From the past experience to the envision of future

Science education is always in the way of innovation driven by S&T

Professor Wei, Yu

Sept.2018, Beijing

YWRCLS

The opportunity provided by opening policy and the high impact coming from well organized social structure in China

Three examples in the past 25 years:

- 1，90’ last century <Future Woman Teacher Project> aimed jump to the information platform
- 2，1994-2001-2011- pilot project of inquiry based science education <Learning by Doing > and international collaboration .
- 3，2002- promote the early child development using Neuroeducation

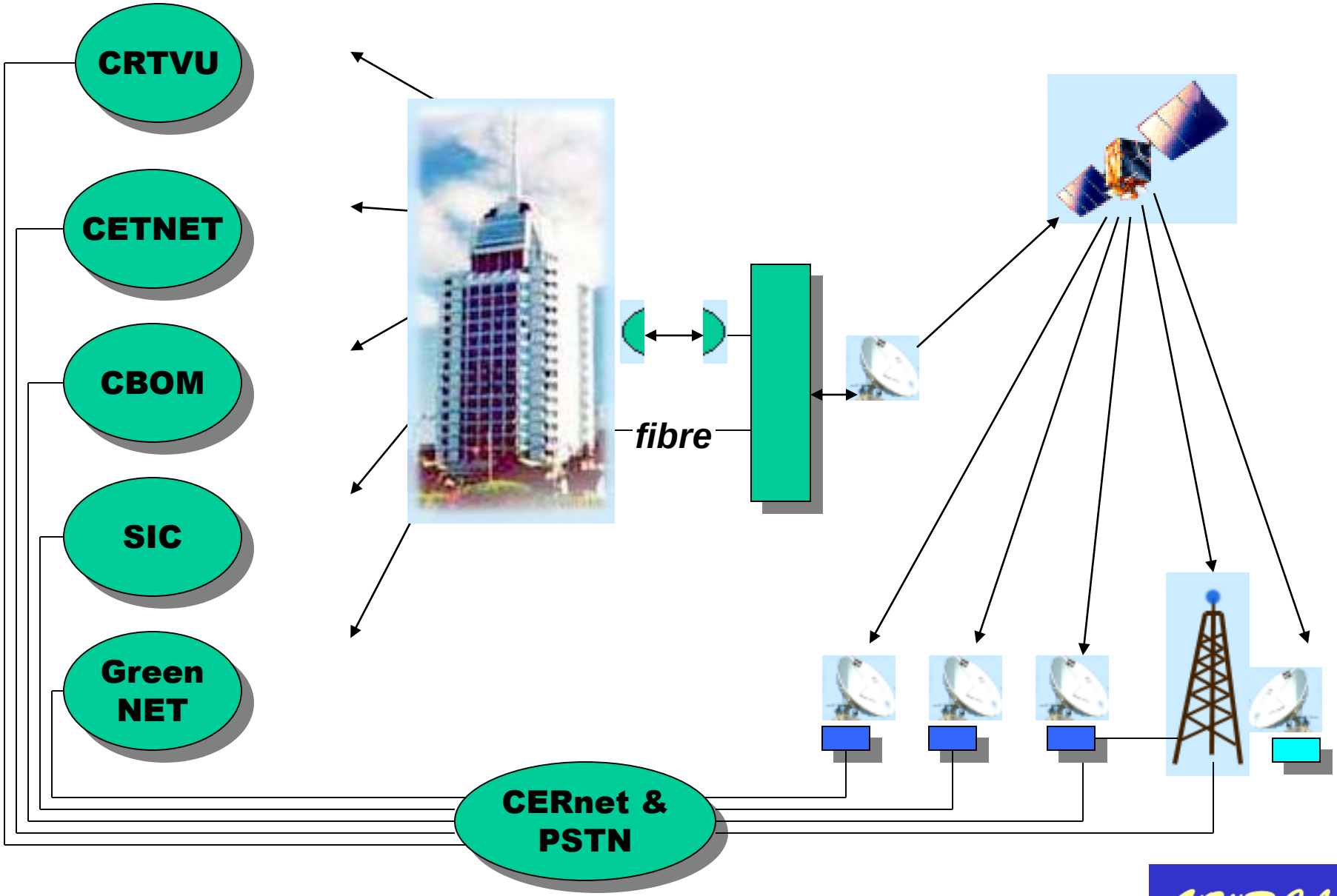
Reflecting to the Past
Building the Infrastructure

1994 China Education and Research Network (CERNET) Project Started;

2000 Upgrade national backbone to 155 M to 622 M ; linked all universities in China as well as connected to outside China

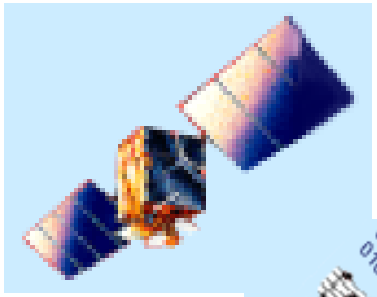
2000 K-Band Satellite Digital Channels Opened

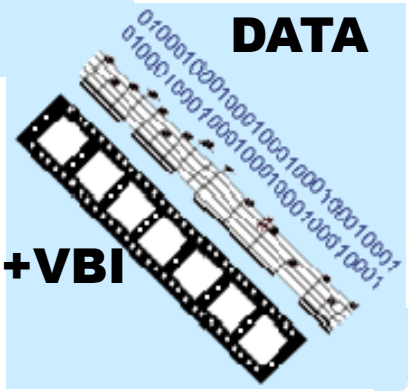
VBI DATA BROADCASTING SYSTEM AT CETV



YWRCLS

Ku Band Digital Compressing





IF

IRD

PC CARD

YWRCLS

Big jump for them

Teachers pass the final exam

YWRCLS

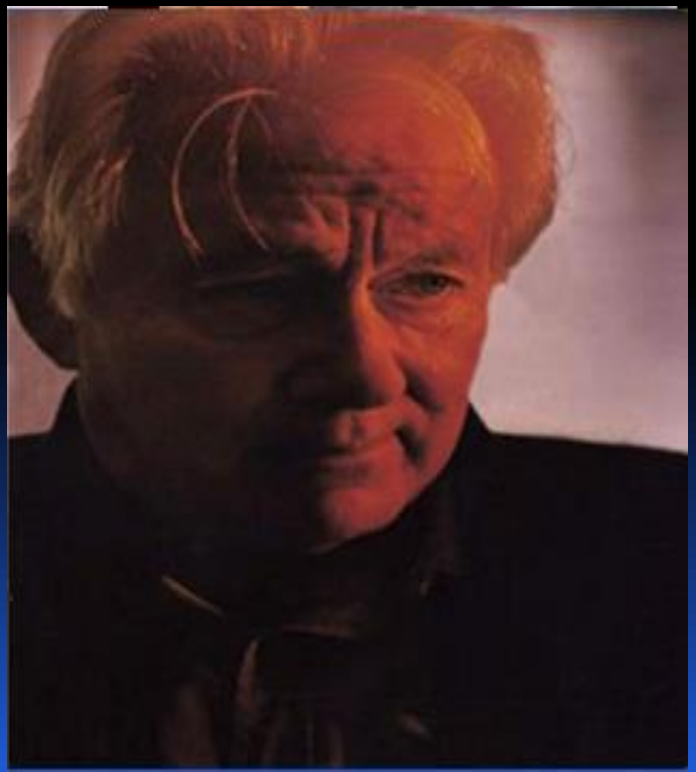
YWRCLS

The opportunity provided by opening policy and the high impact coming from well organized social structure in China

