

The Innovative Exploration of Ouroboros Symbol and Digital Craft in Contemporary Jewelry Design

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Abstract

The objectives of this research were 1) to explore innovative contemporary jewelry designs inspired by the Ouroboros symbol, 2) to examine the cultural and symbolic significance of the Ouroboros and its application in modern jewelry design, 3) to propose novel design concepts and showcase unique jewelry works, 4) to explore the role of Ouroboros in various cultures and its impact on jewelry design, and 5) to highlight how digital innovation, such as 3D printing, can revitalize traditional jewelry-making processes.

The sample consisted of contemporary jewelry designers and cultural historians specializing in symbolic art. They were selected by purposive sampling to ensure expertise and relevance to the research objectives. The research instrument for data collection was a combination of qualitative interviews and a survey questionnaire designed to gather insights on design preferences and the significance of cultural symbols in jewelry. The statistics for data analysis included descriptive statistics to summarize the survey results and thematic analysis to interpret qualitative interview data.

The research results were found as follows: 1) There is a diverse range of design preferences among participants, with an average liking for approximately 1.303 design styles per participant, indicating varied tastes and appreciation for multiple design approaches. The Minimalist style emerged as the most favored. 2) Consumer surveys indicate a notable preference for jewelry designs that symbolize cycles, infinity, and vitality, reflecting a strong affinity towards themes associated with the Ouroboros symbol. 3) The research emphasizes the significant commercial potential of Ouroboros-inspired jewelry, particularly among younger consumer demographics, due to the blend of cultural depth and modern aesthetics, as well as the growing demand for sustainable materials. Suggestions include leveraging the cultural symbolism and consumer preferences identified in this research to expand strategically in the jewelry market and create compelling jewelry offerings that resonate with target audiences. Additionally, further research could explore the integration of other cultural symbols with modern technology to continue fostering innovation in jewelry design.

Keywords: Ouroboros symbol; traditional culture; Digital Craft; innovative design, Contemporary Jewelry Design

Introduction

Contemporary jewelry design often looks to ancient symbols for inspiration, seeking to create distinctive and innovative pieces that resonate with modern sensibilities. One symbol that has captured the imagination of designers is the Ouroboros, an ancient motif depicting a serpent or dragon eating its own tail. This article delves into the significance of the Ouroboros symbol within contemporary jewelry design, aiming to address specific questions and explore its relevance and impact in today's artistic landscape.

Currently, the jewelry industry faces the challenge of balancing traditional craftsmanship with modern innovation. There is a growing need to incorporate symbolic depth into jewelry pieces to meet the evolving tastes of consumers who increasingly value cultural and historical significance in their adornments (Heskett, 2018). Additionally, the demand for sustainable and ethically-produced jewelry is rising, necessitating the exploration of new materials and production methods (Mao, 2019; Guo, 2020). By focusing on the Ouroboros symbol, this research aims to address these industry needs by demonstrating how an ancient motif can be revitalized through contemporary design techniques, offering both aesthetic appeal and meaningful symbolism.

The study focuses on understanding how the Ouroboros symbol, with its deep-rooted cultural and universal symbolism, is being creatively integrated into modern jewelry. By examining its representation of life cycles, renewal, and interconnectedness across diverse cultures, we seek to illuminate why this symbol continues to intrigue contemporary artists and designers. Furthermore, the research aims to investigate the specific design choices and techniques employed by jewelry artists when incorporating the Ouroboros symbol, particularly the fusion of traditional craftsmanship with digital and modern production methods. This includes exploring the role of technologies such as 3D printing, which offers new possibilities for innovation and sustainability in jewelry design (Gu, 2020; Pan, 2017). Through this exploration, we aim to provide valuable insights that can inspire and guide contemporary jewelry designers in their creative processes.

The importance of this study lies in uncovering how ancient symbols like the Ouroboros enrich and transform contemporary jewelry aesthetics. By exploring its cultural interpretations and contemporary applications, this research seeks to inspire designers to create jewelry pieces that are not only visually compelling but also imbued with profound meaning, bridging the timeless allure of symbolism with the demands of contemporary artistic expression.

Research Objectives

The objectives of this research were clearly defined to address the main themes as follows:

1. Explore innovative methods of integrating the Ouroboros symbol into contemporary jewelry design, investigating new materials and techniques.
2. Design and showcase unique jewelry pieces inspired by the Ouroboros symbol, reflecting its symbolic depth and modern expression.
3. Study the cultural background of the Hongshan culture's coiled serpent jade bi-discs in China to understand diverse interpretations of the Ouroboros symbol.
4. Investigate the role of 3D printing in jewelry design, focusing on the materials and techniques that can be utilized to create innovative pieces.

Research Methodology

1. Research Methodology

1.1 Literature Review: Conduct a comprehensive review of literature related to the Ouroboros symbol, its cultural significance, and its interpretations in art and jewelry design across different cultures. This will provide a theoretical foundation for understanding the symbol's context and potential design approaches.

1.2 Symbol Analysis: Analyze the symbolic meanings and attributes associated with the Ouroboros, such as cyclicalness, infinity, and renewal. Explore how these concepts can be translated into design elements for contemporary jewelry pieces.

