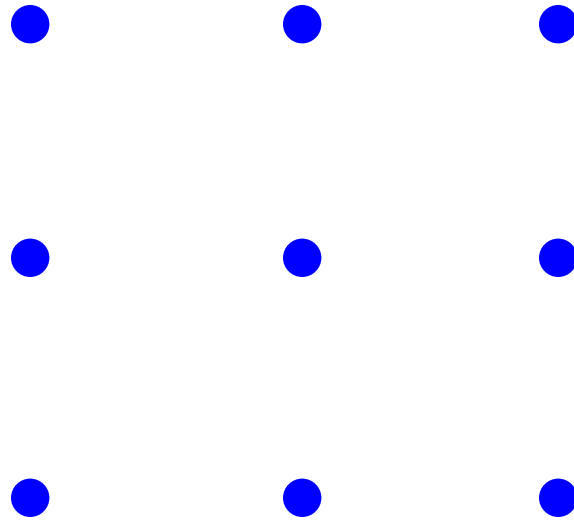

Think Out of the Box Riddle Competition



Pretend that the above is drawn on a piece of paper, draw 4 straight lines with an imaginary pen without lifting up the pen so that the lines go through all the dots using only 4 lines. How can it be done?

Engineering Faculty Seminar

Teaching in Engineering –
 Σ (the right elements) towards a
scholarly approach

Monday 16 April 2012

Dr. Cecilia K Y Chan

Centre for the Enhancement of Teaching
and Learning (CETL), HKU

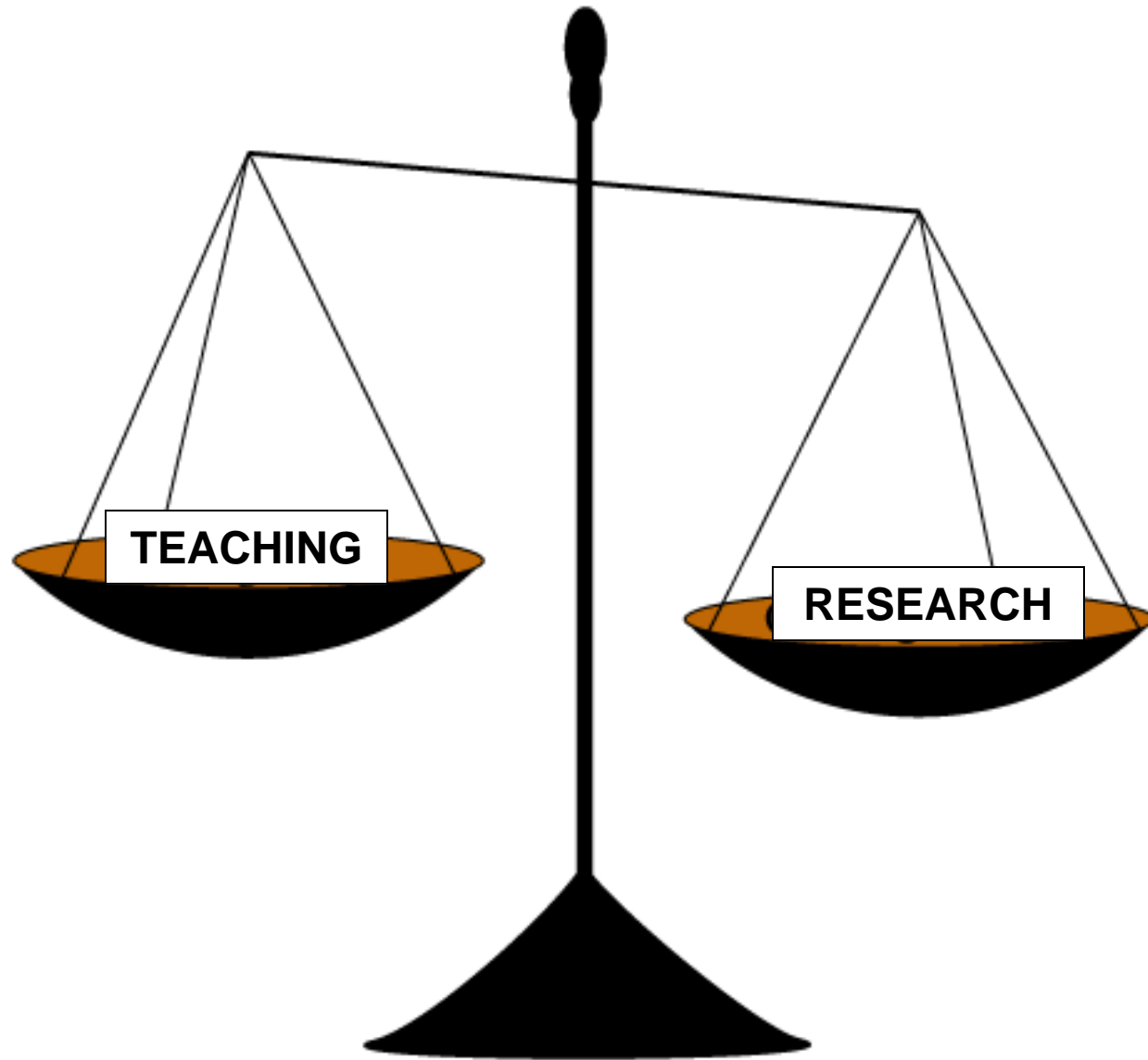
SETL

HKUSLEQ



From Engineering to Education

- Bachelor - Mechanical
- PhD – Electronics/Computer Science
- Postgraduate Dip. and Masters in Education
- Engineering Education Research
- A GRF in Education Research
(An Engineer awarded an Education GRF)



Teaching in Engineering – Σ (the right elements) towards a scholarly approach

- Primary issues in Engineering Education
- The right elements in good teaching
- Transferring good teaching elements into good research elements
 - Engaging in engineering education research
 - Publishing in educational journal
 - Getting teaching/research nexus recognition?
 - Most importantly, re-kindling our spirit in teaching?

Overview: Primary Issues in Engineering Education

- ~~Student Retention~~
- Student Recruitment (Quality Vs Quantity)
- Pedagogy – active learning 
- Assessment 
- Generic skills/Global competence 
- Student Motivation 

Active Learning

Why plan for 'Active' Lectures?

