

The Role of Aesthetic Design in Enhancing User Engagement and Retention on Digital Exhibition Platform

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Abstract

Background: Online exhibition platforms have evolved into essential components of museum and exhibition displays, serving as crucial supplements for presenting collections and events. In a competitive market, museums and exhibition firms face the challenge of maintaining and expanding their visitor base through effective user retention strategies.

Purpose: This study explores the impact of visual design on online exhibition platforms, focusing on its role in creating favorable initial impressions, capturing user attention, and delivering an enjoyable browsing experience.

Methodology: The research employs empirical methods and user experience analysis to investigate how aesthetic design influences user perception and evaluation.

Results: The findings highlight that aesthetic design significantly enhances user experience by improving initial appeal and satisfaction, thereby increasing user engagement and retention rates.

Conclusion: Effective visual design of website interfaces is crucial for enhancing user pleasure and promoting user retention. Detailed exploration of aesthetic elements provides valuable insights into user reactions, enabling targeted design improvements to enhance engagement and retention strategies.

Keywords: User Engagement, Interface Aesthetics, Digital Exhibition Platforms, User Retention, Personalized Design

Introduction

Digital exhibition platforms, as a new kind of electronic commerce, effectively combine the exchange of information, logistics, and financial transactions, providing enterprises with the opportunity to reduce costs and strengthen their competitive advantage (Tang et al., 2023). These platforms play a crucial role in enabling international internet trade by serving as the central hub for displaying products, facilitating communication, and interacting with clients (Vetrivel et al., 2024). However, within a highly competitive sector, online exhibition platforms face escalating costs in order to retain users. Maximising user retention rates is essential for developing brand recognition, disseminating cultural impact, and attaining profitability. Therefore, improving user engagement and retention is a significant problem.

User experience is of paramount importance in the design of digital exhibition websites. Companies with substantial impact, such as Microsoft and Tencent, attach considerable significance to design trends that prioritise the requirements and inclinations of the consumers. In their study, Kim and Sundar (2022) conducted a comprehensive analysis of visual aesthetics and user responses to web interfaces, emphasising the importance of visually

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pleasing designs in enhancing user engagement and satisfaction. The website interface, being the primary means of interaction, has a huge influence on user attitudes and loyalty. The aesthetic design, particularly on online exhibition platforms, significantly influences the initial interactions of users. Deng and Poole (2022) proposed a three-path model that establishes a connection between aesthetic design, perceived value, and technological adoption. They highlighted the substantial influence of aesthetics on user adoption behaviours. It possesses the capability to provide a positive initial impression, ensuring a pleasant browsing experience. The aesthetic design is not only essential for customer satisfaction but also a key factor that impacts user retention.

Studies indicate that aesthetics can be classified into two dimensions: classical aesthetics and expressive aesthetics. Classical aesthetics prioritise the attributes of lucidity and balance, whereas expressive aesthetics emphasise the characteristics of distinctiveness and allure. Personalised visual components, especially in the primary user interface, significantly boost user engagement and commitment. Enhancing customised aesthetics in a competitive market has the potential to improve experiences of human-computer interaction, emotionally engage users, and maintain their retention (Paraschos et al., 2023). Customised aesthetic interfaces satisfy users' desire for full engagement, encompassing entertainment, social interaction, and active participation, hence enhancing the long-term competitiveness of exhibition websites.

The aim of this study is to explore the potential impact of aesthetic design on user engagement and retention on digital exhibition platforms, which are currently facing major obstacles (Dwivedi et al., 2021). The objective of this study is to identify strategies that effectively reduce user retention expenses and improve the overall user experience through the use of proven aesthetic design principles and concepts. Choosing aesthetic design theory has multiple advantages, including providing a structured approach to understanding user preferences and behaviours, as well as the capability to build emotionally engaging experiences that foster long-lasting loyalty (Isbister & Katherine, 2016).

