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FIG. 1 THE COMBINATION OF NATURAL ECOLOGY AND URBAN LIFE WITHIN THE FRAMEWORK OF URBAN FOREST

DIEFAN WANG

CHANGZHOU UNIVERSITY, SCHOOL OF ART AND DESIGN, CHANGZHOU, CHINA
SOUTHEAST UNIVERSITY, SCHOOL OF ART, NANJING, CHINA

 [HTTPS://ORCID.ORG/0009-0001-3935-2244](https://orcid.org/0009-0001-3935-2244)

wdf@cczu.edu.cn
diefanwang6@outlook.com

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ECOLOGICAL DESIGN AND PUBLIC ART IMPACT ON THE PERCEPTION OF THE URBAN ENVIRONMENT

AFFECTIVE PERCEPTION OF DESTINATION IMAGE
ECOLOGICAL URBAN PLANNING
NEIGHBORHOOD ATTACHMENT
PERCEIVED ENVIRONMENTAL PROPERTIES
PUBLIC ART

The study aims to evaluate the impact of a public art project within the framework of ecological urban planning on various parameters: the perception of the environment, the image of the area, and the level of neighborhood attachment among residents and visitors. The objective of the public art project was to integrate artistic design into ecological urban planning. The primary research method involved surveying local residents and visitors in the Xiangjiang New District (Changsha, China) in 2020 and 2023. A statistical analysis of the survey results revealed significant changes in the perception of certain

properties of the urban environment, such as complexity, naturalness, typicality, openness, and consistency. The results also indicated that the project enhanced the overall image of the city and key aspects such as dynamism, sociability, innovation, creativity, and quality of life. These findings can facilitate the more effective integration of public art into ecological design and deepen the understanding of its impact on positive socio-cultural and environmental aspects in cities, thereby benefiting urban planners, designers, and government authorities.

INTRODUCTION

In light of the growing interest in sustainable development and environmental issues, modern cities face the need for innovative approaches to urban design. Sustainable development refers to a concept focused on creating and ensuring a sustainable balance between social, economic, and environmental aspects. The main task of sustainable development is to meet the current needs of society, without compromising the ability of future generations to meet their own needs (Jeronen, 2020; Zhao et al., 2022). Ecological design is an approach to environmental design that focuses on public welfare, environmental sustainability, and the creation of livable spaces. (Sopiana and Harahap, 2023). This approach applies to various fields, such as the design of urban parks, public squares, recreational areas, and other places of public use. Thus, environmental design is the creation of sustainable, eco-friendly, functional, and attractive spaces (Peng et al., 2024). In the context of urban planning, researchers have paid attention to the relationship between public ecological landscaping and public art (Carmona, 2021).

Public art is a form of artistic creation placed in public spaces (O'Callaghan, 2009). The main idea of public art is to appeal to a wide audience outside the walls of galleries and museums (Sharp et al., 2020). The types of public art include graffiti and street art, sculptures and installations, street murals, and in-

teractive projects. Public art can be a means of self-expression for artists (Macaya and Valero, 2019), as well as a way to enrich public space and involve citizens in the visual perception of their environment (Cuffie, 2021; Luo et al., 2022). The use of public art has gained high momentum, and only in Europe alone, 180,000 new works emerge every year (Boffi et al., 2023). However, there is a lack of comprehensive research on the role of public art in ecological urban planning. Previous studies have shown how public art can fit into the natural elements of the urban landscape, creating harmony with the environment (Ode Sang et al., 2022; Saeedi and Dabbagh, 2021). Researchers have also considered the ecological side of public art and its impact on education and awareness-raising on environmental issues (Ardoin and Bowers, 2020).

In the context of exploring the potential of public art in ecological urban planning, sustainable development implies the creation of ecological urban spaces. In this case, elements of public art not only include aesthetic design but also involve citizens in caring for the natural environment and participating in environmental projects. Scientific literature still lacks studies that specifically address the impact of public art based on ecological design on local populations and perceptions of the environment. China, in its quest for sustainability and development against the background of intensive urbanization, can provide a unique context for exploring the impact of public art in ecological design. This study explores the potential of public art as an effective tool to support and promote the principles of sustainability in modern cities.

