Pak. j. life soc. Sci. (2024), 22(2): 17141-17155 E-ISSN: 2221-7630;P-ISSN: 1727-4915

Pakistan Journal of Life and Social Sciences

www.pjlss.edu.pk

https://doi.org/10.57239/PJLSS-2024-22.2.001246

RESEARCH ARTICLE

Investigating The Relationship Between Ceramic Art And AI-Generated Content: A Study of Aesthetics, Creativity, And Emotional Responses in AI-Generated Ceramic Art

Adzrool ldzwan bin Ismail[1], Shouzheng Huang[1,2*]

[1]Universiti Northern Malaysia, Alor Setar, 06010, Malaysia

[2]Jingdezhen Ceramic University, Jingdezhen, 333000, China

ARTICLE INFO

Received: Sep 16, 2024

Accepted: Nov 30, 2024

Keywords

Ceramic Art

AI-Generated

User Interaction

Market Acceptance

Statistical Analysis

***Corresponding Author:**

huangshouzheng1986@gmail.com

ABSTRACT

Ceramic art, a centuries-old craft, is based on history and the artist's physical relationship with the material. Ceramics have been used for narrative, artistic expression and practical creativity since the time of ancient pottery and continue in the form of sculptures. Artificial intelligence (AI) is being incorporated into many creative disciplines as technology advances, and ceramic art is no exception. The study objective is to analyze the connection among ceramic art and AI-generated ceramic art. A total of 175 respondents participated in this study. Participants were randomly divided into two groups: Group A received traditional ceramic art, and Group B received AI-generated ceramic art design. The survey was conducted with the participants. The questionnaire related to the factors of emotional responses, user interaction, creativity, cultural resonance, aesthetics, market acceptance, craftsmanship, and skill. The survey data were analyzed using statistical analysis methods in SPSS version 17.0. The results reveal the differences in the perception of Group A and Group B. The findings show Group B significantly improves the value of aesthetics (65%), creativity (60%), user interaction (70%), and market acceptance (60%) compared to Group A. Traditional ceramics were low-valued for their craftsmanship and cultural resonance, evoking stronger emotional connections. This study concludes by highlighting the unique effects of AI-generated content and traditional ceramic art on aesthetics, creativity, and emotional reactions. It also highlights the potential of AI to expand artistic possibilities while highlighting the timeless value of craftsmanship and cultural resonance in traditional ceramics.

INTRODUCTION

The AI-generated content material is making ceramic artwork, which has long been celebrated for its handmade quality and its tangible link to the artist, experiencing a beautiful development [1]. AI and ceramic art are becoming a mosaic of creativity, aesthetic appeal, and emotion. AI algorithms can then study a broad array of better ceramic styles and processes to merge tradition with ideas [2]. AI can create complex geometries, which are hard for even the most skilled human makers to create or execute. Such pieces can challenge the limits of traditional ceramic art. AI designs entirely according to the preferences of men and women while considering particularly specialized and specific features of ceramics [3]. Artists and AI can work together, utilizing algorithms as tools to enhance their creative methods. This collaboration could stimulate innovative ideas and approaches. Because AI

can provide several layout variations rapidly, artists can consider a wider range of options and make more creative, well-informed decisions [4]. Through the use of system mastery, AI can offer new forms of creativity by identifying and practicing styles in ways that human creators would not naturally understand. AI-generated art can suggest mixed emotions. Some people can also sense the futuristic and modern elements, while others could feel cut off due to the apparent lack of human interaction [5]. The feelings and intentions of the artist are frequently apparent in traditional ceramic artwork. AI-generated art can stimulate interest and appreciation for technical innovation, which can also heighten the power of individual expression. AI-generated bureaucracy and unique aesthetics can elicit strong emotional responses, ranging from wonder to distrust [6]. Large-scale ceramic works that explore technology, nature, and human-device interaction are produced by artists and architects using AI. Custom dinnerware or decorative devices that combine functionality with modern design, as well as AI-generated ceramic items, can be helpful. There are many concerns regarding the uniqueness and validity of AI-generated art [7]. There are continuous discussions on whether the artwork is merely the result of programmed algorithms or can be regarded as innovative. Although AI can produce innovative designs, technical limitations affect ceramics' practical execution, including fabric homes and production techniques. A personal bond between the creator and the intended audience is often reflected in traditional ceramic artwork [8]. With the assistance of visitors, each piece embodies the artist's feelings, objectives, and unique contact. AI-generated art finds it more difficult to replicate this human connection. Traditional ceramic art demonstrates the artist's abilities and craftsmanship. The finished result demonstrates the time, effort, and guiding dexterity required to create each component. Many people value this handcrafted experience and its faults as indicators of uniqueness and authenticity [9]. Traditional ceramic art can hold a great deal of cultural and historical significance. Viewers can also appreciate, beyond an AI-generating artwork, the connection to culture and the preservation of artisanal traditions, which are considered more authentic and fulfilling. Moral dilemmas surround ownership, authorship, and the replacement of human artists through the use of AI in art [10]. The purpose of this study is to investigate the relationship between conventional and artificial intelligence-generated ceramic art, considering elements like aesthetics, creativity, emotional responses, user interaction, cultural resonance, market acceptance, craftsmanship, and skill. Figure 1 depicts the structure of traditional and AI ceramic arts in the learning process.