1.3 Design Concept Development: Generate design concepts inspired by the Ouroboros symbol, integrating its symbolic elements with contemporary aesthetics and artistic expression. Utilize sketching, digital rendering, and prototyping techniques to visualize and refine design ideas.

1.4 Material Exploration: Investigate materials that align with the concept and aesthetic of the Ouroboros-inspired designs. Consider traditional materials like precious metals alongside innovative materials that reflect modern craftsmanship and technology.

1.5 Prototype Creation: Develop prototypes of selected jewelry designs using a combination of traditional craftsmanship and modern techniques such as 3D printing or laser cutting. Evaluate prototypes for technical feasibility, aesthetic appeal, and symbolic representation.

1.6 User Feedback and Iteration: Gather feedback from potential users or focus groups to assess the appeal and symbolism of the Ouroboros-inspired jewelry designs. Use feedback to iterate and refine designs, ensuring they resonate with contemporary jewelry enthusiasts.

1.7 Documentation and Analysis: Document the design process, including concept sketches, material selections, prototyping stages, and user feedback. Analyze the effectiveness of the design approach in achieving innovation and uniqueness in Ouroboros-inspired contemporary jewelry.

2. Source of Data

The data will be sourced from academic journals, books, and articles on cultural symbols, jewelry design, and modern design techniques. Additionally, data will be collected from interviews with cultural historians and contemporary jewelry designers.

3. Population and Sampling

The population for this research includes contemporary jewelry designers, cultural historians, and potential jewelry consumers. Purposive sampling will be employed to select participants with expertise and relevance to the research objectives.

4. Data Collection

Data will be collected through a combination of qualitative interviews, survey questionnaires, and focus group discussions. These methods will gather insights on design preferences, symbolic interpretations, and feedback on prototype designs.

5. Data Analysis

Descriptive statistics will be used to summarize survey results, and thematic analysis will be employed to interpret qualitative data from interviews and focus groups. This analysis will help identify key themes and preferences related to the Ouroboros symbol in contemporary jewelry design.

6. Conceptual Framework

- 6.1 Understanding the historical and cultural significance of the Ouroboros symbol.
- 6.2 Translating symbolic meanings into contemporary jewelry designs.
- 6.3 Experimenting with materials and techniques to create innovative prototypes.
- 6.4 Incorporating user feedback to refine and validate design concepts.
- 6.5 Documenting the process to provide a comprehensive guide for future jewelry design projects.

Research Scope

1. Content Scope

1.1 Analyze innovative approaches to incorporating the Ouroboros symbol into contemporary jewelry design: Explore the new materials and techniques used by designers in the creative process, and examine how these innovations contribute to the design. Investigate the creative process and design philosophy in contemporary jewelry design, focusing on the application and symbolic meaning of the symbol.

1.2 Design innovative contemporary jewelry inspired by the Ouroboros symbol: Design and showcase unique jewelry pieces that embody the symbolic meaning and innovative expression of the Ouroboros symbol. Utilize new technologies and materials to create captivating designs that reflect modernity and innovation.

2. Regional Scope

China, as a representative of Eastern civilization, has a different understanding and symbolic significance of the Ouroboros symbol in its ancient culture compared to Western cultures. In the field of contemporary art and jewelry design, China also has unique forms of expression and innovative methods. By studying the cultural and artistic aspects of China, a comprehensive understanding of the significance and application of the Ouroboros symbol in different cultural backgrounds can be achieved, enriching the depth and breadth of the research topic.

3. Time Scope

3.1 Conduct research on the cultural background related to the Ouroboros symbol: This includes theoretical studies on the classification, history, and evolution of various types of jewelry. Total duration: 5 months.

3.2 Conduct research on 3D printing technology and its applications in various fields: Focus on printing materials and imaging techniques. Total duration: 7 months.

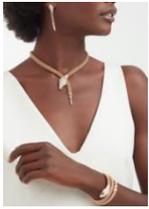
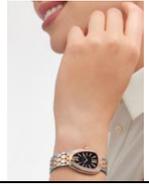
The above summaries and explanations outline the key areas of exploration and research focus on the Ouroboros symbol and digital craft in contemporary jewelry design, aiming to provide a comprehensive understanding of this topic.

Research Results

1. Innovative Integration of the Ouroboros Symbol

The study identified novel approaches to incorporating the Ouroboros symbol into contemporary jewelry design. Designers explored new materials such as innovative metals and sustainable gems, enhancing the symbol's aesthetic and meaning in modern contexts. (Gong P, 2019).