LITERATURE REVIEW

Each city has a unique history of development. The design of a city reflects its cultural background and artistic elements, creating a harmonious atmosphere between the population and the environment (Grenni et al., 2020; Liang and Wang, 2020). Urban planning and design require solutions and elements aimed at a careful impact on the natural environment and human well-being (Ebbesson et al., 2024; Panagopoulos et al., 2016). Currently, many cities in China lack general planning in the field of landscape design (Huang, 2023; Liang and Wang, 2020). As a result, the urban composition remains chaotic, and the ecological value of the urban landscape is insufficient for the development of many cities. An important task of urban landscape planning is the implementation of sustainable urban development. Therefore, strengthening the ecological design of urban landscape planning is crucial. There is an obvious problem of "emphasis on appearance

and disregard for ecology” in the landscape design of many Chinese cities (Dong, 2021).

Design plays an important role in social progress and innovation, contributing to the era of sustainable development (Blasi et al., 2022; Kutty et al., 2020). Urban landscape design focused on sustainable development promotes an effective combination of nature, society, and the economy (Tian, 2020). The concept of sustainable development is constantly being developed, enriched, and specified, opening up new directions for research in various disciplines (Xu, 2018). With the steady increase in urbanization, sustainable urban development has become firmly entrenched in the public consciousness. The significance and level of urban landscape design continue to improve. In the field of urban landscape planning and design, it is essential to implement the concept of sustainable development to harmonize and unify land, resources, population, economy, and the environment (Zhou and Zhang, 2019). In this context, the goal of public art is not only to create a beautiful space but also to actively influence the perception of the environment and raise awareness of environmental issues. Public art can become a platform for public engagement in the discussion of sustainable development. Interaction with works of art can facilitate the exchange of opinions and ideas. Art projects can reveal the values of sustainable development, necessitating respect for nature, efficient use of resources, and the creation of green urban spaces (Nahed and Shoostarian, 2022; Vidal et al., 2020). Public art can create a unique identity for urban areas, highlighting their features and attractiveness in terms of sustainable development. Interesting and inspiring works of public art can stimulate the society to make changes in everyday habits according to the principles of sustainability (Zou, 2019). Thus, public art becomes a powerful tool for communication and visualization of sustainable development ideas. This form of art can create an engaging environment and maintain a long-term interest in environmental issues in the urban landscape.

There is a disagreement among researchers in the assessment and perception of public art since the latter can exert an ambiguous impact on urban space and communities. Some contemporary authors (Boffi et al., 2023; Matthews and Gadloff, 2022; Sharp et al., 2020) underline the importance of art-driven regeneration for the development of social, identical, and economic potential. At the same time, cities that have undergone transformations related to public art often lack a sense of community, local cultural traditions, and dialogue between old residents

and newcomers (Falanga and Nunes, 2021; Grodach et al., 2018; Zebracki and De Bekker, 2018). From the perspective of the community, there is an opinion that public art contributes to psychological recovery in urban conditions and heightens a sense of civic pride (Bornioli et al., 2018; Ode Sang et al., 2022).

In their time, Hall and Robertson (2001) questioned the main previously identified advantages of public art in terms of a sense of place, identity, social transformations, and educational value. According to Hall and Robertson (2001), criticality in public art research was insufficient and has not been fully disclosed to evaluate the statements made in the context of public art. This conclusion necessitates more effective research and analysis methods aimed at assessing the impact of public art in public spaces.

