

# Conceptualization of School Mathematics as Situated in a Social-Cultural Context

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**DG4: Reconceptualizing the mathematics curriculum**

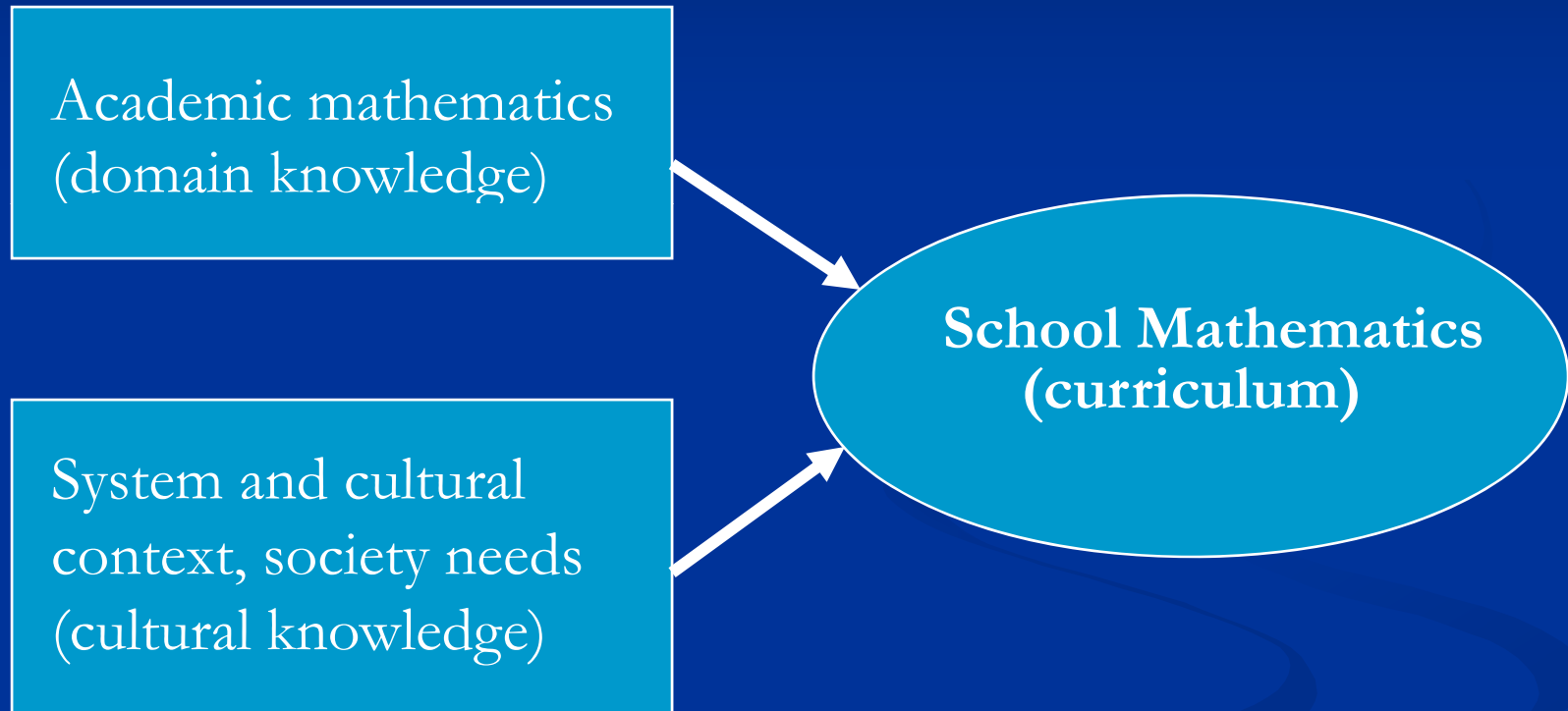
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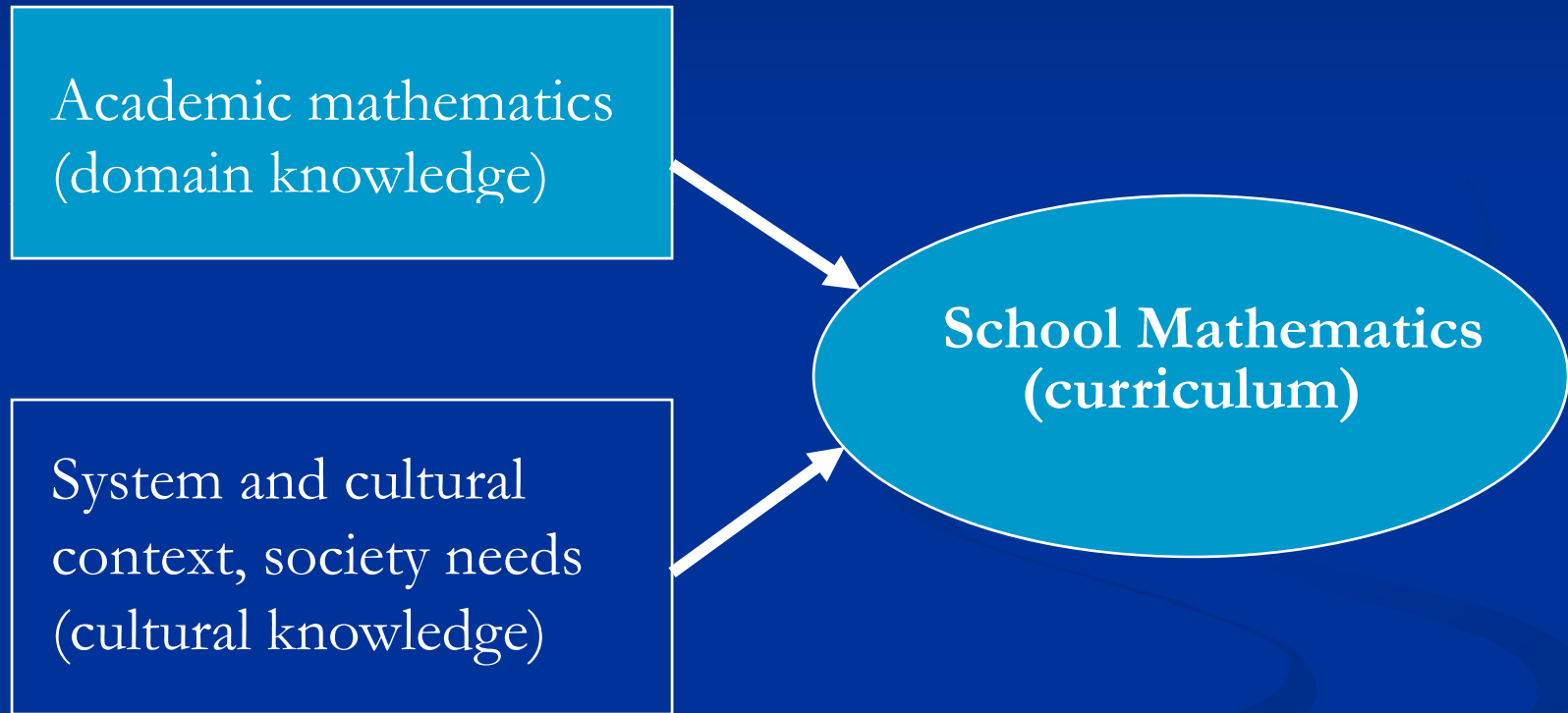
# Culture as an inseparable part of school mathematics

