



## Design and Development of Souvenir Jewelry using Hexi Pictograph

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### Abstract

**Background and Aim:** Hexi rock paintings show what life was like for our ancestors in the early days. This paper looks at how Hexi rock paintings can inspire jewelry souvenirs, how rock paintings are used in jewelry, and where further research could be done.

**Materials and Methods:** The researchers used a mixed methods approach to the study, examining the location, significance, and design applications of the petroglyphs, designing souvenirs using the art of jewelry and the content of the petroglyphs, conducting in-depth consultation on the content of the petroglyphs through a survey of the staff involved, and interviews with the experts, critiquing the products of the designs and incorporating the experts' views into the research process.

**Results:** The result showed that the protective nature of petroglyphs makes fieldwork and the extraction of petroglyph content more challenging. However, during the design and development of products, we identified a market gap for Hexi petroglyphs. In light of market demand and consumer psychology, the study employs Hexi petroglyphs to produce jewelry souvenirs through the collation and extraction of their content, thereby promoting the protection of local culture, the development of the tourism industry, and the creative industry.

This study examines the potential of Hexi rock paintings to be used as a source of inspiration for the creation of jewelry souvenirs. This study is closely related to the future development of Hexi rock paintings and contributes to the promotion of tourism around them and the development of local cultural tourism.

**Conclusion:** This study examines the potential of Hexi rock paintings to be used as a source of inspiration for the creation of jewelry souvenirs. This study is closely related to the future development of Hexi rock paintings and contributes to the promotion of tourism around them and the development of local cultural tourism.

**Keywords:** Souvenir Market; Innovation; Jewellery Design; Hexi Petroglyphs

### Introduction

The petroglyphs of Hexi exhibit a wide variety of motifs, including plants and animals, people, and various combinations and variations of forms. These motifs often have profound and complex meanings, reflecting the will to survive, daily emotions, wisdom of life, and spiritual pursuit of the ancestors. To some extent, they also reflect the social conditions of primitive society and the survival history of the ancestors. This study examines the design and development of Hexi rock painting jewelry souvenirs and their potential new markets. It does so by collating and analyzing the contents of Hexi rock paintings through fieldwork and expert interviews. The incorporation of elements from Hexi rock paintings into the practice of jewelry design innovation plays an important and positive role in promoting the wide dissemination, in-depth protection, effective inheritance, and sustainable development of local culture. Concurrently, it offers a distinctive perspective and novel concepts for the innovative practice of jewelry design, thereby enriching the diverse forms of expression within the design field. In the study, a research project on jewelry souvenirs was conducted in conjunction with the prevailing market conditions, after which the necessity of activating the application of the artistic elements of Hexi rock paintings was analyzed. This study elucidates the application method and element extraction design of Hexi rock painting in jewelry design, to provide reference and reflection for related research.

A variety of skills are used in the design and development of souvenir jewelry, including artistic creativity, cultural representation, and market research. As a material reminder of a location, occasion, or encounter, souvenir jewelry frequently combines regional emblems, materials, and handicrafts to capture the spirit of its source. To create souvenir jewelry that is both authentic and appealing to the

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intended audience, the first step in the process is conducting extensive research into the historical and cultural background of the destination. Travelers and jewelry collectors will find the jewelry more appealing due to its significant sentimental value and enhanced aesthetic appeal as a result of this cultural integration. Designers frequently work with regional craftspeople and utilize native materials to preserve authenticity and boost regional economies (Bazanini, 2021).

Prototyping, testing, and refinement are all part of the development phase, which aims to guarantee the designs' robustness, usability, and aesthetic appeal. Precise prototypes and iterative improvements are made possible by modern technology, especially 3D printing and modeling. Additionally, designers are increasingly choosing eco-friendly materials and ethical production methods, making sustainability a major factor in the creation of souvenir jewelry. Understanding consumer trends and preferences through market analysis is crucial for designing products that satisfy consumer demand while maintaining the integrity of the cultural narrative. Effective marketing techniques are used to draw attention to the jewelry's distinctive features and expand its market reach. These techniques include the use of digital platforms and storytelling (Dunne, 2019).

However, it is essential to research the creation and design of souvenir jewelry utilizing Hexi Pictograph to protect and promote cultural heritage. The distinctive symbols and characters of the ancient Hexi Pictograph, which originated in China's Hexi Corridor, capture a multitude of historical and cultural details. Not only do these pictographs bring life to traditional art forms, but they also serve as a medium for cultural education and storytelling when incorporated into souvenir jewelry designs. This method enables jewelry designers to produce pieces that are firmly anchored in regional history and customs, giving the jewelry a deeper sense of significance and individuality. Designers can create goods that act as cultural ambassadors and promote a greater awareness of the rich legacy of the Hexi Corridor by researching and incorporating Hexi Pictographs (Wang & Zhang, 2022). Additionally, the marketability and distinctiveness of the souvenir jewelry designs can be greatly improved by incorporating the Hexi Pictograph. A rare and culturally significant option, jewelry with Hexi Pictographs offers a unique and authentic experience in a globalized market where customers seek out authentic experiences. These products' distinctiveness can set them apart from mass-produced mementos, attracting travelers and collectors who respect cultural authenticity and originality. Furthermore, the utilization of Hexi Pictographs can stimulate originality in material and design choices, supporting regional handicrafts and sustainable practices. In addition to aiding in the preservation of historic scripts, scholarly research on this integration promotes the economic growth of the areas from which these cultural symbols originate (Li, 2020).

## Objectives

1. The focus of this study is on the cultural connotations, aesthetic value, and potential applications of Hexi rock painting elements in jewelry design.

As a valuable cultural heritage of the Chinese nation, the rich cultural connotations and unique aesthetic value of Hexi rock paintings provide designers with an inexhaustible source of creative inspiration. This study examines the distinctive artistic appeal and spiritual associations of Hexi rock paintings through an investigation of their historical evolution, artistic style, and cultural implications, including their mythological and folk cultural associations.

2. Design and development of new markets for Hexi rock painting jewelry souvenirs

Design innovative and culturally rich Hexi rock painting jewelry products to create a unique brand of Hexi rock painting jewelry souvenirs. To achieve this, it is necessary to conduct an in-depth excavation of the cultural connotations of Hexi rock paintings. This will then inform the integration of modern design methods to design a series of novel and culturally rich Hexi rock painting jewelry products. The products that are designed will focus on highlighting the artistic characteristics and aesthetic value of Hexi rock paintings, while also taking into account the aesthetic demand and collection value of the products themselves.

The achievement of the aforementioned research objectives will result in the transformation of the valuable cultural heritage of Hexi rock paintings into jewelry souvenirs with market potential. This will facilitate a greater understanding and appreciation of this unique art form among a wider audience.



