



EMOTIONAL DESIGN: A REVIEW OF THEORETICAL FOUNDATIONS, METHODOLOGIES, AND APPLICATIONS

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Abstract:

Purpose: This article reviews the theoretical foundations, methodologies, and applications of emotional design, a concept that emphasizes the importance of creating an emotional connection between users and products. The article provides an overview of the three levels of emotional design - visceral, behavioral, and reflective - and their underlying principles.

Research methods: Deep and comprehensive review of literature from multidiscipline field of studies related to emotional design conducted with retrospective reasoning. The article then provides an overview of various applications of emotional design in product design and visual communication design, including digital interfaces, automotive design, and healthcare. The article concludes by discussing the future directions of emotional design research and its potential impact on the design industry.

Findings: Emotional design is a promising approach to product design and visual communication design that can enhance the user experience by creating an emotional connection between users and products. The three levels of emotional design and various research methodologies can be used to measure emotional responses to design.

Implications: Emotional design has been applied in various industries, and its potential impact on the design industry is significant. Future research in emotional design can explore the interplay between the different levels of emotional design and its impact on user behavior and product success.

Keywords: emotional design, theoretical foundation, methodologies, applications

INTRODUCTION

Basically, design is not just about form or function. Design also opens up discussion about the user experience, and emotions play an important role in that experience. The concept known as emotional design relates to how design influences the user's emotions and the way these emotions affect the user's interaction with the product.

In today's competitive markets, creating a positive user experience is essential for the success of any business. Emotional design is a design approach that aims to create products that evoke positive emotions in users, thereby enhancing their experience and building brand loyalty [1]. Emotional design draws on principles from psychology, neuroscience, and design to create



products that are both functional and emotionally engaging [2]. Emotional design is a concept that emphasizes the importance of creating an emotional connection between users and products. It is a multidisciplinary approach that draws from psychology, design, and engineering to create products that elicit positive emotional responses and enhance the overall user experience [3]. Emotional design is a design approach that aims to create products that evoke positive emotions in users. Emotional design has gained significant attention in recent years due to its potential to create products that are not only functional but also enjoyable and memorable to use [4].

The Definition of Emotional Design

Emotional design is a concept that emphasizes that design is not only about functionality, but also about creating an emotional connection with the user. This concept was introduced by Donald Norman, a well-known designer and cognitive psychologist. According to Norman, good design must meet three user needs: visceral needs, behavioral needs, and reflective needs [5], [6].

Visceral needs relate to initial instinctive and emotional responses to designs. This means that the design must trigger a strong and positive response from the user, such as a beautiful visual impression or the use of materials that are pleasant to the touch.

Behavioral requirements relate to the functional interaction between the user and the product. This means that the design must be easy to use and can make it easier for users to complete their tasks. Good design must also consider ergonomics and ease of navigation.

Reflective needs relate to the meaning and value that users place on products. This means that the design must evoke feelings in the user about themselves and their status. Good design can trigger appreciation and positive impressions from users, and help users express identity and personal style.

The Importance of Emotional Design

Emotional design is important because users need more than just functionality in a product. Emotions are an important part of the user experience that influence whether the user will continue to use the product or not. If a product does not meet the user's emotional needs, the user will tend to look for other products that provide a more satisfying experience.

In addition, emotional design can help create a deeper connection between the user and the product. If users feel emotionally connected to a product, they are more likely to trust it and feel more satisfied with their use. This can lead to high user loyalty, which is critical to the product's long-term success.

RESEARCH METHODS

This review article presents a comprehensive overview of emotional design, discussing its definition, principles, and applications. The article also includes a review of case studies that demonstrate the power of emotional design in enhancing user experience and brand loyalty. The article concludes by highlighting the importance of emotional design as a strategic tool for

businesses seeking to differentiate themselves in competitive markets. In this article, we review the theoretical foundations, methodologies, and applications of emotional design.

Deep and comprehensive review of literature from multidiscipline field of studies related to emotional design conducted with retrospective reasoning. The article then provides an overview of various applications of emotional design in product design and visual communication design, including digital interfaces, automotive design, and healthcare. The article concludes by discussing the future directions of emotional design research and its potential impact on the design industry.