- The cultural nature of mathematics curriculum to consider in understanding mathematics curriculum
- The role of culture in *forming* and *transforming* mathematics curriculum

# School mathematics versus Academic mathematics



# Cross-system examination of curriculum



# The often-missing consideration about culture

- Existing cross-system curriculum studies have often focused on examining the similarities and differences in mathematics domain knowledge inclusion and its potential impact on students' mathematics achievement.
- There is often lack of research effort in examining the relationships between curriculum variations and their system and cultural contexts.
- Without a consideration of system and cultural contexts, it is difficult to understand the 'why' behind variations and/or adapt certain approach(s) from one system for making successful educational changes in another.

# Sample- comparison of content topic inclusion in textbooks

- See the sample table

Table: *Textbook variations in algebraic topic inclusion, content requirement and emphasis*

	<b>Topic Inclusion</b>	<b>Content Requirements</b>	<b>Content Emphasis</b>
<b>Asian texts</b>	Advanced topics	High	29%-50% chapters in algebra
<b>US-A text</b>	A broad range of topics	A broad range	83% chapters in algebra
<b>US-NAS texts</b>	Elementary topics	Low	13%-21% chapters in algebra

# Content inclusion and cultural values

- Textbooks' content requirements and emphasis in algebra present a coherent outline for eighth graders from the three Asian education systems.
- The Confucius culture values more on students' learning of abstract mathematics knowledge than on developing their skills of solving practical problems in everyday life.
- Correspondingly, these Asian textbooks tend to include advanced and consistent algebra topics other than practical problems that require the use of mathematics knowledge.



# Content inclusion and cultural values

- In the United States, lack of a common curriculum guideline at the national level. Commercially produced textbooks compete to accommodate the diverse market.
- Students' learning of mathematics in the United States is valued for developing their problem-solving competence, textbooks were written with an emphasis on including various mathematics problems other than increasing content requirements in mathematics.
- The US textbooks tend to decrease mathematics content requirements through including elementary topics and fragmenting a content topic into small pieces.

## Content presentation and organization and cultural expectations for teachers' teaching and students' learning

- The traditional style adopted in the Asian textbooks and the US algebra textbook shows a clear, logic, and consistent presentation and organization of content. Content presented in these textbooks is tersely written.
- The textbooks reflect cultural expectations in students' efforts and teacher's guiding role in the process of learning mathematics from the textbooks.

