

**Optimizing The Learning Environment:
Role Modeling, Compassion and the
Unwavering Commitment to Patient Care**

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“The Riddle”

“ The quest of every doctor in approaching serious disease is to make the diagnosis and design and carry out the specific cure. It is every doctor’s measure of his (her) own abilities; it is the most important ingredient in his (her) professional self-image”

Nuland. *How We Die*. (1994) p 248

Goal: Educate learner’s for expert practice



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Clinical Reasoning

“ Clinical cognition encompasses the range of strategies that clinicians use to generate, test, and verify diagnoses, to assess the benefits and risks of tests and treatments, and to judge the prognostic significance of the outcomes”

Kassirer Acad Med 2010; 85:1118-1124



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Clinical Diagnostic Reasoning Process

**Patient’s story
Data acquisition
Accurate problem representation
Generation of hypothesis
Clinical Reasoning Strategy
Diagnosis**

Bowen. NEJM 355:21 2217- 2223, 2006



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Clinical Diagnostic Reasoning Process

- **Problem representation – a concise conceptualization of the patient’s problem**
- **Generation of hypothesis – explanations of the patient’s problem, differential dx**
- **Reasoning and problem solving strategies are dependent on knowledge structures**



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Clinical Reasoning and Knowledge Structures

- **Clinical reasoning skills develop simultaneously with knowledge acquisition**
- **The development of expertise is more related to the structuring of knowledge than to expansion of knowledge**



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Clinical Reasoning and Knowledge Structures

- When learners are provided with a structure in which to organize new knowledge, they develop better clinical reasoning and problem solving skills

MAYO CLINIC 3254786-4

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Novice Knowledge Structures Causal Networks

Novices learn from books and class and have more biomedical than clinical knowledge

Novices' knowledge structures evolve

- Reduced – insufficient knowledge
- Dispersed – not organized
- Causal networks – prototypical, general pathophysiologic processes explain causes and consequences of diseases

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Novice Clinical Reasoning Hypothetico - Deductive

- Symptom driven – list of complaints
- List of possibilities – not differential dx
- Causal networks – prototypical, superficial
- One hypothesis tested at a time – inefficient
- Less plausible hypotheses – error prone
- Low expertise – novice, expert out of domain, uncertainty

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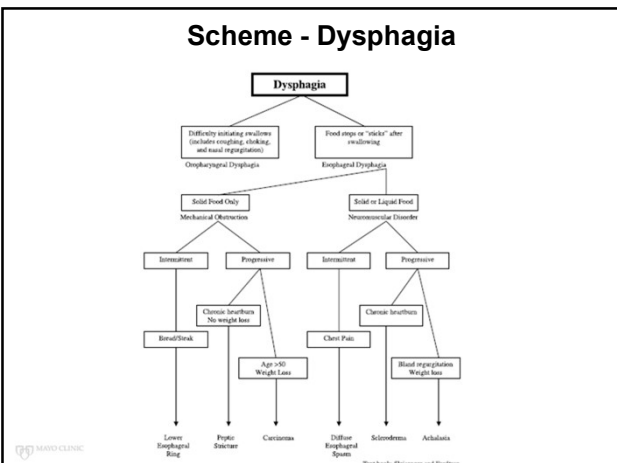
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Intermediate Knowledge Structures Schemes

- Scheme – a well organized, hierarchical knowledge structure developed by applying knowledge to perform a clinical task
- Schemes organize knowledge so we can interpret and respond logically to situations
- An algorithm – a goal directed structure for problem solving, diagnosis, treatment

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Intermediate Clinical Reasoning

- “Forward thinking” – logic to move through decision points and narrow possibilities
- Intermediate expertise, consistent, reliable
- Knowledge is integrated, encapsulated or subsumed in a simplified network
- An intermediate learner’s basic science knowledge may be superficial or inaccurate

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Expert Knowledge Structures

- Experts have a robust understanding of relevant basic sciences
- With many patient encounters, schemes are enriched with an understanding of varying manifestations and presentations of diseases



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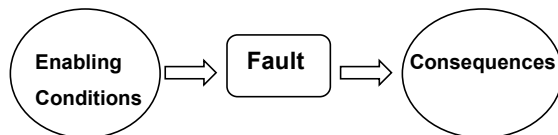
Expert Knowledge Structures Scripts

