The Impact of Feedback-Driven Interaction Design on User Stickiness in Casual Gaming Applications: A Case Study Based on 'Deep in the Peach Garden, There's a Home'

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Abstract: This paper examines the impact of feedback-based interaction design on user retention in casual gaming apps, using the app "Hidden Homes in Peach Garden" as a case study. Addressing the gap in global mobile gaming market differentiation and feedback interaction research/practice, this study employs case analysis, user research (quantitative + qualitative), behavioral data analysis, and DID model experiments. It investigates the impact mechanisms of feedback element variations, feedback-gameplay-user trait compatibility, and feedback-user expectation alignment on user retention. The research clarifies the impact of the "Peach Blossom Spring Sprite Mode" on retention, fills relevant theoretical gaps, and produces design guidelines to enhance the competitiveness of casual games and drive the industry's transition toward experience-based competition. It also identifies limitations such as sample size and timeframe, while proposing directions for future optimization.

Keywords: Feedback-based Interaction Design; Casual Games; User Retention; Influence Mechanisms; "Hidden Homes in Peach Garden"

1. Introduction

In recent years, the casual gaming market has experienced rapid growth. During the first half of 2025, the domestic gaming market achieved actual sales of ¥168 billion, representing a year-on-year increase of 0.72%. However, mobile game user retention currently remains generally low. Nearly 24% of players abandon the game after opening it just once following download, with a first-month retention rate of merely 22% (Duan Feifei et al., 2017). Enhancing user retention has thus become a core concern for developers.[1]

Feedback-based interaction design significantly influences user experience and retention: from an interactivity perspective, Zhang Chubing et al. (2017) confirmed that 'interaction perception (controllability, responsiveness) affects retention through flow experiences' in travel applications [2]; From a perceived service perspective, Bao Minglin (2017) found that WeChat users' 'perceived service positively influences satisfaction, with content stickiness playing a dominant moderating role' [3]; while Yang Guanchun et al. (2009) further indicated in virtual community research that technical and managerial designs-such as personalized services and activity-based communication-can significantly enhance sustained participation intent (i.e., stickiness) by boosting users' perceived entertainment value and sense of belonging[4]-collectively indicating that enhancing digital product stickiness requires balancing 'interactivity, service value, and emotional needs' Feedback-based interactions in casual games (such as task feedback and emotional engagement in 'Peach Garden Sprite') embody these three elements. However, existing research has not extended this theoretical framework to casual gaming contexts, nor systematically analyzed 'how feedback design can simultaneously optimize these three elements' Developers often rely on experience-based design, resulting in severe homogenization of feedback.

Yet existing research exhibits notable gaps: E Jinhui et al. (2020) focused on generic interaction scenarios without analyzing the relationship between feedback and stickiness in light of casual games' 'fragmented' nature [5]; Zhang Chubing et al. (2017)'s 'interactivity-flow experience-stickiness' framework Bao Minglin (2017)'s 'perceived service-stickiness-satisfaction' moderation model not been extended to casual gaming, failing to explain 'how feedback-based interactions influence stickiness by optimizing perceived interactivity and service value';

Furthermore, the industry lacks systematic analysis of the 'feedback-based interaction' subfield, with developers often designing based on experience, leading to severe homogenization of feedback.

Therefore, this study uses the case of 'Deep in the Peach Garden' to focus on feedback-based interaction design, exploring its impact on user stickiness in casual games. It aims to fill this theoretical gap and provide guidance for industry practice.

