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The Power of First Impression： Evaluating the Stopping, Sticking, and Striking Effects in Skeuomorphic Interfaces for Middle-Aged Chinese Users

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1 Introduction

Nowadays, AI reconstructs the human lifestyle. Smart devices are no longer cold machines but 24-hour standby "life assistants" in people's pockets. According to the 55th Statistical Report on the Development of the Internet in China, the

number of Internet users in China had reached 1.108 billion by December 2024. And the Internet penetration rate had risen to 78.6%1. This means that user interface (UI) design has a huge potential market in China. With the high popularity of digital products, the first impression of the user interface (UI) plays a pivotal role in the user experience. Norman's emotional design theory focuses on emotional interaction between human and products2. He defines the emotional design as three levels: visceral, behavioral, and reflective. In the digital era, interface design should consider users ' emotions to enhance human-computer interaction (HCI)3. This study, based on Norman's emotional theory, investigates the influence of skeuomorphic aesthetics for middle-aged Chinese users on visceral appeal. On the visceral level, the aesthetic appeal of user interface (UI) can trigger emotional resonance and create a strong first impression, thereby effectively constructing users' loyalty toward a digital product4. The initial presentation of visual effects, sound cues, and material texture can directly affect the user's preference and trust in the product5. UI designers widely employ skeuomorphic design as a design style. This is because it draws on the appearance and texture of real objects and can arouse users' association with the real world6. However, compared with flat design, there is still debate about whether skeuomorphic design can attract strong interest from specific user groups on a visceral level7. In China's Internet environment, middle-aged users are immigrants in the digital age. Their aesthetic level and user habits differ from the young generation, who are digital natives8. The preference of middle-aged Chinese users for skeuomorphic design has not been fully studied. This study aims to explore the influence of aesthetic elements on skeuomorphic UI design for middle-aged Chinese users. Meanwhile, the identification of UI symbols from middle-aged Chinese users is also revealed in this research.

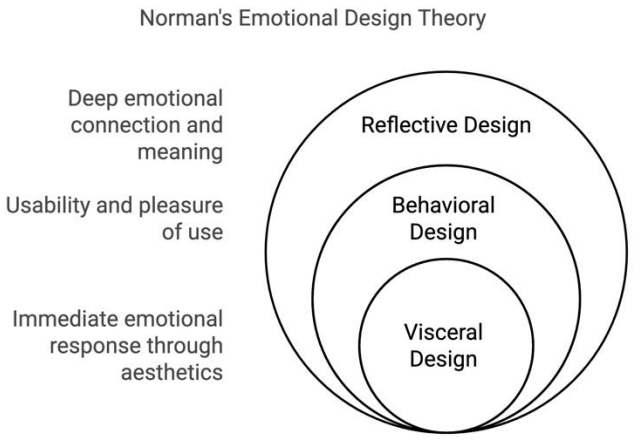
It is acknowledged that traditional skeuomorphic UI has limitations and critical views in contemporary digital aesthetic concepts. Over-decorated skeuomorphic UI can cause digital applications to load too slowly and make users lose patience9. Besides that, if the skeuomorphic UI elements do not match the cultural background of target users, this imitation can actually alienate the users. Critics argue that the design may continue stereotypical aesthetics or exclude users who are not sufficiently familiar with the technology10. To solve the limitations above, this study explores emotional appeal and cultural identity on skeuomorphic aesthetics. And evaluate the stopping, sticking, and striking effects of skeuomorphic UI for middle-aged Chinese users. Most existing studies concentrate on operational efficiency but neglect the first instinct attraction when users first encounter the interface. This study emphasizes how users can quickly establish emotional connections upon seeing a skeuomorphic interface. These include aesthetic factors identification, user stickiness investigation, and striking factors evaluation. This study tries to find a balance between the visceral appeal and usability of skeuomorphic UI in the digital world.

In conclusion, the study focuses on the sustainability of the solution. It tracks users over time, measuring users' retention and emotional investment to assess the long-term appeal toward skeuomorphic UI elements. The results can provide designers with suggestions for improvements to make products that better meet user needs. Accordingly, this study needs to develop an adaptive framework for contemporary UI designers. In this framework, the skeuomorphic design is constantly adjusted and optimized with user needs. The research findings can effectively blend modern popular aesthetics with the visceral appeal of skeuomorphic UI design. Human-centered digital ecosystems benefit from this study. It can be indicated in the transmission and preservation of Chinese culture, as well as stress relief for middle-aged people.

2 Literature Review

2.1 Theoretical Foundations: Emotional Design and Aesthetic Appeal

Norman's emotional design theory provides a useful framework for understanding user interactions with products. Norman (2004) argues that emotional design has three levels: visceral, behavioral, and reflective. The visceral level is based on first impressions and is strongly influenced by aesthetic factors11. Simple sensory cues such as color, texture, and three-dimensional effects can trigger immediate emotional responses. Researchers have demonstrated that the visual appearance of an interface can strongly influence perceived usability and satisfaction (Norman, 2004)12.Hassenzahl (2010) further supports the view that aesthetics play an important role in user experience13. He explains that a product's emotional quality involves both functionality and pleasure of use. Aesthetic appeal can make products appear more accessible and user-friendly. According to Lavie and Tractinsky (2004), there is sufficient evidence that higher user satisfaction is linked to perceived visual aesthetics14. This shows that interfaces are attractive at first glance and have a better chance of engaging users15. The literature consistently points out that aesthetics can have a direct effect on user behavior by creating a sense of trust and comfort. These theoretical frameworks form the basis for understanding the potential of skeuomorphic design. In the context of digital interfaces, designers employ these principles to create experiences that are immediately engaging. The emphasis is placed on evoking a visceral response. Studies in human-computer interaction (HCI) have repeatedly demonstrated that initial impressions are critical for sustained engagement16. The literature from international databases emphasizes that the visceral appeal of a design must be carefully considered when developing digital products.

