HS 2/7

Name- Goehler

Reading Guide due Class Period 4: Self-Awareness (self as student)
Learning through Metacognition & Neuroscience

Directions: In preparation for the class discussions, please complete the following before the 4th class.

1. Skim the 4 articles that make up supplemental materials 4, 5, 6, & 7. Using 1-2 sentences, describe what you will be learning in the reading for this reading guide. How to develope self reflective AWARENESS. Thinking about thinking / Formative assessment strategies Neuroplasticity / malleability. Learning to learn with four techniques.

Read Supplement #4 -Know Thyself: How to Develop Self-Awareness.How important is self-reflection in your life?

1. The first part of this reading connects to information from Parsons ch. 1 and Thomson ch. 2. Review both of these.
   A. Explain how the first portion of the article is both similar and different than information from Parsons ch. 1.
      - Similarities Self Awareness is paramount in establishing Emotional Intelligence.
      - Differences Parsons is more focused on Characteristics of Effective Helpers

   B. Explain how the first portion of the article is both similar and different than information from Thomson ch. 2.
      - Similarities They both address Emotional Intelligence
      - Differences Supp# 4 is via Hindsight, whereas Thomson focuses more outward to Responsibility to self/others MANAGEMENT
2. Understand your life story
   A. Define narrative identity the stories we tell ourselves - about ourselves → well said
   B. *Explain some aspect of your narrative identity. The 3 questions in this portion of the reading may be helpful to you in answering this question. Self awareness is the fruit of reflecting upon life experiences. My personal identity acknowledges my propensity to impinge upon F.E.A.R. (False Evidence Appearing Real) in order to discover the mis Understanding, come what may.
3. Create a daily habit of self-reflection Everything is a learning "experience".
   A. Note that this overlaps with information about the experiential learning cycle. According to research, what advantages are gained by practicing self-reflection? Mindfulness of the more important things in life
   B. *Describe a time in your life when you have used self-reflection. How was it helpful to you? http://betweenthebars.org/blogs/420/william-goehler has about 300 blogs of my self reflections. It has deffinately released alot of anxiety over misunderstood points of view.
4. Seek honest feedback
   A. How does this connect with information you read in the Thomson book? Writing a journal of reflections circumverts the three main triggers (Relationship/Identity/truth) toward being a more authentic person.
   B. Describe a time you received either positive or negative feedback. From others observation, their "feedback" merely tells me how (self) Aware they actually are. I know me much better than others point of view.

Name- Caehler

Read supplement #5- How Metacognition Boosts Learning: Students often lack the metacognitive skills they need to succeed, but they can develop these skills by addressing some simple questions.

1. Define metacognition [Meta Gk. among, with, after] 2: transformation 3: transcending. Cognition is the act or process of Knowing [L. to become acquainted with]. I'd define it as Awareness.

2. Define metacognitive awareness Reflective assessment of Awareness

3. Define the perception gap Overconfidence and/or underconfidence based upon poor reflective assessment of Awareness.

4. List some benefits of metacognitive activities Awareness of awareness permits Management of self and others, along the underlying purpose of discovering whats what... and reflecting upon that for better understanding

5. Explain the following "Simply being aware that there's a difference between a fixed and a growth mindset is one of the most effective metacognitive strategies that students can benefit from" (p. 9). Whats-to learn if one already knows it all?

Well said

6. List metacognitive strategies to use during class Ask the right questions about purpose of study and goal to be achieved – method of study – how to apply – etc.

7. List metacognitive strategies to use when preparing for a test Quiz themselves, students should. Anticipate difficulties and prepare to overcome – preemptively! Write notes and determine readiness.

8. List metacognitive strategies to use to review after a test Reflective Assessment of Awareness and application / Learn from experience / re-determine what to do differently, if need be

9. *How can you use information from this article in this class this semester. Your answer should be specific. You may spend time reflecting on ways you have or have not used metacognitive skills in past classes and how you plan to change that this semester. My best metacognitive tool is to pursue Knowledge simply for the love of truth — as pure research, I put aside Know it all points of view and discover new points of view-to consider merit and applicability.

