

2014 Mexican Ergo Society Congress  
Mérida, Mexico, April 2-5, 2014



International Ergonomics Association

# Ergonomics, Ergonomically Developing Countries, and Localization

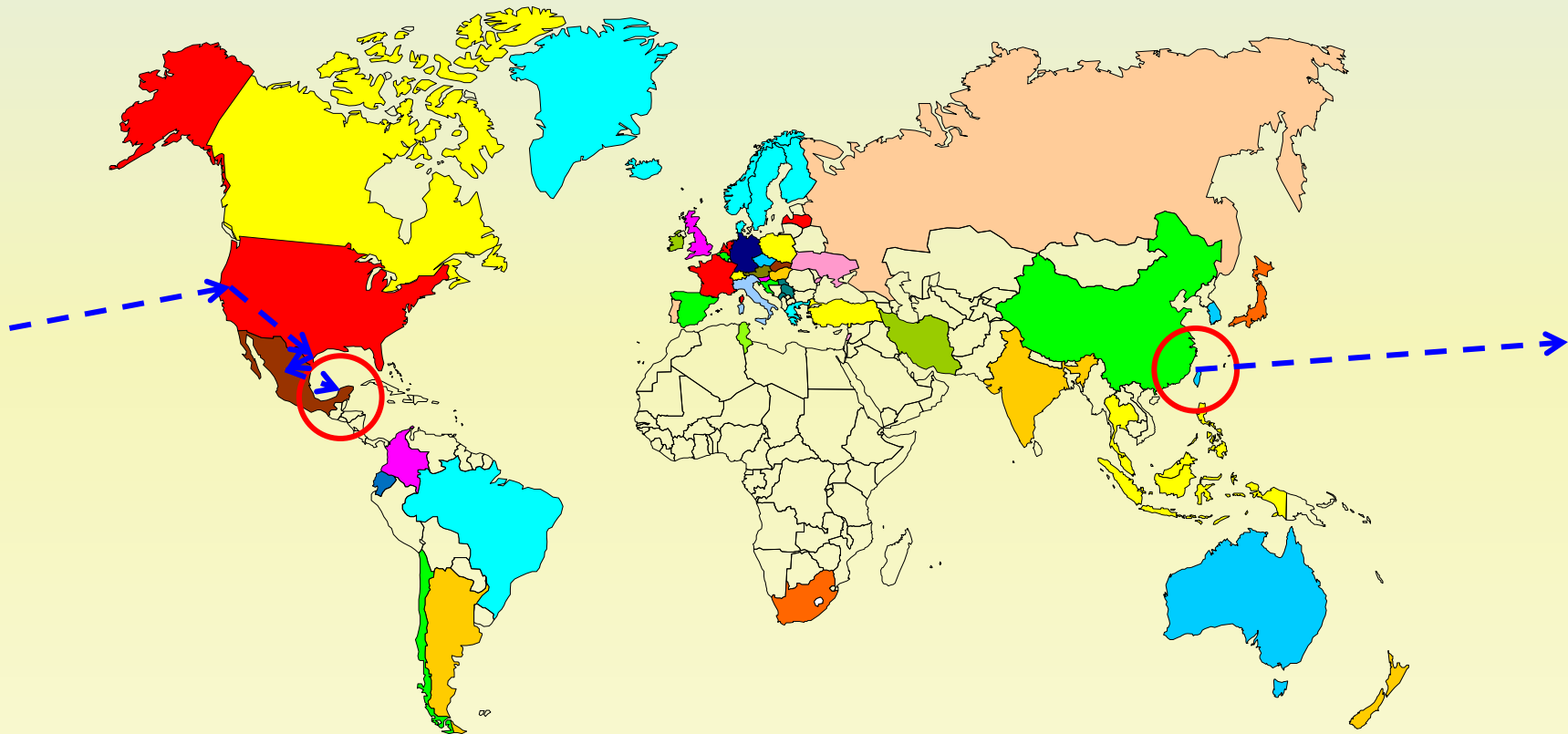


---

**Eric Min-yang Wang**

IEA President  
Professor, Department of Industrial Engineering and  
Engineering Management  
National Tsing Hua University, Taiwan  
Email: [President@iea.cc](mailto:President@iea.cc)

# IEA Family of 48 Federated Societies



Founded in 1950s, is the society of Ergonomics Societies. Has 48 federated societies, 2 affiliate societies, 3 networks, and 10 sustaining members.

