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The Status and Connotation of Senior High School Students' Life Concept on the Background of Core Literacy

Bo Peng[1], Xinrui Sha[1], Ziyue Liu[1], Ruihua Pang[1], Feng Peng[2], Yanfang Sun[1], Lulu He[1], Qingqing Xin[1], Yuchen Liu[3] & Yue Jiang[1]

[1] College of Life Sciences, Xinyang Normal University, Xinyang, Henan, China

[2] Biology Teaching Group, Gushi No. 1 Middle School, Gushi County, Henan, China

[3] Institute of International Education, Xinyang Normal University, Xinyang, Henan, China

Correspondence: Bo Peng, College of Life Sciences, Xinyang Normal University, Xinyang, Henan 464000, China. E-mail: pengbo@xynu.edu.cn

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Abstract

In the document "Curriculum Standard of General Senior High School Curriculum and Biology (2017 ed.)" published in 2018, developing students' core literacy as the fundamental task and value pursuit of current educational and teaching curriculum reform in China. Life concept is the key element of the core literacy of biology in senior high school. This paper expounds the position and value of life concept in the biology curriculum of senior high school, and analyses the connotation of life concept, which will provide an important reference for the effective cultivation of the life concept of senior high school students in the future.

Keywords: core literacy, senior high school students, life concept, status, connotation

1. Introduction

In 2014, the Chinese Ministry of Education promulgated "Opinions on Fully Deepening the Curriculum Reform and Implementing the Fundamental Task of High Moral Values Establishment and People Cultivation", which aimed at the top-level design of education and put forward "core literacy" for the first time in China. According to the Framework for the Development of Core Literacy for Chinese Students that published in 2016, the development of core literacy refers to the essential qualities and key abilities that students should possess and be able to meet the needs of life-long development and social needs (Liu, 2018; Lea et al., 2014; Research Group on Core Literacy, 2016). Core literacy is defined as a kind of interdisciplinary literacy that is applicable to all situations and to all people (Xin et al., 2016; Stols et al., 2015). Then, people's ability to successfully meet the complex requirements and challenges of specific situations, and to build knowledge, ability and attitude into an organic whole, that is, core literacy (Stols et al., 2015; Liu, 2014). The gradual deepening of biology curriculum reform for senior high school students will also aim at promoting the development of students' core literacy. Professor Chongde Lin, an expert of the Chinese Ministry of Education, said: "One of the focuses of the world's education circles is the core literacy of students." Core literacy plays an extremely important role in the process of the current new round of education curriculum reform. Therefore, the core literacy proposed by the Chinese Ministry of Education is the soul of biology in senior high schools, and has become the vane of the current new round of curriculum reform.

In order to implement the fundamental task of "High Moral Values Establishment and People Cultivation", China formally promulgated the educational programmatic document "Developing the Core Literacy of Chinese students" in 2016, which further clarified that the core literacy is deepening the reform of the educational curriculum and achieving the target of High Moral Values Establishment and People Cultivation in China. Subject teaching is an important way to implement the education goal of core literacy. The core literacy of biology is the values, essential qualities and key abilities that students gradually develop in the process of learning biology courses and show in solving practical problems in real situations. Meanwhile, the core literacy of biology is the comprehensive reflection of students' knowledge, ability, emotional attitude and values (Liu, 2018; The Chinese Ministry of Education, 2017). The development of students undefined core literacy has become the fundamental task and basic value pursuit of the curriculum reform of education and teaching in

China, and the Chinese Ministry of Education published the Curriculum Standard of General Senior High School Curriculum and Biology (2017 edition) in 2018.

2. The Important Status of the Life Concept

In the Standard of Biology in Senior High School (2017 ed.), fostering students' biological core literacy as the purpose of biology course in senior high school, which fully reflects the core value of life science education in senior high school. The core literacy of biology in senior high school is gradually developed in the process of biology education teaching and learning of related courses for senior high school students, and it is the value orientation, moral quality and key ability of senior high school students in solving specific problems. At the same time, the core literacy of biology is also a comprehensive reflection of ability, knowledge, emotion and values in senior high school. The core literacy of biology mainly includes four elements: life concept, scientific thinking, scientific inquiry and social responsibility (The Chinese Ministry of Education, 2017; Jiang, 2015). Among them, the life concept is the dimension of unique characteristics of biology among the four elements of core literacy of discipline. Therefore, the life concept is the symbol and key of the core literacy of biology in senior high school.