Digital exhibition platforms, as a new form of e-commerce, effectively integrate information exchange, logistics, and financial transactions, offering enterprises opportunities to reduce costs and enhance competitive advantage. These platforms play a pivotal role in facilitating international internet trade by serving as central hubs for product display, communication facilitation, and client interaction. However, within a highly competitive sector, online exhibition platforms face escalating costs to retain users. Maximizing user retention rates is crucial for building brand recognition, disseminating cultural impact, and achieving profitability. Therefore, enhancing user engagement and retention poses a significant challenge.

User experience is paramount in the design of digital exhibition websites. Companies prioritize design trends that cater to consumer needs and preferences. Comprehensive analyses emphasize the role of visually appealing designs in enhancing user engagement and satisfaction. The website interface, as the primary interaction tool, significantly influences user attitudes and loyalty. Aesthetic design on online exhibition platforms particularly impacts initial user interactions. Studies classify aesthetics into classical aesthetics, prioritizing clarity and balance, and expressive aesthetics, emphasizing uniqueness and allure. Personalized visual elements greatly enhance user engagement and commitment, fulfilling users' desire for full engagement and bolstering the long-term competitiveness of exhibition websites.

This research has numerous benefits. The study conducted by Wei, Yanxia, et al. (2020) explores how digital exhibition platforms might enhance user engagement and retention through the use of aesthetic design. In addition, it will offer specific suggestions for companies to integrate user-centered aesthetic design principles, ultimately improving their competitiveness and long-term sustainability in the digital exhibition industry (Luchs et al., 2016).

Research Objective

The objective of this study is to examine the impact of visual design on online exhibition platforms, particularly its ability to create positive first impressions, capture user interest, and provide a pleasurable browsing experience.

Literature Reviews

1. Theories pertaining to interface aesthetics

This study examines the development of user interfaces for exhibition websites that are accessed through personal computers. The study examines both the primary interface and the functional interfaces (Ruecker et al., 2016). The main components consist of product images, specifications, session attributes, booking capabilities, and search/filtering/ recommendation functionalities. Design involves the incorporation of visual elements, the organisation of information, and the development of interactive experiences (Sedig et al., 2013). This encompasses factors such as colour palettes, typographic choices, icon design, information architecture, and user interaction in relation to the design. Various modes of interaction exert an impact on user attitudes, and design methodologies encompass user research, analysis of aesthetics, and interface design that conforms to user expectations.

Wang H. (2021) and other experts evaluate the aesthetic characteristics of interfaces by analysing objective features such as simplicity, balance, proportion, and echo. Their objective is to understand the factors that impact customers' decision-making through the use of surveys and interviews. The categories encompass surfing behaviour, visual components, and information display. User satisfaction is a vital measure that mirrors the overall excellence of the interface. Ren Yue (2020) did a study that analysed the visual components of mobile shopping applications. The study carefully analysed the utilisation of characters, colours, layouts, photographs, and icons. An optimisation strategy was employed, incorporating modularity, navigation, and advertising design, with the aim of enhancing user satisfaction. The area of literature encompasses various manifestations of aesthetics, which is the study of beauty and taste. In their study, Fong et al. (2018) examined the impact of the visual aesthetics of e-commerce websites on excitement, attitude, and buy intention. The impacts were investigated using the S-O-R framework. Ramezani et al. (2020) did a study to investigate the influence of aesthetics on user behaviour. The research demonstrated that aesthetics had a significant influence on the perception of quality, trust, contentment, and arousal. Oyibo (2020) did a study to examine the influence of colour temperature and layout on many variables, including perceived beauty, ease of use, utility, pleasure, and intention to use. The investigation uncovered substantial consequences for these groups.

A thorough analysis of aesthetic elements successfully represents the visual layout of an interface, which subsequently influences users' perceptions of its usability, user-friendliness, satisfaction, and emotional appeal. Matching the way the interface looks with the features of the product enhances cognitive efficiency and makes it easier and more natural for users to interact with the product for different tasks.