FINDINGS

Theoretical Foundations of Emotional Design

Emotional design is based on the idea that users have an emotional response to a product that influences their behavior and overall experience. The emotional response is often divided into three levels: visceral, behavioral, and reflective [7], [8]. The visceral level is the immediate, instinctual reaction to a product's sensory characteristics such as color, shape, and texture. The behavioral level is the emotional response to the usability and functionality of the product, such as ease of use and effectiveness. The reflective level is the emotional response to the product's symbolism, meaning, and identity, such as the cultural context and personal values.

Emotional design is based on the idea that users' emotions play a significant role in their perception and evaluation of products. Therefore, emotional design principles are geared toward creating products that evoke positive emotions in users [5]. The three primary principles of emotional design are:

1. **Aesthetic appeal:** Products that are visually appealing and aesthetically pleasing are more likely to evoke positive emotions in users. Design elements such as color, shape, and texture can be used to create an aesthetic appeal that enhances the user experience.
2. **Functionality:** Emotional design principles do not compromise on functionality. Products that are designed with emotional design principles in mind are not only aesthetically appealing but also functional and easy to use.
3. **User-centered design:** Emotional design principles are centered on the needs and preferences of the user. Emotional design seeks to create products that fit seamlessly into the user's life and enhance their experience.

In conclusion, businesses seeking to stand out in today's competitive markets should consider adopting emotional design principles in their product design. By creating products that evoke positive emotions in users, businesses can enhance user experience and build brand loyalty [9], [10]. Emotional design is not only about creating products that look good, but also about creating products that fit seamlessly into users' lives and enhance their overall experience. By understanding and implementing emotional design principles, businesses can create products that are both aesthetically pleasing and functional, and that connect with users on an emotional level [11].

Emotional Design Methodologies

To implement emotional design, there are several steps that can be taken, including:

1. **Identifying the target users:** The first step in implementing emotional design is to identify the target users and understand their characteristics. By understanding who the target users are and what they need, the design team can design products that better suit users' needs and preferences.
2. **Determining the emotions to be triggered:** After understanding the target users, the next step is to determine the emotions that the product should trigger. This depends on the type of product being designed and the characteristics of the targeted users. For example, if the designed product is a game application, the emotions to be triggered might be excitement, joy, and pleasure.
3. **Applying emotional design principles:** There are several emotional design principles that can be applied, such as paying attention to the shape, color, texture, and sound of the product, so that it can trigger a positive emotional response from users. Other design principles that can be applied include simplicity, consistency, and considering the context of product use.
4. **Using appropriate research methodology:** To measure the effectiveness of emotional design, the design team needs to use appropriate research methodology. Commonly used methods include self-report data collection, physiological measurement, and facial expression analysis. The data obtained can then help the design team evaluate how effective their product is in triggering a positive emotional response from users.
5. **Developing and testing prototypes:** After designing the product based on emotional design principles, the design team can develop a prototype and test it with users to measure the resulting emotional response. Prototype testing can also help the design team evaluate how well their product can meet users' needs and trigger a positive emotional response.

By following these steps, the design team can develop products that are more attractive, attention-grabbing, and produce a positive emotional response from users, thus enhancing the overall user experience and building brand loyalty.

Applications of Emotional Design

Emotional design has been applied in various industries, including digital interfaces, automotive design, and healthcare. In digital interfaces, emotional design is used to create engaging and enjoyable experiences that keep users coming back. In automotive design, emotional design is used to create cars that evoke feelings of excitement and luxury. In healthcare, emotional design is used to create medical devices that reduce anxiety and improve patient outcomes.

Emotional design can be applied to improve the patient experience, increase patient satisfaction, and ultimately improve patient outcomes.

Application of Emotional Design in Digital Interface

Emotional design is a design approach that aims to create a positive emotional response in users by using design elements such as color, typography, and layout. In digital interfaces, emotional design can be applied to enhance user engagement, satisfaction, and loyalty. This paper presents a review of the literature on emotional design in digital interfaces and provides examples of how emotional design principles have been successfully applied in real-world scenarios [12].

