# 01. General Concept of Educational Research

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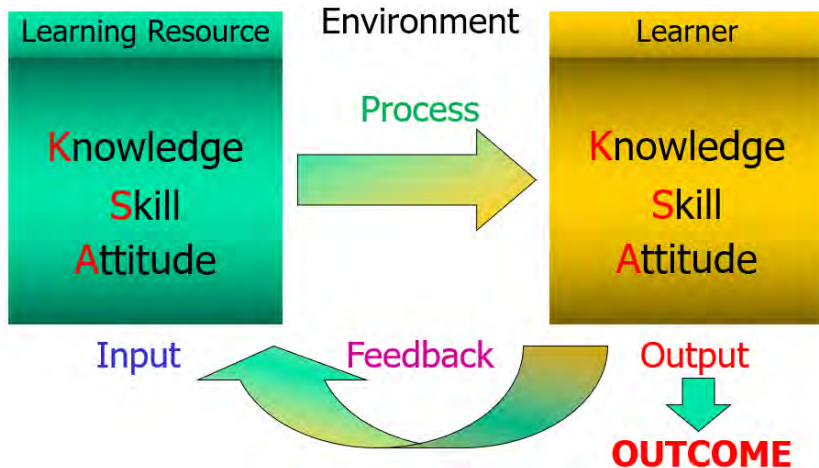


**รศ.ดร.นพ. ชัยเลิศ พิชิตพรชัย M.D., Ph.D.**

**ผู้อำนวยการ สถาบันนวัตกรรมการเรียนรู้**

**มหาวิทยาลัยมหิดล**

https://il.mahidol.ac.th

# H.R.H. Prince Mahidol of Songkla

*True success is not in the <span style="color:red">learning</span>,*

*but in its <span style="color:red">application</span>*

*to the <span style="color:red">benefit of mankind</span>.*

# Quick survey...

- https:

Q1: ท่านทราบเกี่ยวกับ Bloom's Taxonomy มากน้อยเพียงใด

Q2: ทักษะการคิดคำนวณ จัดเป็น domain ใดของ Bloom's Taxonomy

Q3: "หลังการศึกษา ผู้เรียนเข้าใจวิธีผ่าตัดไส้ติ่งอักเสบ" เป็นการเขียน Learning Outcome รายชั่วโมงที่ถูกต้อง
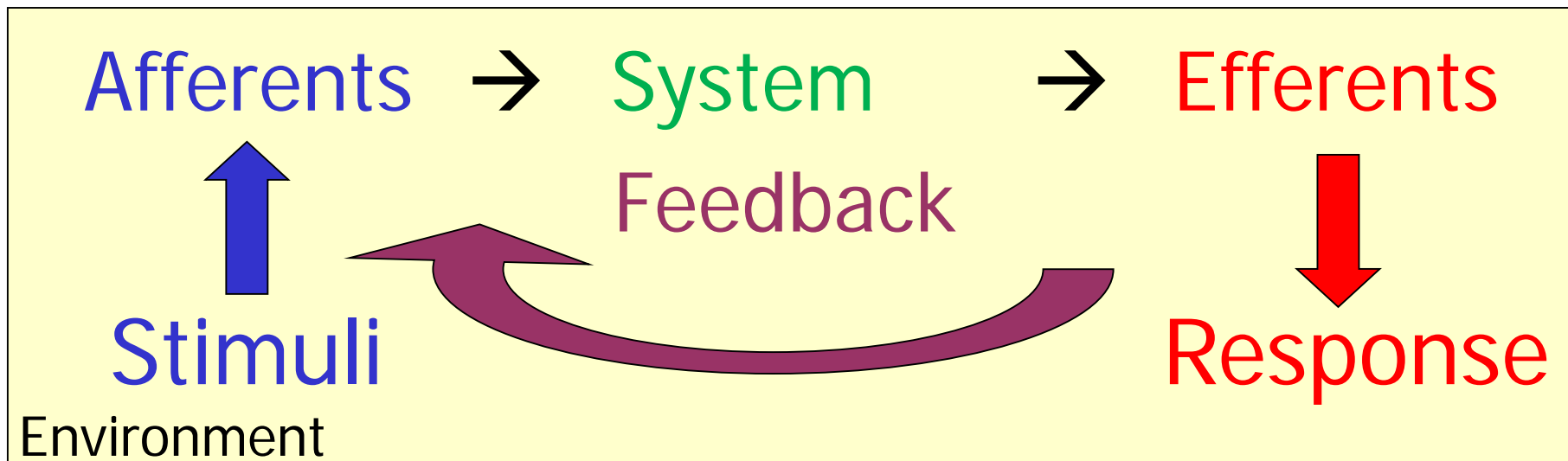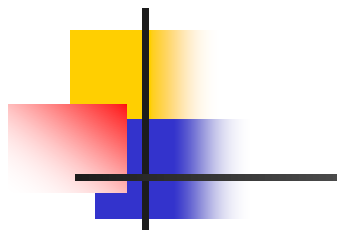
Q4: ท่านอยากทราบเกี่ยวกับเรื่องใด