Furthermore, it is anticipated that this project will contribute to the development of cultural and creative industries and the inheritance and promotion of the excellent traditional Chinese culture.

### Literature review

In the process of integrating symbolic rock painting symbols or rock painting elements into jewelry, one of the most difficult tasks is to find suitable matching patterns or patterns, which involves the appearance, connotation, and tribe/era of Hexi rock painting. This problem can be solved from several aspects - mining the background relationship between history and society, analyzing the symbolic meaning or emotional expression of the patterns or patterns through appearance analysis, or finding the similarity of the known patterns and patterns. This research project takes the Hexi rock painting exhibits in the museum and its market as the starting point, and tries to extract and redesign the Hexi rock painting elements to meet the various needs of jewelry souvenir design, Study its social and historical background, and determine the importance and feasibility of Hexi rock painting. On the other hand, Hexi rock painting culture will be promoted from multiple angles, different spiritual contents, different forms, or more popular and portable ways. Tourists can even select or customize according to preset standards, shapes, patterns, etc., which will improve the quality, authenticity, and history of products and expand the market of products and contents. **Swanson and Timothy (2012)** observed that it is important to commercialize the intangible meaning of souvenirs from a marketing perspective and transform them into tangible consumable products sold by destination merchants. Therefore, this research topic mainly focuses on how to more carefully examine the elements of Hexi rock paintings and jewelry souvenirs with clearer or more connection.

The focus of this research topic is mainly on two main aspects, that is, the design content used for making Hexi rock painting souvenir jewelry, and the selection of materials, such as selecting the theme or pattern patterns from existing exhibits, entering the museum commodity market in the form of publicity, souvenirs and works of art, and even creating Hexi rock painting series.

The 21 papers that were reviewed in this study are primarily concerned with the application of cultural elements in the market of tourist souvenirs, jewelry design, tourist souvenirs in museums, and petroglyphs in design.

Papers 1-8 of the paper focus on tourist souvenirs and their markets; There is no clear definition of tourist souvenirs in academia. But everything belongs to its roots, tourist souvenirs belong to tourism commodities, and tourism commodities have a relatively clear definition. That is the sum of tangible and intangible services with practical value and value provided by suppliers to meet the needs of tourists to sell and exchange.

Tourist souvenirs are divided into three categories, traditional tourist souvenirs, industrialized tourist souvenirs, unindustrialized tourist souvenirs, and traditional tourist souvenirs in daily life tourism to be deeply rooted in the hearts of the people. Such products are linked to the business cards of a place, such as graphic books in the Mogao Grottoes in Dunhuang and products related to the Forbidden City in Beijing. Most of the industrialized tourist souvenirs have local cultural characteristics and unique charm, but such goods are mainly sold locally. For example, beef jerky in Inner Mongolia, soy products, raisins in Xinjiang, etc. Unindustrialized tourist souvenirs are brand new tourist souvenirs in the context of the new era, with a wide variety of goods, but most of them are made by individuals or small teams, as the name suggests, "small workshops" are produced. Similar products have handmade handicrafts that are not clearly defined.

With the development of tourism in the world, most people can enjoy traveling. Other industries such as souvenirs, catering, and transportation have also benefited from this rapid change. Tourist souvenirs have become an important product that people bring to their relatives and friends. The material and local relations contained in tourist souvenirs, the consumption of cultural symbols of tourist souvenirs, the economic effect of tourist souvenirs, the social and cultural influence, and the development of characteristic tourist souvenirs. It has become an indispensable part of the world economy.

Sections 9-12 of the thesis take jewelry design and materials as the main direction, not only studying the artistic design content of jewelry design and decorative elements, but also exploring the



combination of metals and gemstones with artistic design as decorative elements, and proving the feasibility of mixing precious metals with natural raw minerals through experiments.

In their 2007 study, Hashimoto and Telfer examined the geographical representations embedded within souvenirs in Niagara. They explored the concept of geographically displaced authenticity. Geographical representations embedded in Niagara souvenirs" as the object of study. By studying the authenticity of the concept of geographical scale and geographical dislocation associated with souvenirs of Niagara Falls, Canada. Make reasonable market research based on the types of souvenirs in Niagara Falls. A review of the literature reveals that souvenirs frequently serve as a source of inspiration for traditional arts and crafts, which both stimulate interest in the destination and strengthen the local cultural identity is a significant aspect of the area's character. The growing interest in souvenirs and cultural heritage has stimulated the development potential of the related markets to a certain extent.

Papers 13-21 focus on the application of museum souvenirs, rock paintings, and cultural elements in jewelry. The museum is not only a cultural heritage preservation unit, but also a media for inheriting cultural heritage, and a carrier of cultural tourism projects. However the current status quo of tourist souvenirs in Chinese museums is that the variety is single, there is no innovation, the commodity price is expensive, and the public demand is low and unwilling to spend a lot of money to buy. In contrast, in Europe and North America, the income of many museum tourism souvenirs has become the main source of income for museums. The case of promoting the "St. Petersburg City Brand" by selling souvenirs in museum shops shows that selling quality souvenirs directly related to high-impact museum exhibits can enhance the city's all-around branding. It can be seen that making full use of market rules, market-oriented, and guided by consumer demand, can improve the influence of museums and increase profits, and at the same time can drive the promotion of cultural element products.

As mentioned before, there is a good market, and good products will continue to emerge. "Souvenirs and the Commodification of the Sámi Spirit in Tourism", which begins with the live display of Sámi souvenirs related to the religious context in souvenir shops, investigates the complex relationship between these factors in the religious sphere, the past, the artistic or craft sphere, and the question of ownership. Explore the relationship between spiritualized and commercialized souvenirs and the general Western understanding of the religion and spirituality of the Sámi Aborigines. An example of such souvenirs is a replica of a Sámi Eddy drum of different sizes and qualities, while others discuss the use of symbols on the drum suitable for souvenirs such as jewelry or other design products. The starting point is the material souvenir itself, combined with live displays in shops, online, and social media, and connected to the imagination of visitors.

Similarly, Hexi rock art can also be promoted to the market through commercialization, so that the public can know and understand, Research on this topic through the research and analysis of the tourist souvenir market (mainly museum souvenir market), from the connotation of Hexi rock art and product commercialization, to the design and market development of souvenir jewelry products as the ultimate goal, to open up new channels for the dissemination of local culture.