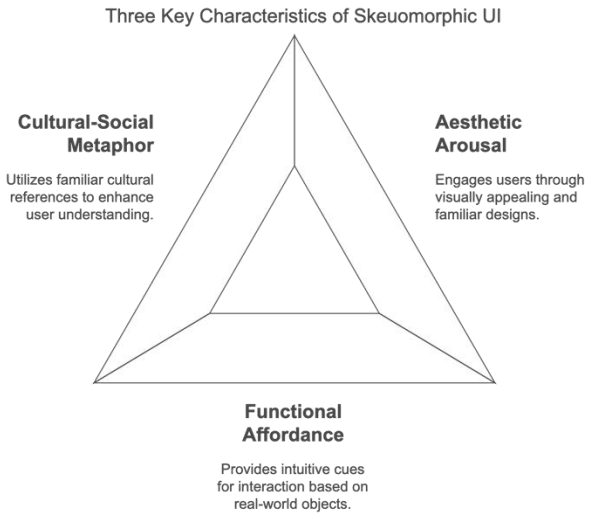


2.2 Characteristics of Skeuomorphic

Skeuomorphic design is a style that replicates real-world objects in a digital context17. It relies on visual metaphors that users can recognize and relate to the UI function easily. The design approach uses realistic textures, shadows, and 3D effects to intimate physical materials. The purpose of this design style is to create a bridge between familiar physical experiences and a new digital interface18. Norman's discussion on affordances in "The Design of Everyday Things" (1988) demonstrated the basic theory for using skeuomorphic style to strengthen UI function19. By applying real-world visual elements such as wooden texture, glassy textures, and tactile indicators, skeuomorphic UI aims to invoke a sense of users' familiarity. Such design cues are believed to reduce the learning time for

new users and establish initial trust in the user interface (Norman, 2004)20. However, the literature also reveals criticisms of skeuomorphic design. Scholars' biased view skeuomorphic design as an over-decorative style. With the rise of flat design in the digital era, many researchers have questioned the efficiency and clarity of over-decorative interfaces21. Nielsen ' s heuristics (1995) emphasize simplicity and functionality, which critics argue may be compromised by excessive ornamentation22. Research indicates that although skeuomorphic interfaces may initially capture users ' attention, they may sometimes obstruct quick navigation and processing speed23. This debate is key to determining if skeuomorphic design suits all user groups, especially middle-aged users with different expectations than digital natives.

Skeuomorphic UI has distinct characteristics aimed at enhancing user experience. It seeks to bridge the gap between the physical and digital worlds, creating visually appealing and user-friendly interfaces that resonate with users' experiences and expectations. According to previous studies, there are three characteristics of skeuomorphic UI showed in figure 2. They are aesthetic arousal, functional affordance, and cultural-social metaphor (Chen et al., 2020; Bollini, 2017; Page, 2016; Zhang et al., 2022; Lee, 2023; Choong and Salvendy, 1998)24. Researchers have noted that the tension between aesthetic richness and operational efficiency requires a balance25. The literature indicates that the effective use of skeuomorphic design may connect emotional appeal with UI affordance. Recent studies explore this balance by observing how users feel while measuring their task performance (Hassenzahl, 2010; Lavie & Tractinsky, 2004)26. These studies help us understand whether skeuomorphic UI leads to long-lasting user engagement and satisfaction.



2.3 Cultural Symbols Influences in Digital Interface Design

Cultural symbols play a critical role in shaping digital interface design. Semiotic theory provides a clear framework for understanding how these symbols carry meaning and influence user perception. In his work, Barthes (1972) pointed out that everyday objects and images are full of cultural myths that influence how they are interpreted27. Similarly, Eco (1976) argued that symbols act as carriers of meaning and guide users' responses in different contexts28. Sociocultural semiotics specifically focuses on how signs and symbols are used and understood within specific social and cultural contexts (Islam and Bouwman, 2016; French et.al., 1999). A variety of digital symbols mainly compose the entire user interface in electronic equipment. Meanwhile, Chinese research has also highlighted the importance of cultural context in UI design. Reports from the China Internet

Network Information Center (CNNIC, 2024) demonstrate that the rapid increase in internet penetration in China calls for user interfaces that reflect local cultural values. Chinese studies suggest designs with familiar cultural elements are more successful29. While flat design is popular globally, some Chinese users still prefer traditional aesthetics30.

The introduction of smartphones to China dates back to the 1980s31. Studies found that middle-aged individuals are more likely to understand the functionality of UI in relation to elements and cultural symbols of familiar things around them32. This user group prefers realistic textures and design elements with memories of earlier eras33. A well-designed UI should meet diverse user needs, solve usability issues, evoke emotional satisfaction, and provide space for personal expression by applying metaphor methods (Lei, 2019)34. Literature supports that aligning design elements with cultural context enhances an interface's appeal35. Cultural semiotics is suitable for skeuomorphic UI research in the Chinese environment, which has particular cultural attributes and social values different from Western culture and society (Lei, 2019; Fei, 2017; (Karreman et al., 2016; Gu, 2016). This perspective emphasizes the necessity for user interface design that is sensitive to the cultural backgrounds of its intended audience.

2.4 Middle-Aged Chinese Users: Characteristics and Preferences

Middle-aged Chinese users have grown up with the great impact of digital change36. They are immigrants of the digital world compared with digital natives, who were born after the 1990s37. The digital landscape in China is characterized

by rapid growth and diverse user demographics. Middle-aged users are the majority of the socio-economic, and they can afford digital products for themselves, their children, as well as for their parents. According to this reason, the UI design should satisfy middle-aged users' needs. This group has unique characteristics. They do not adapt to digital technology as quickly as younger generations. Their exposure to early digital technologies and subsequent adaptation to modern interfaces is distinct from that of digital natives. Czaja and Lee (2007) highlight that age can influence technology adoption and the perception of usability. Although their work primarily focused on older adults, the insights are relevant for middle-aged users as well.

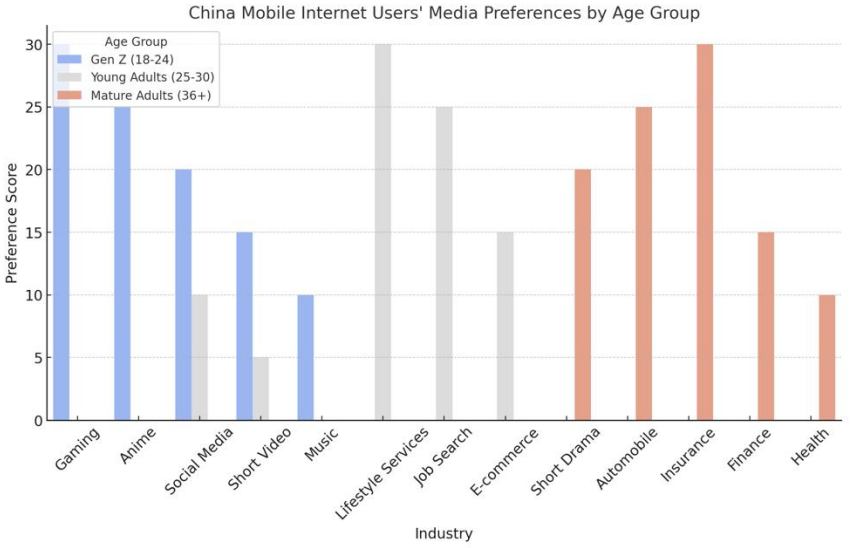
Studies have noted that middle-aged Chinese users tend to favor interfaces that offer both familiarity and clarity. The role of nostalgia experience is particularly important among middle-aged users. Research indicates nostalgic cues can enhance trust and satisfaction with digital products (Marcus & Gould, 2000)38. This indicates that middle-aged users favor designs featuring the physical traits they grew up with. Skeuomorphic UI creates an opportunity to enhance user appeal. The realistic presentation of textures and materials can evoke memories and create an emotional connection39. In contrast, purely abstract or flat designs might not provide the same level of intuitive recognition for middle-aged users. The literature suggests that incorporating tactile textures, auditory cues, and three-dimensional effects into UI design can significantly improve the first impression for this group (Norman, 2004; Hassenzahl, 2010).

