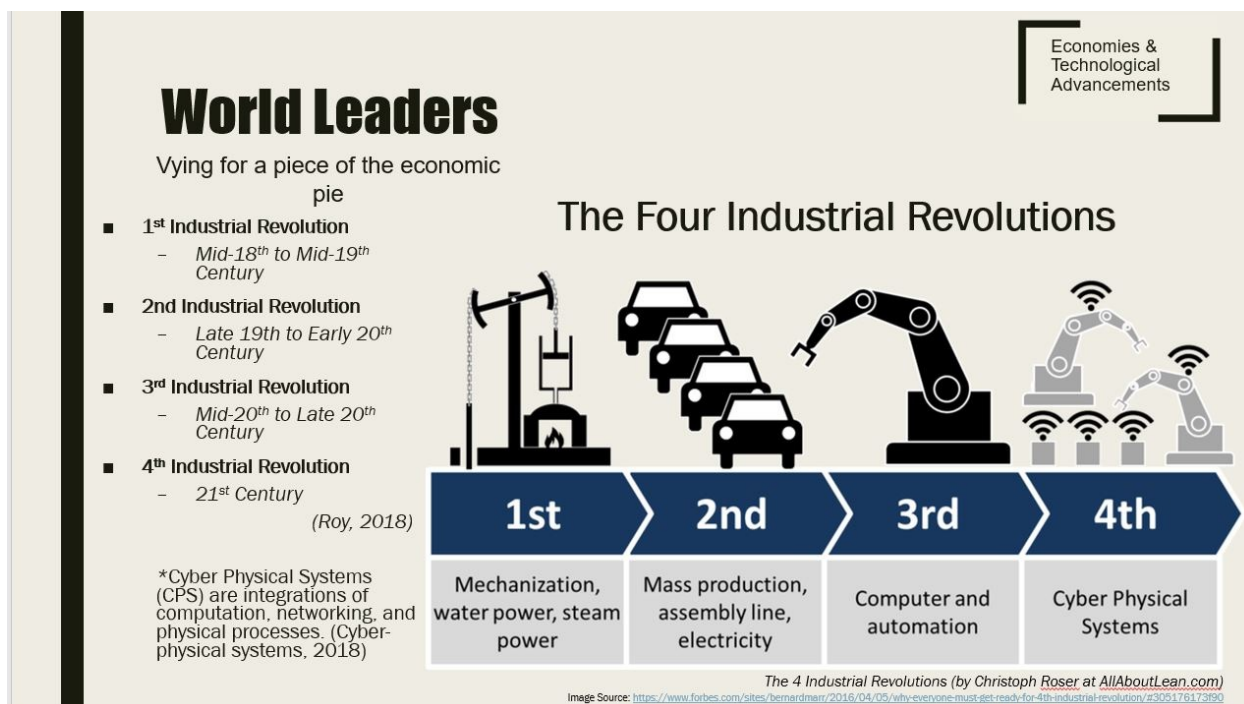


East Asia: Twenty-first Century Educational Practices and STEM Education

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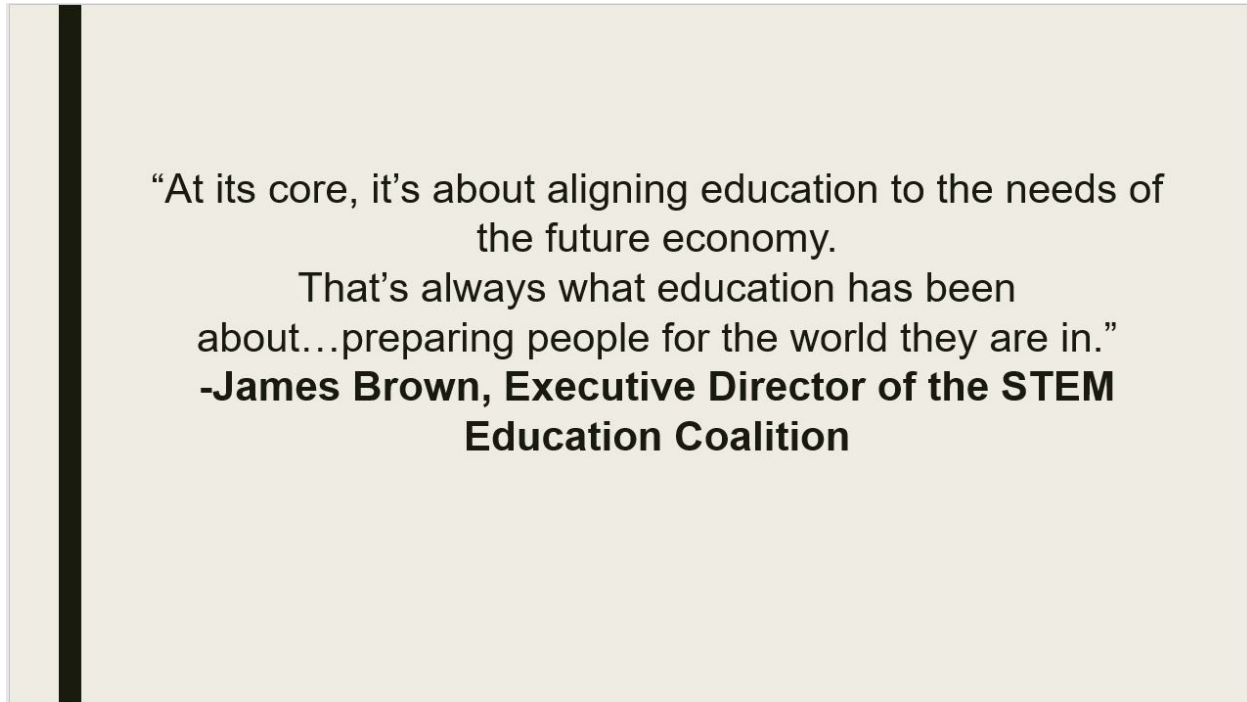


Slide 6 from the “East Asia: Twenty-first Century Educational Practices and STEM Education”
Sources available on slide and in PowerPoint.

East Asian countries such as China, South Korea, Japan, Taiwan, and Singapore have excelled in the fields of science and math education. Technological advancements developed and produced in these countries have positioned them to be highly competitive in the global economy. These nations are highly interested in STEM education and systematically examine the strengths and weaknesses of their programs in a seemingly never-ending quest for global competitiveness. It addresses East Asian educational practices and curriculum—with special attention to STEM subjects—that have and may continue to produce high test scores, technologically advanced societies, economic development, and effectively address future 21st century skills demands. A major goal of the module is to stimulate discussions concerning the applicability (or lack thereof) and possible modification of East Asian STEM educational practices to American educational institutions.

The major instructional component is a thirty-seven minute, thirty-second audiovisual PowerPoint presentation. It was first developed and field tested to serve as a resource for STEM educators and related stakeholders such as school administrators, board members, and parents. However, the module is also an excellent pedagogical resource for high school and even college-level instructors and students in a variety of courses. The module can be utilized in American