Digital interfaces have become ubiquitous in our daily lives, and they are used for various purposes, such as communication, entertainment, and productivity. To make these interfaces more engaging and satisfying, designers have started to apply emotional design principles [13]. Emotional design is a design approach that aims to create a positive emotional response in users by using design elements such as color, typography, and layout. This approach has been applied successfully in various fields, such as advertising, product design, and architecture. In digital interfaces, emotional design can be used to enhance user engagement, satisfaction, and loyalty [8].

Studies have shown that emotional design principles can positively affect user engagement and satisfaction in digital interfaces. For example, a study by Mayer and Estrella [14] found that users preferred a website with a visually appealing design over a website with a less attractive design. The visually appealing website also generated more positive emotions, such as pleasure and satisfaction, in users. Another study by Carvalho and Oliveira [15] found that the emotional design of a website can affect users' perception of the website's usability. In their study, participants rated a website as more usable when it was designed with emotional appeal compared to a less emotional design.

There are several examples of emotional design principles being applied in digital interfaces. One such example is the Duolingo language learning app. Duolingo uses bright colors and playful illustrations to create a fun and engaging experience for users (Figure 1). The app also incorporates gamification elements, such as a point system and leaderboards, to encourage users to continue learning. As a result, Duolingo has become one of the most popular language learning apps in the world.

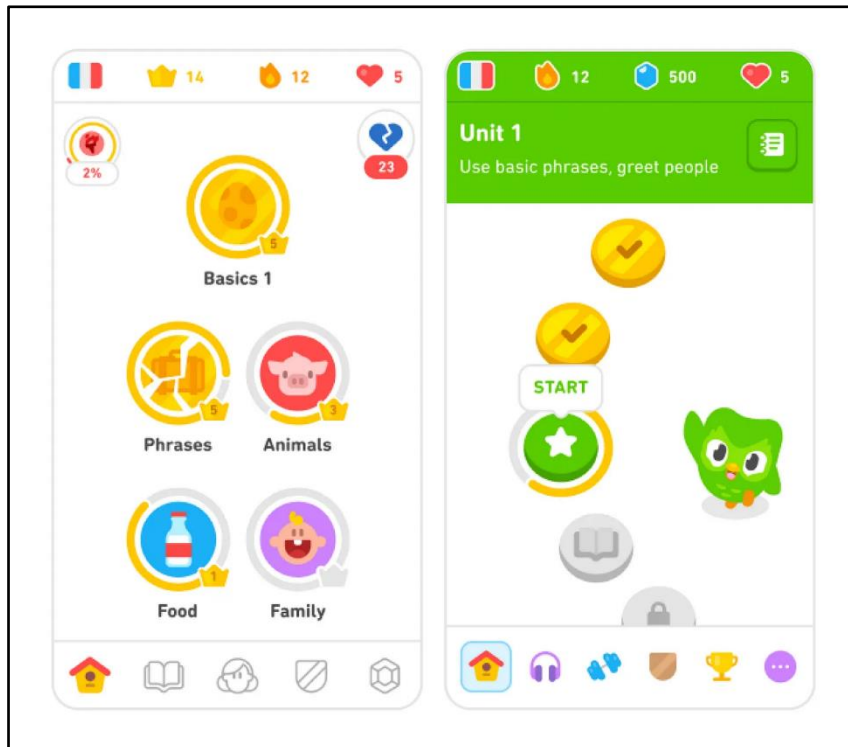


Figure 1. Duolingo Interface

[Source : Holly Munson, Anton Yu, Ananya Rajgarhia and AJ Noh [16]

Another example is the Headspace meditation app. Headspace uses a calming color palette, soft animations, and peaceful background music to create a relaxing and stress-free experience for users. The app also offers guided meditations that help users manage stress and improve their overall well-being (Figure 2). As a result, Headspace has become one of the most popular meditation apps in the world.

