

Educational Strategies

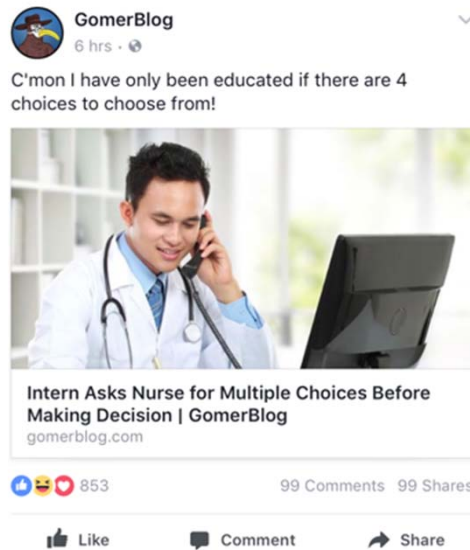
Moving Beyond Traditional Lecture Format for Greater Knowledge Retention



Goals / Objectives:

By the end of this session, learners will be able to:

1. Differentiate the value and utility of pedagogical and andragogical teaching models
2. Identify 4 principles of adult learning as they pertain to medical education
3. Implement novel techniques for effective learning



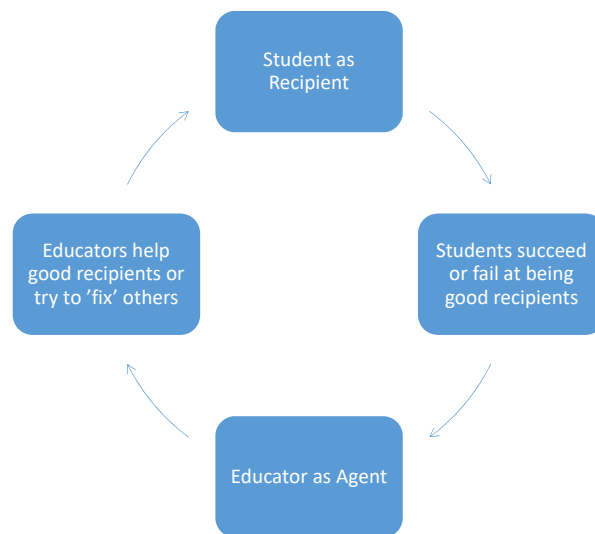
The Conundrum:

- We've all been good students...