10. *Look at your answers so far on this reading guide. Ask yourself "How well am I doing on this reading guide? What can I do to continue my high level of performance or improve my performance on the remainder of the reading guide?" I think that I'm producing original understanding of material in the most part. I appreciate this course material so I anticipate new discoveries, as is the purpose of Pure Research.

Name- Goehler

Read Supplement #6- What Is Brain Plasticity?

1. Define neuroplasticity its a term that refers to the brain's ability to change or adapt as a result of experience.

2. Give a 3-5 sentence summary of the history and research on brain plasticity Up until the 1960's, it was believed the brain was formed in childhood. By adulthood the structure was pretty much the mold of life. Yet modern research and personal experience demonstrates the mold can be broke with determined effort to become better able to function as a re-formed homo Sapiens - sapiens.

3. How does brain plasticity work? neuro/neurons are nerve cells. neurogenesis represents
   A. Define neurogenesis the plasticity involved in the re forming malleability of the brains function, growth and change. Genesis of new neuron pathways.
   B. List the 2 different reasons that neuroplasticity occurs. brain damage re forming function. And the worst one of them all: Education and Life experience assumptions/ points of view reforming new Education — points of view.
   C. What does the author mean what she says "Environment plays an essential role in the process?" (p. 12) The interaction of Nurture and Nature developes the brains ability to function accordingly — in accord with nurture and nature of beingness.
   D. List examples of when neuroplasticity is not good. Adapting to a lower standard of disabling influence, such as we see with mediocrity and degradation of sapience — a truly disadvantaged waste of potential, it is!

4. Types of brain plasticity
   A. What is the difference between ① functional plasticity and ② structural plasticity? ① the brains ability to relocate functions from damaged to undamaged areas ② actually change physical structure as a result of learning
   B. Define synaptic pruning 15,000 per neuron? Wow! Disfunctional synap are eliminated to strengthen logical synaps
   C. *List 2 examples of things you can do to "develop new connections and prun(e) away weak ones?" Less TV and more books! Change the environmental influences.
   ↳ Good examples

5. Connecting supplemental articles 4, 5, & 6
   A. Look back over the information you read in supplemental articles #4 and #5. Describe how that information is connected to the information you read in this article. Meta Cognative disciplines reforming optimum Awareness of Self. reflective points of view, effectively create new synaptic connections to logic.
   B. *Describe something you are doing or have done in your life that has either positively or negatively impacted your brain's plasticity. For the Love of Truth I attack FEAR, IGNORANCE and SUPERSTITIONS. This has re-formed so many pathways that now there are fewer in my social circles to interact with in a world where mediocrity prevails in a cretin culture.

Name- Goehler

Read Supplement #7- Learning to Learn: You, Too, Can Rewire Your Brain

Before reading this article, please read the following overview that will provide you with background information to make the content of the article clear. This article discusses the work of Dr. Oakley and her colleague. They developed an online course that is open to anyone with internet access. These courses are called MOOCs (massive open online courses). You are reading the article because their course focused on teaching learning techniques derived from neuroscience. The beginning of the article focuses on Dr. Oakley's story and the end provides tools for learning.

1. Read the first 2 pages of the article.
   A. List 3-5 key points from this portion of the article. blending neuro-science and common sense/ a neuro scientist and an engineering professor / Metaphors use the same neural circuits /

   B. Think back to the concept of narrative identity from supplemental article #4. How would you describe Dr. Oakley's narrative identity? As a youngster: "I flunked my way through school", she said- "I rewired my brain and it wasn't easy", indicates self awareness via reflective assessment, ultimately to become this more authentic leader.

   C. *In what ways do you relate to (or don't relate to) aspects of Dr. Oakley's story? I too flunked through life and determined to better understand the world I'm in, this journey of discovery re-wired my points of view and I now live life and strive to provoke others to re consider their points of view.

2. Four techniques to help you learn. Using 1-2 sentences, describe each of the following learning techniques:
   A. Focus/Don't- default-mode and task-positive networks permit new info to settle. Read- Study- Reflect, isn't exactly a new learning technique.
   B. Take a break- entering a relaxed state permits the brain to sub-consciously consolidate new knowledge.
   C. Practice- Knowing is not enough – we must DO! Demonstrate knowledge by gradients of ability – increases ability to demonstrate knowledge.
   D. Know thyself- Gnothi Seauton is upon the temple of Apollo for a reason. Sapience is a process of observation.

