**How to Succeed at devCodeCamp**

The Science of Optimal Learning

**Why is devCodeCamp’s approach to learning the best for students?**

* devCodeCamp uses scientifically proven teaching methods.
* Learner-Centered Teaching (LCT).
* Ex: Doctors go to school for many years, but the later years (and the years where they learn the most) are when they are Interns and Med Students practicing on the job!"
* Lecture is a component, but students do heavy lifting.
* Different than more passive methods from k-12.
* Methodology based on science and evidence of the success of hundreds of graduates.

**How much do I need to practice a skill before I learn it?**

* When exposed to new learning, a new connection forms in the brain between neurons.
* With each repetition, that pathway is reinforced; it literally gets stronger.
* Each repetition makes it easier and easier until it is second nature.
* Brain cannot form these new neural pathways without repetition.

**If I’m good at multi-tasking, why shouldn’t I use my phone or have unrelated videos in my screen while I work?**

* There are fundamental misconceptions about multitasking.
* “Task shifting” is a better term for what happens when someone tries to multi-task.
* People don’t get better at doing multiple tasks at once..
* “Research demonstrates that individuals who shift tasks make 50% more errors and spend 50% more time on both tasks” (Doyle 79).
* Brain does best with full focus on one task (we emphasize “tunnel vision”).
* Even listening to music while working can be detrimental to focus (with some exceptions).
* However, using our videos as you code along is still an optimal way to learn!

**How do I know if I have the type of brain that can understand code?**

* Some people seem to be “math people” or “English people”, but this is oversimplified
* Prior knowledge shapes our ability to grasp new ideas.
* If we have no prior knowledge, or have not been in related field, we need to build our knowledge.
* Past experiences may have confirmed an idea that you were “not good at something” but it may have been due to a lack of prior knowledge.
* Stereotype Threat (internalizing bias based on race, gender, etc. that effects performance).

**Why is it so important to have a mindset for learning?**

**FIXED MINDSET**

* Inner dialog: I’m just not good at this way of thinking,” or, “This isn’t something I’ll get.”
* Starts to form in adolescence. We may feel we are not a “math” person, for example.
* People with these mindsets are less likely to believe effort will pay off.
* Believe intelligence is mostly fixed at birth, effort is not worth it.
* Think mistakes prove that they are incapable. Avoiding trying is preferable to making mistakes.

**Growth Mindset**

* “I will learn it if I keep working” and “Mistakes are part of the learning process.”
* Realize learning is based on practice and effort, not inborn traits.
* People with growth mindsets learn more.
* You *can* change your mindset with effort.
* Positive self-talk: “I will get this.” “I just need more practice.” “I’m capable.”

**We move so fast in the course, how do I know if I’m getting enough practice on each skill?**

* Each skill is reinforced through multiple practices.
* devCodeCamp uses spiraling curriculum:
  + First repetition
  + Next project builds on skills, but continues to reinforce earlier skills.
  + Projects build and fundamental skills are continually practiced.
* Transference
  + The real learning takes place in transferring what you learned in lectures, and applying it to your code.

**If I’m a visual learner, won’t watching videos help me more than anything else?**

* The idea of being a “visual” OR “auditory learner” is bit of a misnomer.
* People learn best through a multi-sensory approach (visual, auditory, kinesthetic).
* Watching *only* videos may be more helpful than *only* reading, but a learner needs to engage with curriculum by *doing* as well.

**What if I get anxious and feel “stuck” in the course?**

* Anxiety can inhibit learning.
* Take “breaks” as needed. Healthy diet, hydration, and exercise can help in general.
* Practicing a growth mindset and positive self-talk.
* Reach out to instructors with concern or questions.
* Be aware when you are using avoidance behaviors instead of tackling problem.
* Review problem solving lecture to use a methodical approach to get “unstuck.”
* Try a rubber ducky (talk out the problem to someone, even if it’s just a friendly rubber duck).

