

User Behavior Analysis and Optimization Countermeasures in Shopping APP Interface Design

Jinchi Sui^{1,2}, Mohd Mustafa Mohd Ghazali¹

¹ City Graduate School, Faculty of Creative Industry, City University, Malaysia

² Hefei College of Economics and Applied Sciences, Hefei, Anhui, China

Abstract: In this study, the interface design and marketing strategy of shopping APP were deeply discussed, and a series of optimization countermeasures were put forward. The principles of interface design and user behavior are analyzed, and the design problems such as information overload, complicated navigation, low usage frequency and high user loss are pointed out. The countermeasures of interface design optimization, user behavior guidance and marketing strategy adjustment are put forward, including simplifying interface, optimizing navigation, personalized recommendation, incentive mechanism, brand building and marketing promotion. These measures are aimed at improving user experience, enhancing user stickiness and enhancing market competitiveness. Through this research, it provides theoretical basis and practical guidance for shopping APP interface design optimization and market strategy adjustment.

Keywords: Shopping APP; Interface Design; User Behavior; Marketing Strategy; Optimization Game.

1. Introduction

Driven by the digital wave, shopping apps have become an indispensable part of consumers' daily life, and the quality of their interface design is directly related to user experience and the market performance of enterprises. However, in the face of increasingly fierce market competition, many shopping apps have many problems in interface design, user behavior guidance and market strategy, which not only affect users' shopping experience, but also restrict the long-term development of apps. Therefore, this paper aims to deeply discuss the principles and problems of shopping APP interface design, analyze user behavior characteristics and problems, and propose corresponding optimization countermeasures. Through the research of this paper, it is expected to provide new perspectives and ideas for the design optimization and market strategy adjustment of shopping apps, and help enterprises stand out in the field of e-commerce.

2. Overview of Shopping APP Interface Design

2.1. Interface Design Principles

In the field of shopping APP interface design, we must first analyze the four cornerstones of interface design - simplicity, ease of use, beauty, and consistency. Simplicity, as the first principle of interface design, lies in eliminating redundant information and functions and presenting what users need in the most direct way, thus reducing cognitive load and improving usage efficiency[1]. Ease of use emphasizes the intuitive operation of the interface, through the logical structure layout and smooth interaction design, to ensure that users can easily get started without additional learning costs. As for aesthetics, it is not only a visual pleasure, but also a brand image transmission, through harmonious color matching, exquisite icon design and reasonable space layout, to create a pleasant atmosphere. The consistency principle requires the interface design to be unified as a whole, whether it is icon style, color use or operation logic, it should follow a

consistent standard to reduce the user's cognitive confusion and enhance the coherence of the user experience. These four principles do not exist in isolation, but interweave and influence each other, and together constitute a complex network of shopping APP interface design. In this network, each principle is an indispensable link, they work together, so that the interface design can not only meet the basic needs of users, but also provide more than expected user experience on this basis, so as to stand out in the fierce market competition, showing a unique charm and value.

2.2. Interface Design Elements

In the interface design of shopping apps, the interface design elements -- color, layout, icon, text and interaction -- constitute the skeleton and flesh of the design, and each element builds a bridge of communication between users and products[2]. Color, as the first element of visual communication, its choice and application directly affect the user's emotional experience and the building of brand image; It conveys different emotional semantics and functional distinctions through subtle changes in hue, brightness and saturation, making the interface design attract users' attention while also having a distinct visual rhythm. Layout is the spatial planning of interface design, which ensures the orderly presentation of information and improves the readability and easy search of content through reasonable space allocation and element arrangement. In this process, designers need to skillfully use the grid system, the golden section and other design rules to achieve visual balance and functional harmony. Icon, as an intuitive information carrier, its design needs to be concise and clear, both to carry specific functional meaning, but also to have highly recognizable visual characteristics, so that users can recognize and respond in an instant. Text, as the core medium of information transmission, needs careful consideration in font selection, size setting and line spacing arrangement to ensure the effective transmission of information and the comfort of reading. The importance of interaction design as a link between users and interfaces is self-evident. It builds a set of intuitive and smooth user operation logic by clicking, sliding, zooming and other

operational feedback, so that users can feel the temperature and wisdom of the design in the interaction process.

