TEACHING PHARMACOLOGY

Yesterday, Today and Tomorrow

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Professor (Emeritus) Medicine
BHSc(Hons) Program
McMaster University

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SOCIETAT CATALANA DE FARMACOLOGIA

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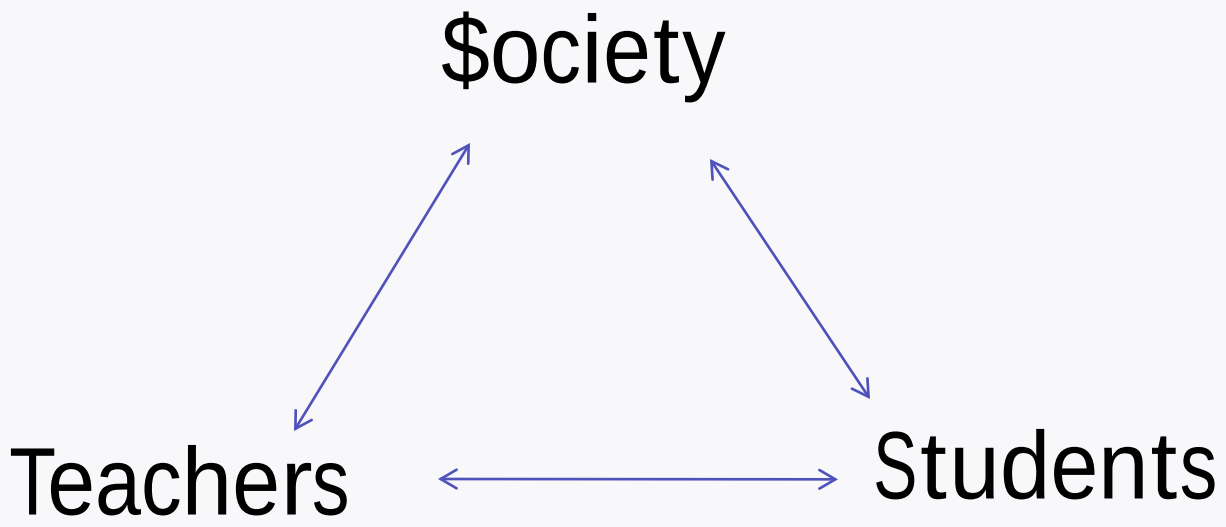
The Educational Enterprise