However, more recent research (Boffi et al., 2023; Sharp et al., 2020) continues to report on the benefits of public art, including its impact on the local population. Thus, Boffi et al. (2023) have studied changes in neighborhood attachment and image of place after the implementation of a renovation project based on public art in the suburbs of Milan. Boffi et al. (2023) found that street art based on local culture correlated well with the attachment of local residents and destination image. However, there was no significant impact among non-residents. Sharp et al. (2020) focused on the inclusive role of public art in the urban regeneration project. As noted by Sharp et al. (2020), the advantages of public art are its ability to inspire local pride and promote local identity. Nevertheless, despite these positive aspects, public art can be controversial because of its symbolism, which can cause different interpretations and opinions (Sharp et al., 2020). A sense of pride is a key component of inclusivity in relation to public art (Sharp et al., 2020). The abundance of ways to interpret public art and the variability of urban societies can pose challenges to community unity. Therefore, it can be challenging to establish a certain meaning (Sharp et al., 2020).

Motoyama and Hanyu (2014) studied the influence of public art on visual properties and affective appraisals of landscapes. The authors reported that the presence of public art decreases the pleasantness of the natural scene but does not reduce the attractiveness of the urban environment. Additionally, Motoyama and Hanyu (2014) found that, although some types of public art can make the natural landscape more pleasant, the result depends on the level of excitement. According to Motoyama and Hanyu (2014), the environment with an optimal average level of excitement contributes to the maximum pleas-



FIG. 2 THE CHILDREN'S UNIT OF THE PROJECT THE CITY GATHER PARK

The children's playground, swings, a colorful runway, the "deer house" slide, and sports equipment are designed to provide space for daily recreational activities, parent-child interaction, and opportunities for socializing among local residents and visitors. Such solutions complement urban lifestyles with beautiful impressions and poetic emotions upon encountering pristine nature.

antness. Eye tracking data showed that visitors spent about a third of their total time walking along the picturesque Danube Canal (Vienna, Austria) to view and study graffiti and sculptures (Mitschke et al., 2017). At the same time, as noted by Mitschke et al. (2017), the time for viewing public art had significant variations: while some participants could spend more than 50% of the time on it, others could spend a little more than 10%.

This study sees it necessary, firstly, to study the influence of public art embedded in environmental design on the local population, a sense of pride, and neighborhood attachment. Secondly, the study aims to examine the impact of public art embedded in environmental design on the perception of the environment. Based on the literature review, it is possible to form the following research questions:

RQ1: Has the project changed Perceived Environmental Properties among residents and visitors?

RQ2: Has the project changed Affective Perception of Destination Image among residents and visitors?

RQ3: Has the project changed Public Art Project Image among residents and visitors?

RQ4: Has the project changed Neighborhood Attachment for residents and visitors?

The purpose of the study is to assess the impact of the public art project within the framework of urban ecological planning on the perception of the environment, the area's image, and the level of neighborhood attachment among residents and visitors.

CASE STUDY

The City Gather Park is located in Xiangjiang New District (Changsha, China), the strategic planning area of One Belt and One Road. This is the first high-end project of the "City Series" that are planned for Changsha. In the neighborhood, there are prestigious infrastructure facilities (Tianxin District Commercial Center and the Yuelu Cultural Center) and Yanghu National Wetland Park. The City Gather Park occupies an area of 10,000 square meters and is a vivid example of a combination of natural ecology and urban life (Fig. 1).

The City Gather Park project rests on the concept of Urban Forest, a combination of urban environmental design and public art. Urban Forest implies the creation of green areas with modern installations and sculptures that not only serve as decoration but also establish an environmentally friendly environment. The concept focuses on increasing the number of green spaces in the city and creating places suitable for rest and relaxation in densely populated areas. Green areas inside the city improve air quality and the overall ecology. Artificial installations, sculptures, and even interactive objects are installed in various parts of Urban Forest-based areas to enrich the visual experience of visitors and stimulate their interaction with nature. Urban Forest promotes a positive attitude towards nature in the urban environment and emphasizes the importance of environmental sustainability in urban planning. This cutting-edge approach demonstrates how public art can be successfully introduced into the urban environment. Urban Forest draws attention to environmental issues, creating attractive places for locals and visitors, including children (Fig. 2). Therefore, a project based on Urban Forest was chosen as a model for research.