2.3. Interface Design Process

Like artistic creation, the interface design process of shopping apps is rigorous and meticulous, covering key links such as demand analysis, prototype design, interface layout, interaction design and visual design[3]. In the demand analysis stage, designers dig into user needs and market trends, and refine core functions and experience points. In the prototype design stage, the requirements are transformed into the interface framework, and the APP structure is outlined through tools such as wireframing. In the interface layout phase, the information architecture is optimized, and the component position and spacing are carefully calculated to ensure visual fluency. In the interaction design stage, the operation logic and feedback mechanism are defined to create an interactive platform. Visual design stage, through color, font and other elements collocation, enhance the interface aesthetic, strengthen the brand impression. Each step is a test of the designer's creativity and execution, connecting and influencing each other, and jointly building a complex and changeable and harmonious unified interface design system.

3. User Behavior Analysis

3.1. User Behavior Theory

In the in-depth analysis of the field of user behavior analysis, we must first build a multidimensional theoretical framework, which covers the three core elements of user behavior model, user psychological needs and behavioral motivation. User behavior model, as the basis for understanding user behavior, is like a detailed map to guide us to explore the user's action trajectory in shopping apps[4]. Through a series of assumptions and variables, the model depicts the entire behavioral sequence of users from contacting the APP to completing the purchase. Its complexity lies in the fact that it should not only consider the direct reaction of users, but also reveal the underlying psychological mechanism. The psychological needs of users are like the driving force of behavior, which comes from Maslow's hierarchy of needs theory. From basic physiological needs to safety needs, social needs, respect needs to self-realization, each level has a profound impact on users' shopping decisions. These needs are intertwined into a complex web, and designers need to understand the user's innermost desires in order to meet their potential psychological needs. As for behavioral motivation, it is the direct incentive of user behavior. Motivation theory tells us that motivation can be internal, such as curiosity, desire for achievement, or external, such as coupons and limited-time promotions. Driven by the psychological needs of users, these motivations stimulate a series of purposeful behaviors, thus forming specific user behavior patterns in the APP.

3.2. User Behavior Data Collection

In the specific practice of user behavior analysis, data collection methods play a crucial role, in which questionnaire survey, user interview, behavior observation and data analysis constitute a multidimensional framework for collecting user behavior data[5]. As a widely used quantitative research method, questionnaire survey systematically collects users' attitudes, preferences and opinions through carefully designed questions. Its advantage is that it can quickly

accumulate a large amount of standardized data in a large range and provide quantitative basis for the overall trend of user behavior. At the same time, user interviews provide more in-depth and personalized data sources. Through direct dialogue with users, researchers can dig out the emotions and motivations that cannot be touched by questionnaires, so as to obtain more abundant qualitative data. Behavioral observation is a more intuitive data collection method, which requires researchers to go deep into the user's usage scenario and record the user's operation process and interaction details in the APP in detail. The unique feature of this method is that it can capture the user's natural behavior and provide a real and reliable basis for understanding the user's behavior. The importance of data analysis as a means of integrating and interpreting the above data is self-evident. Through statistical analysis of the data obtained from questionnaires, user interviews and behavioral observations, researchers can identify user behavior patterns and reveal the underlying rules behind the data.

3.3. User Behavior Characteristics

In the field of detailed analysis of user behavior characteristics, it is not difficult to find that the four dimensions of shopping path, browsing habits, click preferences and residence time constitute a three-dimensional picture of user behavior characteristics in shopping apps. Shopping path, as the trajectory of user behavior, reveals the whole process of the user from entering the APP to completing the purchase, and the conversion rate and loss point of each step map the user's behavior pattern. Its complexity lies in the variability of the path, and each user may walk out of a unique shopping road. Browsing habits reveal the user's navigation mode in the ocean of information, including the user's browsing order, page jump logic and information screening methods. The formation of these habits is often closely related to the user's personal preference and cognitive style, showing rich and diverse behavioral characteristics. Click preference, as a direct reflection of user interaction, reflects the user's attention and interest points on interface elements. Through in-depth analysis of click data, we can gain insight into the user's demand hotspots and the advantages and disadvantages of interface design. As an indirect indicator of users' interest in content, residence time reflects users' attention to goods or information to a certain extent. The length of time users spend on a page or product details is often proportional to their purchase intention, which provides an important reference for designers to optimize interface layout and information presentation.