# What to cover...

1. System Concept & Physiology of Learning
2. Learning vs Education
3. Education Concept
4. Revised Bloom's Taxonomy
5. Educational Research

# 1. System Concept & Physiology
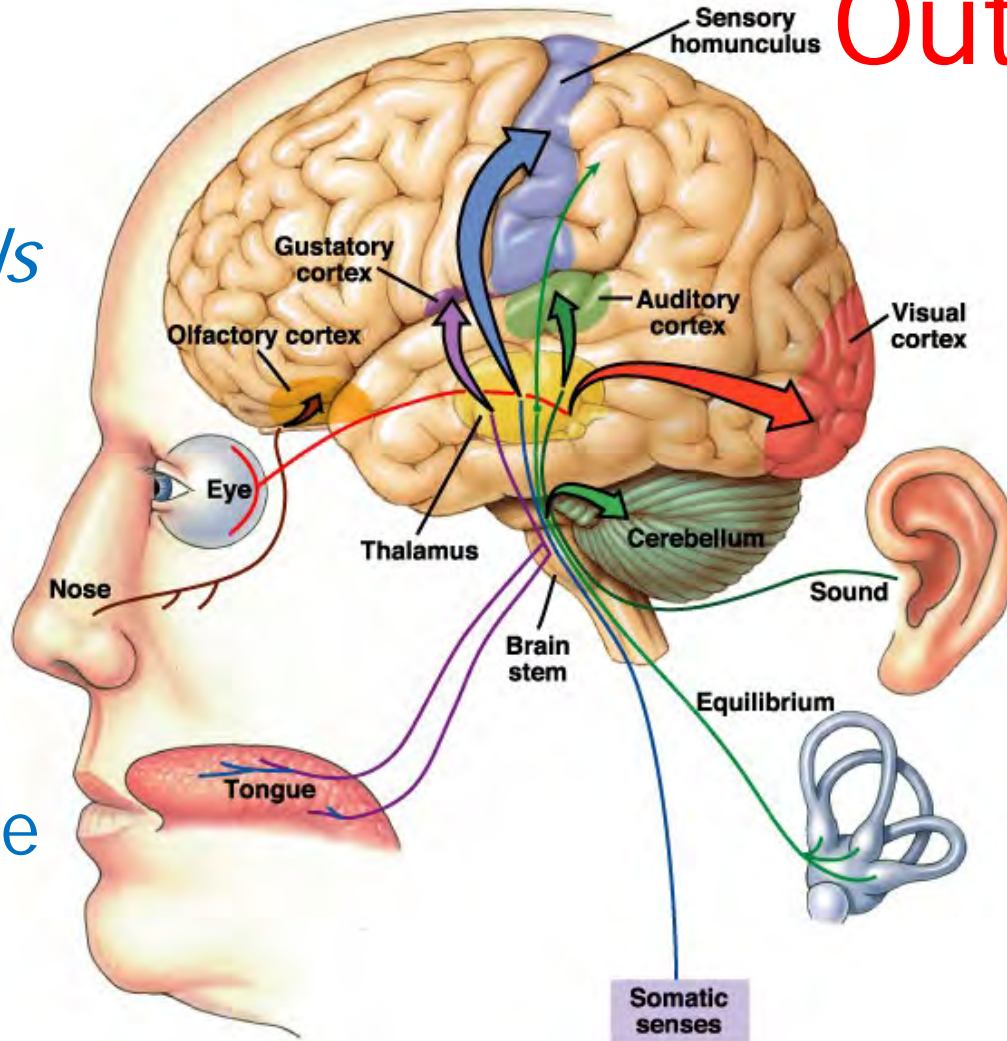
Input  →  Process  →  Output

Feedback

Environment

Afferents  →  System  →  Efferents

Feedback

Stimuli

Response

Environment

# Input → Process → Output & Outcome

*Observation tools*

1. Eye

2. Ear

3. Nose

4. Tongue

5. Skin

Chailerd Pichitpornchai, MD, PhD.   Institute for Innovative Learning, Mahidol University.

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# Input – Sensory perception

## Process

## Brain & Mind

## Output

## Feedback

Muscles

Learning & Memory

Feeling & Emotion

Belief & Behavior

Motor cortex

Premotor cortex (dorsal)