3. *Describe your specific plan for using 2 of the learning techniques from this article in class this semester.
   I expect to maintain a relaxed state of pure research, demonstrating what I'm learning.

*Do not leave this blank. If you understand everything you read, you should still have questions you are wondering about as it relates to the reading. What 1-2 questions do you have for clarification or extension of the reading you completed in this reading guide, which covered 4 articles about self-awareness and learning? If you do not have any questions, feel free to make comments about your thoughts or opinions regarding the reading and how it applies to your life.

Putting the puzzle of Self Awareness together is awesome!

I'm glad you're enjoying it!

Supplement #4

Know Thyself: How to Develop Self-Awareness

How important is self-reflection in your life?

By Bill George, Posted Sep 28, 2015

Retrieved from https://www.psychologytoday.com/blog/what-is-your-true-north/201509/know-thyself-how-develop-self-awareness

How well do you know yourself? How deeply do you understand your motivations?

If you're on this website, you probably know the basics of psychology. You understand biases, the power of the halo-effect, or even how we make decisions.

But, do you understand what drives you? Your own self-image? Or how others experience you?

The charge, "Know thyself," is centuries old, but it has never been more important. Research from psychologist Daniel Goleman shows that self-awareness is crucial for all levels of success. As he outlines in Emotional Intelligence, above an IQ of 120, EQ (Emotional Intelligence) becomes the more important predictor of successful leaders. Developing self-awareness is the first step to develop your EQ.

You can't gain self-awareness through knowing psychology. Rather, it requires a deep understanding of your past and current self. Experiences shape how we see the world. So, we have to reflect on how the world has shaped us. How can you gain self-awareness? Here are three steps to start.

1. Understand Your Life Story

Over the past 10 years, psychologists have focused on a new field of research called narrative identity. As Dan McAdams, Northwestern University psychology professor, explains, "The stories we tell ourselves about our lives don't just shape our personalities — they are our personalities. "

Your narrative identity is the story of your life; but it's more than just a story. How you understand your narrative frames both your current actions and your future goals. As research from Southern Methodist University shows, writing about difficult life experiences improves our physical and mental health. How much you confront your life's challenges - what I call "crucibles" - defines your level of self-awareness.

So, how can you begin? I give a few questions to start.

- Looking at your early life story, what people, events, and experiences have had the greatest impact in shaping the person you have become?
- In which experiences did you find the greatest passion for leading?
- How do you frame your crucibles and setbacks in your life?

2. Create a Daily Habit of Self-reflection

Next, you should develop a daily practice of setting aside at least twenty minutes to reflect on your life. This practice enables you to focus on the important things in your life, not just the immediate. Research from Wisconsin's Richard Davidson demonstrated direct correlation between mindfulness and changes in the brain - away from anger and anxiety and toward a sense of calm and well-being.

Reflection takes many forms. Some keep a journal, some pray, and others take a long walk or jog. Personally, I use daily meditation as my mindful habit. By centering into myself, I am able to focus my attention on what's really important, and develop an inner sense of well-being.

3. Seek Honest Feedback

We all have traits that others see, but we are unable to see in ourselves. We call these "blind spots." Do you see yourself as others see you? If not, you can address these blind spots by receiving honest feedback from people you trust.

Receiving feedback is hard. So, focus on psychological triggers that might block your learning. As Harvard's Sheila Heen argued in "Thanks for The Feedback", three main triggers prevent our learning: relationship triggers, identity triggers, and truth triggers. If you feel defensive, think back to why you do. Often, we can explain it using these triggers.

Becoming self-aware won't happen in a day. Rather, it will take years of reflection, introspection, and difficult conversations. As you follow these three practices, you will find you are more comfortable being open, transparent, and even vulnerable. As you do, you will become a more authentic leader and a more self-aware person.

Supplement #5

How Metacognition Boosts Learning: Students often lack the metacognitive skills they need to succeed, but they can develop these skills by addressing some simple questions.

