

# *Evaluation on the New Teaching Mode of Cultural Creative Product Design Education in Cultural Ecological Field*

Yanling Cao<sup>1,a,\*</sup>

<sup>1</sup>*School of Design, Foshan University, Foshan, Guangdong, China*

<sup>a</sup>*caoyanling3388@163.com*

<sup>\*</sup>*Corresponding author*

**Keywords:** Creation of Product Design, Cultural Ecological Field, Biomass Measurement, Environmental Management

**Abstract:** The development of cultural and creative industries has played a positive role in promoting the development of design education. In order to meet the talent needs of enterprises, the traditional entrepreneurship education concept is changed, and innovative talents are cultivated to promote the all-round development of students. The treatment of agricultural waste is of great significance for strengthening the construction of urban civilization. At the beginning of the introduction, it introduced the background of cultural and creative product design, then conducted academic research and summary on cultural and creative product design and cultural ecological field, and finally summarized the environmental management of agricultural waste biomass measurement; secondly, the algorithm model was established, and various algorithms were proposed to provide a theoretical basis for the research on the new teaching mode of cultural and creative product design in the cultural ecological field; then, it put forward the analysis of the relevant factors of the new model of innovative product design in the cultural ecological field; finally, the simulation experiment was carried out, and the experiment was summarized and discussed; the experimental results showed that the teaching effectiveness of the innovative product design education model in the cultural ecological field is 6.12% higher than that of the traditional education model. The promotion of biomass gasification technology can make full use of the abundant crop straw to effectively protect forest resources, significantly improve the quality of life and living standards of local farmers, and improve the ecological environment to achieve sustainable energy development.

## 1. Introduction

If people want to base themselves on the field of modern cultural ecology and promote the promotion of the dissemination of national mainstream ideology, they should not only find the fit point for the integration of mainstream ideology and modern cultural ecology, but also take multiple measures to create a benign cultural ecology for the dissemination of mainstream ideology. In order to effectively solve the environmental problems in agricultural production, technical management

personnel should strengthen technical input to control the pollution caused by waste from the source to achieve environmental purification and management.

Many scholars have studied the new teaching mode of cultural and creative product design. Wrigley, Cara have discussed the integration of the curriculum and regional cultural resources of the art design major from three perspectives: the background of the curriculum, the development of resources, and the integration of teaching methods [1]. Wright believed that the rapid development of the national economy should also promote the development of the design industry, and the seamless connection between college design education and the needs of enterprises is particularly important [2]. Cao, Jingl explored the teachers of cultural creative design curriculum to explore the curriculum ideological and political resources contained in their professional courses, provide some useful enlightenment and formulate ideological and political education goals in combination with the characteristics of the curriculum, so as to infiltrate ideological and political education into all teaching links [3]. Su, Wen-Zhong discussed the practice of creative design of intangible cultural heritage, based on the validity of the combination of art and engineering and practice and the practical teaching effect as the assessment index, so as to explore a new talent training mode and approach for art and design [4]. According to the current teaching situation, Mao, Lijuan discussed the role and significance of Mooc in the design of tourism cultural and creative products from the aspects of teaching analysis, application strategies, etc. [5]. He, Jintao believed that the integration of production and education is a major strategic issue faced by higher vocational colleges in the new century, and is also the general trend of development in the future. As an emerging industry, its development needs theoretical analysis and discussion [6]. Del Giudice, Manlio summarized the practice of introducing contemporary product design research methods in the cultural creative design classroom by taking cultural creative design, a compulsory course of cultural production and clothing design, as an example [7]. The above research has achieved good results, but with the continuous updating of technology, there are still some problems.