Three examples in the past 25 years:

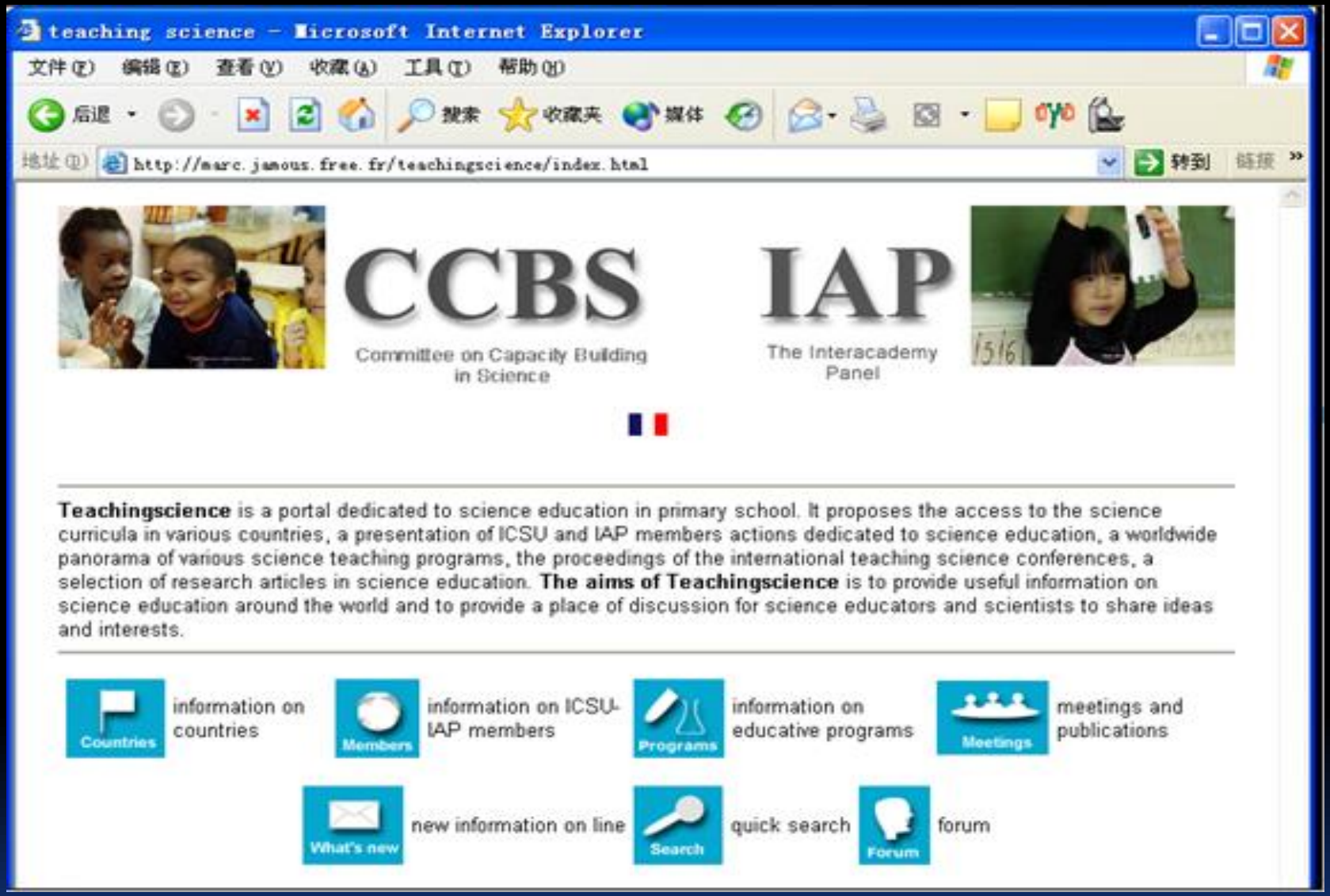
- 1，90’ last century <Future Woman Teacher Project> aimed jump to the information platform
- 2，1994-2001-2011- pilot project of inquiry based science education <Learning by Doing > and international collaboration .
- 3，2002- promote the early child development using Neuroeducation

In the 1980s,Us Nobel Laureate in physics Leon Lederman initiated the reform in science education called "Hands on " --Inquiry based science education



- 1995, French Nobel Laureate in Physics Georges Charpak introduced it to France
- The project named " La Main a La Pate", (to put one's hands in the dough,)-- "to get involved"

YURCLS



Since 1994 as a member of ICSU-CCBS, later join the expert group of IAP-IBSE

International Conference on primary school science and mathematics Education
Nov. 2000 Beijing

Hosted by MOE, ICSU-CCBS, Beijing Office of UNESCO etc.
Organized by BNU

To start pilot Project immediately after the conference and a cooperation agreement has been signed between MOE and Academy of France

Statement for this Beijing Conference

- As we began the 21st Century we become aware that access to the explosive development in science and technology is becoming crucial to personal, national and international "survival"
- Propose a new action network to co-ordinate the efforts to achieve the common goal of worldwide advance of science knowledge and science thinking as a vital component of the education of young girls and boys

- Asia Pacific Workshop of La Main a La Pate Sept.2003

- **27th General Assembly of the International Council for Science (ICSU) and associated meetings, Sept.2002, Rio, Brazil**

"一带一路"上的历史与科学教育

The History and Science Education along the Belt and Road

YWRCLS

“Learning By Doing” Science Education Project

- In Aug. 2001, co-initiated by Ministry of Education and China Association for Science and Technology
- A Pilot Project of Inquiry Based Science Education and Learning in Kindergartens and Primary Schools (5-12years) in China
- It is aimed at promoting the children’s science education as well as their holistic development and wellbeing

- 2001-2011, LBD reach out to 22 provinces and benefiting over 200,000 students and Thousands teachers
- LBD recognized by public and government agencies in China as well as in the international forum of science education (IAP-IBSE),got Purkwa Price 2006
- LBD has become a sound foundation for revising the National Standard of Science Education in Primary Schools and promoting the policy making on early child development ,got the First Class Award of Education Research from MOE in 2010