By **Youki Terada**; November 21, 2017

Retrieved from https://www.edutopia.org/article/how-metacognition-boosts-learning

Strategies that target students' metacognition—the ability to think about thinking—can close a gap that some students experience between how prepared they feel for a test and how prepared they actually are. In a new study, students in an introductory college statistics class who took a short online survey before each exam asking them to think about how they would prepare for it earned higher grades in the course than their peers—a third of a letter grade higher, on average. This low-cost intervention helped students gain insight into their study strategies, boosting their metacognitive skills and giving them tools to be more independent learners.

Patricia Chen, a postdoctoral researcher at Stanford and the lead author of the study, says she often had students coming to her lamenting their poor test scores. "Many students have come to me after their exams trying to understand why they did not do as well as they had expected, despite their hard work," she recalls. She suspected that the issue was that they lacked awareness of how ill-prepared they were—metacognitive awareness—and that led to the unexpectedly low scores. They thought they understood the material better than they actually did.

Nearly two decades ago, Cornell psychologists David Dunning and Justin Kruger conducted a landmark study looking at this perception gap. In a series of experiments, they found that many college students who performed poorly on tests of logic and grammar had overestimated their performance, believing themselves to be above average. This phenomenon, the Dunning-Kruger Effect, explains why many students feel confident that they'll pass a test despite being underprepared. Overconfidence leaves students "with the mistaken impression that they're doing just fine," according to Dunning and Kruger.

More recently, a team of psychologists and neuroscientists published a comprehensive analysis of 10 learning techniques commonly used by students. They discovered that one of the most popular techniques—rereading material and highlighting key points—is also one of the least effective because it leads students to develop a false sense of mastery. They review a passage and move on without realizing that they haven't thoroughly understood and absorbed the material.

This has serious implications for learning: It's far too easy for students to overestimate their understanding of a topic simply because they're familiar with it. Metacognition helps students recognize the gap between being familiar with a topic and understanding it deeply. But weaker students often don't have this metacognitive recognition—which leads to disappointment and can discourage them from trying harder the next time.

Research shows that even children as young as 3 benefit from metacognitive activities, which help them reflect on their own learning and develop higher-order thinking. To promote students' metacognition, middle and high school teachers can implement the following strategies. Elementary teachers can model or modify these strategies with their students to provide more scaffolding.

Metacognitive Strategies to Use During Class

The key to metacognition is to encourage students to manage their own learning instead of passively absorbing material. Donna Wilson and Marcus Conyers use the phrase "drive your brain" as a metaphor to explain to students how they can become more aware of their learning. In addition, promoting a growth mindset helps students understand that learning isn't fixed: Through dedication and hard work, they can learn to be more resilient and overcome many challenges that may otherwise feel impossible. Simply being aware that there's a difference between a fixed and a growth mindset is one of the most effective metacognitive strategies that students can benefit from.

During class, encourage students to ask questions. Keep in mind that struggling students may not know what questions to ask, or may feel too embarrassed to ask any. Don't assume that every student understands the material just because no one asks a question. Use low-stakes formative assessment strategies like exit tickets, pop quizzes, or the classic "One-Minute Paper" to identify gaps in knowledge and guide future lessons (Heitink et al., 2016; Marzano, 2012; Sundberg, 2010).

During class, students should ask themselves:

- What are the main ideas of today's lesson?
- Was anything confusing or difficult?
- If something isn't making sense, what question should I ask the teacher?
- Am I taking proper notes?
- What can I do if I get stuck on a problem?

Metacognitive Strategies to Use When Preparing for Tests

To close the gap between what your students know and what will be on a test, encourage them to quiz themselves instead of just rereading and highlighting a text. This not only boosts long-term retention but also bridges the gap between familiarity with a topic and deep understanding of it (Adesope et al., 2017; Smith et al., 2013).

Before a test, students should ask themselves:

1. What will be on the test?
2. What areas do I struggle with or feel confused about?
3. How much time should I set aside to prepare for an upcoming test?
4. Do I have the necessary materials (books, school supplies, a computer and online access, etc.) and a quiet place to study, with no distractions?
5. What strategies will I use to study? Is it enough to simply read and review the material, or will I take practice tests, study with a friend, or write note cards?
6. What grade would I get if I were to take the test right now?