- Learn ergonomics in minutes
- “Ergonomics Developing Countries (EDCs)” and their needs
- IEA policies on promotion ergonomics in IDCs
- Satisfying local and global ergonomics needs
- Conclusion

# LEARN ERGONOMICS IN MINUTES

- “Ergonomics” is ...
  - Without / with ergonomics, ...
  - Ergonomics is old yet young!
  - Ergonomics is common sense?
  - Domains of ergonomics specializations (According to IEA)
  - Ergonomics development trend
  - Micro-ergonomics vs macro-ergonomics

# “Long, long time ago, ...”

There was an ergonomist and his family. They shared their daily work which are either hazardous or risky .....

Anthropometry

Human-Machine Interface

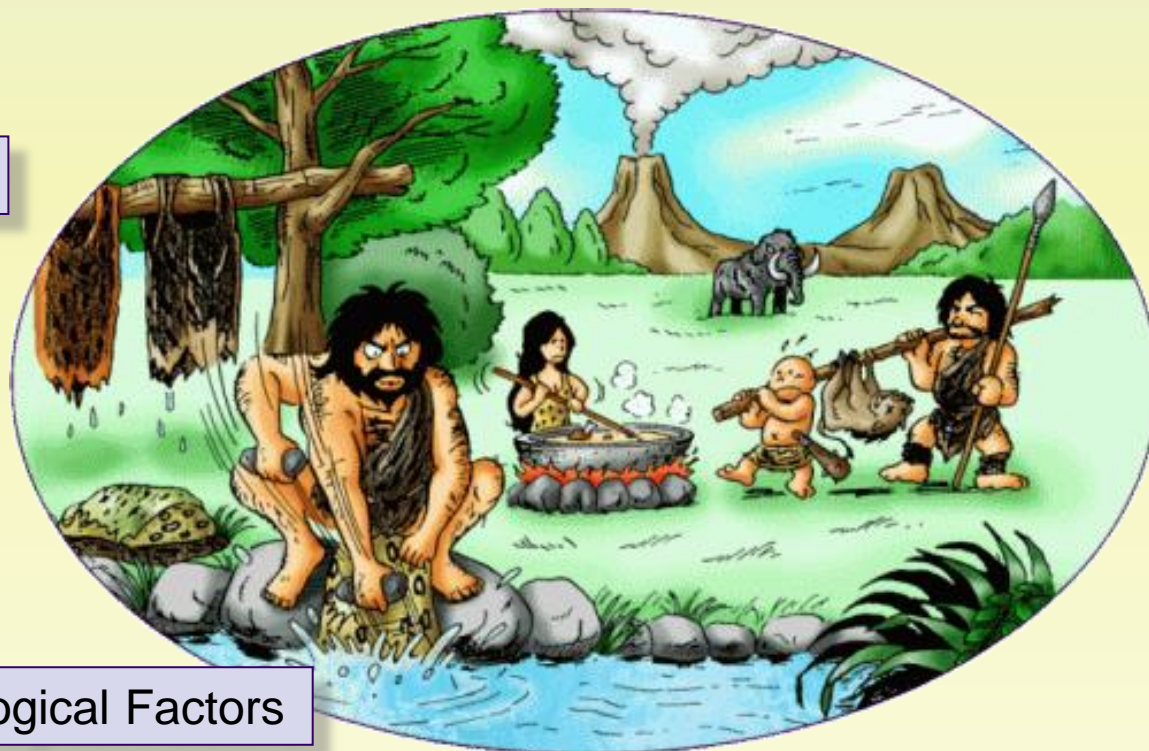
Strength & endurance

Physical Workload

Mental Workload

Reaction Time

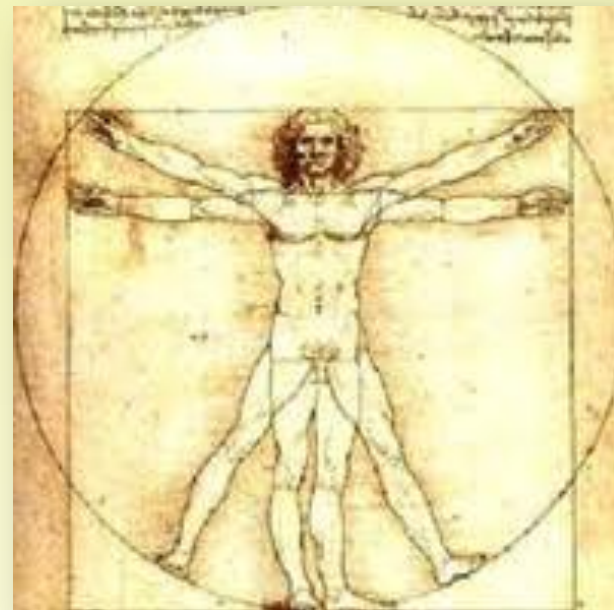