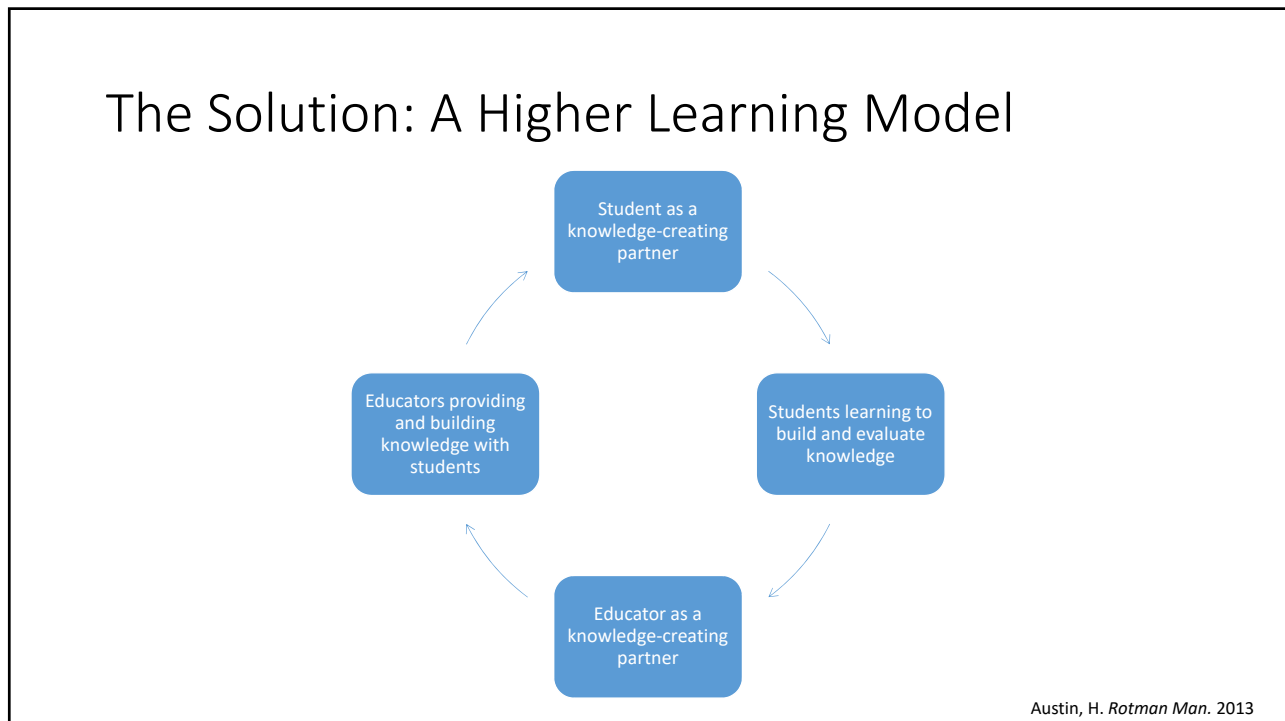
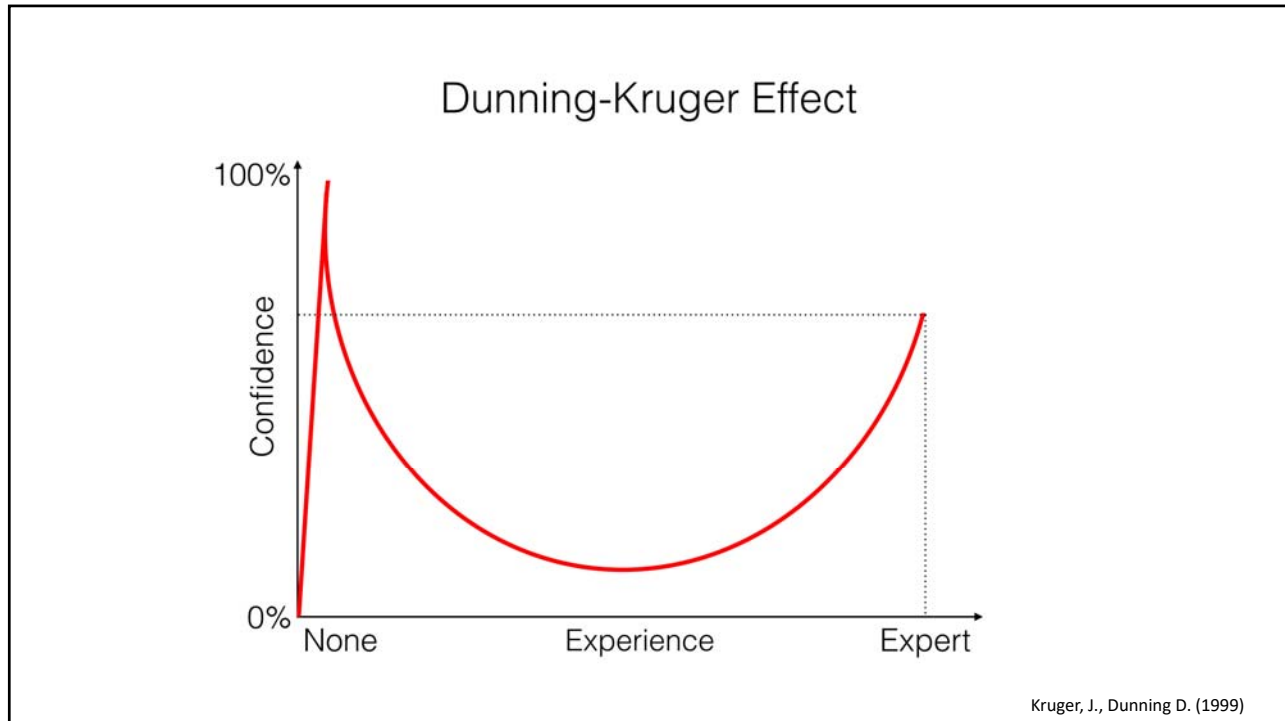
(except we don't need good students)