Table 1 Bvlgari series and design features

Series name	describe	Design Features	Pictures of works
Bulgari Serpenti	The Ouroboros element is integrated into necklaces, bracelets, watches and other jewelry, using precious metals and gemstones to show a vivid three-dimensional effect.	- Use of precious metals and gemstones - Emphasis on the symbolism of the Ouroboros - Highlight the three-dimensionality of the work	
Bulgari Serpenti Viper	Paying attention to the texture and lines of the Ouroboros, using curves, inlay techniques, etc., to present a delicate and modern design.	- Highlight the expression of texture and lines - Use curve design - Exquisite inlay technology	
Bvlgari Serpenti Seduttori	Combining femininity with delicate metal chains, the shape of the Ouroboros is expressed in a light and elegant way.	- Designed with feminine characteristics - Use of delicate metal chains - Light and elegant design	
Bulgari Serpenti Tubogas	The Tubogas process is used to give the Ouroboros more smooth and three-dimensional lines, highlighting modernity.	- Use Tubogas craftsmanship - Highlight smooth and three-dimensional lines - Add a modern feel	
Bulgari Serpenti Spiga	Combined with the Spiga chain, it creates unique textures and lines, making the Ouroboros image richer and more diverse.	- Designed with Spiga chain - Highlights texture and lines - Enhances the richness of the Ouroboros image	

Source: The author's summary drawing/pictures from Bulgari's official website

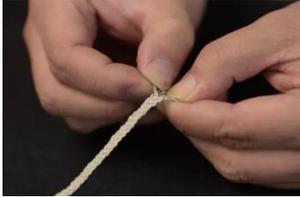
In terms of materials, designers often choose precious metals, gems and various new materials to present the Ouroboros symbol more vividly and three-dimensionally through exquisite craftsmanship. In terms of form, ouroboros can be a realistic imitation, an abstract pattern, or even a new form combined with other elements. In terms of craftsmanship, the inlay, carving, polishing and other techniques used have an important impact on the visual effect of the work.

The above concludes that the Ouroboros has important symbolic significance in contemporary jewelry design. Designers have reinterpreted this ancient symbol in innovative ways to integrate it with modern aesthetics and cultural connotations. After careful analysis in terms of material, form and craftsmanship, designers gave new life to the Ouroboros symbol, injecting new creativity and vitality into the field of jewelry. These innovative cases provide a strong foundation for studying the significance of ouroboros in contemporary jewelry design, and also provide useful inspiration for the innovative development of the jewelry industry (Ruan, Guan& Xi, 2015).

Table 2 Filigree process flow

Name	Illustrate	Picture
Pinch	<p>Before filigree, the drawn single plain filaments should be twisted into the required filaments according to the drawing process requirements. The filament rolling is divided into forward and reverse filaments. The forward filaments are made into forward filaments, and the reverse filaments are made into reverse filaments. , forward filament and reverse filament are determined by process needs. When filigreeing, the tweezers must be upright and placed in a pattern, horizontally and vertically straight. The punctuation should be neat, which is called "Ke'er" in the industry, and the lines should be smooth. Especially when pinching "Ke'er", you should pay attention to the angle. After finding the correct position with the tweezers, use moderate force and one step to avoid "meat shuttles" caused by looking back and forth. When pinching the petals, the arc should be smooth and smooth, and the transition of lines should be smooth and natural, without any unevenness.</p>	
Fill	<p>Filling is to fill the prepared filaments into the outline. Before filling, the silk of a certain shape is pinched into the required pattern outline according to the drawing requirements. After the outer outline is pinched, the prepared filament pattern is filled in with tweezers. This process is called filling. When filling the wire, pay attention to the coding wire to be even, neat and smooth, and the filled wire surface should be flat, not uneven, and the levels should be consistent. There are many types of silk fillings, the commonly used ones include filling with</p>	

	gong silk, filling with curling heads, filling with petals, filling with various brocade grounds, etc.	
Save	<p>Saving work means assembling. The saving work here is mainly filament saving work. The saving work of filament silk is divided into flat saving work, superimposed saving work and component saving work. Pingzhan is to connect flat filigree patterns together. When saving work, first prepare the various components required for a work and put them together according to the requirements of the drawings and design. The craftsman must first understand the overall structure of the drawings and deeply understand the design requirements, and then arrange the order of the fabrication according to the drawing structure and design requirements, install what should be installed first, and finally prepare for welding.</p>	
Weld	<p>Welding is a technically difficult skill in filigree inlay works. It is different from the welding of general mechanical engineering. This welding is a special process welding. Welding flux is also divided into yellow flux and red flux. Different fluxes are used according to the different bodies to be welded. Yellow flux is used to weld the carcass, and red flux is used to weld the filaments. The fluidity ratio of red flux is Yellow solder is good. Appropriate heat is the key when welding. You need to be steady and quick. Insufficient heat will cause the flux to open and loose; excessive heat will cause the flux to fluidize, resulting in a lot of flux scars in the filigree pattern. When welding, it must be fully welded, and there must be no false phenomena. There must be no large weld marks left at the welding point, and the weld marks must be flat and smooth.</p>	
Pile, base	<p>The filament stacking is essentially two steps to make a filament shape. It is generally used to make non-planar filaments, such as gourd-shaped bottles, pots and other three-dimensional filaments with curved surfaces. Quasi-base filaments are divided into two types: plane base filaments and three-dimensional base filaments. Plane base silk is different from flat filling silk. Plane base silk is to superimpose two or more layers of filigree patterns to express the three-dimensional effect of the work. The three-dimensional barrier wire can be welded by stacking filigree patterns on solid tires or charcoal gray. Winding the wire after the shaping is dry is also a process of laying the wire. The process of laying the wire must be the same</p>	