Problem of Attention span

Psychological constraints on learning:

Concentration drops with sustained and unchanging low level activity (such as sitting and listening), but to follow lecture content concentrated effort is required.

Students attention is typically maintained for 10 – 15 mins
minutes???

**“Excellence in Teaching = $f(x)$
What is $f(x)$?”**

By Prof. Ben Young

**Explain the mechanics of torsion by
twisting the biscuit stick!**



Student Experience with Assessment

Assessment Drives Learning

“Students can escape bad teaching: they can’t avoid bad assessment” (David Boud 1994)

Student Experience with Assessment

“Assessment must not be an optional extra, a bolt-on, an after-thought.”

“It must be a result of conscious decisions based on informed choice”

(Sally Brown, 1999)



Generic Skills/Global Competence

Employers have often been surveyed and their concluded remarks were:

**“Engineering Graduates
Lack
Employable Skills”***

* Indo-Asian news service – 2009

The Institution of Engineering and Technology, UK – 2011

Employable Skills

- Problem solving
 - Creativity
 - Leadership
 - Project management
 - Communication
 - Writing
 - Brainstorming
 - Team working
 - Computer Literacy
 - Ethical
 - Language
 - Professional
 - Positive Attitude
 - Common Sense
 - Adaptability
 - Lifelong Learning
etc...
-

Generic Skills/Global Competence

Peter Salovey the psychologist who invented the term E.Q. explained

“I.Q. gets you hired, but it is E.Q. that gets you promoted.”