The cultural ecological field has been analyzed at different levels by many scholars. Jafari, Rahele have studied the integration of the conflicts between various cultures and the needs of local cultures, thus forming an excellent cultural form and works, and inheriting them through intangible cultural heritage [8]. Barkova, EVA believed that the integration logic in the field of university cultural ecology is an objective relationship system with internal consequences, and a relationship system dominated by objective forces originating from specific cultural capital [9]. Murphy, Ailbhe, Johan P learned from the ecological field of university culture, analyzed the ideological threat brought by the proliferation of network information, and the composition and significance of university network culture, and discussed the relationship between network culture and network ideological education [10]. Rummler, Klaus explained the positive role of school-based learning and research in shaping educational culture and teachers' professional development from different perspectives [11]. Wang, C. F explored that in the long history of universities, they have gradually developed into a cultural and environmental field with their own unique personality [12]. Prentiss analyzed that with the continuous progress of information technology means and science and technology, the cultural environment management of colleges and universities has begun to change its original form, gradually moving from abstraction and abstraction to concretization and clarity [13]. Sun, Ying believed that the ecological field of class is established according to the law of human growth, which is characterized by the intersubjectivity of life [14]. The above research shows that the application of cultural ecological field has a positive effect, but there are still some problems.

Agriculture is an important part of the national economy, but the emergence of environmental problems has disturbed the long-term nature of economic development. For the sustainable development of economy and environment, it is necessary to conduct professional management of

pesticides, fertilizers and other consumables that promote agricultural economic benefits, so that their waste use is more environmentally conscious and friendly [15].

## 2. Evaluation of the Relevant Factors of the New Model of Innovative Product Design in the Cultural Ecological Field

### (1) Analysis of the factors in the ecological field of university culture

Cultural ecology is the ideal vision of a university as a department, which is reflected in the balanced relationship, mutual benefit and organic integration between the teaching, academic and management cultures of the university, as shown in Figure 1 [16]:

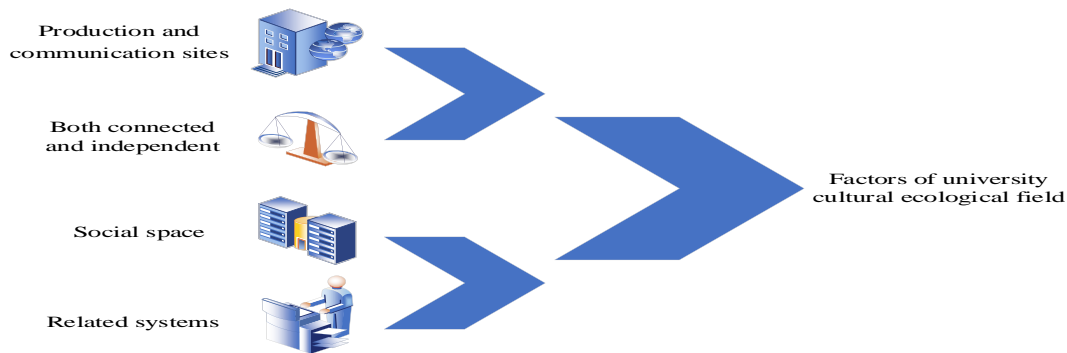


Figure 1: Analysis of university cultural and ecological field factors

1) The cultural ecological field of colleges and universities is the production and dissemination place of cultural capital [17]. Some scholars pointed out that in the transformation of cultural capital, it is sometimes necessary to play its role through the transformation of cultural capital. Within the controllable scope, the academic circles still have a fierce fight for cultural capital, especially for the institutional and fundamental cultural capital. This pragmatic tendency is not conducive to stimulating students' creativity and criticism, but encourages teachers to focus on improving and quickly obtaining benefits. However, this is not a bad thing for colleges and universities, but helps them to achieve their management goals and create an atmosphere of competition rather than encouraging innovation [18].

2) The cultural ecosystem of a university is not only a part of the social cultural ecosystem, but also a relatively independent subsystem with its own structure and functions.

3) The cultural ecological field of colleges and universities is a system related to the teaching mode. This is a system of related concepts rather than entities. The ecological field of university culture is a set of relationship system formed by various objective forces, in which both the subject and the object unconsciously give this gravity.

4) The cultural ecological field of colleges and universities is still a dynamic, constantly conflicting and autonomous social space. Each field has its own value orientation, and follows its unique governing rules to define the construction of social space, which are independent and non transferable.