Among the four key elements of the core literacy of biology in senior high school (life concept, scientific thinking, scientific inquiry and social responsibility), they are not isolated from each other, but an organic whole with a certain logical relationship (Liu, 2018; Chen, 2018). Among them, scientific inquiry, scientific thinking and social responsibility all have interdisciplinary attributes in the field of natural science. The life concept is an essential factor with unique characteristics of biology and a key element of the core literacy of biology in senior high schools. At the same time, the formation of the life concept could not be separated from scientific thinking and scientific inquiry (Yao Chen, 2018; Penuel et al., 2011). It is noteworthy that scientific thinking and scientific inquiry are inseparable: scientific thinking runs through the whole process of scientific inquiry, and scientific inquiry is the empirical process of scientific thinking. In the process of scientific thinking and scientific inquiry, the life concept and social responsibility gradually formed (Osborne et al., 2013; Guo et al., 2018). The relationship among the four key elements of the core literacy of biology in senior high school is shown in figure 1. Therefore, the life concept is the important foundation and the key pillar of the core literacy of biology in senior high school.

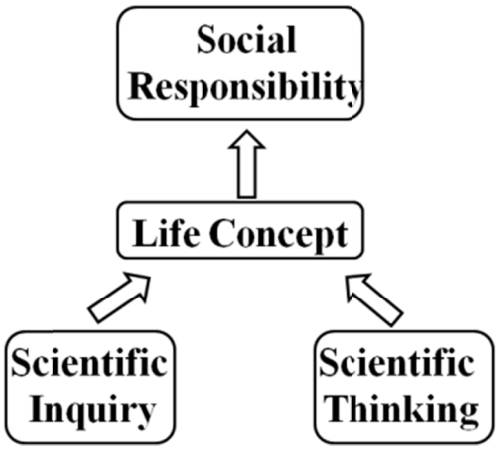

Figure 1. The relationship among the four key elements of core literacy of biology

Compared with other subjects, the life concept is the most unique among the four elements of core literacy, which can guide senior high school students to correctly understand the world of life and explore the essence of life. Therefore, the life concept has an irreplaceable educational significance in other disciplines. Moreover, the cultivation of the life concept is helpful for senior high school students to correctly understand life, deeply understand and explain the phenomena related to life and even the essence of life (Lea et al., 2014). Among the four major elements of the core literacy of the subject, the life concept is the one with unique characteristics of biology, and it is of great and far-reaching significance to correctly guide senior high school students to recognize the world of life and to explore the essence of life in an all-round way. Moreover, in the Biology Curriculum Standard for Senior High School in China (2017 ed.), the first core literacy of biology is the concept of life, which further highlights the important position of the life concept in the curriculum system of biology. This is a landmark change in the reform of high school curriculum education, and it will have a far-reaching

impact on the education and teaching of high school biology in China.

For biologists, biology teachers and high school students, the life concept has an important position and educational value in the core literacy of biology discipline in senior high school. From the point of view of the biologists, the life concept is the life phenomenon and the relationship between them that people have observed, and then the abstract extraction after the explanation is the idea or viewpoint which has been verified by practice or experiment. From the perspective of senior high school students, the life concept is the key or symbolic learning achievement of senior high school students after learning biology course, and it is a yardstick to measure whether senior high school students have received good biology education. From the perspective of biology teachers, all high school biology classes will impart biology and its related factual knowledge to senior high school students. However, while teachers pass on these details, not all teachers can guide and actively help senior high school students develop their life concept at the same time. From the perspective of existing research results and current science education and teaching theories, it is found that all kinds of different situations in senior high school biology class will directly or indirectly affect the learning effect, quality and academic achievement of senior high school students. At the top of the core literacy of biology is the life concept, which is to further highlight the importance of the life concept in the biology curriculum of senior high school and its educational value. At present, the life concept plays a very important role in the core literacy of high school biology, and it is further strengthened in the course of practical teaching practice.