Furthermore, research from domestic surveys, such as those conducted by CNNIC (2025), shows that middle-aged users contribute substantially to China's internet user base40. Their usage patterns, preferences, and needs are distinct from those of younger users41. Although empirical studies on skeuomorphic UI for

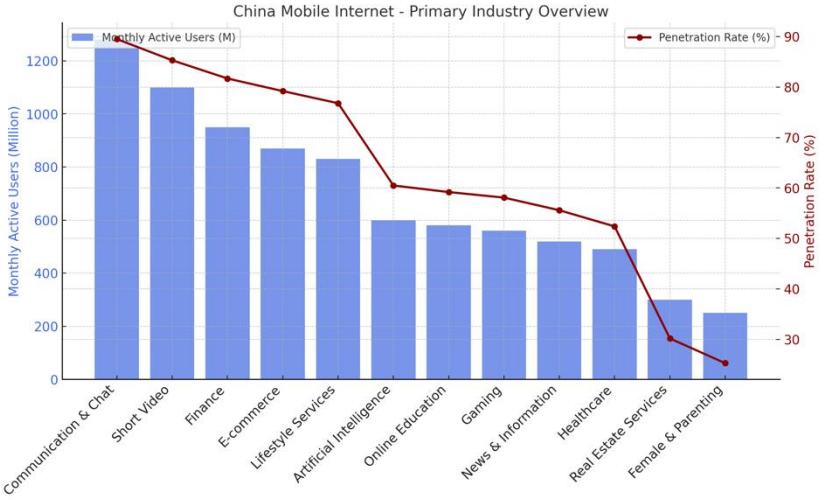
middle-aged users are limited, research on age differences in interface interaction supports further investigation. The gap in the literature indicates that it is necessary to study the visceral reactions and emotional appeal of skeuomorphic UI for middle-aged users. Literature (XXX, 2022) suggests that a balanced interface featuring a skeuomorphic style and clear functionality can reduce cognitive load and stress42. Such findings are especially relevant for middle-aged users, who may face higher levels of stress in their living expenses and work.43. Aligning familiar design elements with user expectations can build up trust and accessibility in digital products. The skeuomorphic style seems more like a caring design. Therefore, aesthetic appeal and emotional arousal on the visceral level of skeuomorphic UI should be systematically explored.

2.5 China's Mobile Application Market

According to China Mobile Internet Traffic Report Q3(2024), Age difference influences internet user preferences, with distinct focuses for each group. Post-00 users favor entertainment like games and animation, while those aged 25-30 prioritize life services and job recruitment. Users aged 36 and above are more interested in short dramas, automobiles, and insurance, reflecting varying needs based on life stages interests.



In China, communication and chatting applications have the highest usage rate in the mobile Internet industry. Life services and other industries continue to grow. Artificial intelligence has emerged as a new player among the top 25 primary industries. Out of these, 19 sectors experienced positive year-on-year traffic growth. Communication and chatting dominate the market, with 1.279 billion monthly active devices and a user penetration rate of 89.5%. Short video, finance, and wealth management also attract strong user engagement, each exceeding 80% penetration. Meanwhile, sectors like female parenting and real estate services face relatively low penetration rates, with some even seeing negative growth. As a newly developed first-level industry, AI is rapidly expanding its influence and market potential, which should not be overlooked.



In March 2024, the number of active mobile Internet users in China reached 1.232 billion, representing an increase of over 20 million compared to the previous year. By June 2024, this figure had further increased to 1.235 billion, reflecting a year-on-year growth of 1.8%. The user base is predominantly concentrated in first-tier and emerging first-tier cities, indicating a trend of population gathering in higher-tier urban areas. Industry analytics data from recent years reveal specific differences in user preferences and mobile app usage. Middle-aged users have become a major group in the mobile app charts and a major consumer force in the market. However, the research on human-computer interaction and emotional links of the middle-aged population is still insufficient. With the deep integration of AI, VR, AR, and XR technologies with real life and the gradual rise of smart wearable devices, the exploration of skeuomorphic UI is essential. On the one hand, although many scholars believe that flat style is the mainstream of today's interaction aesthetics, on the other hand, middle-aged users' demand for realism and cultural memory in the interaction interface should not be ignored. Based on this, exploring how skeuomorphic UI can meet the emotional needs of middle-aged users can not only echo the new trend but also provide more valuable ideas with HCI design.

2.6 Gaps in the Literature and Future Directions

Despite the extensive research on UI design, there are several gaps as follows. Firstly, while Norman's emotional design theory and related works provide a strong theoretical foundation, few studies have empirically investigated the specific impact of skeuomorphic aesthetics on the visceral appeal of interfaces for middle-aged users. Most research has focused on operational efficiency and overall usability rather than the initial emotional connection formed at first glance. Secondly, the debate over skeuomorphism versus flat design remains unresolved. Many studies have focused on the advantages of flat design in terms of simplicity and speed. However, they often neglect the potential emotional and nostalgic benefits of skeuomorphic elements. There is a need to compare these two design styles within the Chinese cultural context. Thirdly, the influence of cultural symbols and traditional aesthetics on UI design has been widely discussed in international literature (Marcus & Gould, 2000). The majority of these studies are based on Western cultural contexts. There is a limited Chinese academic database that specifically examines the influence of skeuomorphic design on middle-aged users. As a result, it is necessary to examine how skeuomorphic UI with traditional Chinese aesthetics can contribute to middle-aged users' attraction and stress relief.