- We need independent doctors

The Conundrum: Earlier Education Model



Austin, H. *Rotman Man.* 2013



Methods of Teaching:

- Pedagogy vs. Andragogy:
 - “The art of teaching...”
- Pedagogy is rooted in dependency
 - Children too immature to direct own learning
 - Teacher expected to make the decisions
 - What is taught and how it is taught
- Andragogy model is rooted in experience
 - More intellectually curious
 - Take responsibility for their learning
- Both exist on a continuum



Key Assumptions of Adult Learners:

- Motivated to learn as the experience calls for
 - Learners learn what learners need to learn
- Orientation to learning is life-centered
 - Life situations versus subject material
- Experience is the richest source
 - Reflection on experience is imperative
 - Experience counts as much as knowledge



Lindeman, E. C. (1926). *The meaning of adult education*. New York: New Republic.

Key Assumptions of Adult Learners:

- Deep need to be self-directing
 - Stimulate inquiry
 - More than fact delivery
- Individual differences increase with age
 - Variable techniques
 - Strategy-focused



Lindeman, E. C. (1926). The meaning of adult education. New York: New Republic.

Influential Theories For Adult Learning:

- Behaviorism
 - Consequences shape behavior
 - Positive/Negative reinforcement
 - Feedback
- Cognitivism
 - Thinking affects behavior
 - The mind is a “computer”
 - Problem solving
- Constructivism
 - Experience + Framework
 - Can change either
 - Facilitated social learning



4 Principles of Adult Learning:

Adults learn most effectively when they...

1. Perceive the relevance of the educational material
2. Are actively engaged
3. Have input into choosing and directing educational experiences
4. Have a chance to reflect on their learning

Difference?



Adult Learning: Inpatient Teaching

- Teaching has value only to the extent that it facilitates learning
- Knowledge is developed not by fact accumulation
 - Extending and revisiting previous knowledge
 - New ideas take on meaning in a coherent relation to old ideas
 - Scaffold new ideas around old ideas, build on existing concepts
- Teaching is enabling
- Knowledge is understanding
- Learning is active construction

Adult learning

- Carl R. Rogers
 - “Student-centered teaching”
- “We cannot teach another person directly; we can only facilitate his/her learning”
- “Every individual exists in a continually changing world of experience in which he/she is the center”
- Motivation to learn must be internal
- Facilitation must focus on the needs and experiences of the learner



Adult Learning: All Learning Is Planned

- New knowledge and understanding builds upon what people know and expect
 - Not "empty vessels"
 - May need to correct prior thoughts and assumptions
- Learning tasks should be structured for information transfer
 - Learners need scaffolding
 - Need to be able to extrapolate lessons
 - See patterns and use standard care
- Learning requires multiple exposures of increasing complexities
 - Accretion: Learning by repetition
 - Handsouts/Lectures
 - Restructuring: Challenging current understanding
 - Needs complex interactions (active learning)

Adult learning: Cyril Houles Learning Styles

1. Goal-orientated

- Education is a means to an end
- Concerned with accomplishing defined objectives
- Recurrent episodes without continuity

2. Activity-orientated

- Gain knowledge by relating to others
- Benefit from frequent interaction with other learners

3. Learning-orientated

- More concerned with the journey of learning, not the destination
 - Learn for the sake of learning
- All types overlap...

