

Research on How the Public Understand Science from the Perspective of Philosophy of Information[†]

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Abstract: Since the Renaissance in the Western world, culture has formed two camps, namely scientific rationality and humanism. Facing the reality that the two cultures are gradually splitting into the camp of insiders and outsiders, this article aims to explain the two cultures and further explore whether it is necessary for the public as outsiders to understand science, to what extent the public should understand science, and how to understand it even as a humanistic social scientist. In the end, the article puts forward suggestions and expects to carry out corresponding reforms in the education system itself and scientific communication methods to meet the needs of cultural development or even the further development of society in the new era.

Keywords: the public; scientific rationality; humanism

1. Introduction

The scientific and technological revolution in the 20th century has greatly changed the social life and survival methods of human beings. In theory, the public should know more about science at all levels of society than ever before. However, this is not the actual case. There are the so-called two cultural divides between the public and science, and even between humanistic social workers and science. Science is consciously or unconsciously covered in mystery. For scientific rationality and humanism, it seems as if these are two fortresses that do not invade each other, and there is a gap of mutual incomprehension between the two. Humanistic intellectuals deceive themselves to believe that traditional culture is all “culture”, but most non-scientists have no idea about the world of physics, not from innateness, but from lack of training. In C.P. Snow’s “The Two Cultures” and “A Second Look”, “The Public Understanding of Science” by the Royal Society, and Alan F. Chalmers’ “What Is This Thing Called Science?”, the authors have a basic understanding of science and the division between science and humanism. Based on this, this article briefly introduces the confrontation between the two cultural camps and demonstrates the necessity and possibility of a public understanding of science and proposes potential measures of reform. This includes reforming the existing education system and methods, breaking the concept of insiders and outsiders, correctly guiding the media in scientific communication, and building a platform for scientists to communicate with the public, so as to strengthen the public’s understanding of science.

Since the Renaissance in the Western world, culture has formed two camps—scientific rationality and humanism. The scientific and technological revolution in the 20th century has changed the social life and way of survival of human beings. In theory, the public at all levels of society needs to know more about science than ever before. However, in fact, can the public as outsiders understand science? To what extent can the public as humanistic social scientists understand science? These are all issues worthy of in-depth consideration.



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2. Whether It Is Necessary for the Public to Understand Science?

The Royal Society has made necessary definitions of “the public”, “understanding”, and “science” [1] (p. 5): “the public” refers to most non-scientific people. Additionally, “understanding” includes not only the understanding of scientific facts, but also the understanding of scientific methods and the limitations of science, the correct evaluation of the practical value and social impact of science, as well as a basic understanding of statistical analysis of the nature of risks, uncertainties, and variability, and learning ability to read data materials.

First of all, what I want to discuss is whether it is necessary for the public to understand science. In the early 17th century, Francis Bacon once proposed that the purpose of science is to improve the destiny of people on the earth [2] (p. 11). Science and technology play an important role in all aspects of our social life. Industrial development and national prosperity are largely based on science. Therefore, everyone needs to have a certain understanding of science, scientific achievements, and limitations of science, rather than pretend to be a so-called “outsider”. Charles Percy Snow made a corresponding explanation from the perspective of the division of two cultures in “The Two Cultures” and “A Second Look”. In his view, a literary worker who does not understand the second law of thermodynamics is like a scientist having not read Shakespeare, and a humanist who does not understand acceleration is equivalent to a scientist who has not read literature at all. Snow further elaborated on this point. He pointed out that anyone should understand that science is the highest form of human intelligence, and that ignorance of science is ignorance of the modern society. The cultural division has brought great harm to mankind. For example, he said, this prevents people with higher education from being able to conduct serious discussions on any major issues together at the same level. Since most intellectuals only understand one kind of culture, it will cause us to make wrong interpretations of modern society, make inappropriate descriptions of the past, and wrong estimates of the future [3] (p. 11).