Research Questions

RQ1 (Stopping Effect):
What aesthetic elements of skeuomorphic user interfaces make middle-aged Chinese users stay on the interface longer?
- This question targets which visual, auditory, or tactile cues in skeuomorphic design effectively capture and sustain user attention.

RQ2(Sticking Effect, Emotional Memory & Habit Formation):

How do skeuomorphic aesthetic cues and culturally resonant symbols promote emotional memory encoding and behavioral reinforcement, leading to habitual, repeated use (the "sticking effect") among middle-aged Chinese users?

This question examines how the interplay of vivid, nostalgia-evoking visuals, tactile affordances, and culturally meaningful metaphors not only creates a memorable first impression but also reinforces usage habits—through emotional conditioning, ease of recognition, and cultural familiarity—to drive long-term engagement and user loyalty.

RQ3 (Striking Effect, Cultural Context):
Why do skeuomorphic aesthetics strike users on a visceral level, and how do aesthetic symbols link to cultural background and growth experiences among middle-aged Chinese users?
- This question investigates the emotional "wow" factor (the striking effect) and explores how cultural familiarity and personal nostalgia amplify this visceral appeal.

Objectives

Objective 1:
Identify and categorize the specific aesthetic cues of skeuomorphic UI that effectively capture and sustain users' attention.

Objective 2:
Investigate the contribution of skeuomorphic aesthetics of mobile apps to middle-aged Chinese user stickiness.

Objective 3: To evaluate the striking emotional factors of skeuomorphic aesthetics for middle-aged Chinese users and further reveal the psychological and cultural mechanisms involved.

3 Methodology

3.1 Research Design

This study adopts a qualitative research design to explore the stopping, sticking, and striking effects of skeuomorphic aesthetics on China's mobile applications. It aims to explore how skeuomorphic aesthetics evoke a visceral response among middle-aged Chinese users. The study relies on Norman's (2004) emotional design theory, which suggests that first impressions are formed on the visceral level. In order to capture the emotional responses of users, a qualitative approach is more appropriate than quantitative methods. The study employs a triangulation strategy by using three methods: in-depth interviews, observations, and focus group discussions. Triangulation strengthens the study by providing multiple perspectives on the same phenomenon (Denzin, 1978). Each selected method examines different aspects of the user experience. In-depth interviews allow researchers to capture individual narratives in detail44. Observations offer direct evidence of users' spontaneous reactions when they interact with skeuomorphic interfaces in a natural setting. Focus group discussions facilitate an understanding of group dynamics and collective perceptions. This design builds on earlier work in human-computer interaction (Norman, 2004; Hassenzahl, 2010) and supports the investigation of both aesthetic appeal and cultural symbolism in UI design. The study also considers previous studies that indicate the importance of cultural context in digital design (Marcus & Gould, 2000; CNNIC, 2024). The design supports a case study approach that is flexible and iterative. Research questions will be refined by flowing the data collection progresses. This methodology maintains understanding grounded in the authentic experiences of individuals in middle age users. The research design is guided by qualitative research principles as outlined by Creswell (2013) and Flick (2014). This study seeks to examine the intricate relationship among tactile textures, auditory cues, and three-dimensional effects on middle-aged Chinese users' instinctive attraction. The qualitative data

primarily uses thematic analysis to organize and summarize. The whole research design focuses on extracting key information from users' authentic language, behaviors, and contexts. It aims to construct a theoretical model of the visceral appeal of Skeuomorphic UI. Overall, this research design provides a systematic, aesthetic framework to examine the visceral appeal of skeuomorphic interfaces in the Chinese cultural context.

3.2 Participant Recruitment

Participants in this study are experienced UI designers and middle-aged Chinese users who are familiar with digital products. According to the definition of the World Health Organization, 44 to 60 years of age is defined as middle-aged people. However, the Chinese demographic structure defines middle-aged users as ranging from 40 to 60 years old45. Therefore, this group of users is the target audience for this study. UI designers who have more than 8 years of work experience can provide sufficient and professional views for these research questions. This study invites 6 to 8 UI designers to gather data concerning their professional aesthetic contributions to the principles of skeuomorphic user interface design. Considering the middle-aged Chinese users grow up during a period of rapid digital transformation. Their experiences differ from those of younger generations who are digital natives (Czaja & Lee, 2007)46. 16 to 20 Middle-aged users constitute the primary subjects of interviews and observations in this study. This number is sufficient to achieve data saturation for in-depth interviews and to allow meaningful discussions in focus group settings. To recruit participants, the study uses purposive sampling. This method ensures that selected individuals who have extensive experience with digital devices and who express an interest in user interface aesthetics. It also employs snowball sampling. This allows initial participants to recommend others who meet the study criteria. Recruitment notices are posted on social media moments, online forums, and social media groups that are frequented by middle-aged professionals. There is a

brief description of the study, its objectives, and the criteria for participation. All participants are fluent in Mandarin and have used digital interfaces for at least three years. The study filters for familiarity with skeuomorphic design elements, such as realistic textures and three-dimensional effects, through a short pre-interview questionnaire. The questionnaire helps to ensure that participants have a personal history with traditional digital aesthetics.

Our recruitment strategy is guided by the practices outlined in Patton (2002) and Creswell (2013), which stress the importance of clear inclusion criteria and purposive sampling in qualitative research. Recruitment is carried out between north and south cities in China, where digital adoption is high. This approach ensures a diverse sample in terms of occupation, socioeconomic status, and digital literacy. Selecting participants ensures diverse perspectives on skeuomorphic interface aesthetics. The recruitment process validated the impact of nostalgic design elements and modern UI affordance on middle-aged Chinese users. It is a representative sample of data.

3.3 Data collection

Data collection for this study is carried out using three qualitative methods: in-depth interviews, observations and focus groups. These methods have been selected to offer a comprehensive and multifaceted perspective on user experiences.

Firstly, in-depth interviews are held with individual participants. This part aims to identify what aesthetic elements of skeuomorphic UI make users stay on the interface longer. Interviewees represent their understanding of aesthetic attractions. Each interview provides participants with the opportunity to express their thoughts freely. The interview questions focus on first impressions, aesthetic attractions, emotional reactions, and memories triggered by skeuomorphic design elements. The interviews are audio recorded with permission from both UI designers and middle-aged users.

