

In the Classroom 89

13 Techniques for Activating Prior Knowledge in the Classroom

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Stan Skrabut: Well, thanks ever so much for taking time to listen to this podcast. It certainly means a lot. I know you could be doing other things, but the fact that you're still hanging out with me, I really appreciate it. I have been reading a lot of different books recently, talking about the brain, and how the brain learns. One of them happens to be brain rules by John Medina and a fascinating look at how the brain works.

Medina talks about sensory memory, short term, or working memory, and long-term memory. If we want our students to remember what we are teaching them, we have to apply the rules that the brain sets forth. The brain has a certain way of encoding information, and moving it into long-term memory, and we have to learn how to get that information from long-term memory back into short-term memory to work with it.

One way of doing that is to strengthen connections that are already there. If there's already a memory, then by latching onto it and strengthening that connection, stands a greater chance that we're going to get that information back out when we want it to. This is tied to the idea of activating prior learning or background knowledge. Let's talk a little bit more about that concept.

Prior knowledge, what we have discovered, it's a lot harder to remember new things. If we can latch onto something that we already know, if we have an experience, it's a lot easier to remember but if it's brand new we struggle, until we can start building upon that knowledge. Experts in a discipline are able to pull on new concepts related to that discipline because of their prior knowledge. They're able to see patterns, they can see them quicker. They can look at it from different perspectives, simply because they have that prior knowledge to work on.

Novices on the other hand, struggle with new knowledge because they don't have that prior experience or do not recognize how it connects to previous knowledge that they may have or previous experiences. So, for example, when I teach faculty how to use a new piece of software, I use a strategy called miss M-I-S-S. Basically, I walk through, and it all ties to the menu system of a new piece of software, because what I do is I start working through the menu system, and I show a new faculty member what's in the menu.

They already know some of those concepts, like how to do cut and paste. Well, cut and paste for video is certainly different than cut and paste for a text document but the overall concept is the same. That you can cut information out from one place and

paste it into another place. That reduces the amount of information or the amount of new knowledge they actually have to pick up.

All they have to do is pick up that new piece, attach it to things they already know, such as, oh, we're doing this different for video than text, but the concept is the same, and they can latch onto that. Moving from Microsoft word to Google Docs, for example, first thing I do is show them all the similarities, and they're fascinated with how much they already know.

Now, I start building on what they already know, and show them the things that make it different, but they have some concepts, they have some prior knowledge that they are working from. When we're talking about prior knowledge, we're really talking about this idea of constructivism, which means that we make connections between old knowledge and new knowledge, and knowledge is built on experiences.

It can be experiences that are gained by reading, it can be experiences gained by dialogue or the fact that they actually have to do something, but we build on these experiences. This idea of prior knowledge and experiences is also really central to this concept of andragogy, which is the teaching of adults. Adults want their previous experiences to be recognized, and they value those previous experiences. So weaving those into instruction is really important if you want students to grow.

If you discount, for adult learners, their previous experiences, you're going to have a hard time teaching them new things. You have to tap into them. Another benefit of prior knowledge is when you're activating this prior knowledge, it also helps instructors identify a baseline of knowledge, in which they can then adjust their instruction to that particular class or those individuals.

What I would like to do is talk to you about 13 different techniques for activating prior learning. Most of the activities I'm going to share, you can have students work on them individually or collectively as groups. There's a lot of flexibility, things that you should do, and these are things that you should at least weave one or two of these things into each class, in order to help move your topic along, in order for you to help them continually gain knowledge and build upon previous knowledge.

Number one, find out what students already know. The better you know your students, the easier it is to connect new concepts to the prior experiences. If you have a classroom full of nurses, then you may approach that class certainly different than if you have a class full of welders. If you have students who have taken classes previously on a particular topic, then you have an idea of prior knowledge they have, and you can adjust your class accordingly.

A math class, for example, if you have a class full of nurses, then maybe you want to use math examples that tie into things that a nurse would typically see during their day-to-day work, and somebody who's in construction, welding, you would provide different examples.

Number two, make it a point to connect to previous lessons. When you're introducing the day's topic, take time to explain how today's topic ties into what you taught in a

previous topic. Make sure that the lessons connect, so they can continuously build upon this. Don't just bring up concepts that are very isolated from each other, that will make it more difficult. If you can kind of layer these things on top of each other, and show where the connections are, and how they tie together, you're going to have an easier time.

Number three, warm up with an activity. At the beginning of a class, start with an activity that practices concepts that you're going to be building on. You may start out by touching upon concepts that you used in the previous class or asking questions that students- you can have them work as a group and answer those particular questions, but basically, you want to get their brain warmed up for the day, and thinking about what they already know, and how this information is going to be applied.

Number four, and I talked about this before, and I have a link in the show notes to this specifically, but it's teach the vocabulary. Before you even jump off into a lesson, introduce the new vocabulary necessary to understand that lesson. Now, the new vocabulary may be missing context but you're going to fill in the context later, but introduce the terms. At least warm them up a little bit by having the terms. You can also have vocabulary pretests, and that way students are actively trying to answer questions that are related to the idea of vocabulary, but getting them familiar with the vocabulary before you jump into the lesson, will help warm them up and give their brain something to latch new knowledge to.

Number five, brainstorm on what students already know. One strategy within this is called KWL and it's an effective tool to do this. Say at the beginning of the class, you have your students pull out a blank piece of paper, and they're going to have columns K, W, and L columns. The first column, what I know. Based on the topic that you're teaching, have them outline what they already know on the topic. The next column is W, what they want to learn and have them outline some of the things that they're expected to learn, what they're hoping to learn. Finally, L is what did I learn.