Metacognitive Strategies to Use to Review After a Test

Don't let students receive a graded test and file it away without using it as a tool for further learning. Try using exam wrappers, short handouts that students complete after a test is handed back. These worksheets encourage students to review their test performance and improve their study strategies throughout the school year (Gezer-Templeton et al., 2017).

After a test, students should ask themselves:

1. What questions did I get wrong, and why did I get them wrong?
2. Were there any surprises during the test?
3. Was I well-prepared for the test?
4. What could I have done differently?
5. Am I receiving useful, specific feedback from my teacher to help me progress?

Supplement #6

What Is Brain Plasticity?

By Kendra Cherry; Reviewed by Steven Gans, MD; Updated May 21, 2017

Retrieved from https://www.verywell.com/what-is-brain-plasticity-2794886

Brain plasticity, also known as neuroplasticity, is a term that refers to the brain's ability to change and adapt as a result of experience. When people say that the brain possesses plasticity, they are not suggesting that the brain is similar to plastic. *Neuro* represents neurons, the nerve cells that are the building blocks of the brain and nervous system, and *plasticity* refers to the brain's malleability.

Up until the 1960s, researchers believed that changes in the brain could only take place during infancy and childhood. By early adulthood, it was believed that the brain's physical structure was mostly permanent.
Modern research has demonstrated that the brain continues to create new neural pathways and alter existing ones in order to adapt to new experiences, learn new information and create new memories.

History and Research on Brain Plasticity

Psychologist William James suggested that the brain was perhaps not as unchanging as previously believed way back in 1890. In his book *The Principles of Psychology*, he wrote, "Organic matter, especially nervous tissue, seems endowed with a very extraordinary degree of plasticity." However, this idea went largely ignored for many years.
In the 1920s, researcher Karl Lashley provided evidence of changes in the neural pathways of rhesus monkeys. By the 1960s, researchers began to explore cases in which older adults who had suffered massive strokes were able to regain functioning, demonstrating that the brain was much more malleable than previously believed.

Modern researchers have also found evidence that the brain is able to rewire itself following damage.

In his book *The Brain that Chances Itself: Stories of Personal Triumph from the Frontiers of Brain Science*, Norman Doidge suggests that this belief that the brain was incapable of change primarily stemmed from three major sources. First was the ancient belief that the brain was much like an extraordinary machine, capable of astonishing things yet incapable of growth and change. Second was the observation that people who had suffered from serious brain damage were often unable to recover. Finally, the inability to actually observe the microscopic activities of the brain played a role in the idea that the brain was relatively fixed.

Thanks to modern advances in technology, researchers are able to get a never-before-possible look at the brain's inner workings. As the study of modern neuroscience flourished, researchers demonstrated that people are not limited to the mental abilities they are born with and that damaged brains are often quite capable of remarkable change.

How Does Brain Plasticity Work?

The human brain is composed of approximately 86 billion neurons. Early researchers believed that neurogenesis, or the creation of new neurons, stopped shortly after birth. Today, it is understood that the brain possesses the remarkable capacity to reorganize pathways, create new connections and, in some cases, even create new neurons.

There are are a few defining characteristics of neuroplasticity:

- It can vary by age. While plasticity occurs throughout the lifetime, certain types of changes are more predominant during specific life ages. The brain tends to change a great deal during the early years of life, for example, as the immature brain grows and organizes itself. Generally, young brain's tend to be more sensitive and responsive to experiences than much older brains.

- It involves a variety of processes. Plasticity is ongoing throughout life and involves brain cells other than neurons, including glial and vascular cells.

- It can happen for two different reasons. As a result of learning, experience, and memory formation, or as a result of damage to the brain. While people used to believe that the brain became fixed after a certain age, newer research has revealed that the brain never stops changing in response to learning. In instances of damage to the brain, such as during a stroke, the areas of the brain associated with certain functions may be damaged. Eventually, healthy parts of the brain may take over those functions and the abilities can be restored.

- Environment plays an essential role in the process. Genetics can also have an influence. The interaction between the environment and genetics also plays a role in shaping the brain's plasticity.