Physiological and Psychological Factors



# “Ergonomics” is ...

- “Ergonomics” is **Human Nature** in everywhere, everyday, involves in doing anything, at anytime, by any human being.

- Goal: Error-free, safety, performance, human wellbeing, etc.
- Focus: Based on human capabilities and limitations to design systems and fit the human needs.



# It's too difficult to live without ergonomics!



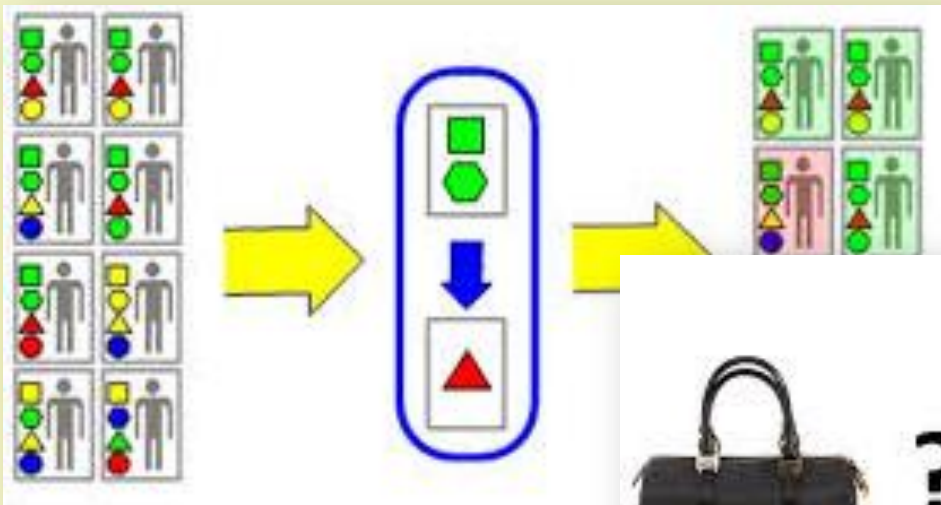
Too large to hold, too small to see, too heavy to carry, ..., etc.



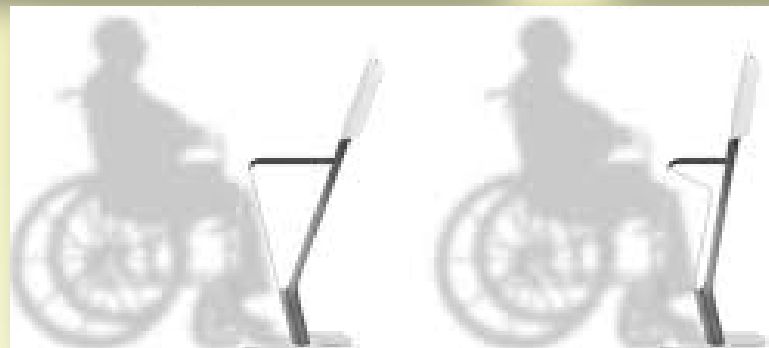


# It's too difficult to live without ergonomics!

Too many to remember, too quick to response, too similar to distinguish



# With ergonomics, things are safer, easier, more efficient and satisfied!



With ergonomics, things are safer,  
easier, more efficient and satisfied!