After that, 13 frequently used mobile phone applications will be selected to observe the operation situation of middle-aged users. This section could investigate the reasons why mobile apps generate user stickiness, which refers to the degree to which users remain engaged with a product, service, or platform over time47. High user stickiness indicates strong user retention and loyalty, often driven by factors like usability, value proposition, and personalized experiences (Kalakota & Robinson, 2001; Reichheld, 2003)48. The observations test users' emotional responses to skeuomorphic aesthetics while using mobile apps on a visceral level. These apps are frequently used among middle-aged users' mobile phones and contain both skeuomorphic and flat elements. During these sessions, and non-verbal responses such as users' facial expressions, gestures, screen operation situations are recorded. Scheduled data collection over a period of three weeks to capture potential variations in user interactions over time. The data allows us to follow up with participants to track their constant emotional responses.

Finally, focus group discussions are organized. This method can help researchers learn about the reason skeuomorphic aesthetics strike users on visceral appeal. How aesthetic symbols link to cultural background and growth experience is examined as well. In these sessions, groups of $5-8$ participants discuss their experiences with digital interfaces. The discussions are guided by a set of open-ended questions. These questions may conclude opinions on the aesthetic appeal of skeuomorphic design. For UI designers, questions focus on the basic design principle behind skeuomorphic elements. By sharing their design experience, aesthetic features are inducted and classified in the skeuomorphic UI design field. At the same time, aesthetic elements that are favored by middle users can also be found. UI designers explain how cultural factors influence their design choices as well. These questions help reveal the designers' perspectives on creating emotional and intuitive interfaces. User feedbacks are gathered from UI designers as secondary data for comparison with the first data from middle-aged

users' discussions. For middle-aged users, the questions focus on their immediate reactions to skeuomorphic UI. Participants are asked to describe their first impressions when encountering skeuomorphic interfaces. And they share which skeuomorphic elements and nostalgic elements can help them relieve stress. Discussions are conducted to explore what skeuomorphic cues evoke nostalgic memories or beautiful feelings. Besides that, middle-aged users share familiar or trustworthy applications in their mobile equipment. The shared information has investigated the situation of skeuomorphic style application. The questions also invite suggestions for improvement. These questions help to uncover how skeuomorphic UI affects their emotional responses and usability perceptions.

The triangulation of methods ensures that data from different sources can be cross-verified. This approach minimizes bias and enhances the credibility of the findings. Each method is pilot-tested before full-scale data collection. This step helps to refine the instruments and ensures that the questions are clear and culturally appropriate. The combination of these three methods provides a comprehensive consideration that reflects both individual and collective experiences of skeuomorphic UI.

3.4 Data Analysis

Qualitative data obtained from interviews, focus groups, and observations can be systematically organized for subsequent statistical representation. Although the study design is primarily qualitative, quantitative measures offer clarity regarding the prevalence and distribution of coded themes. This section outlines data preparation, coding, inter-rater reliability assessment, frequency analysis, demographic cross-tabulation, and results interpretation. The analytical processes align with recommendations from qualitative methodologists (Braun & Clarke, 2006; Miles & Huberman, 1994; Flick, 2014). Steps identify and quantify how skeuomorphic UI elements influence the visceral appeal of middle-aged Chinese participants. To ensure clarity in subsequent analyses, participant identifiers were

assigned to each transcript. These identifiers included coded labels for middle-aged users (MUS) and for UI designers (UDS).

This study conducts a thematic analysis of the core aesthetic elements in Skeuomorphic UI design. The aesthetic factors in skeuomorphic UI design are divided into three primary cognitive dimensions: Stylization Cognition Factor (SCF), Decorative Cognitive Factor (DCF), and Emotional Cognitive Factor (ECF) WU （2015） 49. Through interviews and focus group discussions, 25 major thematic elements were extracted. The statistical analysis examines the frequency distribution across different participant groups, highlighting variations in perception between UI designers (UDS) and middle-aged users (MUS). Results shows that SCF (Stylization Cognition Factor) received 101 mentions from UI designers and 68 from middle-aged users. This suggests that UI designers prioritize 3D effects, material representation, and vintage elements more strongly than users. The difference indicates that while both groups value realism, designers emphasize stylization to a greater extent. DCF (Decorative Cognitive Factor) had the highest frequency among UI designers (121 mentions) but was significantly lower among middle-aged users (56 mentions). The age distribution (44-50 for designers, 44-54 for users) suggests that designers focus heavily on color matching, typography, animation smoothness, and shadow effects, whereas users prioritize functional clarity over ornamentation. ECF (Emotional Cognitive Factor) followed the opposite pattern, with 102 mentions from middle-aged users and only 84 from designers. This confirms that users engage more with cultural familiarity, nostalgia, and social identity in UI design. Unlike designers, who prioritize usability, users emphasize emotional resonance and immersive experiences.

There are three key findings are inferred from these statistics.

Reduce excessive decoration. The discrepancy in DCF (121 vs. 56 mentions) suggests that users prefer simpler, function-oriented UI over highly decorative interfaces.

Enhance emotional appeal. With ECF ranking highest among users (102 mentions), integrating cultural symbols, nostalgia, and interactive feedback can improve engagement.

Maintain realism in design. Both groups acknowledge SCF ' s importance, reinforcing the need for real-world metaphors and material simulation to enhance UI usability.

These findings quantitatively validate qualitative user insights, revealing distinct age-based and expertise-based differences in skeuomorphic aesthetics attraction. Future studies should apply statistical modeling to further explore the interaction between design complexity, perception, and usability outcomes.

Table 1:

Thematic Analysis of Aesthetic Factors in Skeuomorphic UI

Category Coding	**Specific Aesthetic Elements**	**Description**	**Interviewee UDS Frequency Count**	**Age**	**Interviewee MUS Frequency Count**	**Age**
Stylization Cognition Factor (SCF)	3D Effects，Texture ，Material Representation，Real Object ，Physical World，Vintage Elements，Sci-fi Style，Art	SCF focuses on how users recognize and interpret stylized elements in UI design,	101	40-60	68	40-57

	Themes，Crafts Imitation，Chinese Traditional Style	ensuring clarity, consistency, and usability.				
Decorative Cognitive Factor (DCC)	Color Matching，Fonts，Typography，Background，Visual Hierarchy，Details and Quality，Animation Smoothness，Sound Simulation，Light，Shadow Effects	DCF includes embellishments and ornamental elements that enhance visual appeal, making the interface engaging and aesthetically pleasing.	121	40-50	56	40-54
Emotional Cognitive Factor (ECF)	Traditional Customs，Ethnic Attributes，Interest Preferences，Cultural Connotation，Social Cognition and Identity，Visual Intimacy，Empty Space，Atmospherics，Familiarity and Nostalgia，Sense of Immersion，Interactive Feedback，History	ECF focuses on how UI design evokes user emotions, enhancing engagement, comfort, and brand connection.	84	40-60	102	40-60