Superior temporal gyrus/auditory cortex

Frontal cortex

Premotor cortex (ventral)

Ear

Sound

Nature Reviews | Neuroscience
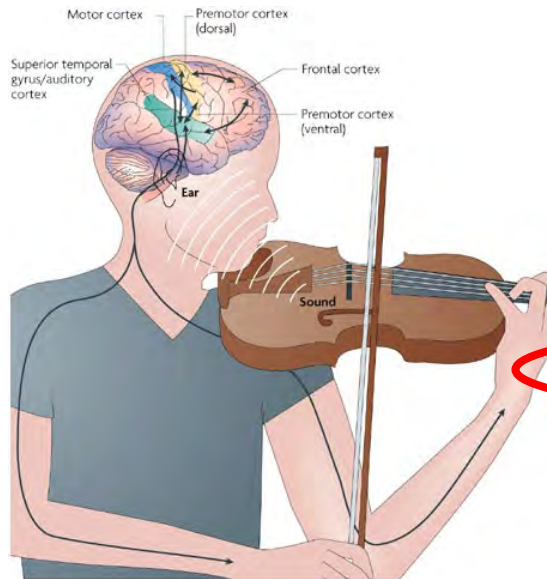
# 2. Learning vs Education

- Learning refers to an intellectual process of acquiring new skills and knowledge, through experience, study or teaching.

- Education is an enlightening process of receiving and providing knowledge, through systematic instruction.

# What is "Learning" ?

- Processes include (C. Pichitpornchai)

I      1. Input DIK (via sensory perceptions)

P          → Brain (recognize, think, analyze, synthesize,.. )

O      2. Practice (motor system)

P & F  3. Monitored by brain & mind

Outcome    → Apply for the benefit of mankind

https://il.mahidol.ac.th/th/i-Learning-Clinic/general-articles/นวัตกรรมการเรียนรู้คือ/