SOFIA LOREN * MARCELLO MASTROIANNI

EN UN FILM DE VITTORIO DE SICA

PRODUCIDA POR CARLO PONTI

OSCAR DE HOLLYWOOD A LA MEJOR PELICULA

ayer, hoy y mañana

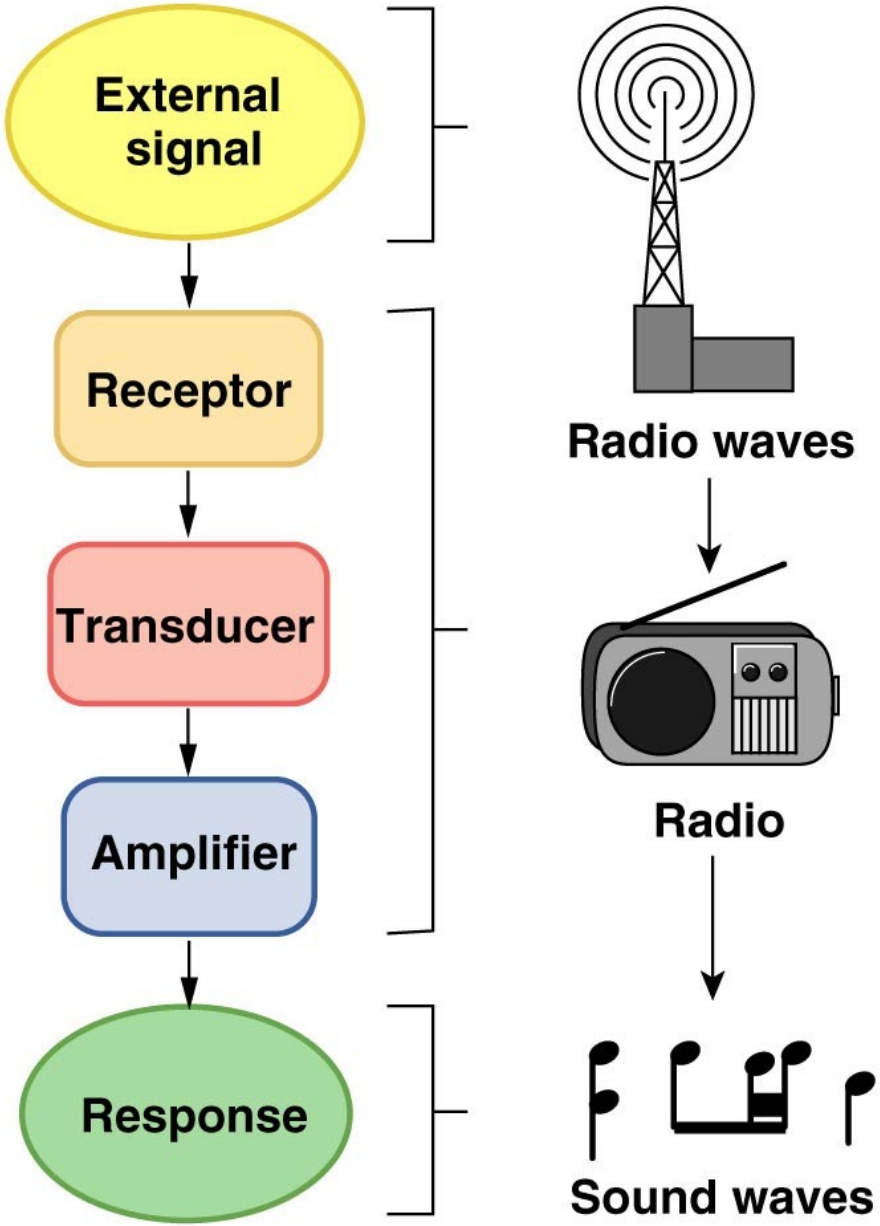
eastmancolor

INFORMATION EXPLOSION

- Goodman and Gilman's Textbook
- First edition (1941) : 2 authors, 1325 pages
- 12th edition (2011): 122 authors, 1990 pages

“The world is too much with us; late and soon---”

Signal transduction converts one form of signal into a different form.



Linking Teaching to Cell Signaling

SENDER (TEACHER)

MESSAGES (CONTENT)

DELIVERY (TEACHING METHODS)

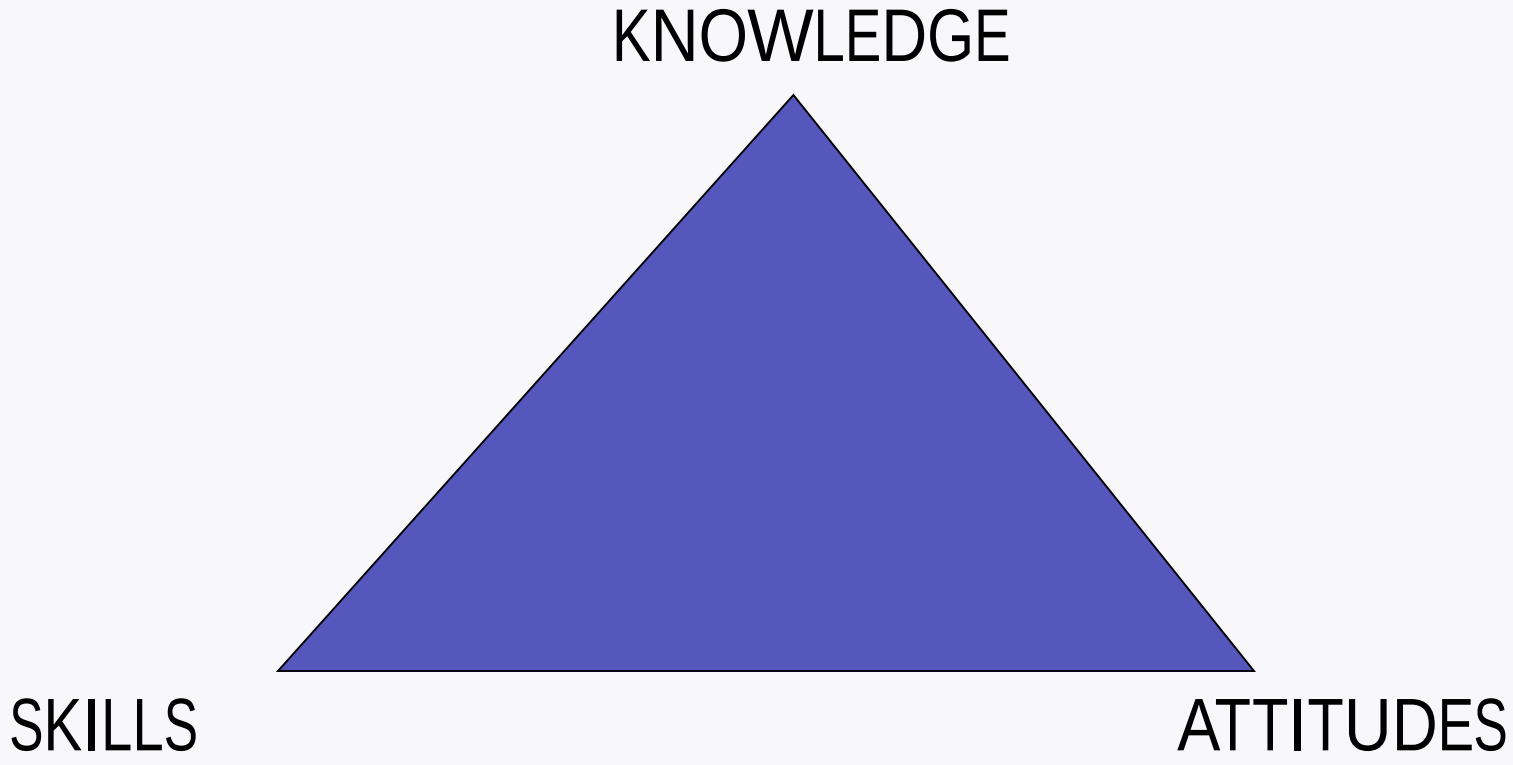
RECEPTION (STUDENTS)