4. Analysis of Existing Problems and Causes

4.1. Interface Design Problems

When discussing the interface design of shopping APP, we face four challenges: information overload, complicated navigation, tedious operation and visual fatigue, which affect the user experience. Information overload results from the designer's failure to effectively filter information, which makes users feel confused in the mass of products, weakens decision-making efficiency and increases cognitive burden. The complexity of navigation is mainly due to the lack of understanding of the APP structure by the designer, resulting in logic confusion, difficult for users to quickly locate, affecting the smooth operation and satisfaction. Cumbersome

operation may be ignoring user habits and convenience, complex processes take a long time, and wear down user patience. The problem of visual fatigue is caused by excessive pursuit of visual effects, ignoring the visual endurance of users, and excessive color and animation cause visual pressure. These issues expose insufficient consideration of user needs and experience in the design process, as well as the deviation between the design concept and the actual use of users.

4.2. User Behavior Problems

In the in-depth analysis of the user behavior of shopping apps, we must face the three interrelated challenges of low frequency of use, low conversion rate and high user churn rate. The existence of these problems, like the hidden undercurrent, poses a threat to the sustainable development and survival of apps. The low frequency of use suggests that the APP has failed to become a part of the user's life and lacks the charm to attract users to come back again and again, perhaps because of infrequent content updates, lack of personalized experiences, or improper incentives. Low conversion rates indicate that user activity within the APP is not effectively translated into actual purchases or other valuable behaviors, which may be related to inadequate product information presentation, ineffective user guidance strategies, or flawed transaction process design. The high user turnover rate reveals that the APP fails to meet the deep-seated needs of users, which may be related to the lack of community interaction or poor service experience, resulting in the difficulty of forming a stable user base even for the initially attracted users. These three issues contribute to a vicious cycle that seriously affects the long-term value of apps. Therefore, in-depth analysis and effective solution of these problems is of great significance to enhance user stickiness and promote business growth.

4.3. Reason Analysis

When exploring the reasons behind user behavior problems, it is inevitable to touch on three deep-seated factors: the mismatch between user needs and interface design, poor user experience, and the intensity of market competition. The root cause of the discrepancy between user needs and interface design is that designers fail to accurately grasp the actual needs of users, or ignore the diversity and complexity of user behaviors in the design process, resulting in a gap between interface functions and user expectations. This mismatch not only weakens user satisfaction, but also reduces the practical value of apps. The phenomenon of poor user experience is often caused by the accumulation of problems at multiple levels, including the complexity of interface operation, the confusion of information presentation, and the slow response of service, etc. These factors work together to make users encounter various inconveniences in the interaction process, thus affecting users' overall perception and evaluation of the APP. The lack of user experience, like a time bomb, may detonate the negative emotions of users at any time, resulting in user loss. The fierce degree of market competition is undoubtedly another major test for APP interface design and user behavior management. Among the many homogeneous competitors, if the APP cannot provide a unique value proposition and excellent user experience, it will be difficult to stand out in the fierce market competition. The pressure of market competition forces designers to iterate and optimize constantly to adapt to the ever-changing user needs and

market competition situation. To sum up, these three reasons are intertwined and together constitute a complex network behind user behavior problems, and in-depth analysis of them is the key to find solutions.

5. Optimize Countermeasures

5.1. Interface Design Optimization

When optimizing the interface design of shopping apps, comprehensive measures must be taken, including simplifying the interface, optimizing navigation, enhancing interactive experience and enhancing visual beauty, in order to enhance user experience and enhance market competitiveness. Simplifying the interface requires refining the information architecture, eliminating redundancy, enabling users to quickly locate information and reducing the information burden. Optimizing navigation involves layout review and a logical navigation system that ensures smooth user switching between functions. To improve interactive experience, it is necessary to deeply understand user habits, and enhance intelligence and intimacy through delicate dynamic effects, reasonable logic and timely error handling. Pay attention to visual beauty, it is necessary to use aesthetic principles, through color, font, icon design, create a beautiful and brand characteristics of the interface, enhance the aesthetic experience and brand image. These countermeasures complement each other, constitute a multidimensional strategy to improve the quality of interface design, promote the positive development of user behavior, and lay the foundation for the long-term development of APP.