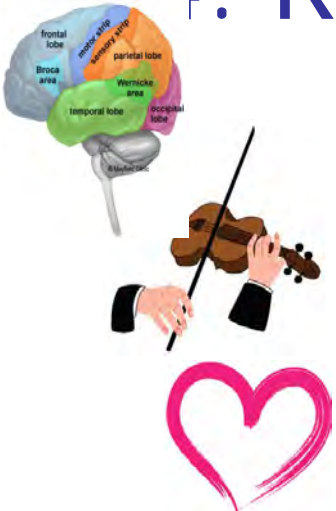# 3. Education Concept

1. Objective: Learning Outcome
2. Learning process: Teaching & Learning
3. Evaluation: Formative, Summative

# 4. Revised Bloom's Taxonomy
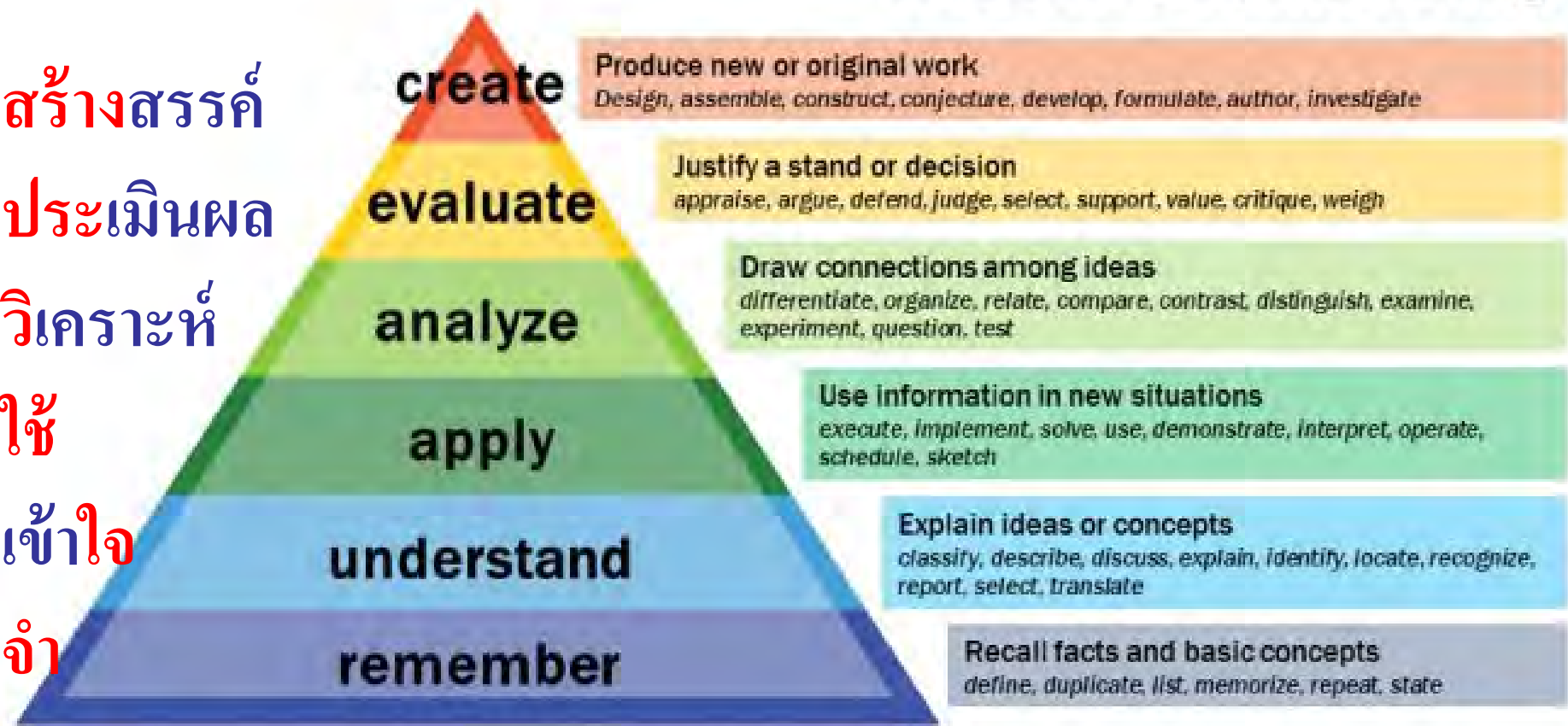
1. Cognitive Domain (Knowledge): Head
2. Psychomotor Domain (Skill): Hand
3. Affective Domain (Attitude): Heart

# *4.1 Cognitive Domain*

**Bloom's Taxonomy**

สร้างสรรค์

ประเมินผล

วิเคราะห์

ใช้

เข้าใจ

จำ



**create**
Produce new or original work
*Design, assemble, construct, conjecture, develop, formulate, author, investigate*