3. The Profound Connotation of the Life Concept

The value of the curriculum development of biology education in senior high school lies in the formation of the basic outlook on life and basic viewpoints of biology for the senior high school students (Silva & Maria, 2015; Nair, 2017; Liu et al., 2011). The 2017 edition of the Standard of Biology in Senior High School requires students to explain the phenomena and world of life by using the life concept, and is willing to explain the life concepts to others, such as the view of structure and function, evolution and adaptation, steady state and balance, and the view of matter and energy, etc. The life concept is the abstract from which people explain the observed phenomena of life and their related characteristics, and then form the views, consciousness, concepts, and methods of thought after being verified by practice or examples. In addition, life concept also can explain life-related events and their phenomena. Through the study of biology curriculum knowledge, senior high school students can form the corresponding life concepts, such as the view of structure and function, evolution and adaptation, steady state and balance, and the view of matter and energy, etc. At present, many scholars have studied the life concept and its related contents, involving the characteristics of the life concept, the significance of life concept as a teaching objective, the methods of infiltrating the life concept in teaching and the characteristics of examining the life concept in examination questions (Guo et al., 2018; Su, 2016). One of the teaching purposes is to enable students to use the life concept to understand the diversity, unity, uniqueness and complexity of the surrounding organisms, and also to form a correct view of nature and world. With this view guidance, it can explore the law of life activities and solve practical problems.

3.1 In the View of Structure and Function

The structure and function of organisms are formed by the long-term evolution of organisms, which are compatible with each other and a reflection of the adaptation of organisms to the environment. Among them, structural and functional adaptation means that a certain structure necessarily corresponds to a certain function, and any function needs a certain structure to achieve (Zhang, 2017). Structure determines function, and function reacts on structure. It is noteworthy that structure determines function is not absolute, there are still examples of "the same structure has different functions" and "different structures have the same functions". In the biological world, function is the guide to determine structural change, and function has a guiding effect on structure. It is necessary to deeply analyze the structure view, the function view and the relationship between them so as to further explore their structural characteristics. At the same time, combined with the existing high school biology curriculum about the content of the structure and function (such as using biological models), so that the students can see on-site how the structure of the organism determines the function, and the function can also divide into internal and external functions. All of these contents will deepen senior high school students' understanding and mastery of the relationship between structure and function in the field of life sciences.

3.2 In the View of Evolution and Adaptation

Evolution and adaptation further reveal the elements of life concept from the perspective of time. All the scientific problems about life and its related sciences can be used to find the most fundamental reason by the concept of evolution and adaptation. That is to say, from the perspective of evolution and adaptation, we can answer the essential questions of life, such as the origin, evolution and possible future development situation of

life. Among them, evolution is the basis of life science. Using the viewpoint of evolution can enable senior high school students to have a better understanding of biological knowledge. In high school biology teaching, teachers first have a profound understanding and understanding of the meaning of evolution and the law of evolution, and then actively guide and cultivate students' concept of evolution in the process of classroom teaching, so that high school students' life concept can be fully developed (Zhang et al., 2017). Adaptation is a phenomenon that the morphological structure or physiological function of organism is suitable for its environmental conditions, which is often accompanied by the adaptation of the structure and function of the organism, as well as the adaptation of the structure and function of the organism and the environmental conditions. Evolution and adaptation are embodied in the process of normal operation and sustainable development of life system. The ultimate result of organism evolution is the formation of new species, and the beginning of new species formation is also the beginning of new adaptation of organisms. Therefore, we should accurately grasp the connotation of evolution and adaptation, the law of evolution and adaptation, and the relationship between evolution and adaptation. Combining with the existing examples of biological evolution, we can understand the delicate relationship between evolution and adaptation, and form a colorful life world, so as to realize the effective cultivation of the life concept.

3.3 In the View of the Concept of Steady-State and Balance

Steady-state is not only the condition of organism survival, but also an obvious characteristic of life system. But steady-state is not absolutely stable, it is a variable and relatively stable state. The maintenance of this state requires that organisms have a relatively perfect regulatory mechanism and can resist the constant changes of external environmental conditions. As far as the relationship between steady-state and balance is concerned, balance is relative. The life system is always in a state of constant breaking of balance, and then a new dynamic balance is established, thus imbalance is absolute. Steady-state is a dynamic balance, but it needs to be achieved through a certain regulation mechanism. In a certain range, the regulation mechanism of life system can resist various disturbances. It keeps its life system in harmony and stability, and then shows the organic unity of balance and movement.