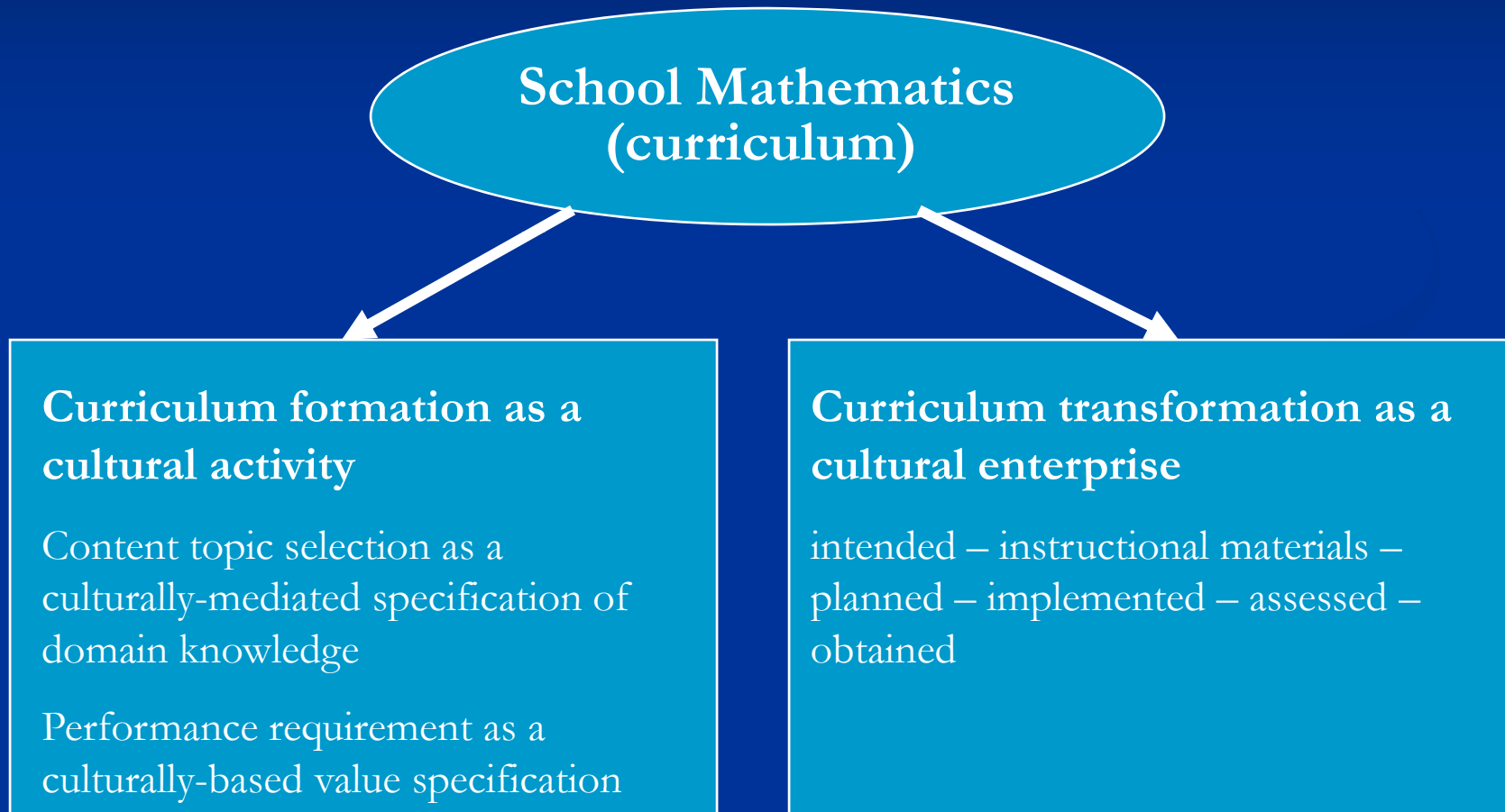
## Content presentation and organization and cultural expectations for teachers' teaching and students' learning

- Content is presented frequently in illustrative problem contexts rather than simply stated, the problem-based style evidenced in the US-NAS textbooks presents a ready-to-be-used format of content presentation for classroom teaching.
- It embodies the intention of developing students' inquiry in the process of learning mathematics. However, the teacher's role is unspecified in this style.

# With cultural knowledge, we can ...

- Cultural knowledge helps understand cross-system similarities and differences in mathematics curriculum characterized in terms of domain knowledge
- Cultural knowledge can also help understand the nature of school mathematics that varies from domain mathematics and from one system to another
- Cultural knowledge helps interpret the way of presenting and organizing content for teaching and learning mathematics

# School mathematics as a cultural system



# References

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