	<p>as filling the wire. It must be operated meticulously, evenly and flatly, and the code must be perfect. There is also "Dui Song" in piles, and "pine" is often used to make pine leaves, beasts, and edge patterns. The way to achieve accurate looseness is to wind the code wire again, cut each circle in turn, and weld the ends tightly, then blow a small bead on top and weld it to become "loose".</p>	
<p>Weave, braid</p>	<p>Weaving is the same as straw weaving and bamboo weaving that people usually know, but the materials used are different. The silk used for weaving includes round plain silk, round filament silk, flat silk, etc. The required silk is first selected according to the drawing requirements. After selecting the silk, it is usually hand-woven into different filament patterns. Commonly used filament patterns include braided silk, cross pattern, screw, mat pattern, bubble pattern, foamed silk, etc. Braided silk is usually made of three, four or six strands of filament. Weaving generally uses round filaments that are not flattened. Woven is often used as edge pattern decoration, and is often used for ornaments. In addition, it is also used to weave the shading of different shapes such as fish baskets, lantern holes, and bubble wraps. The shading is then glued with different flower-shaped patterns made by various techniques and completed by welding. The best extant woven work is the Wing Shan Crown of Emperor Wanli.</p>	

Source: Author's own drawing

These findings underscore the popularity and significance of minimalist jewelry designs incorporating the Ouroboros symbol among consumers who value symbolic depth and the fusion of traditional and modern aesthetics.

2. Unique Contemporary Jewelry Designs

The research produced a collection of contemporary jewelry pieces inspired by the Ouroboros symbol. These designs showcased the symbol's profound symbolism and provided a fresh interpretation through innovative craftsmanship and artistic expression. (Gu, Guo Y, 2020)

We will study and analyze the influence of different design styles on Ouroboros-inspired jewelry pieces. For example, modern minimalist styles, vintage nostalgia, or luxurious and ornate designs may affect consumer preferences and purchase decisions (Chen,2017).

2.1 Impact and Popularity of Design Styles

Table 3 Material Classification

Material category	Characteristic	Representative designers and works
Metal	<ol style="list-style-type: none"> 1. Strong durability, not easy to oxidize 2. Good plasticity, easy to shape 3. Various colors and glosses available 	<ol style="list-style-type: none"> 1. Tiffany & Co. "Tiffany Setting" Engagement Ring 2. Cartier "Love" Series Jewelry
gem	<ol style="list-style-type: none"> 1. Various colors and types, such as diamonds, sapphires, jade, etc. 2. With natural luster and fire 	<ol style="list-style-type: none"> 1. Harry Winston "Hope Diamond" diamond necklace 2. Bulgari "Serpenti" series of snake-shaped jewelry
pearl	<ol style="list-style-type: none"> 1. Natural or cultured, available in various colors and shapes 2. With natural luster 	<ol style="list-style-type: none"> 1. Mikimoto The company that invented pearl cultivation technology, "Mikimoto Pearls" series 2. Chanel "Comète" Pearl Jewelry
organic material	<ol style="list-style-type: none"> 1. Including wood, ivory, coconut shell, etc. 2. Environmentally friendly, lightweight, with natural texture 	<ol style="list-style-type: none"> 1. Monica Vinader Jewelry featuring wood and organic textured designs 2. Alex and Ani Jewelry made from sustainable materials
ceramics	<ol style="list-style-type: none"> 1. Lightweight, available in multiple colors 2. Wear-resistant and not easy to scratch 	<ol style="list-style-type: none"> 1. Ippolita Using ceramics to create light and unique designs 2. Lladro a well-known ceramic manufacturer that launches exquisite ceramic jewelry
Rubber and plastic	<ol style="list-style-type: none"> 1. Lightweight, colorful and malleable 2. Strong sense of modernity 	<ol style="list-style-type: none"> 1. Marc Jacobs Jewelry designed using modern materials such as rubber and plastic 2. Melanie Georgacopoulos Designed with rubber and pearls
3D printing materials	<ol style="list-style-type: none"> 1. Complex geometric shapes and structures can be realized 2. High degree of customization and flexibility 	<ol style="list-style-type: none"> 1. Nervous System Using 3D printing technology to create jewelry with biologically inspired designs 2. Daniela Villegas merging 3D printing and jewelry design
Smart Materials	<ol style="list-style-type: none"> 1. With characteristics such as sensing, reaction, and luminescence 2. Innovative materials that integrate technology and design 	<ol style="list-style-type: none"> 1. Swarovski x Misfit Collaborative smart jewelry that combines crystals and health tracking technology 2. Bellabeat Leaf Jewelry that combines ecology and intelligence
fabric material	<ol style="list-style-type: none"> 1. Light, soft and suitable for wear 2. Colorful patterns and designs can be achieved 	<ol style="list-style-type: none"> 1. Delfina Delettrez Designs unique jewelry using fabric materials 2. Ruth Tomlinson Designs that blend fabric and metal

paper material	<ol style="list-style-type: none"> 1. Lightweight, environmentally friendly and easy to handle 2. Create unique texture and layering 	<ol style="list-style-type: none"> 1. Sarah Angold combines paper materials with metal to create unique jewelry designs 2. Ana Hagopian Jewelry designed using origami techniques
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Source: Compiled and summarized by researchers

By investigating consumer feedback and preferences, we will evaluate the popularity of various design styles in the market to determine the most attractive and commercially viable design directions.