high school STEM classes to provide students with an international context illustrating the importance of the mathematics, science, and technical subjects they are studying. Because of a focus upon human capital development and economic development, the module is applicable to high school economics courses or any course that includes content on contemporary East Asia including AP Human Geography, World History, and Comparative Politics.



Slide 3 from the “East Asia: Twenty-first Century Educational Practices and STEM Education”
 Sources available on slide and in PowerPoint.

Estimated module length: Approximately one and half to three hours (including preparatory reading, presentation, and discussion).

Objectives:

Identify the relationship between Post World War II East Asian economic growth and educational policies and practices.

Understand East Asian STEM educational practices policies including teacher development, supplemental education, curricula, and testing and assessment tools.

Compare and contrast East Asian Science and Mathematics educational policies and practices with those of the U.S

Investigate policy alternatives that might include adoption or modification of East Asian STEM educational practices and policies that might improve STEM education in U.S. schools.

Prerequisite knowledge:

Although prior knowledge about East Asia and in particular, Confucian traditional and contemporary impact on education is helpful, the module can be utilized for educators or students who do not have this background knowledge.

Module: Introductory Activity

Estimated time: including discussion, forty-five minutes to one hour



Michael Lowry, McCallie School, Chattanooga, TN. Source: *The Chattanooga* at <https://tinyurl.com/yc5yd6sq>. See story for details on Michael's 2015 Fulbright Award.

Either assign this [interview with Michael Lowry](#) as a preparatory reading for a workshop or class and have participants spend twenty to thirty minutes discussing the implications of the interview for US, STEM education, and economic and technological development.