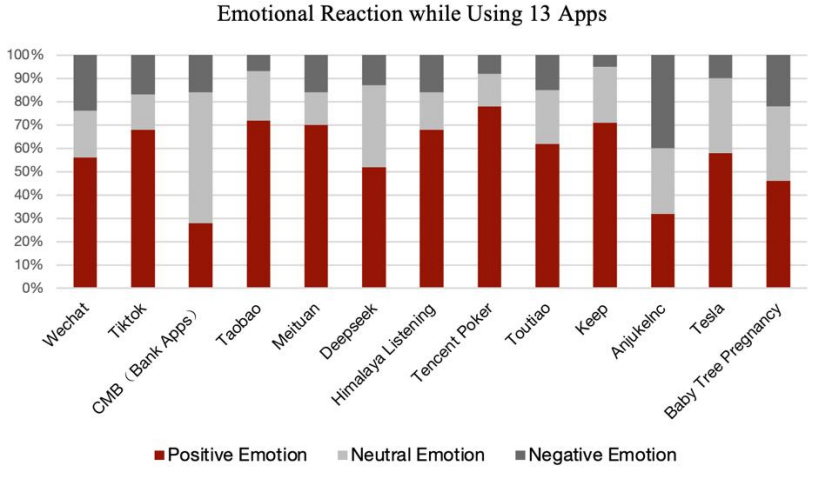
This study collected the mobile Internet applications in China that are currently popular among middle-aged users, along with their usage patterns. The details are as follows. Through in-depth interviews with middle-aged users in China, the usage data are also collected as well. The study found that middle-aged users are very active on social platforms such as WeChat, QQ, and Weibo. These apps dominate their daily lives, with a usage rate of up to 90 % and an average of 4 hours of use per day. Users say these platforms fulfill their needs for real-time communication, information sharing, and social connections. Short-video platforms like TikTok and Kwai enjoy an 85% usage rate among middle-aged individuals, primarily for entertainment, live streaming, and learning square dance. In contrast, financial and e-commerce apps have lower usage rates (45 % and 60 %, respectively), but the importance of these apps is rated very high as they support payroll, pension management, and daily shopping needs. Life services apps are mainly used by users in the 40-45 age group, providing important functions such as food delivery and navigation. Similarly, self-study and educational apps for children are utilized by 85 % of users, with many middle-aged individuals investing up to 3.5 hours a day. That indicates a strong motivation for continuous learning and parental involvement among middle-aged Chinese users. Furthermore, the data suggests that there is a different preference for age segmentation within the middle-aged population. Users aged 40-48 tend to use utility apps such as AI assistants, real estate, and car services, while those aged 55-60 prefer entertainment and news apps.

Mobile Apps Usage from Middle-Aged Chinese Users

Category	Common APP Examples	Primary Usage Scenarios	Usage Rate/User Proportion	Hours of use per day (Average)	Importance Degree (1-5 Score)	Age Groups
Social Communication	WeChat, QQ, Weibo	Daily Communication News Browsing Curiosity on Friends' Moments	90%	4	5	40-60
Short Video	Tiktok, Kwai, iQIYI	Live Streaming Watching Square Dance Learning Nostalgic Content Insomnia Treating	85%	3	4	40-60
Finance	China Merchants Bank (CMB) Industrial and Commercial Bank of China Limited (ICBC), China Construction Bank (CCB)	Child financial support Salary & Pension Management Investment Medical Emergency Payment	45%	0.5	5	40-55
E-commerce & Online Shopping	Taobao, JD.com, Pinduoduo	E-payments bills Online Shopping Promotional Activities Social Security/Medical Insurance Contributions	60%	1	5	40-55
Lifestyle Services	Meituan, Gaode, Little Red Book	Payment Food Delivery Navigation Life Problem Inquiry	75%	1.2	5	40-45
AI Assistant	Deepseek, Doubao, Kimi	AI Assistant Working AI Inquiry AI Assistant Learning	35%	1	3	40-48
Self-learning & Children's Education	Bilibili, Himalaya Listening, Homework Asistant	Self-Learning Skills History Learning Insomnia Treating Children's Tutorship	85%	3.5	5	40-50
Entertainment	Kugou Music,Tencent Poker, Tomato Novel	Music Listening Stress Relief Boring Time Killing	75%	3	4	55-60
News Information	Tencent News, Toutiao,Weibo	News Browsing Hot Topic Collecting Learning the World Dangers Alert	90%	1	4	40-60
Healthcare & Medical	Keep, Huawei Health Kit, Dingxiang Doctor	Fitness Appointment Booking Medical Consultation Health Data Monitoring Disease Prevention & Control	45%	2	5	40-50
Real Estate Service	Anjukelnc, BEKE.US, Home Link	Property Search and Screening School Districts Search Property Investment Asset Management	40%	0.5	3	40-48
Automobile	Home of Car, King of Car, Telsla	Car Trading & Valuation Assessment Vehicle Maintenance & Remote Diagnostics Remote Control In-Vehicle System Connectivity	35%	0.3	2	40-45
Female Pregnancy & Childcare	Baby Tree Pregnancy, Baby, Meet You	Women's Pregnancy Childcare Female Health Monitoring	10%	0.5	5	40-45

The statistical analysis highlights the popularity and preferences of mobile phone applications among middle-aged individuals. In the subsequent observational study, 13 mobile apps are selected to gather emotional responses from these users by observing their usage and feedback.

Observational data shows that middle-aged Chinese users' emotional responses varied across the 13 mobile apps. Social apps like WeChat evoked moderately positive emotions (56%), but also showed relatively high negative reactions (24%), suggesting that there is room for improvement in the design. In contrast, entertainment and shopping apps like Taobao and Tencent Poker scored high in positive emotions (72% and 78%, respectively) and had the fewest negative reactions, indicating strong emotional engagement. Lifestyle and fitness apps such as Meituan and Keep also received high positive ratings (70% and 71%), suggesting that their design elements resonate well with users. In contrast, functional service apps, such as the Merchants Bank app, generated only 28% positive sentiment, a largely neutral response reflecting a lack of engaging cues. The real estate app Anjukelnc had the lowest positive sentiment (32%) and the highest negative sentiment (40%), highlighting usability issues. Overall, apps withskeuomorphic elements tended to elicit stronger positive emotional responses, emphasizing the need for emotionally coordinated design strategies.



