Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

Utilizing Graphic Design Trends to Reimagine Saudi Culture Identity

Shaimaa M. Hassan[1], Thekra A. Al-Dajani[2]

Abstract

As the Kingdom moves towards renaissance under Vision 2030, and the opportunity to harness its cultural assets to enhance a vibrant community and a prosperous economy, design has played a role in preserving culture and redefining cultural experiences in contemporary contexts. Design is also characterized by its ability to transform and revive cultural practices to change and modify perceptions, generate and disseminate knowledge, and create new value through organizing the experience. The problem of this research is based on the main question of: can the graphic design trends reimagine Saudi heritage; as a step to preserving and redefining cultural? The objective of this study is to explore how contemporary graphic design trends, specifically Organized Chaos and Maximalism, can be used to reinterpret and preserve Saudi cultural heritage. It aims to document and showcase the aesthetic and artistic dimensions of Saudi heritage through bold and modern visual representations, emphasizing oral storytelling and traditional attire and enhance national identity, engage younger generations, and create a cultural brand that resonates with both local and global audiences. The study evaluated the effectiveness of ten graphic design approaches by gathering feedback from 10 experts. Design 3 and Design 8 received the highest quality index scores of 90.00, reflecting their strong visual impact, unique concepts, and effective use of cultural elements. The highest-ranked aspect was innovation, with a score of 83.33, followed by aesthetics at 82.72 and functionality at 82.28. Despite the lack of statistically significant differences in specialists' evaluations, certain designs were perceived as stronger than others. Design 6 ranked lowest in the aesthetic aspect due to its unbalanced structure and weak visual impact. Design 4 received the lowest overall ranking with a score of 74.33, attributed to its lack of clarity and weaker adherence to design principles. Similarly, Design 1 had the lowest innovation ranking at 76.00, with recommendations for concept reinterpretation, better element distribution, and bolder color choices.

Keywords: *Organized Chaos, Maximalism, Graphic Design, Saudi Cultural Identity.*

Introduction

Graphic design is an expansive discipline that encompasses a wealth of knowledge and reflects diverse human activities. At its most impactful, it has the power to communicate messages that not only alter visual perceptions but also reshape cultural identity and societal norms. In today's technology-driven world, digital media influences every aspect of life, playing a crucial role in graphic design by assisting clients in establishing brand identities and enabling consumers to connect with products more effectively (Barnard, M. 2013).

As a multidisciplinary field, graphic design focuses on visual creativity, integrating ideas, concepts, text, and imagery into a cohesive visual presentation through print, digital platforms, and other media. It provides structure and organization to content, simplifying communication and ensuring that the intended message is clearly conveyed to the target audience. The field encompasses various specializations, including art direction, typography, page layout, and information technology, offering designers multiple areas of expertise (Ambrose, 2019).

One of the notable graphic design trends in 2021 was "organized chaos," which defied conventional design principles by blending the unpredictability of anti-design with the structured simplicity of minimalism. This approach embraced disorder while maintaining a sense of balance, finding coherence within the seeming randomness (Rimmer, 2021).

Maximalism, on the other hand, embraces the philosophy that "more is more." It rejects the constraints of minimalism, favoring excess and bold expression. This design style is characterized by rich, extravagant

[1] Department of Graphic Design, College of Designs and Arts, Umm al-Qura University, Kingdom of Saudi Arabia, Email: Dr.sh3mhassan@gmail.com, (Corresponding Author), https://orcid.org/0009-0007-4975-9439

[2] Department of Graphic Design, College of Designs and Arts, Umm al-Qura University, Kingdom of Saudi Arabia, Email: thekramubarak2018@gmail.com, https://orcid.org/0009-0006-1682-3695

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

elements, often incorporating intense color combinations that clash in an engaging and visually stimulating way. While some maximalist designs use limited color palettes, most rely on vibrant, contrasting hues to create a striking, immersive effect (Barnhart, 2021).

The objective of this study is to explore how contemporary graphic design trends, specifically Organized Chaos and Maximalism, can be used to reinterpret and preserve Saudi cultural heritage. The research aims to document and showcase the aesthetic and artistic dimensions of Saudi heritage through bold and modern visual representations, emphasizing oral storytelling and traditional attire and enhance national identity, engage younger generations, and create a cultural brand that resonates with both local and global audiences.

The study will evaluate the effectiveness of ten graphic design approaches by gathering feedback from 10 experts. Their assessment will help determine how well the designs will reinterpret Saudi cultural heritage, balance tradition with contemporary trends, and engage the target audience. The evaluation will likely consider factors such as aesthetic appeal, cultural authenticity, innovation, and the overall impact of the designs.

The importance of the research lies in extrapolating the aesthetic dimension inherent in Saudi heritage in general in an attempt to document the values of beauty belonging to the heritage legacy in the Kingdom of Saudi Arabia, and motivating generations to appreciate and preserve Saudi heritage and what is related to the arts of their societies.

Literature Review

Cultural Identity and National Branding

Cultural identity plays a crucial role in shaping a nation's self-image and global perception. It encompasses shared traditions, values, language, and artistic expressions that distinguish one society from another. National branding, on the other hand, is a strategic effort to promote a country's unique cultural identity to both domestic and international audiences. Anholt (2007) emphasizes that a strong national brand is built on a country's cultural assets, historical heritage, and modern advancements, forming a coherent narrative that resonates globally. Saudi Arabia, for instance, has leveraged its rich cultural heritage and Vision 2030 initiatives to enhance its global image by promoting traditional arts, design, and tourism while modernizing its economy.

Graphic design is a powerful tool in national branding, as it visually represents cultural identity and fosters a sense of belonging among citizens. Research suggests that visual storytelling through design elements such as typography, color schemes, and imagery can reinforce cultural narratives and strengthen national pride (Olins, 2004). For example, Qatar's branding for the FIFA World Cup 2022 integrated traditional Arabic calligraphy and Islamic geometric patterns, blending heritage with contemporary design to project a modern yet culturally rooted identity. Such branding efforts help nations maintain authenticity while engaging global audiences through compelling visual communication.

In the digital age, national branding extends beyond government initiatives to include social media campaigns, commercial branding, and tourism marketing. Kavaratzis and Hatch (2013) argue that successful place branding requires a dynamic interaction between historical narratives and modern cultural expressions, ensuring that a country's identity remains relevant in a rapidly evolving world. Saudi Arabia's AlUla tourism campaign exemplifies this approach by using graphic design, digital media, and architectural branding to highlight the region's historical significance while positioning it as a luxury destination. This demonstrates how graphic design can act as a bridge between tradition and modernity, crafting a brand that appeals to both local and international audiences.

Furthermore, cultural identity and national branding influence economic growth by attracting investment, tourism, and international collaboration. Research indicates that strong national branding can significantly impact a country's soft power and economic competitiveness (Dinnie, 2016). Nations that successfully integrate their cultural identity into branding effort not only preserve their heritage but also create economic

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

opportunities through cultural tourism, creative industries, and global partnerships. Saudi Arabia's Diriyah project, for instance, merges historical authenticity with contemporary branding strategies to position the country as a global cultural hub. This highlights the essential role of design in shaping and maintaining national identity while promoting sustainable development.

The artistic representation of these renowned musicians, not only celebrate individual musical achievements, but also contribute to a broader narrative of cultural pride by incorporating traditional attire, historical references, and elements of nostalgia, these portrayals bridge the past with the present, making Saudi cultural identity more accessible and relatable to diverse audiences.

Trends in Graphic Design: Maximalism and Organized Chaos

Cultural changes, technical breakthroughs, and audience preferences all influence graphic design trends. Maximalism and Organized Chaos are two noteworthy concepts that have gained popularity recently; They both defy standard design conventions and embrace striking, unorthodox aesthetics.

The constraint of minimalism is contrasted with maximalism, maximalism rejects the principle of "less is more" and instead embraces an "excess is success" philosophy. This approach often incorporates vibrant color palettes, layered typography, and intricate patterns to create immersive visual experiences, which is defined by bright colors, dense compositions, and exuberant ornamentation (Barnhart, 2021). According to Lupton and Phillips (2015), maximalist design aims to overwhelm the senses, drawing attention through bold contrasts and exaggerated forms. This aesthetic has been widely adopted in branding, advertising, and digital media, where designers seek to create memorable and dynamic visuals that stand out in an oversaturated market.

Organized Chaos, on the other hand, creates compositions that seem chaotic yet retain visual harmony by combining unpredictability with underlying structure (Rimmer, 2021). This trend has been particularly influential in web design, where interactive layouts and overlapping layers create a sense of movement and depth, engaging users on a more intuitive level.

Both Maximalism and Organized Chaos have been influenced by advancements in digital tools and software, allowing designers to experiment with complex compositions more freely. The rise of artificial intelligence (AI) has enabled the creation of intricate, layered visuals that push the boundaries of conventional design principles (Ambrose, 2015), They provide designers with tools to evoke strong emotional responses, create unique brand identities, and challenge traditional design conventions. As Barnard (2013) notes, graphic design is a constantly evolving field that reflects cultural and artistic shifts. By embracing these bold trends, designers continue to push the boundaries of creativity while redefining how visual communication shapes perceptions and interactions in the modern world.