Evidence for Self-Directed Learning (SDL):

- 2010 systematic review of 59 studies (n=8011)
- Compared with traditional teaching methods, SDL was associated with a moderate increase in the knowledge domain (SMD 0.45, 95% CI 0.23–0.67)
- Moderate quality evidence suggests that SDL in health professions education is associated with moderate improvement in the knowledge domain compared with traditional didactic teaching
- May be as effective in the skills and attitudes domains

Evidence for Self-Directed Learning (SDL):

- 2014 retrospective descriptive analysis of academic learning logs between 2008 and 2011 in London, Ont
- Family Medicine residents at Western University (n=72)
- Residents chose to spend most of their academic time engaging in self-study (44%)
- Attending staff physicians' teaching sessions (20%)
- Participating in conferences, courses, or workshops (12%)
- Postgraduate medical education sessions (12%)
- Concluded that residents:
- Used a variety of learning modalities
- Chose self-study over other more traditional modalities for most of their academic learning

Sy A. *Can Fam Physician*. 2014;60(11):e554-e561.

Evidence for Flipped Classroom:

- Pilot study from 2014-2015
- 39/40 Pediatric PGY-2's at Children's National Health System in Washington, DC
- Utilized a novel flipped classroom curriculum to provide RAT training
- Measured effects

Resident-as-Teacher Schedule at Children's National Health System, 2014

8:00–8:15 AM	Breakfast and welcome: Orientation to flipped classroom approach
8:15–9:15 AM	Three-station objective structured teaching examination (OSTE)
9:15–9:45 AM	Workshop 1 (Topic: Adult Learning) Group discussion and application based on articles and quiz completed at home Readings: 1. Kaufman DM. Applying educational theory in practice. <i>BMJ</i> . 2003;326:213–216. 2. Newman P, Peile E. Learning in practice: Valuing learners' experience and supporting further growth: Educational models to help experience adult learners in medicine. <i>BMJ</i> . 2002;325:200–202.
9:45–10 AM	Break
10–10:30 AM	Workshop 2 (Topic: Giving Feedback) Prework Independent work: Reading and completion of questions Readings: 1. Little M, Hewson M. Giving feedback in medical education. <i>J Gen Intern Med</i> . 1998;13:111–116. 2. Ende J. Feedback in clinical medical education. <i>JAMA</i> . 1983;250:777–781.
10:30–11:30 AM	Workshop 2 (Topic: Giving Feedback) Consensus building on question answers, interactive discussion on topic, simulation with standardized learner
11:30 AM–12:30 PM	Lunch break

Chokshi, B. *Academic Medicine*. 2017; 92(4): 511-514.

Evidence for Flipped Classroom:

Table 1

Pre- and Postworkshop OSTE Scores^a for Residents as Scored by Standardized Learners at Children's National Medical Center, 2014

Domain	Preworkshop score, mean (SD)	Postworkshop score, mean (SD)	Difference in pre- and postworkshop scores	P value	Standardized effect size
Teaching a skill	2.72 (0.51)	3.33 (0.60)	0.61	< .001	1.10
Giving feedback	4.21 (0.43)	4.56 (0.43)	0.35	.005	0.81
Orientating a learner	3.79 (0.50)	4.31 (0.50)	0.53	< .001	1.06

Abbreviations: OSTE indicates objective structured teaching examination; SD, standard deviation.

^aOSTE performance scores had a possible range of 1 to 5.

Chokshi, B. *Academic Medicine*. 2017; 92(4): 511-514.

Evidence for Flipped Classroom:

- 2017 systematic review
- 46 articles
 - 9 controlled studies
- Promising teaching approach
 - Motivation, task value, engagement
- Students generally like the FC
- **Strong evidence lacking for effectiveness of FC improving knowledge transfer over traditional teaching methods**



Chen, F. *Med Educ*. 2017, 51: 585-597.