# Ergonomics is old yet young!

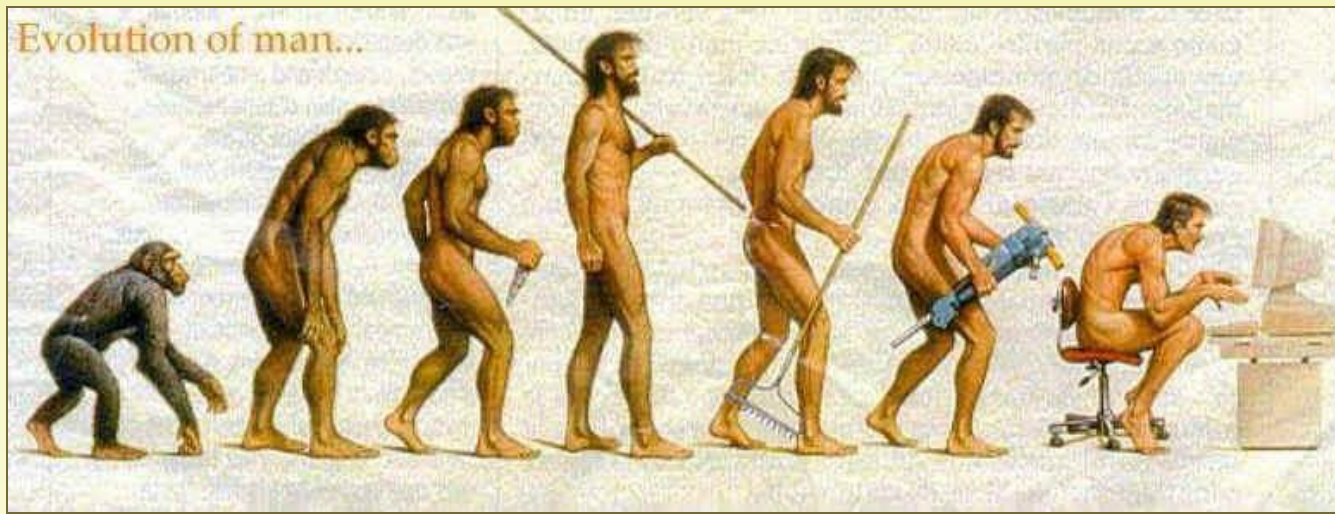
- Ergonomics has been a requirement for survival.
  - Hunting, defense, production, communication, etc.
    - Stones, wood, bones, leather, fibers, etc.
    - Weapons, tools, drums, cloths, etc.
    - They must be effective and usable.
- The practice of ergonomics is as old as the history of human being.
- “Ergonomics discipline is still in its infancy.”

Ergonomics



# Ergonomics is old yet young!

- Whenever and wherever there is a human, there is ergonomics, which *must satisfy the specific needs!*