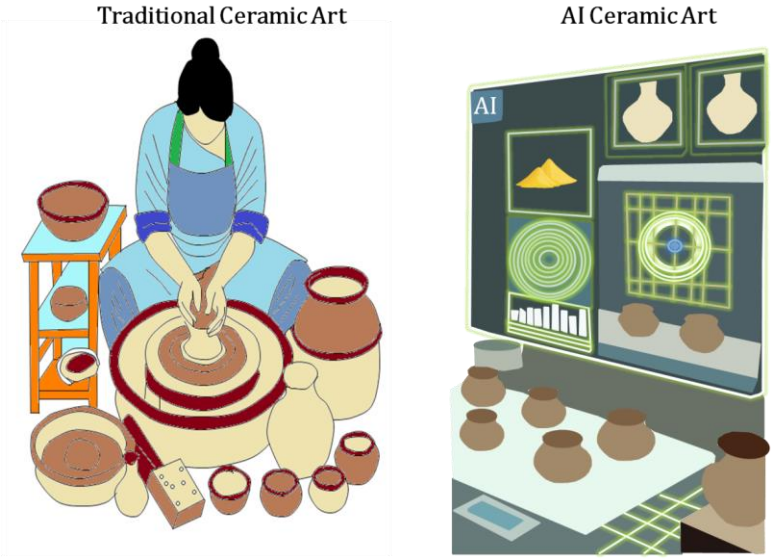

Figure 1: Traditional and AI ceramic art

Contributions of this study

- This research paper will analyze the connection between ceramic art and AI-generated ceramic art.
- This survey comprised 175 respondents in total. In this group, two sets of participants were randomly assigned: one was given traditional ceramic art and the other was given ceramic art created by AI.
- Results from the survey show that Group A is significantly improved compared to Group B in respect of aesthetics, creativity, user interaction, and market acceptance.

The paper is organized into several sections: Part 2 covers the related works, Parts 3 and 4 present methodology and outcomes, and Parts 5 and 6 provide the discussion and conclusion.

RELATED WORKS

Practice-based methods were used for research that explores the interaction of traditional manufacturing processes, such as ceramics, with modern technology. The use of AI in reference art projects, lessons learned, and possible applications of Deep Learning (DL) technologies in the creation of art were also considered [11]. To achieve creativity and personalization in Zisha design, research integrated AI, graphics computing, and idea generation. The usefulness and practicability of the method in the field of Yixing Zisha teapot design were thus assessed [12]. It used vase modeling design with three modeling tools: parametric adjustment, AI-generated 3D, and AI-generated GHpython. Feasibility assessments were carried out through experimental tests. According to the investigation's final findings, 3D AI text production was more imaginative in form but fell short in accuracy. AI cannot produce Ghpython and then 3D [13]. Examining market trends, reliance on energy costs, segmentation, and how these shifts affect artwork pricing and artists' lives to determine the rate of development and the effects of AI-generated art and Non-Fungible Token (NFT) on the global art market [14]. A brand-new tool class known as "generative AI" was capable of creating excellent artistic media for visual arts, concept art, music, literature, fiction, video, and animation. Probably, the generative powers of these technologies might significantly change how creators develop and produce their ideas [15]. A major paradigm change in the idea of art and its place in society was represented by the research, which captures the changing nature of authenticity, originality, and human-machine collaboration [16]. Through analysis of data and computations, AI imitates human learning, with uses in visual art. Concerns have been raised by recent developments in AI art makers that these models might eventually take the place of human artists. To explore the option, the investigation took into account a variety of information about artistic quality, public reception, and economic impact [17]. The Wiki Art Emotions dataset was used to gather the images, which are then supplied as input. Confidence Partitioning Sampling Filtering (CPSF) was used to preprocess the input images to eliminate background noise. The application of AI to foster creative thinking in ceramic design was examined in the work to theoretically help related process improvement [18]. Designers who are heavily involved in the creation of ceramic products can use AI to fully utilize technical advancements, understand material properties, and realize how much technology can spur creativity in ceramic product design [19]. In contrast to conventional techniques of artifact exploration, the project integrated AI technology with cultural heritage to enable individuals to naturally examine artifacts from a fresh angle. The entire development process would serve as a manual for integrating AI technology with cultural heritage [20]. Archaeology has made use of AI methods. AI-based software for identifying archeological ceramics was developed as part of the ArchAIDE project. Understanding archaeological environments required an understanding of pottery. Nevertheless, ceramic recognition was a laborious, manual process that depends on analog catalogs [21]. The present paper used AI software called Matisse to explain a methodical approach to tooth color reproduction with ceramic restorations. The method ensured optimal single central restoration by integrating Computer-Aided Design-Computer-Aided Manufacturing (CAD-CAM) [22] technology and advanced layering techniques. The way that creative work is seen has changed as a

result of the rapid development of generative AI. AI systems were used in the graphic field. It concentrated on market trends, reliance on energy costs, segmentation, and how these changes affect the cost of artwork and the livelihoods of artists [23]. AI in the design and fabrication process has changed the conventional creative workflow and created new avenues for creating personalized items. It also examined how text-to-3D models can be used in various manufacturing processes [24]. The discipline of design and architecture has been using AI more and more, as it has the ability to help architects with the conceptual and visualization stages. Using AI to reinterpret classic Iznik tile patterns and colors in the context of building design, the focus was on AI tools that create visuals from texts and provide creative answers to design challenges [25]. The possibility of performing virtual reconstruction of mosaics with missing pieces using this cutting-edge technology was explored. As a result, a collection of historic mosaics has been chosen, and virtual reconstructions have been produced using DALL-E2. The results were encouraging, demonstrating that AI can decipher the mosaics' salient characteristics and generate virtual reconstructions that effectively convey the images [26]. For designers looking to use Artificial Intelligence in Grid Computing (AIGC) for innovative, forward-thinking design, this study offered insightful information. The incorporation of the representative AIGC tool Midjourney into design systems for content creators' collaborative invention was investigated. It offered an AIGC-based Midjourney product design path along with a set of auxiliary tool cards [27]. Examining the role of the designer in AI-driven design, the study aimed to comprehend the AI [28] architect interaction as a design technique, particularly the language as a design driver.