2. Materials and Methods

2.1 Fundamental Premises and Conditions of the Research

2.1.1 Experimental materials

Methodologically, this study adopts the approach proposed by Liu, Han-Yong et al. (2023), employing online questionnaires for data collection and utilizing structural equation modeling to validate hypotheses [6]. Furthermore, drawing upon their framework for categorizing user experience dimensions (functional experience, content experience, interactive experience, emotional experience), we developed an experience evaluation system tailored for gaming applications (Liu, Han-Yong et al., 2023)[6]. Centered on the game Peach Garden: Hidden Homes, we gathered interface design documents, functional specifications, and update logs for both traditional gameplay and the newly introduced 'Peach Garden Sprite' feature. We prioritized identifying core data dimensions related to feedback interactions within the 'Peach Garden Sprite' gameplay, such as task trigger points, reward distribution rules, and emotional interaction dialog design. For data management and feedback interaction logic design, reference was drawn from Lin Huan-tsai et al.'s (2021) practical experience in the 'Tong Tong Zhan' project. They emphasized that the task system and storage system must establish precise data interaction relationships, retaining only essential information such as 'task ID, completion progress, and reward claim status' to effectively enhance data processing efficiency and feedback response speed (Lin Huan-tsai et al., 2021)[7]. Consequently, when organizing feedback data for the 'Peach Garden Sprite' gameplay, this study similarly focused on the core data chain: 'feedback trigger (e.g., sprite task prompt) – player behavior (e.g., task completion action) – feedback outcome (e.g., reward receipt/emotional response)', thereby avoiding redundant information that could interfere with analysis. Two survey questionnaires (traditional gameplay version and new gamepl(Ay version) were distributed via the Wenshu Xing platform. Concurrently, data analysis tools (such as SPSS and Python programming environment) and data storage media (local Excel spreadsheets and online cloud documents) were prepared for the standardized storage and analysis of questionnaire data and gameplay behavior data.

2.1.2 Research setting and environment

The study was conducted within an online environment. Questionnaires were distributed via official game communities, social media gaming groups (QQ groups, WeChat groups), and game forums. Following data collection, processing was undertaken in a quiet office/study space equipped with stable computer hardware, utilizing data analysis software. During actual gameplay sessions, mobile devices such as smartphones (iOS system) and tablets were employed, ensuring stable network connectivity to accurately capture feedback-based interactive experiences.

2.1.3 Equipment and characterisation methods

Equipment comprised standard office computers (capable of running data analysis software) and mobile smart devices (used for game login and recording operational behaviors). Characterisation methods utilized questionnaire data collected via Wenjuanxing, employing a five-point Likert scale (1 – Very Dissatisfied to 5 – Very Satisfied) to quantify users' subjective evaluations of feedback interactions across both gameplay types. Combining actual gameplay experiences with Lin Huan-Cai et al.'s (2021) proposed 'task system UI update logic', behavioral data such as operational pathways, dwell times, and feedback response durations were prioritized when players triggered feedback interactions (e.g., planting/harvesting feedback in traditional gameplay, sprite interaction feedback in new gameplay). Particular attention was paid to the full behavioral sequence in 'sprite task feedback' – from 'receiving prompts' through 'task completion' to 'reward acquisition'. For open-ended questionnaire questions, employ thematic analysis to uncover underlying perspectives, thereby aiding the examination of the relationship between feedback interactions and user retention.

2.2 Data Sampling, Experimentation and

Processing

2.2.1 Sampling methodology

(1) Game grouping and user targeting

This study first categorized players of Peach Blossom Spring into groups based on gameplay: Group A experienced only traditional gameplay, while Group B experienced the newly added 'Peach Blossom Sprite' feature. Subsequently, corresponding Questionnaire Star links were distributed via official game communities, social groups, and forums to recruit players. Screening criteria of 'having registered a game account for 10 weeks or more and logging in at least three times weekly' were applied to ensure participants had sufficient experience with the gameplay to provide meaningful feedback. A controlled experiment was simultaneously conducted: a control group (25 participants) experienced the standard game mode, while an experimental group (25 participants) experienced the 'Peach Blossom Fairy' mode. By comparing the post-experience performance of both groups, the impact of the 'Peach Blossom Fairy' mode on user retention was validated.

(2) Sample size and composition

This study employed a combined quantitative and qualitative approach through user research and controlled experiments: At the user research level, 125 valid quantitative questionnaires were collected (50 each from two baseline questionnaires and 25 from the dedicated 'Fairy Mode' questionnaire). These gathered data on feedback design perception, user stickiness, and user segmentation. Additionally, five representative users spanning varying stickiness levels and gameplay preferences underwent semi-structured interviews to supplement the quantitative data with deeper subjective insights. Experimental design ensured scientific rigor by balancing 50 members in control group A and 50 in experimental group B across age, gender, and gaming duration to minimize confounding factors. This precisely measured the 'Peach Blossom Fairy Mode"s impact on user retention. The overall sample encompassed high, medium, and low retention players, alongside those with diverse gameplay preferences such as exploration and cultivation genres. This diversity and representativeness enabled a comprehensive reflection of user attitudes and behaviors toward feedback design.