## Conceptual Framework

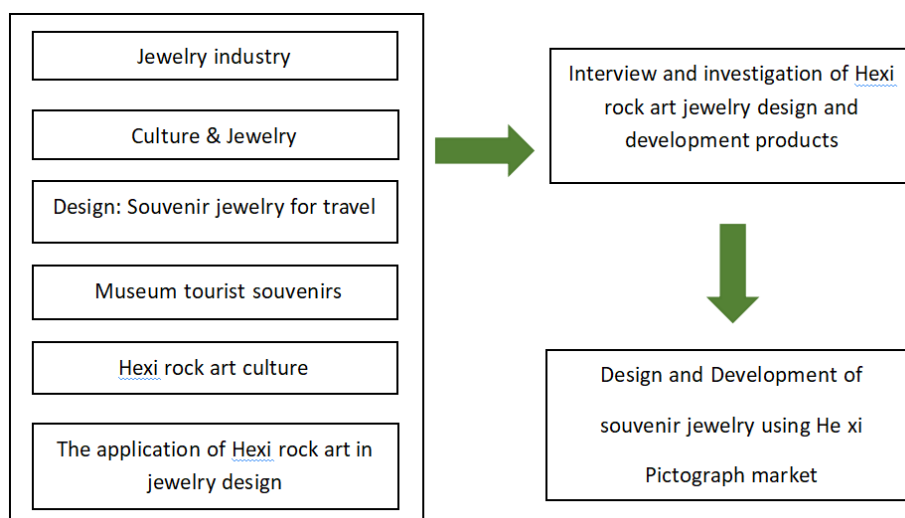


Figure 1 Conceptual Framework

## Methodology

The methodology employed in this study is based on a mixed research approach, which will be divided into four distinct phases: research, analysis, design, and evaluation.

### Step 1: To study.

Organization of rock painting images in Hexi

Through preliminary investigation and literature research, it is found that the current research on Hexi rock paintings is basically based on archaeology and iconography, and in some places, rock paintings have not even entered the public's view, especially the innovative use of rock painting culture. The lack of resources in the Hexi Corridor has led to the fact that the rock paintings in Hexi are basically in a dormant state, and the cultural content of the rock paintings in the museum has not been emphasized and has not played its due role in the process of the development of the local tourism industry. Therefore, the rock painting image information data of Jiuquan City and Jiayuguan City will be collected and organized according to the principles of location, site, cultural background, and type of rock paintings, and metadata will be considered to be added to the image files, including the GPS coordinates of the sites, description of the rock paintings, cultural background, and any other relevant information. This will provide basic materials for the later study of rock painting images in Hexi, as well as for the development of the tourist souvenir market, enrichment of museum stores, and the design and development of tourist accessories using the visual aesthetic value and cultural connotation of the rock paintings themselves.

### Step 2: To analyze.

The researchers plan to use mixed research methods. Through fieldwork and literature research, excavate the geographic environment, social background, and cultural background of Hexi rock paintings, combined with the application of jewelry art, establish the commercial value and artistic value of Hexi rock paintings applied to jewelry art, design and develop Hexi rock paintings art tourism souvenirs ornaments through the museum merchandise market survey and expert interviews, to make the culture of Hexi rock paintings better developed and to open a new museum tourism souvenir Market.

Through preliminary background research on the history and culture of the area related to the Hexi rock paintings, as well as fieldwork and records, it is possible to learn about the ancient civilizations that once flourished in the area, as well as any known cultural practices or beliefs that may be related to the rock paintings.

The process of obtaining data will be divided into two steps: the first step is to identify the data sources, which can be done through internet search, literature survey, expert interviews, etc. to collect relevant data and information on the style, composition, color, and other characteristics of the rock

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paintings in Hexi. The second step is to classify, screen, and organize the collected data and information to extract useful data and elements from them.

The content of the research on images will be presented in the form of a table, and the specific content will be carried out in the following aspects:

1. Analyze the artistic styles and techniques in rock paintings. Identify and organize recurring motifs, symbols, and themes.
2. compare known symbols and motifs in the region's Hexi petroglyphs with known motif symbols and motifs, exploring motifs that may convey specific meanings or tell a story, and providing content factors about cultural interactions and influences.
3. to look for patterns, similarities, and differences between the rock paintings of Jiuquan and Jiayuguan in the broader context of the creation of the various rock painting sites in the two regions, and to analyze in depth the connotative meanings of the rock paintings in the two regions.

### Step 3: To design.

Using computer vision and image processing techniques, digitize Hexi rock paintings and extract features such as shape, color, and texture of patterns and motifs as design materials for jewelry souvenirs. Searching and analyzing a large number of open data sources to find market and cultural information related to Hexi rock paintings. In addition, interviews, statistics, and analysis of tourists' preferences consumption behaviors, and word-of-mouth on social media were used to obtain data on the market demand and consumption trends of Hexi cultural souvenirs and jewelry.

#### 1. Pattern:

Hexi rock art elements are the natural materials accumulated by the local people in long-term production and life, and the patterns created have distinct regional characteristics and era characteristics. The rich motifs, as well as the unique organizational form, reflect the local people's reverence for nature. The elements of Hexi rock art can continue to evolve and change and are inextricably linked to the formal structure of the pattern. To better carry forward and inherit national culture, it is necessary not only to protect it but also to innovate. Hexi rock art elements have abstract and geometric expressions. Therefore, when designing, consider extracting, deforming, and reconstructing the lines in the Hexi rock paintings, and should also pay attention to the aesthetic habits and lifestyles of the current public. Through jewelry to convey the profound local cultural connotation, and give it personalized characteristics, the use of Hexi rock paintings rich pattern shape changes, re-create, introduce, and develop it to create new tourist souvenir jewelry, endowing modern jewelry with strong artistry, pattern novelty and shape diversity.

#### 2. Materials:

In the history of jewelry development, jewelry materials have also experienced a long evolution and development, Paleolithic primitive society, people used stones, animal bones, and other production tools and ornaments, and then later through social culture, economic development began to use metals, gemstones, etc., and in the use of jewelry, is also dominated by the hierarchy, such as primitive society period, tribal or ethnic group leaders have the power to control jewelry, into the feudal society period, royalty and magnates become the main users of expensive jewelry, Therefore, it has been found that the value of traditional jewelry depends more on the value and characteristics of the material. However, combined with the development of modern society, the diversification, characteristics, and value of jewelry materials are not limited to traditional materials.

Non-traditional materials utilized in contemporary jewelry encompass two categories:

(1) Synthetic and inorganic materials that were manufactured as a result of technological advancements.

(2) Alternative organic materials, such as plant petals and shells. (Siran, Z., & Al-Khulaqi, A. 2022)

Therefore, considering the pattern form and concept of Hexi rock art itself, the current situation of the tourist souvenir market (mainly for museum tourist souvenir jewelry), to facilitate consumers' daily wear and use, and the complexity of jewelry technology processing, the design products in this study consider the design and production of metal and enamel technology, and launch the Hexi rock art series of tourist souvenir jewelry. But it must be noted that the work itself is related to the idea of modern design, the material craftsmanship is only the surface used to add color to the product, that is, the basic

technical part. In the overlapping part of product content and material technology, the understanding of materials, and the exploration of processes are all ways to help products achieve better performance. Yu, et al (2018) research proposed: that materials from around can better reflect the cognition and love of life.

