Deliberate Practice (DP) And The TTUHSC SOM Expert Skills Program (ESP)

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Orientation week is designed to help you transition into the medical school environment.
This lecture is different – it is designed to help you transition into your career.

There will be differences in expectations due to the wide variety of premedical backgrounds you have experienced.

- Variety of educational backgrounds
- Variety of input advice on what to do to succeed.
- Tendency to trust out of either hope or fear.

Your first chance to experience medical education was the ESP prematriculation phase.

Transition: What questions will be answered today?

Questions Addressed Today

1. How competent are we and how far do we have to go?
2. What should we measure to assess competency and why?
3. How is DP used in the first two years of medical school?
4. What is the best paradigm for applying DP to learning?
5. How do we apply DP to the new paradigm?
6. How does an analytical protocol help to define the responsibilities of the student?
7. How are Step 1 Prep sessions different from review courses?
8. What responsibilities do the faculty have in this process?
9. If the curriculum is managed by the faculty, are there also responsibilities to the student?
10. Are their any lifestyle practices that help develop brain function?
11. What is the likely outcome of the ESP?
12. Where do we go from here?

Transition: How competent are we and how far do we have to go?

Conscious Competence Sequence
"You don't know what you don't know"

1. Unconscious incompetent
   – You before ESP
2. Conscious incompetent
   – You during ESP, med school, and residency
3. Conscious competent
   – You at Board eligibility
4. Unconscious competent
   – You as an expert, if DP used
   – 10 years/10,000 hours

Everyone progresses through each step, in order, no exceptions.

1. Unconscious incompetent – While other experience or talent may help prepare you for learning, everyone begins with an untrained brain.
2. Conscious incompetent – As you learn during training, you become aware of the requirements for competency.
3. Conscious competent – As you achieve the learning needed, you can now perform at a minimum standard level.
4. Unconscious competent – As you undergo expert skill development, you perform unconsciously. This can only be achieved through DP.

Transition: What should we measure to assess competency and why?

Not Everything That Counts Can Be Counted.

– Albert Einstein

- Scores, grades, and rankings are part of your education and, eventually, your career.
- These measure performance not expert skill.
- Expert skill = performance x professionalism
  - If either is zero, it's all zero
- Professionalism – unrelenting desire for DP skill
- Work vs DP
  - Work not unpleasant if seen as useful
  - DP difficult; not direct cause and effect
  - Examples: bodybuilding (DP), surgical procedure (work), surgical practice (DP)

We measure performance for two reasons:

1. Feedback to guide skill development
2. Accomplishment to certify skill level achieved.

For technical and paraprofessional level training, skill level can meet less demanding criteria.

For health professionals, skilled performance is only part of the story.

True professionals also employ DP to achieve expert skills.

The reason that everyone does not choose to be a professional is that DP isn't fun.

- Even work isn't unpleasant if it is seen as useful or profitable.

It's what you do when you don't have to that determines what you will be when you can no longer help it.

Transition: How is DP used in the first two years of medical school?

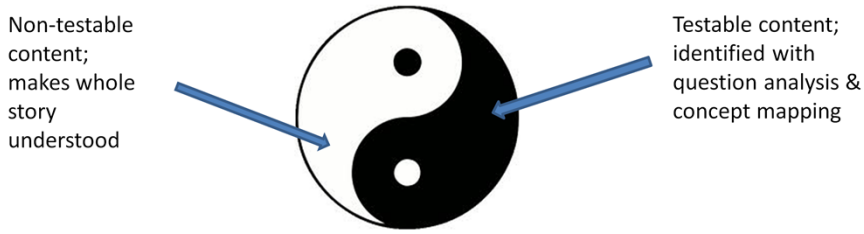
The Brain Is A Work In Progress – Applications Of DP In Medical Education

