

In the Classroom 43

Using Concept Maps in the Classroom

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Stan Skrabut: Welcome back. Thanks for taking the time to listen to this podcast. It certainly means a lot. This week, well, actually this past week, I hit my first milestone with this podcast. The podcast received its first 1000 downloads. I'm absolutely thrilled. Well, actually, we're now at just over 1100. I really appreciate your support in listening, but for me, hey, 1000 downloads, I'm pretty excited.

This week, we're going to explore the use of concept maps in the classroom. Concept maps is a really powerful tool for showing different concepts, ideas, topics, and the relationship between those concepts. It is a tool that you can use throughout the term and I would encourage you to do just that. What is a concept map? A concept map is a graphical organizer that visually shows the relationship between concepts.

These concepts are that you draw them out. You can do this on a whiteboard, you could do it on butcher paper, you can do it on an overhead, you can use digital devices to do this. There's all kinds of different ways that you can do this. The idea is that you start with a concept, and you'll put a circle around it. Then you'll start identifying other topics or concepts that are related to the first one.

Between them, you will create a line and also put a descriptive phrase indicating these relationships. The concepts or the circles are called nodes and those lines with the descriptive phrases are called links. You start out with a central concept, and then everything starts branching out from there. Normally, the concept starts at the top of whatever you're doing the whiteboard, the sheet of paper, and then you start branching your way down.

The use of concepts started as a way to help explain different ideas. It started back in the '1960s more formally, and it was part of the constructivism movement, the learning movement. Constructivism is a theory where the nature of learning- it focuses on how humans make meaning of their experiences. It's just how we connect ideas that each person will see the same lecture, but maybe walk away with different things because of our other previous experiences and how we are connecting them all together. Basically, you're plugging in new knowledge and attaching it or integrating it with prior knowledge.

I know concept mapping also is mind mapping. As I was getting ideas for this podcast, I come to learn that there actually are some differences and lucid charts explain the differences. For concept maps, they say, they are used to represent tacit knowledge like existing theories or concepts and ideas usually generated externally. They also tend to represent academic knowledge, so their application is more formal. They contain general knowledge near the top of the map with related concepts arranged

hierarchically below and they show topics with cross-linkings and multiple relationships. I took that from their website.

On the other hand, Mind Maps, this is a way that you can flesh out ideas which are generated internally, they tend to represent a greater variety of tasks and concepts so their application is more flexible, contain a single word phrase or image in the center of the map with related ideas radiating outward in all directions and shows topics with single parent and several children.

To me, they're really close. I think in your classroom, you're probably going to blend the two ideas as you go back and forth between what a concept map is and what a mind map is. Either way, it's a great way to visually capture how the relationships are of different concepts. Why do we want to use concept map? Part of it goes back to Universal Design for Learning and you know that I'm a fan of that. There's definitely some episodes that I'm going to ask you to check out dealing with Universal Design for Learning, specifically eight, nine and 10. Those episodes talk a lot about it. Yes, I'll put a link back in the show notes for those specific things.

This one really falls under the idea of multiple means of representation, and specifically providing options for comprehension. That's what we're trying to do, is we're trying to tie all this information back that we're presenting to students so they can comprehend it. A way that they can map this in their head and that's why it's a concept map that allows them to do it. It allows us to highlight patterns, critical features of a process or a system, any big ideas and what those relationships are.

Basically, you're aiming for higher levels of cognitive performance. The research is heading that direction because educators for medical education are using concept maps quite a bit. There's a lot of good research talking about how medical educators are using these in the classroom. It'll help their students be able to map out patient cases, apply clinical reasoning, critical thinking, problem-solving skills because they can just start sketching these things out and looking for patterns and making sure that they didn't miss anything. Concept maps are a great way to scaffold knowledge.

With that all said, how do you create a concept map? Actually, it's pretty darn simple. You start with a main idea. That's step one, start with a main idea or a topic or an issue and you basically write it on on the board or however that you're capturing this information and you put a circle around it. Below that, you're going to write next level concepts. You may want to have a parking lot off on the side where you're capturing these things. If you're doing some brainstorming, you're capturing the ideas, and then you're going to figure out where they fit in this map.