### 3. Function:

Historically, jewelry was defined as ornaments worn on the head. However, it has since been expanded to include ornaments worn on any part of the body, such as earrings, pins, pendants, bracelets, etc. This expansion can be attributed to the physiological need to beautify the body. (Siran, Z., & Al-Khulaqi, A. 2022, Dec). Consequently, the utilization of Hexi rock art elements in the design and development of jewelry products is a suitable approach for the current generation, who are gradually developing an increasingly sophisticated aesthetic awareness. Furthermore, it offers the potential to enhance the commercial appeal of the museum without compromising its intrinsic value, thereby facilitating the dissemination of Hexi rock art culture to a broader audience.

### Step 4: To evaluate.

1. Interview conditions/criteria: Interview three industry experts, including experts engaged in museum culture, rock painting research, and design experts (J), or hold a talk and exchange meeting (targeted sampling) to discuss innovative design and how to promote the market of Hexi rock painting jewelry and souvenirs.

2. Content: Design and development of Hexi pictograph souvenir jewelry

3. Market survey conditions/criteria: relevant museum staff, exchange the current status of jewelry products in the museum tourism souvenir market, as well as the status of jewelry souvenirs related to Hexi rock paintings.

4. Investigation: Through research, examination, interview, and communication, the design is completed and submitted to three experts for review, and finally improved according to the experts' review.

## Results

Distribution, main images, and content analysis of petroglyphs in the JiuJia area, Gansu

Please refer to the table below for the detailed information map of the petroglyphs in Jiuquan and Jiayuguan City

(Table 2.1 Classification and content analysis of main images of petroglyphs in JiuQuan City)

(Table 2.2 Main image classification and content analysis table of petroglyphs in JiaYuguan City)



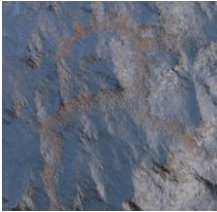

(Table 2.3 Digitally processed image summary table)










(Table 2.4 Comparative Analysis Table of Contents of Rock Art Images in JiuJia City)








To make the image clearer and facilitate the classification and analysis of the image, the subject researchers carried out digital image processing on the collected images. In the form, the subject researchers will compare the photos taken in the field with the digitally processed images.

According to current statistics, there are 23 rock art sites in Jiuquan City and 1 rock art site in Jiayuguan City. The research project will select representative rock art images for analysis.

Table 1 Classification of main images and content analysis table of petroglyphs in JiuQuan City

JIUQUAN	NUMBER	CONTENT	IMAGE
Animal	Deer image 1	Hanxia petroglyphs - According to the image processing results, the image of the rock painting is a deer, the huge antlers are exaggerated, the limbs of the deer are clear, and the antlers are strongly patterned. This group of images is more typical among the deer images in Hexi rock paintings, the body of the deer is composed of only two arcs, which represent the back and abdomen respectively, and the legs are represented by zigzag curves. The patterned shape is a major feature of the petroglyphs of deer images in the Hexi Corridor. By summarizing the shape and antlers of the deer into smooth geometry or curves, the beauty of the lines is preserved, the style is simple, the lines are smooth, and the integrity of the image is preserved. From another perspective, it also reflects the deer worship consciousness in the typical animal worship in the rock paintings of the grasslands in northern my country. The ancestors believed that the horns of animals were a bridge to communicate with the gods, and horns could also promote the reproduction of species. Animals with horns have supernatural powers. Divine power. In the petroglyphs, the images of exaggerated antlers and enlarged bodies also imply the meaning of praying for a good harvest and peace, which is why ancient ancestors chose deer as objects of worship.	 
	Deer image 2	Sander petroglyphs - According to the results of image processing, the image is a dynamic running deer, the antlers are branch-like, the tail is a bit incomplete, the limbs are strong and long, the running movement is very strong, the head of the deer is tilted back, and the antlers are tilted backward to buttocks. The height of the deer's body is the same as the antlers. The antlers in this group of patterns are extremely exaggerated, like the branches of a big tree, full of decorative sense, but the body shape is very simple, and the overall shape is simple and clear.	 

JIUQUAN	NUMBER	CONTENT	IMAGE
bison image 1		Algreta petroglyphs - According to the results of image processing, the image is a bison. The chiseling method is used to emphasize the external outline of the bison, and the body of the bison is decorated with dense chiseling points.	 
sheep image 1		Algretai petroglyphs - According to the image processing results, the image is an argali, and the shape of the argali is portrayed in the way of line expression, which is relatively not realistic enough, reflecting the aesthetic differences of different creators in different periods.	 
sheep image 2		Budu Hulusitai Rock Painting - According to the image processing results, the image is a wild goat. The petroglyph pattern uses silhouettes to depict the animal image. The pair of large curved horns on the top of the wild goat's head are very obvious. In the higher mountain forests, they often live in alpine caves in summer and migrate from the top of the mountain to the Knife Forest in winter. From this, it can be inferred what the natural environment was like in the area where wild goats lived.	 
sheep image 3		Daheigou Rock Paintings - According to the image processing results, the image is a Qingyang. The back and waist of the Qingyang are straight, and the head is triangular. The features are still very obvious.	 
donkey image		Budu Hulusitai Petroglyphs - According to the image processing results, the image is a wild donkey. It can be seen from the shape of the animal's moving limbs and swaying long tail that this group of wild donkeys is dynamic and looks like a group walking.	

JIUQUAN	NUMBER	CONTENT	IMAGE
			
	elephant image	Daheigou Rock Paintings - According to the image processing results, the image is an elephant, which is also an animal species rarely seen in Hexi rock paintings. Combined with the elephant's living environment and habits, It provides clues to the age of rock paintings in Hexi and also provides some evidence for climate changes in the Hexi Corridor.	 
People	character image 4	Daheigou petroglyphs - This group of rock paintings can be classified as scene rock paintings. According to the image processing results, the marked image is a human figure, with a bow and arrow in his right hand, and a knife or shield in his left hand. Combined with the scene environment, it can be known as a hunting picture, and the image of the characters is a hunter. What is interesting is that clothing appears in this group of characters, which is different from most other characters. Most of the characters do not depict the clothing of the characters. The researchers speculate that it may be related to the age of rock painting creation, to a certain extent It reflects the aesthetic consciousness of the society at that time.	 
	Character image 5	Daheigou Rock Paintings - This group of rock paintings are scene rock paintings. According to the image processing results, the marked image is a horse rider, the figure is wearing a hat, the hair or headband is floating behind the head, and the limbs of the horse are not parallel. Comprehensive It can be inferred from the above that the image is in the dynamic process of running, combined with the whole picture, it can be identified as a group attack picture.	 



