5.2. User Behavior Guidance

A series of innovative and effective measures, including personalized recommendation, incentive mechanism, social interaction and user education, are needed to explore the optimization countermeasures of user behavior guidance. These strategies aim to enhance APP activity and user stickiness through refined user behavior shaping. Personalized recommendation mechanism, relying on big data analysis and machine learning technology, can provide users with customized product or service information according to the user's browsing history, purchase preferences and behavioral characteristics. This accurate recommendation not only improves the user's information receiving efficiency, but also enhances the user's shopping experience. The incentive mechanism is designed to stimulate the user's participation and purchase desire through points, coupons, member privileges and other means, so as to promote the positive transformation of user behavior. The core of the incentive mechanism is to form a positive feedback loop through both material and spiritual rewards to encourage users to continue to be active on the APP platform. The introduction of social interaction builds an interactive network among users through such functions as comments, sharing and community communication. The integration of such social elements not only enhances users' sense of belonging and community identity, but also provides users with more diverse interaction scenarios, thus improving users' overall satisfaction. The implementation of user education aims to improve users' understanding of APP functions and operation ability through tutorials, guides, and operation tips, and reduce users' confusion and misoperation in the process of use. The in-depth user education helps to cultivate the self-service ability of users, and then improve the autonomous

utilization rate of apps. These optimization countermeasures for user behavior guidance are intertwined and mutually reinforcing, forming a comprehensive and multi-level user behavior guidance system. Their comprehensive application will effectively promote the positive development of user behavior and provide a strong driving force for the sustained growth of shopping apps.

5.3. Market Strategy Adjustment

A well-positioned strategy requires an in-depth analysis of the market environment to establish the unique value proposition and market positioning of the APP, a process that involves forward-looking judgment of the target user group, competitors and market demand to ensure that the APP can occupy a place in the market segment. Brand building initiatives, through a consistent brand image, unique brand story and distinct brand personality, to build user identity and loyalty to the APP. Brand building is not only a strategy for external display, but also a deep transmission of the connotation of corporate culture, which helps to enhance the image and value of the APP in the minds of users. The tactics of marketing promotion involve multi-channel and multi-means integrated marketing, including social media promotion, online and offline activities, joint marketing with partners, etc. These promotion activities aim to expand the visibility of the APP, attract potential users, and increase market share. The optimization of user services emphasizes the user-centered service concept, and improves user satisfaction and word-of-mouth dissemination by providing services such as rapid response customer service support, flexible return and exchange policies, and personalized user experience. The excellence of user service is the key to establishing long-term user relationships, and it is also an important way to enhance brand reputation. These optimization countermeasures of market strategy adjustment are related to each other and jointly build a three-dimensional market strategy framework. Their implementation will help shopping apps gain a firm foothold in the market and achieve the goal of standing out from the competition.

6. General Junction

Through the comprehensive analysis of shopping APP

interface design principles, user behavior problems and market strategies, a series of targeted optimization countermeasures are put forward. The study found that simplicity, ease of use, aesthetics and consistency of interface design, as well as in-depth analysis of user behavior, are the keys to improving user experience. At the same time, in view of user behavior problems and market challenges, this study proposed a multi-dimensional solution of interface design optimization, user behavior guidance and market strategy adjustment. Through the implementation of these countermeasures, shopping apps can effectively improve user satisfaction, enhance user stickiness, and thus improve market competitiveness. In summary, the research results provide theoretical support and practical guidance for the interface design optimization and market strategy adjustment of shopping apps, and have important reference value for promoting the innovation and development of e-commerce. In the future, with the progress of technology and changes in the market, these strategies need to be constantly iterated and improved to adapt to the changing user needs and market environment.

References

- [1] Liu Minjuan. Research on Innovation and Creativity of food APP interface UI Design -- Review of Mobile UI Design Practice [J]. Food and Machinery, 2022(006):038.
- [2] Ren Zenggen, Guo Fu, Li Mingming, et al. Research on Graphic Layout design of shopping APP Product display interface based on visual browsing behavior [J]. Journal of Ergonomics, 2023, 29(4):9-14.
- [3] Lu Bing. Research on the Application of traditional Chinese Elements in mobile APP interactive interface design [J]. Footwear Technology and Design, 2024, 4(9):76-78.
- [4] Liu Yujiao, Wu Qiong, Wang Ying. An APP interactive interface design focusing on design for postgraduate entrance examination -- taking Jiyi APP as an example [J]. Design, 2022, 35(5):4.
- [5] Yao Weiyin, Zheng Xi. Research on mobile App interface dynamic design strategy [J]. Packaging and Design, 2023(2): 170-171. (in Chinese).