Rising questions and discuss

Nanjing Xi Lu Kindergarten in Shanghai,2004

YWRCLS

Jan.2002

June 2017

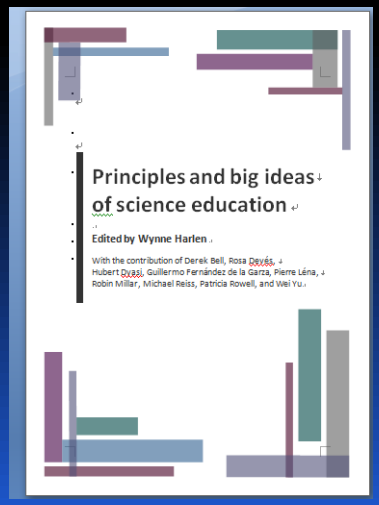
2017 Learning by doing science education in mental illness children school in Shantou

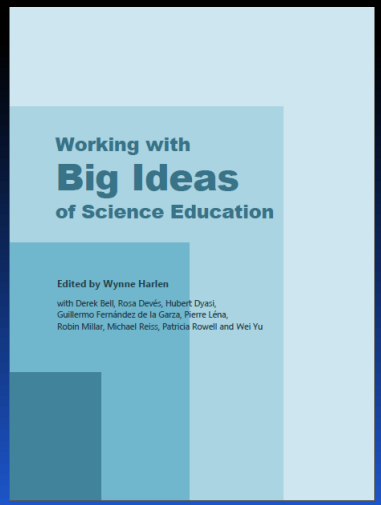
YWRCLS

2009年10月

From left to right: Rosa Devés, Pierre Léna, Wynne Harlen, Hubert Dyasi, Derek Bell, Patricia Rowell, Robin Millar, Wei Yu, Michael Reiss, Guillermo Fernández de la Garza

2014年9月





YWRCLS

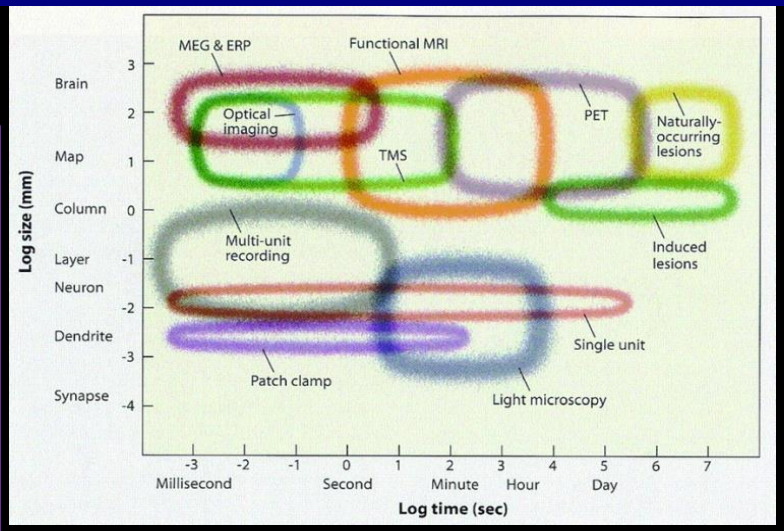
The opportunity provided by opening policy and the high impact coming from well organized social structure in China

Three examples in the past 25 years:

- 1，90’ last century <Future Woman Teacher Project> aimed jump to the information platform
- 2，1994-2001-2011- pilot project of inquiry based science education <Learning by Doing > and international collaboration .
- 3，2002- promote the early child development using Neuroeducation

Philosophy Destructive Changing


Figure 1
René Descartes (1596-1650)