Methodologies

This study aims to integrates contemporary graphic design trends (Organized Chaos and Maximalism) to reinterpret Saudi cultural identity, by submit a Saudi brand proposal, to enhance Saudi cultural identity by showcasing it in a modern and innovative way, It tells stories through unique designs that consumers can own, making them part of the narrative. By presenting Saudi figures in a modern style that harmonizes tradition and innovation, creating a rich and engaging visual experience. Character details and traditional Saudi attire are based on real photographs, with the illustrations categorized under the abstract style, combining realism in essential details with abstraction in simplified or emphasized elements. The designs are created using Adobe graphic design programs, focusing on decorative details and the cultural fabric of traditional garments while preserving the uniqueness of each character. The strategy behind the brand is to establish clear communication standards that effectively engage diverse target audiences and fulfill brand's mission. The brand appeals to bold color enthusiasts and those who appreciate chaos, exaggeration, and spontaneity. The target age group ranges from 12 to 40 years old, encompassing both male and female

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

audiences. Tarqeesh embodies four key emotions that resonate with its target audience: luxury, love, friendship, and confidence.

Project Steps:

- Conducting in-depth research on Saudi cultural identity and heritage in each region, focusing on traditional attire, artistic elements, and prominent figures.
- Creating an inspiration board for each region, featuring key landmarks, personalities, clothing, and traditional cuisine to establish cultural roots and visual connections for the project.
- Illustrating the main characters while preserving the essential details of their identity. These drawings fall under the abstract style, blending realism in key details with abstraction.
- Defining the design direction, adopting Organized Chaos as a contemporary graphic design approach that balances structured randomness and bold compositions.
- Breaking conventional design rules while maintaining balance and coherence.
- Utilizing Maximalism, exaggerating elements in size, color, or effects to deliver impactful messages and capture attention.
- Highlighting key focal points and infusing dramatic, visually striking elements into the designs.
- Evaluate the designs by experts

Visual Brand Identity Design Element

Brands serve as a powerful tool for capturing customer attention, making their economic and cultural aspects a key focus for graphic designers. Branding is a complex framework designed to engage and inspire a specific audience in a distinctive and lasting way. Its primary objective is to shape how that audience perceives the brand and what it stands for. Memorable symbols play a crucial role in visual identity, acting as triggers that evoke emotions, sensations, and experiences (Morgan et al., 2011).

a. Brand name	"Taraqish" is a term that means embellishment and ornamentation.
b. Logo	
c. Typography	Al-Ruq'a script is one of the Arabic scripts. It was said that it was named by this name because it was written – in the beginning – on patches of leather, and (riqa') is the plural of (riq'a), which is the small piece of paper that is suitable for letters and stories. The script is clear and aesthetically pleasing in the shapes of its letters, leaning towards simplicity and clarity while avoiding complexity, overlapping, and intricate compositions. It combines strength and beauty at the same time, and easy to learn in a relatively short time. (Adam et al., 2017). Additionally, Ruqaʿa script is known for being fast, smooth, and flexible in writing. It is widely used in daily life. (Taha, 2002).
d. Color pallets	Color psychology examines how colors influence human behavior and perception. Although people may not always be aware of it, their interpretation

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

	of color is shaped by factors such as gender, age, culture, and ethnic background. These elements contribute to individual responses to specific colors or color combinations (Mollica, 2018). The meaning of a color is influenced by a hierarchy of external factors, including cultural norms, language, social standing, environment, time period, and personal experiences. Semantics, which explores the meaning of words and their use in language, also applies to the language of color (Holtzschue, 2012). However, certain universal color responses exist beyond these individual differences (Mollica, 2018). Colors play a crucial role in shaping the way ideas are conveyed, much like language. Their meanings can evolve, shift, or even be replaced over time, making color a dynamic and expressive form of communication (Holtzschue, 2012). In branding, four key emotions—luxury, love, friendship, and trust—are strategically evoked to connect with the target audience. A careful study of color associations ensures that the chosen palette effectively conveys the brand's message.
- Purple	The shades that fall between primary colors often carry richer narratives and profound emotional meanings (Opara et al., 2014). Purple has long been linked to royalty, symbolizing grace, dignity, and refinement (Mollica, 2018).
- Red	Red embodies energy, strength, passion, and love (Mollica, 2018).
- Blue	Blue, often connected to the sky and water, evokes a sense of tranquility, relaxation, and peace (Mollica, 2018).
- Green	As the color of nature, green represents freshness, fertility, and balance. It is also considered the most soothing color for the eyes (Mollica, 2018).
- Black	Black is associated with solemnity and can be used to enhance the prominence of other colors. It creates a striking contrast when paired with vibrant hues (Mollica, 2018; Spillers, 2003).
e. Brand Slogan:	"Every Pattern Has a Story" – Each illustration conveys a unique narrative.
f. Layout / Composition	Visual imagery is employed to elicit an emotional response, ensuring that the viewer is in the right mindset to absorb the intended message. Composition refers to the arrangement and organization of visual elements within a design. It involves merging distinct components to create a unified whole, emphasizing that the overall design is greater than the sum of its parts. A well-structured composition is just as crucial as the individual elements that contribute to it (Dabner et al., 2017). Establishing a design reference, particularly the organized chaos approach as a modern graphic design trend, merges deliberate randomness with structure to produce bold and dynamic visuals. This method blends order with rule-breaking while preserving balance and design coherence. It also amplifies elements—whether through size, color, or effects—to deliver a powerful message and instantly draw attention. This approach is often used to emphasize a focal point or introduce a dramatic and striking effect within the design.
g. Photographs/ illustrations	Photographs and illustrations were combined to produce visually captivating and distinctive outcomes, enhancing the design's dynamism and immersive quality. Icons were carefully selected for their symbolic relevance to reinforce the intended design message. The following elements and icons were incorporated, along with their meanings:
- Islamic decoration	Geometric patterns gained prominence due to their alignment with Islamic aniconism, which de-emphasized figural representation. Their intricate and repetitive nature encouraged spiritual reflection while symbolizing infinite creation (Clevenot, 2000).
- Decorative Unit of Arabic Letters	Calligraphy is regarded as the most esteemed art form in the Islamic world, with Arabic script adorning a wide range of objects. Over centuries, numerous calligraphic styles have emerged, each serving religious, political, social, and cultural functions (Ekhtiar et al., 2012).

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

- Palm tree	The palm tree holds deep cultural significance in Saudi Arabia, symbolizing generosity, resilience, pride, and vitality. It represents perseverance, strength, and stability, embodying patience in adversity (Al-Azzam et al., 2014).
- Roses	Revered as "the queen of flowers," the rose carries connotations of love, royalty, beauty, sensuality, secrecy, and mysticism. It is also associated with achievement and perfection (Benzakein, 2017).
- Stars	Stars symbolize illumination, knowledge, and excellence. Their enduring nature represents the interconnectedness of all things and the perpetual cycle of life. They serve as a source of inspiration, encouraging individuals to pursue their aspirations (Action Symbolism, 2023).
- The Oud musical instrument	In Arab culture, the oud is celebrated as "the king of instruments." The term *al-oud* is believed to derive from the Arabic word for "wood." More than just a musical instrument, the oud reflects centuries of cultural exchange and musical evolution, embodying both heritage and innovation (Djuraeva, 2017).
- Musical symbols	Musical notation symbols function as a universal language for musicians, representing pitch, rhythm, tempo, dynamics, and other musical elements. They enable precise interpretation and performance across diverse musical traditions (Fabian, 2017; Racy, 2000).
- Radio	The radio symbolizes communication, news dissemination, and the widespread transmission of ideas and influence. It also evokes nostalgia, recalling an era before digital communication (Yang, 2021).
- Microphone	A microphone represents the power of communication and self-expression, providing individuals with a means to share their thoughts, beliefs, and emotions. It fosters understanding and connection among people (Rivera, n.d.).
- Octopus	The octopus symbolizes intelligence, adaptability, agility, empathy, altruism, and the remarkable ability to regenerate.
- Magic carpets	Magic carpets have long represented humanity's innate longing for freedom, flight, and discovery. These mythical objects have captivated storytellers and audiences, serving as vessels for extraordinary journeys of the imagination (Johnson et al., 2021).
- Turban	The spiritual significance of the turban extends beyond its physical form, embodying faith and personal identity. Each fold carries stories of wisdom and humility, while its vibrant colors reflect individual life experiences. The turban's design and colors hold deep meaning, representing personal beliefs and cultural heritage. Wearing it fosters a sense of community and mutual respect, reinforcing its role as a unifying symbol (Shiningsikh, 2024).
- Dove	The dove represents a symbol of love and purity in many civilizations. (Mara et al., 2019). The dove is also associated with peace and in the stories of the prophets.

Designs

The First Design:	
Character: Khalid Abdulrahman is a Saudi singer and composer (Urkevich, 2015).	