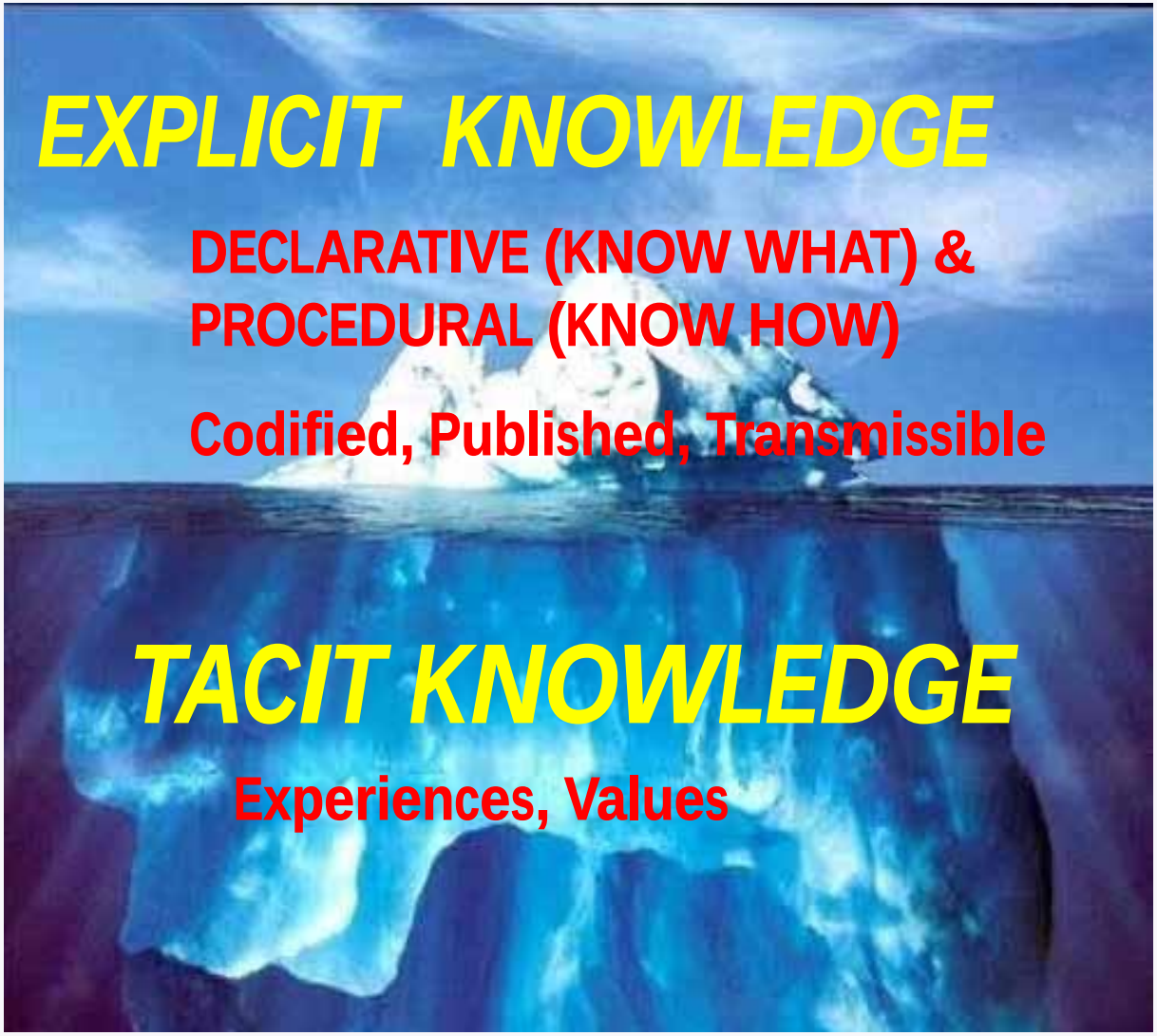
- RECOGNITION (DISCRIMINATION)
- TRANSDUCTION
- AMPLIFICATION

THE EXTERNAL SIGNAL

The messages to be sent
Or What do we want students learn?

COURSE DESIGN: OBJECTIVES




EXPLICIT KNOWLEDGE
DECLARATIVE (KNOW WHAT) &
PROCEDURAL (KNOW HOW)
Codified, Published, Transmissible
TACIT KNOWLEDGE
Experiences, Values

From Goodman and Gilman's TEXTBOOK

"The subject of pharmacology is a broad one and embraces the knowledge of the source, physical and chemical properties, compounding, physiological actions, absorption, fate, and excretion, and therapeutic uses of drugs. A *drug* may be broadly defined as any chemical agent that affects living protoplasm, and few substances would escape inclusion by this definition."

FIRST EDITION 1941

"These two sentences still serve us well. This first section of the 12th edition of this textbook provides the underpinnings for these definitions by exploring the processes of drug invention and development into a therapeutic entity, followed by the basic properties of the interactions between the drug and biological systems"