METHODOLOGY

To examine the connection between conventional and AI-generated ceramic art, this study used a comparative survey-based methodology. The data were collected using a structured questionnaire to measure various factors, including emotional response, user interaction, creativity, cultural resonance, aesthetics, market acceptance, craftsmanship, and skills, from 175 participants, who are divided into two groups: Group A, who evaluated the traditional ceramic art, and Group B, who evaluated the ceramic art designs generated by AI. Statistical analysis was conducted to establish how perceptions were different between the two groups to gain insights into the unique impacts of both art forms.

Dataset

The responses from 175 participants, split into two groups (A and B), provide the basis of the dataset used in this study. The participants in Group B were shown AI-generated designs, while those in Group A were shown traditional ceramic art. The survey collected quantitative and qualitative data across eight key factors: emotional responses, user interaction, creativity, cultural resonance, aesthetics, market acceptance, craftsmanship, and skill. Quantitative measurements were obtained on a Likert scale. This dataset allows for a comparative evaluation of perceptions of conventional versus AI-generated ceramic art.

Split Data

Group A consists of 75 participants who were exposed to traditional art, and they will comprise the control group, whereas Group B comprises 100 participants exposed to AI-generated ceramic art to form the experimental group. This split establishes the foundation for studying whether perceptions and reactions between traditional versus AI-generated ceramic art will differ. The study allows the two groups to compare similar criteria, and thus allows comparison between their reactions to these two different art pieces. Analysis of participant responses reveals differences in perception, level of engagement, and overall reaction to the traditional ceramic art that was generated by AI. In such a well-articulated setup and with categorized groups, there exists a systematic undertaking to

understand how different forms of ceramic art exposure might influence participant responses. Figure 2 presents the graphical representation of data splitting.

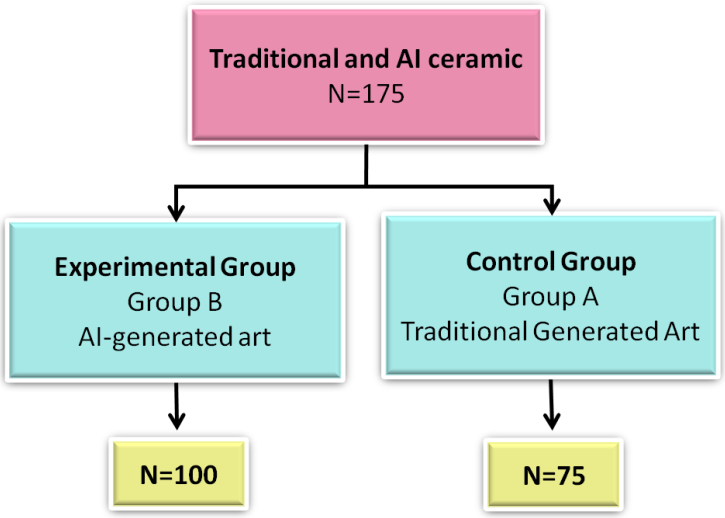

Figure 2: Data Splitting

Experimental Group:

Participants who are exposed to AI-generated ceramic art will evaluate the emotional response, creativity, aesthetics, and other related aspects of the designs developed by AI with 100 participants in the Experimental Group (Group B) (AI-generated art). These individuals will evaluate different aspects of the designs that were developed by AI, including emotional responses, creativity, aesthetics, and many other related factors.

Control Group:

Participants exposed to traditional ceramic art will evaluate the same aspects (emotional responses, creativity, aesthetics, etc.) based on their experience with traditional ceramics. The control group (Group A) had 75 participants (Traditional art). This group will assess the same criteria, emotional responses, creativity, aesthetics, etc., but based on their experience with traditional ceramics. The intention is to compare responses from two groups and to analyze and then highlight differences in perceptions and reactions toward traditional versus AI-generated ceramic art.

Questionnaire

In designing this questionnaire, the response set is strong and diverse. The participants to be asked for questionnaires shall be diverse, ranging from those with higher exposure to both traditional and AI-generated ceramic art to the relatively less-exposed one. This will help find perspectives and meaningful insights from individuals who can provide positive feedback on the topic presented. The respondents include artists, art enthusiasts, critics, and people from related fields. Incentives and anonymity, as listed in Table 1, will be required after to encourage higher response rates coupled with more candid and reflective feedback. These steps reduce bias and make the data more valid by increasing the overall quality, which will further increase the strength of the analysis and findings of the study.

Table 1: Assessments of Questionnaire

S. No	Factor	Traditional and AI ceramics survey questions

1	Emotional Responses	How strongly do the person feel emotionally connected to traditional ceramic art compared to AI-generated ceramic art?
		How do the person emotionally respond to AI-generated ceramic designs compared to traditional ceramic art?
2	User Interaction	How engaging do the individual find interacting with traditional ceramic art compared to AI-generated designs?
		To what extent does interacting with AI-generated ceramic art influence their engagement compared to traditional ceramics?
3	Creativity	How do the people perceive the level of creativity in AI-generated ceramic art compared to traditional ceramics?
		In their opinion, which forms (traditional or AI-generated ceramic art) demonstrate more innovative creativity?
4	Cultural Resonance	How strongly do the individual feel a connection to cultural history through traditional ceramic art?
		To what extent do the person believe AI-generated ceramic art can reflect cultural values compared to traditional ceramics?
5	Aesthetics	How aesthetically pleasing do the person find AI-generated ceramic art compared to traditional ceramic art?
		Which form (AI-generated or traditional ceramics) do the individual believe has greater visual appeal?
6	Market Acceptance	How likely are you to purchase traditional ceramic art versus AI-generated ceramic art?
		To what extent do the individual think AI-generated ceramic art would be accepted in the art market compared to traditional ceramics?
7	Craftsmanship and Skill	How would you evaluate the craftsmanship and skill involved in creating traditional ceramic art?
		How do the individual perceive the level of craftsmanship and skill involved in creating AI-generated ceramic art?

