

Science Teaching Around the World: Lessons for U.S. Classrooms

■ Part II in a series of three articles

■ Part I appeared Sept. 26

■ Part III appears Oct. 24

PART II – THE ROLE OF SCIENCE CONTENT IN LESSONS

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What does science teaching look like in different countries? Do higher-achieving countries share common science teaching features? What is the role of science content in lessons?

In Part II of this three-part series, we continue examining key findings from the [Trends in International Mathematics and Science Study \(TIMSS\) 1999 Video Study](#)—the first international study to provide a detailed picture of science teaching practices in higher-achieving countries.

The TIMSS Video Study of Science

The [TIMSS Video Study](#) examined science teaching practices in the United States and four countries that outperformed the United States in science achievement on the 1995 and 1999 TIMSS assessments: the Czech Republic, Japan, Australia, and the Netherlands. A random sample of 100 eighth grade science lessons in each country was videotaped during one school year. This process captured a range of science content and illustrated typical science teaching practices in each country.

Key Findings

Part I of this three-part series (*Education Week*, Sept. 26) explored the first key finding from the [TIMSS Video Study](#):

Finding #1 – Each of the higher-achieving countries had a distinct core pattern of science teaching. In contrast, U.S. lessons were characterized by variety.

Part II examines the second key finding:

Finding #2 – Although their teaching approaches were different, every higher-achieving country had a strategy for engaging students with core science ideas—they all had a way to keep science lessons focused on content. In U.S. lessons, content played a less central role and sometimes no role at all; instead, lessons were typically built around engaging students in a variety of activities.

The Czech Republic

Czech lessons focused on challenging science content

that was often abstract and theoretical. Lessons were densely packed with science ideas and technical terms. Teachers held students to high standards for mastering content through

finding was that 27 percent of U.S. lessons did not include any science content; instead, students carried out activities without any links to science content ideas.

This will be addressed in Part III, scheduled to appear Oct. 24 in *Education Week*.

Enhancing Instruction in Science

To help teachers better connect hands-on inquiry-based learning to the development of science content understanding, [Pearson](#) created a new professional development program, [Enhancing Instruction in Science](#), based on the findings from the [TIMSS 1999 Video Study](#). Designed for science teachers in grades 2-8, [Enhancing Instruction in Science](#) helps teachers work with students to draw coherent connections between classroom content and activities and larger conceptual ideas about science.

Additional Resources

A five-CD set with five full lesson videos from each country, and commentaries by the teachers and researchers, is available from the Online Store at www.PearsonAchievement.com.

The full TIMSS Video Study science report and a highlights report are available at <http://nces.ed.gov/timss>.

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Summarizing Science Content in Lessons

■ Czech Republic	Challenging content
■ Netherlands	High expectations for independent learning of science content
■ Australia and Japan	Using evidence to build a strong content storyline
■ United States	Doing a variety of activities with weak or no links to science content

public reviews, discussions, assessments, and other forms of public student work.

The Netherlands

Dutch teachers set high expectations for students' independent learning of science content. Textbook and homework assignments usually defined lesson content and organization. During lessons, students were continually engaged with science content ideas. Class discussions focused on student questions about these independent assignments.

Australia and Japan

Lessons in Australia and Japan used activities and evidence to build a coherent content storyline in which ideas and activities were carefully sequenced and explicitly connected. Teachers developed just one or two science ideas across a lesson, supporting each idea with multiple sources of evidence. They expected students to develop conceptual understanding, and to support concepts, ideas and conclusions with evidence.

The United States

In the United States, science content was often secondary to activities. While high-interest activities were prominent and frequent, teachers did not typically connect them to the development of science content ideas. Science content was usually organized as a collection of discrete facts, definitions and algorithms rather than a connected set of ideas. A striking

Summary

While the higher-achieving countries each had a unique approach to teaching science, they all shared a strong focus on developing science content and connecting that content to activities. In contrast, U.S. lessons engaged students in a variety of activities, often very motivating ones, that were either weakly connected to science content ideas or not connected at all.

Coming Up in Part III

What implications do the [TIMSS Video Study](#) findings have for U.S. science teaching?

The U.S.: The Missing Links Between Ideas and Activities