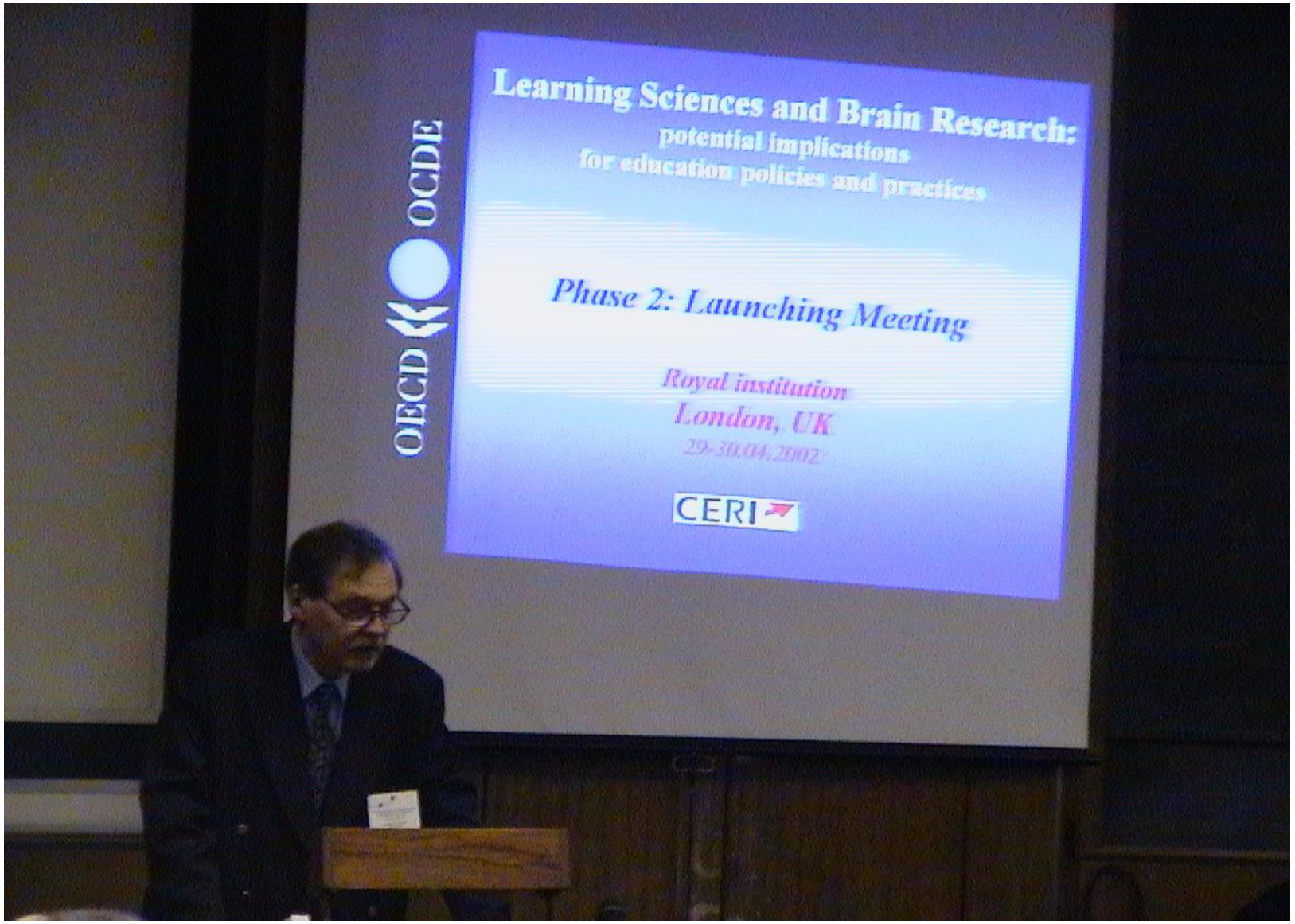


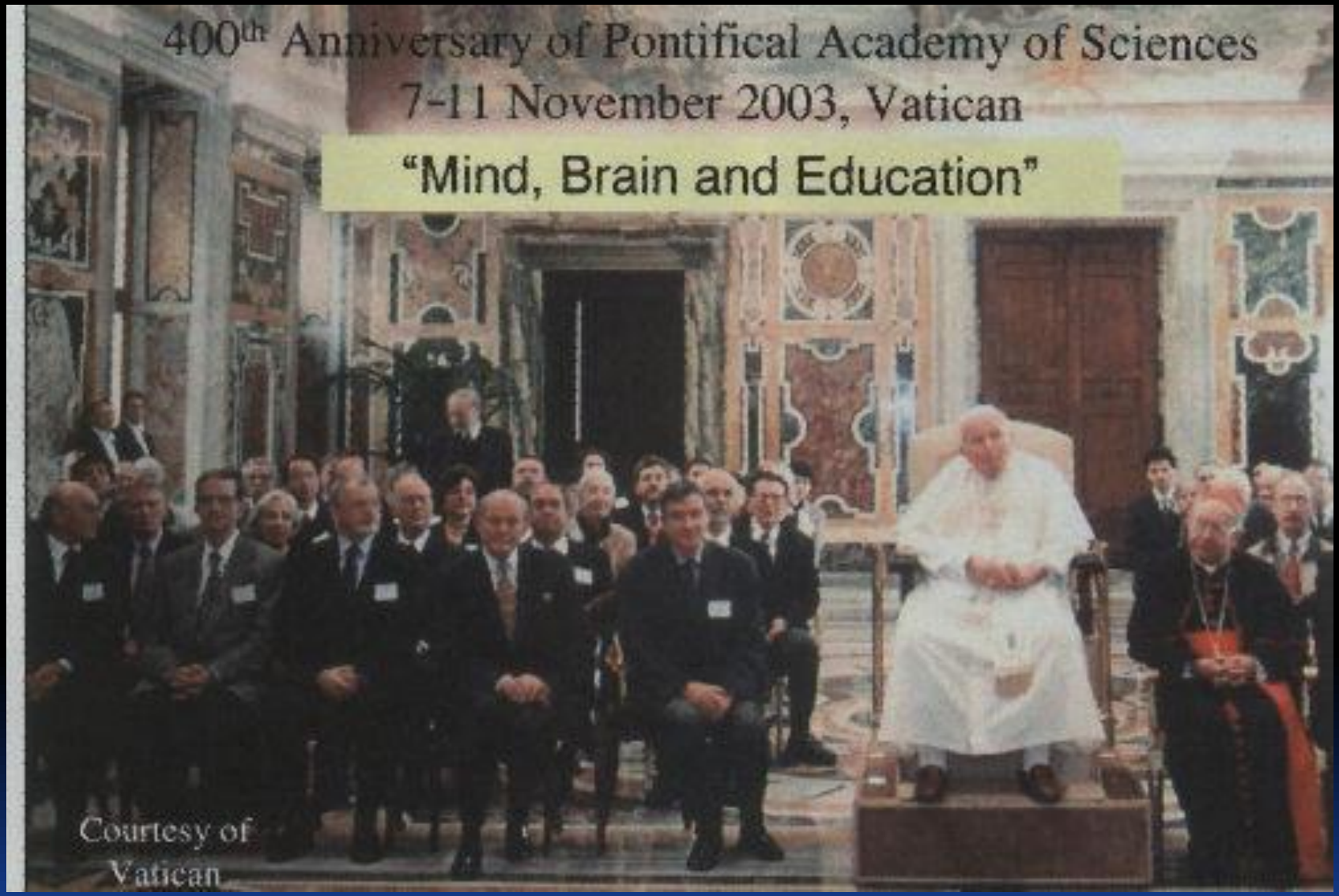
Antonio Damasio

The ideological feature in the 20th century (at least the second half of the 20th century) is the deviation from Cartesian dualism. The publish of a book "《*Descartes ‘Error: Emotion, Reason, and the Human Brain*》 in 1994 marked such turning point, the author of this book is neuroscientist Antonio Damasio.

cited from < The History of World Philosophy> written by Hans Stoerig (Germany)

YWRCLS


OECD OCDE
Learning Sciences and Brain Research:
potential implications
for education policies and practices
Phase 2: Launching Meeting
Royal institution
London, UK
29-30.04.2002
CERI


400th Anniversary of Pontifical Academy of Sciences
7-11 November 2003, Vatican
"Mind, Brain and Education"
Courtesy of Vatican