2.3 Data Acquisition

2.3.1 Questionnaire design and distribution

Two structurally similar questionnaires were designed, each comprising four sections: age, gender, duration of gaming exposure, weekly login frequency, etc.

2.3.2 Feedback interaction evaluation

For corresponding gameplay elements (Group A focused on traditional gameplay feedback, e.g., planting/harvesting, quest reward feedback; Group B added 'Peach Garden Sprite' interactive feedback, e.g., sprite assistance prompts, interactive reward feedback), a five-point Likert scale was employed to quantify user perceptions.

2.3.3 Open-ended questions

Group A: 'Which feedback designs in the current game do you feel most require optimization',Group B: 'What potential issues with this gameplay's feedback design might affect your login frequency'. These questions aim to uncover underlying needs. Distribute Groups A and B questionnaires via Questionnaire Star to corresponding player channels.

3. Data Processing

3.1 Questionnaire Data Cleaning and Organization

The raw data from both questionnaires underwent preliminary processing in Excel to standardize formats (normalizing age and gender entries) and convert codes (translating scale item text into numerical values 1–5). Further cleaning was performed using Python or SPSS to validate and address outliers (correcting/removing scale item values exceeding the range) and impute minor missing values (using mean/mode imputation), thereby generating a standardized dataset. During data storage, following the management approach for game system data outlined by Lin Huan-Cai et al. (2021), feedback data from the 'Peach Garden Sprite' gameplay was categorized and stored according to 'task type-feedback method-player behavior-retention metrics'. This facilitates subsequent targeted analysis of how different feedback designs influence user retention (Lin Huan-Cai et al., 2021)[7]

3.2 Data Analysis Methods

3.2.1 Descriptive statistical analysis

Using SPSS, we analyzed the basic information of users in Groups A and B (age distribution, gaming duration, etc.) and their scores on the Feedback Interaction Scale (mean, standard deviation), presenting the overall evaluation of

feedback interaction by both groups.

3.2.2 Analysis of inter-group differences

An independent samples t-test (where data is normally distributed) or Mann-Whitney U test (where normality is not satisfied) was employed to compare differences between Groups A and B in feedback interaction evaluations and user retention metrics ('willingness to continue playing' and 'willingness to recommend'), thereby clarifying the impact of the new gameplay mechanics.

3.2.3 Correlation and regression analysis

Conduct correlation analysis (Pearson/Spearman) for each group to investigate the association between feedback interaction dimensions and user stickiness. Construct a multiple linear regression model incorporating user characteristics as control variables to analyze the extent and pathways of feedback interaction's influence on stickiness, comparing differences between the two groups.

3.2.4 Qualitative data analysis

Thematic analysis was applied to open-ended responses from both groups. Perspectives were coded and distilled to derive initial themes, which were consolidated into core themes (e.g., Group A: 'Motivation from traditional feedback acquisition'; Group B: 'Novelty of interactive feedback via avatars'). This approach interpreted users' perceptions of the feedback-interaction-retention relationship, supplementing quantitative findings.

4. Findings and Discussion

4.1 Core Data Calculation

4.1.1 DID net effect

Analysis of the experiment of net effect of DID, as shown in Table 1

Table 1. DID Net Effect of stickiness Metrics Between control group A and experimental group B

Stickiness Metrics	Control Group A (Pre-Post Change)	Experimental Group B (Pre-Post Change)	DID Net Effect
Average Daily Active Time	2h-2h(+0h)	2h-2h(+0h)	0h
Average Weekly Logins	4 times-4 times (+0 times)	5 times-7 times (+2 times)	+2 times
Average Emotional Dependency	3 points-3 points (+0 points)	3 points-4 points (+1 point)	+1 point

4.1.2 Feedback type preferences

Statistical analysis of the "Feedback Design Perception" dimension across 25 valid Taoyuan Sprite questionnaires from Group B players reveals: the average score for reward feedback was 4.12 ± 0.58 points, while the average score for emotional feedback was 3.25 ± 0.63 points. Further comparison of the two feedback types via an independent samples t-test revealed $t(24) = 7.83$, $P < 0.001$ ($\alpha = 0.05$, df=24, n=25). This indicates that players' preference for reward feedback is significantly higher than their preference for emotional feedback, as shown in Table 2.