- Illness scripts – knowledge structures learned from experience used to organize knowledge and process information for clinical reasoning
- Instance scripts – individual patients remembered as elaborate set of specifics



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Illness Scripts



- Enabling conditions – risk factors that influence the probability that someone gets a disease - age, gender, medical history (predictors)
- Fault - functional disturbance (pathophysiology)
- Consequences – symptoms, clinical signs, complications, abnormal labs or imaging, functional disturbance



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Expertise and Illness Scripts

Illness scripts :

- Activated by memory association
- May operate beneath conscious awareness
- Mental models that a clinician compares with a patient's presentation until one fits
- If expected findings are present, the script is instantiated (verified or confirmed with supporting evidence)



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Expertise and Pattern Recognition

- Extensive experience leads to acquisition of a large repertoire of illness scripts and instance scripts
- Expertise permits problem representation and resolution by recognition of similarities to previous solutions
- Most effective and efficient strategy but is only available to experts in their domain



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Expertise and Illness Scripts

- The key difference between experts and non experts is that experts have extensively integrated enabling conditions into their illness scripts
- Integrating enabling conditions into illness scripts is a consequence of experience with real patients rather than becoming more knowledgeable

Cognition and Instruction

16(4): 367-398, 1998



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How can we facilitate the development of rigorous knowledge structures?

“Our major problem is not what to teach, it is how to teach it.”

Charles William Eliot
President, Harvard University 1869



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Learning and Context

“It is a safe rule to have no teaching without a patient as a text, and the best teaching is taught by the patient himself.”

Sir William Osler



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Patients as Cases

Patients or (Cases) are the “unit” of :

- Clinical work
- Clinical teaching
- Consultation
- Continuing education
- Clinical examinations
- Clinical memory – expertise

Cox. Med Ed 2001; 35, 862-866



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Case-based Teaching

Case-based teaching

- a meaningful problem
- that requires authentic action on the part of the learner
- in the process of understanding key concepts
- and resolving the problem.

Challenge learners with cases that explode the complexity of common illnesses

Integrate relevant basic sciences and societal and delivery system issues



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Intermediate Knowledge Structures Schemes

- History – What questions should you ask a patient with dyspnea? (pertinent + and -)
- Exam – What findings should you look for?
- Evaluation – What are likely explanations? How can we cost-effectively confirm or refute probable diagnoses
- Management – What initial measures are indicated?



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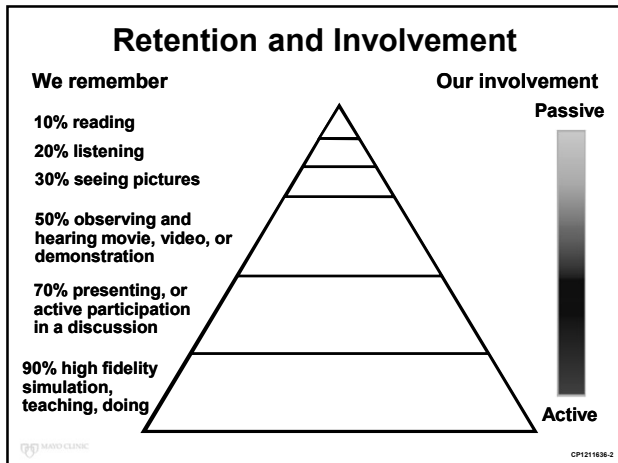
Goals of Learning

What do we want students to do with the knowledge, skills, and attitudes they learn?

- 1) Remember → Retention
- 2) Use to solve problems → Application
- 3) Apply in new situations → Transfer



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Active Learning

“Learning results from what the student does and thinks and only from what the student does and thinks. The teacher can advance learning only by influencing what the student does to learn”

Herbert A. Simon
1978 Nobel Prize in Economics
Carnegie Mellon University

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**“Tell me, and I will forget.
Show me, and I may remember.
Involve me, and I will understand.”**

Confucius 430 B.C.