MATERIALS AND METHODS

PARTICIPANTS

Two samples of residents and visitors of Changsha (China) were chosen as participants in the study. The first sample was recruited in 2020, when The City Gather Park project had not yet been implemented. Art design facilities were completely absent within the green zone, the green zone was not landscaped). The second sample participated in 2023, when the art design project had already started functioning. A total of 322 questionnaires were processed, 155 from 2020 and 167 from 2023.

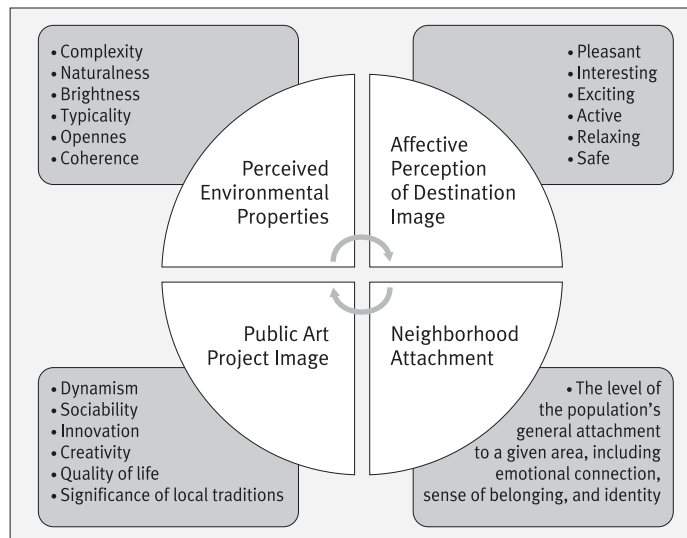
In Sample 1, the average age of participants was 36.7 years; there were 52% women and 48% men. In Sample 2, the average age of participants was 38.3 years; there were 56% women and 44% men. The study participants included both residents (local population) and non-residents (tourists and visitors). The percentage of respondents was 67% in Sample 1 and 63% in Sample 2. Samples 1 and 2 represent different groups of participants. Participants from 2020 are not the same people as participants from 2023. The study did not assume that they were the same people. At the same time, we attempted to form equivalent samples to minimize the impact of demographic characteristics on the results.

PROCEDURE

This study was a quasi-experimental study design. Participants in Sample 1 and Sample 2 answered questions from the same questionnaire at different time periods: at the initial stage of the project and after the project was implemented. Xiangjiang New District is a highly urbanized and densely populated business district. In addition, the media actively discussed the project, so almost all residents and visitors contacted by the researchers immediately understood what kind of a project they were asked to take part in. The links to the questionnaires were posted on local social media groups. The participants filled out the questionnaires in person. The survey was in Chinese. No personal information was collected. All participants were of legal age.

SCALES

This study used the Model for Assessing the Potential of Public Art in Ecological Urban Planning. The Model includes 4 components (Fig. 3): (1) Perceived Environmental Properties; (2) Affective Perception of Destination Image; (3) Public Art Project Image; (4) Neighborhood Attachment. Perceived Envi-



ronmental Properties combines complexity, naturalness, brightness, typicality, openness, and coherence (Motoyama and Hanyu, 2014). Complexity: A measure of the diversity and complexity of visual, structural, and textural elements in an environment. Naturalness: The number of such natural elements as plants, water or natural materials. Brightness: The level of illumination or brightness in a given area. Typicality: Compliance of the environment with the local typical architecture or style. Openness: Free space and visibility, contributing to spaciousness. Coherence: The connection and consistency of the elements of the environment with each other.