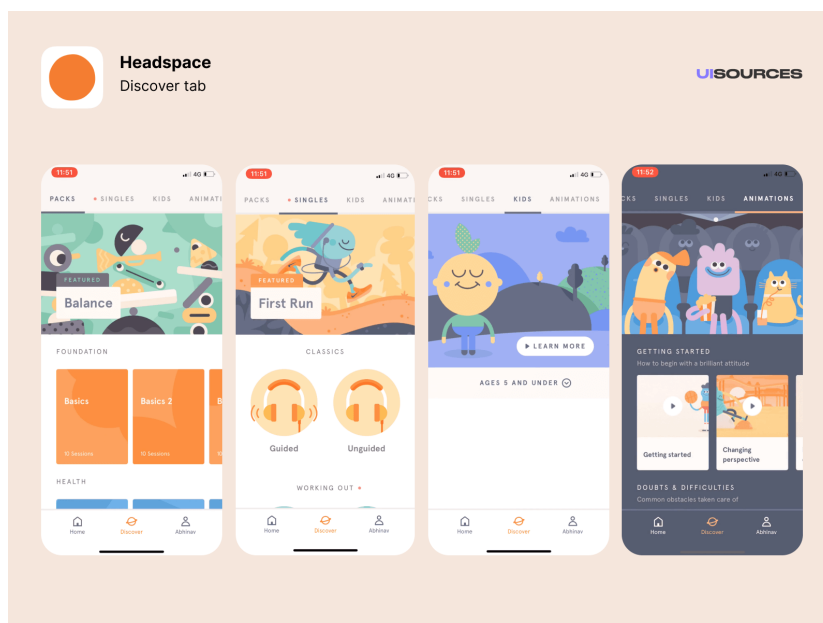


Figure 2. Headspace Interface

Source : Ulsources [17]

Emotional design principles can be applied effectively in digital interfaces to enhance user engagement, satisfaction, and loyalty. By using design elements such as color, typography, and layout, designers can create a positive emotional response in users. Examples such as Duolingo (Figure 1) and Headspace (Figure 2) show that emotional design principles can be applied successfully in real-world scenarios. As digital interfaces continue to play an increasingly important role in our daily lives, emotional design will become an essential aspect of designing engaging and satisfying digital experiences.

Application of Emotional Design in Automotive Design

Emotional design has become increasingly relevant in today's design industry, including automotive design. Automotive manufacturers are recognizing the importance of designing for emotions, as emotions play a significant role in users' decision-making processes when purchasing a vehicle. The emotional connection that users form with their vehicles can lead to increased brand loyalty and repeat purchases. Therefore, emotional design has the potential to enhance user experience and create a competitive advantage for automotive manufacturers. This article aims to explore the application of emotional design in automotive design and its potential benefits.

Examples of Emotional Design in Automotive Design:

1. Tesla Model S: The Tesla Model S is a luxury electric vehicle that has been designed to evoke positive emotions. The vehicle's sleek and futuristic design creates a visceral response in users (Figure 3), while its performance and technology features create a behavioral response (Figure 4). Additionally, Tesla has built a strong brand image that reflects its values of sustainability and innovation, creating a reflective response in users.



Figure 3. Tesla S's sleek and futuristic design
Source : <https://www.tesla.com/models>