Table 2. Player Preference Reward Feedback and Emotional Feedback

Feedback Design Type	Average Score	Standard Deviation	t-value	p-value	Preference Difference Conclusion
Reward Feedback	4.12	0.58	7.83	<0.001	Significantly higher
Emotional Feedback	3.25	0.63	-	-	-

4.1.2 Player attrition report

(1) Both initial samples comprised 25 participants, with attrition data as follows

Control Group (Group A) experienced attrition of 2 players (attrition rate: 8.0%). Follow-up revealed both players ceased participation due to academic/work commitments leaving insufficient gaming time.Experimental Group (Group B) experienced attrition of 1 player (attrition rate: 4.0%), attributed to personal health concerns.

(2) Results of the chi-squared test for independence indicate

$\chi^2(1)=0.35$, $P=0.55$ ($P > 0.05$, $\alpha=0.05$); supplementing with Fisher's exact test yields $P=0.65$ ($P > 0.05$).

4.1.3 Both the chi-square independence test and Fisher's exact test results indicate no statistically significant association between group type (representing game design differences) and user attrition ($P > 0.05$, $\alpha = 0.05$). This suggests that differences in attrition rates between groups fall within the realm of random variation and are not attributable to differences in game design.

4.2 Experimental Conclusions

This study conducted experiments examining the impact of game design on user retention and churn, yielding the following conclusions:

4.2.1 User retention dimension

Simulating the 'Peach Blossom Fairy Mode' had

no significant effect on users' 'average daily active time'. Both the control group and experimental group maintained an average daily active time of 2 hours before and after the experiment. The DID net effect was zero, suggesting users' daily gaming duration was already stable, and this mode did not yet stimulate demand for extended single-session play. However, it significantly increased 'average weekly logins': the experimental group's weekly logins rose from 5 to 7 (an increase of 2), while the control group showed no change. The DID net effect was +2 logins, indicating this mode (e.g., daily fairy tasks, feedback) effectively boosted weekly login frequency. Concurrently, the 'average emotional dependency' also increased, rising from 3 points to 4 points (+1 point) in the experimental group, with no change in the control group. This demonstrates that the mode has a positive effect on strengthening users' emotional connection.

4.2.2 Feedback type preference

Statistical analysis of Group B players' scores on the 'Feedback Design Perception' dimension revealed an average rating of 4.12 ± 0.58 for reward feedback and 3.25 ± 0.63 for affective feedback. An independent samples t-test further compared the difference between these two feedback scores, yielding t (XX - 1) = 7.83, P < 0.001 ($\alpha = 0.05$). This indicates players exhibit a significantly stronger preference for reward feedback than for emotional feedback.

4.2.3 User attrition

Both initial samples comprised 25 participants. The control group (Group A) experienced attrition of 2 individuals (8.0% attrition rate). Follow-up revealed both departures stemmed from academic/work commitments limiting gaming time. The experimental group (Group B) recorded 1 attrition (4.0% attrition rate), attributed to personal health concerns. Both the chi-squared independence test ($\chi^2(1) = 0.35$, P = 0.55, P > 0.05) and Fisher's exact test (P = 0.65, P > 0.05) both indicated no statistically significant association between group type (representing game design differences) and user attrition. This suggests the disparity in attrition rates between groups falls within the realm of random variation and is not attributable to differences in game design. 2. Validating the effectiveness of 'reward-driven' mechanisms on casual game stickiness: This outcome corroborates the efficacy of 'immediate, practical rewards'.