Affective Perception of image destination covered six aspects: Pleasant, Interesting, Exciting, Active, Relaxing, and Safe (Motoyama and Hanyu, 2014). Pleasant: The extent to which the image of the area is pleasant or evokes positive emotions. Interesting: The capability of the image of the area to attract attention and arouse the interest of the observers. Exciting: The level of stimulation and excitement caused by the image of the area. Active: A measure of activity, regarding the formed idea of the area. Relaxing: The ability of the reputation of the area to create a sense of peace and relaxation. Safe: The level of security associated with the area.

The image of the public art project included the following categories: dynamism, sociability, innovation, creativity, quality of life, and significance of local traditions (Boffi et al., 2023). Dynamism: The project's level of dynamism. Sociability: The capability of the project to stimulate social interactions. Innovation: The availability of innovations and modern elements. Creativity: The presence of creative ideas and approaches. Quality of

FIG. 3 MODEL FOR ASSESSING THE POTENTIAL OF PUBLIC ART IN ECOLOGICAL URBAN PLANNING

Life: The impact of the project on the overall quality of life in the area. Significance of Local Traditions: Compliance of the project with local traditions and cultural values.

Neighborhood Attachment implies the feelings, connections, thoughts, and intentions of people in relation to their socio-physical environment (Fornara et al., 2010). This term is part of a more general concept of place attachment. The latter is formed over time and covers the affective and emotional connections of a person with their spatial environment (Brown and Perkins, 1992). Place attachment goes back to the theory of attachment by Bowlby (1988) and refers to affective and emotional patterns that establish a connection between people and their places, giving a special meaning to life. This conceptual framework of place attachment overlaps with other constructs such as belonging to a place, place identity, dependence on a place, rootedness, a sense of community, and a sense of place (Fornara et al., 2010).

The participants indicated their socio-demographic data: age, gender, residence status (within or outside the district), as well as the presence of their own children. They evaluated the following aspects: Perceived Environmental Properties, Affective Perception of Destination Image, Public Art Project Image, and neighborhood attachment.

Perceived Environmental Properties had to be assessed in terms of six items: Complexity, Naturalness, Brightness, Typicality, Openness, and Coherence (Motoyama and Hanyu, 2014). The respondents used a 5-point Likert scale. The interpretation of the points was as follows: 1 – no complexity at all, no naturalness at all, no brightness at all, no typicality at all, no openness at all, no coherence at all; 5 – great complexity, great naturalness, great brightness, great typicality, great openness, great coherence. *Affective Perception of Destination Image* included six aspects: Pleasant, Interesting, Exciting, Active, Relaxing, and Safe (Motoyama and Hanyu, 2014). Each item had to be evaluated from 1 to 5 points, with 1 meaning *unpleasant, uninteresting, boring, inactive, distressing, fearful* and 5 meaning *pleasant, interesting, exciting, active, relaxing, safe*.

The participants evaluated *Public Art Project Image* on six points: Dynamism (Florida, 2019), Sociability (Putnam, 2000), Innovation (Florida, 2019), Creativity (Mabile, 1983), Quality of life (Diener et al., 1999), and Significance of local traditions (Carmona, 2010). A similar approach was applied in the study by Boffi et al. (2023). Each point was rated from 1 to 5 points on the Likert scale. Interpretation: 1 – almost not dynamic, almost

sociable, almost not innovative, almost not creative, low quality of life, and low significance of local traditions; 5 – very dynamic, very sociable, very innovative, very creative, a high quality of life, a high significance of local traditions.

The *Neighborhood Attachment Scale* (Fornara et al., 2010) contained 8 items, for example “This is an ideal neighborhood for me”. The participants assessed each item according to the degree of agreement with it (from 1 = disagree to 5 = completely agree). The internal reliability of the Neighborhood Attachment Scale (Cronbach's Alpha) was 0.84 in this study.

STATISTICAL DATA ANALYSIS

The study used an independent t-test to answer research questions about changes caused by the project in the Perceived Environmental Properties (RQ1), Affective Perception of Destination Image (RQ2), Public Art Project Image (RQ3) and Neighborhood attachment (RQ4). This tool helped compare the results of two similar samples of participants for the period of 2020 (Sample 1, before the introduction of public art) and 2023 (Sample 2, after the start of the project). The data was tested for normality. The histogram test confirmed the normality of the distribution for parametric tests. The data was analyzed in IBM SPSS.