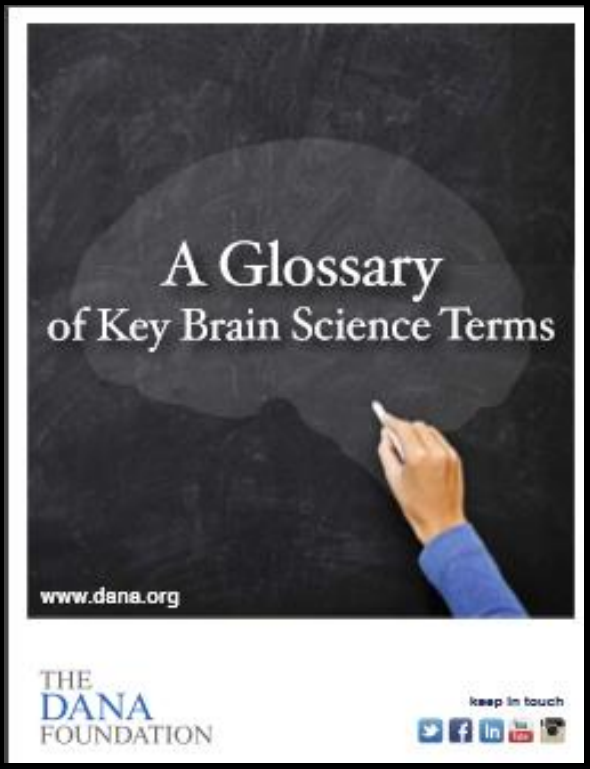
YWRCLS

Research Center of Learning Science (RCLS), Southeast University, China

Founded June, 2002

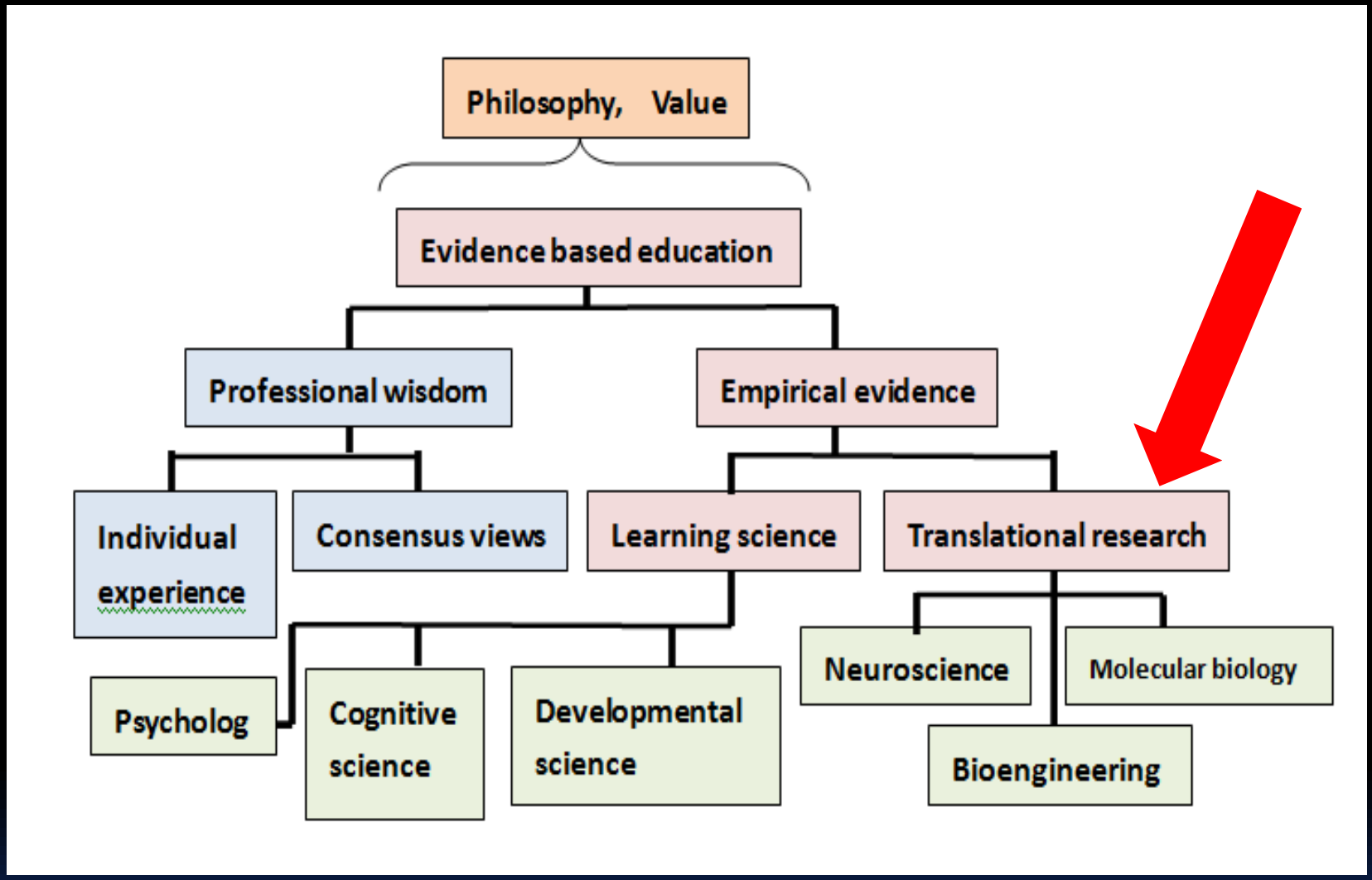
Key Lab for Child Development and Learning Science of MOE, 2004

YWRCLS



April 2016
（169）

Neuroeducation: Sometimes referred to as educational neuroscience, this **collaborative, interdisciplinary field** of study uses findings in cognitive neuroscience to inform teaching and other educational practices.



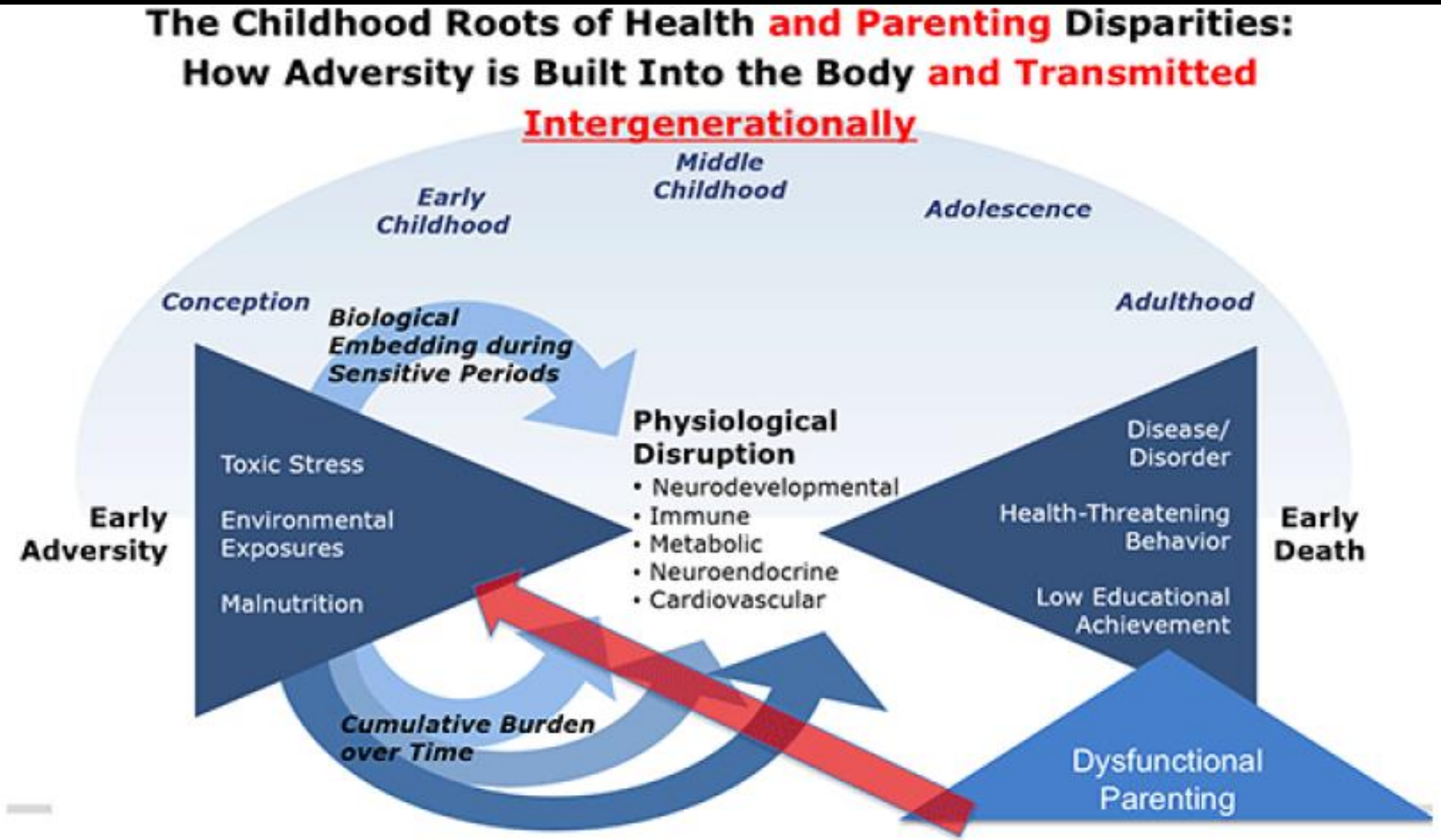
Neuroeducation will change the educational policy, teaching and learning