- Plasticity is based on dendritic growth during consolidation of experience.
- Skill development = dendritic growth (in sleep)
- Any part of the brain can grow more intelligent
  - Sensory (history and physical, visual data)
  - Recognition (meaning of patient data)
  - Creativity (differential diagnosis)
  - Analysis (diagnosis, taking exams)
  - Motor function (physical exam, medical procedures)
  - Emotion (communication, value to you and others)

Any area of the brain can be developed through skill training.
Brain development occurs through its property of plasticity – the ability to grow dendrites in areas that are used.
Where is the gym for growing the brain? Lecture hall, study rooms, anywhere that you can map or dialogue.
Dendritic growth during sleep provides a long lasting persistence of skills developed from experience.
Learning involves more than improving the function of memory; this is only one of the skill areas needed in medicine.
DP can be applied to all areas of the brain for expert skill development.
Transition: What is the best paradigm for applying DP to learning?

A New Paradigm

- Old Paradigm: Learn (*to recognize*) everything possible in time available.
- New Paradigm: Analyze every concept that is testable for a rationale.



Complete content, e.g. respiratory physiology

The primary skill emphasized in premed is recognition.
Medical education requires a new paradigm – "always be thinking of a rationale."
A corollary is, "always be identifying testable concepts."
Much information is not testable – and is not intended to be.
Information needed for clinical thinking has meaning, so information alone is not enough.
Meaning allows prediction and evaluation of results, information is robotic.
Learning meaning is, in the long run (think final exams, Step 1), the most efficient and effective approach.
Transition: How do we apply DP to the new paradigm?

The Need For An Analytical Protocol

- Protocol: a standardized process applied to a given situation
- Learning protocol goals:
  - Whole brain (expert skill) development with DP
  - Efficiency (best use of time) and effectiveness (smart use of time).
  - Develops an analytical approach to learning
- Learning protocol design:
  - Daily concept mapping of new material (plus weekly review)
  - Group analysis of selected questions; Step 1 Prep

Time is used most efficiently if an effective protocol is in place.
A learning protocol takes daily information and processes it to maximize understanding.
Work on limiting skills; different in each individual
The two most effective methods in the medical education environment are:

- Daily concept mapping: increases focus during lecture and during individual study; catching up resumes the map where it was left.
- Group question analysis: This weekly activity engages all areas of the brain and develops recognition of testable concepts; the thinking in the group carries over to individual study, increasing both efficiency and effectiveness.

Transition: How does an analytical protocol help to define the responsibilities of the student?

Responsibilities – Student

- Transform experience provided by teachers into your own knowledge
  - Act on material taught and organize it for yourself
  - Avoid automated behavior; reduces focus and sensory skills
  - Emphasize awareness of organization
  - Use Step 1 Prep sessions to facilitate
- Accept your unique concept organization as valid once facts have been verified.
  - Work with a partner to help verify
- Use DP to build skill areas that are deficient

The transformation process requires analytical thought.
Analytical thought requires:

1. Focus and attention
2. Recognition
3. Anticipation and prediction through questions
4. Decision and action

Teachers provide experience through lectures and learning objectives.
Do not expect any book to teach you or any teacher to produce learning. Only you can produce learning through action.
Expecting a book to tell you what to learn lacks analytical thought due to:

a. Lack of decision making
b. Mistaking recognition for learning

Everyone sees the same material differently and also correctly. This is because the same subject can be organized differently. You only have to organize it your way.
Each student will find the whole brain process to work more easily at some steps, e.g. recognizing facts, and not so easily at others, e.g. identifying grouping terms.
Transition: How are Step 1 Prep sessions different from review courses?

Step 1 prep vs Step 1 review

- A review "course" is a comprehensive coverage of essential concepts
  - Most effective immediately preceding examination
  - Ineffective in developing analytical skills
- A preparation "program" is a regular focused analysis of key concepts
  - Only effective with regular "workouts" over a long period of time
  - Permits whole-brain dendritic growth
  - Facilitates review time

USMLE preparation is dramatically different from USMLE review.
Review courses acquired their reputation for effectiveness during an earlier era when the licensure exams were 80% memorization.
Review courses are now inadequate because:

a. They teach the wrong part of the brain.
b. They are too short.