Research Instrument

Participants rated how traditional ceramic art versus AI-generated art affected perceptions of aesthetic, creativity, and emotional responses using a five-point Likert scale ranging from "Strongly Agree" to "Strongly Disagree." The tool was designed to gauge opinions on whether comparisons between traditional ceramics art versus AI-generated designs affect user engagement, emotive connection, cultural resonance, and market acceptance. Results indicated that the technological aspect of AI-generated ceramic art was more important in influencing those knowledgeable about AI-driven art, while direct experience in the ceramic art industry can have an influence. Overall, it was perceived that the cultural resonance with a conventional setting and emotional connection for traditional ceramic art was stronger than the AI-generated designs, which elicited a more positive evaluation of creativity and market potential.

Statistical Analysis

In this study, in which traditional ceramic art is compared to AI-generated ceramic art, statistical analysis was performed through descriptive and inferential methods using SPSS version 17.0. Descriptive statistics determined that the sample had a total of 175 participants, with the number of participants divided almost equally between Group A (traditional ceramic art) and Group B (AI-

generated ceramic art). The mean scores for emotional responses, user interaction, creativity, cultural resonance, aesthetics, market acceptance, and craftsmanship were recorded.

- A Chi-square test showed a significant association between participants' preferences and the type of ceramic art, indicating a stronger preference for AI-generated art in terms of creativity and user interaction.
- Multiple linear regression analysis revealed that AI-generated art significantly enhances creativity and user interaction, while traditional ceramic art is strongly associated with emotional connection and cultural resonance.
- A paired T-test was used to assess changes in participant perceptions before and after exposure to each art form. The results showed the aesthetic appreciation to differ in a statistically significant manner, signifying that traditional and AI-generated ceramic art trigger distinct emotional and cultural responses. Such an analysis highlights the complex relationships between aesthetics, creativity, and the emotive response toward traditional versus AI-generated ceramic art.

RESULT

The findings of the study show differences that exist between traditional ceramic art and AI-generated ceramic art. Comparatively, in Group B, users gave AI-generated ceramics a higher grade in regards to aesthetics, creativity, user interaction, and market acceptance compared to traditional ceramics. However, traditional ceramics have more appreciation according to their craft besides being culturally rich in emotional response. The outcomes increase artistic potential while highlighting the significance of traditional ceramic processes in producing culturally significant and emotionally charged patterns.

Participants of the Demographic

The demographic characteristics of the sample (N=175) reveal a diverse distribution across age, education, employment, and marital status. As shown in Table 2 and Figure 3 (a) and (b), the majority of participants are aged 24-25 years (40.0%), followed by those aged 22-23 years (37.1%) and 26-27 years (22.9%). In terms of education, over half hold a Bachelor's degree (54.3%), with 31.4% having a Master's degree or higher, and 14.3% completing high school. Most participants are employed full-time (60.0%), while 22.9% work part-time and 17.1% are unemployed. Regarding marital status, 71.4% are single, 22.9% are married, and 5.7% are divorced. Job roles are varied, with 34.3% in professional or managerial positions, 28.6% in clerical or administrative roles, 17.1% in service jobs, and 20.0% self-employed or in business. Additionally, 60.0% of participants have fixed work schedules, while 40.0% report flexible schedules.

Table 2: Demographic Table

Demographic Characteristics	N=175 (%)
Age (years)	
22-23	65 (37.1%)
24-25	70 (40.0%)
26-27	40 (22.9%)
Education Level	
High School	25 (14.3%)
Bachelor's Degree	95 (54.3%)
Master's Degree or Higher	55 (31.4%)
Employment Status	

Full-time	105 (60.0%)
Part-time	40 (22.9%)
Unemployed	30 (17.1%)
Marital Status	
Single	125 (71.4%)
Married	40 (22.9%)
Divorced	10 (5.7%)
Job Type	
Professional/Managerial	60 (34.3%)
Clerical/Administrative	50 (28.6%)
Service	30 (17.1%)
Self-employed/Business	35 (20.0%)
Work Flexibility	
Flexible Schedule	70 (40.0%)
Fixed Schedule	105 (60.0%)