“Traditionally the emphasis in engineering education has been on the scientific side, with students given a thorough grounding on basic scientific and mathematical principles underpinning their discipline. However, the constraints on engineering problem solving today are increasingly not technical, but rather lie on the societal and human side of engineering practice.”

-Jane Grimson*

*J. Grimson, “Re-engineering the curriculum for the 21st century”, European Journal of Engineering Education, 2002

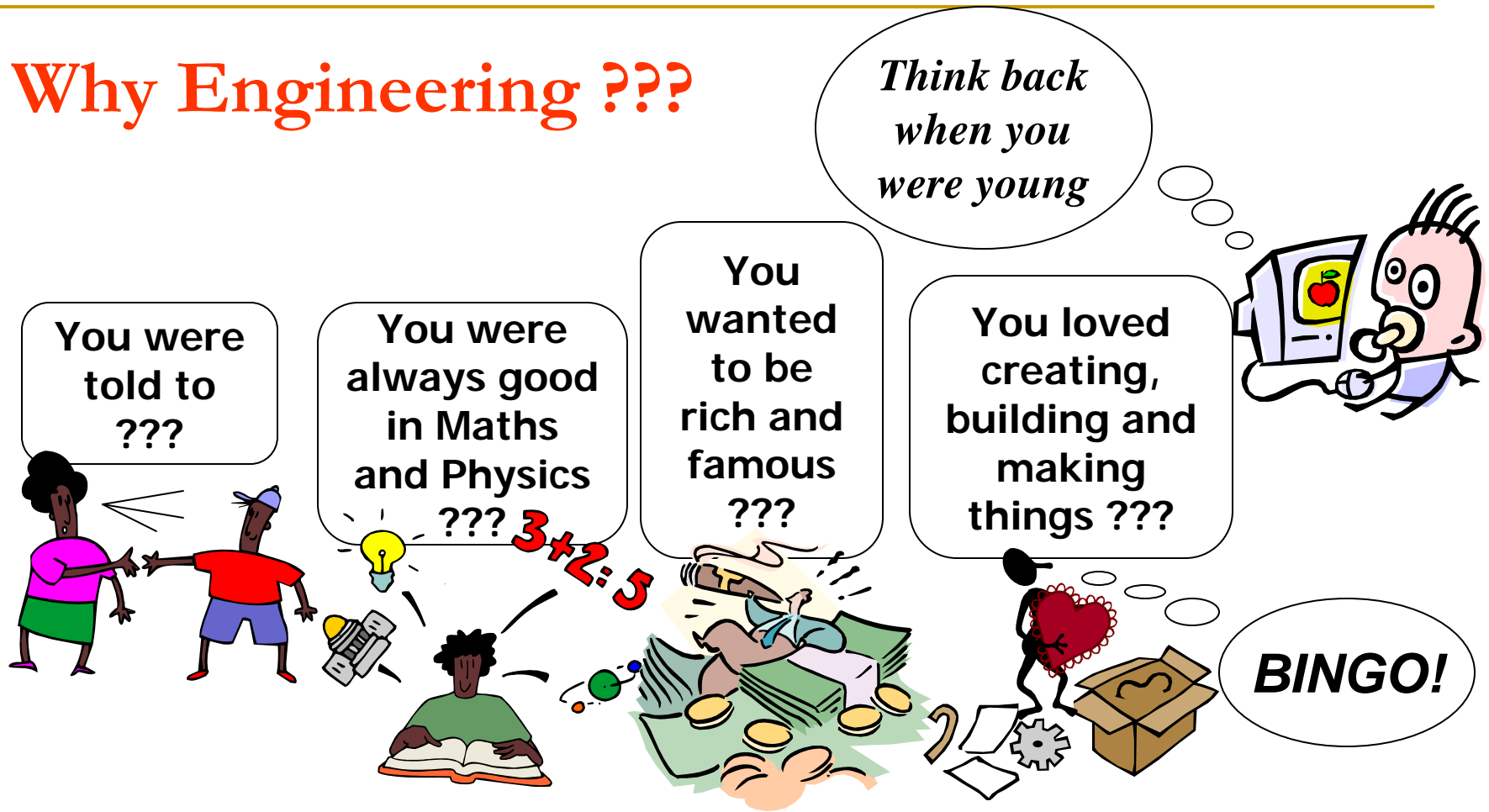
**Certifying and Assessing employable
skills?**

Provide a graduate portfolio??