12Th EDITION, 2011

From Discovery to Invention

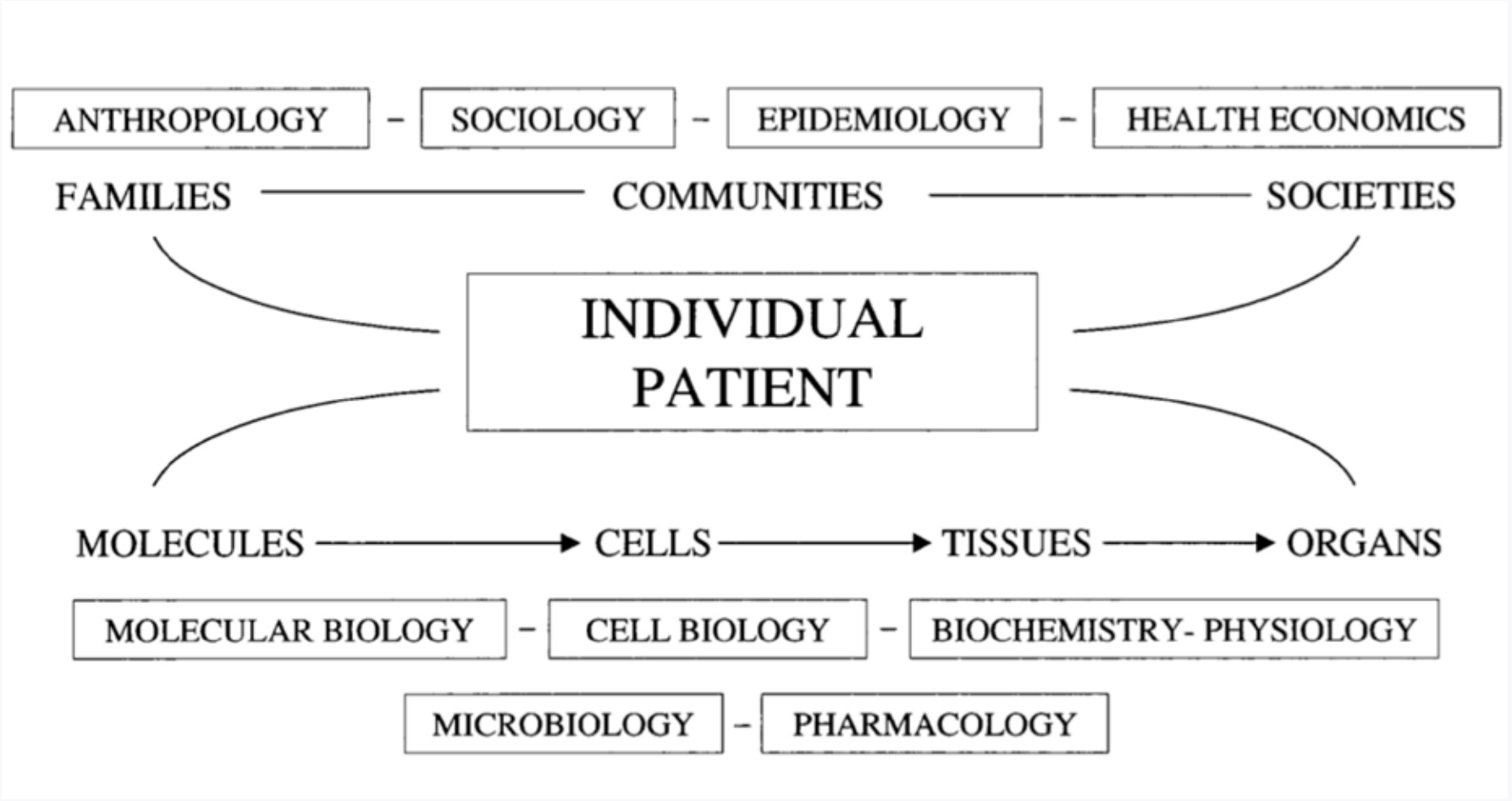
"We intentionally use the term *invention* to describe the process by which a new drug is identified and brought to medical practice, rather than the more conventional term *discovery…..* In the past, drugs were discovered as natural products and used as such. Today, useful drugs are rarely discovered hiding somewhere waiting to be found; rather, they are sculpted and brought into being based on experimentation and optimization of many independent properties. The term *invention* emphasizes this process; there is little serendipity."