**What else can I do to optimize my learning?**

* Get enough sleep at night (sleep is an important component in memory and learning).
* Feed your brain and stay hydrated.
* Take notes, especially handwritten ones (Translate concepts from lectures into your own words, Summarize key points, Create visuals for yourself.
* Consistently review materials we give you to help make the transfer to long term memory.
* Develop [GRIT](http://americanradioworks.publicradio.org/features/tomorrows-college/grit/angela-duckworth-grit.html): the theory that perseverance is the most important determinant of success.
* Take advantage of all the resources provided by devCodeCamp.
* Make a conscious effort to develop a growth mindset.

**Some of the material in the course seems too hard for my level of experience, why do we get tasks that are so hard?**

* Vygotsky’s “Zone of Proximal Development”
* Tasks are not made too hard to accomplish, but they may require assistance, research, and use of resources.
* You can do it with effort.

**For Additional Reading**

Aleman, C. (n.d.). The Biggest Benefits of Effective Note-taking. Retrieved from <https://www.linkedin.com/pulse/20140907101944-51876784-the-biggest-benefits-of-effective-note-taking/>

*A review of some of the ways taking notes can engage the brain with learning new information.*

Barratt, B. (2019, January 22). How To Get Out Of The Bad Habit Of Multitasking. Retrieved April 15, 2019, from <https://www.forbes.com/sites/biancabarratt/2019/01/22/how-to-get-out-of-the-bad-habit-of-multitasking/#4b62db716522>

*A look at why multi-tasking is really just shifting attention and ways to avoid shifting attention in the workplace.*

Decades of Scientific Research that Started a Growth Mindset Revolution. (n.d.). Retrieved from <https://www.mindsetworks.com/science/>

*An overview of the science behind Growth Mindset, with links to additional resources.*

Gretchen Schmelzer. (2015, January 12). Understanding Learning and Memory: The Neuroscience of Repetition. Retrieved from <http://gretchenschmelzer.com/blog-1/2015/1/11/understanding-learning-and-memory-the-neuroscience-of-repetition>

*Explains how the brain learns something new over time, and the strategies that aid in retention.*

Doyle, T. (2013). The new science of learning: How to learn in harmony with your brain. Sterling, VA: Stylus.

*Overview of all concepts mentioned above. Comprehensive explanations of learning and the brain.*

Hanford, E. (n.d.). Angela Duckworth and the Research on 'Grit'. Retrieved from

<http://americanradioworks.publicradio.org/features/tomorrows-college/grit/angela-duckworth-grit.html>

*An explanation of grit as well as a recorded podcast on the topic.*

Janet, T. (2016, January 20). What is passive learning? (and how to avoid it) – Educational & Classroom Technologies. Retrieved from <https://mcgrawect.princeton.edu/what-is-passive-learning-and-how-to-avoid/>

*An explanation of passive learning and how to avoid it to become an active learner.*

Klass, P. (2017, May 15). No Such Thing as a Math Person. Retrieved April 15, 2019, from <https://www.nytimes.com/2017/05/15/well/family/trying-to-add-up-girls-and-math.html>

*A look at the idea that people are "math people" or "not math people" and why that belief can be damaging.*

Napier, N. K., Ph.D. (2015, May 12). The Myth of Multitasking. Retrieved April 15, 2019, from <https://www.psychologytoday.com/us/blog/creativity-without-borders/201405/the-myth-multitasking>

*Debunks the idea of multitasking, with concrete examples.*

Scaffolds and spirals. (n.d.). Retrieved from <http://www.steve-wheeler.co.uk/2016/06/scaffolds-and-spirals.html>

*Explanation of the learning theories related to scaffolding, spiraling, and Zone of Proximal Development.*

Steele, A. (2017, September 30). Stereotype Threat (Steele, Aronson). Retrieved from <https://www.learning-theories.com/stereotype-threat-steele-aronson.html>

*The theory behind how stereotypes about a person’s gender, race, or background can influence performance.*

Varrata, K. (2017, April 14). Teacher-Centered Versus Learner-Centered Learning. Retrieved April 15, 2019, from <https://knowledgeworks.org/resources/learner-centered-learning/>

*An overview of the main differences between the more traditional "teacher-centered approach" compared to the "learner-centered" approach to teaching.*