RESULTS

- **RQ1: Has the Project Changed the Perceived Environmental Properties among Residents and Visitors?** – In general, on the scale the Perceived Environmental Properties between Time 2 ($M_{Time2}=3.30$, $SD_{Time2}=0.64$) and Time 1 ($M_{Time1}=2.97$, $SD_{Time1}=0.66$), there are statistically significant differences ($t=7.24$, $p=0.001$) with a noticeable effect size ($d=0.516$; Table I). Five of the six categories on the Perceived Environmental Properties assessed by residents and visitors for the period Time 2 are significantly higher than for the period Time 1: Complexity ($t=13.27$, $p=0.000$), Naturalness ($t=6.19$, $p=0.012$), Typicality ($t=6.87$, $p=0.001$), Openness ($t=6.42$, $p=0.026$), Coherence ($t=6.77$, $p=0.001$). The effect size was the largest for Complexity ($d=0.928$), but for the other categories, the effect size was also noticeable.

- **RQ2: Has the Project Changed Affective Perception of Destination Image among Residents and Visitors?** – As for the project-driven changes in Affective Perception of Destination Image, there are no statistically significant differences on the scale (Table II). Significant changes have occurred in only one category:

TABLE I DESCRIPTIVE STATISTICS AND INDEPENDENT T-TEST SCORES BETWEEN TIME 1 AND TIME 2 ON PERCEIVED ENVIRONMENTAL PROPERTIES

	Perceived Environmental Properties							
	Time 1		Time 2		t	p	d	95% CI (Lower-Upper)
	M	SD	M	SD				
Complexity	2.91	0.66	3.49	0.59	13.27	0.000*	0.928	0.698–1.159
Naturalness	3.12	0.48	3.36	0.56	6.19	0.012*	0.459	0.237–0.68
Brightness	2.88	0.72	3.01	0.73	1.13	0.317	0.179	–0.04–0.398
Typicality	3.11	0.65	3.46	0.70	6.87	0.001*	0.517	0.295–0.74
Openness	3.05	0.74	3.38	0.61	6.42	0.026*	0.488	0.267–0.71
Coherence	2.77	0.71	3.11	0.63	6.77	0.001*	0.508	0.286–0.73
Average	2.97	0.66	3.30	0.64	7.24	0.001	0.516	0.293–0.738

* $p < .05$

TABLE II DESCRIPTIVE STATISTICS AND INDEPENDENT T-TEST SCORES BETWEEN TIME 1 AND TIME 2 ON AFFECTIVE PERCEPTION OF DESTINATION IMAGE

	Affective Perception of Destination Image							
	Time 1		Time 2		t	p	d	95% CI (Lower-Upper)
	M	SD	M	SD				
Pleasant	2.77	0.73	3.12	0.82	5.21	0.031*	0.45	0.229–0.671
Interesting	2.61	0.77	2.7	0.88	1.01	0.321	0.116	–0.103–0.334
Exciting	2.89	0.82	2.73	0.66	–1.56	0.077	–0.216	–0.435–0.003
Active	2.65	0.86	2.78	0.63	1.33	0.275	0.173	–0.046–0.392
Relaxing	2.86	0.78	2.81	0.52	–0.96	0.330	–0.106	–0.325–0.112
Safe	2.59	0.64	2.52	0.71	–0.96	0.303	–0.103	–0.322–0.115
Average	2.73	0.77	2.78	0.70	0.90	0.452	0.074	–0.144–0.293

* $p < .05$

Pleasant ($t=5.21$, $p=0.031$), the effect size was medium ($d=0.45$). This fact may indicate that the changes caused by the project did not have such a strong impact on some aspects of affective perception, such as Interesting, Exciting, Active, Relaxing, and Safe. At the same time, the project has had a significant positive impact on the perception of the pleasantness of the environment among residents and visitors (Pleasant).