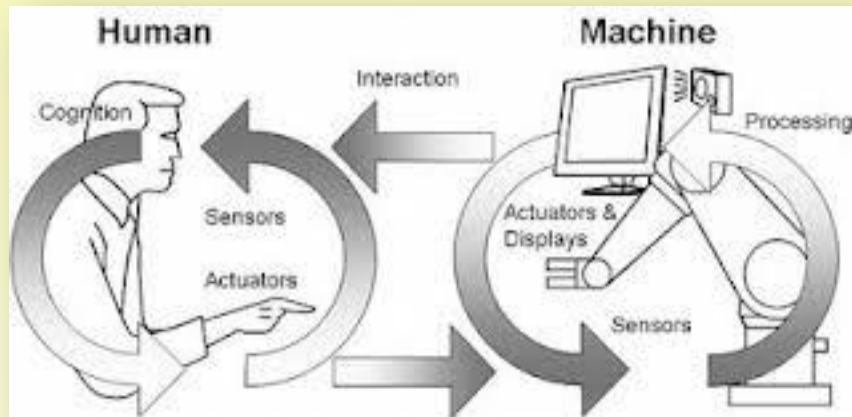


# Ergonomics is common sense?

- NO! NO! NO!
- If ergonomics is common sense, the traffic signs and many other things would not need any design!
  - “What would be the width of the stroke of the words if the signs are to be read clearly at 100 meters before for a 40 km speed car?”



- Ergonomics design is not just hardware design, it must take users and environment into consideration.
- Users: All people involved; e.g., end users, manufacturers, technicians, recycling workers, etc.



# Domains of ergonomics specializations (According to IEA)



- Micro**
  - **Physical ergonomics:** Human, machine, and environment.
  - **Cognitive:** mental processes, mental workload, decision-making, HCI, etc.
- Macro**
  - **Organizational:** optimization of sociotechnical systems
  - **Others: Important ingredients to maximize the contributions, e.g., culture, arts, caring, affection, etc.**



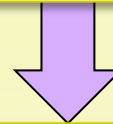
# Ergonomics development trend



- The levels of development (in terms of research and implementation) and the influence are increasing from physical aspects to others:

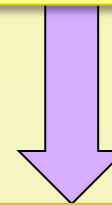
- Physical ergonomics
- Cognitive ergonomics
- Organizational ergonomics
- **Others.**

Developed  
for years



Not yet  
developed

Personal



Human  
Value

# Most applications are of micro-ergonomics



- ***Micro-ergonomics***
  - *User interface design*
  - *Human-Computer Interaction*
  - *Product design*
  - *Material handling*
  - *Musculoskeletal disorder issues*
  - *Safety design*
  - ...

# Growing macro-ergonomics



- ***Macro-ergonomics***
  - *Organization Design and Management (ODAM)*
  - *Socio-technical aspects*
  - *Social-psychological issues*
  - *Participatory approach*
  - *Holistic considerations*
  - ...

# “ERGONOMICS DEVELOPING COUNTRIES (EDCs)” AND THEIR NEEDS

# Economics vs Ergonomics



- **Economics:**
  - **Industrially Developed Countries (DCs)**
  - **Industrially Developing Countries (IDCs)**
- **Ergonomics:**
  - **Is there any Ergonomics Developed Country?**
  - **Criteria of dividing Ergonomics Developed and Developing need to be discussed.**
  - **All countries are Ergonomics Developing Countries (EDCs)**

# Economics vs Ergonomics

No  
Ergonomics  
Developed  
Country

Econ:  
DCs

Econ:  
IDCs

Ergo: All Countries are  
Ergonomics  
Developing Countries  
(EDCs)

- Different countries may have different needs and specific ergonomics issues.
- IEA has the responsibility to create the environment for all countries to identify their ergonomics needs, to exchange their ideas and experience with other countries and to develop necessary skills to satisfy the needs.

# IEA POLICIES ON PROMOTION ERGONOMICS IN IDCs



# IEA By-laws



- **The mission of the IEA is**
  - to support its federated societies in the **development, promotion and dissemination of ergonomics/human factors science and practice**
  - to **expand the scope of ergonomics, its application and contribution to society**
  - to **improve quality of life.**

# IEA policies on promotion ergonomics in IDCs



- Written in **IEA OPERATING PROCEDURES**
- **IEA Triennial Awards**
  - IEA Triennial Award for Promotion of Ergonomics in Industrially Developing Countries
  - K.U. Triennial Smith Student Award
    - Two best student papers at the IEA Triennial Congress
    - At least one student shall reside and conduct the research in an IDC.