### (2) The meaning and characteristics of innovative design of cultural and creative products

Based on the academic discussion on the definition and characteristics of cultural products, most scholars regard it as a spiritual product. It is an inevitable trend of human cultural development or a cultural precipitation of social development and change, and spirit is an important factor determining consumer consumption [19]. The meaning and characteristics of innovative design of cultural and creative products are shown in Figure 2.

1) Popular science design: leisure is the main cultural activity of people, and it is also important for consumers' cultural literacy on the basis of entertaining the public. Popular science design is to

infiltrate the concept and connotation of scientific popularization into the connotation of cultural products to achieve the purpose of educating consumers. At present, it has become a trend to add scientific elements to the content production of cultural products.

2) Creativity is both the soul and the core of cultural products. Creative design is to constantly introduce new concepts and new thinking in the development of cultural products, so as to create personalized cultural products that meet the needs of the public.

3) Three dimensional design: if a cultural product wants to be recognized by consumers, its cultural connotation must be three-dimensional. Three dimensional means that the connotation of cultural products is multifaceted and multi-level, that is, consumers with different kinds of psychological needs can extract different information from the same cultural product. Therefore, three-dimensional design means that the connotation of cultural products is expressed by researchers and developers from multiple levels, multiple angles and multiple ways.



Figure 2: Meaning and characteristics of cultural and creative product innovative design

(3) Environmental management of agricultural waste biomass measurement in cultural ecological field

From the perspective of ecological civilization, the institutional connotation of environmental management is mainly reflected in the mainstream development trend of environmental management, the ecological development trend of environmental management and the institutional trend of performance of environmental management, as shown in Figure 3 [20]:

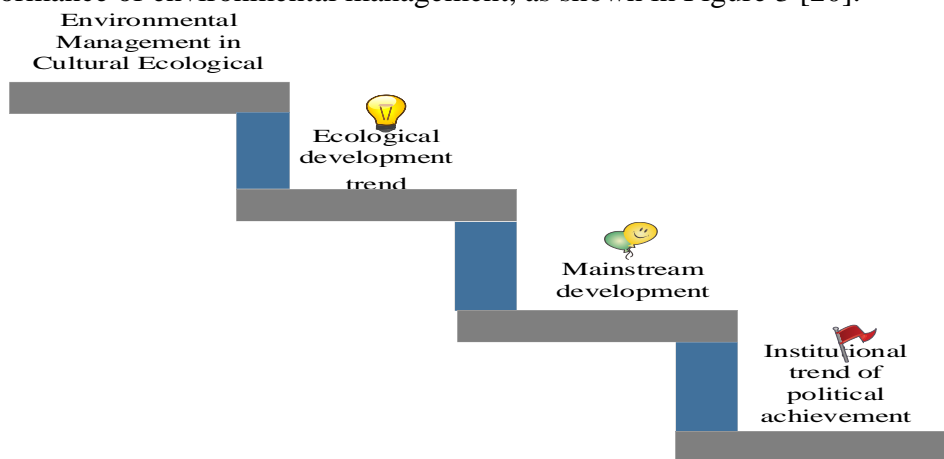


Figure 3: Institutional connotation of environmental management

1) Environmental management presents a mainstream development trend

With the improvement of people's quality of life and cultural level, the importance of environmental management would gradually increase, and more people would participate in environmental protection activities. Relevant government departments have incorporated environmental management into the overall management of the government. Through appropriate environmental management systems, environmental management activities become standardized

and sustainable in the vision of ecological civilization, and become an important part of the long-term management of the government.

At the same time, in the process of governance, through various media and other means, the government has increased the public's attention to environmental management, enabling more people to make contributions to environmental protection in real life.

### 2) Environmental management presents an ecological development trend

From the perspective of ecological civilization, environmental governance must fully consider the elements of ecology and take it as the basic criterion for formulating various systems. In environmental governance, the establishment of ecosystems must take into account the specific needs of each ecosystem, and at the same time make the functions of various departments coordinate and promote each other.

In environmental governance, the government should play the role of macro-control and actively provide various platforms for the public so that more people can participate in environmental governance.

