Asia-Pacific Economic Cooperation

2018/SOM1/HRDWG/EDNET/007
Agenda Item: 6.24

Human Capacity Building for Glocalized Scientific Literacy: Phase 1 - The Best Practice Models for Innovative STEM-Related Education for Teacher Professional Development

Purpose: Information
Submitted by: Chinese Taipei

APEC 2018 PAPUA NEW GUINEA

Human Resources Development Working Group Education Network Meeting
Port Moresby, Papua New Guinea
28 February – 1 March 2018

Human Capacity Building for Glocalized Scientific Literacy:

Phase 1 The Best Practice Models for Innovative STEM-Related Education for Teacher Professional Development

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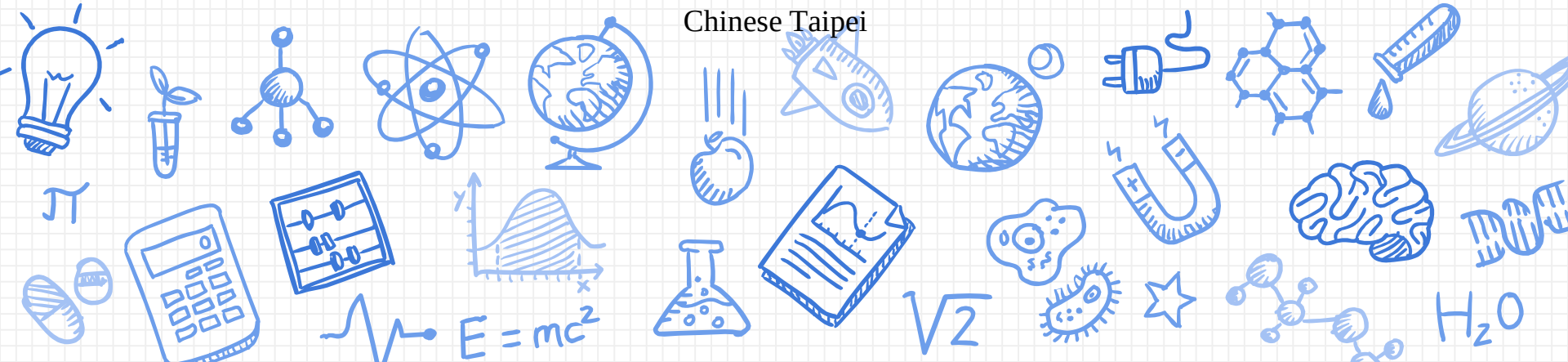
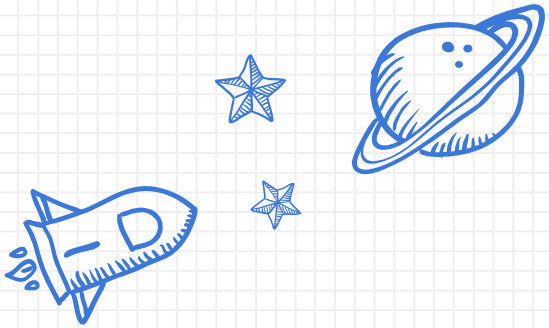


Objectives

- Empowering science teachers' competence for cultivating students' scientific literacy through localized policy changes and initiatives, in particular, via the design of science and technology curriculum standards for K-12
- Exemplifying the expansion and implementation of new science educational initiatives, such as STEM $^{+}$, with glocalization approach, to an economy-wide scale
- Sharing existing knowledge and further develop new generation science literacy enhancement scheme for the Asia Pacific region