**evaluate**
Justify a stand or decision
*appraise, argue, defend, judge, select, support, value, critique, weigh*

**analyze**
Draw connections among ideas
*differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test*

**apply**
Use information in new situations
*execute, implement, solve, use, demonstrate, interpret, operate, schedule, sketch*

**understand**
Explain ideas or concepts
*classify, describe, discuss, explain, identify, locate, recognize, report, select, translate*

**remember**
Recall facts and basic concepts
*define, duplicate, list, memorize, repeat, state*

Vanderbilt University Center for Teaching

https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/

# Bloom's revised taxonomy
## with matched sample verbs, learning outcomes and assessment tasks

| Taxonomy[1] | Example Active Verbs[2345] | Example Unit of Study Learning Outcomes | Example Assessment Tasks |
|---|---|---|---|
| **Create**<br><br>Putting elements together to form a novel, coherent whole or make an original product | Create, generate, plan, produce, invent, imagine, frame, fabricate, develop, design, devise, initiate, craft, build, construct, set up, compose, write, argue, teach, theorise | Argue for reform of selected areas of criminal procedure.<br><br>Design new products according to the conditions of minimal environmental cost. | Model or product, editorial, portfolio, performance test, presentation, poster, project, design plan, business plan, treatment plan, exhibition, simulation, game, website, audio and/or video-taped interview, video, position paper, conference paper, letter to the editor, letter to client, reflective journal, report |
| **Evaluate**<br><br>Making judgments based on criteria and standards | Evaluate, check, critique, value, appraise, assess, judge, rank, rate, gauge, estimate, approximate, calculate, compute, quantify, determine, ascertain, weigh, measure, review, justify, predict, decide | Assess the resources needed for an interactive digital media project.<br><br>Evaluate different theoretical approaches in the study of personality. | Essay, report, letter of advice, presentation, briefing paper, article or book review, literature review, article for foreign newspaper or magazine, reflective journal, written exam[†] |
| **Analyse**<br><br>Breaking material into its constituent parts and detecting how the parts relate to one another and to an overall structure or purpose | Analyse, differentiate, organise, attribute, separate, dissect, examine, investigate, study, critique, estimate, test, diagnose, explore, consider, distinguish, compare, contrast | Analyse risk management strategies for investment decisions.<br><br>Examine regional identities within the Sydney basin from 1788 to the present. | Essay, literature review, problem scenario analysis, group work report, work-based problem analysis, critical incident analysis, committee inquiry report, case study report, reflective journal, written exam[†] |
| **Apply**<br><br>Carrying out or using a procedure in a given situation | Apply, perform, execute, implement, use, utilise, employ, operate, exercise, practise, solve, carry out, verify, conduct | Apply ethical frameworks associated with the provision of holistic nursing care.<br><br>Carry out the basic experimental procedures of DNA cloning. | Performance test, direct observation, clinical assessment, mini practical, employer's report, case study report, lab or field report, illustrated manual, simulated interview, audio and/or video-taped interview, video, debate, role play, moot trial, viva, written exam[†] |
| **Understand**<br><br>Determining the meaning of instructional messages, including oral, written, and graphic communication | Interpret, exemplify, classify, summarise, infer, compare, explain, perceive, discern, deduce, relate, conclude, describe, define, outline, discuss, illustrate | Explain how strategic cost management can be used in the creation of competitive advantage.<br><br>Describe the ways in which gene expression is regulated in both prokaryotes and eukaryotes. | Essay, report, presentation, poster, project, annotated bibliography, glossary, encyclopaedia entry, written exam[†], multiple-choice questions |
| **Remember**<br><br>Retrieving relevant knowledge from memory | Recognise, recall, memorise, list, name, recite, identify, label, select, state, organise | Identify the major organs of the immune system.<br><br>Recognise architectural technical drafting symbols. | Multiple-choice exam, true-false questions, short answer questions, matching task |

† May include short answer and essay type questions.
1 Source: Krathwohl, D. R. (2002). A revision of Bloom's taxonomy: An overview. *Theory into Practice*, 41(4), 212-218.
2 Ibid.
3 Urdang, L. (1991). The Oxford thesaurus. Oxford: Clarendon Press.
4 (n.d.). Roget's II: The new thesaurus. Third Edition. Retrieved 4 May, 2008, from Thesaurus.com website: http://thesaurus.reference.com/browse/apply
5 Microsoft® Office Word 2003 thesaurus.