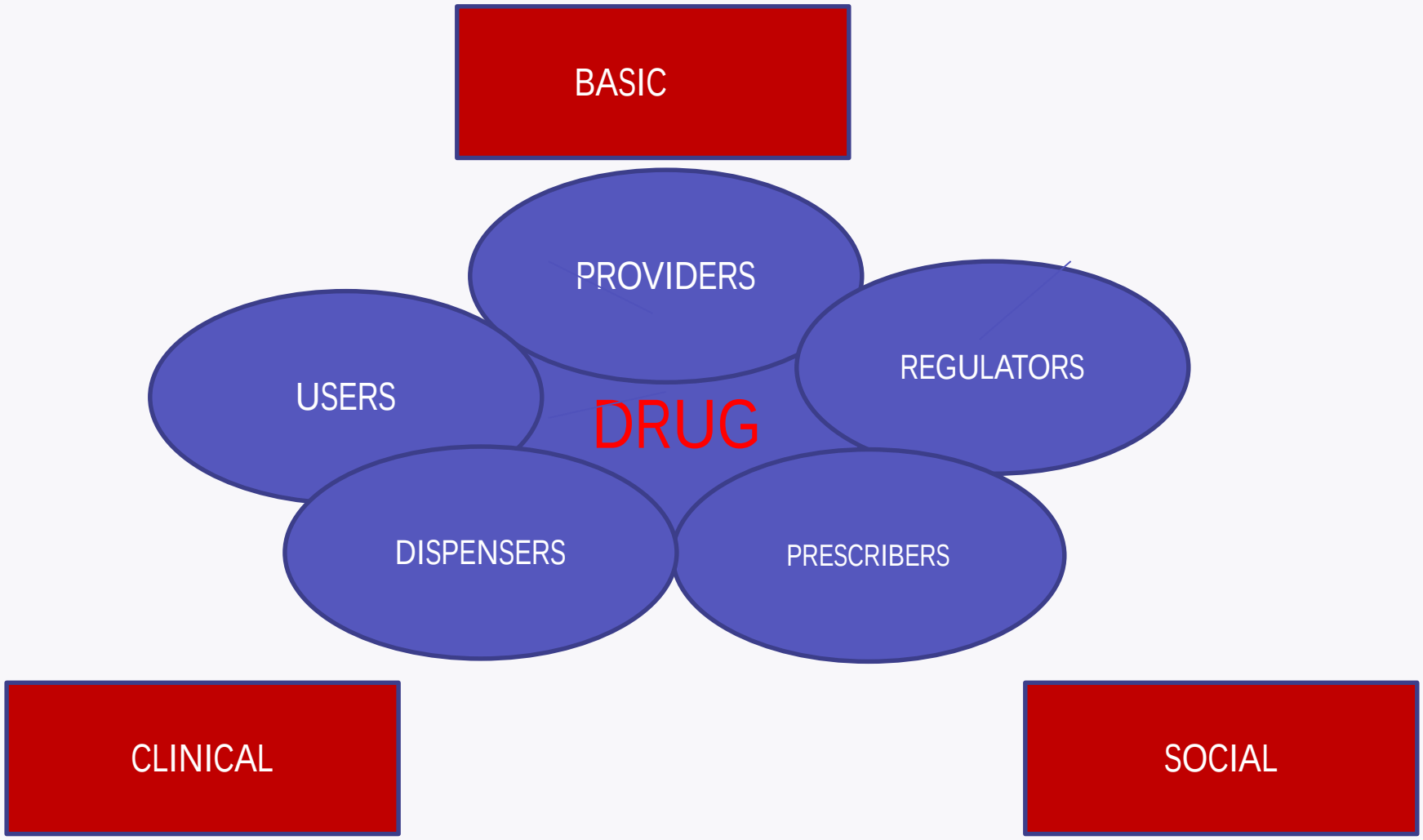
12Th EDITION, 2011

Generic Issues

- Discovery/ Invention
- Approval
- Formulation
- ADME
- Dose -response relations
- Efficacy/Effectiveness
- Social Issues

Tween Two Worlds




BASIC
PROVIDERS
USERS
REGULATORS
DRUG
DISPENSERS
PRESCRIBERS
CLINICAL
SOCIAL

The Messages

DOMAIN	ELEMENTS
KNOWLEDGE	Core Concepts/Essential facts/Techniques used to gather information/Assumptions/Sources of error
SKILLS	Information gathering/Critical analysis/Communication skills/Abilities to work independently & with others/Self-Assessment
ATTITUDES	Willingness to : learn/unlearn/admit ignorance/take on responsibility Enthusiasm/Irreverence/Flexibility Humility

INFORMATION LITERACY

How We Teach

Adv Physiol Educ 31: 176–179, 2007;
doi:10.1152/advan.00092.2006.

Information literacy in an inquiry course for first-year science undergraduates: a simplified 3C approach

P. K. Rangachari[1] and Usha Rangachari[2]

[1]*Bachelor of Health Sciences (Honours) Programme, Faculty of Health Sciences, and* [2]*Population Health Research Institute, Hamilton Health Sciences, McMaster University, Hamilton, Ontario, Canada*

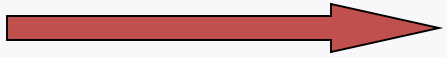
Submitted 30 August 2006; accepted in final form 20 December 2006

The Teacher

DOMAIN	ELEMENTS
KNOWLEDGE	Depth /Perspective
SKILLS	Communication/Giving clear consistent feedback/Stimulating
ATTITUDES	Willingness to teach/Enthusiasm/High Expectations/ Open to diverse ways of learning/Flexible

SENDING THE MESSAGE: DELIVERY

Shifting the Locus of Control

Teacher  Student

Foster ACTIVE learning

Active Learning: Not a New Concept at All

- Purkyne
- Henle
- Ludwig

- “The German Disease” moved from continental Europe to England and the US

APPROACHES

LABORATORIES (Real or Virtual)

INQUIRY-BASED APPROACHES (Face-to-Face/Virtual/Blended)

- PBL (Problem-Based Learning)
- POGIL (Process-Oriented Guided-Inquiry Learning)
- PLTL (Peer Led Team Learning)
- PEL (Provocation-Enhanced Learning)
- TBL (Team-Based Learning)

`When I use a word,' Humpty Dumpty said in rather a scornful tone, `it means just what I choose it to mean -- neither more nor less.'