Needs Assessment:

- The Curriculum Committee, under the direction of the entire faculty, spent some time this Spring performing a needs assessment of our didactic curriculum
- Some identified needs:
 - Difficult to incorporate all existing didactic lectures into 18 month cycle
 - Finite number of available slots
 - Lectures are continuously added to the number, but rarely removed from the rotation
Competing new topics or mandatory sessions
 - Existing didactic topic did not necessarily correlate with evolving Family Medicine core curriculum
 - Some core Family Medicine topics were not covered

Existing Curriculum:

- 217 down to 154
- Combining topics
 - Some topics were duplicated on the schedule, even being given by the same faculty
 - Some topics were covered by different departments: physicians, psychology, pharmacy
- This has allowed new topics to be introduced as well as introducing other types of noon-conferences:
 - Resident Well-Being
 - Residents as Teachers
 - Career Development

An Ever-Changing Curriculum:

- The next task, after developing this new list of topics, was to create goals and objectives & new titles for the lectures
 - Hopefully, inspiring novel approaches to didactic topics
 - New teaching styles
 - Combination lectures:
 - e.g. Pharmacy + Medicine
- Future steps
 - Evaluation and continued revision/adaptation

Creating Goals & Objectives:

- Using Bloom's Taxonomy, goals and objectives are being (or have been) developed for each noon didactic conference
 - Provide direction for the lecturer
 - Provide the learner with an understanding of what they should take away from the talk
- Handout tool and demonstrate to audience

Adult Learning: Summary



- Pedagogy: Dependency (teacher is leader)
- Andragogy: Experience (teacher is facilitator)
- Adults learn best when they:
 - Perceive the relevance, are actively engaged, have input, reflect
- Teaching is intentional *but* situational
- Reflect on your learning needs and goals
 - Are you meeting them
 - How can you achieve them
- **Be flexible and hold your colleagues accountable!**