Then the study conducted in-depth interviews with the subjects and asked them to explain the reasons behind their various emotional reactions. Thirteen apps were assessed for their skeuomorphic design and user feedback, with the majority receiving positive reviews. Users believe that most apps have high visceral appeal, as well as usability. Currently, skeuomorphic design elements are still preferred by middle-aged Chinese users. They include skeuomorphic icons, physical simulations, subtle shadows for scene simulation, 3D effects, emoticons, animated stickers, and digital gifts. These elements adhere to specific Chinese aesthetic principles and cultural customs in various applications. A notable example is the "red envelope" feature, which is represented as animations or coupons, widely used in Chinese UI design. Interviewees state that skeuomorphic elements can evoke feelings of trust, nostalgia, and friendliness. However, finance apps, health care apps, automobile apps, and AI assistant apps mainly employ a minimalist design style but still contain skeuomorphic elements. The study found that minimalist UI or flat UI received lower visceral appeal ratings yet retained high usability. This is because some software is necessary to maintain normal work-life expenses. Nonetheless, from the standpoint of visceral appeal, skeuomorphic interfaces make it easier to evoke an emotional response. The collective data shows that skeuomorphic elements, often used by middle-aged Chinese users, can evoke feelings of warmth, trust, freshness, coziness, motivation, nostalgia, care, friendliness, ceremony, harmony, and more. It is obvious that all these feelings are positive emotions of humans. Therefore, skeuomorphic style plays a vital role in visceral appeal from middle-aged Chinese.

13 Apps' Feedback from Users about the Visceral Appeal of Skeuomorphic Interface

Code No.	Apps Name	Enjoyed (No/Yes)	Visceral Appeal	Usability	Aesthetic &Skeuomorphic Elements Mentions	Emotional Feeling Description
1	Wechat	Yes	High	High	Chat bubbles Rounded edges Bright Color Subtle Shadow Emoji symbols	Clean Friendly Realistic "conversation" Scenario Green Color Evokes trust
2	Tiktok	Yes	High	High	Gift &Reward in Live Streaming Emoji symbols	Stylish Dynamic China chic Avant-Garde Nostalgia
3	CMB (Bank Apps)	No	Moderate	High	Bank card icons Simulation 3D Button Subtle Shadow	Steady Professional Trustworthy
4	Taobao	Yes	High	High	Menu Icons Coupon Icons Red Packet Holiday Themed UI In-store displays Simulation	Colorful Festival Sense of Ceremony Cluttered Nostalgia
5	Meituan	Yes	Moderate	High	Menu Icons Coupon Icons Red Packet Holiday Themed UI In-store displays Simulation	Colorful Festival Sense of Ceremony Nostalgia Popularity
6	Deepseek	Yes	Low	High	Icon Logo	Minimalist Modern Clean
7	Himalaya Listening	Yes	Low	High	Dynamic Audio Wave Effects Real Book Elements Physical Buttons Tapes Simulation	Warm Friendly Relaxing Atmosphere
8	Tencent Poker	Yes	High	High	Poker Table and Card Simulation The First Player Version Game Props from Real World	Glamorous Realistic Humor Cute
9	Toutiao	No	Low	High	Red Packet Coupon Newspapper Typography Simulation Few Skeuomorphic Elements	Simple Style Nostalgia
10	Keep	Yes	Moderate	High	Audio Cues Few Skeuomorphic Elements	Modern Energetic, Inspirational
11	Aniukelnc	Yes	Yes	Low	Menu Icons Subtle Shadow Coupon Icons VR Simulation	Fresh Colorful Cozy Sense of Ceremony Cluttered
12	Tesla	Yes	High	High	Real Car Simulation Shadow Space 3D perspective	Minimalism Style Science & Technology
13	Baby Tree Pregnancy	Yes	Moderate	Moderate	Menu Icons In-store displays Simulation	Pink Warm Color Soft Caring Peace

After the in-depth interviews and observations, this study investigates the emotional factors underlying middle-aged users' preferences for skeuomorphic UI. To ensure that the survey data are both objective and comprehensive, we convened three focus groups for discussion. The first group consisted exclusively of designers across three age brackets (45–50, 50–55, and 55–60). The second comprised end users within the same three age brackets. And the third was a

mixed group of both designers and users, also covering the 45–50, 50–55, and 55–60 age ranges. We then analyzed the conversational content from all three focus groups. Following in-depth interviews, this study evaluates the striking emotional factors of skeuomorphic aesthetics for middle-aged Chinese users.

Analyzing the data charts, the study first quantitatively measures the role of skeuomorphic UI in eliciting emotional experiences by analyzing the content of the discussions in the three focus groups (all designers, pure users, and mixed users and designers, respectively). The table in the first section shows the distribution of the 11 emotional responses (e.g., nostalgia, cultural belonging, authenticity and security, aesthetic craftsmanship, and affective kinetic energy) on three levels of engagement: high, medium, and low. It can be seen that ‘cultural belonging’, ‘sense of solemnity’, and ‘familiarity and low learning cost’ were mentioned a high number of times (112, 123, 121), suggesting that these emotional elements have a high degree of influence on the emotional responses. (112, 123, 121), indicating that these emotional elements play a significant role in users' perception of skeuomorphic design. At the same time, each emotion dimension is based on 24 participants, which reflects the consistency and representativeness of the focus group's emotion expression, and provides strong data support for the subsequent research question of ‘how the aesthetic elements in the skeuomorphic UI influence users’ emotions through cultural background and upbringing’.

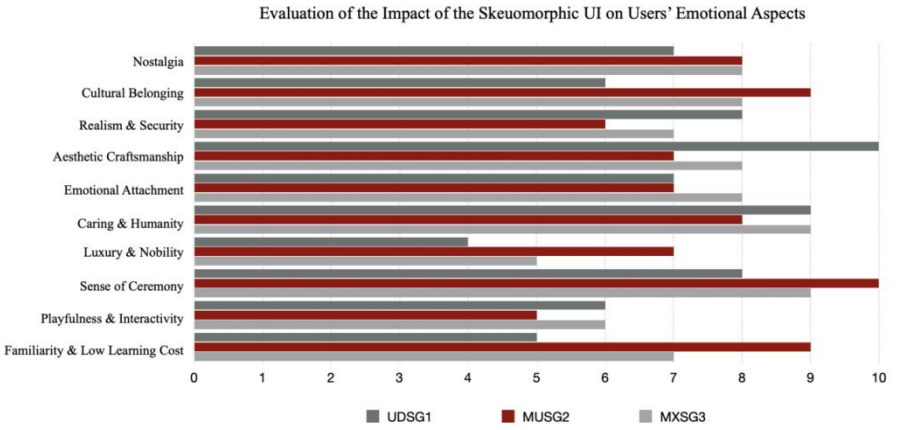
The other part of the data chart shows the subjective responses of different focus groups to each emotional factor on a 1-10 scale. Taking the ratings of the designer group (UDSG1), the user group (MUSG2), and the mixed group (MXSG3) as an example, each group responded to the dimensions of ‘aesthetic craftsmanship’, ‘cultural belonging’, ‘sense of authenticity and safety’, and ‘sense of security’. The high scores on the dimensions of ‘aesthetic craftsmanship’, ‘cultural belonging’, and ‘sense of reality and security’ show that each participant group has a high degree of acceptance of the emotional messages conveyed by skeuomorphic UI. Although there are slight differences in specific scores across groups, the overall trend is consistent, indicating that skeuomorphic UI can