- **IEA Funds**

- HFESA Fund for Southeast Asia
- HFES Fund
- JES Fund

## ● IEA Supported Conferences

- 10 free copies of the proceedings for IDCs
- Waive the capitation fees for conferences held in IDCs or for delegates from IDCs
- Host helps fund Triennial Congress participants from IDCs
- Reduced registration fees for participants from IDCs

# SATISFYING LOCAL AND GLOBAL ERGONOMICS NEEDS

# Global Ergonomics Issues/Needs from Developed Countries



- Musculoskeletal disorders
  - Work styles and work postures
- Lack of inter-personal contact, stress and mental workload
  - Individual, team work, independent and dependent work
- Changing of circadian rhythm
  - Shift work: Fixed shift or rotated shift
- Human errors
  - Fatigue, distraction, poor design on UI.



# Local Ergonomics Issues/Needs in Some Asian Countries



- Agricultural ergonomics
  - Tools, work posture, work method, etc.
- Daily life ergonomics
  - Unique local equipment.
  - Symbols for illiterates.
- Imported devices and systems
  - Localization of the labels, workstations, and work organization.
  - Incompatibility of the mental map and design.

# Localization first



- Ergonomics itself is characterized by its localization flavor.
- Global ergonomics issues/needs  $\neq$  Local ergonomics issues/needs
- Should emphasize localization first, then globalization
- They may influence each other.



# Localization first



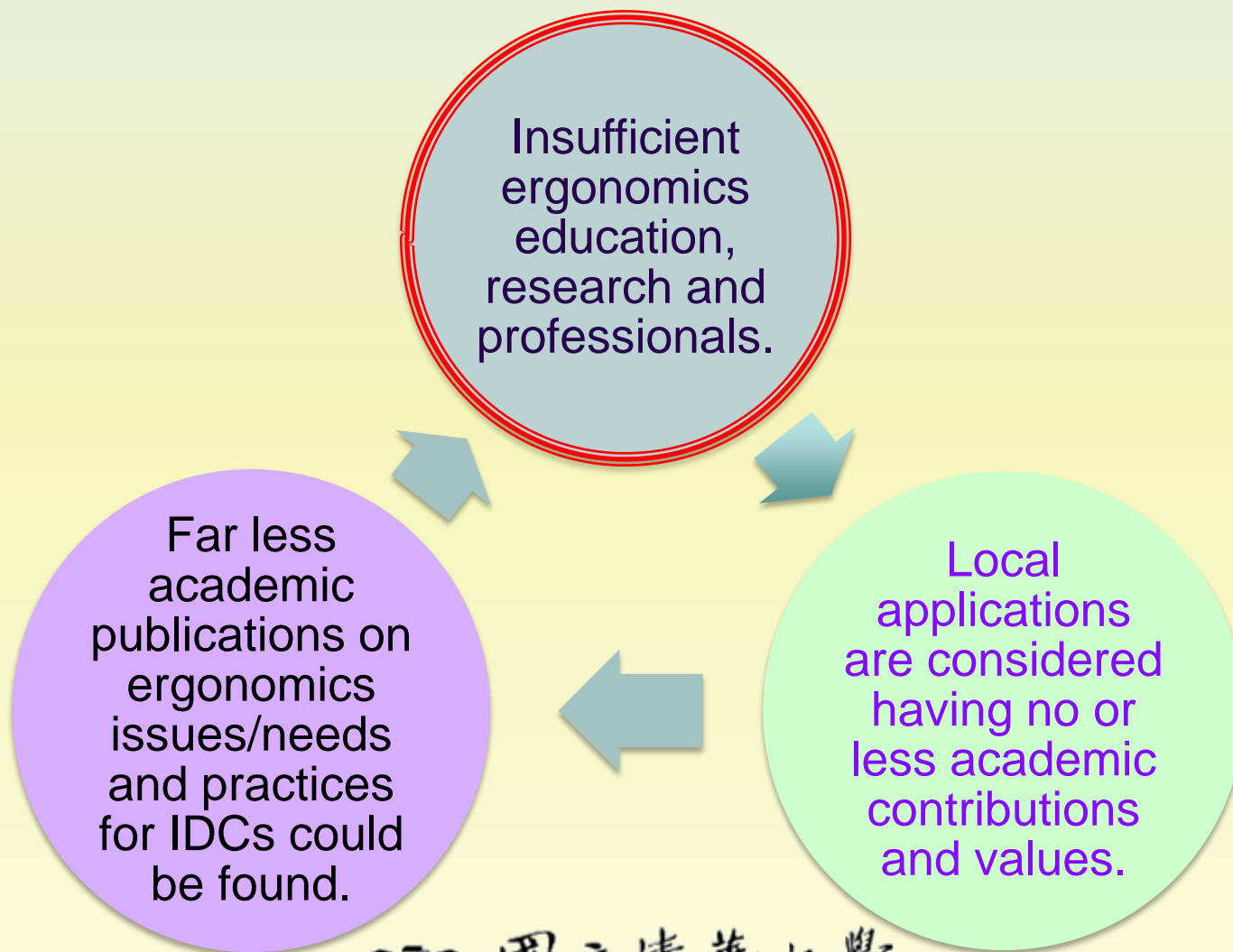
- Past: Localization > Globalization, protection, isolation
  - Poor usability with imported products and systems which were designed for local needs in foreign country.
- Present: Globalization > Localization.
  - Globalized systems which considered too much of global needs and little of local needs. (Does not fit local needs.)
- It doesn't make sense to neglect local needs to satisfy global needs.