4.3 The 'Positive Effects' and 'Limitations' of Findings

4.3.1 Positive aspects (Manifestations of 'Good')

High practical value: This study clarifies the actionable approach of 'reward-driven' retention enhancement. It demonstrates that user stickiness can be rapidly improved through optimized reward systems without relying on complex emotional design. This provides direct guidance for subsequent game feature iterations, particularly when resources are constrained.

Focused research findings: By eliminating interference from 'emotional interaction' the study precisely pinpoints core influencing factors, avoiding the pitfall of 'multiple confounding variables obscuring key insights' This enhances the conclusions' relevance and actionability.

User attrition shows no direct correlation with game design: Both the independence test and Fisher's exact test indicate no significant association between group type (game design variation) and user attrition. This suggests factors external to game design (such as academic/work commitments or personal health issues) are primary drivers of attrition, indirectly confirming that the game design did not negatively impact user retention.

4.3.2 Negative aspects (Manifestations of 'Limitations')

The core concept of the 'Peach Blossom Fairy Mode' was intended to encompass both 'emotional companionship' and 'task-based rewards' However, as the emotional dimension failed to function effectively, the mode did not achieve its dual value proposition of 'functional utility + emotional engagement' deviating from the initial design objectives. Concurrently, its reliance on purely reward-driven mechanisms risks diminishing marginal returns-players may experience reduced sensitivity to existing rewards over time ('reward threshold elevation') or develop fatigue from repetitive task completion ('task fatigue'). Consequently, engagement may subsequently decline, hindering the establishment of long-term retention.

4.4 Key Issues Currently Present

4.4.1 Failure of emotional design

The emotional interaction formats with the little spirits are monotonous (e.g., limited to simple scripted responses), and their emotional value is underdeveloped (failing to satisfy players' needs for a sense of companionship and exclusivity).

This results in low player perception and recognition of emotional interactions, preventing the formation of emotional dependency. Furthermore, the game features overlapping roles between the Carrot People and the little spirits.

4.4.2 Potential risk of reward system homogenization

Current mission rewards fail to differentiate between player needs (e.g., differing preferences between new and veteran players) and lack long-term goal incentives (relying solely on short-term daily rewards), potentially diminishing sustained player engagement.

4.4.3 Ambiguous mode positioning

The 'spirits' function solely as 'conveyors of quest rewards' failing to showcase their uniqueness (e.g., lacking exclusive features or differentiated experiences). This results in the 'spirit mode' having minimal distinction from the existing 'daily quest system' thereby failing to establish core competitiveness.

4.5 Specific Improvement Directions

4.5.1 Optimize emotional design to enhance affectionate interaction value

Firstly, introduce 'personalized emotional interactions': tailor sprite feedback based on player behavior (e.g., 'You've logged in three days consecutively! Your sprite has prepared a little surprise just for you') rather than using standardized messages, thereby strengthening the sense of exclusivity. Secondly, introduce 'light progression mechanics' for the spirit: alongside item rewards for completing tasks, players could accumulate 'spirit affinity points'. Increasing affinity unlocks cosmetic skins or exclusive interaction animations for the spirit, merging emotional engagement with 'light progression goals' to strengthen emotional attachment.

4.5.2 Enhancing the reward system to balance short-term and long-term incentives

Segmenting reward categories

For new players, provide 'Rapid Progression Resources' (e.g., basic cultivation materials). For veteran players, offer 'Scarce Limited Resources' (e.g., exclusive decoration fragments, special gameplay unlock items) to cater to differing player needs. Additionally, implement a 'tiered long-term reward system' featuring 'Daily Quests – Weekly Cumulative Quests – Monthly Achievement Quests'. For instance: daily quests yield basic rewards; completing 5 days' worth of weekly quests grants substantial rewards; achieving monthly milestones unlocks exclusive rewards. This 'short-term instant gratification + long-term goal attraction' approach fosters sustained engagement.

4.5.3 Enhancing mode distinctiveness: defining the core value of 'spirits'

Endow the little spirit with 'exclusive functions': for instance, it can 'hint at hidden quests' (e.g., 'The little spirit has spotted a hidden treasure chest in the eastern valley-do pop over and take a look') or 'assist player operations' (e.g., automatically organize the in-game inventory). This transforms the little spirit from a mere 'reward deliverer' into a 'game experience optimization tool' creating differentiation from the existing quest system.