Challenges and Opportunities

SUSTAINABLE DEVELOPMENT GOALS

Global Science & Engineering Graduates Comparison

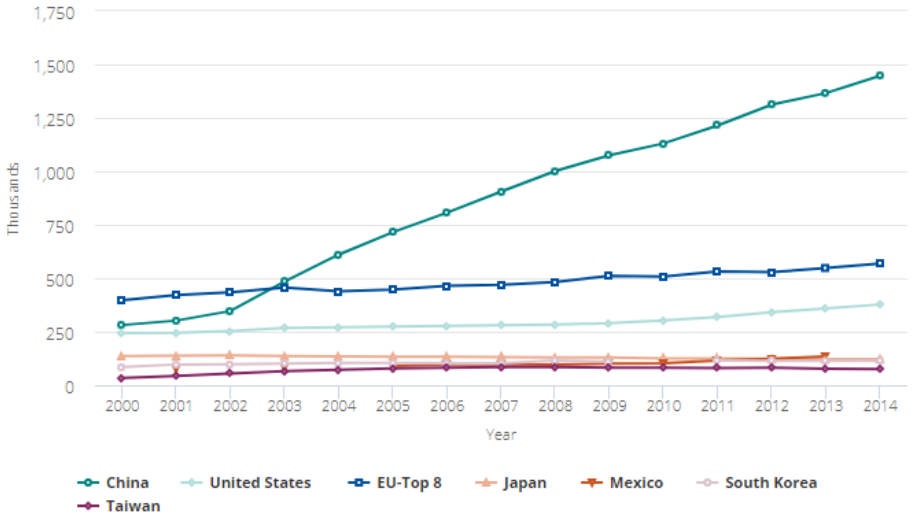
"More than 22 million students worldwide earned first university degrees in 2014, with more than 7.5 million of these in S & E fields"

"India and China awarded the largest numbers of first university degrees in S & E (1.9 and 1.7 million, respectively), followed by the United States (742,000), Russia (429,000), and Japan (316,000)."

"Between 2000 and 2014, the number of S & E first university degrees awarded in China, Chinese Taipei, Germany, Turkey, and Romania at least doubled"

Data Source: https://www.nsf.gov/statistics/2018/nsb20181/report/sections/higher-education-in-science-and-engineering/international-s-e-higher-education#first-university-degrees-in-s-e-fields

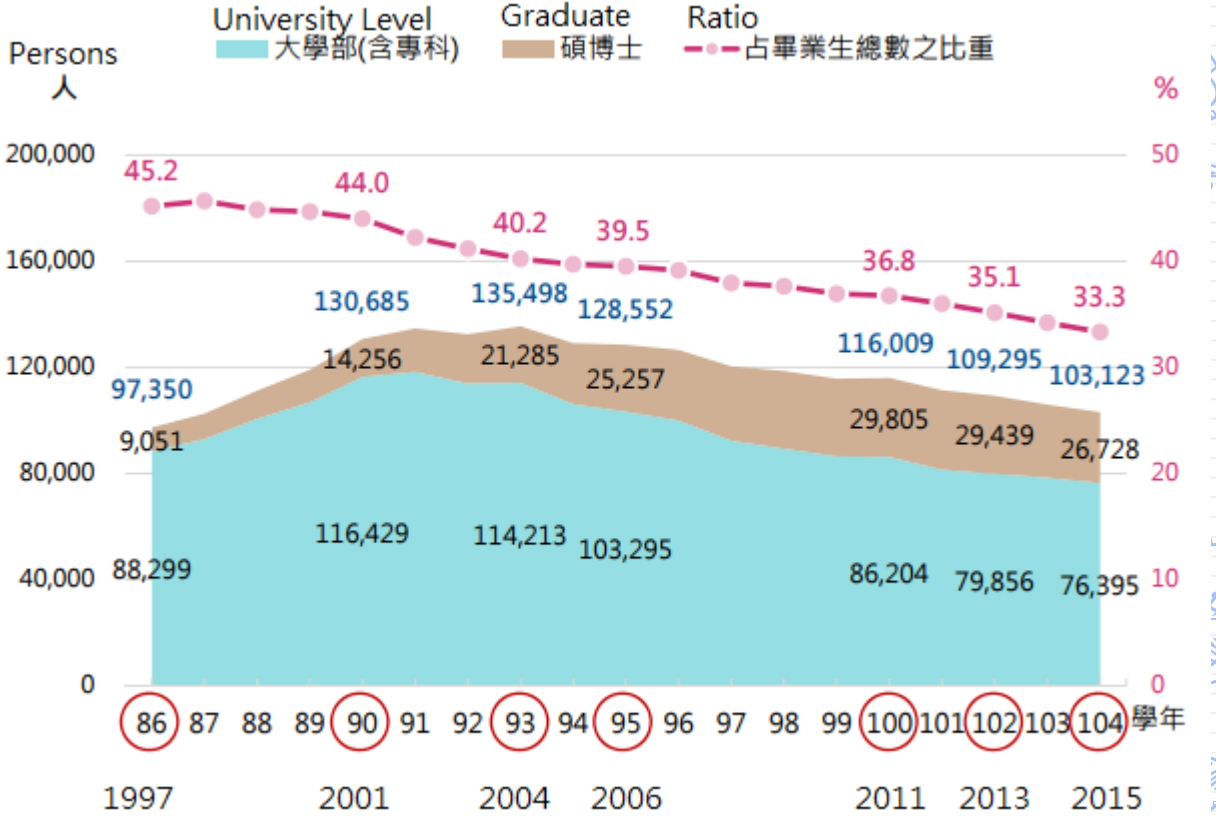
First university natural sciences and engineering degrees, by selected country or economy: 2000–14