JIUQUAN	NUMBER	CONTENT	IMAGE
Character image 6		Holezadegai Rock Paintings - This group of rock paintings is a scene-type rock painting. Character depictions do not occupy a major position in the entire picture. In particular, the images are also very simplified, with no clothing or hat decorations. According to the investigation, the rock painting site dates from the Paleolithic period to the Warring States period, so it can be speculated that the creation of this image is related to the times.	 
Character image 7		Shander Rock Paintings - This group of rock paintings are scene-type rock paintings from the Neolithic to the Spring and Autumn Period and the Warring States Period. The carving techniques of this group of rock paintings are extremely simple, rough, and powerful, and have a unique style.	 
Character image 8		The Rock Paintings of Crescent Lake represent a group of rock paintings from the scene, chiseled by intaglio techniques. These rock paintings span the Warring States Period to the Western Han Dynasty. The figures depicted in these rock paintings wear hats or some kind of tribal decorations, hold a bow in their right hand, an arrow in their left hand, and one leg bent. The character dynamics are clear, and the figures are depicted realistically.	 







Table source: drawn by the author

Table 2 Main image classification and content analysis table of petroglyphs in Jiayuguan City

JIAYUGUAN	NUMBER	CONTENT	IMAGE
Animal	bison image 1	Heishan Rock Paintings - According to the image processing results, this group of images is three bison. The patterns are mainly portrayed on the surface, and they all show walking dynamics. The tail is raised and swayed. The body is strong. The animal shape is realistic and concrete.	 
	bison image 2	Rock Paintings in Heishan - According to the results of image processing, this group of images is an image of a cow mainly depicted in lines, showing the dynamics of walking slowly, with its tail hanging	

JIAYUGUAN	NUMBER	CONTENT	IMAGE
		down, like a leisurely walk, and the image is complete.	
bison image 3		Rock Paintings in Heishan - According to the results of image processing, this group of images is a group of images of cattle mainly depicted on the face, with arched backs, forward horns, and high raised tails. It can be seen that this group The bison presents a similar offensive state, and the whole group of images looks strong.	 
sheep image 1		Rock Paintings in Heishan - According to the results of image processing, this group of images is a group of images of antelopes mainly depicted on the surface. Although the lines are simple, they are flexible. From the observation of form, they seem to be like running sheep. There are other patterns behind the main body, but due to the age, the specific image can no longer be seen, like another sheep following behind, or there may be scratches left on the rock after the weathering of the natural environment.	 
sheep image 2		Heishan Rock Paintings - According to the results of image processing, this group of images is a group of images of standing sheep that are mainly depicted in lines. Most of the lines are straight lines, and the images presented are simple and clumsy.	 
camel image 1		Montenegro Petroglyphs - Herd of Camels Grazing	 

JIAYUGUAN	NUMBER	CONTENT	IMAGE
	camel image 3	Heishan Rock Paintings - According to the image processing results, this group of rock paintings are the images of camels chiseled by silhouette method, with the camel's head raised high, and the camel's body is strong and heavy, very imposing.	 
	deer image	Rock paintings in Heishan - According to the results of image processing, this group of rock paintings are inscribed deer images with lines, and the torso and horns on the head of the deer can be distinguished.	 
People	character image 1	Heishan Rock Paintings - According to the results of image processing, the outlines of the characters can be seen. Judging from the posture, they seem to be dancing or jumping and running. The upper body and arms are slender. From the perspective of human body structure, the proportions of the characters in this group of rock paintings are not accurate. , but very interesting.	 
	character image 2	Heishan Rock Paintings - According to the image processing results, this group is a single image of a person, and the whole body of the person is chiseled to express the outline. From the perspective of posture, it seems to be shooting with a bow and arrow, with the arms half curled up. The image of the person is complete, but One thing to note is that there is a difference between the drawing method of the bow and arrow figure and the way of depicting the characters. The lines of the tools are shallower and more connected, and even not obvious to the naked eye. You can consider the possibility that the characters and tools are not from the rock paintings of the same era or the characters' movements. possible.	 

JIAYUGUAN	NUMBER	CONTENT	IMAGE
character image 3		Montenegro Rock Paintings - According to the image processing results, this group is a single image of a person. Judging from the posture, the characters seem to be dancing. One hand is raised, and the short fingers of the characters can be seen, and the other arm is half-curved, the figure seems to be wearing a hat on the top of the head. The figure is complete and cute. Different from the other figures listed, the figure in this group of petroglyphs is more rounded, like a child wearing a hat dancing.	 
character image 4		Rock Paintings in Montenegro - According to the image processing results, this group is human images. The larger figure has his hands on his hips, and there is an indistinct pattern engraved on the side. It seems to be a child. The two figures seem to be dancing, and they seem to be adults. teaching children.	 
character image 5		Black Mountain Rock Paintings - According to the image processing results, this group of rock paintings has two patterns. What can be seen more clearly is the animal image in the front, with two high humps, a long neck, tilted forward, and the body and limbs are relatively long. It is long and can be the image of an animal, a camel. Based on the rough outline and scene, it is estimated that the figure behind it should be a human figure. Judging from the posture, it looks like walking or standing. Judging from the combination, it should be a scene of camels grazing.	 







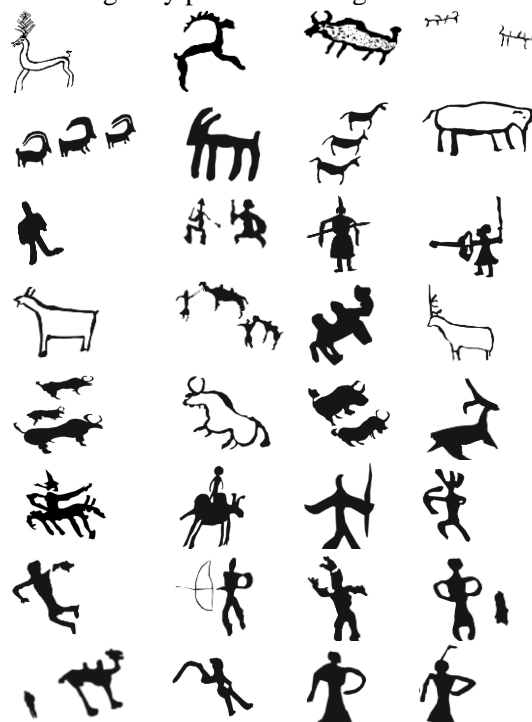
JIAYUGUAN	NUMBER	CONTENT	IMAGE
	character image 6	Black Mountain Rock Paintings - According to the image processing results, the picture shows a whip-wielding man driving a horse. In addition to human figures, the whole set of pictures also contains animal images of tigers, snakes, and camels, which is very rich. The figure holds a long whip and raises his arms high, with complete dynamics.	 
	character image 7	Black Mountain Petroglyphs - According to the image processing results, the picture shows a dancer, wearing a long tunic that reaches the ankle, with one hand on the hip.	 
	character image 8	Montenegro Rock Paintings - According to the results of image processing, this picture and task image 7 belong to the same group of rock paintings, and they are dancers from the same group. Both of them are wearing tunics with one hand on their hips. The headdress is presumably related to identity or religion, and the human figures are arranged horizontally.	 