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

Story: The image depicts the singer Khalid Abdulrahman wearing a ghutra and agal (the traditional Saudi attire). Beside him is an oud, a musical instrument. The background is adorned with traditional Islamic decorations, along with flowers and leaves, giving the image an aesthetic touch. Additionally, a crescent moon and stars are present, symbolizing his title "Mukhawi Al-Lail" (Companion of the Night).	
The Second Design	
Character: Abadi Al-Johar is a Saudi singer and composer (Urkevich, 2015).	
Story: The character of the singer Abadi Al-Johar is depicted wearing a Ghutra and Agal (traditional Saudi attire) while playing the Oud. The background is adorned with traditional Islamic patterns, along with flowers, leaves, and octopus' arms, giving the image an artistic and aesthetic appeal. These elements symbolize his nickname, "The Octopus of the Oud," which he earned due to his exceptional skill in playing the instrument. Abadi Al-Johar is regarded as one of the most prominent Oud players in the Arab world and owns around 36 Ouds, including one that belonged to the legendary musician Mohammed Al-Qasabji, crafted 109 years ago (Karolak, 2020).	
The Third Design:	
Character: Mohammed Abdu is a Saudi singer and composer (Urkevich, 2014).	
Story: The image depicts the renowned singer Mohammed Abdu, incorporating elements of Saudi culture and heritage, such as traditional attire and Arabic calligraphy. The composition evokes nostalgia for the past, especially with the presence of a cassette player and a radio. Surrounding the figure are roses, a reference to his famous song "Amirat Al-Ward" (Princess of Roses), enhancing the artwork's sentimental and cultural depth.	
The Forth Design:	
Character: Rashed Al-Majed is a Saudi singer, actor, composer, and music producer.	
Story: The image depicts the Saudi singer Rashed Al-Majed wearing traditional Saudi attire while riding a flying carpet, with a turban adorned with flowers beside him. This visual representation aligns with his title, "The Sindbad of Arabic Song," which reflects his long and diverse musical career. One of the possible meanings of the word "Sindbad" is "The Master of the Indus River," as it is derived from the words "Sind" (referring to the Indus River) and "Bad" (meaning master or ruler). This interpretation symbolizes Rashed Al-Majed's artistry as a river that never sinks. The flying carpet was chosen as the central element, inspired by the tales of Sindbad, alongside Sindbad's turban and a	

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

microphone, reinforcing his well-earned title, "The Sindbad of Arabic Song." (Urkevich, 2014).	
The Fifth Design:	
Character: Abdul Majeed Abdullah, Saudi singer and composer	
Story: The artwork features Abdul Majeed Abdullah, the renowned Saudi singer and composer, alongside a oud, a microphone, and decorative elements. The composition also includes Jazan's signature jasmine flowers (Ward Al-Ful Al-Jizani), symbolizing the singer's birthplace and heritage. The inclusion of jasmine flowers pays tribute to his famous song "Ya Ward" (Oh, Rose), one of his most beautiful and well-known songs. The song is distinguished by its poignant lyrics and melancholic melody, portraying the pain of a lover's betrayal, likening the beloved to a rose—beautiful yet capable of causing wounds. A notable lyric from the song states: "Ya Ward, who taught you to wound? Hurting others was never in your nature." (Urkevich, 2015).	
The sixth Design:	
Character: Najdi – Central Region.	
Story: The artwork embodies the character of the Najdi woman, highlighting her distinctive features, generosity, hospitality, and significant role in society. She is dressed in traditional Najdi attire, known as *Al-Nashl*, which consists of a long, loose-fitting *Dara'a* and a *Muqna'a* that covers either the head only or part of the face. The outfit is often adorned with intricate hand embroidery or golden threads. (Aldabbagh, 2024).	
The seventh Design:	
Character: Kahlaa - Northern region.	
Story: The artwork portrays a woman from the northern region, known for her love of adorning her eyes with kohl. She wears the traditional *Thoub Al-Mahwathal*, decorated with colorful embroidery and traditional patterns, complemented by a *Sheilah* wrapped around her head and secured for a complete look (Almejmaj et al., 2014). Accompanying the woman is an Arabian oryx, an animal renowned for its captivating eyes.	
The Eighth Design:	
Character: Raihanna – Southern Region	

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

Story: The artwork portrays a southern woman wearing the traditional "thobe al-mujannab", a decorated dress featuring warm colors like red and orange. It is paired with the "sheila al-mrayasha" or the "yellow scarf" wrapped around the head, along with basil (rayhan) adorning her hair. The fragrance of basil emanates from her, symbolizing one of the region's most important agricultural products, which women have used for adornment in both the past and present.	

The Ninth Design:	
Character: Hijazi – Western Region	
Story: The Hijazi woman dazzles in enchanting attire that reflects her beauty and elegance. For special occasions, she wears a stunning dress called "Al-Dair wal-Manthour," adorned with elegant finishing touches such as "Al-Muharramah" and "Al-Madawarah.".She is also known for another distinctive outfit, "Al-Sidrah," topped with "Al-Musa'afah," a traditional ensemble that embodies her pride in her heritage and authenticity (Alzanbgi & Abass, 2018). The beauty of the Hijazi woman is further accentuated by the presence of doves that accompany her with grace, their melodious cooing captivating poets who have long sung of her charm and allure, deeply intertwining her with the cultural fabric of Hijaz.	
Tenth Design:	
Character: Zahra Al-Hada – Western Region	
Story: A woman from Taif is depicted wearing the traditional Taif attire, which consists of the "Milayah" or "Burqa" that covers the head, paired with a long dress adorned with beads or intricate hand embroidery. The outfit is distinguished by light colors such as white and beige, giving it a delicate and elegant appearance, particularly among the women of the Thaqeef tribe. Surrounding her are Taif roses, enveloping her in their enchanting fragrance, a signature scent of the region.	

Study Tool

To test the study hypotheses, a questionnaire was designed using a three-point Likert scale to evaluate the proposed designs based on three key dimensions: aesthetic, functional, and innovative aspects. The questionnaire was developed to gather expert assessments regarding the effectiveness of the designs in achieving these dimensions.

- Aesthetic Dimension: This section evaluates the visual appeal of the design, including color harmony, elegance, versatility, and line integration.

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

- Functional Dimension: This part measures the practicality and usability of the design, assessing its suitability for various applications, its ability to meet consumer needs.

- Innovative Dimension: This segment examines the originality and creative aspects of the design, including structural harmony, coherence, conceptual application, dynamic visual impact, and adaptability to various artistic and technological fields.

Validity and Reliability of the Study Tool

To measure the validity and reliability of the study instrument, the validity of expert judgment and internal consistency validity were calculated using the correlation coefficient between the total score of each axis and the overall questionnaire score. Cronbach's alpha coefficient was used to verify the consistency of the items within each dimension and the scale as a whole. The study hypotheses were tested using variance analysis to examine differences between designs, as well as calculating the arithmetic mean and quality coefficients to rank the designs.

Instrument Validity and Reliability

Face Validity (Expert Judgment Validity)

The face validity method was employed to ensure the suitability and relevance of the research instrument for the study objectives. The initial version of the instrument was presented to a group of specialized professors for evaluation. The experts assessed the clarity and accuracy of wording, linguistic correctness, sequencing and organization, adequacy of the number of items, and comprehensiveness of the questionnaire.

Table 1 presents the agreement percentages among experts regarding the evaluation criteria for the specialist opinion questionnaire. The agreement percentages ranged between 83.33% and 100%, with an overall average agreement of 91.66%, indicating a high level of expert consensus and exceeding the 75% approval threshold.

Table (1). Expert Judgment Results for Specialist Opinion Questionnaire Items

Evaluation Criteria	**Clarity and Accuracy of Wording**	**Sequencing and Organization**	**Relevance of Dimensions to Questionnaire Objective**	**Appropriateness of Item Count in Each Dimension**	**Alignment of Items with Dimension Objective**	**Comprehensiveness of the Questionnaire**
Agreement Percentage	83.33%	83.33%	100%	83.33%	100%	100%
Overall Agreement Average	91.66%					

Validity through Internal Consistency (Correlation Between Each Axis Score and Overall Questionnaire Score)

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

Internal consistency validity was measured using Pearson's correlation coefficient between the total score of each axis and the overall questionnaire score. The results are shown in Table 2.

Table 2. Correlation Coefficients Between Each Axis Score and the Overall Questionnaire Score

Axis	Correlation Coefficient	Significance Level
Aesthetic Aspect	0.964	0.000
Functional Aspect	0.971	0.000
Innovative Aspect	0.967	0.000

As seen in Table 2, the correlation coefficients between the total score of each axis (Aesthetic Aspect, Functional Aspect, and Innovative Aspect) and the total questionnaire score indicate strong correlations (greater than 0.6) and are statistically significant at 0.05. This confirms the internal consistency of the questionnaire's axes and demonstrates that it effectively measures the intended constructs, affirming the validity and coherence of the questionnaire's dimensions.

Questionnaire Reliability

Reliability was assessed using Cronbach's alpha coefficient.

Table 3. Cronbach's Alpha Reliability Coefficients for Questionnaire Axes

Axis	Number of Items	Cronbach's Alpha
Aesthetic Aspect	6	0.928
Functional Aspect	6	0.927
Innovative Aspect	6	0.946
Evaluation Aspects (Overall)	18	0.975

Table 3 shows that all Cronbach's alpha values exceed 0.70, indicating high internal consistency within each axis and the overall scale, confirming the questionnaire's reliability.

Study Hypotheses

Design evaluation plays a crucial role in determining the effectiveness and appeal of a product, particularly in fields where aesthetics, functionality, and innovation interact. Specialists assess designs based on various criteria to ensure they meet industry standards and user expectations. The aesthetic aspect reflects the visual appeal and artistic value of a design, while the functional aspect determines its practicality and ease of use. Additionally, the innovative aspect highlights the extent to which a design introduces novel features or creative solutions. This study examines whether statistically significant differences exist in specialists' evaluations of designs across these key dimensions, providing insights into the factors that influence expert judgment and overall design assessment.

- There are statistically significant differences between the mean evaluation scores of specialists regarding designs in terms of achieving the aesthetic aspect.
- There are statistically significant differences between the mean evaluation scores of specialists regarding the designs in terms of achieving the functional aspect.
- There are statistically significant differences between the mean evaluation scores of specialists regarding the designs in terms of achieving the innovative aspect.
- There are statistically significant differences between the mean evaluation scores of specialists regarding the designs in terms of achieving the evaluation aspects.

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

Hypothesis Testing

First Hypothesis:

The first hypothesis states: "There are statistically significant differences between the mean evaluation scores of the specialists regarding the designs in terms of achieving the aesthetic aspect."

