Research on the Computer Digital Construction of Ecological Architecture

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Abstract. The concept of "arcoloy" appeared as early as the 1960s, but there is no unified concept and definition of this Building type in the academic world, but there are many different terms, such as Green Building, Ecological Building, Sustainable Building, and so on. The first International Conference on Sustainable Building (ICSC) defined sustainable building as "the creation and responsible maintenance of a healthy built environment based on efficient use of resources and adherence to ecological principles". Although this definition is not perfect, it can be seen that the core of ecological architecture lies in reducing the impact on the natural environment. First, it reduces the direct consumption of natural resources and the discharge of pollutants. The second is to reduce energy consumption, thereby indirectly reducing the consumption of natural resources.

Keywords: Ecological Architecture, Computer, Digitization, Construction

1. The introduction
The leap-forward development of the construction industry is usually accompanied by technological revolution, material revolution and tool revolution. The emergence of building Information Modeling (BIM) can be said to be the most avant-garde technology and tool revolution in the current construction industry. It even surpasses the role of tools in the general sense, and brings a revolution of creation mode to the construction industry. Ecological architecture is a new architectural form in recent years. The ecological building is to regard the building as an integral ecosystem, and realize the orderly transformation of matter and energy within its own ecosystem through organizing different physical factors in the corresponding internal and external space, and finally realize an environmental ecological recycling system with low pollution and high energy efficiency. Ecological buildings can provide a healthy and green environment and provide users with high-quality living space and activity space. In addition, ecological buildings can effectively reduce energy consumption and achieve an organic integration between buildings and the environment on the basis of protecting nature and respecting the environment [1].

2. Application of digital technology in ecological architecture
Digital ecological architecture takes ecological architecture as the main body and uses digital system as the means to achieve the ecological survival goal of architecture. Ecological architecture is the
product of the combination of ecology and architecture. The object of its research is an artificial ecosystem composed of man, building, natural environment and social environment in the environmental changes caused by man's building activities, namely the built environment. The environmental changes in the form in the history of the relationship between human and nature, destroyed the original ecological balance, which makes the research goal is first under changed conditions, construction, the natural and the social coordinated development, using the reconstruction of the natural environment, adapt to and protection of the harmony of nature, maintain the ecological balance of better, create suitable for human survival and development of all kinds of ecological balance. In order to achieve the above goals, the core technology of digital city is applied to complete the digital ecological mode of building manufacturing and operation on the basis of the digitization of ecological indicators, so as to make the change of the whole ecological environment under monitoring, and the ecological city develops towards the direction conducive to urban survival and human survival. Therefore, it can be said that digital ecological architecture here is an important part of digital city and should be considered in the overall planning of digital city development. In the architectural design of ecological buildings, different greening methods should be selected to improve the microclimate around the building, and the adaptability of the building space should be improved through the selection of large-span and light-weight building structures. The design of ecological architecture should start from the characteristics of ecological architecture and take into account the corresponding relationship between the interior and exterior environment of the architectural design area as a whole and systematically. In order to achieve the harmonious coexistence between human and the environment and nature, in the selection of building materials, we should try our best to choose green and environment-friendly materials within the allowed scope. Ecological building should also use energy saving and environmental protection technology to realize the prevention and control of environmental pollution. The site selection of ecological buildings should be as far away from the polluted areas as possible, and the natural environment and vegetation within the architectural design area should be reasonably constructed in an ecological culture. Digital eco-building application systems must be considered in digital urban architecture and core application systems. As shown in Table 1.

| Application system | core application system | management information system |
|--------------------|-------------------------|-------------------------------|
|                    |                         | e-government system           |
|                    |                         | ecological building system    |
|                    |                         | other systems                 |

3. The role of ecological architecture in architectural design

3.1. *It can effectively improve the quality of life of urban residents*

With the continuous development of China's economy and urban construction, the problem of ignoring environmental protection appears in the architectural design of most of China's urban construction. If environmental factors are not taken into account in urban building design, environmental protection will be damaged and energy will be wasted. With the development of the city towards modernization and intelligence, the reasonable addition of some ecological design elements in the architectural design will greatly reduce the damage of residents' production and life to the environment and energy, and finally realize the real improvement of residents' living quality [2].

3.2. *It can vigorously promote the economic development of the city*

The important planning of urban development includes urban economic development, which can be said to be a necessary factor for a city to achieve sustainable development. In order to break through the shackles of urban inherent planning and construction and make the design of urban buildings effectively promote the effective unity between economic growth, environmental protection and energy protection, it is necessary to accelerate the development of ecological buildings and realize the
rapid development of urban economy through the construction of ecological buildings [3].

3.3. Can realize the healthy development of the city
The design of ecological buildings can realize the organic unity of the design concepts of ecology, environmental protection and energy saving, so as to effectively ensure the realization of the goal of sustainable and healthy urban development. In order to realize the balance between urban environment and energy resources distribution, it is necessary to carry out systematic design in strict accordance with the overall situation of urban development in the design of ecological buildings. As a qualified ecological architecture design, it must be able to effectively promote the health of the citizens, promote the continuous development of education, and promote the healthy development of the city while paying attention to the ecological environment quality and the use of energy. See Figure 1 for the effect of ecological architecture on people's life [4].

