

Day 28 - Proceduralization

Welcome to the how to learn anything course from Play-Doh university, where you're going to learn the science-based tools of pro learners to accelerate your learning. Remember more and master any hard skills. These are the secret techniques. They didn't tell you in school.

If you're passionate about changing your life with learning, join us, at plato.university to get exclusive content with every lesson. I'm your learning guide, Brandon Stover and let's get started.

All right. Welcome to our first technique in the execution phase, where we're really going to master the things that we're learning. And this is going to be technique number 14 in our toolbox of different techniques to be, become a better learner.

And this technique today is proceduralization now as mentioned before the process of becoming an expert of. Or a master requires converting a lot of declarative knowledge into automatic unconscious procedural knowledge.

Now, as we already know, when you learn something you're depositing sets of neuro links into long-term memory.

However, there are two completely different ways that you could be depositing. Those links one way is to use the relatively quick to learn declarative learning system. And this is closely integrating with working memory. So you're mostly conscious of what you're doing.

And so far, most of the memory techniques that we've learned thus far involves declarative. But there is a second equally important learning system. And this is the procedural system.

when you deposit sets of links through the procedural system, those links go into different place in long-term memory, then where you deposit the links that are de declare.

So most of the time in your learning, you learn something using the declarative system and then build on it by using the procedural system to have a much richer and deeper set of links on whatever.

So turning something from declarative, learning to procedural learning is often going through a set of procedures, just like it sounds in order for the. Things to become automatic. You don't have to think about it when you're recalling the steps of something that you've learned.

See, procedural knowledge such as the ever remembered how to ride a bicycle are much less susceptible to being forgotten. That knowledge that requires explicit recall to retrieve.

Now an example of this is when you're first learning, how to type. Oftentimes you have to use declarative knowledge in order to remember where the different letters are on the keyboard. But as, as you start typing, he began to. Learn these things within your motor skills and it becomes second nature.

It becomes a procedure of clicking that letter. Whenever you need to use it on the screen.

Now we talked a little bit about the science of why this work, but let's elaborate on this.

For many decades, researchers thought procedural learning, only involved motor skills like that, of surname serving a tennis ball, riding a bike, playing the piano or learning to type. As I just gave him the previous example, then researchers realized that the procedural system was also involved in habits.

Like putting on your pants before you put on your shirt.

But now researchers are discovering that procedural and declarative systems work together in most kinds of learning, including writing language, math, music, and everything in between. But unlike. Declarative learning. You're largely not aware of when you're learning through or using the procedural system, that's kind of a black box.

You can't really see what's going on inside. And the procedural system can receive input from your working memory or input from your different senses, but you were unaware of how the black box of the procedural system does its learning. All you know is whether you're actually performing the habit or going through the procedure. But despite this black box behavior, the procedural system is extremely sophisticated. It can help you learn simple and complex patterns without consciously thinking about them.

And these well-developed links in your procedural system allow you to be lightning quick, even in stressful situations.

So the way this works with. The relationship to declarative knowledge is declarative knowledge often needs to know each step and learn it individually. As you begin to learn something like play the guitar, you're going to focus intently on each step that you're learning, but then these steps become a pattern in your brain.

Only needs to remember the first cue of that pattern in order to pull it out of long-term memory. And this is what we're doing When we are proceduralizing something. taking a set of steps or a set of links and being able to perform those links without thinking them all or remembering that first cue in order to pull out those links or those steps out of long-term memory.

Procedural memories are typically accessed by the appropriate trigger conditions. You access your knowledge of how to drive when you were behind the wheel of a car, you use the rules of grammar. When you're speaking the language in contrast, accessing declarative memories is more complicated.

Now, what are the results for you? If you started turning some of your learning into procedures, will you start to develop habits and intuition to perform tasks, effortlessly and quickly.

creating well-developed links in your procedural system allows you to be lightning quick, even in stressful situations.

To these links, not only involved such motor skills as serving a tennis ball, but also the ability to quickly see relationships between things such as seven and five is the sum the 12, without having to think about them or that a certain type of calculus problem requires taking a derivative. Or maybe when you face a native speaker of the language you're studying, procedural links are also what enable you to speak comfortably and fluently

instead of finding yourself, searching for words together, the speed and smooth confidence of the procedural system, coupled with the flexibility of the declarative system can really accelerate your learning.

now, how do we apply? Proceduralization at Play-Doh university? Well, some portions of a skill you are learning. We have, you practiced several times because it is the core of that. For example in our how to start a podcast course,

we have you practice recording an episode several times because that's at the core of being a podcaster.

By doing this, we're allowing you to build a habit inside of this skill and go through a set of steps that become a procedure for you to easily remember, without actually having to think about it every single time you sit down to record an episode.

General now let's discuss how you can start applying this into some of the skills that you're learning. First, you're going to sit down and learn something through declarative knowledge. You're going to focus intently on the things you're learning, moving those things from working memory to long-term memory.

And as you do this, you're going to start recognizing patterns and repeatable steps within a skill. And engage in deliberate practice until those become an automatic habit for you.