CYOAL

Choose Your Own Acronym Learning

THE NARCISSISM of small DIFFERENCES

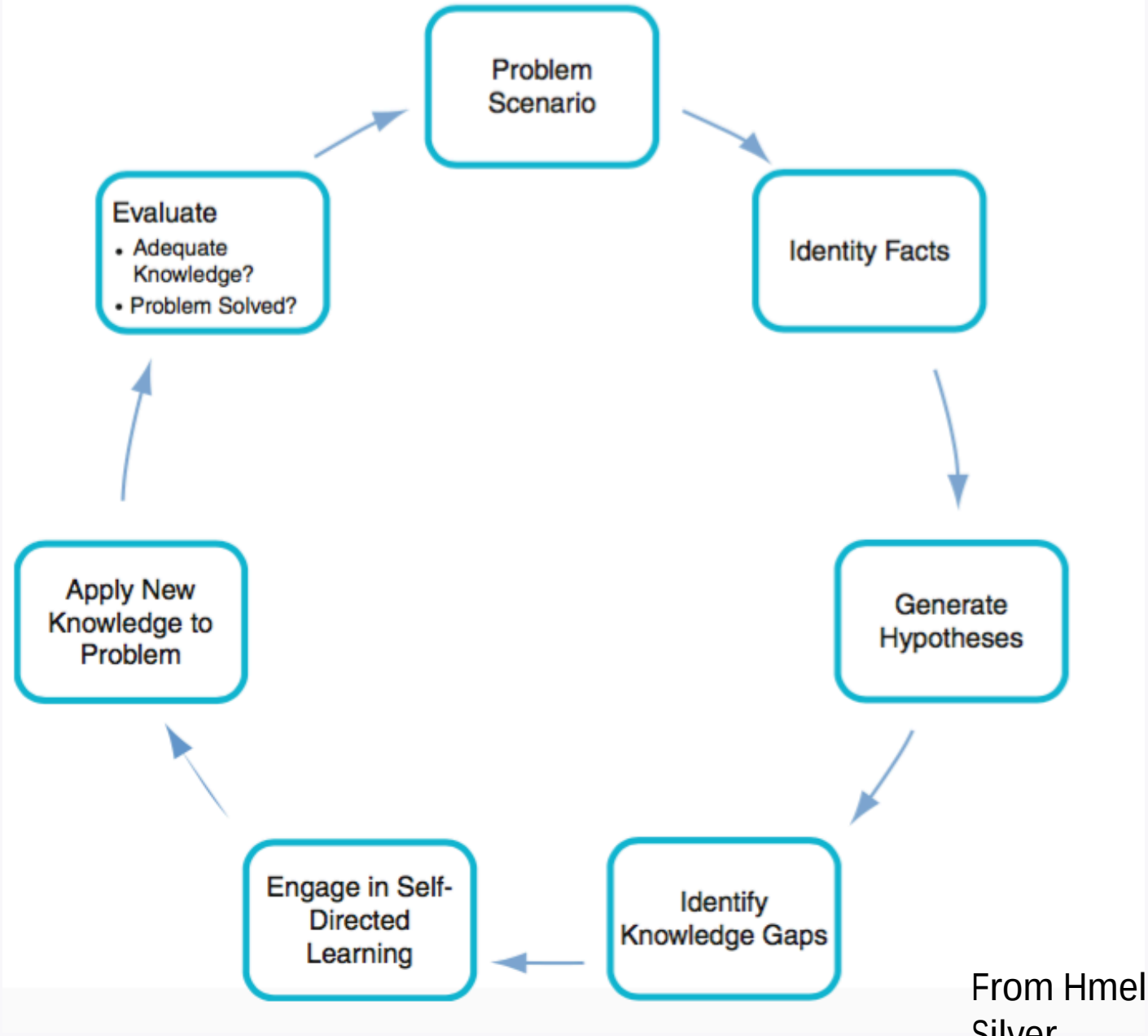
Problem-Based Learning (PBL)

ORIGINS– McMaster University MD Programme
Essentials

- Learning begins with a scenario/problem/case/data
- Situations spring-boards for learning
- Brainstorming to generate issues
- Framing of learning tasks