Cited from Yu Wei, Educational Review， BKU， Vol. 9 No 4,2011,10

Research supporting the policy making

The Committee of the CPPCC and other related 4 Ministries jointly convened a high-level Forum on Early Child Development,Nov.2007

The forum issued a proposal <Let every child have a good start in life>, which promoted the formulation of our early education policy.



The negative effects on young parents of their own early-life adversity can propel disparities in health and development across generations. (Image courtesy of Linda C. Mayes)

- **Scientific research tells us that earliest 1000 days from gestation to child 2-3 years old include the opportunity window and also sensitive period for children in adversity.**
- **Early adversity will substantially embed children's biological systems and change their biological foundation and development tracts, as well as exert the impact on their abilities in different aspects.**
- **These dangers to themselves may also be passed on to their offspring through their parents behavior and the different epigenetic mechanisms.**
- The most effective way to avoid and remedy these adverse effects is to provide **a sustainable and supportive family upbringing environment** for these children.

Integration project for early childhood development

- In recent years, according to the evidence provided by scientific research, international organizations such as WHO, UNICEF and the World Bank have been appealing to Governments and interested parties to recognize that the root of human sustainable development is human development, particularly for early child development .
- Called for putting the results of scientific research into practice, to support the integration project

- It is recommended that the national poverty alleviation point of time be moved to **the earliest 1000 days** to integrate health care, education and all aspects of poverty alleviation, to support and improve the quality of family upbringing of adverse children, and to **implement integrated action** to help adverse children.
- This is **an effective measure** to improve the precision of poverty alleviation, to realize education equity and to block intergenerational transmission of poverty.
- **A matter of sustainable development of the Chinese nation.**

Family upbringing is irreplaceable for early children

1, Nutrition, Food and safety (traditional areas)

2, Stable, secure attachment relationship

3, Warm, stable, prompt interactive caregivers

4, Active interactive language learning (hear， understand, then talk)

5, A rich, inquiry learning environment (imitation and inquiry)

6, Avoid early neglect and abuse (stress response of HPA-axis)