Table 2.3 Summary table of digitally processed images





Due to the unevenness of the rock surface, the age of creation, and the weathering of the rock, many petroglyph patterns are difficult to identify. Except for the unidentifiable named patterns, according to image processing technology, the currently recognizable patterns are: horse, Animal images such as cattle, sheep, dogs, deer, tigers, wolves, snakes, and camels; characters such as hunters and dancers; the scenes depicted include dancing, hunting, riding horses, riding camels, hunting, etc., and there are many mysterious symbol.

Among them, the hunting pictures can be divided into three types: single hunting, group hunting and group hunting. The characters in the picture have different postures. The hunter in the hunting picture is usually located behind the animal. The hunter usually wears a tunic, a pointed hat, long boots and holds a weapon for hunting. According to historical research, in the pre-Qin and Qin-Han periods, there were a large number of Serbians living in the Western Regions, and some small city-states and even the entire country in the Western Regions were composed of Serbians. This image may be Serbians, who originally lived in the Hexi Corridor. Later, they migrated north and south to the Tianshan Mountains and Central Asia. As for the typical dance picture in Jiayuguan Heishan Rock Paintings, the dancers wear robes and feather-like ornaments on their heads, with one hand on their waist and the other hanging high; or their hands on their hips, which makes people feel a strong sense of rhythm.

These rock paintings are mainly created using chiseling techniques, reflecting people's hunting, herding, dancing and other content at that time, and have a strong flavor of life.

Table 3 Comparative analysis table of rock painting image content in JiuQuan and JiaYuguan cities

	JIUQUAN	JIAYUGUAN
Distribution of petroglyphs	The Jiuquan rock paintings are primarily located in the Subei area, with a total of 23 sites, and one in Dunhuang, Aksai, Guazhou, and Yumen, respectively. A total of 19 petroglyph sites have been identified in SuBei.	Jiayuguan rock paintings are mainly Heishan rock paintings, located in the northwest corner of Jiayuguan, and there are many rock painting spots.
Time	<p>There are many rock painting sites in Jiuquan City, and the creation time of different sites is different. The time spans from the Neolithic Age to the Han Dynasty. The summary is as follows:</p> <p>The Algetai petroglyphs span the period from the Warring States Period to the Western Han Dynasty.</p> <p>The petroglyphs of the Budu Hulu Site span a temporal range from the Spring and Autumn Period to the Western Han Dynasty.</p> <p>The petroglyphs in Kuangougou span the period from the Warring States to the Western Han Dynasty, with a focus on hunting and grazing.</p> <p>The Daheigou petroglyphs also span this period, with a similar focus.</p> <p>Gegewusu Petroglyphs: Neolithic-Bronze Age</p> <p>The Hanxia petroglyphs span the period from the Warring States Period to the Western Han Dynasty. (inscribed, sheep, deer)</p> <p>North Mountain petroglyphss in Hongliuxia: From the Warring States Period to the Western Han Dynasty</p>	<p>Warring States Period to Ming Dynasty (475 BC/403 BC-1644)</p>



	JIUQUAN	JIAYUGUAN
	<p>The Houhuiwanzi petroglyphs span the period from the Warring States Period to the Western Han Dynasty.</p> <p>The Huiwanzi petroglyphs span the period from the Spring and Autumn Period to the Western Han Dynasty.</p> <p>Kholzadga petroglyphs: Paleolithic to Warring States Period</p> <p>Petroglyphs of the Old Daoist Huduge: From the New Period to the Spring and Autumn Period and the Warring States Period</p> <p>Liugou petroglyphs: From the Warring States Period to the Western Han Dynasty</p> <p>Petroglyphs of Seven Donkeys: Spring and Autumn Period to Western Han Dynasty</p> <p>Sander Petroglyphs: From the New Period to the Spring and Autumn and Warring States Periods</p> <p>Deep Groove petroglyphs: Spring and Autumn Period to Western Han Dynasty</p> <p>Petroglyphs of Dajingquan in Shibao City: From the New Period to the Spring and Autumn and Warring States Periods</p> <p>Tonggututu petroglyphs: From the Warring States Period to the Western Han Dynasty</p> <p>Petroglyphs of Crescent Lake: From the Warring States Period to the Western Han Dynasty</p>	
Petroglyph theme	Camels, bison, sheep, dogs, horses, donkeys, etc., the hunting grounds are the main ones; the combination of people and animals; the combination of witchcraft, mysterious patterns, deer and trees, etc.	Bison, sheep, wild deer, tiger, leopard, wolf, snake, etc., mainly hunting scenes; large-scale dance, sacrificial scenes, etc. Animal portraits are typically represented by a large number of beautifully drawn images of yaks.
Production method	chiseling, milling, line engraving	Grinding method, chiseling method, line engraving method
Rock painting modeling	Single line, line outline, silhouette	Silhouette-based, with some line outlines
Petroglyph carrier	Mountain rock face and boulder surface in the ditch	Mountain rock face and boulder surface in the ditch

Table source: drawn by the author

Through the above overview and comparison of petroglyphs, it can be seen that in this long and narrow petroglyph distribution belt in Gansu, there are differences in rock paintings at various locations. Therefore, they also have different tribal cultures. Judging from the themes of rock paintings, there are many images of sheep and dogs in Jiuquan rock paintings, and images of deer and trees appear many times. Jiayuguan Heishan rock paintings are typical of a large number of exquisitely crafted yak images. However, since Jiuquan City and Jiayuguan City are both located in the west of the Hexi Corridor, and the two cities are bordered, and part of the area is included, the following common points can be concluded: the petroglyphs in the west of Hexi are mainly animal-themed, and most of them are

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chiseled. Line modeling or silhouette modeling, mainly concrete and realistic life scenes, rock painting records are full of natural and realistic styles.

Due to the unique geographical location of Gansu, the Hexi Corridor is also the activity area of most nomadic peoples in history. It connects the southeast and northwest, and the expansion and migration of various tribes and ethnic groups. Cultural exchanges and dissemination lead to diversity. In addition, it should be noted that since the boundaries between these areas are not fixed, they must overlap to a certain extent. Therefore, with the continuous development of the understanding of the original petroglyphs in Hexi, further research and discovery are needed to improve the classification of these areas. or supplement.