2.2 Market Trends and Consumer Preferences Survey

Researcher will conduct in-depth research into current trends in the jewelry market and consumer preferences. This includes surveys and analysis of jewelry consumer groups to understand their attitudes and expectations towards Ouroboros symbols and related designs (Zhao & Wang, 2019).

Through market research and data analysis, we will grasp consumer purchasing trends and market demands to provide market-oriented creativity and direction for the design.

2.3 Assessment and Recommendations for Commercial Potential

Based on the results of design styles and consumer surveys, will assess the commercial potential of Ouroboros-inspired jewelry pieces in the market.

Researcher will offer targeted recommendations and strategies, including positioning and pricing strategies, market promotion, and sales channel selection, to maximize the commercial value and market impact of the works.

Table 4 Average Preference Analysis of Different Contemporary Jewelry Style Types

Design Style	Number of Likes (Percentage)
Minimalist	287 (45.56%)
Tech	181 (28.73%)
Vintage	143 (22.70%)
Pop Art	82 (13.02%)
Cyberpunk	76 (12.06%)
Cubism	52 (8.25%)

Source: Researcher's Compilation

To calculate the average number of design styles liked per participant:

$$\text{Total likes} = 287 + 181 + 143 + 82 + 76 + 52 = 821$$

$$\text{Average} = \frac{821}{630} \approx 1.303$$

Based on this survey of 630 participants, the average number of design styles liked per participant is approximately 1.303. This indicates that most participants have preferences for multiple design styles, with Minimalist style being the most favored.

One of the key components of this study is the analysis of design styles and market value, aimed at assessing the potential impact and commercial value of Ouroboros-inspired jewelry pieces in the market.

Consumer surveys indicate a strong preference for jewelry designs that symbolize cycles, infinity, and vitality, reflecting significant consumer affection towards themes associated with the Ouroboros symbol. Jewelry made from sustainable materials also enjoys notable favorability, underscoring consumers' increasing demand for ethical purchases and environmentally-friendly products (Zuo, 2018).

The research findings indicate that Ouroboros-inspired jewelry designs hold significant commercial potential, particularly among younger consumer demographics. Consumers show strong affinity for jewelry designs with symbolic meaning, especially those that blend cultural depth with modern aesthetics (Li,2020). Market trends demonstrate a growing demand for jewelry made from sustainable materials, aligning well with the cultural symbolism often found in Ouroboros-inspired designs. The high engagement from younger consumers suggests important market opportunities in promoting and selling Ouroboros-inspired jewelry. These findings provide strategic direction and opportunities for design development, marketing initiatives, and market expansion.

3. Cultural Background of Hongshan Serpent Jade Bi-discs

Findings revealed insights into the cultural significance of the Hongshan serpent jade bi-discs in China. This archaeological context enriched the understanding of how ancient symbols like the Ouroboros have evolved and been interpreted over time.

3.1 The research demonstrates the impact of minimalist style in contemporary jewelry designs featuring the Ouroboros symbol, which has garnered substantial consumer attention. This signifies a preference among consumers for sleek and fashionable jewelry that carries symbolic depth, especially appealing to those interested in unique pieces blending traditional and modern aesthetics.

The researcher's contemporary jewelry design work is inspired by the designer's fieldwork on the snake and the Ouroboros symbol collected during the research and archaeological process of the Hongshan Cultural Site in Wuxi. Through Liu Meng's "Glazed Snake Exquisite Ball" and other related literature, the snake exquisite spherical ware is the first time that the highest specification of Yue State burial utensils has been discovered. The glazed snake delicate ball is completely made of eight snakes head and tail bite, entwined into the hollow spherical artifact is completely different from other objects unearthed from the same tomb, it has a peculiar shape, exquisitely clear, colorful, this kind of shape of the artifact is the first archaeological discovery in our country so far, it is precious (Figure 1).



Figure 1 Coiled snake spherical device

Source: One of the top ten new archaeological discoveries in China in 2004 / Excavation report of the noble tomb of Yue Kingdom in Hongshan, Wuxi

In this study, we aim to explore the innovative application and unique expression of the Ouroboros symbol in contemporary jewelry design. We will design a series of creative and distinctive contemporary jewelry pieces inspired by the Ouroboros symbol, embodying concepts of cycles, infinity, and vitality represented by the symbol.

Firstly, we will explore application and representation of Ouroboros symbol in various types of jewelry. From necklaces and bracelets to rings and other jewelry categories, we will cleverly integrate elements of Ouroboros to showcase modern aesthetics and design trends.