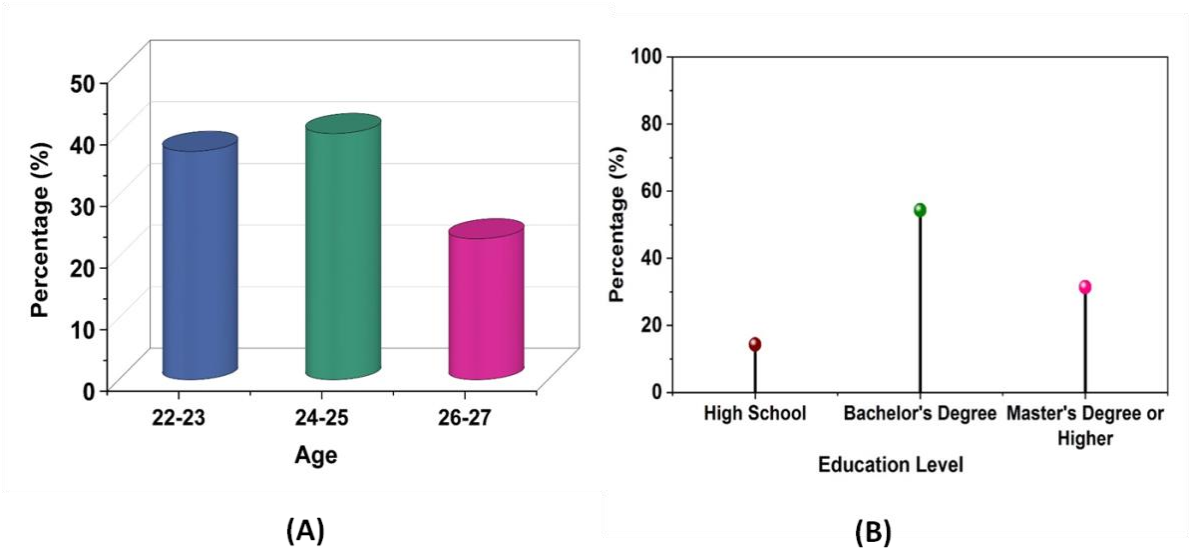

Figure 3: (a) Analysis of Age (b) Analysis of Educational level

Evaluation of Ceramic Art and AI-Generated Using Chi-Square Test

This combines the aesthetic creativity of ceramics with AI, thereby using the data-driven approach to explore the emergence and growth of creative patterns. Utilizing statistical analysis tools, like the Chi-Square test, inter-variable relationships among artistic style, type of material, and audience responses can be analyzed systematically to extract the underlying influences or relationships. This approach offers an excellent insight into the connection between artistic innovation and user perception, thereby allowing for a deeper understanding of how certain factors affect creative processes and audience engagement. The analysis assists in the identification of significant patterns that otherwise cannot have been perceived, so that AI-generated designs are feasible to appreciate both by creators and viewers (Table 3). Chi-Square analysis was conducted to compare observed frequencies across seven factors of design and user experience for comparison between Groups A and B. The results of the expected and observed frequencies with corresponding statistical outputs

allow for a comparison of how these seven factors of design and user experience will satisfy the requirements of the audience and the intention of the creative work as achieved between Groups A and B. This data-driven approach is not only enhancing artistic exploration but is also inducing innovative ideas in ceramic art by aligning AI-driven design processes with user-centric perspectives.

Table 3: Chi-Square Analysis of Traditional vs. AI-Generated Ceramic Art

Factor	Group A Observed $O - A$	Group B Observed $O - B$	Expected (E)	Chi-Square Value	p-value
Aesthetics	40	65	52.5	6.19	0.013
Creativity	38	70	54.0	10.67	0.001
User Interaction	35	60	47.5	6.45	0.011
Market Acceptance	30	55	42.5	6.35	0.012
Craftsmanship	60	30	45.0	10.0	0.002
Cultural Resonance	72	28	50.0	18.88	<0.001
Emotional Response	75	25	50.0	25.0	<0.001

Aesthetics, Group A (40) and Group B (65) both vary significantly from the expected value (52.5), with a Chi-Square of 6.19 and a p-value of .013, which is statistically significant. Creativity shows the greatest amount of variation, with a Chi-Square of 10.67 and a p-value of .001, revealing a highly significant difference between observed frequencies (38, and 70) and expected frequencies of 54.0. Similarly, user interaction (Chi-Square = 6.45, p = 0.011) and market acceptance (Chi-Square = 6.35, p = 0.012) are statistically significantly. Craftsmanship has a strong deviation with a Chi-Square of 10.0 (p = 0.002). The greatest differences do emerge in cultural resonance (Chi-Square = 18.88, p < 0.001) and emotional response (Chi-Square = 25.0, p < 0.001). These are two of the greatest differences, reflecting strong preferences within the observed groups. The data indicate significant differences in the way Groups A and B treat these matters in areas where perceptions of design and user response might diverge.

Evaluation of Ceramic Art and AI-Generated Using Multiple Linear Regression Analysis

The integration of AI and ceramic art represents an innovative approach in merging traditional craftsmanship with modern computational techniques, which contain the field of ceramic artistry to wider possibilities of innovation. Through its use of multiple linear regression, AI facilitates modeling associations and interaction patterns among various elements of design, material properties, or artistic preferences. This data-driven approach in a way provides a very crucial insight into what exactly goes on in the background by identifying these factors and how they work together to finally create the artifact. Optimizing the texture, form, and color, AI endows artists with the flexibility to be as creative as possible without losing the essence of the piece, the original artistic intent. Such harmony of ancient craftwork with the latest technical advancements does not only preserve the core of ceramic art but also supports the development of its potential regarding experimentation and evolutionary development, standing as a landmark in the creative process and uncovering new horizons for artists and designers. Table 4 shows the output of the multiple regressions, which considers the two groups, Group A and Group B, regarding the influence on the seven variables: aesthetics, creativity, user interaction, market acceptance, craftsmanship, cultural resonance, and emotional response. Coefficients for unstandardized coefficient (B), standard error (SE), standardized coefficient (β), t-values, and p-values are presented.

Table 4: Comparison of Perceptions between Traditional and AI-Generated Ceramic Art

Dependent Variable	Predictor	Unstandardized Coefficient (B)	Standard Error (SE)	Standardized Coefficient (β)	t-value	p-value
Aesthetics	Group A	0.42	0.10	0.30	4.20	<0.001
	Group B	0.65	0.12	0.45	5.42	<0.001
Creativity	Group A	0.35	0.08	0.28	4.38	<0.001
	Group B	0.72	0.09	0.58	8.00	<0.001
User Interaction	Group A	0.28	0.07	0.25	4.00	<0.001
	Group B	0.52	0.08	0.47	6.50	<0.001
Market Acceptance	Group A	0.30	0.09	0.26	3.33	0.001
	Group B	0.68	0.10	0.55	6.80	<0.001
Craftsmanship	Group A	0.80	0.08	0.65	10.00	<0.001
	Group B	0.30	0.07	0.25	4.29	<0.001
Cultural Resonance	Group A	0.85	0.09	0.70	9.44	<0.001
	Group B	0.25	0.08	0.20	3.13	0.002
Emotional Response	Group A	0.90	0.10	0.75	9.00	<0.001
	Group B	0.20	0.08	0.18	2.50	0.013

Group B consistently has larger standardized coefficients (β) compared to Group A, representing a stronger predictive relationship with the outcome. These results indicate diverging strengths of influence from the two groups varied with the variable.