2. Enhancing user involvement and user loyalty

The term "user engagement" was initially introduced in the field of marketing and has subsequently been widely recognised in the domains of human-computer interaction and user experience. User engagement refers to the extent to which users are actively involved in specific behaviours and activities. The concept of user involvement has different implications and assessment criteria depending on the specific study subject. The MICE website operates as a subdivision of the MICE business, fulfilling both commercial and instructive goals. Khan (2017) conducted a study where an online survey was given to 1,143 YouTube users who were registered. The study aimed to investigate the factors influencing users' engagement with and utilisation of content on the site. The study employed a framework that specifically targeted usage patterns and user satisfaction. Bonson (2015) identified 'popularity' (quantified by the number of likes), 'engagement' (quantified by the number of comments), and 'diffusion' (quantified by the number of retweets) as key metrics for analysing the level of European citizens' participation in the European government's implementation of Facebook, with the objective of supporting research on civic engagement. This study investigates the relationship between personalised visual combinations and user engagement in the traditional interface. In addition, the visual experience of online interfaces can be analysed and contrasted quantitatively by examining data on comments, retweets, and login frequency. Brody et al. (2011) established the concept of user involvement as a psychological state. Engagement is now recognised as a prominent psychological phenomenon that individuals experience while interacting with gamified systems in various situations. Engagement, as described by Beniste et al. (2022), Blauchaus et al. (2019), Wongkitrungrueng and Assarut (2020), and Lin Z et al. (2023), is a complex concept that includes three aspects: cognitive, emotional, and behavioural involvement. User participation in a multidimensional user experience scenario can be assessed in three dimensions: cognitive, emotional, and behavioural. During the process of gathering information, users can evaluate the cognitive efficiency of obtaining and utilising that knowledge. Furthermore, the visual stimuli can evoke emotional involvement and satisfaction in users (Lin & Jhih-Syuan Elaine, 2022). Creating an emotional bond between the platform and the user can enhance user retention on the site. Social participation on a website refers to the collective interactive experience of user groups, which is influenced by their behavioural component. In general, evaluating user involvement from many perspectives aligns with the current direction and goals of exhibition websites.

Conceptual Framework

Modeling and Research Hypotheses

1. Investigating the Aesthetic Aspect

In their 2004 study, Lavie and Tractinsky introduced two distinct categories of aesthetics: Classical Aesthetics and Expressive Aesthetics. Classical aesthetics encompasses the principles of design that emphasise organisation, incorporating ideas such as 'tidiness', 'balance', and 'precision'. This dimension encompasses the inherent characteristics found in traditional principles that constitute aesthetic design and fulfils numerous usability design requirements. Expressive aesthetics include the utilisation of creativity, special effects, uniqueness, refinement, and charm in design. It demonstrates a designer's capacity to challenge conventional design principles and exhibit creativity and originality in website design.

Users see classic and expressive aesthetics as a synthesis of design aspects, rather than perceiving a specific design feature. In 2004, Lavie and Tractinsky created a scale consisting of 5 items to assess the suitability of classical and expressive aesthetics in online interfaces. Cai et al. (2015) contended that the classical aesthetics test comprised of evaluative items related to emotions and overall quality, but the expressive aesthetics instrument consisted of items that were neutral in nature.

Table 1 Distinction between classical and expressive aesthetics (Drawn by the author).

Classical Aesthetic Measurement	Expressive Aesthetics Measurement	Literature sources
Clean Clear Pleasant Symmetrical Aesthetic	Creative Complex Effect of use Charming Original	Lavie et al. 2004
Harmonious interface design Interface layout is intuitive Logically organized The layout follows the user's habits	The interface looks great! Love the look and feel of the interface The interface is visually appealing The interface is visually appealing	Cai et al. 2015

2. Categories of Tasks on the MICE Website

The tasks on the MICE website can be classified as either browsing or searching. Browsing jobs typically involve broad objectives, whereas searching tasks typically involve particular and predetermined objectives. MICE platforms generally possess their own dedicated display modules and search capabilities. This study distinguishes between search and browsing tasks based on whether users have explicit browsing objectives. It is crucial to emphasise that aimless browsing is not considered in this study, as users are already acquainted with the overall content available on the website.