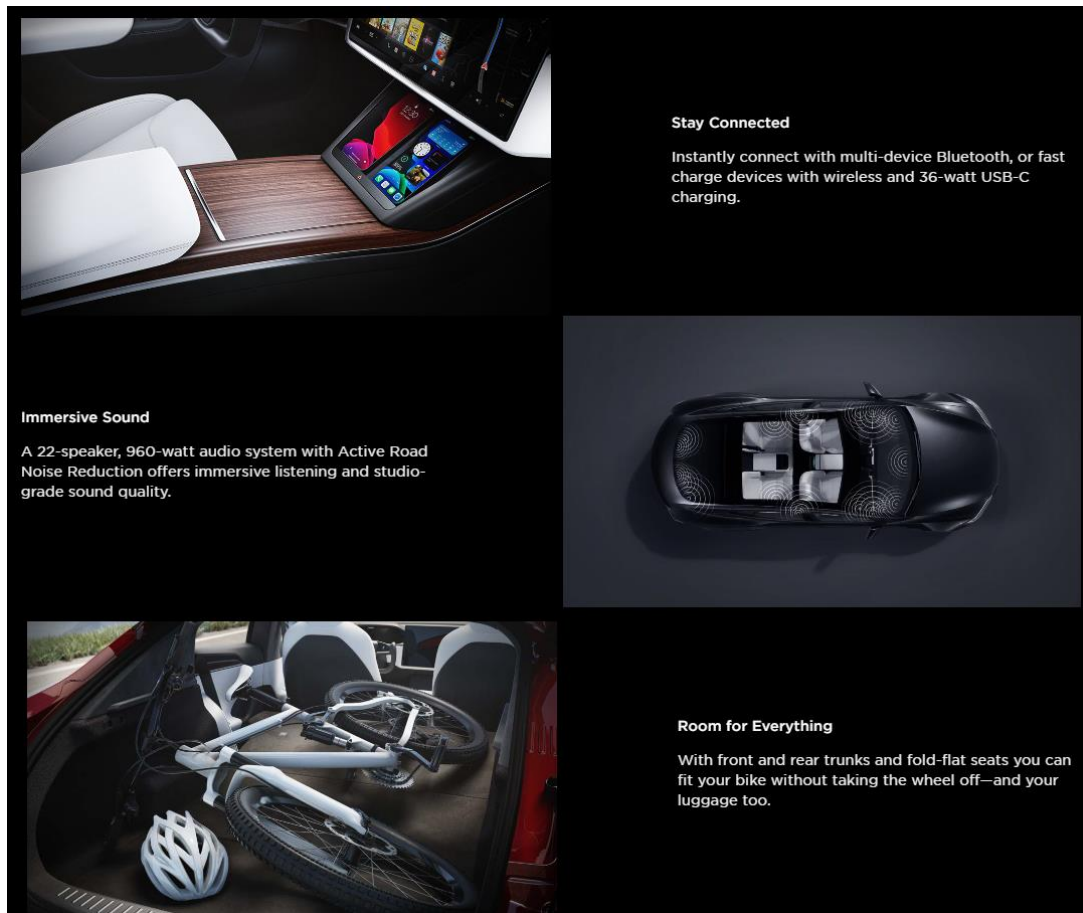


Figure 4. Tesla S's performance and technology features

Source : <https://www.tesla.com/models>

2. MINI Cooper: The MINI Cooper is a small car that has been designed to create a fun and playful user experience. Its retro design and customizable features create a visceral response in users, while its compact size and agile handling create a behavioral response (Figure 5). Additionally, the MINI Cooper has a strong brand image that reflects its values of individuality and style, creating a reflective response in users.



Figure 5. Mini Special Edition : Mini Multitone

Source : <https://www.miniusa.com/model/special-editions/multitone.html>

Benefits of Emotional Design in Automotive Design:

1. **Enhancing User Experience:** Emotional design can enhance user experience by creating products that evoke positive emotions and memorable experiences. This can lead to increased brand loyalty and repeat purchases.
2. **Competitive Advantage:** Automotive manufacturers that successfully apply emotional design principles can differentiate themselves from competitors and create a competitive advantage.

Increased Sales: Emotional design can influence users' decision-making processes and lead to increased sales. Users are more likely to purchase a product that evokes positive emotions and creates a memorable experience.

Application of Emotional Design in Healthcare

1. Designing Hospital Rooms

Hospital rooms can be a source of stress and anxiety for patients, especially those with serious illnesses or injuries. By applying emotional design principles, hospital rooms can be transformed into more welcoming and comforting spaces [18]. For example, the use of warm colors, comfortable furniture, and natural light can create a more soothing and calming environment (Figure 6) [19], [20]. A study by Ulrich et al [21] found that patients who had a view of nature from their hospital room had shorter postoperative hospital stays, took fewer pain medications, and had fewer postoperative complications.



Figure 6. Teletón Infant Oncology Clinic in Mexico
Source : mindfuldesignconsulting.com [19]

2. Medical Device Design

Medical devices are an integral part of healthcare, but they can also be intimidating and frightening for patients, especially children. By applying emotional design principles, medical devices can be made more user-

friendly and less intimidating (Figure 7). For example, the use of bright colors, friendly shapes, and playful designs can help reduce anxiety and make medical procedures less scary for children (Figure 8). A study Hanberger et al. and Ebrahimpour et al found that using a playful design for an insulin pen reduced anxiety and increased confidence in children with type 1 diabetes [22], [23].