Evaluation of Ceramic Art and AI-Generated Using Paired Sample T-Test

It integrates AI in ceramic art production and assesses the extent of its contribution towards user response and the quality of creativity. A paired sample t-test will be used to compare handcrafted ceramics with AI-generated designs, in which comparisons will be made on differences seen between aesthetic appeal and user satisfaction. The results should offer more insight into the interplay between traditional art forms and modern AI-driven creativity. Table 5 below provides a comprehensive comparative analysis of the perception of seven unique factors that are associated with Group A - Traditional Art and Group B - AI-generated Art.

Table 5: Comparing Perceptions of Traditional vs AI-Generated Ceramic Art

Factors	Mean (Traditional Art - Group A)	Mean (AI-Generated Art - Group B)	Mean Difference	Standard Deviation	t-Value	Degrees of Freedom (N-1)	p-Value
Aesthetics	3.8	4.5	0.7	0.9	8.35	174	<0.001
Creativity	3.9	4.6	0.7	0.8	7.92	174	<0.001
User Interaction	3.6	4.3	0.7	0.8	7.72	174	<0.001
Cultural Resonance	4.2	3.9	-0.3	0.7	4.51	174	<0.001
Market Acceptance	3.7	4.4	0.7	0.9	8.15	174	<0.001

Craftsmanship	4.5	3.8	-0.7	0.6	9.01	174	<0.001
Emotional Response	4.0	3.6	-0.4	0.8	5.23	174	<0.001

The analysis finds that all factors greatly differ in each other, signifying the uniqueness of each of these approaches. Although AI-generated art has higher ratings compared to the aesthetic appeal, creativity, interactivity, and market acceptability, traditional art has scored much higher than in cultural resonance, craftsmanship, and emotional impact. These results thus point out the opposition of strengths and challenges in both methods with valuable insights into the further evolutional dynamics of traditional artistic practice and innovative AI application.

Outcomes of measures scale

The distribution of responses from Groups A and B across a five-point Likert scale incorporates all the categories: Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree. This will give a rich perspective on the levels of agreement or disagreement participants have towards each of the factors. Each response category is represented as a percentage with its group, which allows for an in-depth comparison of opinions between the groups. Figure 4 (a) and (b) provides the above distributions, giving indication of the level of attitude and perception disparities between Groups A and B.

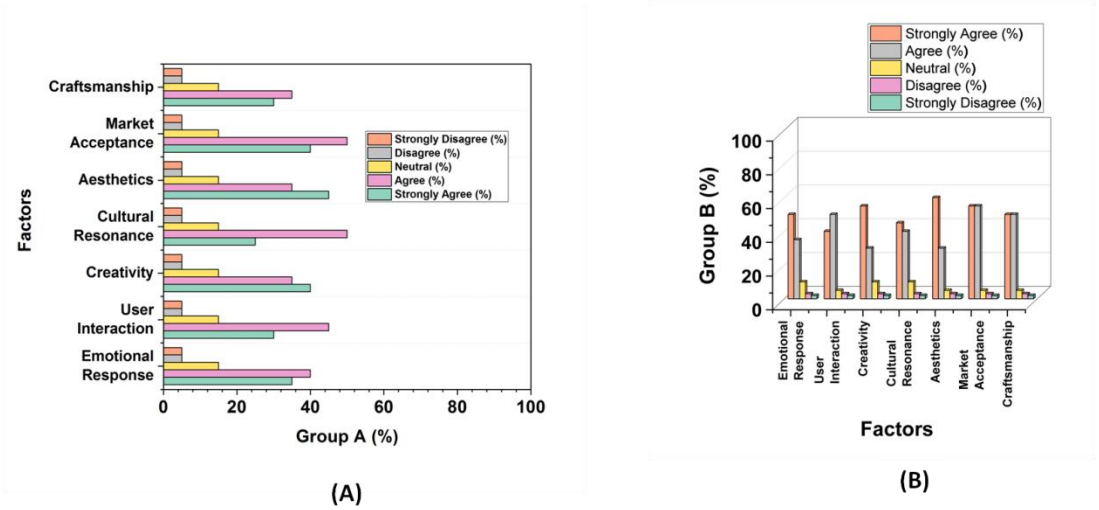

Figure 4: Analysis of the Likert scale

Percentages can be analyzed by researchers to identify strong points of consensus where participants agree a lot and areas of divergence where opinions are quite divergent. This form of analysis is important for understanding the dynamics of attitude trends of groups because it points out specific determinants that respond differently across groups, thereby enhancing the understanding of the factors being evaluated and informing further research or practical applications.

Evaluation of Traditional Vs AICeramic

Traditional ceramics seem to find their roots in the centuries-long past craft of the artisan, as molding and glazing are used to demonstrate the prominent role played by the human aspect of art and crafting these beautiful objects. Rich cultural heritage prevails over such ceramics, in which every individual piece depicts elaboration of individual elements. As illustrated in Figure 5, AI-driven ceramics have incorporated advanced technologies such as artificial intelligence (AI) and 3D printing into the area. Such new technologies not only achieve super-precise designs impossible with traditional technologies but also allow for material optimization, which leads to increased durability,

efficiency, and sustainability in ceramic products. The major benefit of this new process is that mass customization is possible because it caters to consumer preferences without sacrificing design details or production efficiency. Blending technological innovation with the functionality of modern manufacturing processes, AI-driven ceramics represent an evolution of ancient craft that bridges gaps between tradition and modernity with broadened horizons for creative expression and industrial applications.