Therefore, making full use of the existing biochemical reaction test conditions, observing the differences before and after the biochemical reaction on the spot, deeply experiencing the universality of the steady-state and the relativity of the balance, all of these are very important for the effective cultivation of the view of steady-state and balanced for the high school students. Simultaneously, combining with the definition of the steady-state and the balance in the existing high school biology textbooks, we can understand the difference and relationship between steady state and balance, and then let senior high school students realize that steady-state is a dynamic balance which is realized by regulating mechanism, and finally effectively cultivate the view of steady-state and balance for the senior high school students.

3.4 In the View of Material and Energy

We need to deeply explore the value of material education in the process of the education and teaching of senior high school students, including moral value, intellectual value, sports value and aesthetic value. For example, setting up a correct view of living matter can effectively train high school students to set up the consciousness of ecological civilization, save natural resources, protect the ecological environment, and promote the formation of the concept of healthy and sustainable development of the material world. The cultivation of the concept of energy can enable senior high school students to explain the phenomenon of life activities from the perspective of energy and reveal the law of life activities (Liang, 2013). The synthesis, metabolism and decomposition of substances in the body of life are always accompanied by the absorption, transformation and release of energy, which means that material is the carrier of energy. At the same time, the mutual transformation of living matter needs the impetus of energy, so energy is the booster to promote the mutual transformation of living matter. Therefore, in the process of teaching biology education in senior high school, it is necessary to highlight the importance of constructing the concept of energy, and to straighten out the relationship between "material view" and "structure and function view", "evolution and adaptation view", "steady-state and balance view". These improvements raise awareness of the important position of life concept and the value of education.

In the view of life concept, structure and function view, evolution and adaptation view, steady-state and balance view, material and energy view are interrelated and inseparable organic whole. Among them, the basis of structure and function view is material view, while structure and function view are the basis of other life concepts (evolution and adaptation view, steady state and balance view, material and energy view). The life with specific structure and function shows relative balance and stability under certain environmental conditions, and then forms the view of steady state and balance, which ultimately reflects the operating mechanism and law of

the life system (Haroun et al., 2016). In order to adapt to different external environments, the concept of evolution and adaptation is the inevitable result of the development of life system. The concrete manifestation of the adaptation of life systems to environmental condition is the view of structure and function of organism. Therefore, the relationships between structure and function view, evolution and adaptation view, steady-state and balance view, and material and energy view are shown in Figure 2.

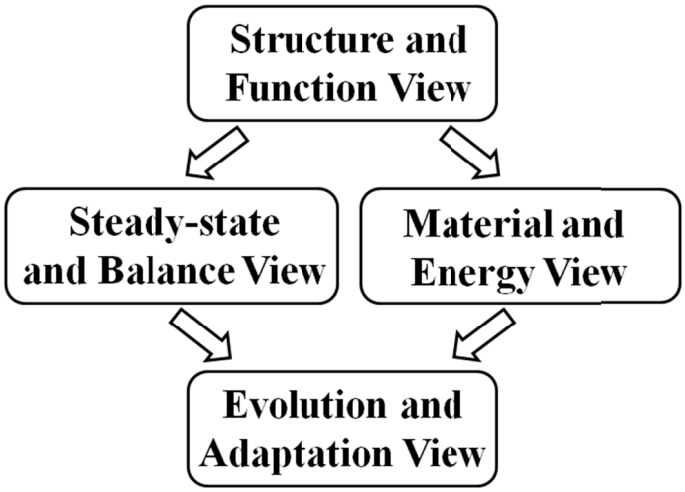

Figure 2. The relationship among the four elements of life concept

4. Conclusions

Core literacy is the soul of biology in senior high school, and it is also the vane of the current new round of senior high school curriculum reform. The life concept is the unique dimension of the four key elements of the core literacy of biology, which is the symbol and key of the core literacy of biology in senior high school. In the view of life concept, the four concepts of structure and function, evolution and adaptation, steady-state and balance, material and energy are interrelated organic whole. In the teaching of biology in senior high school, we should embody the important position and educational value of the life concept, which is of far-reaching significance for guiding senior high school students to understand the world of life correctly and comprehensively and to explore the essence of life.

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