Figure 1. the effect of ecological architecture on people's life.

4. Future development trend of ecological architectural design

4.1. Self-regulation
Ecological architecture design is mainly divided into passive and active self-regulation. Passive regulation should rely on the structure and components of the building itself to establish a suitable living environment when shading the doors, Windows and balconies. Passive regulation is to solve the problem of traditional architecture, to realize the attention to the built environment, but also to achieve a profound understanding of modern architectural design concepts. To guide the ecological construction of architectural design through self-regulation. At present, foreign residential architects have realized the heat preservation and heat insulation effect of buildings by selecting glass greenhouses and corresponding structural forms. It can be said that active regulation is the greatest achievement of ecological modern architectural design, which makes the application of computer technology in architectural design, realizes the organic combination of computer technology and designer's extension idea, and makes ecological architectural design have a technological revolution. Architectural designers can also further refine, accurate and rigorous the design of architectural ecology through active regulation, so as to realize the organic integration of architectural design ecology and architectural structure, physics and modern computer technology. Building digitization should include the creation of intelligent building environment supported by digital technology and the combination of physical building and digital virtual space. In addition to the building structure, intelligent management and other aspects of the content, but also the intelligent building itself brought by the new content of architectural design; The latter is more concerned with the new forms and functions of existing physical buildings under the influence of digital technology. The creation of building digital intelligent environment is also closely related to traditional research fields, such as sustainable development in ecology. The ecology and efficiency of living organisms are the result of the optimization and selection of nature over hundreds of millions of years, and are the eternal pursuit of artificial products such as architecture. The most significant feature of living organism is stress, that is, it can adjust the metabolism of material and energy and adapt to the new environment by
monitoring the external environment. In a sense, intelligent building is a kind of life building. With the help of digital technology, intelligent building also has the stress of life. The computer control system of environment and equipment in intelligent building can automatically adjust indoor temperature, humidity, illumination and other parameters through monitoring and evaluation of the building's internal and external climate information, thus creating a healthy, comfortable and safe building environment with high efficiency and low consumption [5].

4.2. Generation of neurological function

For the evolution of life, the production of neural function is an inevitable requirement for the complexity of body composition and function, so is architecture. The more the building evolves, the larger the volume, the more complex the functions, and the more sophisticated the equipment, the higher the requirements for the overall collaborative operation of the building and the automatic control of the internal environment will be. With the application of digital technology, the building has gradually materialized its own nerve center and network, and has the ability to respond to changes in the external environment and automatically adjust and control it. Epidermal tissue $\rightarrow$ neurological function. In this evolutionary process, living organisms move from aquatic to terrestrial, from variable temperature to constant temperature, and from lower level to higher level. Interface technology $\rightarrow$ equipment system $\rightarrow$ intelligent control. From materials to equipment and then to digital intelligent technology, the evolution of architecture has achieved three leaps. In this process, the application index of each major plate required by ecological building is shown in Figure 2.

\[ \text{Figure 2. The application index of each major plate required by ecological building.} \]

4.3. Virtual ecology of buildings

Digital technology can construct virtual space through computer technology and network technology, dissolve physical building in physical form, and realize ecological building in a new level. Fundamentally speaking, the progress of architecture is the progress of technology. Under the promotion of technology, the existence form of architecture is moving from the original passive "natural shaping" in the period of low productivity to the "technological shaping" in the period of large industry, and is developing into the "virtual invisibility" in the digital age. To understand virtual architecture, we must first understand virtual space. Virtual space refers to the virtual space of immaterial existence established in human consciousness through sensory signal stimulation (text,
image, sound, smell, etc.). For example, the network space established through the Internet and the virtual reality used for dynamic demonstration of design schemes all belong to virtual space. Although books, TV and other traditional media can also create virtual space, digital technology has unprecedented powerful visual realistic simulation ability and real-time dynamic interaction ability, so it occupies an irreplaceable important position in the process of constructing virtual space today [6].

5. Conclusion
BIM is an inevitable product of the development of our times, and its steady development will have extremely far-reaching significance for the development of the whole industry. The application of BIM is also a requirement for sustainable development. BIM plays an important role in the management process of the whole life cycle of buildings, in the ecological analysis of buildings and other applications. "Digital architecture" can be expressed as: under the support of digital technology, the architecture field adopts advanced architectural methods and technical systems to adapt to the industrial and economic pattern in the digital age, meet the demand of massive information processing in the whole life cycle of buildings, and improve the overall efficiency and environmental quality of buildings; It is a general term for the technologies, theories and methods of architectural design, construction and full life cycle management in the digital age. The technical purpose of the concept of "digital architecture" is to realize informationization, automation, intelligence, integration and optimization of architecture field and system. Its social and economic purpose is to promote the integration of natural and social resources, improve the operation efficiency of construction process and building system, ensure the quality of building products and effectively promote environmental protection.

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