



Lesson 1.14 Discourse & Text: Science and Technology

Talk about Science and technology

- ▶ Some people say that science and technology play an increasingly important role in our society? Do you agree or disagree?
- ▶ What new technology do you expect to become reality in the future? Why?
- ▶ Do you think technology, for example AI, will some day manipulate human beings, or mankind is always in control? Why?

What is science?

- ▶ Generally, science is a logically self-consistent system of knowledge consisting of concepts, laws, theorems, formulae and theories and other factors.
- ▶ From a dialectical materialist point of view, science is at least a kind of rational knowledge rather than perceptual knowledge (Wang et al., 2011).

Science vs technology

- ▶ Science is the study of the natural world by collecting data through a systematic process called the scientific method.
- ▶ And technology is where we apply science to create devices that can solve problems and do tasks. Technology is literally the application of science.
- ▶ <https://study.com/academy/lesson/how-science-technology-are-related.html>

The difference between Sino-western sciences

- ▶ Why modern science was born in the west?

The difference between Sino-western sciences

1. The traditional sciences in China emphasize on description of natural phenomena and summing up of experiences; and the western science is keen on research on the cause behind natural phenomenon.

- ▶ “Brush talks from dream brook” 《梦溪笔谈》, “Mohist Canon” 《墨经》 and “Xu Xike’s travel records and diaries” 《徐霞客游记》, none of them did not emphasizes on the description of natural phenomena.

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- ▶ In contrast, Archimedes used his Buoyancy theory to explain why a wood floats on the water while a stone sinks.
 - ▶ William Gilbert regarded the earth as a big magnetic body, and used his theory to explain why the magnetic needle directs to the south and the north.
 - ▶ And Newton used the law of universal gravitation to explain why the Projectile always falls down on the ground.

The difference between Sino-western sciences

2. Traditional Chinese sciences emphasize on understanding a problem by means of intuition and tacit neglecting strict definition of a concept, which the western sciences pay great attention to. Based on these concepts, the westerners use logical and strict reasoning and experiment method to examine and prove knowledge strictly which guarantee the exactness and perspicuity of the western sciences.

- ▶ E.g.
- ▶ Yin and Yang Theory
- ▶ Principle of leverage by Archimedes, concepts such as fulcrum, center of gravity, lever and actuating arm.

The difference between Sino-western sciences

- ▶ 3. The traditional Chinese sciences emphasize on practicality, while In the west, practice is not the main motive force to drive science to move forward. The purpose of science is not completely for improving the productivity and developing economy.
- ▶ E.g.
- ▶ “Zhou Bi Suan Jing”(The Arithmetical Classic of the Gnomon and the Circular Paths of Heaven) 《周髀算经》; “Armillary Sphere” 浑天仪
- ▶ Faraday's study of electromagnetic induction, Maxwell's study of electromagnetic theory, Planck's quantum hypothesis, Darwin's study of biological evolution, and Einstein's study of the theory of relativity.

The difference between Sino-western sciences

- ▶ 4. Traditional Chinese sciences emphasize on acquisition of knowledge, neglecting inspection and argumentation (reasoning), while in western sciences any knowledge is tested and verified strictly (Wang et al., 2011).

Three groups of knowledge

- ▶ Knowledge is divided into three groups: **objective, subjective and reasoning knowledge.**
- ▶ **Objective knowledge** mainly includes natural science knowledge and social science knowledge, which must be logical and can be tested within the range of experiences and measured in terms of being correct or false. It must be tested by means of logic and experiences.
- ▶ **Subjective knowledge** includes literature, arts, comments, religion and philosophy etc. They are man-made with no distinction of correctness or falseness. They are the opinions of people on the problems. All they need is to make one's argument consistent and not self-contradictory.
- ▶ **Reasoning knowledge** refers to logic and mathematics. They do not need to be checked by experiences.
- ▶ Subjective knowledge and reasoning knowledge only need to be checked by logic method.
- ▶ **Scientific knowledge is only one part of sciences.**

The difference between Sino-western sciences

- ▶ 4.
- ▶ In ancient times China take the lead in the world in Scientific knowledge not in sciences or scientific technology. For example, related knowledge in such works as “Mohist Canon” 《墨经》, “The Nine Chapters on the Mathematical Art” 《九章算术》 and “Qi Min Yao Shu” 《齐民要术》 cannot be analyzed logically or verified or disproved by strict experiment or observation.
- ▶ And the reason why the past quantum hypothesis, the hypothesis of continental drift and the Big Bang hypothesis are called theories now is that they were proven through undisputed observations and facts.

References

- ▶ Wang, X., Qian, Z. & Su, G. (2011). Study on differences between Chinese and Western sciences and their causes. *Scientific Research and Essays*, 6(21), 4545-4550. doi: 10.5897/SRE11.760