One view of review is that it refreshes "faded labels on file folders" in the brain. It doesn't do any good to find the information in the folders if you don't know how to think about it.
USMLE preparation develops the part of your brain that actually takes the test, i.e. the prefrontal area.
Prefrontal development is critical because:

- Like learning facts, it can't develop overnight.
- It requires constant decision making that forces the rest of the brain to also develop.
- It is used intensively in the clinics, even in procedurally oriented disciplines.
- It can improve scores on block exams due to the use of current material during weekly sessions.
- It can use mirror neurons to acquire perspective from other learners.

Transition: What responsibilities do the faculty have in this process?

Responsibilities - Faculty

- Organize and present foundational concepts
  - Better teachers are good story tellers
  - Stories provide better understanding
  - Stories easier to remember
- Relevance:
  - Foundation for future courses
  - Relevance to Step 1

Faculty have a primary responsibility to provide the content that you then transform into your own knowledge.

- They should eliminate non-essential concepts
- They should organize essential concepts.
- They should delineate clearly how students need to think about the essential concepts.

Faculty also have a responsibility to maintain relevance of concepts to future courses as well as past courses.

- They should always ask students for the rationale for their thinking.

Transition: If the curriculum is managed by the faculty, are there also responsibilities to the student?

Responsibilities – Curriculum

- Organize and present training for clinical skill development
- Scaffolding – each block provides vocabulary for successive blocks
- First year responsibility – leveling
- Second year responsibility – clinic prep
- Third year responsibility – clinical basics + exposure
- Fourth year responsibility – getting a job
  - Time permitting, becoming well rounded
  - Filling in deficiencies

The curriculum is determined by the faculty in compliance with national accreditation standards.
Among the broad goals are:

- Training necessary to development of clinical skills
- Training necessary for resolution of ethical problems.
- Training necessary for continued self-directed education.

Each year has a different purpose, i.e. the curriculum is not just an accumulation of course credits.
Transition: Are their any lifestyle practices that help develop brain function?

Non-cognitive Methods For Brain Development

- Exercise stimulates brain-derived neurotropic factor (BDNF) in frontal area.
- Most efficient is anaerobic intervals
  - Supported by recent research
  - Biologically superior to long distance running
  - 20 minutes, 3 times per week maximum
  - Exercise bike or elliptical machine
  - Search for Peak8 or Sprint8 for details
- Yoga can increase focus and attention
  - Simple instructions at yoga.about.com

Cognitive function is enhanced by exercise.
Brain derived neurotrophic factor (BDNF) is released in the frontal cortex after brief exercise.
Anaerobic interval training is recently gaining attention as preferable to extended aerobic training for many areas of general health.
In addition to its exercise value, yoga has the added advantage of improving focus and attention – if practiced properly.
Transition: What is the likely outcome of the ESP?

Revolution By Evolution

- ESP is revolutionary
- Methods are the easy part
- Implementation is hard part
  - Good communication is critical
  - Requires learning about skills
  - Requires developing skills
- Must evolve through more experience
- Need data: subjective, objective
- No other system of learning can compete
  - The only good option will be to participate

Currently, only TTUHSC teaches the complete picture that connects expert skill development to learning skills.
Learning skill development automatically produces expert skill development in clinical skills since clinical skills are learning skills.
The revolution will only acquire a following across the country through an evolutionary path that involves collection and reporting of data to learn from experience.
No other system can compete with ESP. This is a bold claim, but it can readily be defended.
Transition: Where do we go from here?

Next Steps

- Concept mapping/Step 1 Prep workshop
- Wednesday, August 8; ACB150; 3pm (after ECE small groups)
- Not part of the curriculum
  - Voluntary
  - Coordinated with curriculum
- Examples with Upper Extremity, first major topic in Clinically Oriented Anatomy