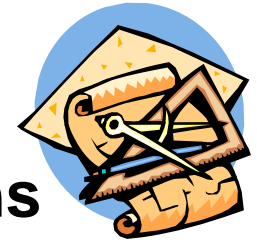
Motivation Video

Why Engineering ???

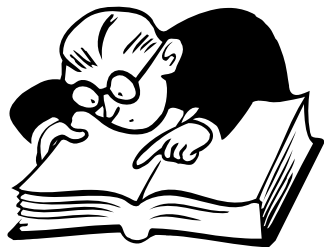


Do you remember the good old times that you used to take apart a perfectly working radio/watch/walkman just to put them back together ?

Early Experiences in College



- ❶ Quite the opposite to their College Expectations
- ❷ Too many set practical “follow the procedures” labs
- ❸ Lots of theories but not enough real life related examples
- ❹ Little to none wild, brainstorming, think outside the box design projects or labs



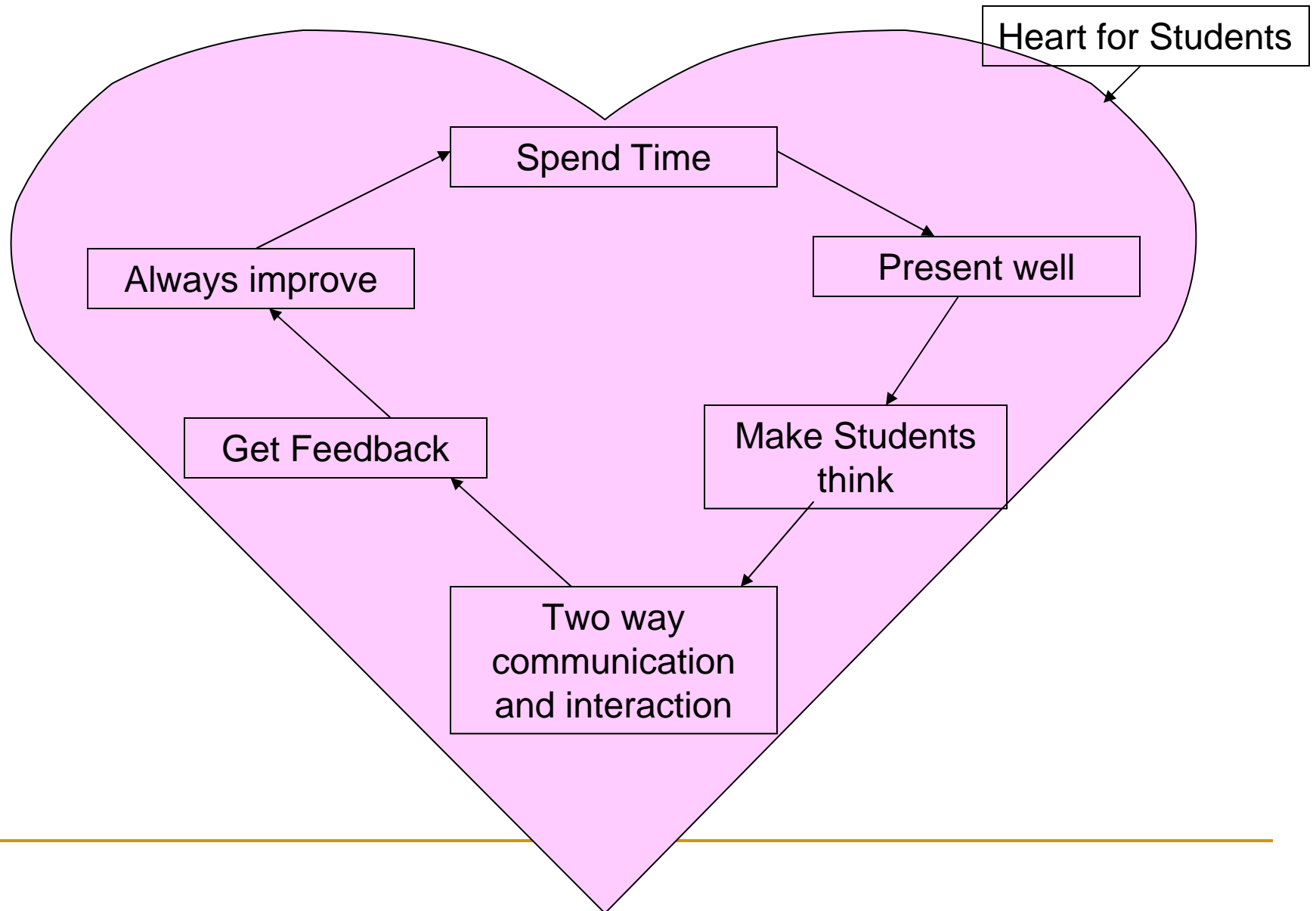
However, the basic knowledge is a mandatory process of the learning curve, after all, how can we run if we can't walk ?