7, Promoting social interaction with peers

8, Early detection, diagnosis and treatment of abnormal development and diseases

Cited from Yu Wei<《Eight key points of family education in 0-3 years>

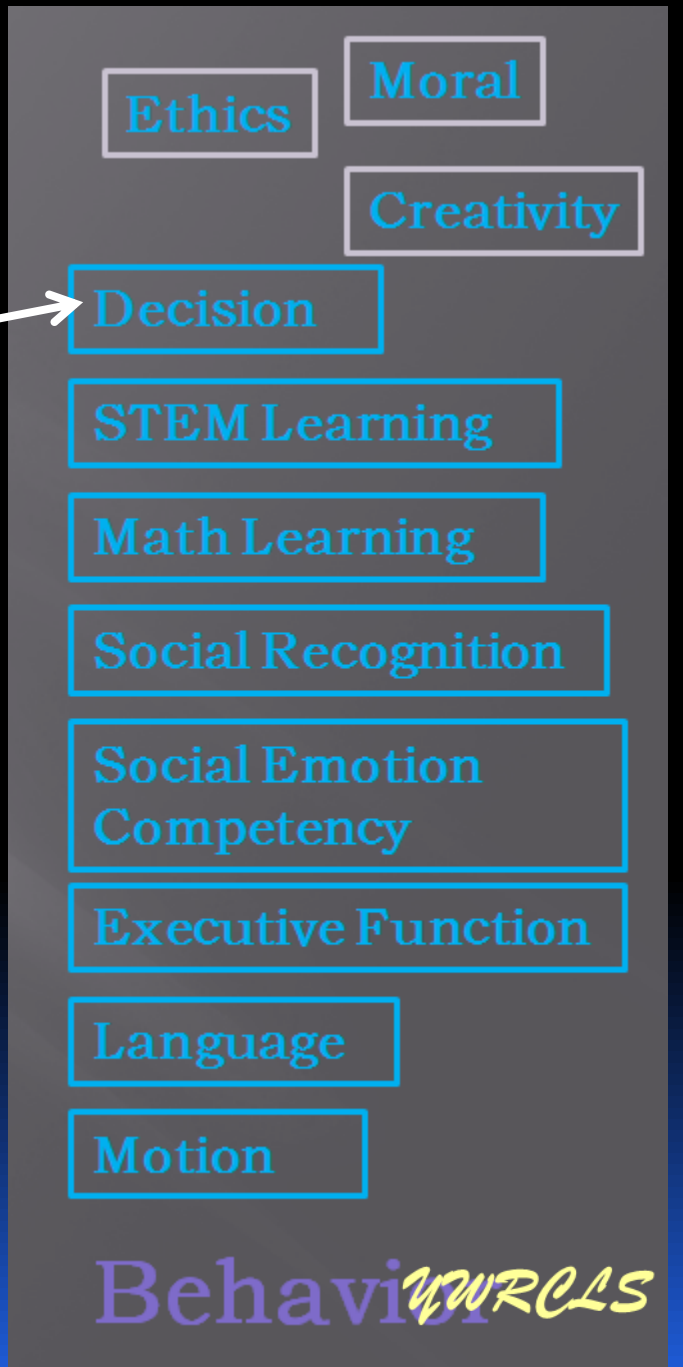
YWRCLS

Taking early development as an example

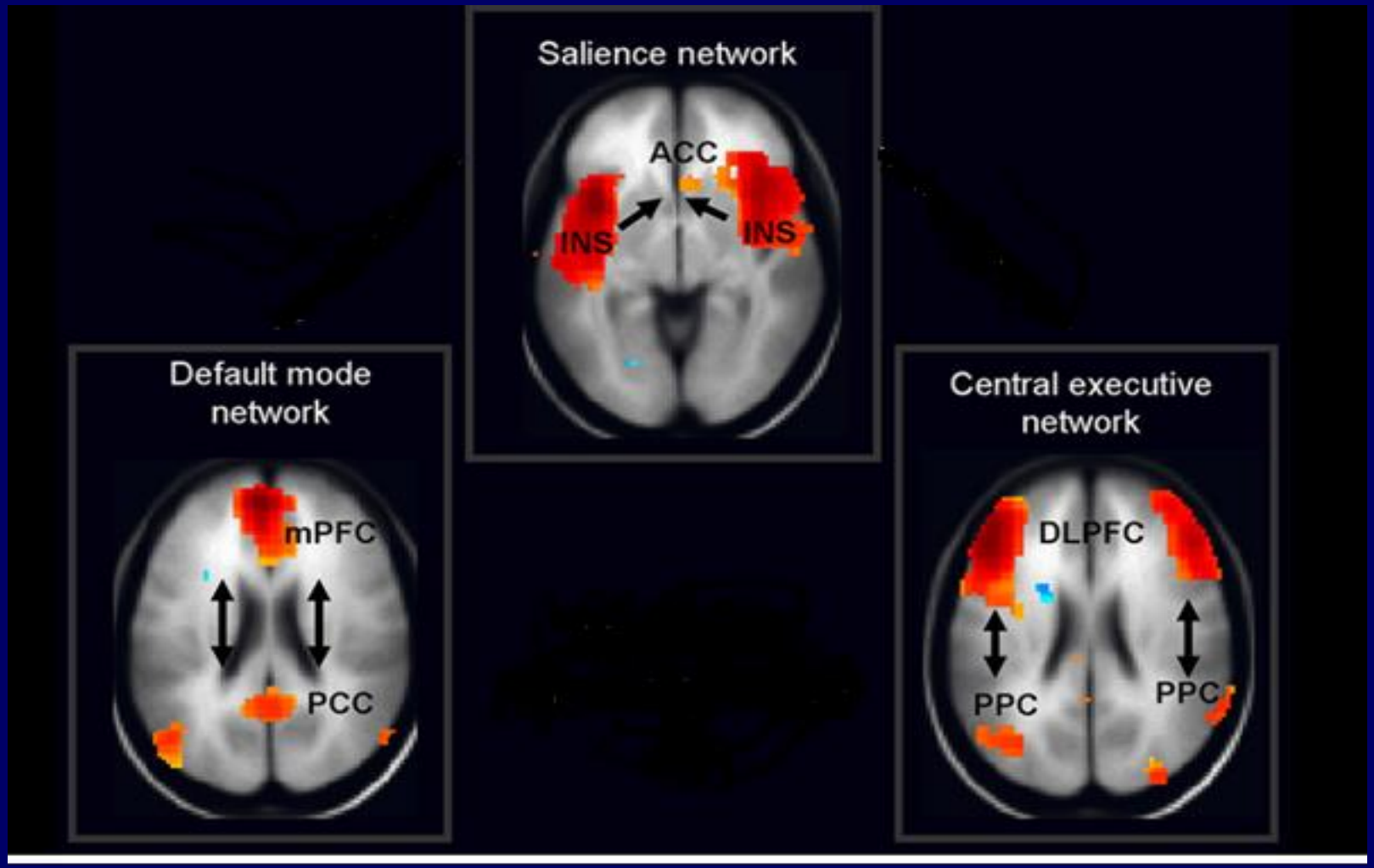
- **All education should be guided by evidence based research**
- **Education actually is constructing brains of children**
- **Education needs to follow the development of brain, so that our children can become healthy and excellent socialist constructors and successors**
- **Merging evidence based education and IT is the major mark of education modernization**

The major different between individuals is the competency of decision making

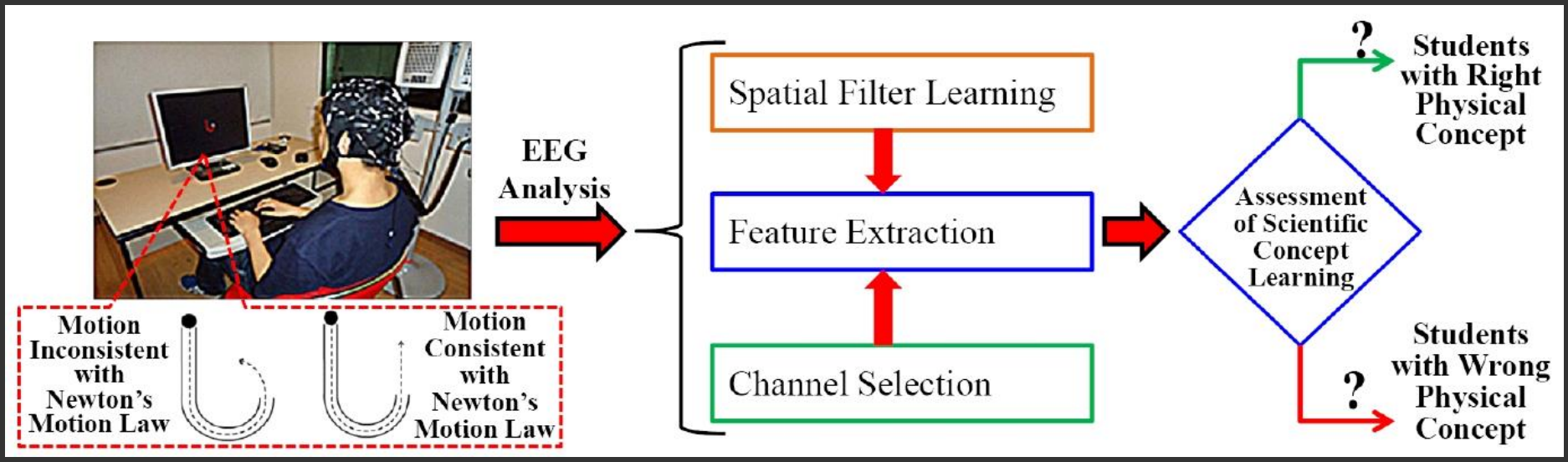
The goal of education is cultivating students becoming informed decision makers.