# Localization is less emphasised



- **Tradeoff between Globalization and Localization is crucial!**
  - Not much ergonomics research has been doing for local needs.
- **Why there was not much ergonomics research had been doing for local needs? Particularly for IDCs.**

# A vicious circle



# A platform for promotion of ergonomics in IDCs is needed



- DCs have stronger influences on the development of ergonomics educational and training materials with less IDCs viewpoint
  - Local information may be neglected
  - Research publications and results from DCs lead research directions and research in IDCs but they may be irrelevant to the IDCs.
  - Over-emphasize SCI misleads the purpose of research. More theoretical work than practices.
- **Journal of ergonomics for IDCs is needed.**

# CONCLUSION

# Conclusion



- Ergonomics is in everyday life and must serve human.
- Good ergonomics design should be as natural as possible, as if there is no intentional design in it.
- Local ergonomics needs and applications must be honored.

- Local efforts to promote ergonomics with the assistance of international collaboration.
  - Understand local culture.
  - Educate and train local ergonomists.
  - Collect local basic data: physical, physiological, psychological, and other relevant databases.
  - Identify local issues.
  - With the help of legislation.
  - Satisfy local needs.

- International or regional collaboration is encouraged and appreciated.
- New Ergonomics Societies is also encouraged and supported.
- New IEA federated society is also welcomed.



THANK YOU FOR  
YOUR ATTENTION!

# IEA Council meeting + HEPS 2014, 6/23-26, 2014, Taipei, Taiwan

(<http://www.heps2014.org/>)



## The 4th International Conference on Healthcare Systems Ergonomics and Patient Safety (HEPS 2014)



23-26 June 2014

Taipei, Taiwan



### Conference Theme

The vision of HEPS is represented by the bridge connecting the past and future of healthcare services, as well as ergonomists, healthcare professionals, patients and providers. The past three HEPS conferences in 2005, 2008 and 2011 successfully contributed to highlight and develop the ergonomics contribution to patient safety, thanks to the participation of researchers, practitioners and patient advocates. We set "Bridging Research and Good Practices towards Patients Welfare" as the focal theme, hoping that the 2014 meeting will witness consolidation of the reciprocal benefits of research and practices in HEPS.

### The Host

The 4th HEPS conference, jointly organized by IEA, EST and TJCHA will focus on the challenges healthcare ergonomics faces in designing healthcare services as the co-product of the interaction between clinicians and patients. It is warmly welcomed that researchers and practitioners around the world to submit their latest work and research achievements to this conference. The conference will be held in Taipei, Taiwan, from June 23 to 26, 2014. Please visit <http://140.124.75.185:81/> for more information about the conference.



International Ergonomics Association



Ergonomics Society of Taiwan



Taiwan Joint Commission on Hospital Accreditation and Quality Improvement