

**MATHEMATICAL LITERACY AND CURRICULUM BASED ON IT  
–WITH SEVERAL REALIZATIONS IN JAPAN–**

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In this talk we propose a new framework of mathematical knowledge, based on the notion of mathematical literacy, and as an applications we give a framework of mathematics curriculum of teacher education. We then report several trials to realize these frameworks.

1. Mathematical Literacy Revisited

Historically “literacy” has several meanings. Taking this into account, we use the word “literacy” in a wide sense, and in a narrow sense.

“Literacy of A for B” means a fundamental knowledge of A in a wide sense which people belonging B are preferable to have.

A typical example is “mathematical literacy for all”. But in this case more suitable is, for example, “for all Japanese in the 21st century”. This literacy was described in a report of the Project: “Science for All Japanese”.

For the description, we need to make the meaning of “fundamental knowledge” more precise. Here we modify the framework of mathematical literacy given by OECD-PISA.

For example, we should know not only core contents of mathematics but relations with outside world and inside knowledge (epistemology). As for competencies, we classify them into three categories, mathematical language ability (mathematical literacy in narrow sense), problem solving and modeling.

This framework would give a solid base to plan curricula of mathematics in schools. We note that Japanese national standard curriculum of mathematics was planned with the common spirit in 2008.

2. Curriculum of mathematics in teacher education

We then try to apply this framework to obtain that of the mathematical literacy for teachers. This is possible because roughly we have only to deepen the math literacy for all or make it conscious. We had better to distinguish math teachers and elementary school teachers (the former mainly discussed).

Following F. Klein who gave lectures of math literacy for coming Gymnasium math teachers, we consider two concrete cases, the history of mathematics and the introduction of modern mathematics.

Finally as a concrete example we give a curriculum based on this idea, which we call the “Sugiyama model”.