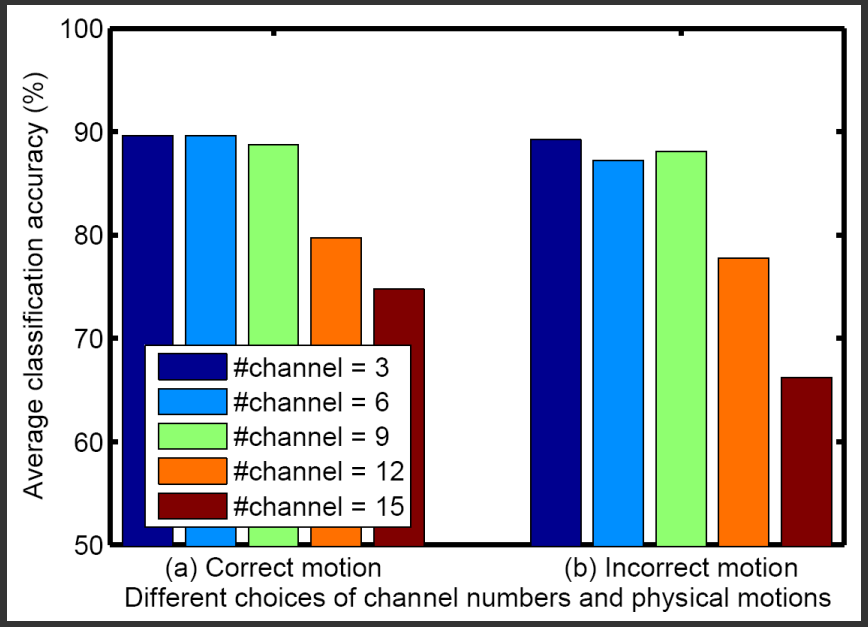


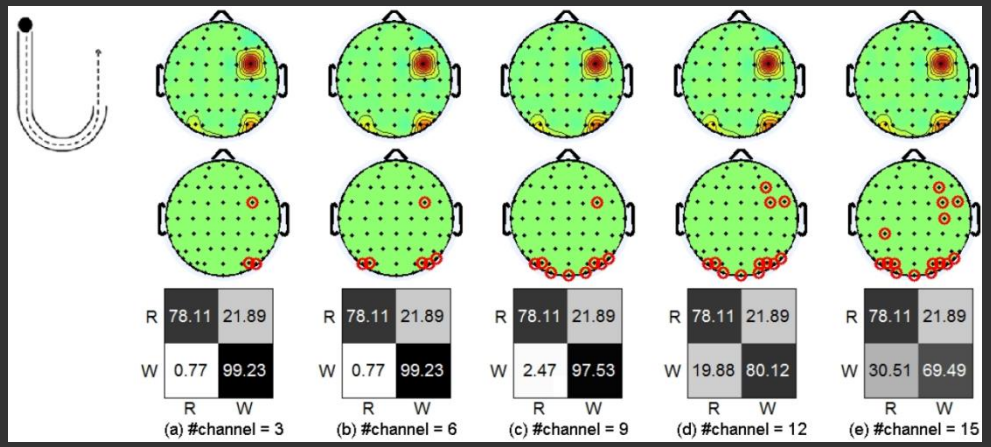
从功能连接网络研究创新过程



Assessment of Student's Scientific Concept Learning Outcome in Science Education Using EEG Analysis Approach







From Prof. Wen-ming Zheng, Dr. Yan-man Zhu

YWRCLS

EF evaluation and training, using EEG and behavior assessment in virtual reality

Developed by Prof. Yu, Dong-chuan, RCLS SEU

YWRCLS

Thanks to

Cast, MOE colleagues and teachers working in LBD project

Li ka shing Foundation and GE foundation

- HanBo(汉博） Team

Colleagues and Students in RCLS ,SEU

YWRCLS

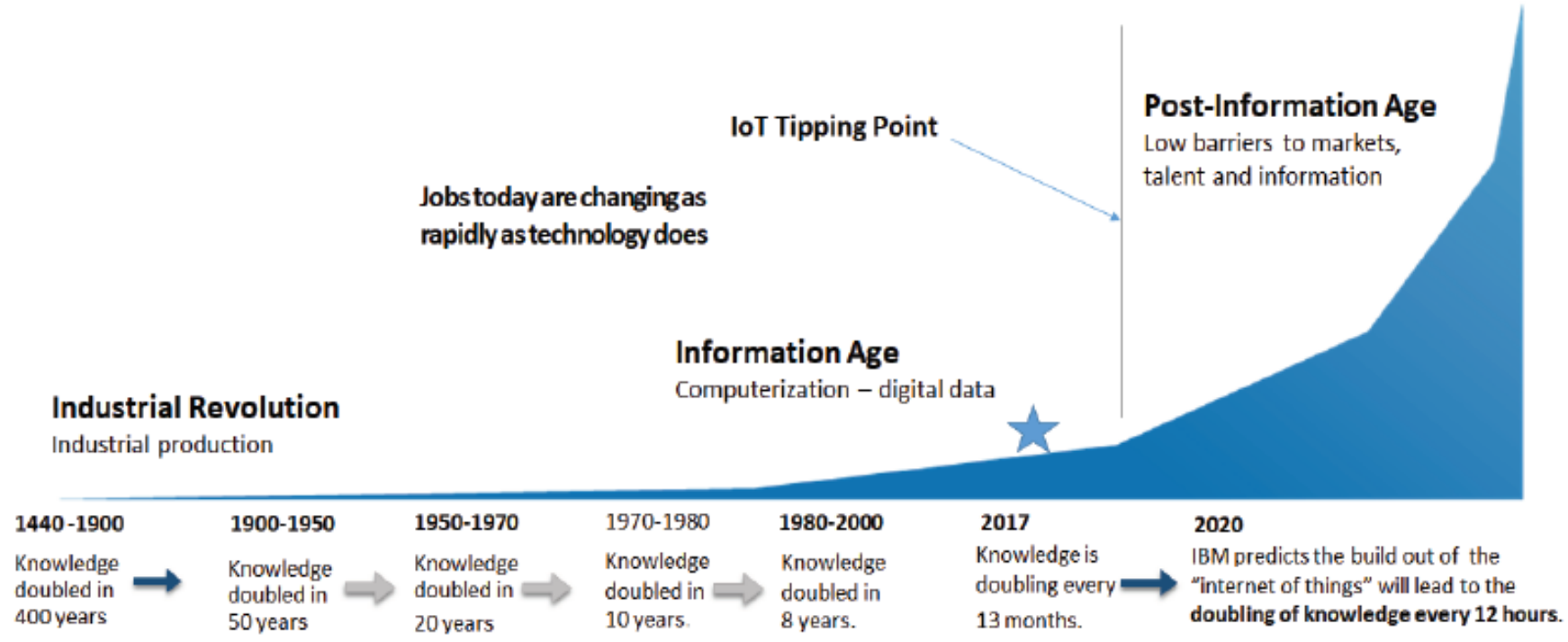


FIGURE 3-1 Knowledge-doubling curve; "Internet of Things" or IoT Tipping Point refers to the anticipated acceleration of knowledge associated with widespread growth of the IoT.

SOURCE: Presentation by Michael Richey, Boeing, at Committee Meeting, September 14, 2017, slide 3.

From the past experience
to the view of future

Science education is always in the way of innovation driven by S&T

Thank you!

YWRCLS