Furthermore, we will conduct in-depth research on a variety of materials suitable for Ouroboros-inspired designs. In addition to traditional precious metals and gemstones, we will explore the use of modern synthetic materials and digital craftsmanship. The selection and application of these materials will infuse our creations with innovation and contemporary appeal.

Additionally, we will leverage advanced technologies such as 3D printing and CNC carving to innovate and realize our design concepts. These technologies not only enhance the efficiency of production process but also expand possibilities and expressions of our designs.

The designer combined the Ouroboros symbol with contemporary aesthetic concepts and launched a bracelet called "Modern Snake". The design abandons traditional forms and uses abstract lines and geometric patterns to interpret the image of ouroboros into a more concise and modern interpretation. By choosing different materials, such as white gold and diamonds, the design works show noble and fashionable qualities.

4. Role of 3D Printing in Jewelry Design

The study explored the transformative impact of 3D printing on jewelry creation. It highlighted the use of advanced printing techniques and materials to realize intricate and customizable designs inspired by the Ouroboros symbol.

Create a series of contemporary jewelry designs inspired by the Ouroboros. Describe in detail the philosophy, conception process, material selection and craftsmanship of each design (Guo,2020).

Table 5 Stages and steps of contemporary jewelry creation

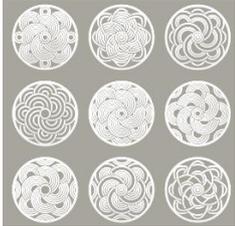
Stage Step Description	Stage Step Description	Stage Step Description
Source of inspiration	Studying Ancient Symbols	Study and explore ancient symbols, such as the Ouroboros, to understand their cultural context and symbolic meaning.
	Looking for inspiration	Get inspired by the ancient symbol of ouroboros and explore the concepts and meanings it represents.
	Cultural interpretation	Analyze the interpretation and interpretation of the Ouroboros in different cultures, including its role in ancient art and mythology.
Extract elements	Symbolic characteristics	Extract features of the Ouroboros symbol, such as spiral shape, cyclic pattern with the tail biting the head, etc.
	Symbolic elements	Discover the meaning of ouroboros symbolism, such as the cycle of life, infinity and power, and transform it into design elements.
	Material selection	Choose suitable materials such as metals, gemstones or modern synthetic materials based on the properties and symbolic meaning of the Ouroboros.
Innovative design	Concept development	Combining the symbolism of ouroboros and extracted elements to develop innovative design concepts and styles.
	Digital craft	Using digital craftsmanship and modern technologies such as 3D modeling and printing, design concepts are transformed into jewelry prototypes.
	Aesthetic expression	Focusing on aesthetic expression, we create unique and modern jewelry pieces through the combination of lines, shapes and materials.

Source: researcher's own drawing

4.1 Sources of inspiration and design creation:

The designer draws inspiration from the Ouroboros symbol to create contemporary jewelry pieces with a modern aesthetic and uniqueness. These works not only convey the symbolic meaning of ouroboros, but also show the designer's innovative interpretation of traditional symbols, reflecting the organic integration of cultural symbols and design creation (Liu, Lv & Gao, 2020).

Table 6 Sources of inspiration and design creation

	Source of inspiration	Extracted elements	Innovative design
picture			
illustrate	<p>The Ouroboros symbol is the designer's source of inspiration. It symbolizes the cycle and infinity of life. It is an ancient and symbolic pattern with a rich traditional background in different cultures. Designers drew inspiration from this and explored the possibility of integrating this ancient symbol into contemporary jewelry designs.</p>	<p>The designer extracted the cyclic image of ouroboros and the pattern of its tail biting its tail, as well as the concepts of life, infinity and cycle it represents (Shao, 2018). These elements are translated into forms and materials in contemporary jewelry design, giving the pieces a unique look and meaning.</p>	<p>The innovative design is reflected in the combination of the Ouroboros symbol with modern aesthetics. Through artistic expression and material selection, the designer creates unique and modern contemporary jewelry works. These works not only convey the symbolic meaning of ouroboros, but also demonstrate the designer's innovative interpretation of traditional symbols, reflecting the organic integration of cultural symbols and design creation.</p>

Source: researcher's selfie

4.2 Innovative display and design results:

Designed jewelry pieces inspired by ouroboros show innovation and uniqueness in appearance and form, expressing the symbolic meaning of ouroboros through clever design, attracting the attention of the audience and the market. These works are not only works of art but also vivid interpretations of cultural symbols (Hao, Zhao, 2012).

Table 7 Researcher Design Process Chart

Title of work	Features of work	Innovation display	Design results
Ouroboros Necklace	Inspired by the Ouroboros, the necklace represents the cycle symbol of Ouroboros and is made of bronze metal, symbolizing the cycle and infinity of life.	Through the form and material selection of the necklace, the symbolic meaning of the Ouroboros is cleverly expressed, showing a unique design style.	Successfully attracting market attention, the necklace became equally popular as a work of art and jewelry, highlighting the cultural significance of the Ouroboros symbol.
			