• **RQ3: Has the Project Changed Public Art Project Image among Residents and Visitors?** – In general, there are noticeable changes in the perception of the project by residents and visitors (Table III). Thus, on average, on the scale Public Art Project Image between Time 2 ($M_{\text{Time2}}=2.92$, $SD_{\text{Time2}}=0.65$) and Time 1 ($M_{\text{Time1}}=2.63$, $SD_{\text{Time1}}=0.67$), there are statistically significant differences ($t=4.73$, $p=0.025$) with a medium effect size ($d=0.45$). Five of the scale's six categories evaluated by residents and visitors for the period Time 2 are significantly higher than for the period Time 1: Dynamism ($t=3.77$, $p=0.048$), Sociability ($t=6.59$, $p=0.004$), Innovation ($t=4.86$, $p=0.018$), Creativity ($t=9.19$, $p=0.001$), and Quality of life ($t=5.61$, $p=0.01$). The effect size was large for Creativ-

ity ($d=0.944$), noticeable for Sociability ($d=0.707$), and medium for Quality of life ($d=0.527$) and Innovation ($d=0.448$). Despite its statistical significance, the effect size was small for Dynamism ($d=0.223$). For Significance of local traditions, there were no significant differences.

• **RQ4: Has the Project Changed Neighborhood Attachment for Residents and Visitors?** – According to the results of the statistical analysis, the project has changed significantly the Neighborhood attachment of residents and visitors: $M_{\text{Time1}}=2.77$, $SD_{\text{Time1}}=0.76$, $M_{\text{Time2}}=3.05$, $SD_{\text{Time2}}=0.81$, $t=4.41$, $p=0.036$, $d=0.356$ (Table IV). These data indicate stronger place attachment after the implementation of the project.

DISCUSSION

The results of the study indicate that the project combining ecological urban planning and public art has changed the perception of environmental properties among residents and visitors. Due to the project, they perceive the environment as having more complexity, naturalness, typicality, openness, and coherence (RQ1). The results support the trends

TABLE III DESCRIPTIVE STATISTICS AND INDEPENDENT T-TEST SCORES BETWEEN TIME 1 AND TIME 2 ON PUBLIC ART PROJECT IMAGE

	Public Art Project Image							
	Time 1		Time 2		t	p	d	95% CI (Lower-Upper)
	M	SD	M	SD				
Dynamism	2.12	0.69	2.27	0.72	3.77	0.048*	0.223	0.004–0.443
Sociability	2.58	0.66	3.04	0.66	6.59	0.004*	0.707	0.482–0.933
Innovation	2.86	0.71	3.19	0.76	4.86	0.018*	0.448	0.227–0.669
Creativity	2.95	0.73	3.57	0.58	9.19	0.001*	0.944	0.714–1.175
Quality of life	2.81	0.59	3.11	0.55	5.61	0.01*	0.527	0.304–0.749
Significance of local traditions	2.44	0.65	2.36	0.64	-1.26	0.265	-0.124	-0.343–0.095
Average	2.63	0.67	2.92	0.65	4.73	0.025*	0.45	0.228–0.671

* $p < .05$

TABLE IV DESCRIPTIVE STATISTICS AND INDEPENDENT T-TEST SCORES BETWEEN TIME 1 AND TIME 2 ON NEIGHBORHOOD ATTACHMENT

	Time 1		Time 2		t	p	d	95% CI (Lower-Upper)
	M	SD	M	SD				
	Neighborhood attachment	2.77	0.76	3.05	0.81	4.41	0.036*	0.356

* $p < .05$

identified in previous studies (Boffi et al., 2023; Hall and Robertson, 2001; Mitschke et al., 2017; Motoyama and Hanyu, 2014; Sharp et al., 2020). All these studies emphasize the positive impact of public art and ecological urban planning on the overall harmony of urban space. The conclusions are in line with the study by Motoyama and Hanyu (2014). These authors also advocate for the idea that public art changes the visual characteristics of the environment, affecting the perception of complexity and diversity (Complexity). Boffi et al. (2023) confirm that street art inspired by local history and culture can improve the perception of natural elements in the environment. These findings are consistent with this study on changes in the perception of Naturalness due to the project.