# *4.2 Psychomotor Domain*

- Dave's Psychomotor Domain Taxonomy

5. Naturalization: Automate & become expert

4. Articulation: Combine & integrate related skills

3. Precision: Develop precision

2. Manipulation: Follow the instruction

1. Imitation: Copy

Dave, R.H. (1970). Psychomotor levels in Developing and Writing Behavioral Objectives, pp.20 21. R.J. Armstrong, ed. Tucson, Arizona: Educational Innovators Press.

# *4.2 Psychomotor Domain (2)*

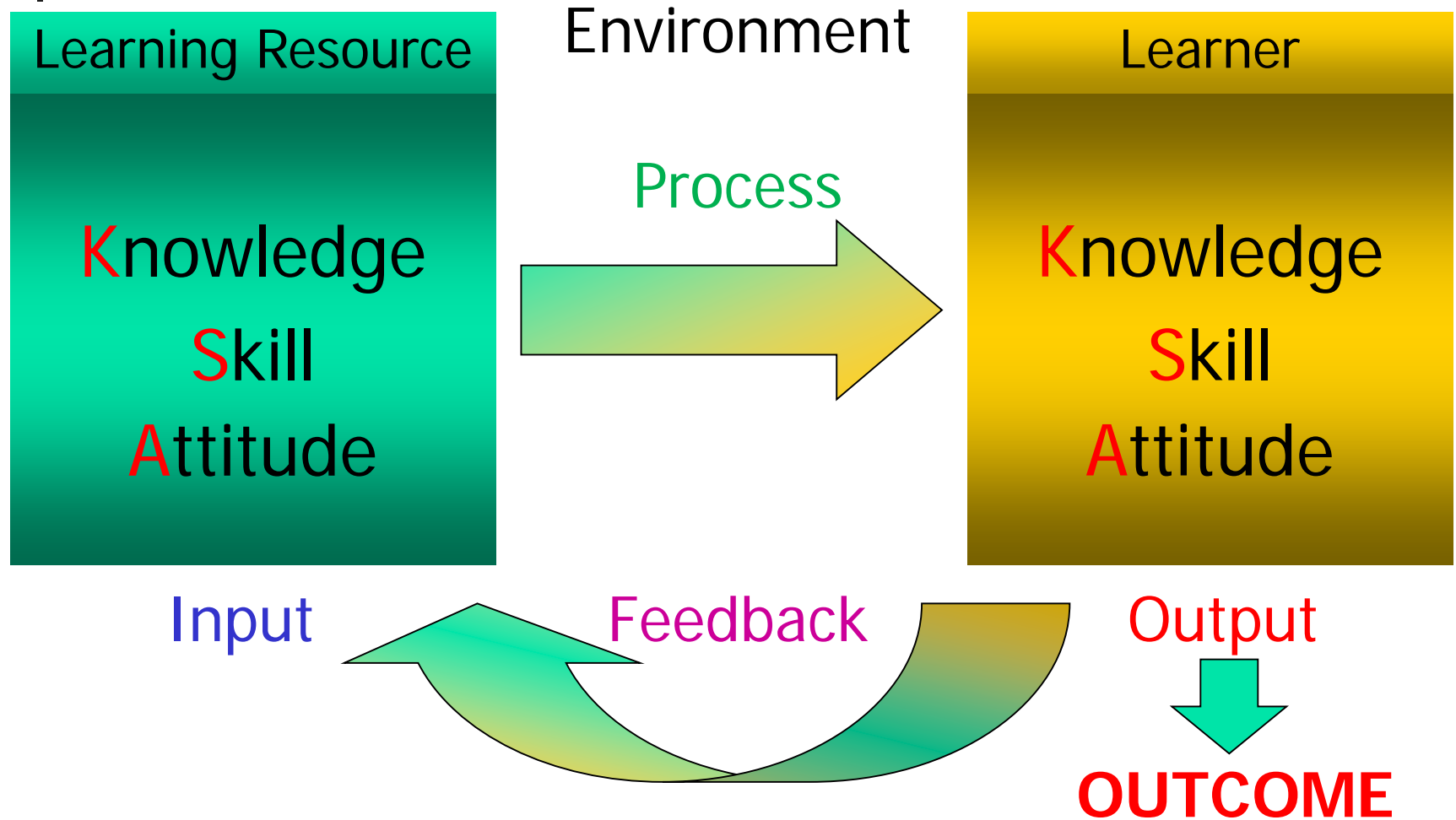| Category | Behavioral Description |
|---|---|
| 5. Naturalization | High level of performance achieved with actions becoming second nature |
| 4. Articulate | Several skills can be performed together in a harmonious way |
| 3. Precision | Performance becomes more exact, and action are more precise |
| 2. Manipulate | Actions performed through memorization or following directions |
| 1. Imitate | Learning by watching and imitating actions |