- Brain plasticity is not always good. Brain changes are often seen as improvements, but this is not always the case. In some instances, the brain might be influenced by psychoactive substances or pathological conditions that can lead to detrimental effects on the brain and behavior.

Types of Brain Plasticity

- Functional Plasticity refers to the brain's ability to move functions from a damaged area of the brain to other undamaged areas.
- Structural Plasticity refers to the brain's ability to actually change its physical structure as a result of learning.

The first few years of a child's life are a time of rapid brain growth. At birth, every neuron in the cerebral cortex has an estimated 2,500 synapses; by the age of three, this number has grown to a whopping 15,000 synapses per neuron.

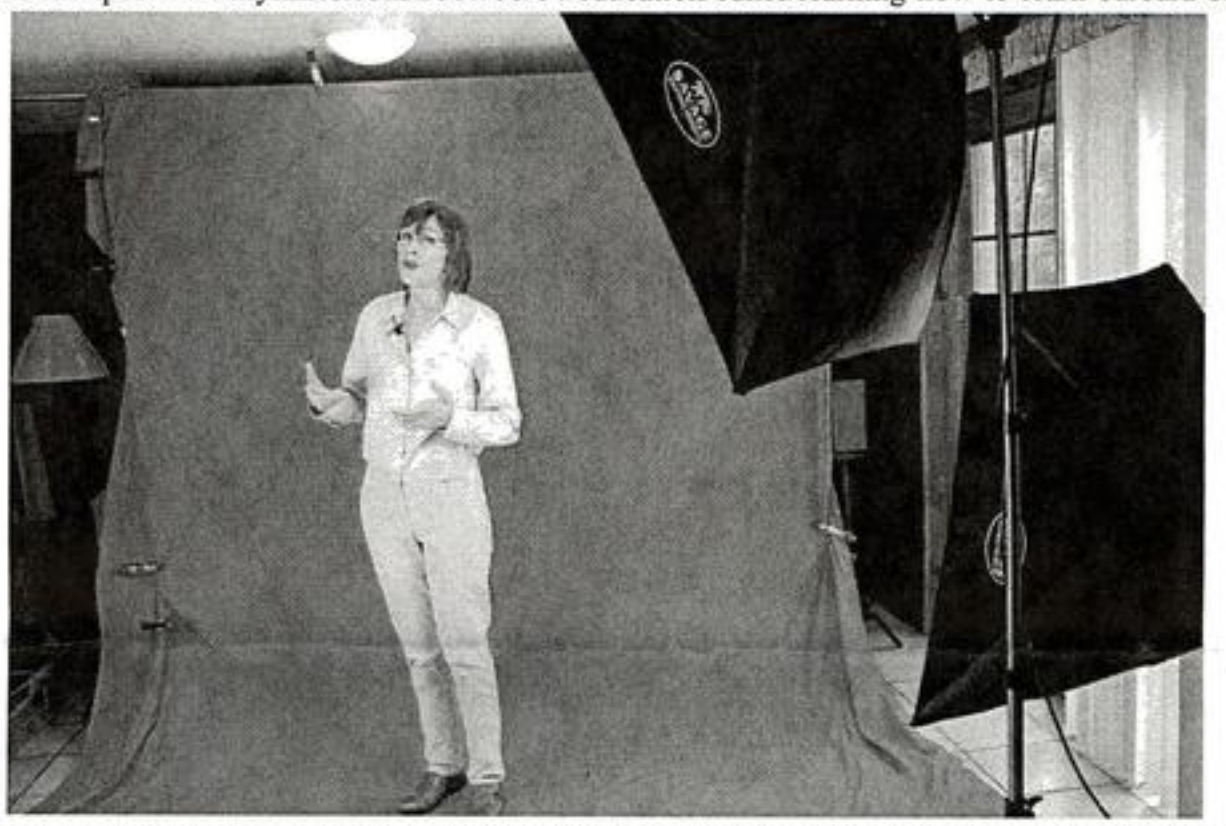
The average adult, however, has about half that number of synapses. Why? Because as we gain new experiences, some connections are strengthened while others are eliminated. This process is known as synaptic pruning. Neurons that are used frequently develop stronger connections and those that are rarely or never used eventually die. By developing new connections and pruning away weak ones, the brain is able to adapt to the changing environment.

