional involvement through intimate relationship tension, then creating impact through cognitive contrast. The dining table scene in Chapter 2 is the first key node in motivation design. At 9 PM, the protagonist brings home fried chicken takeout while her husband serves heated home-cooked food. Two food options sit on the same table; the husband pushes away the fried chicken, the protagonist pulls it back, after several rounds the fried chicken falls to the floor, the protagonist's emotions explode and she leaves home. This scene design does not stand on moral high ground saying “takeout is unhealthy” but transforms dietary choice into a relationship conflict—the husband's goodwill is rejected, the protagonist's exhaustion is not understood, both feel wronged. What players see in this conflict is not “right or wrong” but “how health problems affect the closest people.”

The game adopts a “soft-hard combination” dual-track popularization strategy at the ability level. “Soft popularization” refers to subtle infiltration during plot progression, “hard popularization” refers to professional knowledge presentation in popularization tips, with both serving players at different demand levels. Soft popularization completes health concept implantation through visual storytelling. In the Chapter 9 scene where the husband cooks according to recipes, the table displays meat, vegetables, staples, and eggs; players clicking on different dishes can see ingredient composition—this interactive process doesn’t feature terms like “protein”

“carbohydrates” “dietary fiber” but directly answers “what constitutes balanced eating” through visual composition.

The game designs two systems at the prompt level: popularization tip prompts and visual interaction guidance, with both coordinating to form a complete behavioral prompt closed loop. The timing of nine popularization tips has been precisely designed. The most critical prompt design is in Chapter 7. The protagonist, pale-faced, struggles to continue mukbang, glances at antibiotics on the table corner, hesitates for a moment—this “hesitation” pause gives players space to think; if a popularization tip pops up directly at this point saying “don’t take antibiotics,” players will feel lectured; finally the popularization content pops up after she endures the pain and continues live streaming. This timing choice lets players experience consequences first, then understand reasons, with the prompt effect much stronger than advance warning.

5. Conclusions

This paper employs the core principle of “plot serving science popularization” and elaborates methods for plot design in medical science popularization games through the design practice of *The Actions Inside*: reverse construction starting from popularization objectives, making stories serve knowledge transmission rather than filling knowledge into existing stories; utilizing players’ immersion in character growth arcs to complete cognitive transformation and acquire knowledge through emotional resonance; designing life-oriented scenes based on situated cognition theory to promote medical knowledge transfer from games to reality; and conducting refined design across motivation, ability, and prompt dimensions according to the Fogg Behavior Model to promote players’ behavioral transformation from “knowing” to “doing.” Ultimately achieving the expected popularization effect: letting players naturally acquire knowledge while enjoying stories and potentially transforming knowledge into health behaviors.

This research’s limitations are equally evident. As a design practice study, the article only explains the methodological framework and design logic but lacks sufficient data to verify the actual effects of science popularization regarding players’ knowledge acquisition and behavioral change after experience, so it is not elaborated in the main text. This is also an urgent problem to solve after most science popularization works are produced and released. As science popularization game practitioners, we deeply feel there are many areas in this field that still need exploration. Establishing an effect evaluation system is urgently needed—what designs truly help players remember knowledge and change behavior currently lacks systematic verification. Personalized plot technology is also worth attempting, as players from different backgrounds may need different popularization methods. Interdisciplinary cooperation is even more essential; deep collaboration among medical experts, game designers, science popularization scriptwriters, and others still has much room for growth. We also look forward to more attention from academia and even the general public toward medical science popularization games.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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References

- [1] State Council. Healthy China Action (2019-2030). Available online: http://www.gov.cn/xinwen/2019-07/15/content_5409694.htm (accessed on 20 November 2024).
- [2] 2024 Game Public Welfare Typical Cases - Science Popularization. Available online: <https://www.163.com/dy/article/JIVR76DD05346936.html> (accessed on 20 November 2024).
- [3] Tencent Games. Tencent's Layout of Functional Games. Available online: <https://games.qq.com/a/20180228/009141.htm> (accessed on 20 November 2024).
- [4] Deterding, S.; Dixon, D.; Khaled, R.; Nacke, L. From game design elements to gamefulness: defining gamification. In Proceedings of the 15th International Academic MindTrek Conference, Tampere, Finland, 28-30 September 2011; ACM: New York, NY, USA, 2011; pp. 9-15.
- [5] Dicheva, D.; Dichev, C.; Agre, G.; Angelova, G. Gamification in education: a systematic mapping study. *Educ. Technol. Soc.* 2015, 18, 75-88.
- [6] Baranowski, T.; Buday, R.; Thompson, D.I.; Baranowski, J. Playing for real: video games and stories for health-related behavior change. *Am. J. Prev. Med.* 2008, 34, 74-82.
- [7] Shang, J.J.; Pei, L.S. Research on the application of gamified learning concepts in teaching. *E-Educ. Res.* 2014, 35, 73-78.
- [8] Gee, J.P. What Video Games Have to Teach Us About Learning and Literacy; Palgrave Macmillan: New York, NY, USA, 2003; pp. 1-35.
- [9] Genette, G. Narrative Discourse: An Essay in Method; Wang, W.R., Translator; China Social Sciences Press: Beijing, China, 1990; pp. 1-25.
- [10] Brown, J.S.; Collins, A.; Duguid, P. Situated cognition and the culture of learning. *Educ. Res.* 1989, 18, 32-42.
- [11] Lave, J.; Wenger, E. Situated Learning: Legitimate Peripheral Participation; Cambridge University Press: Cambridge, UK, 1991; pp. 27-43.
- [12] Fogg, B.J. A behavior model for persuasive design. In Proceedings of the 4th International Conference on Persuasive Technology, Claremont, CA, USA, 26-29 April 2009; ACM: New York, NY, USA, 2009; pp. 1-7.
- [13] Fogg, B.J. Tiny Habits: The Small Changes That Change Everything; Houghton Mifflin Harcourt: Boston, MA, USA, 2019; pp. 45-78.

- [14]Yong, E. I Contain Multitudes: The Microbes Within Us and a Grander View of Life; Zheng, L., Translator; Houlang Publishing Company: Beijing, China, 2016; pp. 156-178.



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