To verify this hypothesis, the specialists' evaluations were calculated to assess the designs, and an analysis of variance (ANOVA) test was conducted for the aesthetic aspect, as shown in the following table:

Table (4). Specialists' Evaluations of Designs in Terms of Achieving the Aesthetic Aspect

Designs	Evaluation Phrases					
	(1)	(2)	(3)	(4)	(5)	(6)
First Design	19.00	23.00	23.00	22.00	24.00	23.00
Second Design	26.00	25.00	23.00	25.00	24.00	24.00
Third Design	26.00	29.00	27.00	27.00	26.00	28.00
Fourth Design	22.00	23.00	20.00	22.00	27.00	23.00
Fifth Design	25.00	25.00	26.00	25.00	27.00	23.00
Sixth Design	23.00	24.00	21.00	20.00	24.00	22.00
Seventh Design	27.00	27.00	27.00	25.00	25.00	26.00
Eighth Design	28.00	28.00	28.00	27.00	27.00	28.00
Ninth Design	27.00	26.00	28.00	27.00	27.00	27.00
Tenth Design	23.00	22.00	23.00	26.00	23.00	21.00

Table 4 illustrates the responses of the experts regarding each statement related to the aesthetic aspect. It is evident that the experts' responses vary across different designs for each statement. The range of total responses for the first statement was from 19 to 28, for the second statement from 22 to 29, for the third statement from 20 to 28, for the fourth statement from 20 to 27, for the fifth statement from 23 to 27, and for the sixth statement from 21 to 28.

The arithmetic mean, standard deviation, and T-test were calculated for the aesthetic aspect statements and for the aesthetic aspect as a whole, as shown in Table 5. Table 5 demonstrates the statistical significance of all statements related to the aesthetic aspect and the overall axis, as the significance value was less than 5% for all statements and for the aesthetic aspect as a whole.

Table (5). Mean, Standard Deviation, and t-Test Results for Aesthetic Aspect Statements

#	Statement	Mean	Std. Dev.	t-Value	Significance
1	The design features a harmonious balance of different elements, with well-distributed components around the central figure.	2.46	0.758	6.07	0.000
2	Bright colors like yellow and red blend well with the subdued background, creating an attractive and visually comfortable effect.	2.52	0.717	7.25	0.000
3	The use of symbols adds a classic touch that reflects a specific historical era, enhancing the cultural and expressive depth of the image.	2.46	0.744	6.18	0.000

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

#	Statement	Mean	Std. Dev.	t-Value	Significance
4	The artistic style combines realism with expressive digital techniques, giving the design a unique creative character.	2.46	0.758	6.07	0.000
5	The human figure is the focal point, surrounded by various symbols, directing the viewer's attention toward the main character and creating visual harmony.	2.54	0.703	7.69	0.000
6	The character's features convey seriousness and prestige, while the surrounding elements evoke nostalgia and appreciation for the past.	2.45	0.757	5.94	0.000
Overall Aesthetic Aspect	2.48	0.634	7.60	0.000	

The significance level for all statements and the overall aesthetic aspect was less than 5%, indicating statistical significance.

A variance analysis was conducted to examine the differences in specialists' evaluations of the proposed designs regarding the aesthetic aspect. Table (6) presents the results:

Table (6). ANOVA for Specialists' Mean Evaluations of Designs in Terms of Achieving the Aesthetic Aspect

Source of Variance	Sum of Squares	df	Mean Square	F-Value	Significance
Between Groups	3.991	9	0.443	1.116	0.360
Within Groups	35.767	90	0.397		
Total Variance	39.758	99			

The ANOVA results indicate that the F-value (1.116) is not statistically significant ($p = 0.360$, which is greater than 0.05). This suggests no significant differences between specialists' evaluations regarding the aesthetic achievement of the designs.

These results confirm that there are no statistically significant differences between the specialists' evaluations of the designs concerning their aesthetic achievement. This finding is based on the lack of statistical significance at the 0.05 level, leading to the rejection of the first hypothesis.

The researchers attribute this outcome to the similarity in aesthetic levels among the designs, which resulted in non-significant differences. Additionally, variations in specialists' personal preferences and aesthetic tastes may have contributed to the lack of statistical significance.

Table (7). Mean, Standard Deviation, and Quality Index for Specialists' Evaluations of Designs in Terms of Achieving the Aesthetic Aspect

Design	Mean	Std. Dev.	Quality Index	Rank
First Design	2.24	0.779	74.67	9
Second Design	2.45	0.614	81.67	6
Third Design	2.72	0.437	90.67	2
Fourth Design	2.28	0.604	76.00	8
Fifth Design	2.52	0.610	84.00	5
Sixth Design	2.23	0.694	74.33	10
Seventh Design	2.62	0.613	87.33	4
Eighth Design	2.77	0.387	92.33	1
Ninth Design	2.70	0.637	90.00	3

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

Design	Mean	Std. Dev.	Quality Index	Rank
Tenth Design	2.30	0.804	76.67	7

From Table (7), it is evident that Design 8 achieved the highest quality index (92.33) and was ranked first, while Design 6 received the lowest quality index (74.33) and was ranked last.

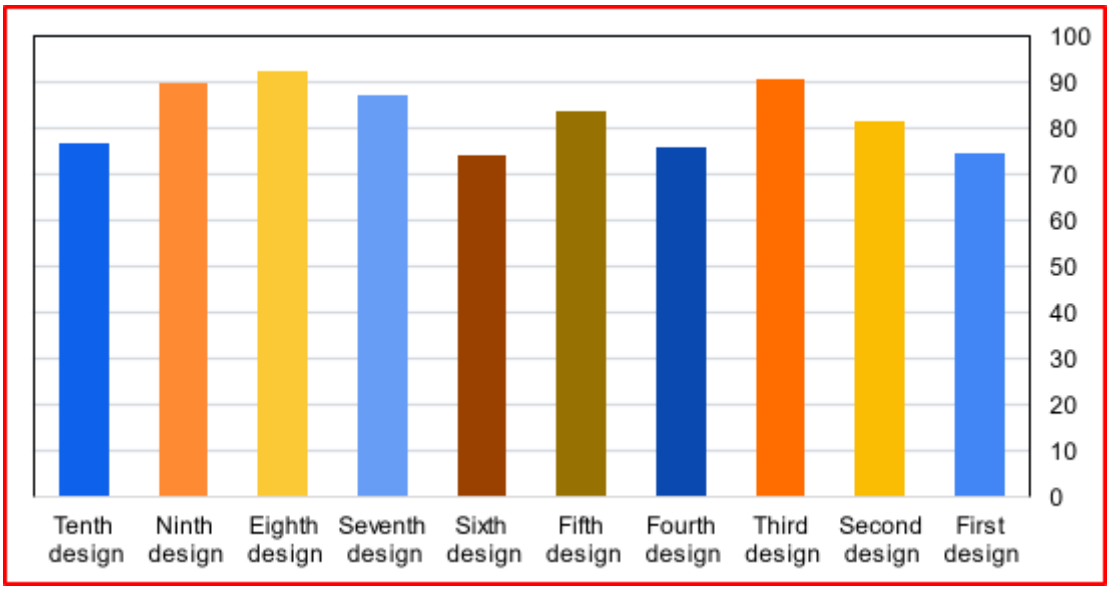

Figure (1). Quality Factor for Experts' Evaluation of Designs in Terms of Achieving the Aesthetic Aspect

From Table (7) and Figure (1), it is evident that:

The designs can be ranked according to the quality factor based on the experts' opinions regarding the achievement of the aesthetic aspect. The quality factor ranged from 74.33 to 92.33, with the best design in terms of achieving the aesthetic aspect being Design Eight. The researchers attribute this to the fact that the design integrates cultural and natural elements while maintaining balance and proportion among its components, making it visually pleasing. The central character is positioned in the middle, surrounded harmoniously by other elements. Soft, curved lines were used in the floral and plant designs, while sharper lines were applied to the clothing design, creating a visually striking contrast. Additionally, the contrast between vibrant colors and a neutral background highlights the key elements of the design.

The results also showed that the least effective design in achieving the aesthetic aspect was Design Six. The researchers attribute this to an unbalanced composition and inconsistent color contrast. Furthermore, the character details were unclear and unattractive.

Second Hypothesis:

The second hypothesis states that "There are statistically significant differences between the mean scores of specialists' evaluations of the designs in terms of achieving the functional aspect."

To verify this hypothesis, the specialists' evaluations of the designs in terms of the functional aspect were calculated, and an analysis of variance (ANOVA) test was conducted for the functional aspect, as shown in the following table:

Table (8). Specialists' Evaluations of Designs in Terms of Achieving the Functional Aspect

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

Designs	Evaluation Phrases					
	(1)	(2)	(3)	(4)	(5)	(6)
First Design	26.00	24.00	24.00	21.00	22.00	24.00
Second Design	27.00	24.00	26.00	23.00	22.00	24.00
Third Design	26.00	28.00	27.00	26.00	24.00	28.00
Fourth Design	19.00	22.00	21.00	20.00	23.00	22.00
Fifth Design	25.00	25.00	28.00	25.00	23.00	23.00
Sixth Design	23.00	23.00	25.00	24.00	24.00	26.00
Seventh Design	23.00	26.00	26.00	26.00	25.00	26.00
Eighth Design	28.00	27.00	29.00	26.00	26.00	26.00
Ninth Design	26.00	27.00	29.00	24.00	27.00	26.00
Tenth Design	22.00	22.00	23.00	23.00	26.00	25.00

Table 8 shows the responses of the specialists for each statement of the functional aspect, highlighting the variation in their responses across different designs for each statement. The response range for the first statement was from 19 to 28, for the second statement from 22 to 28, for the third statement from 21 to 29, for the fourth statement from 20 to 26, for the fifth statement from 22 to 27, and for the sixth statement from 22 to 28.

The arithmetic mean, standard deviation, and t-test were calculated for the statements of the functional aspect and for the functional aspect as a whole, as shown in Table 9. Table 9 indicates the significance of all functional aspect statements, as the p-value was less than 5% for all statements, which means that all designs successfully achieve the functional aspect.