The study investigates the information retrieval methods employed by visitors on the exhibition website, differentiating between search and browsing tasks. Variations in path length occur as a result of differences in search tactics. Researchers have observed that when users are searching for specific information, they tend to adopt analytical techniques that involve shorter paths. On the other hand, when users are browsing and exploring content, they tend to use a roaming approach that involves longer paths. This finding was reported by Mandel in

2013. In addition, the study revealed that users change their courses more frequently when using a goal-oriented method as opposed to a wandering strategy. When it comes to scanning patterns, browsing tasks are usually guided by familiarity and are impacted by the activity itself rather than specific results. The browsing behaviours are vulnerable to the interface environment, where the movement of the human eye from top to bottom is affected by peripheral information, highlighting local scanning paths (Tang et al., 2022). In contrast, active search is minimally influenced by the surrounding environment and is regulated by top-down cognitive processes, which corresponds to the features of global scanning.

3. User perception

Contemporary studies in human-computer interaction are centred around the concept of intuitionized interaction. This refers to the phenomenon where users instinctively utilise their previous knowledge and experience in particular settings without conscious effort. Intuition, which is based on prior experience and factual information, allows people to quickly and efficiently solve problems. Intuitive interaction focuses on utilising users' pre-existing abilities and habits to facilitate a natural connection with a system, with a primary emphasis on efficiency and speed. It should be designed to align with the cognitive qualities of users, in order to minimise the costs of learning and operational losses by ensuring cognitive matching. Intuitive interaction, as described by Zhao Kairu (2018), refers to a user's quick and efficient unconscious actions that are guided by their current knowledge. These actions are facilitated by a system that incorporates cognitive habits and behaviours that align with the user's preferences.

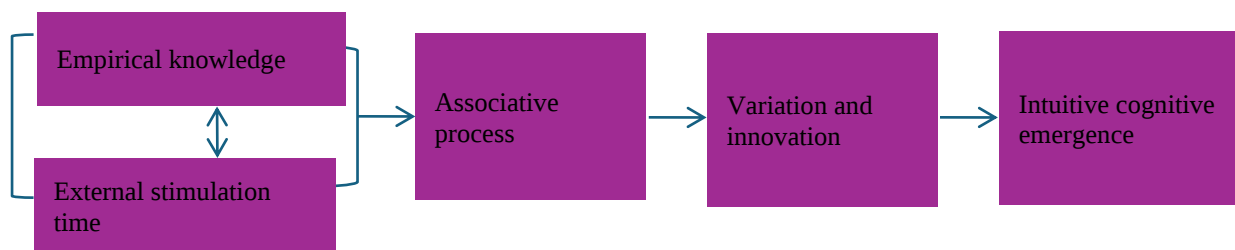


Figure 1 User recognition process (Drawn by the author).

Research Model

This work introduces a research model that seeks to elucidate the differences in the influence of various aesthetic aspects on user engagement in convention and exhibition websites, as well as the underlying mechanisms involved. The research model employs the aesthetic dimension as the independent variable, which is further categorised into classical aesthetics and expressive aesthetics. The variable that is influenced by other factors is user involvement with the product, while task type and product type are variables that moderate this relationship. The impact of the independent variable on the level of engagement in the dependent variable is influenced by the combined impacts of cognitive load and intuitionization, as stated by Hofer et al. (2020).

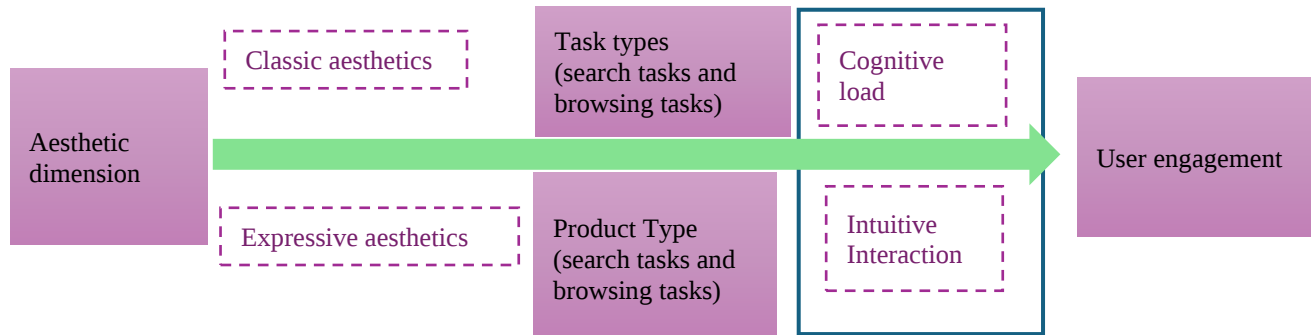


Figure 2 Hypothetical research framework (Drawn by the author).