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Student Centered Active Learning

“The process of building mental models of whatever is being learned, consciously and deliberately testing those models to determine whether they work, and then repairing the models that appear to be faulty”

Michael and Modell 2003

“Authentic action by the learner in the process of understanding and resolving the problem”

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“What is important is not just the ‘performance’, but the understanding of why they are doing what they are doing, and what they are learning from it.”

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Understanding

- Understanding is an interpretive process in which students must actively participate
- Understanding enables transfer of learning to new situations - "flexible performance capability"
- Good Judgment - Conceptual Understanding

Harvard Teaching for Understanding

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Understanding

- We look for competency – what a learner can do
- We should look for understanding – does the learner know why they are doing what they are doing
- Ask open ended questions that make the learner's thinking visible



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Experts and Outcomes

Why do experts get different outcomes?

Diagnosis – Look up if uncertain

Procedures – Slow down



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Adaptive Experts

- Adaptive experts continue to grow because they intentionally engage in problem solving not only to improve their performance but also to enhance their understanding of their domain
- Conceptual understanding enables adaptive capabilities



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Adaptive Expertise

- Routine experts try to adapt novel problems to a comfortable, acceptable solution
- Adaptive experts use novel problems to extend knowledge and understanding
- Adaptive experts recognize when rules and principles do not apply and display flexible, innovative and creative reasoning abilities



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“We are not what we know but what we are willing to learn.”

Mary Catherine Bateson



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Expertise and Illness Scripts

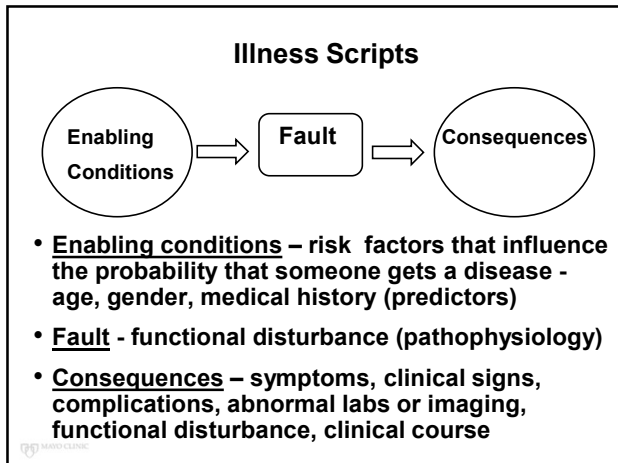
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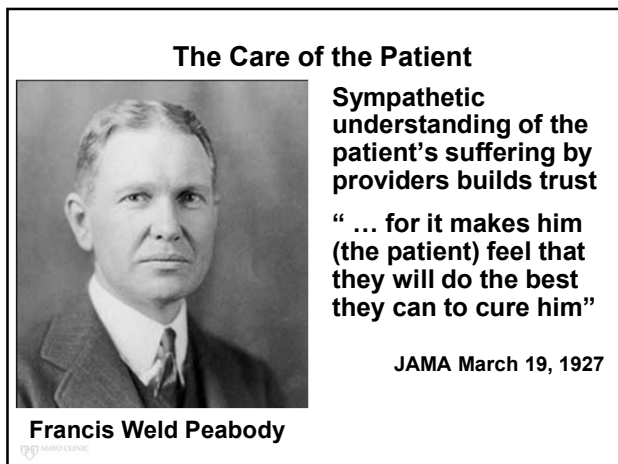
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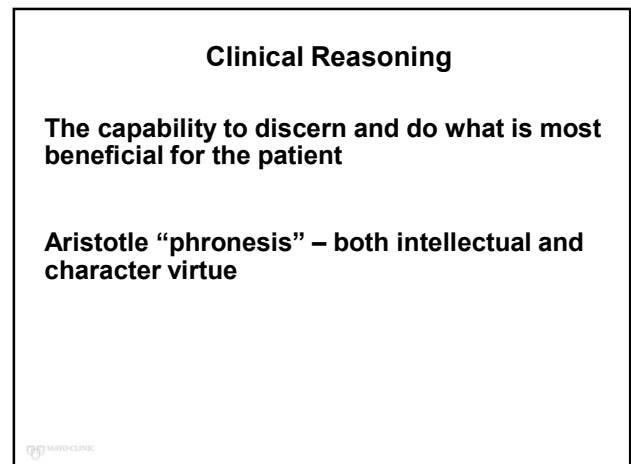
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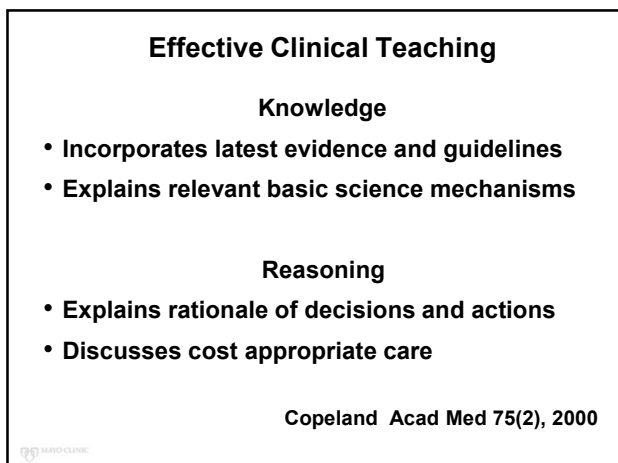
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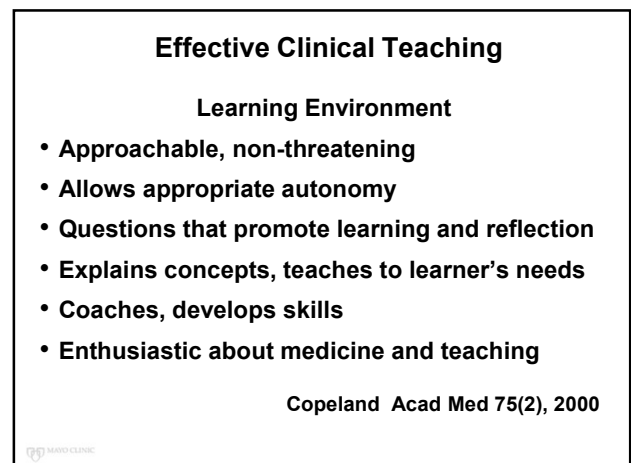
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Students Describe Good Learning Environment