Table (9). Arithmetic Mean, Standard Deviation, and T-Test for Statements and Functional Aspect Axis

No.	Statements	Arithmetic Mean	Standard Deviation	T-Value	Significance
1	The design clearly reflects cultural and artistic elements, making it easier for the viewer to understand and connect with its content.	2.45	0.743	6.05	0.000
2	The design incorporates symbols that enhance the message and provides a visual context expressing heritage and art.	2.48	0.731	6.56	0.000
3	The design attracts attention through its bright colors and harmonious elements, making it visually impactful and easy to remember.	2.58	0.669	8.66	0.000
4	All elements contribute to enhancing the overall content without any excessive or distracting components, supporting its function as an integrated visual design.	2.38	0.788	4.82	0.000
5	The design can be used in multiple fields, such as advertising design,	2.42	0.806	5.21	0.000

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

No.	Statements	Arithmetic Mean	Standard Deviation	T-Value	Significance
	music covers, or cultural campaigns, due to its strong aesthetic and symbolic nature.				
6	The design encourages viewer interaction by combining nostalgic elements with modern touches, reflecting creative thinking in visual storytelling.	2.50	0.745	6.71	0.000
Functional Aspect	2.47	0.640	7.31	0.000	

A variance analysis was conducted to evaluate specialists' assessments of the designs in terms of achieving the functional aspect. Table (10) presents the results:

Table (10). Variance Analysis of Specialists' Average Ratings for Designs in Terms of Achieving the Functional Aspect

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Squares	F-Value	Significance
Between Groups	2.798	9	0.311	0.740	0.672
Within Groups	37.823	90	0.420		
Total Variance	40.621	99			

The results of the variance analysis in Table (10) show that the F-value was 0.740, which is not statistically significant, as the p-value was 0.672, greater than 0.05. This indicates that there are no significant differences between the specialists' ratings regarding the functional achievement of the designs.

The findings confirm that there are no statistically significant differences between the specialists' average ratings of the designs in terms of achieving the functional aspect. This is evidenced by the lack of significant statistical differences at the 0.05 level in their assessments.

As a result, the second hypothesis cannot be accepted, which stated:

"There are statistically significant differences between the specialists' average ratings of the designs in terms of achieving the functional aspect."

The researchers attribute this to the similarity in the functional performance of the presented designs, meaning that all designs successfully met their functional objective, rendering the differences between them statistically insignificant.

Table (11) presents the means, standard deviations, and quality coefficients of the proposed designs in achieving the functional aspect.

Table (11). Arithmetic Means, Standard Deviations, and Quality Index for Specialists' Evaluation of Designs in Terms of Achieving the Functional Aspect

Designs	Mean	Standard Deviation	Quality Index	Design Ranking
First Design	2.35	0.729	78.33	7
Second Design	2.43	0.707	81.00	5
Third Design	2.65	0.441	88.33	2
Fourth Design	2.12	0.749	70.67	8
Fifth Design	2.49	0.597	83.00	4
Sixth Design	2.42	0.695	80.67	6

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

Designs	Mean	Standard Deviation	Quality Index	Design Ranking
Seventh Design	2.53	0.608	84.33	3
Eighth Design	2.69	0.464	89.67	1
Ninth Design	2.65	0.594	88.33	2
Tenth Design	2.35	0.798	78.33	7

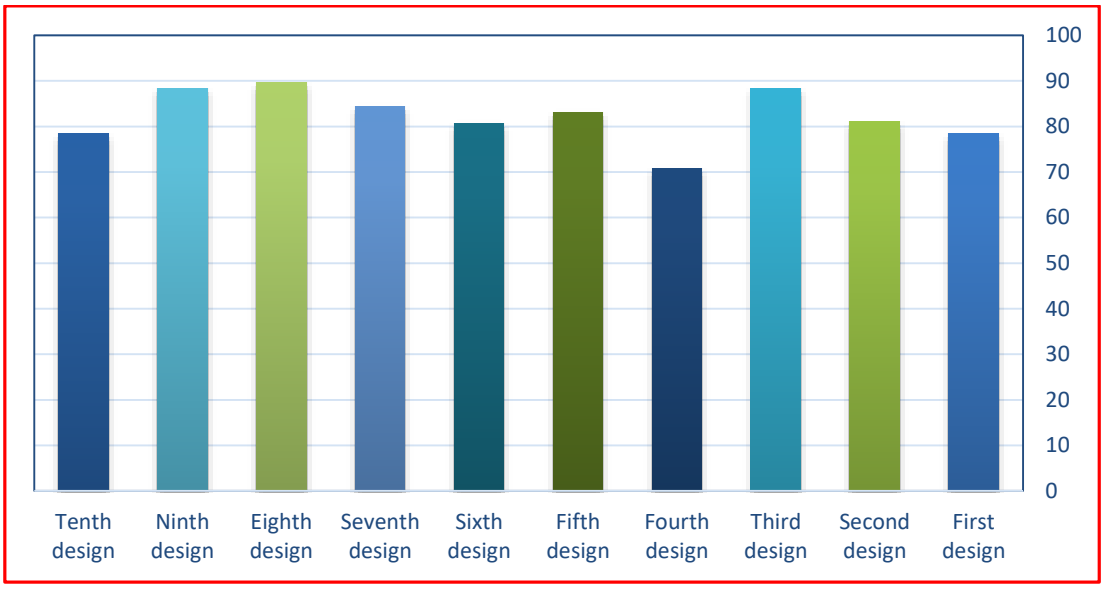

Figure (2) Quality Index for Specialists' Evaluation of Designs in Terms of Achieving the Functional Aspect

From Table (11) and Figure (2), it is evident that:

The designs can be ranked according to the quality index based on specialists' opinions regarding their achievement of the functional aspect. The quality index ranged from 70.67 to 89.67. The best design in achieving the functional aspect was Design 8, which, according to the researchers, effectively conveyed cultural messages and expressed identity through the use of appropriate symbols and colors for the target audience. Additionally, the design had a strong visual impact, making it effective in attracting attention and leaving a lasting impression.

The results also indicated that Design 4 was the least effective in achieving the functional aspect. The researchers attribute this to a lack of clarity in conveying the message, as well as issues with contrast, proportion, and visual hierarchy, which are crucial for directing user attention and enhancing interaction.

Third Hypothesis

The third hypothesis states:

"There are statistically significant differences between the mean scores of specialists' evaluations of the designs in terms of achieving the innovative aspect."

To verify this hypothesis, specialists' evaluations of the designs were assessed, and an analysis of variance (ANOVA) test was conducted for the innovative aspect, as shown in the following table:

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

Table (12). Presents The Experts' Evaluations of the Designs in Terms of Achieving the Innovative Aspect.

Designs	Evaluation Phrases					
	(1)	(2)	(3)	(4)	(5)	(6)
First Design	22.00	22.00	23.00	24.00	24.00	22.00
Second Design	24.00	25.00	24.00	23.00	25.00	25.00
Third Design	28.00	27.00	28.00	27.00	27.00	26.00
Fourth Design	22.00	23.00	24.00	21.00	23.00	25.00
Fifth Design	24.00	26.00	24.00	25.00	26.00	26.00
Sixth Design	25.00	23.00	25.00	23.00	24.00	24.00
Seventh Design	25.00	25.00	28.00	27.00	26.00	24.00
Eighth Design	26.00	28.00	26.00	27.00	26.00	25.00
Ninth Design	26.00	26.00	27.00	28.00	26.00	27.00
Tenth Design	25.00	25.00	23.00	25.00	24.00	26.00

Table 12 presents the responses of specialists for each statement related to the innovative aspect, highlighting variations in their evaluations across different designs. The response range for each statement varied as follows: Statement 1 (22–28), Statement 2 (22–28), Statement 3 (23–28), Statement 4 (21–28), Statement 5 (23–27), and Statement 6 (22–27). The arithmetic mean, standard deviation, and T-test were calculated for both individual statements and the overall innovative aspect, as shown in Table 13. The results indicate that all statements related to the innovative aspect are statistically significant, with a significance value of less than 5% for all statements, confirming that all designs successfully meet the innovative aspect.

Table (13). Arithmetic Mean, Standard Deviation, and T-Test for Statements and the Overall Innovative Aspect

No.	Statements	Arithmetic Mean	Standard Deviation	T-Value	Significance
1	The design features a creative artistic style that blends modernity and heritage, giving it a unique character that distinguishes it from traditional designs.	2.47	0.784	5.99	0.000
2	Innovation is evident in the way different elements are integrated with the main character, creating a harmonious composition with cultural and artistic dimensions.	2.50	0.718	6.97	0.000
3	The use of bright and contrasting colors in an unconventional manner adds a lively touch, enhancing the innovative aspect of the design.	2.52	0.745	6.98	0.000
4	The design combines digital techniques with illustrations, reflecting a modern artistic vision with elements of classical art.	2.50	0.758	6.58	0.000
5	The selection of symbols is not solely based on aesthetics but also carries cultural and temporal significance, reinforcing innovation in conveying meanings.	2.51	0.732	6.97	0.000
6	The design presents a non-traditional interpretation of a well-	2.50	0.732	6.84	0.000

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

No.	Statements	Arithmetic Mean	Standard Deviation	T-Value	Significance
	known character or cultural theme, deviating from conventional templates and achieving a creative touch.				
Innovative Aspect	2.49	0.624	7.56	0.000	

An analysis of variance (ANOVA) was conducted to evaluate specialists' assessments of the designs in terms of achieving the innovative aspect, as shown in Table (14).