### 3) Environmental management shows a systematic trend of political achievements

The institutionalization of environmental performance refers to the implementation of green performance theory, which is an important indicator to measure the efficiency and efficiency of government organizations. In the specific operation and management, attention should be paid to the combination of environmental management objectives and the practical needs of environmental management, so that it can quickly achieve the purpose of environmental management. Sustainable development is an important prerequisite for ecological civilization construction, which would be directly related to the further development of environmental governance.

## 3. Evaluation on the Educational Model of Innovative Product Design and Traditional Educational Model in the Cultural Ecological Field of Colleges and Universities

Experiment description: this experiment would explore by experimental method, and the data sample is 100 students from two design schools in a certain area. Among them, School A uses the cultural ecological field to teach 50 students, while School B uses the traditional education model to teach the remaining 50 students, and then combines them for experimental analysis. The task quantities of four types of product design planned by the two schools from January to March are also calculated for reference, as shown in Table 1

Table 1: Task design of four types of products

product	January	February	March	total
A	36	23	45	104
B	43	41	34	118
C	24	29	31	84
D	213	245	241	699

### (1) Expanding knowledge and promoting the spirit of innovation

The disadvantage of traditional education is that the coverage of knowledge is very small. Under this new teaching mode, the curriculum can be appropriately adjusted to expand the knowledge of students so that they can master more knowledge and lay a solid foundation for future learning. At the same time, people need to publicize their creativity to students. Cultural and creative product design and creativity are essential. Therefore, they should disperse their ideas from the beginning, so as to better cultivate students' creativity. Figure 4 shows the analysis of the two schools' emphasis on emotion, artistry, practicality and culture in their teaching models.

It can be seen from Figure 4 that School A pays more attention to artistry in actual teaching,

while School B pays more attention to the practicality of cultural and creative products in actual teaching. The reason why School A attaches importance to artistry is that whether a cultural and creative work of art can get consumers' attention depends largely on its artistry. The unique artistic aesthetic characteristics are the basis for regional cultural and creative products to attract consumers' attention and obtain economic value. Therefore, artistry is an important principle that cannot be ignored in the design of such products. It attracts consumers at all levels, makes them attracted by cultural and creative products, and stimulates them to form a desire to purchase and finally purchase products. However, School B's emphasis on practicality is related to its practical application in society. Among them, School A pays 17%, 36%, 14% and 33% attention to emotionality, artistry, practicality and culture, while School B pays 15%, 18%, 49% and 18% attention to emotionality, artistry, practicality and culture.

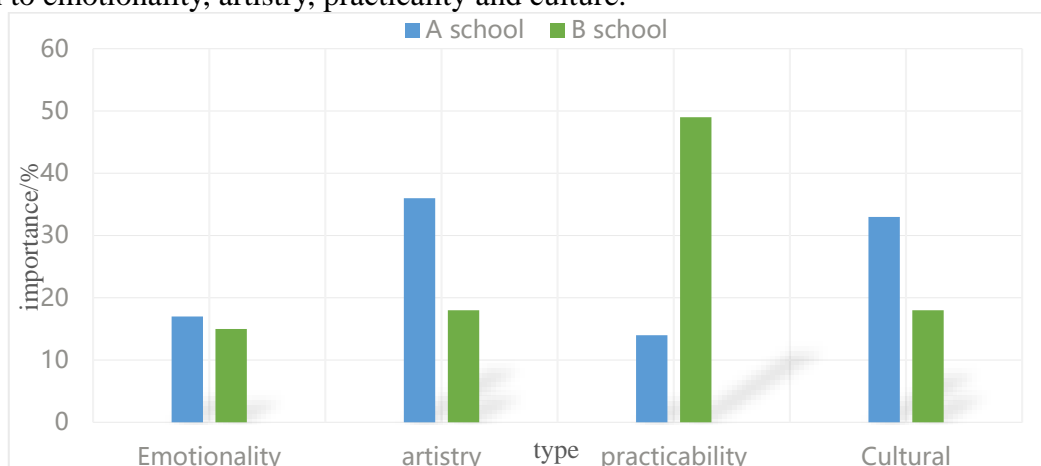


Figure 4: Analysis of the importance of the two schools to cultural creation in teaching mode