Source: researcher's selfie

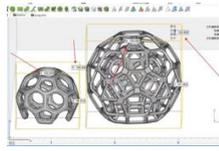
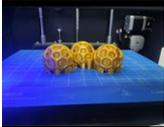
4.3 Integration of culture and technology:

Innovative pieces inspired by the Ouroboros in contemporary jewelry design demonstrate the successful fusion of cultural symbols and modern technology. Designers use advanced production techniques and materials to give traditional symbols new forms of expression and vitality, bringing cutting-edge design concepts and practices to the jewelry industry.

These points highlight how designers have demonstrated unique artistic beauty and technical practice in the field of contemporary jewelry through the innovative application of the Ouroboros symbol, embodying the organic combination and innovative development of cultural symbols and modern design (He, 2017).

According to the research objectives, to explore the innovative design and application of the ouroboros symbolic element as a contemporary jewelry element, it is necessary to demonstrate the innovative design process and application scenarios in detail through hand-drawn drafts, renderings, design processes, production processes, and 3D printing processes.

Table 8 Researcher Design Process Chart

Design Process	Hand Drawn	Process Production	Rendering Design	Process 3D Printing	Process
picture					

Source: researcher's selfie

First of all, the designer conducted in-depth research on the symbolic meaning of ouroboros in different cultures during the creative process. By studying historical documents, artworks and semiotic results, designers can fully understand the cultural connotation and artistic significance of Ouroboros. These research results will be directly reflected in hand-drawn drafts and renderings, showing the specific expression and profound artistic connotation of the Ouroboros symbol in design.

Secondly, during the design process, the designer cleverly integrated the image of ouroboros into the shape of the jewelry. Designers can use modernist styles or technological elements to give Ouroboros new visual expression and creative interpretation. The hand-drawn drafts and renderings clearly demonstrate the designer's conception and design concepts in the conceptual stage, presenting an innovative aesthetic style and design direction.

Next, the production process is a key step in transforming the design concept into actual works. Designers choose the right materials and craftsmanship to carefully craft ouroboros jewelry. The exquisite craftsmanship and detail processing during the production process reflect the designer's respect and unique interpretation of the Ouroboros symbol, ensuring that the design concept is perfectly presented.

Finally, some designers may use advanced 3D printing technology for production. This modern technology brings new possibilities to jewelry design. Through the 3D printing process, designers were able to achieve complex geometric structures and details, accurately rendering the innovative design of the Ouroboros symbol. The use of this technology allows designers to achieve greater creative freedom in materials and forms, injecting new vitality and expression into contemporary jewelry design.

In summary, exploring the innovative design and application of the Ouroboros symbolic element as a contemporary jewelry element requires designers to comprehensively use cultural research, creative expression and modern technology to create deep and personalized Ouroboros jewelry works. This process not only demonstrates the flexible use of symbols in contemporary design, but also reflects the designer's exploration and attempt at cultural inheritance and innovation.

Discussions

The discussion reveals several key insights derived from the survey and research findings. Firstly, the survey results highlight a diverse range of design preferences among participants, with an average liking for approximately 1.303 design styles per participant. This suggests that consumers have varied tastes and appreciate multiple design approaches, with the Minimalist style emerging as the most favored.

Secondly, consumer surveys indicate a notable preference for jewelry designs that symbolize cycles, infinity, and vitality, reflecting a strong affinity towards themes associated with the Ouroboros symbol. This finding underscores the importance of incorporating meaningful symbolism into jewelry designs to resonate with consumer preferences.

Furthermore, the research emphasizes the significant commercial potential of Ouroboros-inspired jewelry, particularly among younger consumer demographics. The appeal of these designs lies in their blend of cultural depth and modern aesthetics, catering to consumers seeking jewelry with symbolic significance. Additionally, the growing demand for sustainable materials in jewelry aligns well with the ethical and environmentally-conscious aspects often associated with Ouroboros-inspired designs.

Overall, these findings provide valuable insights for design development and marketing strategies within the jewelry industry. Leveraging the cultural symbolism and consumer preferences identified in this research presents opportunities for strategic market expansion and the creation of compelling jewelry offerings that resonate with target audiences.

The researcher should demonstrate that the results of this research are consistent with existing theories or how they align with other people's research. For example, the preference for minimalist designs aligns with Heskett's (2018) theory on design and value creation, which emphasizes the importance of simplicity and functionality in contemporary design. Additionally, the affinity for symbolic jewelry resonates with Ren and Song's (2017) findings on the fusion of traditional and modern design elements. These references underscore the broader relevance and applicability of the research findings, situating them within established academic and practical frameworks.

Recommendations

1. Theoretical Suggestions

Combining traditional craftsmanship with digital technology has led to a new industry rooted in internet platforms utilizing 3D printing for cultural mementos. This offers an opportunity to establish strong connections with the online community, streamlining complex production processes into a single assembly line, and meeting diverse customer needs at reduced costs (Qiu, 2019). The use of 3D printing in contemporary jewelry design highlights its advantages, garnering widespread enthusiasm among designers and students alike (Heskett, 2018). As 3D printing technology continues to evolve, it is poised for significant growth in the jewelry design market.