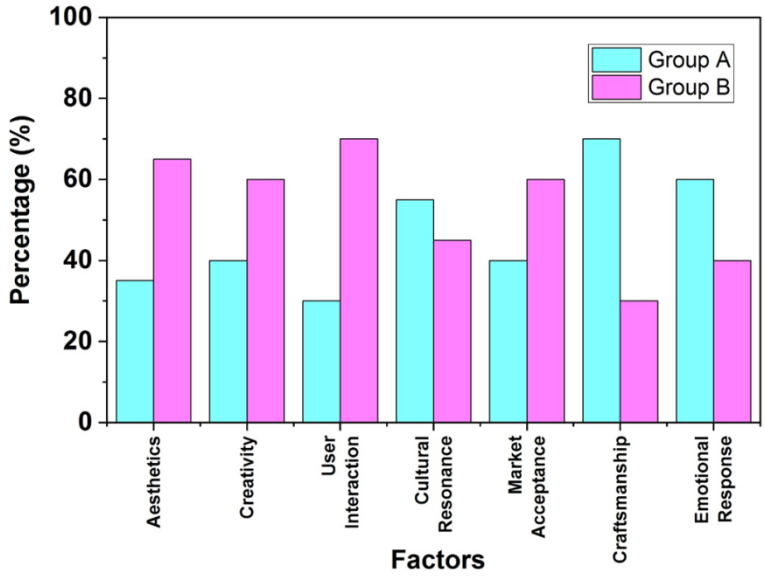

Figure 5: Traditional vs. AI-Driven Ceramics

Comparing traditional ceramic art (Group A) with AI-generated ceramic art (Group B), Group A achieved better craftsmanship (70%), emotional response (60%) and high cultural resonance (55%). This means that Group B scored more highly in aesthetics (65%), creativity (60%), user interaction (70%), and market acceptance (60%). Overall, the art created from AI is more creative and engaging while attracting users, but it reduces the levels of artisanry and cultural linkages.

DISCUSSION

AI-generated art in ceramics could appeal better to a contemporary sense of taste, where technology and creativity come together, pushing the limits established by traditional craftsmanship. The form, pattern, and design possibilities opened up by AI experimentation could be the decisive reason for higher ratings, based on new experiences of aesthetics, challenging and overcoming such traditional notions of art. In contrast, Group A's answers and testimonies represented a robust connection with the cultural dimension of ceramics, highlighting the importance of craftsmanship and cultural relevance. Participants in Group A had a stronger emotional attachment to the tactility of the materials and the process of creating traditional ceramics. There is a sense of culture and authenticity attached to the complex skill and craft used in traditional ceramics, which AI-generated art cannot replicate. Interestingly, acceptance in the marketplace is rated lower for traditional ceramics, which could mean that while they are nearly revered for their exquisite craftsmanship and emotional depth, they fall short of what the modern market values most: innovation and technological novelty. These suggest that a traditional ceramic artist may have difficulties in these technologically advanced marketplaces, where customers are demanding more distinctive and creative creations.

CONCLUSION

The analysis of participant responses shows the different results that derive from either of these types of art forms on aesthetics, creativity, user interaction, and market acceptance. It was indicated that AI-generated ceramic art significantly increased the perceived value of aesthetics, creativity, and user interaction while having more market acceptance. However, traditional ceramics held a much more emotional association and were more culturally significant, emphasizing the value of craftsmanship and cultural tradition. The findings show Group B significantly improves the value of aesthetics (65%), creativity (60%), user interaction (70%), and market acceptance (60%) compared to Group A. These results indicate that AI can be able to extend the boundaries of artistic expression and bring new dimensions to creative thought, while traditional ceramic art forms are the epitome of expressions through culture and emotional association. Future research could delve deeper into how the fusion of AI with traditional art forms creates something new and hybrid, balancing technological innovation with deep cultural traditions.

LIMITATIONS AND FUTURE STUDY

The AI-generated ceramic art used in this study was based on a specific design approach and related technology. There would likely be different results from different AI models and design algorithms, and therefore the current findings can not apply as widely across all forms of AI-generated art. Further work could instead consider the role that AI can also serve as a collaborative tool in the hands of human artists. This might uncover new perspectives on the synergy between human creativity and AI within the artistic process.

REFERENCE

[1] Wang Y, Pan Y, Yan M, Su Z, Luan TH. A survey on ChatGPT: AI-generated contents, challenges, and solutions. IEEE Open Journal of the Computer Society. 2023 Aug 16.

[2] Li, S., Lu, Z., Zhang, H., Ai, Z., Ran, Y., Li, Y., Deng, X. and Li, D., 2022. Rheological behavior of multi-sized SiC inks containing polyelectrolyte complexes specifically for direct ink writing. Journal of the European Ceramic Society, 42(12), pp.4810-4816.

[3] Vora LK, Gholap AD, Jetha K, Thakur RR, Solanki HK, Chavda VP. Artificial Intelligence in Pharmaceutical Technology and Drug Delivery Design. Pharmaceutics. 2023; 15: 1916 [Internet]. 2023

[4] Ai, C., Du, Y., Wen, B., Shu, R., Cao, L. and Wang, W., 2022. Preparation and characterization of diesel particle filter (DPF) with hierarchical microstructure for catalytic combustion of soot. Ceramics International, 48(7), pp.9304-9312.