EU = European Union.

Chinese Taipei

- In 2004, number of STEM field graduates peaked at 135,000, then decreased gradually to 103,000 in 2015.
- Ratio also decreased from 40.2% to 33.3%.
- But in real terms, the 2015 number of graduates was still greater than those from 1997 (97,000 graduates).
- Ratio of Graduate-level (post undergraduate) students increased from 9.3% in 1997 to 26.9% in 2013.



An Example of Problems in STEM Education: Global Science & Engineering Gender-based Graduates Comparison

Women earned half or more of first university degrees in Science & Engineering in many economies around the world in 2014, including the United States, Canada, and several smaller countries.

"In Asia, women generally earn about one-third or fewer of the first university degrees awarded in S&E fields" (e.g. in Chinese Taipei, women earn 26% of the S&E first university degrees; Japan, 29%; South Korea, 34%; Singapore, 36%).

"In the United States and Canada, more than half of the S&E first university degrees earned by women were in the social and behavioral sciences, and less than 10% were in engineering. In contrast, in South Korea and Singapore, nearly half of the S&E first university degrees earned by women were in engineering."

Data Source: https://www.nsf.gov/statistics/2018/nsb20181/report/sections/higher-education-in-science-and-engineering/international-s-e-higher-education#first-university-degrees-in-s-e-fields

Gender Gap in STEM

- Obtaining a quality education is the foundation to improving people's lives and sustainable development. (http://www.un.org/sustainabledevelopment/education/)

- Gender equality is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world, but women and girls continue to suffer discrimination and violence in every part of the world (http://www.un.org/sustainabledevelopment/gender-equality/)

- Major gender inequality persists in STEM education despite large efforts made in the last decades. (https://en.unesco.org/news/new-unesco-report-sheds-light-gender-inequality-stem-education)

Chinese Taipei Project Strategies

- Enhance STEM Education through Exchanges
  - Sharing of past/current STEM+ Education experiences (problems such as gender gap) among participants
  - Exchange of views on issues ranging from curriculum design, implementation of STEM + curriculum, potential challenges in each participating economy etc.
  - Fostering of potential solutions to existing STEM + education challenges and provide practical suggestions from a glocalized perspective
  - Bridging of economies with varying strengths for future collaborations

Time Table for the Chinese Taipei Project

Feb 2018
Presentation of the Program

Feb-June 2018
Send out invitation

March-Dec 2018
Welcome Global Observers

Jan 2019
Holding STEM+ Conference

Jan-Feb 2019
Evaluation, Reflection, & Final report

Project Implementation

- Three-day STEM Education Conference & School Curriculum Observations
  - Observations during March 2018 – February 2019
  - Conference in January 2019

- Invitation of 12 international specialists/academics in STEM Education
- 2-4 STEM Workshops
- Visit 2 schools for classroom observation

- Will also invite Chinese Taipei professors in relevant fields, 10-15 “seed teachers”.
- Open to global application at least 6 months prior to conference，

January 2019 Conference Agenda

- Day 1
  - On International STEM+ Education (by international specialists)
  - Workshops (2-4 instructors)
- Day 2
  - Observation of Local School STEM + curriculum implementation
- Day 3
  - Group Discussions
  - Additional Sessions on International STEM+ Education (by international specialists)

THANKS for Your Attention !

Comments are welcome.

Special thanks to all the people who made and released these awesome resources for free:

- Presentation template by SlidesCarnival
- Photographs by Unsplash.