Traditional design processes often result in mass production, limiting themes to market demands and popular aesthetics. However, advancements in productivity and technology, coupled with diverse materials, contribute to the varied and extensive array of contemporary designs favored by artists (Li & Liu, 2019). Contemporary design emphasizes creativity and conceptual messages, integrating traditional craftsmanship with modern

techniques to promote traditional ethnic cultures and enhance enthusiasm for traditional craftsmanship.

2. Policy Suggestions

Traditional craftsmanship, representing unique cultural facets, is increasingly studied and appreciated. Traditional themes, such as minority wood carvings and tribal totem art, provide rich source material for contemporary design (Pan, 2017). Connecting traditional craftsmanship with modern design fosters cultural exchanges and unveils unique artistic effects (Ren & Song, 2017). Contemporary jewelry design, infused with cultural characteristics, combines aesthetic value with practical functionality, establishing personalized brand images (Zhang, 2020). Traditional craftsmanship, especially intangible cultural heritage, continues to inspire innovative jewelry designs incorporating symbols like the Ouroboros.

Cloisonné craftsmanship, a representative traditional Chinese craft, faces significant impact from contemporary design concepts. To thrive, it must adapt to modern aesthetics, blending traditional techniques with contemporary materials (Wen, 2019). Reforms in cloisonné craftsmanship should focus on meeting contemporary aesthetic needs while preserving its unique beauty (Zhang & Xia, 2016). Integrating materials like wood and metal can reflect spatial layers and enhance cloisonné design works (Wu & Li, 2018).

3. Practical Suggestions

With the advancement of modern technology, particularly 3D printing, there are exciting opportunities for creating unique contemporary jewelry pieces inspired by the Ouroboros symbol. Since the mid-1990s, 3D printing has revolutionized rapid prototyping, enabling designers to experience the joy of hands-on creation (Mao, 2019). The ongoing development of 3D printing technology promises significant advancements in creative cultural design.

Digital technology offers new possibilities for contemporary jewelry design, allowing for the creation of visually striking pieces with cultural significance. The interplay between digital technology and jewelry design transforms conceptual ideas into tangible entities, reflecting the creators' skills and perspectives. This integration enhances the emotional depth and expressive potential of jewelry artifacts, showcasing the intersection of tradition and modernity (Zuo, 2020).

Jewelry design offers a pathway to innovation. By drawing inspiration from ancient symbols and applying modern technologies like 3D printing, designers can create jewelry pieces that resonate with historical depth and cultural significance, contributing to the evolving landscape of contemporary design.

4. Conclusion

Contemporary jewelry design draws inspiration from ancient symbols to create innovative pieces that resonate with modern audiences. The Ouroboros, symbolizing life cycles and renewal, continues to fascinate designers. This study explores its cultural significance and applications in modern jewelry, highlighting how traditional craftsmanship and digital technology can create captivating pieces that bridge the past with the present. The research aims to inspire designers to integrate meaningful symbols into their work, enhancing both aesthetic and commercial appeal.

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References

- Chen, M. Y. (2017). *Research on furniture design based on material emotional perception (Doctoral dissertation)*. Central South University of Forestry and Technology.
- Gong, P. (2019). *Art jewelry design works*. Art Research.
- Gu, X. Q., & Guo, Y. (2020). *Aesthetic exploration of composite materials in contemporary jewelry design*. Chinese Gems and Jade.
- Guo, T. M. (2020). *Application of modern technology in contemporary art creation*. Media Today.
- Hao, Y. H., & Zhao, F. Q. (2012). *On the origin and variation of design morphology*. Tractor and Agricultural Transporter.
- He, W. M. (2017). *Practice and exploration of perception related to design morphology*. Design, 15.
- Heskett, J. (2018). *Design and value creation*. Jiangsu Phoenix Fine Arts Publishing House.
- Li, J. (2020). *Artistic expression and design application of material and form transformation*. Design.
- Li, T. T., & Liu, K. Y. (2019). *Traditional cultural expression under contemporary design language forms*. Design.
- Liu, Y., Lv, S. Y., & Gao, H. Z. (2020). *Cognitive geometry of product form design*. Contemporary Educational Practice and Teaching Research.
- Mao, L. H. (2019). *Research on application of composite materials in contemporary art jewelry design*. Changjiang Series.
- Pan, X. L. (2017). *Digital technology and its application in contemporary jewelry design*. Modern Design.
- Qiu, S. (2019). *The evolution of symbolic elements in jewelry design*. Art and Design Review.
- Ren, C. Y., & Song, Q. C. (2017). *The role of cultural symbols in modern design*. Design Journal.
- Ruan, X. J., Guan, X. S., & Xi, F. (2015). *3D printing technology and its impact on jewelry design*. Technology and Innovation.
- Shao, Y. B. (2018). *Symbolism in contemporary jewelry design*. Creative Arts.
- Wen, Y. (2019). *A study on the integration of traditional elements into modern jewelry design*. Journal of Fine Arts.
- Wu, C. Y., & Zuo, J. (2020). *The influence of digital craft on contemporary jewelry design*. Art Research.
- Zuo, J. (2020). *Cultural heritage and innovation in modern jewelry design*. Heritage and Development.