[5] Hu, Y., 2023. Research on the Design Method of Traditional Decorative Patterns of Ethnic Minorities under the Trend of AIGC. Journal of Electronics and Information Science, 8(5), pp.58-62.

[6] Qayyum F, Kim DH, Bong SJ, Chi SY, Choi YH. A survey of datasets, preprocessing, modeling mechanisms, and simulation tools based on AI for material analysis and discovery. Materials. 2022 Feb 15;15(4):1428.

[7] Zhang B, Cheng P, Deng L, Romainoor NH, Han J, Luo G, Gao T. Can AI-generated art stimulate the sustainability of intangible cultural heritage? A quantitative research on cultural and creative products of New Year Prints generated by AI. Heliyon. 2023 Oct 1; 9(10).

[8] Jiao Y, Dai J, Fan Z, Cheng J, Zheng G, Grema L, Zhong J, Li HF, Wang D. Overview of high-entropy oxide ceramics. Materials Today. 2024 Jul 2.

[9] Du H, Niyato D, Kang J, Xiong Z, Zhang P, Cui S, Shen X, Mao S, Han Z, Jamalipour A, Poor HV. The age of generative AI and AI-generated everything. IEEE Network. 2024 Jul 2.

[10] Feng X, Yu L, Tu W, Chen G. Craft representation network and innovative heritage: the Forbidden City's cultural and creative products in a complex perspective. Library Hi Tech. 2024 Feb 21.

[11] Yao E, Zhang H, Ma K, Ai C, Gao Q, Lin X. Effect of deep cryogenic treatment on microstructures and performances of aluminum alloys: A review. Journal of Materials Research and Technology. 2023 Aug 19.

[12] Tuo Y, Yang Z, Guo Z, Chen Y, Hao J, Zhao Q, Kang Y, Zhang Y, Zhao Y. Pore structure optimization of MoS2/Al2O3 self-lubricating ceramic coating for improving corrosion resistance. Vacuum. 2023 Jan 1;207:111687.

[13] Shi Y. Literal translation extraction and free translation change design of Leizhou ancient residential buildings based on artificial intelligence and Internet of Things. Sustainable Energy Technologies and Assessments. 2023 Mar 1;56:103092.

[14] Tallat R, Hawbani A, Wang X, Al-Dubai A, Zhao L, Liu Z, Min G, Zomaya AY, Alsamhi SH. Navigating industry 5.0: A survey of key enabling technologies, trends, challenges, and opportunities. IEEE Communications Surveys & Tutorials. 2023 Nov 2.

[15] Epstein Z, Hertzmann A, Investigators of Human Creativity, Akten M, Farid H, Fjeld J, Frank MR, Groh M, Herman L, Leach N, Mahari R. Art and the science of generative AI. Science. 2023 Jun 16; 380(6650):1110-1.

[16] Guan JQ, Wang LH, Chen Q, Jin K, Hwang GJ. Effects of a virtual reality-based pottery making approach on junior high school students' creativity and learning engagement. Interactive Learning Environments. 2023 May 19;31(4):2016-32.

[17] Liu Q. Technological innovation in the recognition process of Yaozhou Kiln ware patterns based on image classification. Soft Computing. 2023 Jun 5:1-0.

[18] Zimanyi E. Interrogating the limits of humanitarian art: the uncomfortable invitations of Ai Weiwei. Transnational Screens. 2022 May 4;13(2):141-56.

[19] Yang Z. Scientific and technological creative stage design using artificial intelligence. Computers and Electrical Engineering. 2022 Oct 1;103:108395.

[20] Zhang J, Yarahmadi M, Cabezas L, Serra M, Elizalde S, Cabrera JM, Llanes L, Fargas G. Robocasting of dense 8Y zirconia parts: Rheology, printing, and mechanical properties. Journal of the European Ceramic Society. 2023 Jul 1;43(7):2794-804.

[21] Zhu J, Yu J, Wu Y, Chao Y, Wu P, Lu L, Chen L, He J, Zhu W. Engineering 3D-printed aqueous colloidal ceramic slurry for direct ink writing. Green Chemical Engineering. 2023 Mar 1;4(1):73-80.

[22] Awdaljan MW, Roque JC, Choi J, Rondón LF. Introducing a novel approach to dental color reproduction using AI technology. Journal of Esthetic and Restorative Dentistry. 2024 Dec;36(12):1623-37.

[23] Włodarczyk M. Digital Disruption in Art: A Comprehensive Analysis of AI and NFT Market Dynamics. Annales Universitatis Mariae Curie-Skłodowska, Sectio H Oeconomia. 2024;58(2):171-93.

[24] Danry V, Guzelis C, Huang L, Gershenfeld N, Maes P. From Words to Worlds: Exploring Generative 3D Models in Design and Fabrication. 3D Printing and Additive Manufacturing. 2024 Oct 22.

[25] Gür M, Çorakbaş FK, Atar İS, Çelik MG, Maşat İ, Şahin C. Communicating AI for Architectural and Interior Design: Reinterpreting Traditional Iznik Tile Compositions through AI Software for Contemporary Spaces. Buildings. 2024 Sep 15;14(9):2916.

[26] Moral-Andrés F, Merino-Gómez E, Reviriego P, Lombardi F. Can artificial intelligence reconstruct ancient mosaics?. Studies in Conservation. 2024 Jul 3;69(5):313-26.

[27] Yin H, Zhang Z, Liu Y. The exploration of integrating the midjourney artificial intelligence generated content tool into design systems to direct designers towards future-oriented innovation. Systems. 2023 Dec 4;11(12):566.

[28] Alyıldız EC. Generative Text-to-Image Models in Architectural Design: A Study on Relationship of Language, Architectural Quality and Creativity. ICONTECH INTERNATIONAL JOURNAL. 2023 Sep 25;7(3):12-26.