Table (14). Analysis of Variance (ANOVA) for the Mean Evaluations of Specialists in Clothing and Textile Design for the Proposed Designs in Terms of Achieving the Innovative Aspect

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Squares	F-Value	Significance
Between Groups	2.019	9	0.224	0.490	0.878
Within Groups	41.183	90	0.458		
Total Variance	43.201	99			

The results of the analysis of variance (ANOVA) for the design groups in Table (14) indicate that the F-value was 0.490, which is not statistically significant, as the significance value was 0.878, greater than 0.05. This suggests that there are no significant differences in the specialists' evaluations regarding the achievement of the innovative aspect in the proposed designs.

Furthermore, the results indicate no statistically significant differences among the specialists' mean evaluation scores in assessing the designs' innovative aspect. This is evidenced by the absence of statistically significant differences at the 0.05 level in the specialists' assessments of the designs in terms of achieving innovation.

As a result, the third hypothesis, which states that "There are statistically significant differences between the mean evaluation scores of specialists regarding the achievement of the innovative aspect in the designs," cannot be accepted.

Table (15) and Figure (3) demonstrate that there are differences in the specialists' evaluations of the designs in achieving the innovative aspect. These differences were observed in quality coefficient, means, and standard deviations. The third design was found to be the most effective in achieving the innovative aspect. The researchers attribute this to its unique concept that captures attention and conveys a clear message aligned with the character of the work, in addition to the optimal use of elements and symbolic motifs that create a distinctive and emotionally impactful effect.

The results also showed that the first design was the least effective in achieving the innovative aspect. The researchers attribute this to a lack of clarity in conveying the message, as well as issues with contrast, proportion, and visual hierarchy, which are crucial for directing user attention and enhancing interaction the need for reinterpreting the idea from new perspectives, dynamically distributing elements..

Table (15). Means and Quality Coefficient for Specialists' Evaluations of Designs in Terms of Achieving the Innovative Aspect

Design	Mean	Standard Deviation	Quality Coefficient	Design Ranking
First Design	2.28	0.842	76.00	10
Second Design	2.43	0.753	81.00	7
Third Design	2.72	0.343	90.67	1
Fourth Design	2.30	0.697	76.67	9

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

Fifth Design	2.52	0.681	84.00	5
Sixth Design	2.40	0.824	80.00	8
Seventh Design	2.58	0.609	86.00	4
Eighth Design	2.63	0.622	87.67	3
Ninth Design	2.66	0.539	88.67	2
Tenth Design	2.47	0.706	82.33	6

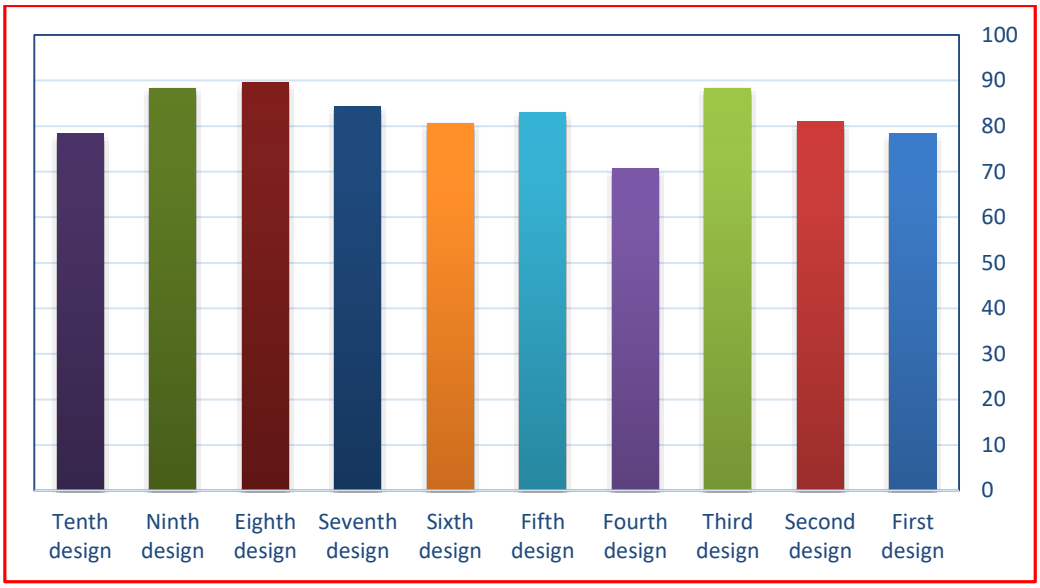

Figure (3). Quality Coefficient for Specialists' Evaluations of Designs in Terms of Achieving the Innovative Aspect.

Hypothesis Four

The fourth hypothesis states that "There are statistically significant differences between the mean scores of specialists' evaluations of the designs in terms of achieving the evaluation aspects as a whole."

To verify this hypothesis, an analysis of variance (ANOVA) was conducted on the specialists' evaluations of the designs regarding their achievement of the evaluation aspects as a whole. Table (16) presents the results:

Table (16). Analysis of Variance for Specialists' Evaluations of Designs in Terms of Achieving the Evaluation Aspects as a Whole

Source of Variance	Sum of Squares	Degrees of Freedom	Mean Squares	F-Value	Significance
Between Groups	2.686	9	0.298	0.749	0.663
Within Groups	35.868	90	0.399		
Total Variance	38.555	99			

The results of the variance analysis presented in Table (16) indicate that the F-value was 0.749, which is not statistically significant since the p-value was 0.663, exceeding the 0.05 threshold. This suggests no significant differences in the specialists' evaluations of the designs concerning the evaluation aspects as a whole.

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

The findings further confirm that there are no statistically significant differences between the mean evaluation scores of the specialists regarding the achievement of the evaluation aspects as a whole. This conclusion is based on the lack of statistically significant differences at the 0.05 level among the specialists' evaluations of the designs in terms of achieving the evaluation aspects as a whole.

As a result, the fourth hypothesis—stating that "There are statistically significant differences between the mean scores of specialists' evaluations of the designs in terms of achieving the evaluation aspects as a whole"—cannot be accepted. The researcher attributes this to the fact that the designs did not exhibit substantial differences based on the evaluation criteria used.

Table (17) presents the means, standard deviations, and quality index of the proposed designs in achieving the overall evaluation aspects.

From Table (17) and Figure (4), it is evident that:

The designs can be ranked based on the quality index according to experts' opinions regarding their achievement of the overall evaluation aspects. The quality index ranged from 74.33 to 90.00. The best designs in achieving the overall evaluation aspects were Design 3 and Design 8. The researcher attributes this to the designs being based on a unique idea that conveys a clear message aligned with the nature of the work. Additionally, the optimal use of cultural elements, balance, proportion, and contrast between components contributed to a distinctive character with emotional impact. These designs are visually appealing, have a strong visual effect, and effectively attract attention while creating a lasting impression.

The results also indicate that Design 4 was the least effective in achieving the overall evaluation aspects. The researcher attributes this to the need for reformulating the concept with a clearer definition of the objective and message. Emphasis should be placed on clarity, ease of understanding, and the effective and harmonious use of design elements. Additionally, adherence to fundamental design principles should be reinforced.

Table (17) presents the means and quality index of experts' evaluations of the designs in terms of achieving the overall evaluation aspects.

Table (17). Means, Standard Deviations, and Quality Index of Experts' Evaluations of the Designs in Terms of Achieving Overall Evaluation Aspects

Design	Mean	Standard Deviation	Quality Index	Design Rank
First Design	2.29	0.767	76.33	8
Second Design	2.44	0.666	81.33	5
Third Design	2.70	0.373	90.00	1
Fourth Design	2.23	0.655	74.33	9
Fifth Design	2.51	0.618	83.67	4
Sixth Design	2.35	0.706	78.33	7
Seventh Design	2.58	0.605	86.00	3
Eighth Design	2.70	0.474	90.00	1
Ninth Design	2.67	0.584	89.00	2
Tenth Design	2.37	0.756	79.00	6

This table highlights the rankings of the proposed designs based on experts' evaluations regarding their achievement of overall evaluation aspects. Designs 3 and 8 ranked highest with a quality index of 90.00, while Design 4 received the lowest evaluation with a quality index of 74.33.

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

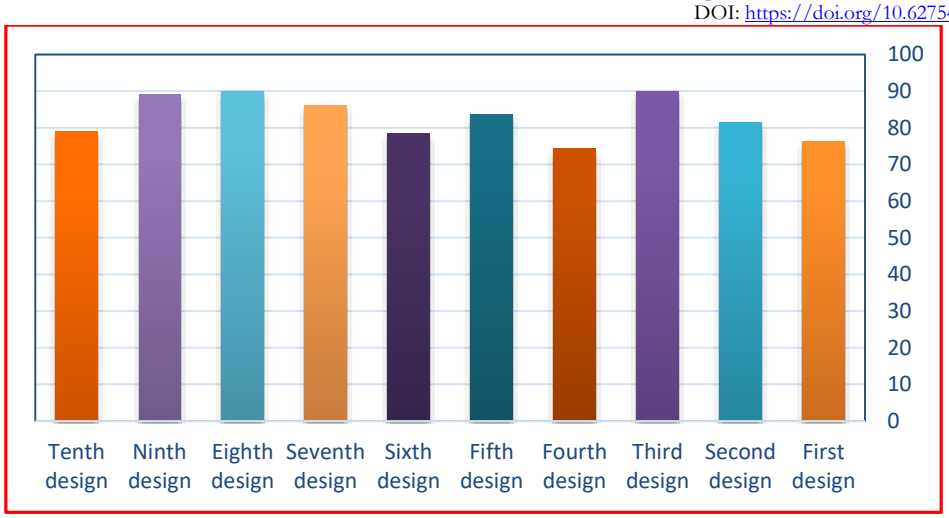

Figure (4). Quality Factor for Evaluating the Average Ratings of Experts on Designs in Terms of Achieving Overall Evaluation Aspects.