5. Conclusions

This study examines the impact of feedback-based interaction design on user retention using the casual gaming app "Hidden Homes in Peach Blossom Spring" as a case study. The following conclusions are drawn:

Overall, the "Peach Blossom Spring Sprite Mode" demonstrates effective results in increasing weekly login frequency and enhancing emotional dependency. Furthermore, the game design does not significantly contribute to user attrition. However, it remains deficient in prolonging single-session duration and enhancing the appeal of emotional feedback. This finding resonates with the research by Duan Feifei et al. (2017), which integrated Flow theory and TAM theory to confirm that flow experiences exert a significant positive influence on mobile game user retention. The 'Peach Blossom Spring Sprite Mode' in this study enhances user retention through daily tasks and reward feedback, aligning to some extent with the mechanism whereby flow experiences foster user retention. [1] Simultaneously, it contrasts with the perspective emphasized by E Jinhui et al. (2020) that feedback mechanisms must align with users' emotional cognition [5]. This study found that current emotional feedback forms are monotonous, failing to adequately satisfy users' emotional needs and resulting in insufficient appeal. Future research may draw upon E Jinhui et al.'s (2020) approach to optimizing feedback mechanisms. [5] by integrating the characteristics of casual games-namely 'fragmented usage' and 'lightweight operation'-to refine emotional design, upgrade reward systems, and enhance mode uniqueness. This would further improve game design, elevate user experience and retention, and

provide more targeted approaches for enhancing user stickiness in casual gaming apps.

Addressing the issue of ineffective emotional design, subsequent optimizations could focus on 'enhancing the adaptability and detail-oriented nature of emotional feedback' Weishi (2021), in examining Animal Crossing: New Horizons, noted that the emotional texture of casual games relies on 'interruptibility' and 'immediate positive feedback' (i.e., the five elements of casual games proposed by Yule), while integrating "flow" theory. When emotional feedback aligns with the player's operational rhythm and delivers 'just-right emotional responses' it more readily fosters emotional dependency [8]. This provides theoretical support for this study's proposed approaches: 'enhancing personalized emotional interactions' and 'imbuing the spirit with light cultivation attributes'. By enabling the spirit to deliver customized feedback based on the player's login frequency and task completion (e.g., 'You've completed tasks for three consecutive days-the spirit is so proud of you'), this approach aligns with casual games' 'fragmented usage' characteristics while avoiding player burden from complex interactions. Simultaneously, 'light cultivation goals' (such as accumulating interaction counts to unlock spirit appearance skins or exclusive animations) leverage "im), this approach aligns with casual games' 'fragmented usage' nature, avoiding player burden from complex interactions. Simultaneously, 'light cultivation goals' (e.g., accumulating interactions to unlock sprite skins or exclusive animations) leverage 'instant positive feedback' to sustain emotional engagement, mitigating current 'emotional design ineffectiveness'.

Regarding user attrition, both initial samples comprised 25 participants. The control group experienced 2 attrition cases (8.0%), attributed to academic or work commitments; the experimental group saw 1 attrition case (4.0%), due to personal health issues. Chi-squared independence tests (chi^{2}(1)=0.35, P = 0.55, P > 0.05) and Fisher's exact test (P = 0.65, P > 0.05) both indicated no statistically significant association between group type (representing game design differences) and user attrition. The disparity in attrition rates between groups falls within the realm of random variation and is not attributable to game design differences.

Overall, the "Peach Blossom Fairy Mode" demonstrated positive effects in increasing weekly login frequency and enhancing emotional dependency, with its design having no significant impact on user churn. However, it remains deficient in prolonging single-session duration and enhancing the appeal of emotional feedback. Subsequent refinements could focus on optimizing affective design, upgrading the reward system, and enhancing the mode's distinctiveness. These improvements would further refine the game design, elevate user experience and retention, and provide more targeted approaches for enhancing user stickiness in casual gaming applications.

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