If you're doing writing, maybe non-fiction, you're capturing ideas, and then you'll slowly put them into the right places. Sometimes we get ahead of ourselves, our brain is just kicking out ideas, and you just want to capture them. Having a parking lot's a good place. Once you identify a specific idea or a concept belongs at this next level, you're going to put it down and once again, circle each one of these. Then you're going to create a line from your first-level concept to that second-level concept. You're going to indicate with a phrase across the line, what that relationship is.

For example, we talked about different divisions of our federal government. That is the first level concept. What are the divisions of our federal government? Then from there, you would write legislative branch, judicial branch and executive branch. The connectors are levels of-- These are each levels of our federal government. Then from there, you can split the legislative branch into the House of Representatives and the Senate.

From there, you may want to indicate what the membership is, how they're explained. Each one brings it down to the next level. Then you can go into the judicial branch, and then you can do in the executive branch, what their responsibilities are, how the membership is selected. All that helps map these things out.

That's the idea. You're going to just continue this, you're going to continue with steps two and three as you get down to adding all these additional levels, all these additional concepts and ideas that you want to put down. Lots of great ways of capturing this information. You can also use imagery. Color is important to make sure that you may want to identify different parts and create a separate color for them. This will help add clarity to what you're doing and help students to be able to map this out in their mind so they can reproduce it later.

A lot of benefits to using concept maps. It's a great way to just brainstorm ideas and see what the relationships are with those ideas. It's also used for clarifying ideas that you can start pulling this apart piece-by-piece and understanding what the relationships are, what elements have a relationship to the concepts above them.

In a classroom setting, you can use this to connect to previous knowledge. You may have a science course that spans for 16 weeks. Each week, you could be focusing on a different part of this concept map and just put pulling it apart and presenting it. At the end of the term, you have this very complex concept map, but it shows how all the different pieces interrelate and connect to each other.

Actually, this is one of the things that I'm planning to do for the upcoming term. I think I'm going to break out and build some concept maps for a course that I'm teaching, a multimedia learning, starting at the high level and just breaking it down. We'll see where it goes. It'll be, I think, interesting how all the different elements in multimedia learning are illustrated and how they interconnect.

If you have students create concept maps, you can also gain insight into how students organize and represent their knowledge. You'll be able to see gaps in their knowledge by examining their concept map. This is another good idea for using them. The nice thing is, is these charts as I indicated with the class that I'm going to do, can grow over time. That you can continue to build on and piece on different parts of this concept map and if you do it digitally, there are some wonderful tools that will allow you to do this and then you can focus on different parts of the concept map and kind of roll up other parts.

I use a tool called FreeMind and so FreeMind allows me to do exactly that as I can roll up and hide parts of the concept map but just indicate they're there so if we're talking about audio, we're talking about video, talking about graphics. If I'm just focused on

the graphical piece, then I can hide the video and the audio and not show that on my concept map right away and then just expand it later when it comes to that point and we can just continue to build on it.

The idea of concept maps also helps students see how information is organized and the relationship between concepts and it will help them with memory recall by also introducing this visual way of representing these concepts will help them in another way be able to recall this information later and it helps them help students identify misunderstanding- areas in their knowledge. If you ask them to be draw out a concept map, it will help identify places where they haven't increased their knowledge at that moment in time.

All right now, here are some ideas that you can use specifically in your classroom for using a concept map. First place to start, pre-assessment. Give them a blank concept map and ask them to fill it out. This may be a little challenging, but it can be a really powerful tool and that is a place to go and then you can certainly in a post assessment, have them redo the same worksheet and see how well they have improved over time.

If you're going to start out with this blank concept map, that's something that they're going to have, this is something that they can fill out also over the term as new knowledge is being added. You will take your completed or expert concept map and then basically take out the words and then throughout the term, you'll start filling in the necessary words, the concepts, the topics, the relationship as you're moving through the class.

You can, as part of your class, distribute a blank concept map and students can then fill it in during the class. Different ways is you can have the nodes can be empty, the links can be empty, the entire sheet can be empty and they can fill it in or you may want to give a portion of it and they have to fill in the other part just different ways that you may want to consider this.