#### Hexi petroglyphs and jewelry design

Hexi rock paintings have unique patterns and symbols. These patterns and symbols come from ancient people's lives, beliefs, religions and cultures, and are their cognition and abstraction of the environment and society. Applying these patterns and symbols to jewelry design can give jewelry unique symbolic meaning and cultural connotation. For example, you can design necklaces, earrings, rings and other jewelry with themes of mythical animals, characters or natural elements in Hexi rock paintings to attract consumers.

Secondly, the original Hexi rock paintings have a unique artistic style with distinctive lines and patterns. Applying these artistic elements to the design of jewelry tourist souvenirs can create jewelry products with both cultural and artistic value and market value. For example, you can use the unique shapes, filigree crafts or enamel craftsmanship of Hexi rock paintings to integrate the cultural artistry of Hexi rock paintings into modern aesthetics and embody it in jewelry products, which not only satisfies the embodiment of its cultural artistry, but also satisfies the practical needs of consumers. Function.

In addition, the original Hexi rock paintings, as a treasure of Chinese culture, have unique historical and cultural significance. Integrating Hexi rock painting elements into jewelry design can help inherit and promote China's cultural heritage. By introducing the history and stories behind Hexi rock paintings to consumers, consumers can better understand and appreciate the treasures of ancient Chinese art. This can not only enhance people's sense of identity and pride in Chinese culture, but also promote cultural exchanges and the promotion of traditional arts.

Of course, there are also some issues that need to be paid attention to when designing jewelry based on original Hexi rock paintings. The first is to protect and respect the original form and integrity of Hexi rock paintings. Secondly, there is the market background. The market for jewelry designed with original Hexi rock paintings as elements has broad development prospects. As people's attention to and recognition of traditional culture increases, the demand for jewelry with historical and cultural connotations gradually increases. The rise of museum stores also provides good market opportunities for jewelry designed with Hexi rock paintings as elements.

The design elements in the Hexi Rock Painting series of jewelry are all taken from Hexi Rock Paintings and applied to Hexi Rock Paintings. The following workflow was carried out when extracting elements of Hexi rock paintings:

Collect related rock painting elements. The elements, types and quantities in Hexi rock paintings are very large. In order to collect complete and authentic content, on-site inspections and communication with relevant cultural relic experts are very necessary. During the process, the content and shape of all relevant elements are confirmed.

Classify and summarize elements. Classify and summarize the contents of existing rock art sites through field investigations, communication with relevant cultural relic experts, and photography records.

Select typical patterns in rock paintings for design conception.

Selection of theme and style.

The jewelry design of the Hexi rock painting series will be based on the new Chinese style, and will be designed and created based on the unique natural environment of the Hexi rock painting. When analyzing the pattern elements, it can be found that most of the elements are expressed in the form of lines or silhouettes, so the design will be In the design, enamel technology and filigree technology are



appropriately integrated, and multi-material expressions are attempted to stylize the Hexi rock painting jewelry works and convey their cultural connotations.

In the context of a market that uses museum stores as a platform, researchers on this topic believe that such jewelry products should be positioned as unique, authentic, and culturally significant pieces. As for the positioning of consumer groups, it is mainly aimed at people who have studied or appreciated or are interested in museum-related culture and history. These consumers usually have a certain level of education and purchasing power, and pay great attention to personal matters in their daily lives. Style, willingness to share products with content, and willingness to collect meaningful products for your own use.

At present, the content of jewelry products in museum stores is generally relatively simple. In order to satisfy the purchasing power of most consumers, most museum jewelry products choose to be promoted with a relatively "safe" and popular product positioning and design, but in essence, it is not culturally appropriate. The inheritance and promotion of jewelry does not have a high influence, and it does not meet the innovation and creativity requirements that design should have to a certain extent. Moreover, the price of jewelry products varies according to factors such as the materials used, the level of craftsmanship, and the uniqueness of the work. . Generally speaking, the price of this type of jewelry products is higher than other jewelry cultural and creative products to convey its value, uniqueness and authenticity.

Therefore, to summarize the above points, regarding the consumer positioning of this series of Hexi Rock Painting jewelry products, please refer to the following:

**Quality and craftsmanship:** Museums often position their jewelry souvenirs as high-quality, well-made items. Emphasis on the use of quality materials, craftsmanship and attention to detail appeals to consumers who value quality and authenticity.

**Cultural and historical significance:** Emphasize the background cultural or historical significance of jewelry souvenirs, position the product as meaningful and educational, and attract consumers who are interested in the historical culture and traditional art behind the product.

**Exclusivity and uniqueness:** The development of this series of Hexi rock painting jewelry tourist souvenirs is a brand-new attempt. The gaps in the market will definitely position this series of products as exclusive or unique.








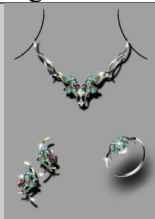
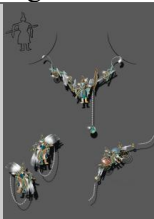

**Locality and handicrafts:** The locality of this series of jewelry products is an opportunity to promote the regional culture. The handmade design and production attracts consumers who want to support local businesses and appreciate handmade unique jewelry products to a certain extent.

**Educational and informative:** This series of jewelry products can also be used as educational tools to provide the public with information about the historical or cultural background of jewelry products.

The application of Hexi rock art elements in jewellery and souvenirs was subjected to a comprehensive examination through qualitative and quantitative analyses. The study concluded that the utilisation of Hexi rock art elements in jewellery and souvenirs is a viable and promising avenue for market expansion. Among the aforementioned applications, the utilisation of Hexiyan art elements in the creation of jewellery and souvenirs confers upon these items a distinctive artistic value and collection value. This is of considerable positive significance in the promotion of the regional cultural industry.

This study examines the application methods and strategies of Hexi rock art in jewellery and souvenir design in a comprehensive manner from a practical point of view. The findings of this study offer valuable insights for those engaged in related design research, while also providing insights into the cultural and tourism development of Hexi rock paintings resources.

The interview questionnaires solicit the opinions of the experts on the design of the jewellery products of each group. The experts will provide feedback on the designed products with regard to three key areas: style and pattern, material selection and craftsmanship in the creation process.

Name	Animal-1	Animal-2	Animal-3	Animal-4	Animal-5
Design - drawing					
Name	Figure-1	Figure-2	Figure-3	Figure-4	Figure-5
Design - drawing					

## Discussion

Hexi rock art is a precious cultural heritage of our country, carrying rich historical information and national cultural connotation. In the process of using Hexi rock art elements in the design and development of jewelry souvenirs, there are some limitations, which affect the full play of Hexi rock art elements in jewelry and souvenir design.

