Practical Research on the Form of Art Undergraduate Education in Cultural and Creative Industry Under the Background of Big Data

Chen Zhou(✉)

Hangzhou Normal University, Hangzhou 311121, Zhejiang, China
zchxtt@126.com

Abstract. In recent years, China's cultural and creative industries have developed rapidly. Under this condition, most provinces and cities have begun to pay attention to the development of cultural and creative industries. As an emerging industry with creativity as the core, cultural and creative industries are being needed by people and filling our lives. In order to make art education in Colleges and universities better adapt to the development of cultural and creative industries and promote the integration of corresponding favorable factors in the context of cultural and creative industries, this paper analyzes the general situation of cultural and creative industries, and deeply analyzes the status and role of art education in cultural and creative industries based on ant colony algorithm, How to optimize the development of art education in Colleges and universities in the context of cultural and creative industries.

Keywords: Cultural and creative industries · Ant colony algorithm · Art Education in Colleges and Universities

1 Introduction

Cultural and creative industry refers to the industry that can make creativity become the most economic value after it is widely industrialized. Industry is known as the sunrise industry with the most development potential in the 21st century. When the cultural industry develops to a certain extent, the creative economy will develop vigorously, and the creative industry will also appear. In the information age, China's cultural and creative industry develops rapidly, and there is a great demand for professional art and design talents in the market, All countries are sparing no effort to encourage and support each other, in order to remain invincible in the future competition. For the cultural and creative industry which highly emphasizes creative ability, the cultivation of cultural and creative talents is of great importance.

With the increasingly stringent demand for talents in art design and the vigorous development of cultural and creative industries, art design education in Colleges and

M. A. Jan and F. Khan (Eds.): BigIoT-EDU 2022, LNICST 465, pp. 478–484, 2023.
https://doi.org/10.1007/978-3-031-23950-2_52

universities can provide talents for cultural and creative industries. At present, although the enrollment of talents in art design major is increasing gradually, there are still many problems and great pressure in talent training. Colleges and universities have to constantly meet the needs of industrial development, Only in this way can we help the development of cultural and creative industries. As the forefront of personnel training, colleges and universities have great advantages in scientific research, and should play a good role in the supply of talents in the development of cultural creativity. Therefore, to further clarify the relationship between art education and cultural and creative industries, to explore the development path of art education, to make it adapt to the needs of the development of cultural and creative industries, and to promote the development of art education, has become a new topic of art education in Colleges and universities [1].

2 Ant Colony Algorithm

2.1 Basic Principle

Artificial ant colony algorithm (ACA) is the principle of simulating the real ant colony foraging process to find the shortest path. ACA absorbs the typical characteristics of ant colony behavior: first, it can detect the situation in a small area and judge whether there is food or other similar pheromone trajectory; Second, it can release its own pheromone; Third, the number of pheromones left behind will gradually decrease at any time.

Ant algorithm seeks the optimal solution through the evolutionary process of candidate solution organization group, which includes the adaptation stage and the cooperation stage. In the adaptation stage, each candidate solution adjusts its structure according to the accumulated information; In the cooperation phase, the candidate solutions communicate with each other to produce better performance solutions.

In ant colony algorithm, a limited artificial ant colony finds the optimal solution to the problem through cooperative search. Each ant establishes a feasible solution or a component of the solution from the selected initial state according to the problem dependency criteria. In building their own solution, each ant collects information about the characteristics of the problem and its own behavior, and uses this information to modify the representation of the problem, as other ants see. Ants can not only act together but also work independently, which shows a kind of cooperative behavior. They do not use direct communication, but use pheromone to guide the information exchange between ants.

Ants use a structured greedy heuristic to search for feasible solutions. According to the constraints of the problem, a solution is listed as the minimum cost (shortest path) through the problem state. Every ant can find a solution, but it may be a poor one. Individuals in the ant colony have established many different solutions at the same time, and finding high-quality solutions is the result of global cooperation among all individuals in the colony [2].

In addition to finding the shortest path between the nest and the food source, the ant colony also has a strong ability to adapt to the environment. As shown in Fig. 1, when there are obstacles on the route, the ant colony can quickly find the optimal path.