Figure 7. Ultrasonic plaque removal system
Source : Assembly eMagazine [24]

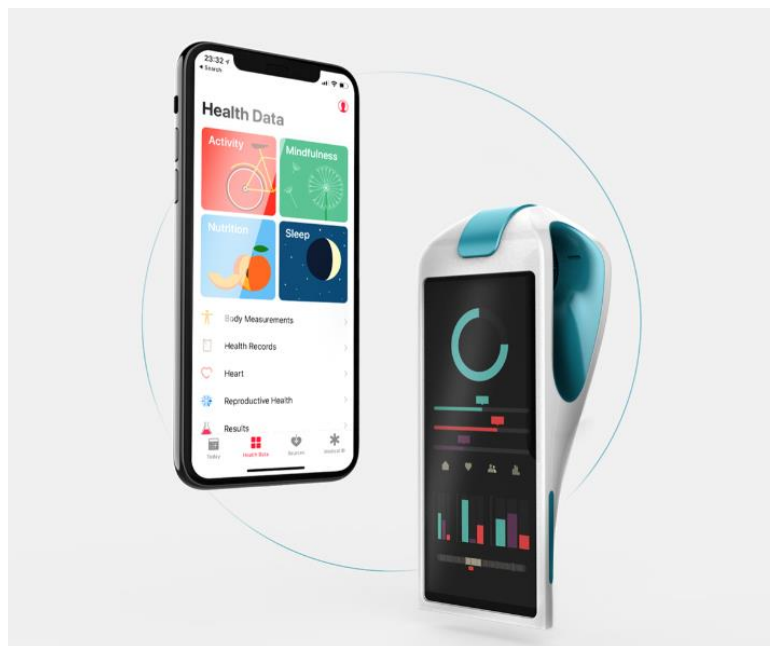


Figure 8. Medical device design by Tony Chui
Source : <https://www.behance.net/gallery/70297223/Medical-Device-Design>

3. Healthcare Apps and Websites

Healthcare apps and websites can be used to improve patient engagement and provide patients with easy access to health information. By applying emotional design principles, these apps and websites can be

made more engaging and user-friendly. For example, the use of personalized messaging, bright colors, and interactive features can help keep patients engaged and motivated to achieve their health goals (Figure 9) [25]. A study by Pagoto et al. and Azar et al found that an app that used personalized messaging and motivational prompts was effective in promoting weight loss [26], [27].



Figure 9. Generis healthcare app
Source : <https://techthelead.com/> [25]

Another Successful Case Studies Implementing Emotional Design

Emotional design principles, such as aesthetic appeal, functionality, and user-centered design, are key to creating products that are both visually appealing and functional. Case studies of successful businesses like Apple, Nike, and Airbnb demonstrate the power of emotional design in creating strong brand identities and loyal customer bases (Figure 10) [28].



Figure 10. Apple, Nike, and Airbnb brand identity
Source : Demir et al.[29]

1. Apple: Apple's success can be attributed to its focus on emotional design principles. Apple's products are not only functional but also visually appealing, with sleek designs and attention to detail. Apple's emphasis on the user experience has led to a loyal customer base and a strong brand identity.

2. Nike: Nike's "Just Do It" campaign is a prime example of emotional design in action. The campaign was designed to motivate and inspire users to push themselves to achieve their goals. The campaign's message resonated with users and helped build a strong emotional connection between users and the Nike brand.
3. Airbnb: Airbnb's success can be attributed to its focus on emotional design principles that emphasize user-centered design. Airbnb's platform is designed to create an emotional connection between users and the places they stay. The platform's emphasis on personalized experiences has led to a loyal customer base and a strong brand identity.

CONCLUSION

Emotional design is a promising approach to product design that can enhance the user experience by creating an emotional connection between users and products. The three levels of emotional design and various research methodologies can be used to measure emotional responses to design. Emotional design has been applied in various industries, and its potential impact on the design industry is significant. Future research in emotional design can explore the interplay between the different levels of emotional design and its impact on user behavior and product success.

Businesses seeking to stand out in today's competitive markets should consider adopting emotional design principles in their product design. By creating products that evoke positive emotions in users, businesses can enhance user experience and build brand loyalty. Emotional design is not only about creating products that look good, but also about creating products that fit seamlessly into users' lives and enhance their overall experience. By understanding and implementing emotional design principles, businesses can create products that are both aesthetically pleasing and functional, and that connect with users on an emotional level.

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