



# Influence of Chaos and Order of Life System on Education

By

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## Abstract

**This paper mainly discuss that life system is a complex structure of chaos and order. The order of life is supported by replication of inherited genes and conversion of energy, while the chaos is due to loss of energy and inevitable genetic mutation. In face of lively student, we should not only follow the linear rules of education, but also respect the individual created by nature.**

## Keywords

**Chaos, order, life system, education**



## I. the Origin and Flow of Chaos

The word "chaos", derived from the Greek, means "something unfathomable and broken," a kind of nothingness of space. As far back as pre-Socratic times, in the old Biblical creation stories, this void was the basis of all creation and used to explain the fundamental origin of the universe. This is consistent with the state before the formation of heaven and earth in the imagination of ancient Chinese people, which refers to the undivided and fuzzy state before the opening of the world. The interpretation of chaos is now familiar to most modern philosophers, such as German classical philosopher Schelling, who called it "the metaphysical unit of potential possibility." Modern science has also adopted this ancient concept of chaos and made it its own, such as Lorenz. At the same time, the word "chaos" has become quite trite in everyday usage, and popular usage has eroded the concept of chaos to mean nothing more than the breakdown or decay of order that people do not want to see, such as chaotic traffic, chaotic discussions, chaotic people, etc. Of course, chaos may be caused by the decline of order, chaos and order is a dialectical relationship.

## 2. The Connotation of Chaos

Before talking about the meaning of "chaos", I think the definition of "certainty" may be clearer. Certainty means pre-determined and pre-determinable. In the empirical world view of physics, it is believed that all the parameters of object's motion can be so precisely and completely determined that its future, no matter how complex, can be calculated by differential equations. For example, object in motion, amoeba, lightning, etc. Such a course of motion is called an orbit. From one end of the track to the other, it's linear thinking.

In nonlinear systems, however, they undergo one or more bifurcation points and are therefore uncertain. As early as 1892, Poincare, a great French mathematician, completed the basic work of mathematics dealing with nonlinear systems. But it wasn't until 1963 that Poincare's idea found a practical application: American meteorologist Lorenz used it to build mathematical models for meteorological calculations. In this model, he found that even three nonlinear systems of first order differential equations would produce completely chaotic orbits. This completely obstructed the weather forecast he was trying to make.

Chaos is the unity of certainty and uncertainty, regularity and irregularity, order and disorder.

## 3. The Chaotic System of Life

### (1) Order of Life

**Construction of Order in Life:** on the one hand, we are fascinated by the repeated order of nature, whether it is the symmetry of a flower or the geometry of a pinecone. In living systems, the inanimate material constructs highly complex ordered structures according to the organizational schemes passed down by genetic laws. The geneticist Mendel discovered that when pea plants with white and red flowers were crossed, the offspring produced pink flowers, showing what appeared to be an even mix of the traits of their parents. But when their children self-pollinate, the next generation produce pure red, pure

white or pink flowers. In other words, in the second generation, the character of solid color is repeated. This is Mendel's first law: genetic traits are determined by a pair of genes, one from each parent. Thus the order of life is constructed.

**Guarantee of Order in Life:** During cell division, a basic requirement for ensuring genetic information is that it can be copied precisely so that two daughter cells contain the same genetic information. But who will guarantee it? The double helix structure in DNA ensures that requirement is met. During replication, the double helix is unwound and complementary strands are formed along the two long strands simultaneously, ensuring that the two new double strands are identical to the parent strand. In the process, about a thousand volumes of information are accurately reproduced in this way. By this way, the order of life is guaranteed.

But order in nature is usually considered as something static, and a crystal is a good example of such order. However, as we shall see, order in living system cannot be compared with the static phenomena of crystal in nature. Life is an order created from motion and change, and can also be defined as a system that maintains and even extends its order by constantly absorbing external energy. Just as a steam engine can run for a long time, if fuel can be added continuously. A life need to keep running, it must be kept giving energy. Life, then, is not a mechanical problem, but primarily an energy problem. Then another question arises: How can living system maintain its stability in terms of energy? How do lives preserve and transfer the energy necessary for their order?

**Maintenance of Order in Life:** On Earth, most of energy comes from the sun, and green plants use it for photosynthesis. That is to say, the electromagnetic energy of sunlight convert into chemical energy such as glucose and starch, and organism absorb these nutrients and convert them into heat energy to maintain body temperature or nutrients needed for life entity, thus the energy cycle is completed. In this way, the high order of life is supported and maintained by genetic copy and energy cycles.

Living systems are again analogous to mechanical systems in sense of maintaining order. As we all know, it takes energy to run a machine for a long time, and so does life for a long time. But is life a machine? Obviously not. A high degree of order is only superficially stable in the flow of life, but from the view of human history, a high degree of order in living systems is a highly improbable event. Life is orderly, and at the same time it is always accompanied with disorder. The living system is the unity of order and disorder. Life is both static and flowing.

## (2) Disorder of Life

**Energy Loss of Life Disorder:** the second law of thermodynamics tells us that the transformation between mechanical energy and thermal energy inevitably has the loss of energy, no steam engine can convert heat energy into mechanical energy with 100% efficiency (typically to 50% - 80%), no matter how good its insulativity and construction. The energy conversion process is inevitably accompanied by loss of energy, the remaining available energy will not be enough to return to the initial state. So the machine

gradually slows down and eventually stops. Perpetual machine is not possible. Immortal life is not possible. It is obvious that water flows downwards and everything goes into decline.

**Genetic Mutation of Life Disorder:** Studies have shown that: for human genome, every 4000 base copies will occur a mistake, which is undoubtedly a disaster for human beings. The limited replicating accuracy during cell division makes it inevitable that incorrect base will be added into. Replicating mechanisms of DNA are far from perfect. And on every beach, we are bombarded with natural radiation, and even in our natural environment, we are exposed to countless chemicals. Genetic mutation need not to be explained. It comes about easily. What needs to be explained is the fact that life is stable and mutation rates are as low as human observed in practice. But we need to note that the very few errors that occur in process of gene replication are important to the dynamics of living systems, making it possible for species to variate and proceed alike. From this perspective, therefore, the disorder of living systems may also be a fault on the right side. Genetic mutation can bring disease and harm to life, but they can also bring evolutionary drive. Although this natural choice works by very small and slow steps, the law of "nature without leap", as Leibniz said, is understandable. Nature will not leap forward. In this way, we can understand why nature is generous with species but stingy with innovation. As we shall see, this continuity of living systems is only superficial, and at the branching points where new things emerge, in fact destruction of order is necessary. Indeed, the interplay of order and chaos is the potential of nature to create everything.

From the above analysis, we know that the living system is a chaotic unity of order and disorder. To be specific, the order of life is supported by replication of inherited genes and conversion of energy, while the disorder declines due to the loss of energy and the inevitable genetic mutation. Thus, living system is a complex structure of chaos and order.

Life is chaotic, in face of lively individual, in education, we should not only follow the linear rules of education, but also respect the individual created by nature mother, teaching in accordance with their own ability.

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