Evaluation Axes

An analysis of variance (ANOVA) was conducted for the evaluation axes of the experts' assessments of the proposed designs. Table (18) presents the results:

Table (18). Analysis of Variance for the Average Scores of Experts' Evaluations of the Proposed Designs

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F Value	Significance
Between Groups	0.0515	2	0.025	0.060	0.941
Within Groups	123.64	297	0.416		
Total Variance	123.694	299			

The results in Table (18) indicate that the F-value (0.060) is not statistically significant, suggesting that there are no significant differences among the evaluation axes assessed by the experts for the proposed designs.

Table (19) presents the means, standard deviations, and quality factors for the evaluation axes of the experts' assessments of the designs.

Table (19). Means and Quality Factors for the Evaluation Axes of Experts' Assessments of the Designs

Evaluation Axis	Mean	Standard Deviation	Quality Factor	Rank
Aesthetic Aspect	2.48	0.634	82.72	2
Functional Aspect	2.47	0.641	82.28	3
Innovative Aspect	2.50	0.661	83.33	1

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

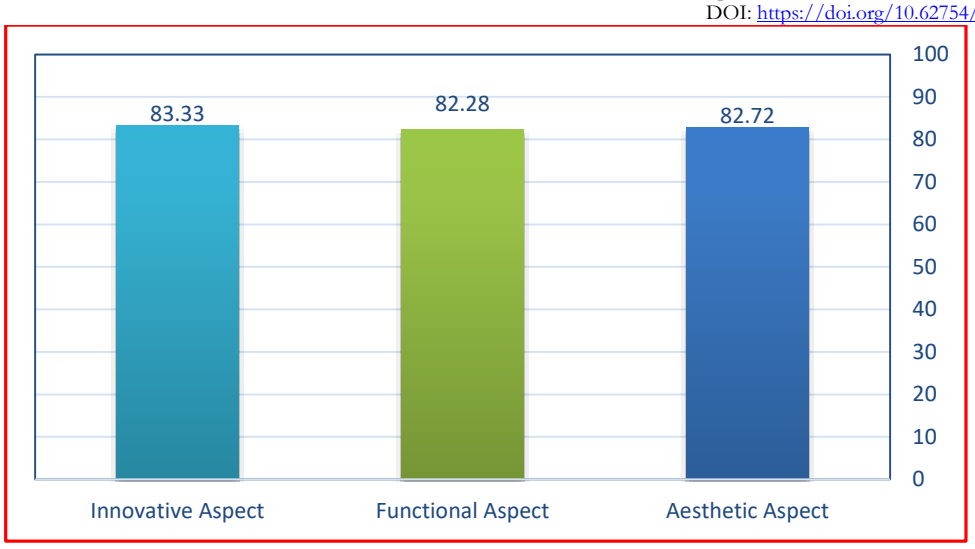

Figure (5). Quality Factor for the Experts' Evaluation Axes of the Designs.

From Table (18) and Figure (5), it is evident that the ranking of the evaluation axes for the experts' assessments of the proposed designs is as follows: the innovative aspect ranks first, followed by the aesthetic aspect, and finally the functional aspect.

Summary of Results

The first hypothesis tested whether there were significant differences in specialists' evaluations of the aesthetic aspect of the designs. The ANOVA results showed no statistically significant differences ($p = 0.360$), leading to the rejection of the hypothesis. This suggests that the designs had similar aesthetic qualities, and variations in specialists' personal preferences may have influenced the results.

The quality index rankings highlighted Design Eight as the most aesthetically successful due to its balanced composition and effective use of elements, while Design Six ranked lowest due to its unbalanced structure and weak visual impact.

The second hypothesis tested whether there were statistically significant differences in specialists' evaluations of the functional aspect of the designs. ANOVA results showed no significant differences ($p = 0.672$), leading to the rejection of the hypothesis. This suggests that all designs effectively met their functional objectives, making variations in evaluations statistically insignificant.

The quality index rankings identified Design Eight as the most functionally successful due to its strong cultural messaging, use of appropriate symbols, and visual impact. In contrast, Design Four ranked lowest, likely due to unclear messaging, poor contrast, and weak visual hierarchy.

The third hypothesis tested whether there were statistically significant differences in specialists' evaluations of the designs regarding their innovative aspects. ANOVA was conducted on the evaluations, but the results showed no significant differences ($F = 0.490$, $p = 0.878$). This means the hypothesis was not supported.

Despite the lack of statistical significance, differences in mean scores and quality coefficients suggested that some designs were perceived as more innovative than others. The third design ranked highest (mean = 2.72, quality coefficient = 90.67) due to its unique concept, effective symbolism, and strong emotional impact. Conversely, the first design ranked lowest (mean = 2.28, quality coefficient = 76.00), with recommendations for reinterpreting its concept, adjusting element distribution, and using bolder colors for greater visual appeal.

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

The fourth hypothesis proposed that there are statistically significant differences between specialists' evaluations of the designs in terms of achieving the evaluation aspects as a whole. However, an ANOVA test revealed that the F-value (0.749) was not statistically significant ($p = 0.663 > 0.05$), indicating no significant differences in specialists' evaluations. Consequently, the hypothesis was rejected, suggesting that the designs did not exhibit substantial differences based on evaluation criteria.

Experts' rankings of the designs based on a quality index ranged from 74.33 to 90.00. Designs 3 and 8 received the highest scores (90.00), attributed to their unique concepts, effective use of cultural elements, and strong visual impact. Design 4 ranked lowest (74.33) due to a lack of clarity in its concept and weaker adherence to design principles.

Further analysis of the evaluation axes showed no significant differences (F-value = 0.060, $p = 0.941$). The ranking of evaluation aspects placed the innovative aspect first (83.33), followed by the aesthetic aspect (82.72), and the functional aspect (82.28).

Discussions

The findings suggest that graphic design serves as a powerful medium for reinforcing cultural identity and historical significance. Each artwork in the series highlights Saudi musical figures through a combination of traditional elements and symbolic motifs. The depiction of singers in their national attire, such as the ghutra and agal, establishes a direct link to Saudi identity. Additionally, the inclusion of instruments like the oud, along with Islamic calligraphy and decorative patterns, reflects the deep-rooted artistic heritage of the region. These visual elements emphasize the musicians' contributions to Saudi music and their role in shaping the country's artistic legacy.

Symbolism plays a crucial role in these artworks, as each composition uses metaphorical imagery to communicate deeper meanings. The oud, often associated with mastery and tradition, appears in multiple pieces to highlight the musicians' skill and their dedication to preserving Arabic music. Abadi Al-Johar's portrait, featuring an octopus, creatively symbolizes his dexterity and expertise in playing the oud. The presence of stars across various artworks signifies inspiration and artistic excellence, reinforcing the idea that these musicians are cultural icons. Furthermore, Rashed Al-Majed's representation on a flying carpet connects to his reputation as "The Sindbad of Arabic Song," illustrating his musical journey and influence beyond national borders.

Beyond symbolism, the artworks evoke a sense of nostalgia and emotional connection. Mohammed Abdu's portrait, incorporating a cassette player and radio, serves as a reminder of the golden era of Arabic music, reinforcing the deep bond between music and memory. These elements highlight the role of music in personal and collective experiences, validating the hypothesis that visual representation can preserve cultural continuity and evoke sentimentality.

Regional influences are also evident in the personalization of each musician's artwork. Abdul Majeed Abdullah's portrait integrates Jazan's jasmine flowers, paying tribute to his hometown and demonstrating how an artist's regional background shapes their identity. This personalization strengthens the link between the musician and their cultural roots, further affirming the hypothesis that visual art reflects and preserves local heritage.

In conclusion, the findings support the hypothesis by demonstrating how graphic design reinforces cultural heritage, personal identity, and artistic legacy. Through traditional symbols, metaphorical imagery, and regional influences, these artworks celebrate Saudi musical heritage while ensuring that the legacies of these artists endure for future generations.

The study played a vital role in documenting the traditional fashions of various regions of the Kingdom of Saudi Arabia and reinterpreting them in a contemporary manner. By preserving the unique heritage of each region while incorporating modern design elements, this research ensured that these traditional garments remained relevant and accessible to future generations.

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

The artwork embodied the character of the Najdi woman, highlighting her distinctive features, generosity, hospitality, and significant role in society. She was dressed in traditional Najdi attire, known as Al-Nashl, which consisted of a long, loose-fitting Dara'a and a Muqna'a that covered either the head only or part of the face. The outfit was often adorned with intricate hand embroidery or golden threads, reflecting the elegance and cultural depth of the region (Aldabbagh, 2024).

The study also showcased the traditional attire of the southern woman, who wore the "thobe al-mujannab," a decorated dress featuring warm colors like red and orange. This ensemble was complemented by the "sheila al-mrayasha" or the "yellow scarf" wrapped around the head, along with basil (rayhan) adorning her hair. The fragrance of basil symbolized one of the region's most significant agricultural products, which women historically used for adornment.

In Hijaz, the traditional attire of women exuded beauty and elegance, particularly on special occasions. The study documented the exquisite dress called "Al-Dair wal-Manthour," adorned with intricate finishing touches such as "Al-Muharramah" and "Al-Madawarah." Additionally, the Hijazi woman was known for wearing "Al-Sidrah," topped with "Al-Musa'afah," a traditional ensemble that embodied her deep pride in heritage and authenticity (Alzanbgi & Abass, 2018).