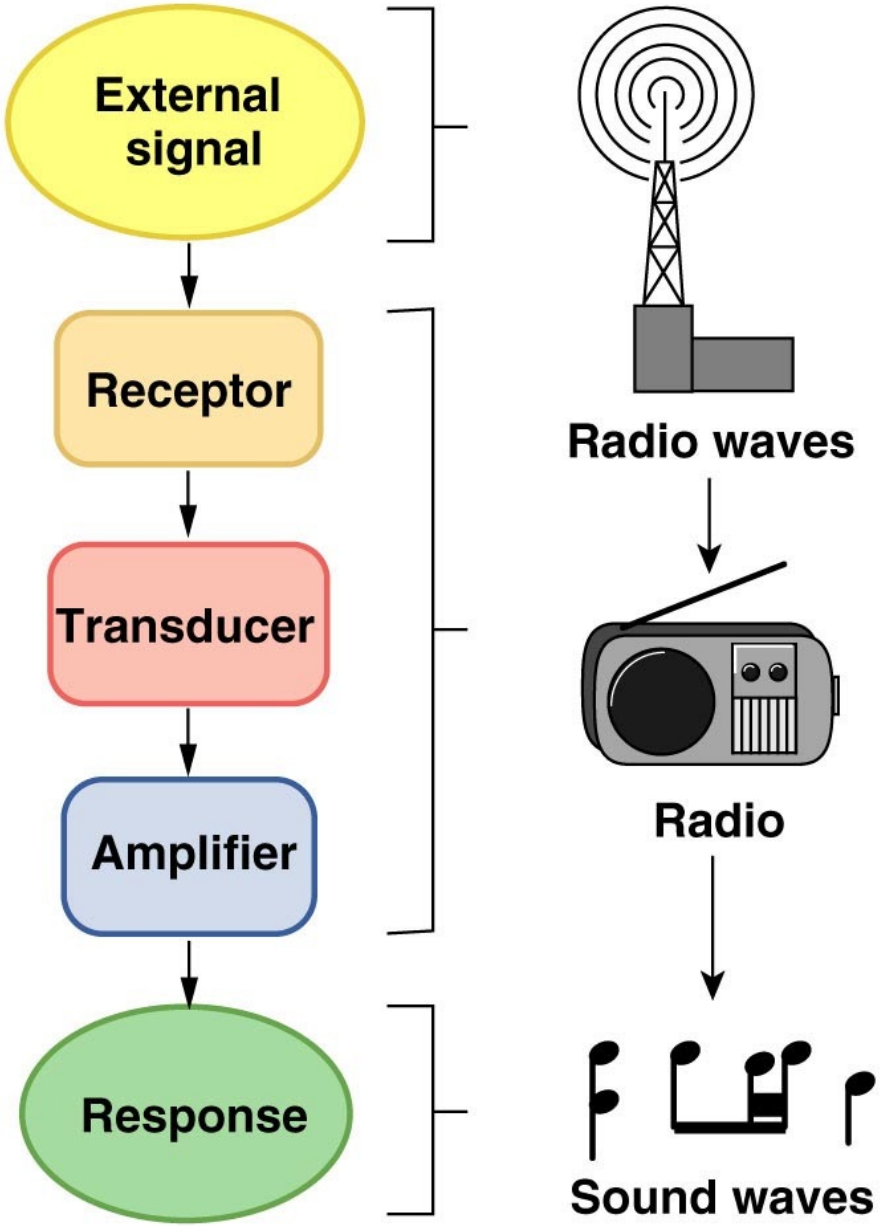
Information gathering

- Discussion
- Evaluation
- Contrary to subject based learning, material learned FROM
- the problem
- SMALL GROUPS NOT STRICTLY NECESSARY



From Hmelo-Silver

Signal transduction converts one form of signal into a different form.



The RECEIVER (Receptor)

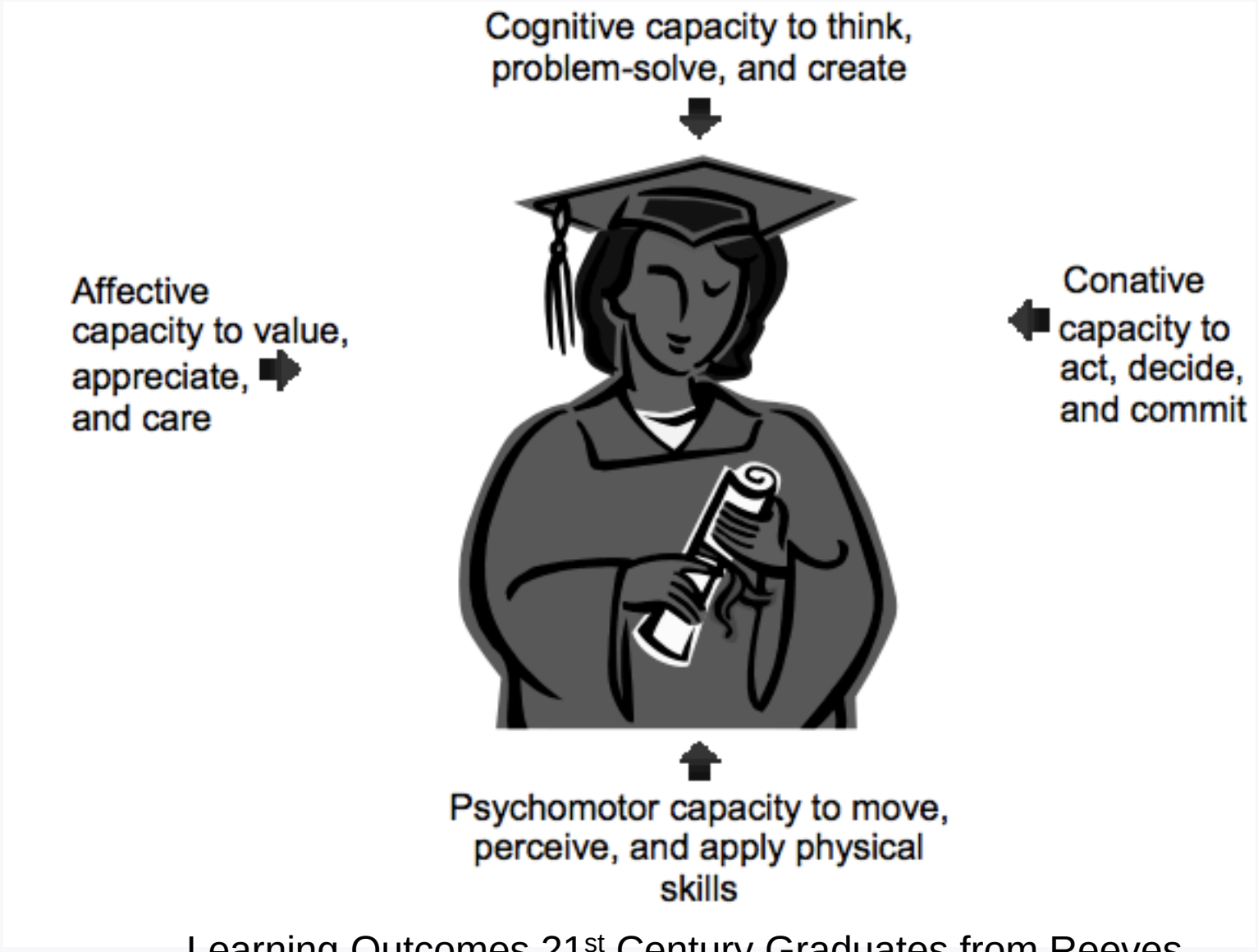
- Receptors sensitive to message
- Discriminate
- Transduce message
- Amplify
- Respond

The RECEIVER (STUDENT)

- Should be receptive (sensitive) to information
- Discriminate to focus on relevant information
- Amplify by adding more information
- Convert information into knowledge
- Types of learners
    - SUPERFICIAL
    - STRATEGIC
    - DEEP