(2) Arrangement and classification of professional courses

The traditional professional curriculum design is very messy, with the phenomenon of making things out of nothing and redundancy. The whole arrangement of the curriculum is very messy and there is no order at all, so it is necessary to change the problems in this regard. The overall design follows the curriculum sequence from simple to deep, which also corresponds to the characteristics of the discipline field, so that the curriculum sequence in the same discipline field is closely linked, which is easy for learners to understand and master. Figure 5 shows the analysis of the learning effect of the students of the two schools:

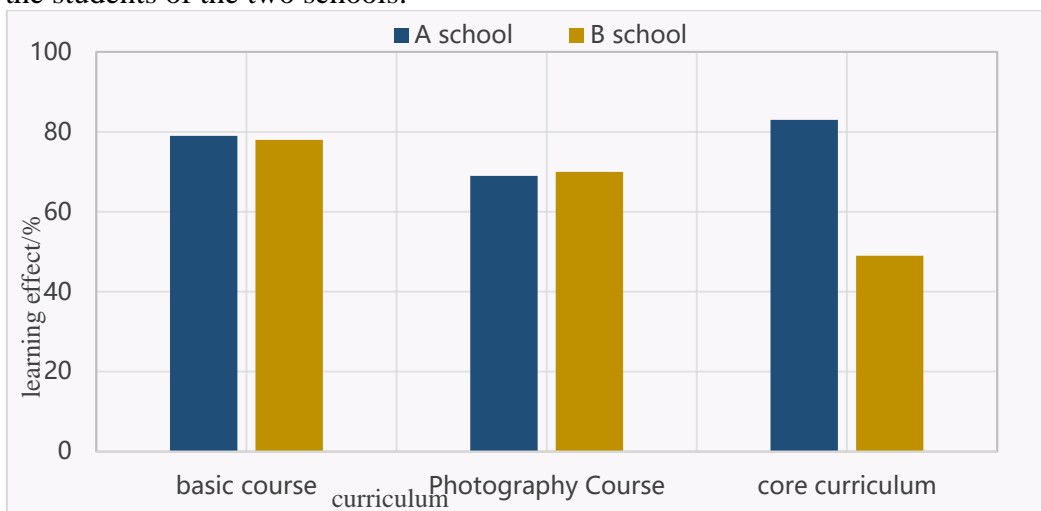


Figure 5: Analysis of learning effects of students in two schools

It can be seen from Figure 5 that although the two schools adopt different teaching modes, the learning effects of students in basic courses and photography courses are not different, and the main difference is for core courses. Through the above, it is not difficult to understand the problems of the traditional education model in the curriculum, which is caused by the unreasonable curriculum arrangement. The data in the figure shows that the learning effect of students of School A in basic courses is 79%, that of photography courses is 69%, and that of core courses is 83%; the learning effect of students of School B in basic courses is 78%, that of photography courses is 70%, and that of core courses is 49%. The learning of the course needs to be distinguished between the primary and the secondary, because it is essential for innovative research on cultural and creative products, which is not only a requirement for improving market competitiveness and promoting industrial development. It is also the main direction for the development of cultural and creative products in the future.

### (3) Emphasis on social practice

In fact, entering the university is equivalent to entering the society. It is known that the society pays more attention to a person's actual ability, but many people ignore this problem because they always blindly learn at school and have relatively little experience in the society. As a result, many excellent students' performance in society is very unfavorable to the school and society, which can be carried out in the following aspects:

1) The cooperation between the units related to the specialty they have learned can enable the knowledge in the enterprise to understand the application of relevant professional knowledge in the company.

2) Students can go to the company to experience themselves, or talk with companies or people who have cooperation with them, provide them with an internship base for them to study in the company or company, and then do their own work in the company. This internship experience in the company would also bring them unexpected opportunities.

