Science Education in China:
International experience and localization

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Outline

- Necessity of STEM
- Development of Science Education in China
- Policies, Strategies & Achievements
- Issues & Thoughts
Innovation is the most important topic for development of the world

- **First Industrial Revolution:** Age of Steam
  - Invention of steam engine in UK

- **Second Technology Revolution:** Age of Electricity
  - Invention of electrical devices in US

- **The New Technology Revolution** —
  - Innovation - Invention
The necessity of STEM

- MS are the basis for Technology and Engineering
- TE are the basis for innovation

- Concern: STEM are weakening in recent years

2015/5/23
 Development of Science Education in China
Emphasizing on science since Modern China

- “Democracy and Science”
  - The May Fourth Movement in 1919
- “Science and technology are productivity”
  - 科学技术是生产力
  - Deng Xiaoping proposed in the All China Congress on Science and Technology in 1978
- “Develop the Country Through Science and Education”
  - 科教兴国战略
  - Jiang Zemin proposed in the All China Congress on Science and Technology in 1995
- “Outline of the Action Plan for the Nation's Science Literacy” (2049 program)
  - 全民科学素质行动计划纲要
Emphasizing on science since Modern China

- “learning well math, physics and chemistry, no problem travelling all over the world”
  学好数理化，走遍天下都不怕
  - Since the 20th century, many young people prefer learning science, technology and engineering

- **Chinese primary and middle schools pay special attention to math and science education**
  - Shanghai has repeatedly ranked first in the PISA test
  - PISA: a worldwide study by OECD in member and non-member nations of 15-year-old school pupils' scholastic performance on mathematics, science, and reading.

2015/5/23
Three reforms in science education since 1978

- **1978-1980s**: Composing syllabus and textbook.
  - Translated foreign books, compose textbook upon Jerome Seymour Bruner’s learning theory.

- **1980s-1990s**
  - Science education in kindergarten and primary school
    - Localization of textbooks while imported Brenda Lansdown’s.

- **2000-**: More international cooperation
  - Science education website (with USA)
  - Learning by Doing (with France)
  - National standard for science education of compulsory education
The number of Chinese students study in STEM

In undergraduate programs, the number of enrollment of engineering students reached 4,953,334, taking 33.1% of the total number.
Policies, Strategies & Achievements

In February 2006, the State Council of China issued the National Scientific Quality Action Plan (2006-2010-2020), emphasizing the scientific quality of minors. The scientific quality of minors was listed as a key project of the four first projects.

National Long-Term Education Reform and Development Plan (2010-2020)

In July 2010, the State Council of China issued the National Long-Term Education Reform and Development Plan (2010-2020), focusing on improving students’ learning ability, practical ability, innovation ability.

Full-time compulsory education curriculum standards for science (grades 3-6)

Issued by Ministry of Education of China, emphasizing Inquiry is the core of science learning. Inquiry is not only the goal of learning, but also the way of learning.
Science Education In China – Strategies

- **Learning by Doing Project**

  - In 2001, the Ministry of Education of China and Chinese Association for Science and Technology co-sponsored and promoted the *Learning by Doing* science education pilot projects, i.e., *Hands On Inquiry Based Learning and Teaching* in kindergarten and elementary schools aiming at promoting the development of science education. *Learning by Doing* project is also a cooperation project between China and the French Academy of Science, and is in IAP-IBSE network.
Schoolteachers National Training Program

- In 2010, The central government of China spent 550 million yuan to support *Schoolteachers National Training Program*, and SNTP has trained a total of 115 million school teachers.

Guideline on Strengthen Training of Schoolteachers

- In 2011, the *Ministry of Education of China* issued *Opinions on Strengthen Training of Schoolteachers*, in the demonstration lead of SNTP, training of 10 million school teachers in different classification, stratification, and sub-job is in full swing.
Science Education In China - Strategies

- **College student competition**
  - "Challenge Cup"
    - Extracurricular and Academic Competition and Business Plan Competition
    - From 1989
    - Initiated by the Chinese Youth League, China Association for Science and Technology, Ministry of Education, All China Union of students

- **Four disciplines Competitions**
  - IT Design, Mathematical Modeling, Mechanical Design and Structural Design
  - From 1993
  - Initiated by the Ministry of Education

- **the Chinese Mathematics Competitions (CMC)**
  - From 2009
  - Initiated by the Chinese Mathematical Society (CMS)
Science Education In China - Strategies

- **National Science Research and Talent Training Base**
  - There are 114 first-class math and natural science discipline bases established as the most advanced leadings level in 5 series.
  - From 1991, Initiated by the Ministry of Education

- **Educating and Training Outstanding Engineers**
  - Brought up numerous of engineering talents who are innovative and suitable to demand of development trends.
  - From 2010, Initiated by the Ministry of Education
Science Education In China - Features

- Complete scientific education system, from preschool education to higher education

- Science Education closely connect with various educational strata's own characteristics

- Learning experiences of science education from other countries
  - Especially the good experience of IBSE and EBSE
  - Further enhance the Chinese science education
Issues & Thoughts
Science Education In China - Issues

- students’ curiosity and thirst for knowledge, not just teacher’s requirements, is the power of inquiry
- more attention should be paid to the diversity of research methods, focusing on evidence
- Promote ability of creativity of students
Inquiry and problem based learning is a great way to get students to think about how science works and how to think like a scientist – this must be taught explicitly and reflectively if students are going to learn the concepts and processes….

“The world is but a school of inquiry.”

- Michel de Montaigne (1533-1592)
Thank You!

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