First of all, the cultural connotation and artistic value of Hexi rock art have not been fully explored. Although some designers have realized the value of Hexi rock paintings, the application of rock art elements in most design works is still on the surface, and their inherent cultural connotation and artistic value have not been truly explored. This makes the design of the work lack depth and it is difficult to reflect the unique charm of Hexi rock paintings.

Secondly, the expression of Hexi rock art elements in the design of jewelry and souvenirs is single. At present, when most designers use Hexi rock art elements, they are often limited to copying them directly into jewelry design, lacking innovation and change. This single form of expression is easy to make the design works fall into a pattern, and it is impossible to show the diversity and richness of Hexi rock paintings.

Thirdly, there are difficulties in the integration of Hexi rock art elements with jewelry souvenir design. Due to the historical background, regional characteristics and aesthetic concepts of Hexi rock paintings, cultural differences and aesthetic concepts may be encountered when applying them to jewelry design. How to retain the characteristics of Hexi rock paintings while integrating them with modern jewelry design has become a major challenge.

In addition, marketing and product positioning are also a major limitation in the design and development of jewelry souvenirs using Hexi rock art elements. Due to the relative niche of Hexi rock paintings, consumers' awareness and acceptance of them are limited. Therefore, designers need to put in more effort when promoting and positioning such products to broaden market channels and improve the visibility and influence of products.

To sum up, there are certain limitations in the design and development of jewelry souvenirs using Hexi rock art elements. In order to overcome these limitations, designers need to start from many aspects, such as excavating the cultural connotation and artistic value of Hexi rock paintings, enriching the forms of expression, integrating design and jewelry aesthetics, and strengthening market promotion, so as to give full play to the unique charm of Hexi rock art elements in jewelry souvenir design.

**Conclusion [11 point]**  
This paper aims to inherit and promote the cultural heritage of Hexi region by applying Hexi rock art elements to the design and development of jewelry and souvenirs. Through qualitative and quantitative analysis, the application of Hexi rock art elements in jewelry and souvenirs was studied in depth. It is found that the application of Hexi rock art elements in jewelry and souvenirs has high

feasibility and market potential. Specifically, the use of Hexi rock art elements makes jewelry souvenirs have unique artistic value and collection value, which is of positive significance for promoting the development of regional cultural industry.

According to the preliminary research, ten sets of jewelry souvenirs were designed and developed, including five sets of animal image jewelry products, five sets of human image jewelry products, and one set of optimal solutions for people and animals were obtained (Figure 5.1).



Figure 2

While the application of Hexi rock art elements in jewelry and souvenirs has considerable potential, there are still some issues that require attention in practical operations. Primarily, in the extraction and recreation of Hexi rock art elements, it is essential to fully respect the cultural connotations and spiritual value of the original works, and to avoid excessive commercialization and abuse. Secondly, in the process of designing and developing jewelry and souvenirs, it is essential to consider market demand and consumer psychology in order to meet the diverse needs of consumers. The incorporation of Hexi rock art elements into jewelry and souvenirs not only preserves and promotes regional cultural heritage but also contributes to the growth of cultural and creative industries.

The difference between this research and other related papers is the unique perspective and rich practical experience on which this paper is based. First of all, from the perspective of practical operation, this paper discusses how to integrate Hexi rock art elements into the design and development of jewelry and souvenirs. Through the in-depth analysis of the characteristics, artistic style and symbolic meaning of Hexi rock paintings, it provides a rich source of inspiration for researchers. At the same time, the research also pays attention to market demand and consumer psychology, and provides targeted design suggestions for researchers.

Secondly, the research of this project is based on actual design cases, and the design products cover various types such as necklaces, earrings, bracelets, etc., showing the possibility of rich application of Hexi rock art elements in jewelry and souvenirs. Through interviews with experts and related workers, the characteristics and advantages and disadvantages of the ten sets of products were compared and analyzed from the perspectives of style and pattern, material application and creative process, which provided a useful reference for follow-up research.

In addition, the research also discussed the status and role of Hexi rock art jewelry and souvenirs in the tourism and cultural industry. It is pointed out that Hexi rock art jewelry souvenirs not only help to enhance the taste and value of local tourism souvenirs, but also promote the development of related industries and inject new vitality into the local economy. This point of view provides new ideas for local governments and enterprises, and helps to promote the cultural and tourism development of rock art resources in Hexi.

In short, from a practical point of view, this paper comprehensively discusses the application methods and strategies of Hexi rock art in jewelry and souvenir design. The findings of this research not only serve as a valuable reference for those engaged in related design research but also provide insights that can inform the cultural and tourism development of rock art resources in Hexi. By exploring the artistic value and market potential of Hexi rock paintings in depth, this paper aims to reinvigorate the local cultural tourism industry.

## Recommendation

As a unique cultural heritage of China, Hexi rock art has its artistic value and historical value that cannot be ignored. The application of Hexi rock art elements to jewelry design and development will



not only help to inherit and promote this valuable cultural heritage, but also inject new vitality into the jewelry industry. Here are some suggestions to guide the use of Hexi petroglyph elements in jewelry design development:

#### **In-depth study of the characteristics of Hexi rock art art**

In order to ensure the authenticity of the jewelry design, the designers must first conduct an in-depth study of the artistic characteristics of Hexi rock paintings. This includes the shape, color, texture, symbols and other aspects of the petroglyphs so that the characteristics of Hexi petroglyphs can be fully reflected in the design process.

#### **Refining petroglyph elements**

On the basis of studying the characteristics of Hexi rock art art, designers need to refine representative elements. These elements can include animals, hunting scenes, natural landscapes, etc., and the key is to ensure that the petroglyph elements in the jewelry design have high recognition and artistic value.

#### **Innovative Jewelry Design Concepts**

When applying Hexi rock art elements to jewelry design, designers should dare to innovate and break the framework of traditional jewelry design. For example, petroglyph elements can be combined with modern jewelry design styles to create unique jewelry products.

#### **Pay attention to the quality of jewelry making**

In the jewelry design process, designers should pay attention to the craftsmanship quality of jewelry making. The exquisite technique is used to perfectly present the elements of Hexi rock paintings on the jewelry, making it a work of art.

#### **Cross-border cooperation**

In order to better promote Hexi rock art jewelry, cross-border cooperation can be carried out, such as working with tourism, cultural and creative industries and other related enterprises to jointly create Hexi rock art theme jewelry products. This will help to increase the visibility and market competitiveness of jewelry design.

In short, the application of Hexi rock art elements to jewelry design and development will not only help inherit and promote this valuable cultural heritage, but also bring new development opportunities to the jewelry industry. Researchers should deeply study the artistic characteristics of Hexi rock paintings, innovate design concepts, pay attention to process quality, and create brand effect to promote the development of Hexi rock art jewelry design.

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