However, what is it like on the factual level? Not to mention the general public; even humanistic social workers know very little about science. Similarly, scientists also sneer at the field of humanism. The two cultures have gradually split into camps of insiders and outsiders [2] (p. 13). Francis Bacon, the philosopher, and many of his contemporaries summarized this scientific attitude at the time. They insisted that if we want to understand the natural world, we must consult the natural world instead of the writings of Aristotle. The premise of Snow’s writing of this speech is his special status. As a scientist and a literary worker, he travels between the two groups of people. In his own words: “The education I have received is entirely for the sake of cultivating a scientist, but a career as a writer” [3] (p. 27), working with scientists during the day and colleagues in literature at night, I have a deep understanding of the two major cultural camps. According to Snow, the two groups of people have similar intelligence, the same experience, no obvious difference in social origin, and almost no difference in income, but they are almost completely no longer connected. In terms of knowledge, morality, and psychological temperament, for them, there is so little in common. Scientific rationality and humanism are like two fortresses that do not invade each other, having a gap of mutual incomprehension between the two, while each fulfilled their duties in the long river of human history but never interacted with each other. There is a vivid description of this in Snow’s speech: humanistic intellectuals deceive themselves to believe that traditional culture is all “culture”, as if the search for natural order is boring. Most non-scientists have no idea about the world of physics at all. This is not from innateness, but from lack of training. He has a very interesting comment on these two types of people: they do not know what they have lost, they mock and treat scientists who have never read an important literary work as ignorance, but their own ignorance and their own specialization is even more surprising [4] (pp. 35–42).

3. The Main Ways for the Public to Understand the Science

From the above discussion, we know that it is absolutely possible and necessary for the public to understand the history of science, and in today’s rapid development of

society, enhancing the public's understanding of science is an investment in the future. Therefore, countries need to learn from the education system itself, and corresponding reforms should be made in the methods of scientific communication to meet the needs of cultural development and even the further development of society in the new era. The main ways of understanding are as follows.

The first is to reform the existing education system and education methods, and abandon the excessive admiration of specialization. The five standards of general education in the Harvard Faculty of Arts and Sciences for one are as follows: writing clearly; having the ability to judge and discern the world, society, and the methods of human beings that they know and understand; having a broad vision of one's own culture and others, and arranging one's own life in this consideration; understanding and thinking about moral and ethical issues, and having the ability to make correct judgments when making moral choices; and being professional in certain areas of knowledge. From this, we can see that professional training has been significantly weakened. In addition, the popularization of science in primary and middle school education should be emphasized, so that everyone can have a basic understanding of science in the early stage of the formation of their knowledge system. When talking about the scientific revolution, people such as Newton, Francis Bacon, Galileo, and others in history are no longer unfamiliar to students.

The second is to break the concept of insiders and outsiders. No matter which camp you are in, you must have basic respect and understanding of the other, at least when it comes to the names of Shakespeare or high-energy physics, so you do not appear bewildered. As an individual in a social community, you may not know what the "G Protein-Coupled Receptors" researched by the 2012 Nobel Prize winners in chemistry specifically refers to, but it is necessary to understand the discovery and its great scientific value. It is like I am a student of Chinese philosophy, but this is not a reason for me to bury my head in old books and not understand the development trends of science and technology in today's society.

Third, in terms of science communication, whether it is traditional paper media or the Internet, it must play a role of publicity, correctly guide the public to become interested in science and technology, and become the most convenient and effective way for the public to touch and understand science.

The fourth is to actively build a platform for scientists to communicate with the public. In the process of interoperating between the two cultures, scientists themselves have played an indispensable role. They must learn to communicate with the public, walking out of the laboratory into the public's field of vision, being enthusiastic about spreading science, and truly regarding this as their own inescapable responsibility. It is like the Songshuhui-Association of Science Communicators; as a science communication public welfare organization, they try to make science popular through their own efforts. The founders of the association believed that science to the general public is like a delicious but inconvenient nut, and they just need to peel off the outer hard shell of the scientific nut like a squirrel to get the delicious fruit and dedicate it to the public. The science field can also learn from the current humanities to enter the daily life of the public with the help of TV programs, and bring the classroom to the silver screen, such as the Baijia Forum, where scientists can try to open the world of science and technology to the public in a lively and easy-to-understand way, which is also acceptable to the public.

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References

1. The Royal Society. *The Public Understanding of Science*; Peking Institute of Technology Press: Beijing, China, 2004; p. 5.
2. Chalmers, A.F. *What Is This Thing Called Science*; The Commercial Press: Beijing, China, 1982; p. 11.
3. Snow, C.P. *Pride and Prejudice on Science*; Sichuan People's Publishing House: Chengdu, China, 1987; p. 27.
4. Pearcey, N.; Thaxton, C. *The Soul of Science*; Jiangxi People's Publishing House: Nanchang, China, 2006; pp. 35–42.