3) Setting up a workplace in the school is actually a practice base, so that students can participate in various social activities without going out, and can apply what they have learned to practice in the shortest time, so as to deepen students' understanding of what they have learned. Figure 6 shows the analysis of the number of students in the two schools who choose the above three practice methods:

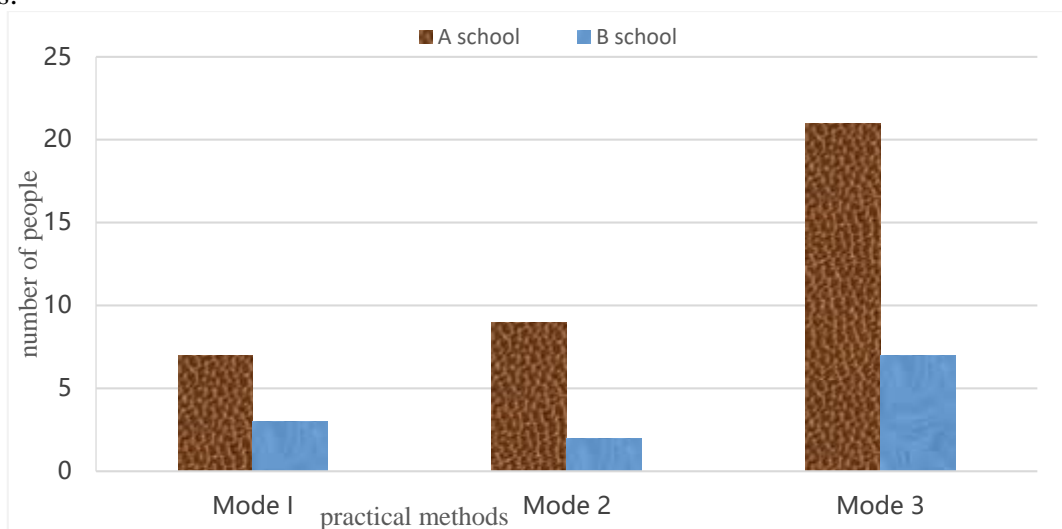


Figure 6: Analysis on the number of students who choose the above three methods in two schools

It can be seen from Figure 6 that the number of students who choose to practice in the two schools is quite different. The number of students in School A who chose the above three practice

methods was 37, accounting for 74% of the total number, while the number of students in School B who chose the above three practice methods was 12, accounting for 18% of the total number. It can be seen that the students in the creative product design education mode in the cultural ecological field are still more active in practice, while the students in the traditional teaching mode do not pay much attention to practice. The specific analysis of the choice of ways is as follows: most students in Schools A and B choose the third way to set up workplaces in the school, and there are no more ways to choose off campus practice, which may be more related to students' desire to learn knowledge and practice at the same time in the school.

(4) Environmental management of agricultural waste biomass measurement in cultural ecological field

In the field of cultural ecology, the environmental governance content of agricultural waste biomass measurement includes the coordination of urban and rural ecological relations and the ecological balance in the middle and lower reaches.

With the improvement of people's living standards, education and environmental awareness, more and more people are involved in environmental protection. The relevant government departments bring the environmental management of agricultural wastes into the overall management of the government, and make various environmental management activities have the characteristics of standardization and durability through the corresponding environmental management system, which has become an important part of the long-term management of the government. Figure 7 shows the effects of urban and rural agricultural waste on environmental management in four stages:

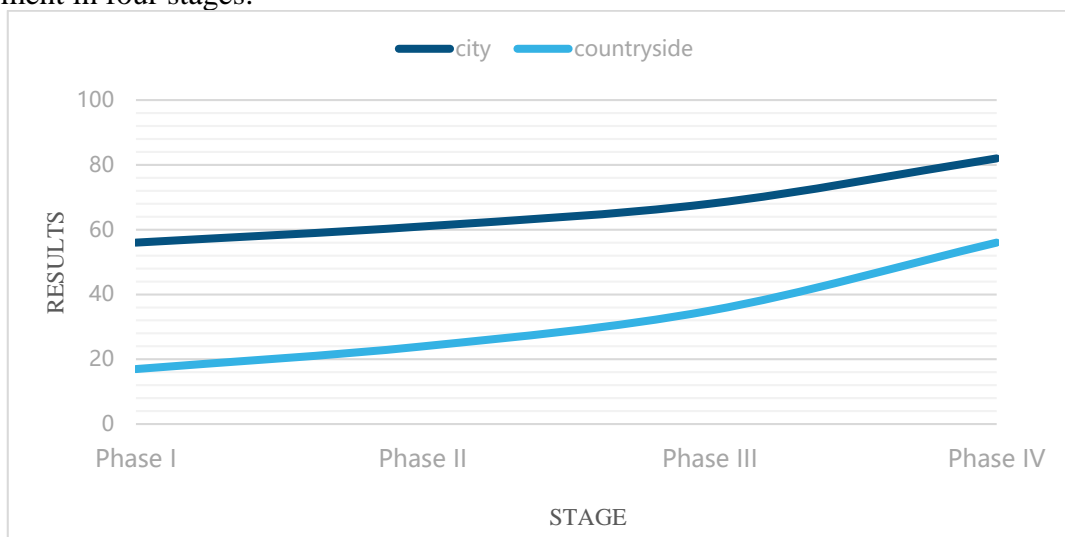


Figure 7: Effectiveness of urban and rural agricultural waste management in four stages

It can be seen from Figure 7 that the trend of the two broken lines in the line chart is the same. The difference is that urban and rural areas have seven different effects on environmental management. The urban broken line effect starts at 56%, which is due to the strong enforcement of relevant regulations in cities and people's awareness of waste, while the rural broken line effect starts at 17%, which is due to the late development of rural related work and people's weak awareness. The analysis of the data in the figure shows that the environmental management effect of urban line from the first stage to the fourth stage has increased from 56% to 82%, with a total increase of 26%, and that of rural line from the first stage to the fourth stage has increased from 17% to 56%, with a total increase of 39%. It can be seen that although the starting point of the rural broken line is busy, the growth rate is still high in cities, so the environmental management of biomass measurement of rural agricultural waste needs to be improved.



Through the research, it can be analyzed that the institutional connotation of environmental management in the cultural ecological field is mainly manifested in the mainstream development trend of environmental management, the ecological development trend of environmental management and the institutional trend of performance of environmental management.

In conclusion, the experimental results show that the teaching effectiveness of the innovative product design education model in the cultural ecological field is 6.12% higher than that of the traditional education model.

#### 4. Conclusions

At present, the teaching system of cultural creative product design course is gradually improving, and its teaching concept and teaching concept are integrated. However, in the context of cultural ecology, the development of cultural resources also needs to rely on product design courses, which mainly includes the excavation of regional cultural resources, the setting of curriculum system based on regional cultural resources, and the connection between curriculum teaching and local enterprises. At the same time, it is necessary to strengthen the treatment of agricultural wastes and the protection of agricultural environment in order to make the ecological environment develop better. Through the simulation experiment of model construction, the experiment obtained the results of expanding knowledge, advocating the spirit of innovation, arranging and classifying professional courses, and paying attention to social practice analysis. Finally, it came to the conclusion that the education model of innovative product design in the cultural ecological field is more effective than the traditional education model.

#### Acknowledgement

This work was supported by

- 1) 2024 Guangdong Province Philosophy and Social Science Planning Discipline Co construction Project.
- 2) School level quality engineering project approval for construction in 2023.