Furthermore, the research highlighted the traditional clothing of women from Taif, particularly those from the Thaqeef tribe. Their attire consisted of the "Milayah" or "Burqa," which covered the head, paired with a long dress adorned with beads or intricate hand embroidery. Distinguished by light colors such as white and beige, this delicate and elegant ensemble reflected the region's unique cultural aesthetics.

Through the documentation and reinterpretation of these garments, the study not only preserved the cultural heritage of Saudi Arabia but also provided a foundation for designers to integrate traditional elements into contemporary fashion. This approach ensured that regional identities remained celebrated while allowing for innovation and modern expression in the evolving world of fashion.

Conclusions

The study confirms that graphic design serves as a compelling medium for preserving and reinforcing cultural identity, particularly in the context of Saudi musical heritage. The integration of traditional attire, iconic musical instruments, and symbolic motifs underscores the deep connection between visual representation and national identity. Each artwork highlights the contributions of renowned Saudi musicians, not only celebrating their individual legacies but also situating them within the broader artistic and historical narrative of the region.

Symbolism emerges as a key artistic strategy, with elements such as the oud representing musical mastery, while metaphors like the octopus and the flying carpet convey skill and influence. These symbolic choices reinforce the musicians' roles as cultural icons, bridging the past with contemporary artistic interpretation. Additionally, the emotional resonance of these artworks, through nostalgic references such as cassette players and radios, further illustrates how visual art preserves collective memory and fosters cultural continuity.

Moreover, the study highlights the significance of regional influences in shaping artistic identity. By incorporating elements specific to each musician's background—such as Abdul Majeed Abdullah's connection to Jazan's jasmine flowers—the artworks personalize their cultural narratives while strengthening ties to Saudi heritage.

Overall, the findings support the hypothesis that graphic design is a vital tool for documenting and celebrating cultural heritage. Through traditional symbols, metaphorical representation, and regional influences, these artworks ensure that the legacy of Saudi musicians endures, fostering a lasting appreciation for the nation's artistic history.

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

The documentation of women's clothing in Saudi Arabia is essential for preserving the cultural heritage of each region, as traditional attire serves as a reflection of history, identity, customs, and traditions. Every region in the Kingdom has distinct garments influenced by its environment, historical interactions, and social practices. For instance, the Najd region is known for its elegantly embroidered dresses and modest coverings, while the Hijaz region features richly decorated garments made from luxurious fabrics. In the southern Asir region, vibrant colors and intricate geometric patterns characterize women's attire, reflecting the area's artistic heritage. Similarly, the Eastern Province incorporates influences from Gulf traditions, resulting in unique embroidery and fabric choices. By documenting these traditional garments, their cultural significance can be preserved for future generations, ensuring that Saudi Arabia's diverse regional identities remain recognized and appreciated.

Recommendations

Based on the findings of this study, the following recommendations are proposed:

- Encourage the incorporation of graphic design in national heritage projects to document Saudi culture identity.
- Develop collaborations between artists, historians, and cultural institutions to create exhibitions that showcase the connection between Saudi culture and graphic design.
- Introduce art-based educational programs that emphasize the role of visual symbolism in preserving cultural identity.
- Organize workshops and lectures for students, artists, and researchers to explore the historical significance of Saudi culture identity and its representation in visual arts.
- Develop digital archives that document visual artworks related to Saudi culture identity, making them accessible to researchers, educators, and the public.
- Explore the use of virtual reality (VR) and augmented reality (AR) to create immersive experiences that showcase the Saudi culture identity.
- Conduct further studies on the impact of graphic design on public perception of Saudi culture identity.

Conflicts of Interest Statement

There are no conflicts of interest declared by the author for the publication of this paper

References

Action Symbolism. (2023, September 2). Star Symbolism: Understanding the meanings behind the stars. Symbolism Guide. https://symbolismguide.com/star-symbolism/

Adam, K., Al-Maadeed, S., & Bouridane, A. (2017). Letter-based classification of Arabic scripts style in ancient Arabic manuscripts: Preliminary results. International Workshop on Arabic Script Analysis and Recognition (ASAR), 95–98. https://doi.org/10.1109/asar.2017.8067767

Al-Azzam, B., Al-Ahaydib, M., & Shalaby, M. (2014). The Socio-Cultural, Historical, and Political Allusions in the Translation of the Saudi National Day Poetry:" Peace, O Gracious King" as a Case Study. Studies in Literature and Language, 9(3), 30

Aldabbagh, M. B. A. (2024). The Influence of Media on the Trend of Saudi Women towards Purchasing Traditional Clothing. International Journal of Academic Research in Business and Social Sciences, 14(6). https://doi.org/10.6007/ijarbss/v14-i6/21754

Journal of Ecohumanism
2025
Volume: 4, No: 2, pp. 2552 – 2578
ISSN: 2752-6798 (Print) | ISSN 2752-6801 (Online)
https://ecohumanism.co.uk/joe/ecohumanism
DOI: https://doi.org/10.62754/joe.v4i2.6667

Almejmaj, M., Meacham, B., & Skorinko, J. (2014). The effects of cultural differences between the west and Saudi Arabia on emergency evacuation—clothing effects on walking speed. Fire and Materials, 39(4), 353–370. https://doi.org/10.1002/fam.2227

Alzanbgi, F., & Da&#;Abass, R. (2018). The design of ready made patterns for the production of conventional clothing in the holy Mecca region. تصميم الأزياء الجاهزة للمنتج التقليدي لمنطقة مكة المكرمة, 8(2), 163–175. https://doi.org/10.21608/idj.2018.85962

Ambrose, G. (2015). Basics Graphic Design 02: Layout. Bloomsbury Publishing.

Ambrose, G., Harris, P., & Ball, N. (2019). The fundamentals of graphic design. Bloomsbury Publishing.

Anholt, S. (2007). Competitive Identity: The New Brand Management for Nations, Cities and Regions. Palgrave Macmillan.

Barnard, M. (2013). Graphic Design as Communication. Routledge.

Barnhart, B. (2021). "Maximalism in Design: Why More is More." Creative Bloq.

Benzakein, E. (2017). Floret Farm's cut flower garden: Grow, Harvest, and Arrange Stunning Seasonal Blooms. Chronicle Books.

Clevenot, D. (2000). Ornament and decoration in Islamic architecture. http://ci.nii.ac.jp/ncid/BA52127143

Dabner, D., Stewart, S., & Vickress, A. (2017). Graphic design school: The principles and practice of graphic design. John Wiley & Sons, pp 20

Dinnie, K. (2016). Nation Branding: Concepts, Issues, Practice. Routledge.

Djuraeva, L. (2017). Portrayal of "Oud" Musical Instrument in Creative Work of Alisher Navoi. Journal of Literature and Art Studies, 7(1), 83-86.

Ekhtiar, M., & Moore, C. (Eds.). (2012). Art of the Islamic world: A resource for educators. Metropolitan Museum of Art.

Fabian, D. (2017). Performing music: written traditions. In The Routledge Companion to Music Cognition (pp. 277-288d). Routledge.

Johnson, E. M., Jacobs, L. B. 1., & Turner, J. J. (2021). Magic carpet. Hassell Street Press.

Karolak, M. (2020). Music for Thought: Examining Saudi identities expressed through music on social media. In Contemporary Gulf studies (pp. 159–178). https://doi.org/10.1007/978-981-15-1529-3_9

Kavaratzis, M., & Hatch, M. J. (2013). The dynamics of place brands: An identity-based approach to place branding theory. Marketing theory, 13(1), 69-86.

Holtzschue, L. (2012). Understanding color: an introduction for designers. John Wiley & Sons. pp.65

Lupton, E., & Phillips, J. (2015). Graphic Design: The New Basics. Princeton Architectural Press.

Mara, I. M., & Ioana, I. M. (2019). "… the price we pay for peace": Luba Lukova's Poster Art. Cultural Intertexts, 113.

Morgan, N., Pritchard, A., & Pride, R. (2011). Destination brands: Managing place reputation. Routledge. pp.30-33.

Opara, E., & Cantwell, J. (2014). Best Practices for Graphic Designers, Color Works: Right Ways of Applying Color in Branding, Wayfinding, Information Design, Digital Environments and Pretty Much Everywhere Else. Rockport publishers.

Olins, W. (2004). Branding the Nation: The Historical Context. Thames & Hudson.

Racy, A. J. (2000). The many faces of improvisation: the Arab taqāsīm as a musical symbol. Ethnomusicology, 44(2), 302. https://doi.org/10.2307/852534

Mollica, P., (2018), Special Subjects: Basic Color Theory: An introduction to color for beginning artists, Walter Foster Publishing, pp.94

Rivera, E. M. (n.d.). Microphone Spiritual Meaning (Spirit's Audio bridge) - Spiritual mojo. Spiritual Mojo. https://spiritualmojo.com/microphone-spiritual-meaning/

Shiningsikh. (2024, December 7). Sacred Turbans: the heart of sikh identity. UAE Times Now. https://shiningsikh.com/sacred-turbans-the-heart-of-sikh-identity/

Spillers, H. J. (2003). Black, White, and In Color: Essays on American literature and culture. http://ci.nii.ac.jp/ncid/BA62107801

Taha, Hassan. (2002). Modifiability as an artistic feature in Arabic calligraphy and as an entry point for enriching decorative designs. Master's thesis, Faculty of Art Education, Helwan University, Cairo.

Urkevich, L. (2014). Arts: Folk dancers and folk singers: Gulf and Saudi Arabia [Dataset]. https://doi.org/10.1163/1872-5309_ewic_ewiccom_0291e

Urkevich, L. (2015) Music and traditions of the Arabian Peninsula: Saudi Arabia, Kuwait, Bahrain, and Qatar. New York: Routledge.

Yang, S. M. (2021). Modern digital radio communication signals and systems. Springer Nature.