Supplement #7

Learning to Learn: You, Too, Can Rewire Your Brain

By JOHN SCHWARTZ; AUG. 4, 2017

Retrieved from https://www.nytimes.com/2017/08/04/education/edlife/learning-how-to-learn-barbara-oakley.html



Barbara Oakley, a professor at Oakland University in Michigan, in her basement studio where she and her husband created "Learning How to Learn," the most popular course of all time on Coursera.

The studio for what is arguably the world's most successful online course is tucked into a corner of Barb and Phil Oakley's basement, a converted TV room that smells faintly of cat urine. (At the end of every video session, the Oakleys pin up the green fabric that serves as the backdrop so Fluffy doesn't ruin it.)

This is where they put together "Learning How to Learn," taken by more than 1.8 million students from 200 countries, the most ever on Coursera. The course provides practical advice on tackling daunting subjects and on beating procrastination, and the lessons engagingly blend neuroscience and common sense.

Dr. Oakley, an engineering professor at Oakland University in Rochester, Mich., created the class with Terrence Sejnowski, a neuroscientist at the Salk Institute for Biological Studies, and with the University of California, San Diego.

Prestigious universities have spent millions and employ hundreds of professionally trained videographers, editors and producers to create their massive open online courses, known as MOOCs. The Oakleys put together their studio with equipment that cost $5,000. They figured out what to buy by Googling "how to set up a green screen studio" and "how to set up studio lighting." Mr. Oakley runs the camera and teleprompter. She does most of the editing. The course is free ($49 for a certificate of completion — Coursera won't divulge how many finish).

"It's actually not rocket science," said Dr. Oakley — but she's careful where she says that these days. When she spoke at Harvard in 2015, she said, "the hackles went up"; she crossed her arms sternly by way of grim illustration.

This is home-brew, not Harvard. And it has worked. Spectacularly. The Oakleys never could have predicted their success. Many of the early sessions had to be trashed. "I looked like a deer in the headlights," Dr. Oakley said. She would flub her lines and moan, "I just can't do this." Her husband would say, "Come on. We're going to have lunch, and we're going to come right back to this." But he confessed to having had doubts, too. "We were in the basement, worrying, 'Is anybody even going to look at this?'"

Dr. Oakley is not the only person teaching students how to use tools drawn from neuroscience to enhance learning. But her popularity is a testament to her skill at presenting the material, and also to the course's message of hope. Many of her online students are 25 to 44 years old, likely to be facing career changes in an unforgiving economy and seeking better ways to climb new learning curves.

Dr. Oakley's lessons are rich in metaphor, which she knows helps get complex ideas across. The practice is rooted in the theory of neural reuse, which states that metaphors use the same neural circuits in the brain as the underlying concept does, so the metaphor brings difficult concepts "more rapidly on board," as she puts it.
She illustrates her concepts with goofy animations: There are surfing zombies, metabolic vampires and an "octopus of attention." Hammy editing tricks may have Dr. Oakley moving out of the frame to the right and popping up on the left, or cringing away from an animated, disembodied head that she has put on the screen to discuss a property of the brain.

Sitting in the Oakleys' comfortable living room, with its solid Mission furniture and mementos of their world travels, Dr. Oakley said she believes that just about anyone can train himself to learn. "Students may look at math, for example, and say, 'I can't figure this out — it must mean I'm really stupid!' They don't know how their brain works."

Her own feelings of inadequacy give her empathy for students who feel hopeless. "I know the hiccups and the troubles people have when they're trying to learn something." After all, she was her own lab rat. "I rewired my brain," she said, "and it wasn't easy."

As a youngster, she was not a diligent student. "I flunked my way through elementary, middle school and high school math and science," she said. She joined the Army out of high school to help pay for college and received extensive training in Russian at the Defense Language Institute. Once out, she realized she would have a better career path with a technical degree (specifically, electrical engineering), and set out to tackle math and science, training herself to grind through technical subjects with many of the techniques of practice and repetition that she had used to let Russian vocabulary and declension soak in.