#### References

- [1] Wrigley, Cara, and Kara Straker. "Design thinking pedagogy: The educational design ladder." *Innovations in Education and Teaching International*, 2017, 54(4): 374-385.
- [2] Wright, Natalie, and Cara Wrigley. "Broadening design-led education horizons: Conceptual insights and future research directions." *International Journal of Technology and Design Education*, 2019, 29(1): 1-23.
- [3] Cao, Jingli. "Transforming Chinese Characters into Product Design: Learning from Nature." *Creative Education*, 2022, 13(3): 971-995.
- [4] Su, Wen-Zhong, Po-Hsien Lin, and Feng-Nien Han. "Study of Three Levels of Design for Cultural and Creative Products Pertinent to Consumer Personality Traits." *Business and Economic Research*, 2018, 8(2): 193-203.
- [5] Mao, Lijuan. "Research on the Development Path of Cultural and Creative Industries in the Digital Economy Era." *American Journal of Industrial and Business Management*, 2020, 10(7): 1237-1249.
- [6] He, Jintao, Dengkai Chen, and Suihuai Yu. "Research on color design and evaluation method of cultural creative products based on color harmony theory." *Xibei Gongye Daxue Xuebao/Journal of Northwestern Polytechnical University*, 2020, 38(4): 766-773.
- [7] Del Giudice, Manlio. "The microlevel actions undertaken by owner-managers in improving the sustainability practices of cultural and creative small and medium enterprises: A United Kingdom–Italy comparison." *Journal of Organizational Behavior*, 2017, 38(9): 1396-1414.
- [8] Jafari, Rahele, Abbasali Ghaiyoomi, and Toktam Farmanfarmaee. "Investigating the citizenship vitality in cultural ecology based on sustainable development of Hamedan city." *Journal of Cultural Management*, 2019, 13(45): 19-36.
- [9] Barkova, Eva. "Ecology of socio-cultural communications: worldview and methodological foundations." *Man in India*, 2017, 97(21): 241-256.

- [10] Murphy, Ailbhe, Johan P. Enqvist and Maria Teng o. "The creation field transforms the urban society ecosystem: insights into urban lake management in Bangalore, India", *Science of Sustainable Development*, 2019, 14(3): 607-623.
- [11] Rummler, Klaus, Caroline Grabensteiner, and Colette Schneider-Stingelin. "Mobile learning for homework: Emerging cultural practices in the new media ecology." *Comunicar*, 2020, 28(65): 101-110.
- [12] Wang, C. F. "Sustainable development of local cultural ecology: A conceptual discussion of cultural industry, plant culture, and ethnobotany." *Guizhou Ethnic Studies*, 2020, 41(12): 148-155.
- [13] Prentiss, Anna Marie, Matthew J. Walsh, and Thomas A. Foor. "Evolution of early Thule material culture: Cultural transmission and terrestrial ecology." *Human Ecology*, 2018, 46(5): 633-650.
- [14] Sun, Ying, and Quanfeng Ou. "Research on the traditional zoning, evolution, and integrated conservation of village cultural landscapes based on "production-living-ecology spaces"—A case study of villages in Meicheng, Guangdong, China." *Open Geosciences*, 2021, 13(1): 1303-1317.
- [15] Hu, Zhuofeng, Zhurui Shen, and Jimmy C. Yu. "Converting carbohydrates to carbon-based photocatalysts for environmental treatment." *Environmental science & technology*, 2017, 51(12): 7076-7083.
- [16] Acharya, Jyotikusum, Upendra Kumar, and P. Mahammed Rafi. "Removal of heavy metal ions from wastewater by chemically modified agricultural waste material as potential adsorbent-a review." *International Journal of Current Engineering and Technology*, 2018, 8(3): 526-530.
- [17] Yang, Fan. "The maturity and CH<sub>4</sub>, N<sub>2</sub>O, NH<sub>3</sub> emissions from vermicomposting with agricultural waste." *Compost Science & Utilization*, 2017, 25(4): 262-271.
- [18] Abd Elhafez, S. E. "Management of agricultural waste for removal of heavy metals from aqueous solution: adsorption behaviors, adsorption mechanisms, environmental protection, and techno-economic analysis." *Environmental Science and Pollution Research*, 2017, 24(2): 1397-1415.
- [19] Gontard, Nathalie. "A research challenge vision regarding management of agricultural waste in a circular bio-based economy." *Critical reviews in environmental science and technology*, 2018, 48(6): 614-654.
- [20] Varma, Rajender S. "Biomass-derived renewable carbonaceous materials for sustainable chemical and environmental applications." *ACS sustainable chemistry & engineering*, 2019, 7(7): 6458-6470.