Dave, R.H. (1970). Psychomotor levels in Developing and Writing Behavioral Objectives, pp.20 21. R.J. Armstrong, ed. Tucson, Arizona: Educational Innovators Press.

# *4.3 Affective Domain*

| Category | Behavioral Description |
|---|---|
| 5. Characterizing | Act consistently in accordance with the values you have internalized |
| 4. Organizing | Put together different values, information, and ideas then relate them to already held beliefs to create your own unique value system |
| 3. Valuing | Able to see the value or worth of something and express it |
| 2. Responding | Actively participating in learning process. You are not only aware of a stimulus, but reacting to it in some way |
| 1. Receiving | Involve passively paying attention and being aware of the existence of certain ideas, material, or phenomena |

https://thepeakperformancecenter.com/educational-learning/learning/process/domains-of-learning/affective-domain/
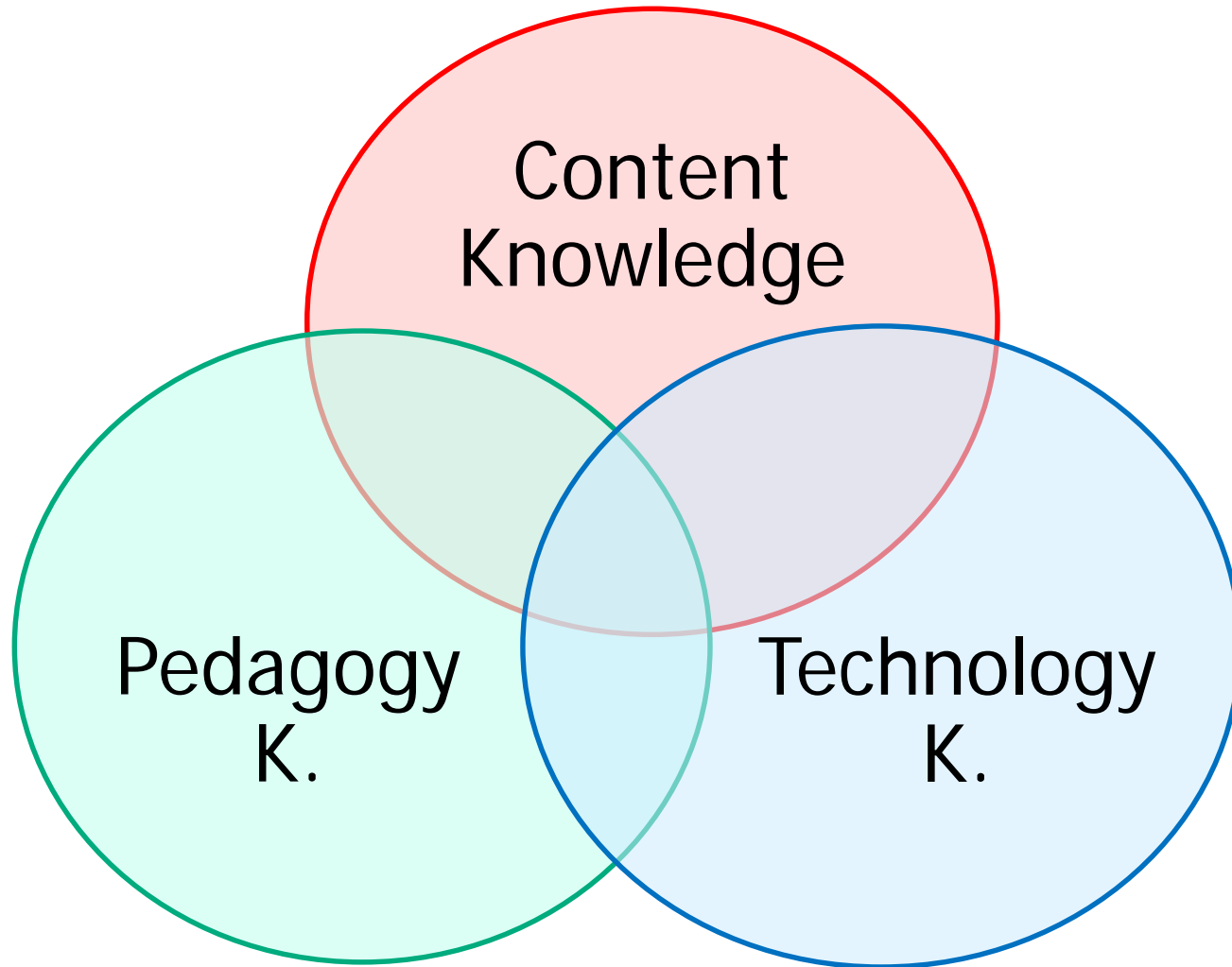
# 5. Educational Research