Although workshop leaders or teachers can design alternative questions, the following is a suggested general question that is certain to stimulate discussion:

Singapore consistently ranks number one in the world in mathematics, science, and literacy in international testing. In the 2015 OECD's *Program For International Student Assessment (PISA)*, perhaps the most prestigious of all international assessments, globally, U.S. students ranked 40th, 25th, and 24th respectively, in these three categories. What portions of the interview with Michael Lowry appear to substantiate Singapore's high level performance? What portions of the interview possibly lead to questions about the accuracy of the above data?

The remainder of the module is a PowerPoint presentation Readers may also watch the PowerPoint below as video presentation with narration by the author of this module. The complete materials for this module are also compiled at the end.

[The PowerPoint is accessible here.](#)

Estimated time: thirty-seven minutes, thirty-seconds.

PowerPoint Module Outline:

East Asia: Educational Practices and STEM Education in the 21st Century

- World Leaders
 - Economies and Technological Advancements
 - China, Japan, South Korea, Taiwan, Hong Kong, and Singapore
 - Economic rankings
 - Education
 - Science and Math rankings
 - China, Japan, South Korea, Taiwan, Hong Kong, and Singapore
- Educational Approach
 - East Asia
 - Cultural view
 - Cram programs
 - Teacher education levels
 - Pedagogical practices (Science and Math)
 - Singapore, Japan, China, South Korea
- Future Skills Needed
 - 21st Century Skills
- STEM Education
 - Educational Models/Perspectives
- U.S. Educational Models of the Future
- Review
- Discussion Questions
- References

[A video presentation of this module with the PowerPoint slides and narration by the author.](#)

Please see below to skip to specific slides of the module:

[Slide 1: Introduction](#)

[Slide 2: Outline](#)

[Slide 3: Quote by James Brown, Executive Director of the STEM Coalition](#)

[Slide 4: 2017 World Economies](#)

[Slide 5: Notable Asian Economies](#)

[Slide 6: “The Four Industrial Revolutions”](#)

[Slide 7: “Asian Industry: Types”](#)

[Slide 8: “Quote by Dave Breitenstein, Audience/Metrics Analyst”](#)

[Slide 9: “Education Rankings \(Specifically in Science and Math According to 2015 PISA Scores\)”](#)

[Slide 10: “Education Rankings \(Specifically in Science and Math according to the Trends in International Mathematics and Science Study 2015\)”](#)

[Slide 11: Educational Approach: Cultural View](#)

[Slide 12: Educational Approach: Cram Schools](#)

[Slide 13: Educational Approach: Teacher Education Levels](#)

[Slide 14: Educational Approach: Pedagogical Practices \(Singapore\)](#)

[Slide 15: Educational Approach: Pedagogical Practices \(Japan\)](#)

[Slide 16: Educational Approach: Pedagogical Practices \(China\)](#)

[Slide 17: Educational Approach: Pedagogical Practices \(South Korea\)](#)

[Slide 18: Future Skills Needed \(1/3\)](#)

[Slide 19: Future Skills Needed \(2/3\)](#)

[Slide 20: Future Skills Needed \(3/3\)](#)

[Slide 21: What is STEM Education?](#)

[Slide 22: STEM: Single-Discipline Reference and STEM as a Reference for Science and Math](#)

[Slide 23: STEM: Separate Science Disciplines That Incorporate Other Disciplines and STEM: Separate Disciplines](#)

[Slide 24: STEM: Science and Math Connected by Technology or Engineering Program and STEM: Coordination Across Disciplines](#)

[Slide 25: STEM: Combining Two or Three Disciplines and STEM: Integrated Disciplines](#)

[Slide 26: STEM as a Transdisciplinary Course or Program](#)

[Slide 27: U.S. Educational Models of the Future](#)

[Slide 28: Review](#)

[Slide 29–34: Discussion Questions](#)

[Slide 35–39: References](#)

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Digital Materials for the Module “East Asia: Twenty-first Century Educational Practices and STEM Education”

Interview with Michael Lowry

<https://www.utc.edu/asia-program/docs/modules2/wilkinson/lowryinterview.docx>

PowerPoint

<https://www.utc.edu/asia-program/docs/modules2/wilkinson/wilkinsonm2powerpoint.pptx>

Video Presentation of “East Asia: Twenty-first Century Educational Practices and STEM Education”

<https://youtu.be/diml8Tl57nk>