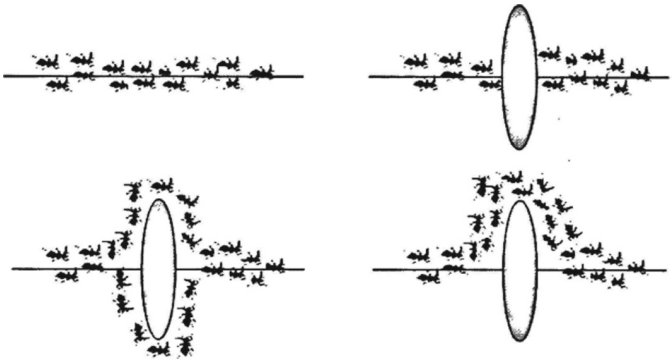

Fig. 1. Adaptive behavior of ant colony

2.2 Mathematical Model

For the sake of understanding, the ant colony algorithm model is usually illustrated by taking the ant system (AS) to solve the TSP problem of a city on a plane as an example. Firstly, the following notation is introduced: let m be the number of ants in the ant colony, dij $(i, j = 1, 2, \ldots, n)$ denote the distance between city i and j, $b(t)$ be the number of ants in city i, $m = \sum_{i=1}^{n} b(t)$, $\tau_{ij}^{\alpha}(t)$ is the amount of information left on the line at time t. Let $\tau_{ij}(0) = c$, where c is a constant. The ant k $(k = 1, 2, \ldots, m)$. In the process of movement, the direction of transfer is determined according to the amount of information on each path. $p_{ij}^{k}(t)$ represents the probability of ant k transferring from position i to position j at time t.

$$p_{ij}^{k}(t) = \begin{cases} \frac{\tau_{ij}^{\alpha}(t)\eta_{ij}^{\beta}(t)}{\sum \tau_{is}^{\alpha}(t)\eta_{is}^{\beta}(t)}, j \in allowed_k, s \in allowed \\ 0, otherwise \end{cases} \tag{1}$$

2.3 The Advantages of Ant Colony Algorithm

Ant colony algorithm is a kind of bionic optimization algorithm based on the collective foraging behavior of the biological ant colony system. Therefore, the algorithm must have many advantages of the real ant colony system. The summary is as follows:

(1) Parallel distributed computing. All ants search for many points in solution space independently and unsupervised, which is very suitable for parallel implementation. Therefore, it is an efficient parallel search algorithm in essence. The distribution calculation characteristics of ant colony algorithm are shown in two aspects: one is that pheromone is distributed on each side of the structure map. Each ant constructs the solution according to the information element condition of the current location, and does not need control center; On the other hand, when one or several ants stop working, the whole ant colony system can still keep normal function, so the algorithm has strong robustness.

(2) Strong global optimization capability. The probability of finding global optimal solution is increased by using the randomly generated ant group instead of single ant; In addition, probability rules are used instead of deterministic rules to guide search; The algorithm can escape local optimization. The traditional optimization algorithm is sensitive to the selection of initial value and iteration step, and it is difficult to escape once it is trapped in local optimization.
(3) It has strong adaptability. The ant colony algorithm has no special requirements for search space, such as the continuity, differentiability of objective function and accurate mathematical description of objective function and constraint function, which has wide adaptability.
(4) Polysolubility. Because ant colony algorithm uses population method to calculate evolution, when the population is solved once, it can provide multiple approximate solutions, which is very useful for multi-objective search or need more approximate solutions as reference.
(5) It is easy to combine with other algorithms. The construction process of ant colony algorithm solution is completed gradually, which can be combined with prior knowledge in this field conveniently. The deconstruction mechanism of ant colony algorithm has a very good advantage, that is, it can handle constraints conveniently. Ants can dynamically adjust the next accessible nodes in the process of solution construction to ensure the feasibility of the solution. However, the processing of complex constraints is a weak link of other algorithms.

3 The Current Situation of Art Undergraduate Education in Colleges and Universities

3.1 Unreasonable Curriculum and Teaching Mode

In the present art design education, many colleges and universities ignore the cultivation of students' design ideas and the overall logical thinking. Many colleges and universities are not clear about the relationship between art design courses, and the courses are scattered. Many colleges and universities only pay attention to the formal effect, and do not really cultivate the design thinking of students. It is difficult for students to understand the course deeply because of the content of the course which is too scattered and independent, and it does not form a certain design ability. Moreover, teachers are too single in teaching mode, according to the traditional teaching mode, so the students trained lack innovative thinking, so the talents trained by such art design education are difficult to meet the needs of cultural and creative industries in the market [3].

3.2 The Talent Training Mode is Out of Line with the Market Demand

Nowadays, many colleges and universities have opened art design majors to train design talents. But now many colleges and universities cultivate design talents can not meet the real needs of the market. Nowadays, the demand of design talents is not only to have professional design skills, but also to have excellent practical ability and professional design literacy. So many colleges and universities are training design talents and the

market needs of design personnel is out of line. On the one hand, most of the students in our country are trained by traditional teaching ideas. The mode is too single, only focusing on textbooks, and there is no chance of practice; On the other hand, some young teachers are directly left in school for teaching, without practical experience, so they can not teach more practical experience to students. Therefore, the talents cultivated in art education in Colleges and universities are out of line with the market demand.