- Systematic collection and analysis of data related to the field of education.

- It may involve a variety of methods and various aspects of education including student learning, teaching methods, teacher training, classroom dynamics, etc.

https://en.wikipedia.org/wiki/Educational_research

# Teaching & Learning Components

| Learning Resource | Environment | Learner |
| --- | --- | --- |
| Knowledge Skill Attitude | Process → | Knowledge Skill Attitude |

Input        Feedback        Output

OUTCOME

# TPACK: Technology Integration Framework

# Q5:

- What are your problems regarding teaching and learning?
- Research Question

# Education (Research)

- Curriculum/Program (PLO)
  - Course (CLO)
- Teacher → Pedagogy, Classroom Management
- Learner → How to learn
- Teaching & Learning Materials & Technology
- Evaluation Methods
- Faculties & Staff Development

# Teaching & Learning Processes

1. Traditional Lecture
2. Active Lecture
3. Story Telling
4. Question & Answer
5. Buzz Group
6. Group Discussion
7. Brain Storming
8. Role Play
9. Flip Classroom

10. Multimedia/Web – AV, AR
11. Problem-Based
12. Project-Based
13. Team-Based
14. Demonstration
15. Experiment
16. Field Trip / Experience
17. Learning by Teaching
18. etc.

# Education Research's Aims

Aims at building on existing knowledge and understanding of learning and education by

- Studying phenomenon, interaction, interventions

- Formulating models, theories and predictions

- Studying what works, why, how and for whom

# Educational Research is…

- Seeking to deepen the knowledge and understanding of learning & teaching
- The process of
  - Transforming ideas and problems into researchable questions
  - Choosing a research approach

# Transforming ideas to...

- To get from ideas or problems
  to research questions
    - Have a conceptual, theoretical framework
    - What is already known
    - What needs to be investigated further
  - → Research questions
  - → Research methodology

# About the speaker

Assoc.Prof.Dr. Chailerd Pichitpornchai
M.D., Ph.D.

1. Director, Institute for Innovative Learning
2. Dept. of Physiology, Fac. of Medicine Siriraj Hospital
   Mahidol University

Mobile:      086-363-1539
Email:       Chailerd.Pic@mahidol.edu
             Chailerd@gmail.com