Σ (Right Elements) in Good Teaching

- Heart – 7 must Teaching Approach
- Aligned your learning activities, assessment and learning outcomes
- Bring in active learning methods
- Relate the theories with real life engineering practices and your top notch research
- Work together as a team. Collaborate.
- Keep in mind the issues
- Open mind

7 Must Teaching Approach – B. Young



Engineering Research and Engineering Education Research

- It doesn't have to work
- It can be based on a theory, literature, or someone else's work
- Timing is important
- Qualitative Vs Quantitative
- Often involves human – ethics approval
- Does not require a lot of money

Engaging in Engineering Education Research – Need to do

- Research Questions? What, why, how?
- Ethical Approval
- Identifying research grants

Education Research Grants

External

- GRF
- ESRC-RGC
- Education Bureau EDB
- Quality Education Fund

Internal

- Teaching Development Grant
- Leung Kau Kui/Run Run Shaw Research and Teaching Endowment Fund
- Social Science/Education Related Grant

Examples:

- Dr. Scott Smith: employing case studies for large class teaching
- Dr. KW Chan, Anderson Shum, Michael Chen: innovative first year projects to engage students in mechanical engineering
- Dr. Vincent Tam: using diff. forms of MCQs for active teaching
- Dr. Wilton Fok: Virtual laboratory and assessment in experiential learning
- Dr. Alfred Yu: Transferable Skills
- Dr. Henry Lau: interviewed his PBL approaches

Engineering Education Journals

- Journal of Engineering Education (AJEE)
- European Journal of Engineering Education (EJEE)
- International Journal of Continuing Engineering Education and Life-Long Learning (IJCEELL)
- International Journal of Electrical Engineering Education
- International Journal of Engineering Education
- Journal of the Higher Education Academy Engineering Subject Centre
- Journal of Professional Issues in Engineering Education and Practice

Going Forward

- 15 members in HKU + some external
- Roundtable Discussion on diff. engineering education areas
- Set up a website with engineering education information
- Build a collaborative community
- Free Research Assistant and Advice
- Set up a teaching portfolio

In order to motivate our student,
we need to motivate ourselves first

Students are the seeds of today and are
the crops of the future

Thought of the Day

Try to improve one teaching
method a year

Answer to the riddle

iRIDDLER.com