Along the way, she met Philip Oakley — in, of all places, Antarctica. It was 1983, and she was working as a radio operator at the Amundsen-Scott South Pole Station. (She has also worked as a translator on a Russian trawler. She's been around.) Mr. Oakley managed the garage at the station, keeping machinery working under some of the planet's most punishing conditions.

She had noticed him largely because, unlike so many men at the lonely pole, he hadn't made any moves on her. "You can be ugly as a toad out there and you are the most popular girl," she said. She found him "comfortably confident." After he left a party without even saying hello, she told a friend she'd like to get to know him better. The next day, he was waiting for her at breakfast with a big smile on his face. Three weeks later, on New Year's Eve, he walked her over to the true South Pole and proposed at the stroke of midnight. A few weeks after that, they were "off the ice" in New Zealand and got married.

Dr. Oakley recounts her journey in both of her best-selling books: "A Mind for Numbers: How to Excel at Math and Science (Even if You Flunked Algebra)" and, out this past spring, "Mindshift: Break Through Obstacles to Learning and Discover Your Hidden Potential." The new book is about learning new skills, with a focus on career switchers. And yes, she has a MOOC for that, too.

Dr. Oakley is already planning her next book, another guide to learning how to learn but aimed at 10- to 13-year-olds. She wants to tell them, "Even if you are not a superstar learner, here's how to see the great aspects of what you do have." She would like to see learning clubs in school to help young people develop the skills they need. "We have chess clubs, we have art clubs," she said. "We don't have learning clubs. I just think that teaching kids how to learn is one of the greatest things we can possibly do."

Four Techniques to Help You Learn

1. FOCUS/DON'T: The brain has two modes of thinking that Dr. Oakley simplifies as "focused," in which learners concentrate on the material, and "diffuse," a neural resting state in which consolidation occurs — that is, the new information can settle into the brain. (Cognitive scientists talk about task-positive networks and default-mode networks, respectively, in describing the two states.) In diffuse mode, connections between bits of information, and unexpected insights, can occur. That's why it's helpful to take a brief break after a burst of focused work.

2. TAKE A BREAK: To accomplish those periods of focused and diffuse-mode thinking, Dr. Oakley recommends what is known as the Pomodoro Technique, developed by one Francesco Cirillo. Set a kitchen timer for a 25-minute stretch of focused work, followed by a brief reward, which includes a break for diffuse reflection. ("Pomodoro" is Italian for tomato — some timers look like tomatoes.) The reward — listening to a song, taking a walk, anything to enter a relaxed state — takes your mind off the task at hand. Precisely because you're not thinking about the task, the brain can subconsciously consolidate the new knowledge. Dr. Oakley compares this process to "a librarian filing books away on shelves for later retrieval."

As a bonus, the ritual of setting the timer can also help overcome procrastination. Dr. Oakley teaches that even thinking *about doing things* we dislike activates the pain centers of the brain. The Pomodoro Technique, she said, "helps the mind slip into focus and begin work without thinking about the work."

"Virtually anyone can focus for 25 minutes, and the more you practice, the easier it gets."

3. PRACTICE: "Chunking" is the process of creating a neural pattern that can be reactivated when needed. It might be an equation or a phrase in French or a guitar chord. Research shows that having a mental library of well-practiced neural chunks is necessary for developing expertise.

Practice brings procedural fluency, says Dr. Oakley, who compares the process to backing up a car. "When you first are learning to back up, your working memory is overwhelmed with input." In time, "you don't even need to think more than 'Hey, back up,' " and the mind is free to think about other things.

Chunks build on chunks, and, she says, the neural network built upon that knowledge grows bigger. "You remember longer bits of music, for example, or more complex phrases in French." Mastering low-level math concepts allows tackling more complex mental acrobatics. "You can easily bring them to mind even while your active focus is grappling with newer, more difficult information."

4. KNOW THYSELF: Dr. Oakley urges her students to understand that people learn in different ways. Those who have "racecar brains" snap up information; those with "hiker brains" take longer to assimilate information but, like a hiker, perceive more details along the way. Recognizing the advantages and disadvantages, she says, is the first step in learning how to approach unfamiliar material.