And this is why we focus so much intently on deliberate practice in the last section, because this is what's going to help you take some of the knowledge that you've learned declaratively and turn it into procedures that you can put into procedural long-term memory.

Now this isn't always perfect. When you go through this process, most skills we learn are incompletely proceduralized. We may be able to do some of them automatically, but other parts require us to actively search.

For instance, he might be able to easily move variables from one side of an equation to the other in algebra, without thinking. But you may have to think a bit more when exponents or trigonometry is involved.

Now, some skills cannot be completely automated and will always require some conscious thought.

But this will create an interesting mix of knowledge with some things retained, quite stably over long periods of time and other susceptible to being forgotten. One strategy for applying this concept might be to ensure that a certain amount of knowledge is completely proceduralized before practice can include.

Another approach might be to spend extra effort to proceduralize some skills which will serve as cues or access points for other parts of your knowledge. You may aim to completely proceduralize the process you start working on a new

programming project, for example, so that you can get over that hump of the process of writing a new.

Now let's look at a few examples of a way you can apply these steps to more conceptual skills, such as doing math or learning a language. As opposed to some of the other skills that use motor movements, which are much easier to conceptualize how you would proceduralize those skills, for example, learning the steps to ride a bicycle or drive a car.

Let's say that we're learning math or science and trying to proceduralize some of the information that we've learned in math and science. It's relatively straightforward to learn math declaratively, you just follow the step-by-step procedure.

You've been taught to solve the problem, and you're done

this straightforward approach. Does little to help build links in the long-term memory through the procedural. A much better approach is Dick internalize key exemplar problems. This helps you develop an intuitive, fast procedural system. To internalize a problem, you should pick a problem where the complete work solution is available.

Then begin working out the problem, trying to listen to your intuition and the procedural cues that often come up as you're trying to solve that problem.

Once you've solved the problem, then go ahead and check the actual answer and the procedure that they went through to see if you got the problem.

That's okay. If you need to take peaks during, along the way as you're solving this problem, but make sure that you're doing each step by taking a cue from your intuition first.

Now once you've internalized allies in the process of solving this problem and doing several other problems that share resemblances or differences from this problem, your brain begins to develop an intuition for how to solve these kinds of problems. And that's when you're beginning to, proceduralize a concept like solving questions in math.

In other words as your brain internalizes, seemingly simple but important procedures, like get rid of the parentheses and group that X variables on one side and numbers on the other, you begin to develop a deeper sense of the patterns involved in this and related types of problems.

This means to develop your problem, solving intuition, you should internalize different types of problems each over several days until you know how to do each step when solving a problem. And the solutions come very.

Now let's talk about if you're learning a foreign language.

Oftentimes you start to use the declarative system to easily learn new vocabulary words, and quickly learn the patterns for verb conjugation or. now declarations. The problem is, is when you find yourself in front of a native speaker, you often struggle, and this can happen because you have to put the links of learning in your slower to retrieve from declarative memory.

You haven't yet deposited those sets of links into your procedural system. And it's the procedural links that give you easy, natural fluency in a language. So the more that you're able to develop your procedural links when learning a language, the more fluent your language, language skills become.

So in order to really set learning language into the procedural, You need to use things like retrieval, practice, spaced, repetition, and interleaving skills that we all learned from before in order to move that language from our declarative knowledge into our procedural.

You can even use this to improve things like your writing or artistic skills. We're going to share an example. When we go over the technique of experimentation where Benjamin Franklin learned to become a better.

But to give a little preview here, we're going to see how his process of becoming a better writer. first, started with practicing declaratively and breaking things down and putting it into his declarative knowledge. However, eventually it became a mix where some of it became procedural law.

And what Benjamin Franklin did to become a better writer was look for people's writing that he admired and tried to figure out the process of their writing and create it in his own style. Again, we'll go over this more in experimentation, but the use of the Franklin approach requires you to find writing.

You had. Take a paragraph and jaw a word or two down to remind yourself of the key ideas of each sentence. As you go through that, person's writing, then use those keywords as hints to see if you can recreate that sentence, check your sentence against the original and see which one is better. Does the original have better vocabulary, better pros?

If it does. You just learned how you can improve. Now notice in this example, you're not just memorizing other people's writing. You're actively beginning to build your own sets of links about how to write well, eventually using this technique, you can discover ways you can write better than the originals you're learning from

by doing this. And you're starting to pre create procedures for yourself for writing, using the styles of other people that you're learning.

So those are a few examples of different ways that you can start to proceed, realize skills. Remember, you're learning something through declarative knowledge, focusing intently on it, working with those skills and then recognizing patterns and repeatable steps within a skill and engaging in deliberate practice with it until they become automatic.

They become procedural.

So to practice this technique, Maybe you could create a system or a habit or procedure for you to do, to take every time you're going to start up learning.

Think of it like a startup sequence on your computer. Each thing firing to get you the mode for learning,

or maybe take another skill that you're learning and see which steps are within that skill that you can start to put into procedure. And when you do this, make a very rich Q in the beginning of this procedure of steps, so that all you need to really remember is that first cue and it will cue all the other steps to come out effortlessly.

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