The project had an impact on creating a pleasant atmosphere in the area, but was insignificant in terms of other aspects related to the affective perception of the area (Interesting, Exciting, Active, Relaxing, and Safe) (RQ2). This fact may indicate that the project has primarily influenced the overall perception of the environment's pleasantness, without having such a significant impact on other emotional aspects. The conclusions about the improvement of pleasantness are consistent with the study by Sharp et al. (2020).

These authors underlined the importance of a sense of pride and pleasantness as key components of the impact exerted by public art on the local population.

The results of the study show that the project has changed the perception of the public art project among residents and visitors (RQ3). The public art project has positively influenced its perception by residents and visitors, especially in aspects related to dynamism, social activity, innovation, creativity and quality of life. The revealed changes in the perception of the project's image correlate well with previously documented conclusions. There are numerous studies reporting that projects containing elements of creativity and art have a beneficial effect on the attractiveness of the urban environment (Cameron et al., 2020; Sharp et al., 2020). Innovations in urban space can also contribute to a positive perception among the population (Ji et al., 2021). The conclusions about the positive impact of the public art project on social activity and community perception (Sociability) are sufficiently consistent with previously published works (Askarizad and Safari, 2020; Sharp et al., 2020). These papers also highlight the importance of social interactions in an urban environment for the formation of a pleasant and perceived community. The obtained results suggest that

public art projects strengthen place attachment among residents and visitors (RQ4). The results broaden previous studies (Casais and Poço, 2023; Zhu and Chiou, 2022) that confirm the importance of cultural projects for the formation of positive feelings and connections with the environment.

Further research may focus on assessing the long-term effects of the project and its impact on environmental perception and quality of life. When developing future projects, it is recommended to include the local community in the decision-making. This measure can ensure their active participation and support.

CONCLUSIONS

Overall, the findings of the research emphasize the significance of incorporating public art and environmentally friendly design into urban space in order to enhance the standard of living and aesthetic allure of the city. The practical application of these approaches can contribute to the formation of more pleasant and comfortable urban spaces. Positive changes in the perception of dynamism and social activity emphasize the value of projects that promote communication and interaction in the city. Such initiatives can stimulate social and cultural events, increase social engagement, and create more connected communities. The results of the study indicate an increase in place attachment due to the project. This conclusion is important for the practice since a strong connection of residents and visitors to a place facilitates sustainable development and increases the level of participation in urban life. Despite the lack of statistically significant changes in relation to local traditions documented in this study, this aspect can be decisive for preserving and strengthening the city's identity in design practice.

The study recommends continuing to integrate public art and urban environmental design to create an interesting, diverse, and enjoyable urban space. When planning projects, it is necessary to pay attention to local traditions and cultural values for their preservation in the context of changes. Another essential aspect is the creation of conditions for social interactions in the urban environment. This approach better reflects the needs and preferences of residents, thereby increasing the effectiveness and sustainability of urban initiatives.

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ILLUSTRATION SOURCES

FIGS. 1, 2 Compiled by the author based on the photos from Amazing Architecture

FIG. 3 Compiled by the author based on: BOFFI et al., 2023; BROWN and PERKINS, 1992; FORNARA et al., 2010; MOTOYAMA and HANYU, 2014

AUTHOR'S BIOGRAPHY

DIEFAN WANG is a dynamic researcher and educator. Currently a doctoral candidate and postdoctoral fellow at Changzhou University's School of Art and Design, Diefan delves into the affective perception of destination imagery and ecological urban planning. Simultaneously, as a professor at Southeast University's School of Art, Diefan fosters creativity and explores the intersections of public art and neighbourhood attachment.

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