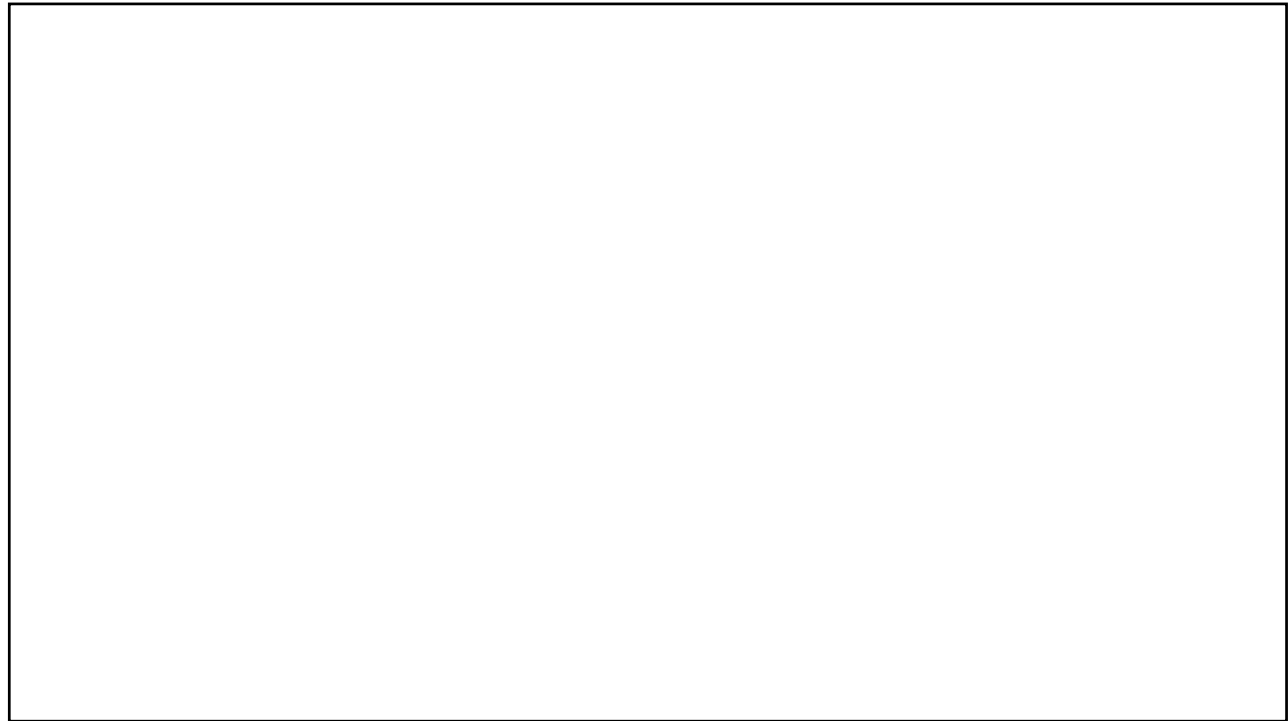
Adult learning: Summary



- Adults
 - Have more life experience and unique motivations
 - More self-directed in their learning
 - Have biases and potentially detrimental prejudices
- The approach to teaching should be based on the goals of the learners, the educational content, and other factors (situational)
 - Andragogic approach may not be appropriate in all situations
- Be aware of you learning needs/goals and how you can best achieve them
- **Be flexible and hold your colleagues accountable!**

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Interactive teaching styles are more effective (Raleigh)

- Study of 9 residency programs
- Three different teaching styles for same topic
 - Traditional slide-based lecture
 - Engaged classroom
 - High-tech simulation
- Pre-test given prior to session
- Post-test given two weeks later
- Engaged classroom and high-tech simulation resulted in greater knowledge retention and learner satisfaction than traditional slide-based lecture



Think/Pair/Share

- Strengths
- Weaknesses



Think/Pair/Share

- Ask your audience of learners to think about a specific area of the topic under discussion
- Pair with another learner and discuss it with each other for a few minutes
- When you bring the group back together, ask each pair to share their thoughts



Jigsaw

- Divide the learners into small groups of three to five
- Assign each of the groups a sub-topic
- After giving them time to research and discuss (differential diagnosis, possible lab workup and imaging studies, and recommended treatments, etc.) have a spokesperson from each group present the findings to the class
- Supplement with your own discussion/slides, etc.
- Usual group time—about 20 minutes
- Usual full class time—about 30 minutes



Dinner

- Group 1: Lobster Bisque
- Group 2: Caesar salad with homemade dressing
- Group 3: Beef Wellington
- Group 4: Tiramisu

HINT: In these interactive lecture styles, don't specify a time for the discussion. Listen to your audience. At the beginning, as the learners are starting the discussion amongst themselves, it will be relatively quiet until they become more engaged. The sound will reach a crescendo in a few minutes, after which it will taper off. When it begins to crescendo again, stop the discussion—that is when the group begins talking about things other than the assigned topic.



Flipped Classroom

- Takes more time in preparation for the instructor and for the learner
- Allows the learner practice the knowledge learned, and thus retain it
- Learner centered, instructor facilitated (McLaughlin)
- Residents are given assigned readings and are expected to come prepared to discuss the assigned material
- Instructor gives a short lecture, after which the learners go through cases and apply the material learned prior to the session.