This allows them to think about what they already know about a topic, and be able to outline that, and have some expectations on how they're going to link what they expect to learn into that. Once again, you can have them work as a group on this. Have them write down specific questions that they want to ask during the class that they're going to be interested in. That's a great way to have them tap into this prior knowledge.

Number six, concept maps. I talked about this in a previous episode, I'm going to link to it. Use concept maps or graphical organizers. You can create your own workbooks, give students an opportunity to map out, do a concept map on the particular topic that you're talking about, and have them fill in this information to the best of their ability. You also may pre-fill some of this information, so you can prompt them and get them to move forward on this. Concept maps are really powerful if you can stretch them all the way through a course.

So for 16 weeks that you continuously build on this concept map. You may start very simple, and then you just keep adding components to this concept map, and they

have to keep working through it. This will really help that information stick because they keep building on new pieces of knowledge to things that they already know.

Number seven, begin with a questionnaire. You can have a pretest. Now naturally, you don't want this to be a graded activity but you can have a pretest so you uncover what students already know about a topic.

It serves the instructor for identifying that baseline but it also warms the student up to the topic. Some things that they're going to know already, some things they don't know but you'll have an idea of where you need to provide attention, as you're providing your structure. When you happen to be giving an examination, you can also warm up to the exam by giving some sample problem.

Number eight, at the end of your class. At the end of the class period, have students write down what they know about the next class topic. You may introduce the next topic, have students spend a couple of minutes writing down what they already know about that topic and turn it in. It will warm the students up, they will hopefully go home, and brush up on some of those things because they certainly don't want to look foolish as they come into a class but it also provides you, as the instructor, some insight on what students already know.

Number nine, ABC brainstorming. This is similar to the KWL where you're asking what they know, what they want to know, and what they learn, but basically, you're just focusing on what they know in the ABC brainstorming. You have students pull out a piece of paper, write the alphabet A to Z and then for each letter, you have them write out a term or phrase related to the topic that begins with that letter, and have them write out as many things as they have. Once again, the whole purpose is to activate that prior knowledge. What do they already know about a particular topic? These are just quick exercises that you can use.

Number 10, prior knowledge self-assessments. This comes to me from Carnegie Mellon University. This idea of prior knowledge self-assessment can help you calibrate your course, and provide additional supports, and resources, vary your lesson plan, based on what students self-report on how knowledgeable or skillful they are on different topic. Basically, a question will come up. How confident are you at creating a map of 1865 railroads, for example. Students would say, "Have no idea." to "Let's do this. I can map these things out." Then you have a general sense of how much knowledge they have on a particular topic.

Another way of doing this is number 11, using concept tests. At the beginning of class, have students respond to a series of questions that tap prior knowledge. You can use clickers or polls, and just have five or six questions that you're just taking the pulse of students on what they know on a particular topic. Once again, if you're using polls or clickers, things to that manner, that you can have the answers reported to you, you can look at them, you can break students up into groups further discuss it, re-poll them, if you want to. It gives you an idea of how much you're going to have to dig into a topic or continue on.

I talked a little bit about this in a previous episode, when I talked about a really important strategy. If you have students read, then there's some type of self-assessment or some type of an assessment before you get into the discussion, you will alter how those discussions run because they will have prior knowledge that you can build upon.

Last week, I talked about gallery walks, and that is our number 12, conducted gallery walk. Gallery walk, you can create a gallery walk around a couple or handful of topics that you have not necessarily introduced students to, but have them go out and, collectively as individual little groups, document what they know about each of those concepts. Then, you can look at the results and proceed with your lesson from there.

Then finally, this comes from the University of Nebraska, is having just a fun activity where you are listing facts about a topic. Students can compete that you may give a prize to the student who answers the most unique answers on a topic, and basically keep score but you're looking for unique, correct answers on a topic just to add a little competitiveness in your class but also tap into that prior knowledge.

Those are 13 different ways that you can go ahead and tap into this idea of prior knowledge. Because we're online, you can take these concepts online. There's definitely tools that you can use. Google Apps, a lot of Google apps that I'm a fan of anywhere from Google Docs, to Google Sheets that you can build some of these assessments, and have students work on this collectively online. Jamboard, and that's another product that shows up in the Google apps, that in real-time, you can have students put sticky notes on these boards. A lot of fun in using these tools but also it serves a purpose of activating this prior knowledge.

Some things that you want to think about when you are doing this, some tips for success. I got this from Cornell University. They offer some suggestions for assessing prior knowledge. First of all, don't collect names if they're handing in assessments. Think of it more just as anonymous surveys or different ways of doing that, and also make sure that they know that it's not graded. You may want a grade for participation but really don't grade for any type of assessment, at least not at this level.

Technology is your friend. It will very quickly aggregate data for you, so you can see where they sit on a particular topic. Build out using an audience response system or other polling mechanisms or tools like Google Forms or surveys that you have in your learning management system, that will collect the data for you, and summarize that data, very rapidly. Then you can certainly share that with the students. Then finally, share questions with your colleagues, teaching assistants to confirm that the questions make sense. Those are some things from Cornell University.

Tapping into prior knowledge, absolutely a huge important concept, when it comes to building learning in your topic or discipline. The fact that most students come to this, they're novice learners in your discipline, you have to show them some of these expert strategies, on how to organize their information, how to tap into it so they can

build upon that knowledge. Those are the things that I have to share. Let me know what you think but before I go, here's a quick plug for my book.