Course : Techniques du travail universitaire (Study Skills)
Level : 1st year Licence
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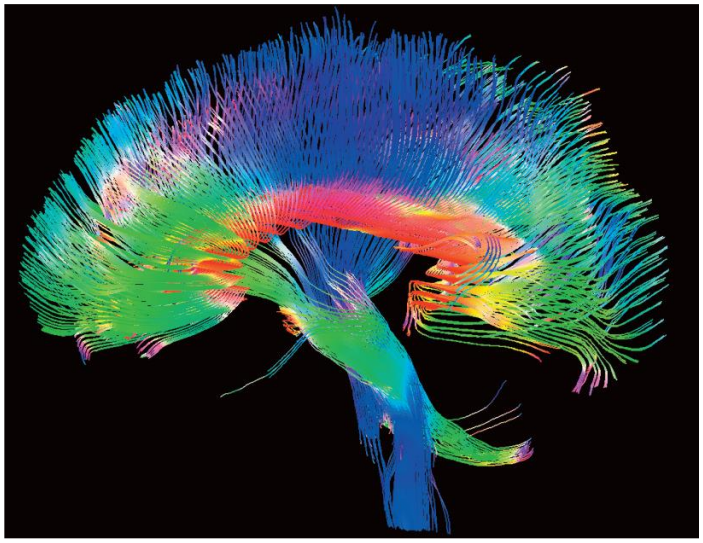
Mind Development

How Your Brain Really Works

Studying is about making memories, but memories are not made in a straightforward manner. We do not "place" information in one spot—like placing an item on acloset shelf, returning later to pick it up, dust it off, and then use it to answer aquestion on a test. Instead, we make memories when our brain's networks of connection are activated in patterns. Basically, here's what science tells us: Mental exercisecreates and strengthens networks of connections in your brain similar to theway lifting weights strengthens your muscles. The more you "work"the information (for example, by explaining a concept in your own words), themore neural connections are made or strengthened and the stronger your memorybecomes. As a result, you remember more when it's time to take a test. But here's a surprising fact: Memories—including those formed while you study—are deeply personal, customized to fit your brain and nobody else's in exactly the same way. Why? Because learning is not like painting on a blank canvas.Rather, you start with a backdrop of networks that represent your current knowledge,preferences, and habits.

Simply put, you are your connections. You make long-lasting memories by weaving the new information into your unique brain cell connections. No two people will do this in exactly the same way. Likewise, there is no magic formula for studying well. With this in mind, start experimenting with the techniques described in thischapter to find out what works best for your brain. But please don't worry: You don't have to become an expert in neuroscience to learn how best to exercise your brain cell networks. Take a look at Figure 1, and then learn the basics of brain change and how to apply that information to your everyday life as a student.

FIGURE 1 TheConnectome
This imageis a model created to represent the incredibly complex and unique networks of connections among brain cells. Nobody's connections are exactly the same as yours. Shown in (a) is a model of neuronal connections across different regions of the brain as a whole.



Getting Things into Your Head: Brain-Change Fundamentals

When you study, you start by bringing new information into your brain, a processreferred to as encoding. Basically, when you pay attention to information, you encode it. Reading, listening to lectures, taking notes, and reviewing notes are allforms of encoding. But not all forms of encoding are equally helpful. Commonstudy strategies—like rereading the text or notes, or trying to memorize definitionsword for word—are rote methods that involve shallow processing, which results invery limited brain change. This kind of encoding produces only the weakest of neuralconnections, without generating enough raw material from which to later constructan accurate memory.

To study better, move beyond shallow encoding to process information at adeeper level. For example, relate the new information you are trying to learn tosomething that is already familiar to you. Let's say you need to learn the definitionof the term *homeostasis* ("the maintenance of a steady internal state in the body").That may seem very abstract until you think about your actual experiences withhomeostasis—say, a time when you have felt hot and sweaty. That's your body tryingto cool itself off, and that's a homeostatic experience. Ever felt dehydrated? That'syour body signaling that more liquid is needed. Thinking in this way, you will findthat homeostasis now seems far more familiar because you've connected it toknowledge and experiences that are already represented in your networks of braincells. Even the simple act of putting things into your own words triggers deeper processingbecause you are converting the material into words that are more familiar toyou.

Quality studying also requires practice in getting the learned information outagain, a process referred to as *retrieval*. As a student, when I tried to remember theexact words of a definition, I was practicing retrieval—but only in a very shallowform. It is much better exercise for the brain when studying involves deeper methodsof retrieval, like restating definitions in your own words (without peeking atyour notes first!) or trying to explain the material to someone else.

Exercise Your Brain by Reading Before Class

Reading before class is one of the most overlooked ways to boost your learning in acollege course. Think of how a warm-up prepares the body for a workout. Reading the material before class serves a similar function. If you first process this new informationand get the neural networks primed, the result will be a much more productivetime in class. Why? You will have an easier time figuring out which informationis most important. What you hear in class will more easily connect with the networksin your brain because of the mental warm-up. So make the most of yourreading by following these tips:

Invite Desirable Difficulties

Get a good workout while you read: If you feel your eyes skimming across the page,or if you reach the bottom and don't remember much (if anything) of what you just read, then you are barely processing the information at all. It happens to the best ofus. The important thing is to catch yourself, shake the cobwebs out of your head,and start again with the goal of staying more engaged. Awareness is a step in theright direction. See Table 2 on the next page for specific tips on how to keep yourbrain active while reading.

Space It Out

If you have a 50-page chapter to read for Monday's class, break it down into smaller chunks (perhaps 15- to 20-page sections), and spread your reading out across a couple of days. Here's another reason to space things out: If you are zippingthrough a 50-page chapter in one sitting, I doubt that you are engaging desirabledifficulties! Pace yourself. Course materials are often organized into sections withheaders. Read one or two sections in one sitting, but no more than that. Remember,your brain needs breaks in order for memories to consolidate. Also, this will helpyou manage your attention better and help reading become more enjoyable.

Self-Test While You Read

As you read, think of questions you could ask yourself to test your learning. Write them down somewhere. When you reach the end of the section, use these questionsas a self-test quiz. How much did you remember? Take note of the information thatyou left out, and go back to review that material

Work the Information in Different Ways

First and foremost, make sure you are focused on the meaning of the words, not memorizing the author's words, which triggers only shallow encoding. How can you do this? Take notes while you read, but don't just copy from a book or screen. Instead, putthings into your own words. Consider how this new information fits in with youruniquely wired brain. How does it link to your experiences? Does an image come tomind? If so, draw it. Does a silly thought occur to you? For example, I remember readingabout the hippocampus, a brain structure involved with memory, and I immediately thought: "Hippos are similar to elephants, and elephants supposedly have good memories."It stuck. It worked for me, but it might not work for you. Remember, you are yourconnections, so make what you read stick in a way that makes sense to you!

Train Your Brain for Exams and Other Assessments

Students often ask me how best to prepare for exams. It's a great question, but the problem is that most ask it less than a week before the exam. When should you start preparingfor the exam? Today! But that doesn't mean you have to spend hours studying today.A little goes a long way, especially when you revisit the material several times a week. It'slike going to the gym a few times a week instead of spending 10 hours there on Saturdayto make up for a week of sloth. Here are some suggestions for how to proceed.

More Mind Development Strategies:

- Keep Things Challenging
- Space Out Your Study Sessions
- Test Yourself, Early and Often