Science/Mathematics Education in the Language-Culture Milieu without the Dichotomy between the Worlds of Phenomena and Ideas

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An issue crucial to science/mathematics education is conceptual confusion stemming from translation in Japan. As a rule, translation distorts language-culture assumptions. This will be illuminated in the context of science education. For instance, although the assumption of the dichotomy between the phenomenal world and the world of Idea is essential to the scientific way of thinking, the assumption is lost in translation of scientific concepts into Japanese words. In the translation of "nature" into the Japanese word "shizen", of which meaning is originally "spontaneity", pupils as well as science educators rarely envisage the concept of "nature" in the world of Idea, because the Japanese culture has refused such a dichotomy.

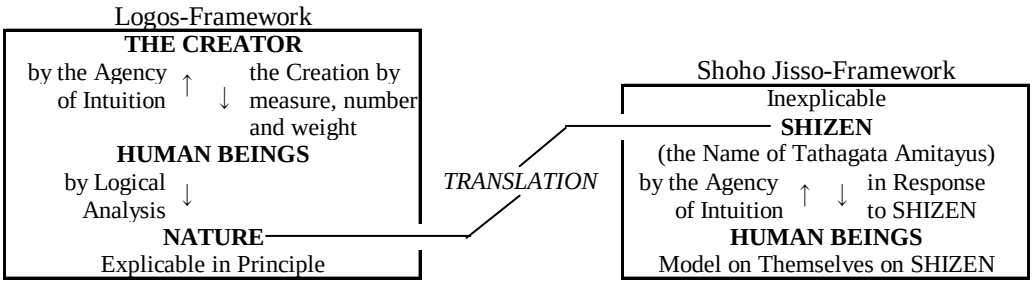

Figure 1. Language-Culture Disorder in Translation

Figure 1 shows how the translation distorts "nature" in science education in Japan. On one hand, the Logos-framework justifies the scientific way of thinking on the basis of the dichotomy. There, the downward arrow from "the Creator" to "Human Beings" indicates the creation in the manner of mathematics. Therefore, the creation assures "Human Beings" that their effort to give mathematics expression of the world is not vain at all. In their effort, the mathematics expression is identical with understanding of ideas in the mind of "the Creator" in principle. This understanding is symbolized by the upward arrow to "the Creator". Being unable to grasp the mind of "the Creator" directly, "Human Beings" have to search the phenomenal world for mathematical or logical structure of "nature" in the first place, and then envisage the mind of "the Creator" through an irrational leap to the world of Idea. This procedure is the same as scientists have to take in order to find scientific laws, which formulate relationships between Ideas (Kawasaki 2002). These two steps are consistent with the dichotomy.

On the other hand, the Shoho Jisso-Framework, which explains the Japanese way of thinking, is constructed without the dichotomy. This framework will become comprehensible to those who share the Logos-Framework if they consider the framework to be deficient in the first step to investigate mathematical structure of "nature". Within this Japnese framework, "shizen" is traditionally accepted as another name of

Tathagata Amitayus Buddha who possesses infinite life in the belief system of the Japanized Buddhism. Japanese people believe that the salvation of the Tathagata has an essential feature of "spontaneity" and cultivate a way to regard each natural phenomenon in the same light as the Tathagata. Therefore, the essence of "shizen" appears similar to that of the self-introduction of the Creator "I am who I am" in Exod.3:14. This is the reason why the Japanese word "shizen" usually refers to something supernatural (Kawasaki 1996).

Although "nature" is equated with "shizen" in science education in Japan, this Japanese word definitely remains in the same linguistic status in the Shoho Jisso-Framework, which presumes neither the dichotomy nor the belief that the world was created in the manner of mathematics. Consequently, it is improbable for Japanese pupils to search for the mathematics structure of natural phenomena within the Shoho Jisso-framework. Even in the science classroom, leaving out the first step in the Logos-Framework, pupils assume a similar outlook on "shizen" to that on the mind of "the Creator". Thus, they naturally consider "shizen" to be inexplicable although "nature" should be explicable in the scientific way of science.

Because "shizen" tend to remind pupils that it is inexplicable, science educators have to give additional consideration of the dichotomy in the Japanese language-culture setting. The additional consideration will focus on the difference between these frameworks. Because of a lack of the additional consideration, it becomes problematic for educators to have pupils form the conception of scientific law on the basis of experimental data. Although pupils obtain experimental data in their actual experiment in the science classroom, they try to derive their conclusion, i.e., the scientific law concerned, within the phenomenal world only. Pupils without the dichotomy have no idea that scientific laws involve some transcendental feature. Accordingly, they cannot accomplish the irrational leap into the world of Idea to establish scientific laws.

The same additional consideration should be given in mathematics education in Japan, because mathematics also presupposes the dichotomy. Mathematics is not just a skill of numeracy. It is well-known that Idea was equated with numbers in the civilization of ancient Greek. In the main stream of the Western intelligence, mathematics is regarded as the investigation of relationships between numbers or numerical things in the world of Idea. Mathematics also presupposes the dichotomy and is axiomatization-oriented. Consequently, mathematics education is not just teaching the skill. However, few mathematics educators seem to realize the difference between these frameworks in Japan. If science/mathematics educators draw their attention to the difference, i.e., the difference in language-culture setting for education, the additional consideration will be significant to improvement in science/mathematics education in Japan. Obviously, the present discussion is applicable to the same language-culture milieu as Japan.

References

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