Within the exhibition interface, the classic aesthetics interface incorporates elements such as interface aesthetics aspects, clear navigation, and orderly layout (Liu et al., 2019). It utilises obvious buttons and labels to effectively organise information, minimising redundant data and creating a low attention competitive environment for users. On the other hand, the performance aesthetics interface includes hedonic and sensual components, featuring special typography and unique visual effects. This design creates a high attention competitive environment. When utilising the exhibition interface for searching, it is crucial for the user to maintain a concentrated focus on the search task. Excessive peripheral information can lead to user distraction and disorientation. Therefore, it is essential to provide a low-distraction environment that minimises the user's need for attention. A clear and concise list format aligns better with the user's cognitive processing, as stated by Jiang et al. (2021). During browsing, users may experience distractions and intense competition for attention due to the high attention competition environment interface. Users tend to be attracted to different products and are more inclined towards interfaces that have both aesthetic appeal and are suitable for browsing tasks. The matching effect between these two categories enhances the user's positive degree of participation. Thus, the proposed hypothesis:

H1: The combination of convention interface design and task type has a combined affect on user engagement in terms of the aesthetic component.

Hypothesis 1a: The inclusion of classical aesthetic ideas in the design of the MICE interface leads to increased user engagement during search tasks.

H1b: Utilising convention interfaces that are created with expressive aesthetic concepts will result in increased user retention throughout browsing tasks.

A study conducted by Liu, Mengyang, et al. (2019) found a strong positive association between consumers' intuitive cognition and satisfaction. Intuitive interaction refers to incorporating users' innate cognitive ability into the design of user interfaces, allowing them to easily and instinctively comprehend and use the interface functions without the need for additional learning efforts (Kaltenbacher, 2008). Intuitive interaction design enhances user experience by creating a sense of naturalness, ease, and intuitiveness by strategic use of layout, colour, form, and animation in the interface. Hence, an interface that exhibits a significant level of intuitive interaction aligns with the user's mental conceptual model and contributes to enhancing user satisfaction (Macaranas et al., 2015). The match effect refers to the degree to which users' subjective views and expectations of a shopping interface align with their actual experience. According to the authors, when the interface design aligns with user intuition and perceptions, there is a correlation between the aesthetic aspect and the type of task or product.

As a result, users perceive more intuitive interactions in the interface, leading to increased user satisfaction (Alves, Tomás, et al., 2020).

Enhanced user satisfaction is achieved. Hence, the correlation between intuitive interaction and the matching effect leads to increased user satisfaction.

H2: Intuitive interactions mediate the interaction between the aesthetic dimension of the exhibition interface and the task type.

H2a: Intuitive interaction plays a role in enhancing satisfaction during a search task when using a conventionally designed interface with classical aesthetic principles.

H2b: Intuitionized interaction mediates the positive effect of a convention interface designed with expressive aesthetic principles on satisfaction when performing a browsing task.