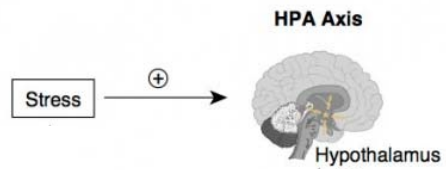


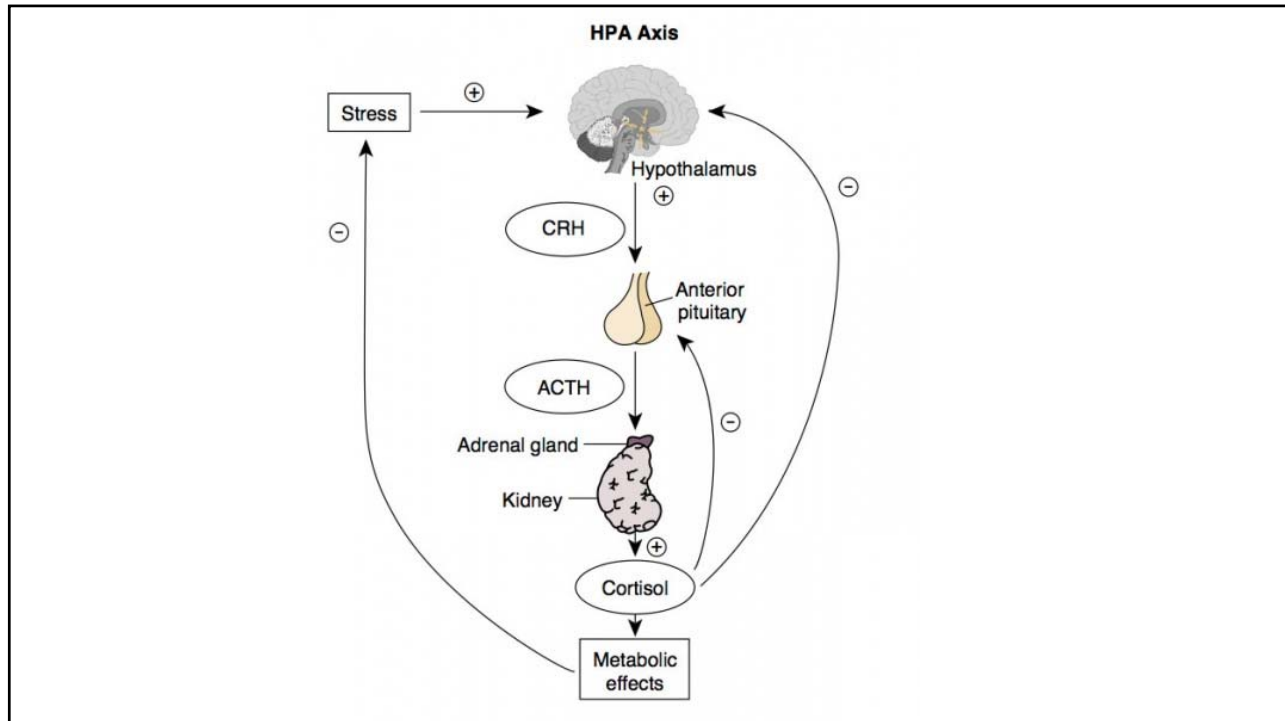
Experiences

- Debate—"Constructive Controversy" (Johnson)
- Walking Lecture
- Demonstration (HPA Axis)





The HPA Axis








The HPA Axis In Action

Bean Bags - CRH 

Yellow Whiffle Balls - ACTH 

Salt - mineralocorticoid (aldosterone) 

Sugar - Glucocorticoid (cortisol) 

Rubber Bands - negative feedback 

The diagram shows the HPA axis in action using physical objects. **Stress** (a box) has a positive effect (+) on the **Hypothalamus** (a brain model). The Hypothalamus releases **CRH** (a blue bean bag), which has a positive effect (+) on the **Anterior pituitary** gland. The Anterior pituitary releases **ACTH** (a yellow whiffle ball), which has a positive effect (+) on the **Adrenal gland**. The Adrenal gland releases **Cortisol** (a sugar packet), which has a positive effect (+) on the **Kidney**. The Kidney produces **Metabolic effects** (a salt packet). There are three negative feedback loops (-): one from **Cortisol** back to the Hypothalamus, one from **Cortisol** back to the Anterior pituitary, and one from **Metabolic effects** back to the Hypothalamus. Rubber bands are placed on these feedback loops to represent negative feedback.

Online Resources

- Prezi
- Poll Anywhere
- Kahoot



Games

- Jeopardy (Latessa)
- Bar trivia



High-tech Simulation



Topics Jigsaw Exercise

- Objectives written (That's another lecture)
- How will you teach these topics



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