“Good teaching is characterized by inspiring, supporting, actively involving and communicating with students”

“Many of our behaviors were similar to those of a child following a parent. We wanted to be just like them”

Acad Med 2008; 83: 452-466

Role Modeling Acad Med 2003; 78:1203-1210



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Stressors for Staff

- Less time with patients
- Increased clerical work (EMR)
- Corporatization of health care
- Micromanaged by administration
- System is a barrier to quality care

Mayo Clinic Proc 2019;94:1556



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Moral Distress

Incoherence between one's beliefs and values and one's actions

Providers daily encounter changes imposed by business forces that have compromised quality, safety, service and patient-centeredness of care



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Physician's Professional Formation Learning Environment

“Even experienced faculty may feel confusion about conflicting role obligations as they respond to the pressures of practice in the contemporary health care environment”

“It was not uncommon for clinician teachers to express negative and cynical comments about the medical profession, which left learners feeling pessimistic about their chosen profession”

Acad Med 2003;78:1203-1210



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Moral Distress

Our experiences with what is wrong for medicine have distracted us from being mindful of our values, service traditions and “what is right” or meaningful with medicine



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Learning Environment

“rediscover ,with clarity, the moral purpose of medicine”

Acad Med 2003; 78: 1203-1210

“a care and concern for the future of man, a platonic love of the species, not for what it is, but for what it might be.”

William Arrowsmith
The Future of Teaching



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Reclaiming What is Sacred

...a community held together by “the grace of the great things”

“...the great things that call us together to know, to teach, to learn”

“ ...that evoke from us the virtues that give our community its finest form”

P. Palmer
The Courage to Teach



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“The Great Things” Our Missions

- Deliver outstanding care
- Improve the delivery of care
- Advance the sciences of medicine
- Learn and serve together
- Forming health care professionals to practice the art of healing



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Faculty as Role Models

- Faculty are role models in an apprenticeship system
- We must be what we want our students to become



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Thank You

Questions

Comments

Discussion

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