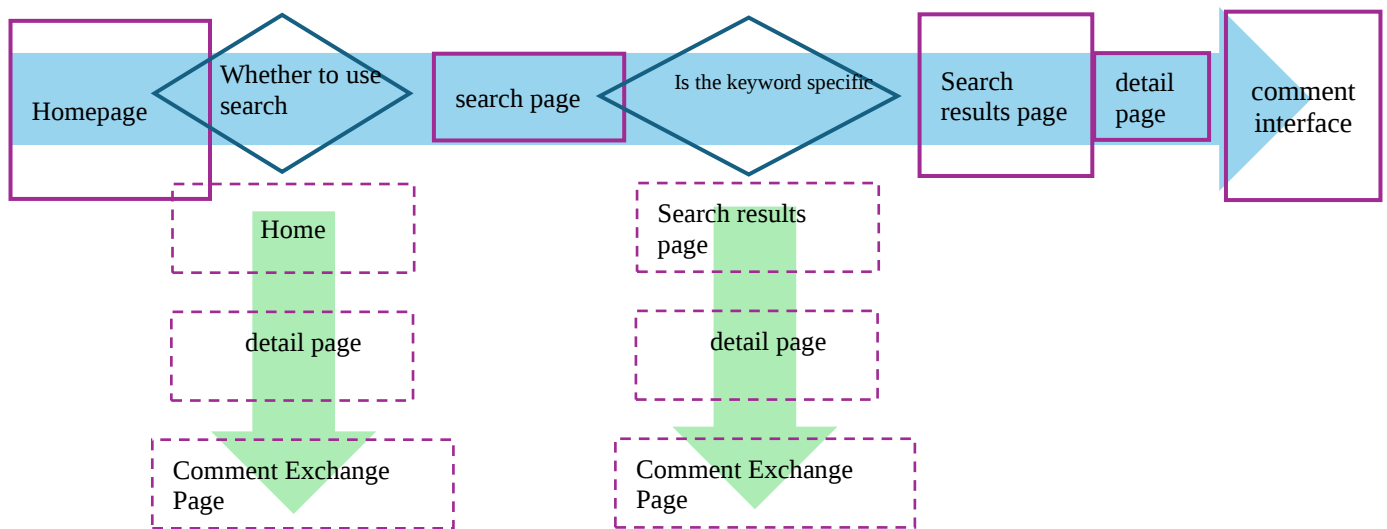


Figure 3 User information search analysis (Drawn by the author).

Research Methodology

This study utilises a blend of quantitative and qualitative research methods, specifically: literature review, questionnaire survey, experimental investigation, and model analysis. The selected exhibition websites are the China Import and Export Commodities Fair (Canton Fair), the Palace Museum, and the China Exhibition Information Network.

The following is the framework of the questionnaire on browsing and operating habits of the MICE interface:

Table 2 Questionnaire Framework Chart (Drawn by the author).

Dimension (math)	Element
Demographic characteristics	Sex, age, occupation
User frequency	Frequency of visits to the MICE website
Common Operations/Interface Functions	Browse the main interface information Browse the corresponding exhibition module View product details Use the search box to retrieve product information

For the textual description of the beautiful interface: simple, logical, clear, pleasant, in line with the current popular elements, in line with the operating habits, and interesting. Age 18-35 years old, 63 subjects were selected to participate in the experiment and complete the following experimental process.

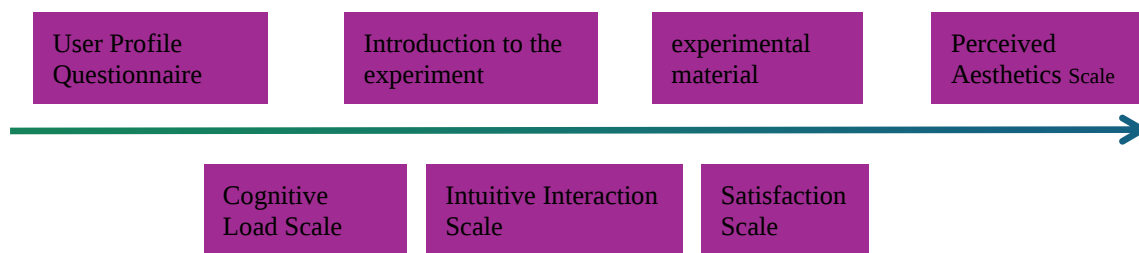


Figure 4 Experimental procedure (Drawn by the author).