It can also be used as an assessment tool that part of your exams is that you give them a partial concept mapped in, ask them to fill it in starting from a certain point and they can create the map. You may want to give them certain pieces and they have to fill in the rest. Lots of different ways that you can do this.

And with that, if you give them maybe as a homework assignment that they have to complete a concept map, you can actually have a rubric that grades that where you are awarding points based on elements that they have included, especially if you're looking for very specific things and this was recommended by the creators Novak back in the 1960s so you may want to give like one point for valid concepts, maybe five points for each level of the hierarchy that they are able to complete, one point for each of the branches, 10 points for cross linking specific examples.

Those are some of the points that they awarded. Breaking down a case study or a chapter that you can have students do this in groups or individually where they work through a case study and create a concept map for that or they have to work through a chapter and basically map out how the chapter is organized, so those are different ways that you can do that.

If you do tools-- and I'll talk about tools in a few minutes, but basically, if you have students created in the tool, then they can compare their map to an expert map at the end of the day. Actually, they could do it either way, but it doesn't- it gives them an opportunity to get it as close as possible and then they can always keep improving it. Then one final area for using it in the classroom is actually, it can be used to help develop your curricula.

You can do it for a single course where you can use a concept map to map out the things that you want students to learn and that's really kind of the focus questions. What do I want students to learn about this specific topic? You can start mapping out your key concepts and the relationships, but also you can identify major themes that you want to focus on and this will help create the different weeks or modules as you design them but it'll also allow you to design your instruction methods, the activities, the assessments, any of the content. You can attach it to these concept maps, but you can also take it out at a another level. How does this particular course fit in with the rest of the courses for a program?

If you map out the entire program, you can see where divisions need to be made. Maybe there's some things that are just one-off that you can eliminate or do we need to develop a course around them? And find out areas that are common across the curricula and identify how you can fit those in a little tighter and a little better. Basically, it'll let you know how you fit into the big picture.

Tips for success. First of all, teach students how to build the concept map, right? At the very beginning level, take time for your course to learn how to build a concept map and then start using concept map. You can use them in every single class, you can use them across the whole curriculum and I think this is a really strong way of doing that. When you're building out your concept map, you can just very simply just throw it up there and say, here's the concept map or you can start building node by node and connection by connection, link by link but also have the students participate in the creation of that concept map.

A class activity is get them out from their seats or give them some butcher paper, divide them into groups and have them work on different pieces and then having them come together and walk and talk you through building out the bigger concept map. You also want to build the concept map rather than just giving them a completed map. Have them fill the things in. Have them do this using concept maps after a lab or major activity to help crystallize that learning. Have them be able to map this all in a concept map on what they did.

The concept maps can be a great note taking tool and so this allows them to capture this knowledge and where it all fits together. The university of Waterloo center for teaching excellence has offered also a number of ideas for concept maps. One, have students regularly fill out concept maps. Can be done in groups or individually and as I said, have students build course maps over the entire term and so therefore, the concept maps have to be integrated into the course.

All right, last piece here, some tools. I'm going to put a link into the show notes but a couple tools that I have personally used, I've used MindMeister and FreeMind. Those

are two tools that I have personally used. I just downloaded CmapTools and I'm going to go check that out. I've also used XMind and then I have some others, View and Draw.io, but I also found a link that has an extensive number of these tools both free and purchase. I opt for the free ones that'll help you build out some concept maps.

I would encourage you to check them out. I think this is a really powerful tool for the classroom that you can show how the content you're providing, mapping this thing out helps solidify things that you're doing, the relationship. Sometimes we have the text, the narrative in the textbook and that just-- It can be too complicated sometimes or hard to understand and so by mapping this out, sometimes you can simplify it and that's the power of concept map.

With that, let me know how you're using these things. Let me know if you are using concept maps. Give me ideas on how you are specifically using them. I have some ideas that I have in mind that I'd like to explore and maybe I'll come back in and talk to you about them. In the meantime, here's a plug for my book.