Types of Learners

ITEMS	SUPERFICIAL	STRATEGIC	DEEP
OVERALL OBJECTIVES	Learn to pass	To get HIGH grades	To understand the material
APPROACHES	Memorize Concentrate on detail Stick to course requirements Do not learn beyond the material	Well organised Efficient Focus on past exams to prepare Alert to marking cues	Reads beyond the course material Question, argue See connections between present and past learning
DRIVING FORCES	Fear of failure	Fear of not getting high scores	Predominantly interest



Learning Outcomes 21st Century Graduates from Reeves (2006) Int. J. Learning Technology

GAUGING RESPONSES

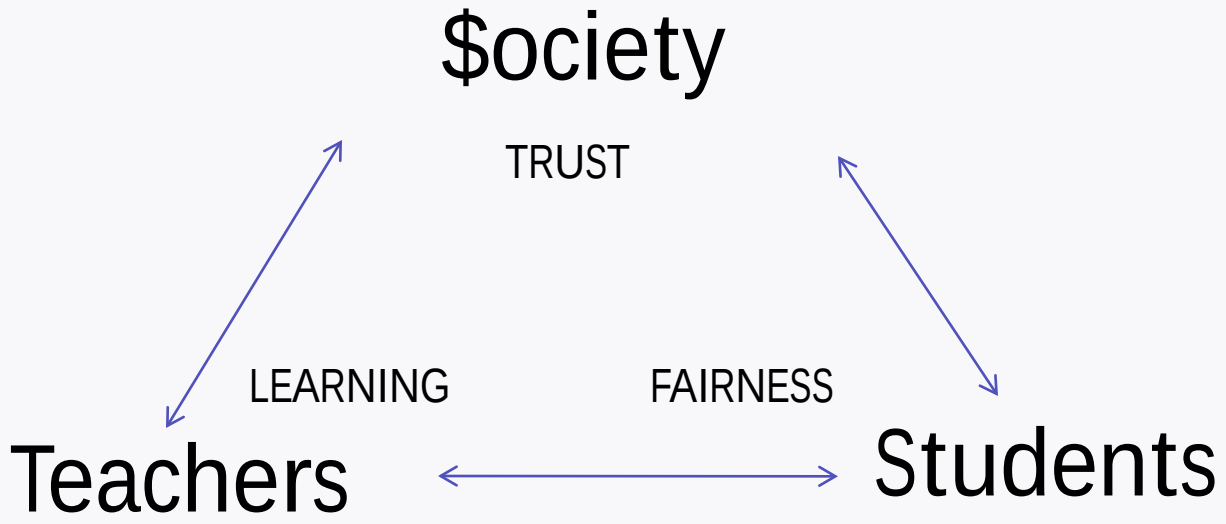
RECOGNITION OF SAME MOLECULE BY SIMILAR RECEPTORS LEAD TO DIFFERENT RESPONSES

Measured in Different WAYS

STUDENT RESPONSES TO LEARNING SITUATIONS

ASSESSED BY DIVERSE TECHNIQUES

EVALUATION



COURSE DESIGN: EVALUATION

The Thorniest Problem of All

EVALUATE – to determine the worth of

ASSESSMENT – gather evidence so that one can determine the worth of

EVALUATION IS **NEVER** NEUTRAL

WHAT IS VALUABLE DEPENDS ON CONTEXT

Evaluation

General Principles

1.Students must learn from the procedures

2. Students must be tested on their strengths as well as their weaknesses

3. Must be consonant with the goals of the program

EVALUATION

CATEGORY	FORMATS
Written	MCQs/Essays/Short-Answer
Faculty Observation	Observation/Standard Orals
Multisource	Self/Peer Assessments/Standardized Patients
Simulation	Computer-Assisted/Models
Multi-Competencies	OSCES/TRIPSES/TRIPLE JUMPS
Work Samples	Portfolios/Record Reviews

Kramer et al (2009) J. Dental Education 73 (1) p 14

Evaluation: The Teacher's Perspective

Have my student's learnt anything?

How far have the objectives of my course been met?

Can I distinguish one student from another?

Do my students find the course meets their needs?

Can the procedures used give any indication to others as to whether the students have accomplished anything?

Can the student performance give me pointers as to how I am teaching?

Evaluation –Student's View

Is the exam fair?

Does it really test what I have learned?

Does it give me a fair chance to show what I know/have learned?

Is it useful to me: i.e. does it make me learn things that would be useful later on?

Does it reward genuine effort or pure luck?

Were the expectations made clear to me?

Will the marks I get/comments help me improve?

IMPACT?

CONSEQUENTIAL VALIDITY

TEACHING- DIMENSIONS

- SUPERFICIAL – Teaching is a chore
- STRATEGIC – Teaching to the Test
- DEEP – Teaching so that learning really matters

DEEP TEACHING

- Fostering deep learning
- Two types of “knowledge”
  - Knowledge of the subject (disciplinary)
  - Knowledge of HOW to teach (Pedagogic Content Knowledge)
- Attitudes
- Skills
- Focus on Assessments


NURSES
PHYSICIANS
Health Economists
LAWYERS
DRUGS
JOURNALISTS
PHARMACISTS
POLICE
SALES REPS
REGULATORY

Adv Physiol Educ 31: 283–287, 2007;
doi:10.1152/advan.00053.2007.

Back to the future? Active learning of medical physiology in the 1900s

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BARRIERS – BACON'S IDOLS

The IDOLS of the TRIBE

inherent limitations of mind/senses

The IDOLS of the CAVE

blinkers , draw conclusions to fit prejudices

The IDOLS of the THEATRE

false notions defy questioning

The IDOLS of the MARKETPLACE

inappropriate usage of words/ideas

The Teacher's Role