Research Results

1. Hypothesis H1 is verified, proving that the aesthetic dimension of convention interface design and task type jointly affect user engagement.
2. Hypothesis H1a is confirmed, demonstrating that the MICE interface, designed with classical aesthetic principles, enhances user satisfaction during search tasks.
3. Hypothesis H1b is confirmed, showing that convention interfaces with expressive aesthetics lead to higher user satisfaction in browsing tasks.
4. Hypothesis H2 tested directional interactions mediating the relationship between aesthetic dimensions in convention website interfaces and task types.
5. Hypothesis H2a: Intuitive interaction mediates the positive effect of a convention interface designed according to classical aesthetic principles on satisfaction when performing a search task.
6. Hypothesis H2b was verified that intuitionized interactions mediate the positive effect of convention interfaces designed with expressive aesthetic principles on satisfaction when performing a browsing task.

Discussion & Conclusion

The findings for the aesthetic dimension suggest that interfaces can be designed to incorporate both classical and expressive aesthetics by utilising standardised, consistently innovative visuals and standardised colour schemes. The impact of the aesthetic dimension on satisfaction was found to be statistically insignificant ($p > 0.05$), indicating that the patterns of influence of these two dimensions are highly comparable and that the variations in satisfaction scores were not significant.

Cognitive load had a substantial mediating influence on the relationship between the aesthetic dimension and task type in terms of pleasure. The mediator effect size for cognitive load was 0.8, and it was observed in both the browsing task (mediator effect size of 0.3) and the searching task (mediator effect size of -0.4). The influence of the aesthetic factor and task type on satisfaction was mediated by their impact on cognitive load. By minimising cognitive burden, designers can effectively manage the impact of aesthetic qualities and task type on user satisfaction. The subsequent design strategies are recommended for the aesthetic design of convention interfaces:

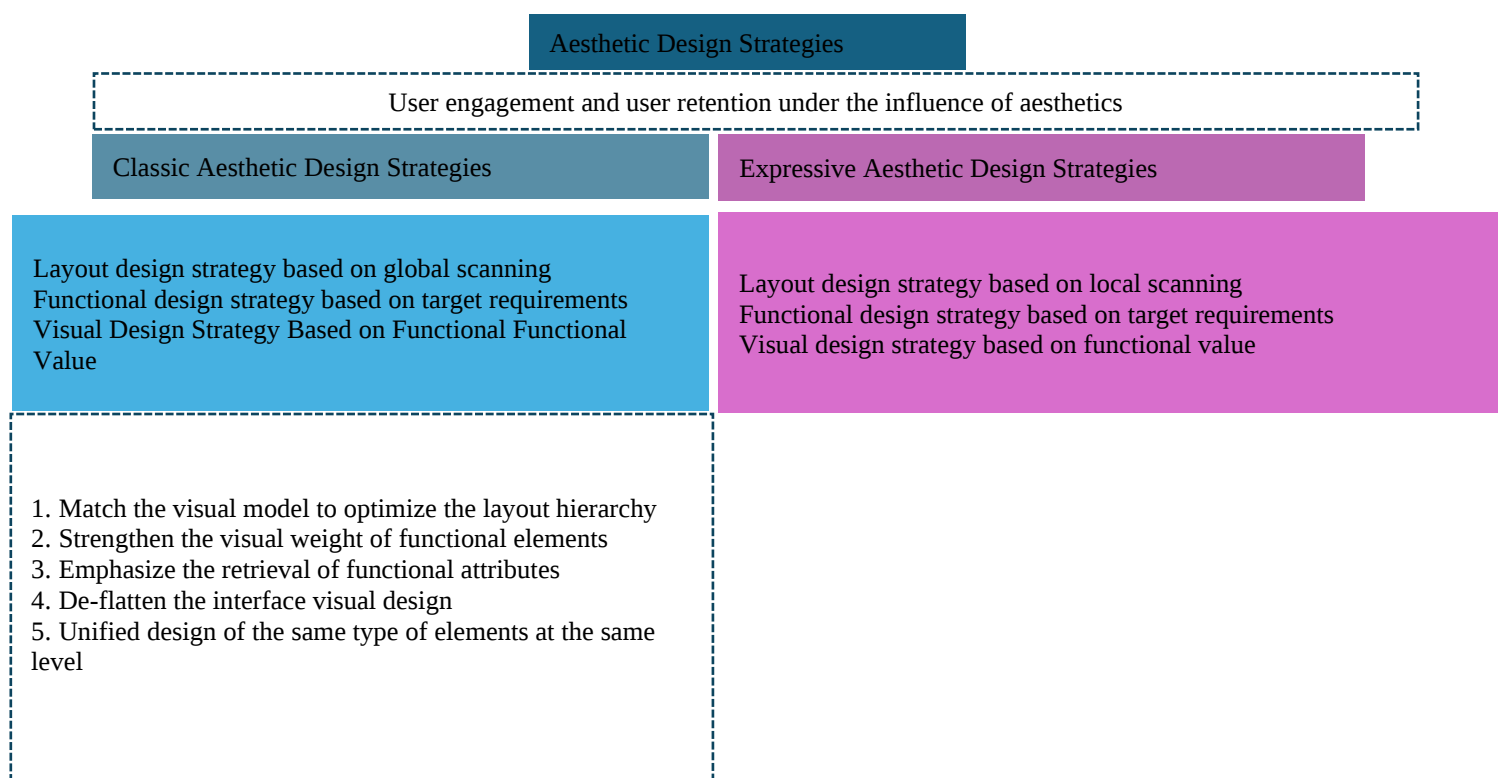


Figure 5 Conclude : Aesthetic Design Strategies (Drawn by the author).

This study examines the growth and patterns of China's online MICE business. Existing research primarily concentrates on enhancing user interaction on e-commerce websites, neglecting the segmentation of MICE websites and the exploration of initial adoption behaviour. The visual design of MICE websites has a significant impact on user engagement and retention. The long-term success of MICE websites heavily relies on users' willingness to continue using the website after their initial visit. Furthermore, the new research concept

involves utilising an aesthetic method to investigate user engagement and retention on MICE websites. Utilising aesthetics-focused exploration and interface design can enhance the enjoyment, involvement, and visual appeal experienced by users during the engagement phase, which is a crucial factor in retaining users. The study proposes that incorporating pertinent design concepts and theories can enhance user retention on convention and exposition websites. Furthermore, the study provides recommendations for future research on convention and exhibition websites, specifically focusing on the integration of intuitive interaction and aesthetic design. It also puts up hypotheses and encourages debates for further investigation.

The findings indicate that interfaces can effectively integrate both classical and expressive aesthetics through standardized, innovative visuals and color schemes. However, the impact of aesthetic design on user satisfaction was found to be statistically insignificant ($p>0.05$), suggesting comparable patterns of influence between these dimensions without significant variations in satisfaction scores. Cognitive load emerged as a significant mediator, influencing the relationship between aesthetic design and task type in terms of user pleasure. With a mediator effect size of 0.8, cognitive load moderated effects in both browsing (0.3) and searching tasks (-0.4), underscoring its role in managing user satisfaction by minimizing cognitive burden. The study recommends implementing design strategies that enhance user engagement and retention on convention and exposition websites, emphasizing intuitive interaction and the integration of aesthetic design principles. Future research should explore initial adoption behavior and further investigate user engagement and retention using aesthetic methodologies in MICE (Meetings, Incentives, Conferences, and Exhibitions) website contexts.

Recommendation

Theoretical Recommendation: Incorporate a multidimensional approach to aesthetics in interface design research. Future studies should explore nuanced aspects of classical and expressive aesthetics, considering cultural variations and user preferences to develop comprehensive models that better predict user satisfaction and engagement on digital exhibition platforms.

Policy Recommendation: Advocate for industry guidelines that encourage the adoption of standardized aesthetic principles in digital exhibition platform design. Policies should promote the use of innovative visual elements and color schemes while ensuring accessibility and usability standards are maintained. This approach can foster a consistent and engaging user experience across platforms, thereby enhancing overall user satisfaction and retention.

Practical Recommendation: Implement user-centered design methodologies that prioritize reducing cognitive load during user interactions. Designers should focus on minimizing complexity in navigation and information presentation, particularly in browsing and searching tasks. Practical strategies include iterative usability testing and incorporating feedback loops to continually refine aesthetic designs based on user preferences and behaviors. These efforts can effectively improve user satisfaction and retention rates on digital exhibition platforms.

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