effectively evoke emotional resonance, both from a professional design perspective and a user experience perspective. This cross-group consistency validates the theoretical basis of the emotional connection between aesthetic elements in skeuomorphic design. It lays the data basis for further exploring the cultural and upbringing experience influencing mechanisms behind it.

High Emotional Aspects from Focus Group on Skeuomorphic UI

Emotional Theme	**High Engagement（Participants NO.）**	**Moderate Engagement（Participants NO.）**	**Low Engagement（Participants NO.）**	**Total NO. Participants**	Relevant Mentions
Nostalgia	15	7	2	24	98
Cultural Belonging	16	8	0	24	112
Realism & Security	13	8	3	24	91
Aesthetic Craftsmanship	16	7	1	24	73
Emotional Movement	14	8	2	24	108
Caring & Humanity	15	6	3	24	94
Luxury & Prestige	5	7	12	24	79
Sense of Ceremony	18	6	0	24	123
Playfulness & Interactivity	9	11	4	24	87
Familiarity &	7	12	5	24	121

Low Learning Cost					
Classical &Traditional	18	5	1	24	89



The study shows that middle-aged Chinese users prefer skeuomorphic UIs because the familiar, culture-rich look feels safe, respectful, and easy to use. Designers, everyday users, and mixed groups all gave high ratings to these feelings, confirming that the results are reliable. Skeuomorphic design is more than an outdated style; it evokes warm memories, builds trust, and provides clear guidance for future UI work aimed at this growing audience.

Pengnate, S., & Antonenko, P. (2013). A multimethod evaluation of online trust and its interaction with metacognitive awareness: an emotional design perspective. International Journal of Human-Computer Interaction, 29(9), 582-593.

4 Results

The findings of this study are presented through thematic analysis of interview data, observational studies of app usage, and focus-group ratings of emotional factors. From the thematic analysis, 25 skeuomorphic aesthetic elements were categorized into three main cognitive factors: Stylization Cognition Factor (SCF), Decorative Cognitive Factor (DCF), and Emotional Cognitive Factor (ECF). Designers emphasized decorative and stylized elements such as color matching, typography, 3D effects, textures, and vintage elements significantly more often than users, reflecting a professional concern for visual refinement and complexity. Conversely, middle-aged users frequently highlighted emotional and culturally resonant factors like nostalgia, immersive feedback, and cultural symbolism, revealing their deeper engagement with emotional meanings. The observational study of thirteen popular mobile apps revealed strong positive emotional responses to apps with pronounced skeuomorphic elements (e.g., Taobao at 72% and Tencent Poker at 78%), whereas functional-oriented apps, particularly financial and utility apps, elicited significantly lower positive reactions (e.g., a major banking app at only 28%). Finally, in focus-group assessments involving designers, users, and mixed groups, emotional themes such as a sense of ceremony, familiarity coupled with low learning costs, and cultural belonging consistently ranked highest. Particularly, elements of aesthetic craftsmanship, authenticity, and cultural resonance emerged as powerful triggers for emotional engagement, confirming skeuomorphic UI's capacity to generate impactful visceral reactions by connecting visual symbols with the cultural backgrounds and lived experiences of middle-aged Chinese users.

Based on the detailed findings presented, we can logically synthesize the relationships among the research questions and objectives to draw a comprehensive conclusion:

The analysis revealed clear alignments between skeuomorphic design elements and user behavior, directly addressing the three core research questions. Regarding RQ1 (Stopping Effect), stylized and decorative aesthetic elements such as vibrant color matching, refined typography, 3D effects, textures, and vintage aesthetics

were identified as critical for capturing initial user attention, particularly emphasized by designers. However, the lasting appeal (RQ2, Sticking Effect) relies more significantly on emotional cognitive factors — nostalgia, immersive feedback, and culturally symbolic cues — that resonate deeply with middle-aged users' emotional memory and promote habitual usage patterns. Apps exemplifying pronounced skeuomorphic traits, such as Taobao and Tencent Poker, substantiated this by eliciting notably stronger positive emotional responses, indicating the efficacy of emotionally resonant aesthetics in reinforcing long-term user engagement and habitual behavior.

Moreover, addressing RQ3 (Striking Effect, Cultural Context), the findings confirm that skeuomorphic aesthetics profoundly impact users on a visceral level precisely because they evoke powerful emotional themes like a sense of ceremony, familiarity, authenticity, and cultural belonging. These aesthetic symbols intricately connect with users' personal experiences, historical memory, and broader cultural narratives, validating Objective 3 by uncovering the psychological and cultural mechanisms underpinning these visceral reactions. Therefore, the study conclusively demonstrates that skeuomorphic UI designs effectively harness aesthetic craftsmanship and culturally meaningful symbolism to achieve sustained user attention, reinforce habitual engagement, and elicit emotionally striking experiences among middle-aged Chinese users.

5 Conclusion

This study demonstrates that skeuomorphic interface design offers three essential benefits for middle-aged Chinese users: the Stopping Effect, where realistic textures and subtle 3D elements prolong user engagement; the Sticking Effect, driven by nostalgic and culturally meaningful symbols that enhance emotional memory and habitual use; and the Striking Effect, achieved through ceremonial elements, familiarity, and cultural belonging that create an instant emotional connection. Designers are encouraged to adopt a balanced approach by maintaining realistic textures and gentle shadows to evoke trust and nostalgia,

while ensuring visual clarity by avoiding overly decorative elements that can disrupt usability.

However, this research is limited by its reliance on qualitative methods and a relatively small sample of Chinese users and designers. Future studies should expand upon these findings by incorporating larger, more diverse participant groups and quantitative analysis, as well as examining cross-cultural variations in user responses. Despite these limitations, the current findings provide valuable insights for designers, suggesting that a thoughtful blend of functional clarity and carefully selected skeuomorphic aesthetics can effectively engage middle-aged users.

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