3.3 Lack of Creativity and Innovation Ability

According to the survey, many colleges and universities are backward in talent training of art design specialty, whether it is education concept or training plan, which is not in line with the current trend, has not kept pace with the times, and does not match the development of cultural and creative industries. We can see that many colleges and universities lack the atmosphere of innovation and creativity. A small number of colleges and universities ignore the education of human quality, and do not pay attention to the cultivation of students' humanistic quality. Moreover, for the talents in the cultural and creative industry, many colleges and universities have not carried out special curriculum and professional training, mainly art design professional education.

At present, the practitioners of cultural and creative industries in the market generally lack the ability of innovation, so it is more necessary for colleges and universities to exert their own strength to train professional talents for the society. At present, many schools of art design in China are still in the stage of introduction, and the relevant research institutions of creative science are also in the stage of introduction. There is a lack of people involved in creative research, and some platforms for creative research are also very lacking. And whether it is the art education major in colleges or some institutions studying creative science, they have not studied the overall development strategy of creative science, but only introduce the layout of talent creative industry and the theoretical basis of creative science [4].

4 Research on Art Undergraduate Education in Colleges and Universities Based on Ant Colony Algorithm

4.1 Combining Art Education with Creative Talent Training Mode

The original art education mode is easy to ignore the humanistic quality. Once it ignores the humanistic quality, it will be contrary to the central content and thought. This is also one of the important contents of Chinese cultural industry, which is of great significance. Art Education in Colleges and universities should be based on humanistic quality education, provide innovative hardware support for students through the form of the second classroom, and edify students' emotion and wisdom by creating a humanistic environment conducive to cultural innovation.

4.2 Closely Linked with the Cultural Industry Market

The development concept of business model innovative education model and the development of cultural industry are mutually adaptive, especially in the aspect of market

development, which will continue to give play to the advantages of art education. At the same time, training methods and education contents should be adjusted in time. Art Education in Colleges and universities should be closely combined with real life. Art education in Colleges and universities should be closely connected with the essence of art creation, and better combine production, learning and research. Art Education in Colleges and universities is the practice base of integrating with the market and actively integrating into the industrial market. The development direction of art education is multi angle, and has made great contribution in the reform and development, but the development of art education needs to increase the pace, take the cultivation of innovative talents as the goal, highly combine with the market of cultural industry, and attach importance to the all-round development of students, so that art education can have fresh vitality and vitality, and cultivate innovative talents with high cultural quality.

4.3 Consolidate the Quality Foundation in the Era of Cultural and Creative Industries

Art Education in Colleges and universities should first establish the basic position of humanistic quality education in art education. To renew the curriculum of art education major, the curriculum should aim at cultivating students' artistic quality and aesthetic ability, strengthen the infiltration and construction of humanities courses and theoretical courses, and improve students' humanistic cultivation; Secondly, we should make full use of the second classroom. Carry out campus innovation activities, combine the first classroom with the second classroom, form a strong cultural innovation atmosphere, stimulate students' creative passion, establish innovation incentive mechanism, encourage students' innovation activities, strengthen the construction of innovation base, and provide hardware support for students' innovation; Third, it is necessary to create a campus humanistic environment conducive to cultural innovation. Campus culture has a subtle influence on the cultivation of students' temperament, the promotion of their realm, the sublimation of their emotions, their behavior and value orientation. It is an effective way to hold all kinds of humanities lectures and actively promote elegant art into campus.

4.4 New Requirements of Art Education in Colleges and Universities for Teachers' Teaching Idea and Teaching Level

The cultivation of creative thinking has a great relationship with teachers' teaching methods. Teachers should guide students' thinking towards divergence, flexibility and originality. At the same time, teachers should consciously add some exploratory topics in teaching to stimulate students' emotions and develop their creative potential. Innovative art education requires teachers to have innovative quality. Teachers should not only have solid and generous professional knowledge, but also master the latest knowledge and research results of various disciplines. The role of teachers should also be changed. Teachers should be changed from the past simple imparter to the information resource allocator and guide.

5 Conclusion

The industrialization of cultural creativity not only provides a broad space for the future of art education, but also points out the direction of reform and development for art education. China's art education should speed up the pace of reform, take the cultivation of innovative talents with high cultural quality as the goal, change the traditional concept of art education, maintain a high degree of integration with the cultural industry market, and pay attention to the overall development of students' innovation consciousness, innovation ability and humanistic quality, Make art education continuously inject new vitality and vigor into the development of cultural and creative industries, and cultivate innovative and compound talents with high cultural quality.

Acknowledgements. 2017 College of Cultural Creativity of Hangzhou normal university Research on Excellent Courses.

References

1. Liu, Y.: Division and reflection on research paradigm of cultural and creative industries in China. Mod. Commun. **1** (2007)
2. Li, S.: Ant Colony Algorithm and its Application. Harbin Institute of Technology Press, Harbin (2004)
3. Li, Y.: Current situation and countermeasures of humanistic quality education for college students. Vocat. Technol. **1**, 53 (2005)
4. Yu, Z.: Research on Zhang Daoyi's art education thought. Design Art **2**, 10–12 (2005)